ANTE VUJIĆ

GENUS *CHEILOSIA* MEIGEN AND RELATED GENERA (DIPTERA: SYRPHIDAE) ON THE BALKAN PENINSULA

АНТЕ ВУЈИЋ

РОД *CHEILOSIA* MEIGEN И СРОДНИ РОДОВИ (DIPTERA: SYRPHIDAE) НА БАЛКАНСКОМ ПОЛУОСТРВУ

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1. INTRODUCTION

Investigations of the fauna present a basis for many biological branches especially in case of zoogeography and phylogeny. The process of multiplication of a taxa at a different systematic levels can be investigated only by a group of organisms in which the process of speciation is easily noticeable. One of such groups characterized by diversity, adaptability and adaptive radiation is the family of hoverflies. Within the family, Holarctic and Oriental genus *Cheilosia* has the largest number of species and a great biological and zoogeographical diversity. The interaction between *Cheilosia* species and plants, the type of larval development and heterogeneity of the species in forest habitats initiated this study about the relationship between the insect group and the type of biocenosis.

Over the fourteen years period many samples of genus *Cheilosia* and related genera were collected throughout the Balkan Peninsula. This work resulted in the discovery of undescribed species, endemic taxa and species from remote biogeographical regions. The zoogeographical data helped to elucidate the potential places and way of development for these taxa. The importance of the Balkan Peninsula in the formation of the European fauna, further validated.

The study included the analysis of accessible museum material collected on the Balkan Peninsula and colaboration with Claus Claussen, Germany and Gunilla Stahls, Finland, the authors working with the Palaearctic type material, in identification of collected species.

The preparation of this manuscript in English demanded an additional effort not only by the author, but also by referees and language consultants. They all tried to maintain a consistent translation and use of original geographical names yet it is possible that some inconsistencies occurred, for which the author accepts complete responsibility.

2. GENUS *CHEILOSIA* AND RELATED GENERA

Genus *Cheilosia* belongs to the family Syrphidae, suborder Brachycera Cyclorrapha, the order Diptera and the class of Insecta. Its development takes place in the tissues of plants and mushrooms. This genus consists of a group of species with indistinct mimetic characters, that causes problems in distinguishing the black colored hoverflies from other flies. However, their peculiar shine, the habitats almost exclusively limited to forest biotopes, and their characteristic way of flying, enable differentiation of *Cheilosia* samples from similar insects in the field.

In the last two centuries, during which the study of hoverflies has been carried out, the authors have faced various taxonomic problems, especially in case of the genus *Cheilosia*. Specialization of larval development resulted in a high degree of adaptive radiation of the genus. A large number (over 400), morphological similarity (the presence of "sibling species") and the polytypic character of certain species has resulted in the presence of numerous synonyms and incorrect determinations. The genus has not been revised during this century, although a number of authors have tried to clarify the systematic status of certain groups within the genus. These attempts have resulted in the description of taxa of different levels and of unclear phylogenetic status.

Three closely related taxa, *Cheilosia, Nigrocheilosia* and *Portevinia* are reported differently in recent literature for the Palaearctic fauna: all three within the genus *Cheilosia* (Dirickx, 1994); *Portevinia* separately and the other two together as *Cheilosia* (Torp, 1994); and *Nigrocheilo*sia as a subgenus of *Cheilosia* (Barkalov & Stahls, in press).

To make the survey and analyses easier these taxa are presented here as separate genera. Additional taxonomic and systematic reasons that support this approach, besides the characters mentioned in the key, will be explained in a separate paper.

2. 1. NOMENCLATURAL AND TAXONOMICAL HISTORY

During the past 190 years the taxonomic status of genus *Cheilosia* have been the subject of many discussions, analyses and studies. The name *Cheilosia*

was used for the first time by Panzer (1809) in his description of the genus with a type species *Syrphus rosarum* Fabricius, 1787. Meigen (1822) used the name for the second time for definition of one distinct group of species, not congeneric with Panzer's type species. This caused a great number of misunderstandings and changes in genus nomenclature (for more see: Goffe, 1944; Barkalov & Kerzhner, 1991). Schiner (1860) suggested a new name for the genus reported by Panzer, *Pyrophaena* with the type species *Syrphus rosarum*. Becker (1894) made the first revision of genus *Cheilosia* in the form of a monograph under the name *Chilosia*, an unjustified emendation of *Cheilosia* Meigen. Finally, to prevent confusion, the International Commission on Zoological Nomenclature should be asked to suppress generic name *Cheilosia* Panzer and all uses of the name *Cheilosia* prior to the publication of *Cheilosia* Meigen, 1822 and to set aside all designations of type species for the nominal genus *Cheilosia* Meigen, 1822 prior that by Coquillett (1910) of *Syrphus flavipes* Panzer, 1798 (Barkalov & Kerzhner, 1991).

As this genus includes an extremely large number of species, many attempts have been made to define lower taxonomic categories within the genus, related groups of species or a simplification of its division for determination. Meigen (1838) divided the genus into two groups on the basis of presence or absence of eye hairs. Bigot (1883) suggested the separation of genus *Carthosyrphus* in the case of species with bare eyes and arista. Becker (1894) divided the genus into four groups that are still in use. Hellen (1912) mentioned 8 groups on the basis of combining morphological features.

Shannon (1922) published the revision of tribe Chilosini and defined two genera: *Cheilosia* Meigen, 1822 (eyes with hairs and antennal pits separated by chitinous bridge) and *Carthosyrphus* Bigot, 1883 (eyes bare and antennal pits connected). He separated two subgenera within the genus *Carthosyrphus*: *Hiatomyia* (with type species *Cheilosia willistoni* Snow) in the case of species with long hairy arista and subgenus *Carthosyrphus* s.str. in the case of species with bare or pubescent arista. Within the genus *Cheilosia* he suggested the separation of subgenera *Chilomyia* (with type species *C. occidentalis* Will) characterized by the presence of long hairs on face. Portevin (1927) proposed to separate the species *Cheilosia maculata* Fallen from the genus. While describing the new species for the Alps and the Carpathians, Oldenberg (1916) designated a separate subgenus *Taeniochilosia* with type species *Chilosia atriseta*.

Independently from the papers published in the meantime, Enderlein (1936) gave the names to Becker's groups: he left the old name *Carthosyrphus* for the first group (A) with the new type species *Syrphus antiquus* Meigen, 1822; for the second group (B) he suggested the name *Dasychilosia* with type species *Syrphus variabilis* Panzer, 1798; he kept the name *Cheilosia* s.str. for the third group (C) and designated *Syrphus canicularis* Panzer, 1801 as a type

species; the fourth group (D) was named *Chaetochilosia* with type species *Eristalis mutabilis* Fallen, 1817.

Goffe (1944) designated genus *Portevinia* as separate, with the type species *Eristalis maculata* Fallen, 1817.

In the analysis of genus *Cheilosia* in North America Hull & Fluke (1950) defined the following subgenera as valid: *Carthosyrphus* (eyes bare) with two groups of species (1. bare face; 2. hairy face); *Cheilosia* s.str. (face without hairs) with six group of species (the division was done on the basis of face profile and body hairs): *Chilomyia* (face hairy); *Endoiasimyia* (arista with long hairs; hairy eyes); *Hiatomyia* (arista with long hairs; eyes bare); *Taeniochilosia* (arista with long, dense hairs).

In his discussion of phylogenetic relations in the family Syrphidae, Shatalkin (1975) described a new subgenus, according to the structure of male genitalia, in adition to other morphological characters (*Nigrocheilosia*, with type species *Eristalis pubera* Zettersedt, 1838).

Barkalov (1983) also considered the importance of the structure of male genitalia in the systematic of genus *Cheilosia*. His analysis of 90 species from the regions of Siberia and Far East resulted in the designation of 8 types of male genitalia and description of subgenus *Neocheilosia*, with the type species *Cheilosia scanica* Ringdahl.

Out of 400 known species (Thompson, 1980), 295 are registered for the Palaearctic (Peck, 1988). Before the beginning of century, many dipterologists were engaged in the strenuous work of describing a great number of two-winged insects (Becker, Fallen, Loew, Macquarti, Meigen, Rondani, Zetterstedt). This period was characterized by short descriptions, and different values of applied morphological characters, while type material usually consisted of only one sample.

After 1960 many new taxa have been described: in the former SSSR (Barkalov, Peck, Skufjin, Stackelberg, Violovič, Zimina) and in Europe (Bradescu, Claussen, Goeldlin de Tiefenau, Marcos-Garsia, Nielsen, Torp Pederson, Speight, Van der Goot). In the last 15 years, the authors have given a great contribution not only in describing the new taxa but also in clarifying the taxonomic status of the already described species. Many synonyms, redeterminations and redescriptions have been found out (Barkalov, 1981a, 1981b, 1983, 1984, 1990, 1993a, 1993b; Barkalov & Stahls, in press; Claussen, 1987, 1988, 1989, 1995; 1996a, 1996b; Claussen & Kassebeer, 1993; Claussen & Speight, 1988; Marcos-Garcia, 1987a; 1987b; Speight & Claussen, 1987). A detailed revision of *Nigrocheilosia* species has been made by Gunilla Stahls from Finland and A. Barkalov from Russia and is now in press.

Several species of genus *Cheilosia* with type locality on the Balkan Peninsula has been described. Becker (1894) reported the species *Chilosia langhofferi* in Dalmatia. In the same paper he described *Chilosia umbrisquama* with the type locality near Thesallonike in Greece. Strobl (1898) described the form *nigritarsis* of species *C. schnabli* (Becker, 1894) and the variety *nigropilosa* of species *C. pulchripes* Loew, 1857 from Bosnia and Herzegovina. A few years later Strobl (1909) described two varieties, *nigrociliata* of *C. latifacies* Loew, 1857, and *geniculata* of *C. impressa* Loew, 1840, from Slovenia. Two species from Bulgaria were also described: *Chilosia drenowskii* by Szilady (1936) and *Chilosia bureschi* from the Pirin mountain by Delkeskamp (1942). During the last two years descriptions of six species discovered on the Balkan Peninsula by Claussen and Vujić have also been published.

2. 2. FAUNAL HISTORY

In the last century, the majority of researchers studied two-winged insects as a whole. Heterogeneous and voluminous material was collected during various field expeditions, the purpose of which was to discover new species. The obtained results were published in the form of descriptions of unknown taxa and faunal lists with few data on the locality and dates. In the second half of the 20th century the studies of hoverflies on national territory have been elaborated in some of European countries, and published with faunal data about the genus *Cheilosia* and related genera.

The investigations of hoverflies fauna on the Balkan Peninsula from the middle of the 19th century up to the '60s of this century are mainly connected with the work of dipterologists who published the species records for certain regions. Data regarding the records of the genus *Cheilosia* were also contained in them: Strobl (1898, 1900, 1902, 1909) collected the material in Bosnia and Herzegovina, Dalmatia and Slovenia; Nedelkov (1912) in Bulgaria; Langhoffer (1917-1923) in Croatia; Drenski (1934) in Bulgaria; Marcuzzi (1941) in Dalmatia; Delkeskamp (1942) in Bulgaria; Coe (1956, 1957, 1960) and Leclerq (1961) in the former Yugoslavia; Bankowska (1967) in Bulgaria; Lambeck (1968) in Slovenia. The faunal lists include data about species names and localities but usually without additional information necessary for better understanding of habitat types and other characteristics of investigated areas.

Innovations of faunal researching were introduced by Glumac in the period 1955-1968. Besides the list of confirmed species in certain regions, Glumac presented an analysis on the basis of range types and the way of larval development. His papers contained data about species biology (feeding plants, flight period, frequency and abundance) and the characteristics of localities. He unified the data on the hoverfly fauna in Yugoslavia in the form of a catalogue (Glumac, 1972). The methods Glumac used in his investigations were continued and developed later in a few monographs: Šimić (1987) presented the hoverflies

fauna for Montenegro, Vujić & Simić (1994) for the Vršac hills, Vujić & Glumac (1994) for Fruška gora mountain. A species list with short faunal analyses was provided by Šimić & Vujić (1984) the area along the Tisa river.

The faunas of border regions of the Balkan Peninsula are presented by several authors: Bradescu (in the period 1963-1989) reports a large number of data for Romania; Toth (in the period 1978-1985) for Hungary; Claussen & Lucas (1988) for the island of Crete.

2. 3. MORPHOLOGY

Diagnostic features. The main morphological character that separates the family Syrphidae from other Diptera is the presence of vena spuria, the secondary strengthening of the wing membrane (Fig.1F:e). Diagnostic characters which separate the tribe Cheilosiini from the other hoverflies are the following: hairy humerus; upper outer cross-vein (Fig.1F:h) more or less flat; vein R4+5 almost straight; cross-vein r-m meets the discal cell in the first third (Fig.1F); antennas shorter than the length of head; eye margin with well-developed orbital stripes, covered with hairs (Fig.1B:f); tergites dark (difference to *Chamaesyrphus*). The other characters that separate the genus *Cheilosia* and related genera from other Balkan's Cheilosiini are: face in profile without prominent lower part (as in *Rhingia*); third antennal segment not subtriangular and arista not inserted at the anterior extremity of the segment (as in *Pelecocera*); mesoscutum without distinctive gray stripes and strong lateral bristles (as in *Ferdinandea*).

Genus *Cheilosia* and related genera. Dark flies of medium size (5-17mm); the arrangement and the color of the body hairs may vary, but the color of the integument is black. Morphological features of the species are obscure; many of characters show a slight interspecific variability. Besides terminalia, sexual dimorphism is observable in head structure and length of body hairs.

Head (Fig.1A:b). Eyes connected in males and separated in females (Fig.1B). Three ocelli (Fig.1B:c) situated on the top of the head, function as a special sense organ for orientation during flight. Frons in anterior part slightly projected (Fig.1B:a). Antennas begin in antennal pits; the connection or separation of pits is one of the most important characteristic for the determination of the relation between certain taxa within the examined group. The first two segment of antennas smaller, while the third is several times larger (Fig.1E), with arista on its dorsal side. The shape, size, and color of antenna, as well as the thickness and hairiness of arista, are very important diagnostic characters. Face in profile is slightly concave under antennas and around the median part (Fig.1B:d). The width and dusting of the orbital stripes (Fig.1B:f) are frequently important to the taxonomy of group. The length and color of facial and frons hairs, as well as the dusting of face and frons, present good diagnostic features.

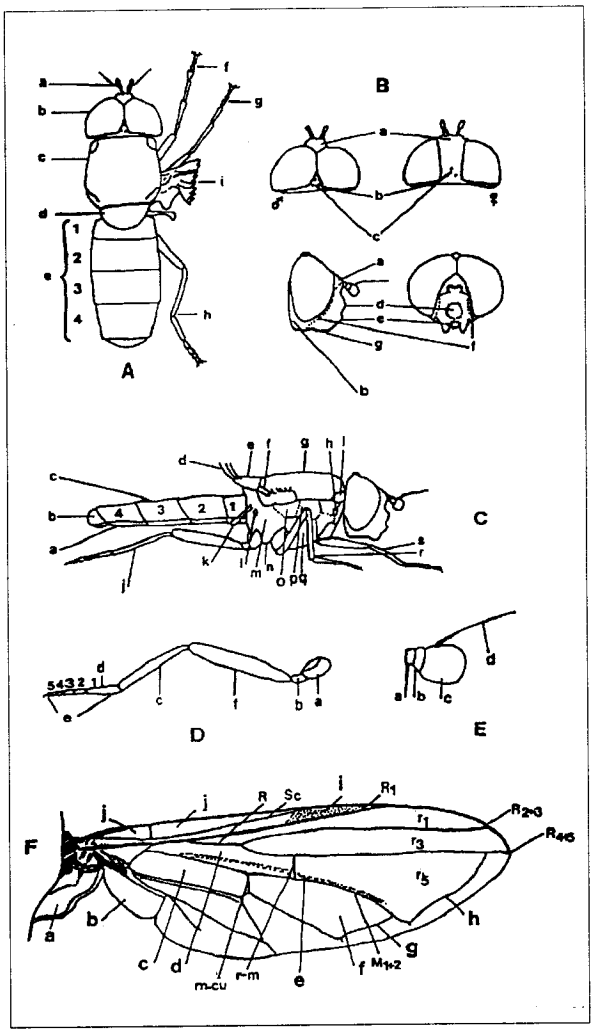


Fig.1 Morphological characteristics of Cheilosia species.

(A) Cheilosia albitarsis (dorsal view): a-antenna; b-head; c-thorax; d-scutellum; e-abdomen (1-4 abdominal segments); f-front leg; g-middle leg; h-hind leg; i-wing base.

(B) Head: a-frons; b-occiput; c-vertex; d-facial tubercula; e-mouth edge; f-eye margin (ocular orbite); g-gena.

(C) Cheilosia albitarsis (lateral view): a-sternite; b-hypopygium; c-tergites (1-4); d-marginal bristles on scutellum; e-scutellum; f-postalar calluse; g-mesoscutum; h-anterior spiraculum; i-humerus; j-hind leg; k-haltere; l-posterior spiraculum; m-hipopleura; n-metasternum; o-protopleura; p-mesopleura; q-sternopleura; r-middle leg; s-front leg.

(D) Hind leg: a-coxa; b-trochanter; c-tibia; d-metatarsus; e-tarsal segments (1-5).

(E) Antenna: a-first segment; b-second segment; c-third segment; d-arista.

(F) Wing: a-squama; b-alula; c-second basal cell; d-first basal cell; e-vena spuria; f-discal cell; g-lower marginal cross vein; h-upper marginal cross vein; i-stigma; j-costal cell; veins (R; R1; R2+3; R4+5; Sc; M1+2); cross veins (m-cu; r-m); cells (r1; r3; r5).

Thorax. Mesoscutum approximately rectangular, from lateral view slightly convex (Fig.1C:g); humeri (Fig.1C:i) hairy; postalar calluses (Fig.1C:f) usually with bristles; mesoscutum surface covered with hairs of various lengths and color, which are one of the important diagnostic characteristics. Pleurae (Fig.1C:m-q) covered with hairs, the arrangement of which is often important for determination. Scutellum (Fig.1A:d) with hairs and frequently with marginal bristles (Fig.1C:d) which have certain taxonomic importance. Coxa and trochanter (Fig.1D:a,b) only exceptionally with taxonomic importance. The color of the legs and hair arrangements are of great significance in diagnostic. Wing structure is slightly variable within the genus (Fig.1E); the arrangement and color of the microtricha on the wing surface and the location of some veins are taxonomically important. The position of vein R4+5 in relation to the wing top separates genus *Portevinia* from other genera. The angle at which the upper marginal cross-vein meet the longitudinal vein R4+5. (Fig.1D:h) is often used as a diagnostic character.

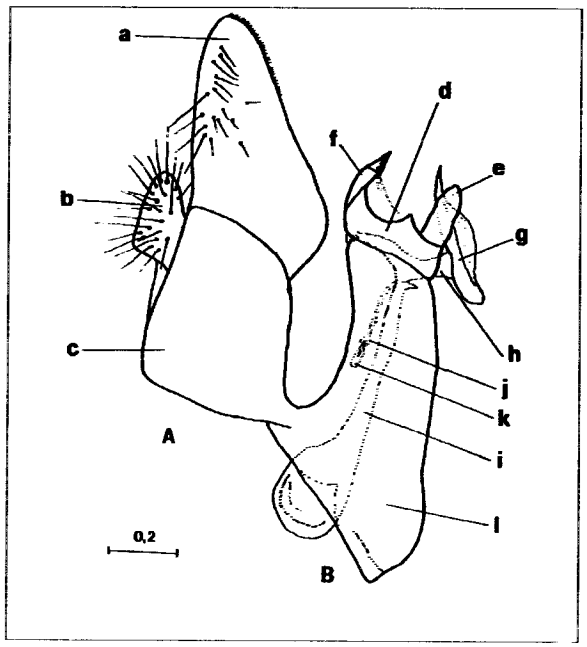


Fig. 2 Male genitalia (Nigrocheilosia kerteszi), lateral view. (A) Epandrium, a-c: a-surstilus; b-cercus; c-tergum 9. (B) Hypandrium, d-l: d-lobus superior, e-ventro-apical prong; f-dorso-apical prong; g-distal part of aedeagus; h-pyxis; i-aedeagus; j-spermal pump; k-ejaculational apodema; l-theca. Scale in mm.

Abdomen. It consists (Fig.1A:e) of nine segments; each segment is built of tergite (dorsally) and sternite (ventrally) (Fig.1C:a,c); the first four (or five in female) are large and easily observable; in females the others are retracted into fifth segment and modified to form an ovipositor; in male the postabdominal segments infiltrate into the structure of hypopyges. The color and arrangement of hairs on tergites and sternites are often used as a diagnostic character. This also applies to the arrangement of shiny and dull areas on the surface on tergites and dusting of certain parts of abdominal segments.

Male genitalia. The most important character in the systematic and taxonomy of this insect group is the

structure of male genitalia. Male genitalia consists of a phallar part (hypandrium) (Fig.2B) and tergite 9 (epandrium) with surstili and cerci (Fig.2A); the terminal lobes of the sternite 9 (theca) (Fig.2B:l) are the pair of superior lobes (Fig.2B:d). The structure of aedeagus involves the basal part, apical sclerite (pyxis), apodema, ejaculatorial apodema with a spermal pump (Fig.2B:g-k). The shape of the superior lobe is key in the systematic of genus *Cheilosia* and related genera. The shape and size of surstyli are often important in diagnostics.

2. 4. KEY FOR THE BALKAN GENERA OF *CHEILOSIA* GROUP

1. Vein R4+5 meeting costal vein above the most projected part of wing; face in profile protruded in lower part, facial tubercle connected with mouth edge; tergites 2-4 with havely dusted, gray rectangular pair of spots. .....*Portevinia*

– vein R4+5 meeting costal vein in the most projected part of wing.....2

2. Male genitalia with sclerotized canoe-like superior lobe (Fig.2B:d); eyes bare; antennal pits usually confluent (with few exceptions: in *N. insignis*, *N. heculana*, and *N. hercyniae* the praefrons is often connected with medium process of lunula); legs mainly black (if not then cross veins darkened, as in *caerulescens* group or post-ocular orbits well-developed, as in *N. hercyniae*); .....*Nigrocheilosia*

– Male genitalia with finger- or sickle-like ventro-apical prong of superior lobe (Fig.4:d,e; Fig.6:d,e).....*Cheilosia*

2. 5. DISTRIBUTION

The genus *Cheilosia* and related genera have the highest number of species in the Holarctic, especially in the temperate zone. In other biogeographical regions only a small number of species has been recorded (Oriental region, India). The genus *Cheilosia* is especially characteristic for the zone of Holarctic deciduous forests, where the greatest number of species are located, though a considerable number is also found in the boreal forests and mountain tundra of the Alpine region. Almost all species of genus *Nigrocheilosia* were found in the Palaearctic Alpine and high mountain regions. The most important centers of diversity for the examined genera in Palaearctic are the Alps, central Asia and Japan. Not so large centers, but still very important are the Carpathians, Caucasus, and the Balkan Peninsula.

2. 6. BIOLOGY

Larval development. The larvae of genus *Cheilosia* and related genera develop in herbaceous and woody plant' tissues and basidiocarpes of mushrooms. Host plants are known for approximately 30 *Cheilosia* species. Species from

the family Apiaceae, genera *Carduus* and *Cirsium*, are particularly interesting because of the large number of *Cheilosia* species found in different parts of the plant. The *Cheilosia* species can be leaf miners, those which develop in the roots, stalk, bulb and in conifers. Larvae are morphologically variable depending on the local conditions in which they develop. In analysis of the third larval stadium of development in the genus *Cheilosia*, Rotheray (1990) concludes that similar ways of living cause similar morphological characters. He designated 5 types of development: in mushrooms (*C. longula*, *C. scutellata*), in mushrooms and plant tissue (*C. pagana*), in leaves (*C. fasciata*, *C. semifasciata*), in stalk and root (*C. albipila*, *C. canicularis*, *C. fraterna*, *C. grossa*, *C. variabilis*) and in Pinaceae (*C. alaskensis*). He points out that morphological characters depend on substrate compactness.

The specialization of larval development provokes an intensive process of speciation and the appearance of species with a narrow geographic range (Glumac, 1980). The narrow distribution of plant species causes the narrow range of an insect as in case of monophagous species that develop in endemic plants. In this way it is possible to explain the appearance of a large number of species of genus *Cheilosia* with limited ranges.

Seasonal Dynamics. A large number of species flies in early spring, before other hoverflies. The number increases during the spring but decreases abruptly at the beginning of summer. The summer season is characterized by the appearance of species developing in the basidiocarps of mushrooms.

The majority of species are univoltine, while polyvoltine species usually have spring and summer generation. The appearance of more generations is found on lower altitudes where seasons last longer. High mountain seasons do not provide enough time for development of more than one generation.

Ethology. The adults are most frequent in forest biocenoses. They appear near the forest clearings and margins with many flowering plants. When not visiting flowers, male samples are distributed over the open areas or occupy the space among three crowns defending their territory. It has been observed that insects change the flying height depending on temperature and humidity. At lower temperatures they usually stand on upper leaf surface, exposed to sunshine.

The *Cheilosia* species copulate either while flying or while being on the surface. A the male positions himself above the female, attaches to her thorax and they fly up together. Although a great number of samples of these genera have been collected, insects in copulation have been collected only few times.

Habitat types. The species of examined genera appear in various types of habitat. Mountains are especially rich with heterogeneous biocenoses caused by different altitudes, expositions and various relief structures (gorges, canyons, glacial formations – refuges for zoogeographically important species). The greatest faunal diversity is in forests and near streams, rivers and lakes. It is also very important that habitats are autochthonous and preserved, as in case of national parks. In biotopes that are under a strong anthropogenic influence *Cheilosia* species disappear very quickly due to the alternated environmental conditions.

The numerosity of the population depends on the habitat type. Some species are abundant in oak forests but extremely rare at higher altitudes. Contrary to them are the species that prefer living conditions above 1000 m, which appears at lower altitudes only in small populations.

3. MATERIAL AND METHODS

3. 1. COLLECTING

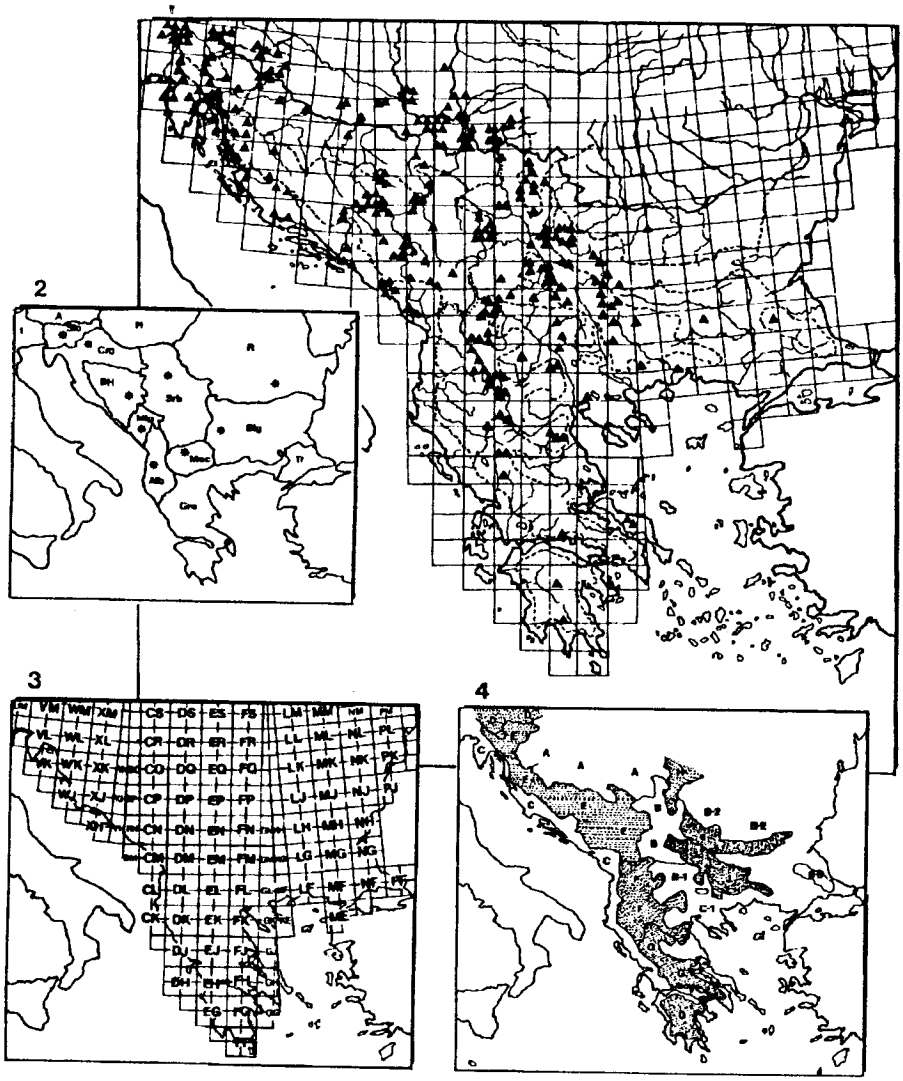
The majority of material presented here was collected over the territory of the Balkan Peninsula during the period of 14 years (1981-1994). The investigations were carried out in phases, each covering a part of the Balkan territory and different biogeographical areas. The field trips in the region of east Bulgaria, Dacian, and Strandža hills have not yet been done and there are only insufficient data from the collections.

The 249 localities (Map 1) belonging to the 41 areas (Map 5) from the Balkan Peninsula was examined through 547 field trips. According to the extent of research, the number of localities visited, following three groups can be separated.

I. *Areas investigated over a long period.* The fauna of hoverflies in these areas was a subject of systematic investigations during several years. The material collected is numerous and allows a reliable fauna characterization of investigated genera. Researches was carried out in 9 areas with 129 localities and 367 field trips: Fruška gora, Vršačke planine, Obedska bara, Suva planina, Durmitor, Kopaonik, Šar-planina, Malinik and Kučaj mountains, and Stara planina (Map 5).

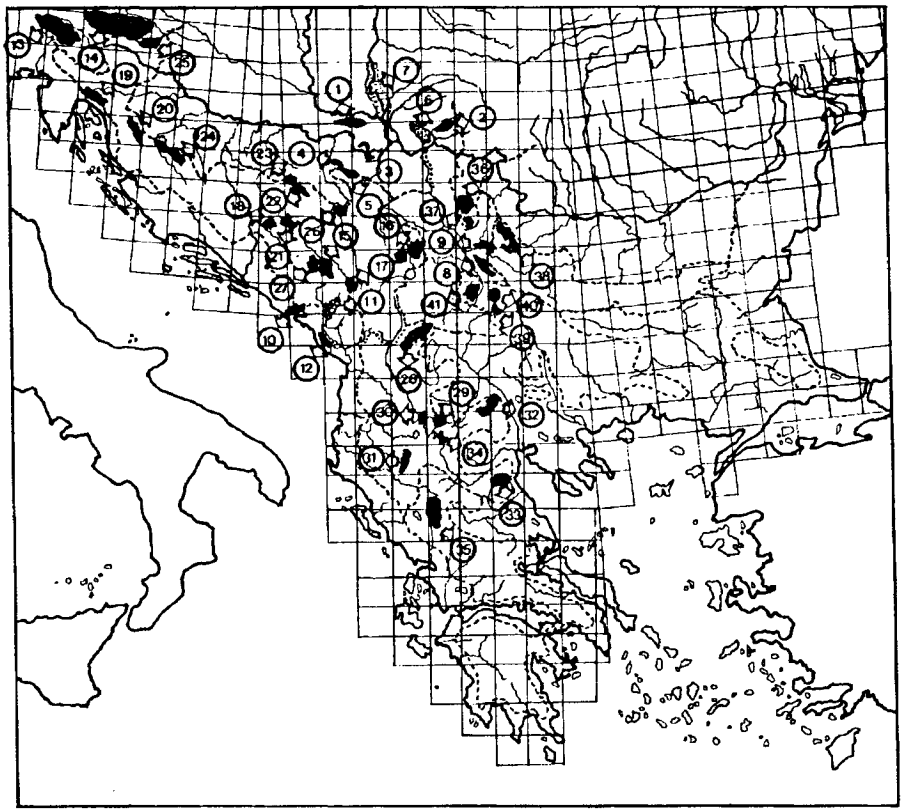
II. *Areas investigated for one or two years.* The study included 32 areas with 78 localities and 138 field trips: Baba, Bjelasica, Bjelašnica, Boka Kotorska, Bosilegrad, Cer, Čemernik, Deliblato sands, Gorski Kotar, Galičica, Grammos, Grmeč, Jahorina, Javor, Julijske Alps, Kamniške and Savinjske Alps, Konjuh, Kožuf, Kukavica, Mala Kapela, Menina, Morača canyon, Olimp, Pindos, Rtanj, Rumija, Svrljiške mountains, Tara, Tisa valley, Verno, Vlašić, and Volujak (Map 5).

III. *Isolated records.* Isolated records of examined genera were reported from 42 localities. These localities were not a subject of continued investigation.



Map 1-4 The Balkan Peninsula.

*(1) Investigated localities (▲). (2) Balkan states: Slo-Slovenia; Cro-Croatia; BH-Bosnia and Herzegovina; Srb-Serbia; Mac-Macedonia; Blg-Bulgaria; Gre-Greece; Alb-Albania; Tr-Turkey; (I-Italia; A-Austria; H-Hungary; R-Romania; * marks the capital city). (3) UTM system with marks. (4) Bigeographical territories: A-Pannonian and Subpannonian; B-Moesian hilly areas; B-1-Macedonian hilly areas; B-2-Dacian hilly areas; D-3-Strandža hills; C-Mediterranean and Submediterranean (C-Adriatic; C-1-Aegean); D-Eastern Alps; E-North Dinaric mountains; F-South Dinaric mountains; G-South Greece mountains; H-Carpathians; I-Stara Planina (Balkan range); J-Rilo-Rhodopes.*



Map 5. The Balkan Peninsula. Investigated areas: (1) Fruška gora; (2) Vršačke planine; (3) Obedska bara; (4) Cer; (5) Vlašić; (6) Deliblatska peščara; (7) Potisje; (8); Suva planina; (9) Svrljiške planine; (10) Boka Kotorska; (11) Kanjon Morače; (12) Rumija; (13) Julijske Alpe; (14) Kamniške in Savinjske Alpe; (15) Durmitor; (16) Kopaonik; (17) Bjelasica; (18) Bjelašnica; (19) Gorski Kotar; (20) Grmeč; (21) Jahorina; (22) Javor; (23) Konjuh; (24) Mala Kapela; (25) Menina; (26) Tara; (27) Volujak; (28) Šar-planina; (29) Baba; (30) Galičica; (31) Grammos; (32) Kožuf; (33) Olympos; (34) Verno; (35) Pindos; (36) Malinik and Kučajske planine; (37) Rtanj; (38) Stara Planina; (39) Bosilegrad; (40) Čemernik and Vlasinsko jezero; (41) Kukavica.

3. 2. COLLECTIONS

Among the aims of this work was to check the colections of genus *Cheilosia* and related genera from the Balkan Peninsula in the folowing museums:

- Natural History Museum in Belgrade (NHMB), (leg: Glumac, Stojičević);
- Croatian Museum of Natural History, Zagreb (CNHM), (leg: Langhoffer);
- Slovene Natural History Museum, Ljubljana (SNHM), (leg: Sivec);
- Bosnia and Herzegovina Museum, Sarajevo (BHMS), (leg: Hensch, Hilf, Maly, Schneereg, Simmet, Strobl, Thalhammer, Winegouth);
- Zoological Institute and Museum, Sofia (ZIS), (leg: Buresch, Drenski, Nedelkov, Urumova).

These insect collections contain the samples collected in the period from 1885 to 1981.

The greatest part of the examined material is deposited at the working collection from the Institute of Biology in Novi Sad (IBNS), (leg: Aleksić D., Božičić Branka, Ercegovac Ljiljana, Gardinovački Gorana, Glumac S., Milankov Vesna, Nonveiller G., Radišić P., Radnović D., Radović Dragana, Ranđelović V., Stolić Sanja, Šimić Smiljka, Vujić A., Zlatković B.). Only several specimens are preserved in the private collection of C. Claussen (CCC), one female in the collection of Dr Miroslav Bartak, Praha, Czech Republic (MBC), and one male and one female in the collection of the "Zoologisches Forschungsinstitut and Museum Alexander Koenig", Bonn (ZFMK).

In the Survey of Fauna there are data from two collections that were not available for checking but these determinations were confirmed by Claus Claussen. In the collection of J. Lucas (JLC) from Rotterdam (The Netherlands) there are samples from 7 localities in Slovenia, 23 from Croatia, 8 from Macedonia, 23 from Greece and 2 from Bulgaria (213m 255f). The other collection of C. Claussen (CCC) is in Flensburg (Germany) with several samples collected in Bulgaria.

The only larger collection having samples collected on the Balkan Peninsula that has not been available for checking, is the one from Poland. The collection is reported by Bankowska (1987) in paper on Syrphidae of Bulgaria.

3. 3. MATERIAL

A total number of 13593 samples of genus *Cheilosia* and related genera have been analyzed – 9742 males and 3851 females. Out of this number 720 specimens (276m and 444f) belong to the collections from other Museums: NHMB (115m 147f); CNHM (71m 75f); SNHM (36m 59f); BHMS (93m 112f);

ZIS (42m 33f), and the rest (12873 samples: 9466m 3407f) is deposited at the collection in Novi Sad (IBNS).

3. 4. FUZZY RELATIONS METHODOLOGY

The method of fuzzy relations (Tepavčević & Vujić, 1996) has been applied in zoogeographical analysis of hoverflies. This method is based on the theory of lattice and theory of fuzzy sets and its theoretical basis has been developed in detail for the first time. It is also for the first time that this method has been used for solving the problems from the field of biology.

3. 5. MAPS

All verified data were registered on special maps for better understanding of zoogeographical features of examined taxa. The geographical map of the Balkan Peninsula (Map 1) was divided by a UTM grid of squares 50 x 50 km (Map 3). All localities are marked according to their UTM sign. Whenever the name of a locality is given in the chapter "The Balkan Peninsula", it is always accompanied by its UTM mark. Map 2 has been provided with administrative borders between states. Map 4 contains the demarcation lines between biogeographic territories defined by Matvejev (1976). The biogeographical division is present on all other maps (Maps 16-50) with the localities of each species on the Balkan Peninsula. They also contain the distribution data of the species in Europe and Palaearctic.

3. 6. REMARKS

3. 6. 1. The Balkan Peninsula

This chapter contains basic geographical and biogeographical characteristics of the investigated area. In the title of each biogeographical territory there are letters from A through J in parentheses. In chapters The Survey of Fauna and Zoogeographical Analysis, letters appear with the name of a locality as an indicator of the biogeographical territory it belongs to.

The localities where the material was collected are grouped to:

- areas investigated over a long period;
- areas investigated over a period of 1-2 years;
- isolated records.

Along with the names of mountain regions there is the altitude of the highest point in the parentheses. In the case of investigated localities there are the altitudes at which the material was collected, the UTM signs, the dates of field trips, and the names of legators. The localities were grouped according to the collections that the material came from. The term "leg. incog." was used

when it was not possible to find out who had collected the material. "Unidentified Localities" refers to a group of geographical locations with the same name where it was not possible to find out where legator exactly collected the samples.

3. 6. 2. The Survey of Fauna

The survey of fauna contains the name of a taxon, synonyms, verified, unverified, erroneous references and redeterminations.

The parentheses beside "Analyzed material" contain the total number of males ("m") and females ("f"), the flight period and the range of altitudes at which the samples were collected. The sections "Published records" present the verified material from published collections with the data about papers, samples and determinations defined by authors. Under the title "New data" there is a list of all localities with the number of samples and the date of collection. The number in parentheses beside each locality refers to the biogeographical territory to which it belongs. The data are presented according to the states (Slo-Slovenia; Cro-Croatia; BH-Bosnia and Herzegovina; Mtg-Montenegro; Srb-Serbia; Mac-Macedonia; Blg-Bulgaria; Gre-Greece), and at the end of each record there is an abbreviation of Museum where a sample or samples are kept. In the case of a large number of specimens for one region, only the numbers of localities are given (from chapter "The Balkan Peninsula"), the recorded period of the sample and the total number of males and females.

The section titled "Distribution" contains data about the range, distribution of species over the Balkan Peninsula and the first records of the species on the Balkan Peninsula or in certain states. The abbreviation "B.T." means biogeographical territories and "B" the type of biomes. The signs for each biogeographical territory and type of biome are given in the chapter "The Balkan Peninsula".

The last section is "Biology" and refers to data from literature and presents the author's comments.

4. THE BALKAN PENINSULA

The Balkan Peninsula is located in southeastern Europe, geographically, it is bounded by the rivers Soča, Sava and Danube in the continent and by coasts of the Adriatic, Ionian, Aegean and the Black Sea. Most of this Peninsula is covered with the mountain ranges of the Dinaric Alps and Stara Planina, as well as massive mountains Rilo-Rhodopes in the central part. Hilly areas predominate between high mountains, since lowlands are rather rare on the Balkan Peninsula.

Biogeographically, the transition of the Balkan to Central Europe is gradual and the faunas of the bordering parts are connected with the fauna on the Peninsula. Therefore, adjacent regions, such as the Eastern Alps bordering the Balkan Peninsula to the West, the Pannonian Plains and the Subpannonian slopes with the Sava and Danube rivers, the Dacian slopes located between the Carpathians and the Balkan range of mountains with the Danube, were included in the investigations.

The influences and changes of different biogeographical regions during geological periods resulted in a great biodiversity on the Balkan Peninsula. During the Tertiary period the Balkan had a tropical climate. Following this during the glaciations in the Pleistocene epoch much of the European continent was covered by glaciers. Although the Balkan Peninsula was also covered by glaciers on its mountains, the climatic conditions were favorable enough to facilitate the survival of thermophilous and cold-sensitive species. Consequently, a number of the Tertiary species survived in the Balkan's refuges. In the period between glacial epochs, these species extended their distribution northwards, while Central and North European species retreated to northern habitats and to higher altitudes on the Balkan Peninsula. These changes resulted in the formation of a great number of new taxa due to new living conditions as well as great climatic variations in the Quarternary period. Thus, the Balkan Peninsula is one of the important speciation centers not only in past geological periods but, also, today.

The main characteristics of the living world of the Balkan Peninsula are due to a direct contact of preglacial and postglacial communities. Such a contact

resulted in the formation of mixed communities, in which the elements of the Mediterranean and Submediterranean biogeographical subregions are difficult to be separated. Two dominant groups of habitats may be distinguished on the Balkan Peninsula (Matvejev, 1976; Matvejev & Puncer, 1989):

- preglacial groups of habitats are found in the biomes of Submediterranean broad-leaved woodlands and shrubs, forest and forest-steppes of the Oromediterranean mountains, montane forests on slopes and in gorges, and Mediterranean evergreen forests and maquis;
- postglacial groups of habitats are found in the biomes of South European mostly broad-leaved woodlands, European mostly coniferous forests of boreal type, and highmountain and Nordic tundra.

4. 1. BIOGEOGRAPHIC POSITION AND DIVISION

4. 1. 1. History

The biogeographical division of the Balkan Peninsula has been based upon the characteristics of the particular group examined by each investigator. At the beginning of the century the most prominent researchers were malacologists such as Kobelt, Pavlović, and Wagner and Sturany who divided Balkan on the basis of the study of malacofauna (after Matvejev, 1961). The first synthetic zoogeographical presentation of Yugoslavia was given by Hadži, who also outlined the first zoogeographical map using the features of terrestrial fauna (Hadži, 1931, after Matvejev, 1961). Other animal groups were also the basis for making the conclusions about zoogeographical division of Yugoslavia and Serbia (herpetofauna: Werner and Radovanović; mammals: Martino; birds: Matvejev) (after Matvejev, 1961).

The researchers of flora defined phytogeographical characteristics of the Balkan. Adamović outlined the map of phytogeographical division of the Balkan Peninsula (after Matvejev, 1961). A detailed survey of flora with phytogeographical analysis and the presentation of biogeographical territories was given by Turrill (1929). Horvat (after Matvejev, 1961) divided the Balkan Peninsula on the basis of phytogeographical areas, pointing out the existence of four vast regions within the north temperate climatic zone. He defined each region by making a connection between phytogeography and synecology. The importance of the Balkan Peninsula as a glacial refugium, with a disscusion about the relations, dynamics and the process of evolution and speciation of plant species in south-west Europe was reported by Janković et al. (1984). They also gave a short presentation of florogenesis and the phytogeographical position of Serbia.

Matvejev, an ornithologist and entomologist, worked more than 30 years on problems of establishing the relationship between the distribution of plant and animal communities. He presented the basic principles of biogeography of

Yugoslavia and isolated floral and faunal regional communities at the level of biogeographical provinces (Matvejev, 1961). Following the accepted principles Matvejev (1976) divided the Balkan Peninsula into the geographical territories that actually presented the biogeographic division of this region. The elaboration of the map of biomes on the basis of biogeographical characteristics of Yugoslavia, introduce the concept of biome (landscape type) in the sense of the integrality of biotope and biocenosis (Matvejev & Puncer, 1989). The mapping was based on UTM net with geographical coordinates. The following characteristics of biomes were included: climate, vegetation, type of ranges and characteristic habitats. The results of Matvejev (1976) and Matvejev & Puncer (1989) are a foundation for the zoogeographical analysis presented in this monograph.

4. 1. 2. Biogeographical Territories at The Balkan Peninsula and Adjacent Regions

The grouping of the investigated localities was based on the division of the Balkan Peninsula into the biogeographical territories after Matvejev's work (1976). On the Balkan, European and Mediterranean biogeographical subregions are connected. Historically, faunistically and ecologically they are different. These subregions have been frequently in immediate contact with a high degree of exchange of flora and fauna. Therefore, boundaries between them are difficult to define. Separation of the geographical entities is based on the fact that the range boundries of many species coincide completely with the edges of these territories. According to Matvejev (1976) the ranges of the Balkan endemics occupy one or more separate entities, pointing out that the accepted geographical division is simultaneously the biogeographical division of the Balkan Peninsula.

Matvejev & Puncer (1989) made a map of biomes in Yugoslavia. According to the Matvejev (1973) a biome represents an ecological type of the regional zone, i.e. a territory of ecologically similar areas being different from the adjacent territories in a number of distinct characteristics of relief, composition, and arrangement of habitats (in particular their plant and animal world). Parts of the area included in a biome in distinct regions of Yugoslavia are different due to different history. Biome types in which the investigations were carried out were also cited in each distinct geographical region on the Balkan Peninsula. In the Survey of Fauna, under "Distribution" the presence of each species in different types of biomes (B) is given:

(1) biomes of Mediterranean evergreen woodlands and maquis;

(2) biomes of Submediterranean broad-leaved woodlands and shrubs;

(3) biomes of South European mostly broad-leaved woodlands;

(4) biomes of European mostly coniferous forests of boreal type;

(5) biomes of high mountains rocks, pastures, snow-patches and avalanches of Alpine and High-Nordic type;

(6) biomes of steppes and woodland steppes;

(7) biomes of stony grounds, pastures and woods of Oromediterranean mountains.

4. 1. 2. 1. PLAINS AND HILLS

The populations of *Cheilosia* species occur almost entirely in forest habitats. Consequently, open lowlands landscapes fit less species of the examined hoverflies. The autochthonous forests are in exemplary condition only on the hills and low mountains; a number of such mountains were included in field investigations.

Pannonian Plain and Subpannonian Hills (**A**) (Map 6). The Pannonian Plains is the northern boundary of the Balkan Peninsula with Central Europe. Although agrobiocenoses are predominant, autochthonous steppe communities, forest-steppes, and lowland oak communities are also preserved. The Subpannonian region is located on the slopes of the eastern Alps, Dinaric mountains, and western Carpathians. Here also belong individual mountains along the edge of the Pannonian Plains: Slavonian mountains, Fruška gora, Vršačke planine and hills in Šumadija (Matvejev, 1976). The majority of *Cheilosia* specimens were collected in South European deciduous oak and beech forests. Areas investigated over a long period include: Fruška gora, Vršačke planine, and Obedska bara. Areas investigated for one or two years include: Subpannonian mountains, Deliblato sands, and Tisa valley.

Map 6 Pannonian and Subpannonian biogeographic territory

Fruška gora (538 m) (Map 5:1). Biome of South European, mostly deciduous woodlands.

This low mountain represents a horst due to the tectonic lowering of the surrounding land. It extends from west to east and was an island in the Pannonian Sea during Neogene period. The National Park of Fruška gora includes protected oak, mixed and beech forests. The fauna of hoverflies was studied systematically during the period 1956-1957 (Glumac, 1959) and in 1987-1991 (Vujić & Glumac, 1994).

IBNS: Investigated localities (1-18) (date and leg. in: Vujić & Glumac, 1994): (1) ANDREVLJE CR 90 (200m); (2) BORKOVAC DQ 08 (100m); (3) BRANKOVAC DR 00 (400m); (4) ČORTANOVCI 19.iii.1994, leg. Milankov Vesna, Vujić A; (5) GLAVICA DR 00 (300m): 13.iv.1994, leg. Radenković Snežana, Vujić A; 25.iv.1994, leg. Radenković Snežana, Radišić P, Vujić A; 30.iv.1994, leg. Milankov Vesna, Vujić A; 4.v.1994, leg. Radenković Snežana, Vujić A; (6) HOPOVO DR 00 (300m); (7) IRIŠKI VENAC DR 00 (400m); (8) KAMENIČKI PARK DR 00 (100m); (9) KARLOVAČKI RIT DR 10 (100m); (10) LEŽIMIR CQ 89 (300m); (11) LJUBA CR 70 (200m); (12) MUTALJ CQ 99 (150m); (13) PARAGOVO DR 00 (300m): 30.iv.1994, leg. Milankov Vesna, Vujić A; (14) RAKOVAC DR 00 (200m); (15) RAVNE DR 00 (200m); (16) STARI LEDINCI DR 00 (200m); (17) VRDNIK DQ 09 (200m); (18) ZMAJEVAC DR 00 (400m). **NHMB**: leg. Glumac S: Letenka CR 90 (300m); Petrovaradin DR 11 (150m); Sremski Karlovci DR 10 (150m); Stari Ledinci DR 00 (200m); Stražilovo DR 10 (400m); Viline Vode (DR 00) (300m); Zmajevac DR 00 (400m).

Vršačke planine (639m) (Map 5:2). Biome of South European, mostly deciduous woodlands, while biome of Submediterranean forests with *Quercus cerris* and *Quercus farnetto* on the slopes.

Vršačke planine represents the highest mountain of the Banat region in Voivodina. Geologically, it is the northern most part of the Serbian-Macedonian massive. They lie in the triangle of the Moesian, Pannonian and Dacian biogeographical areas (Vujić & Šimić, 1994). Vršačke planine is covered with oak, mixed and beech forests. Detailed investigations were performed in the period 1983-1986, and they continued since 1991.

IBNS: Investigated localities (1-12) (date and leg. in: Vujić & Šimić, 1994): (1) FISEŠ EQ 39 (100m) 23.iv.1994, leg. Vujić; (2) GUDURICA ER 30 (100m); (3) GUDURIČKI VRH EQ 39 (600m); (4) JABLANKA EQ 39 (100m); (5) LISIČJA GLAVA EQ 29 (400m); (6) MALO SREDIŠTE ER 30 (150m); (7) MARKOVAC ER 30 (100m); (8) MESIĆ EQ 39 (100m); (9) MISA EQ 29 (100m); (10) PREVALA EQ 29 (300m); (11) ŠIROKO BILO EQ 29 (300m); (12) VRŠAČKA KULA EQ 29 (200m).

Obedska bara (72 m) (Map 5:3). Biome of South European, mostly deciduous woods in inundated areas.

This area represents a large marsh near the river Sava in Srem. It is extending between the villages Obrež and Kupinovo, occupying the shape of a half-moon. The swampy habitats represent one of the most important orni-

thological reservations in Europe. They are surrounded by a relatively well preserved oak and hornbean forests. Obedska bara was investigated in the period 1986-1990.

IBNS: Investigated localities (1-2): (1) DEBELA GORA DQ 25 (80m): 23.iv.1986, leg. Vujić A; 6.v.1986, leg. Vujić A; 11.vi.1986, leg. Vujić A; 3.iv.1988, leg. Radnović D, Vujić A; 23.iv.1988, leg. Radnović D, Vujić A; 16.iv.1989, leg. Milankov Vesna, Radović Dragana, Vujić A; 15.iv.1990, leg. Milankov Vesna, Vujić A; (2) OBREŽ DQ 15 (80m): 26.viii.1989, leg. Milankov Vesna, Radnović D, Radović Dragana, Vujić A.

Subpannonian mountains (Map 5:4,5). Biome of South European, mostly deciduous woodlands.

The two mountains, Cer (Map 5:4) (in the south from Šabac) and Vlašić (Map 5:5) (southwest from Valjevo) that were studied, are covered with oak and mixed forests. Hoverflies were collected during 1989.

IBNS: CER (687m): PETKOVICA CQ 74 (300m): 9.iv.1989, leg. Vujić A; 12.v.1989, leg. Vujić A. VLAŠIĆ (474m): ZAVLAKA CQ 82 (300m): 5.iv.1989, leg. Vujić A; 12.v.1989, leg. Vujić A; 25.ii.1990, leg. Vujić A.

Deliblato sands (Deliblatska peščara) (Map 5:6). Biome of European steppes and forest-steppes.

This region represents the largest aeolian accumulation area in the Balkan Peninsula. It originates from Wurm glaciation period due to river and lake sand. Today, its greatest part is under the vegetation, partially autochthonous steppe habitats. It belongs to the protected areas. The insect material was collected from 1983.

IBNS: Investigated localities (1-8): (1) ALIBUNAR DQ 99 (90m): 21.iv.1989, leg. Šimić Smiljka, Vujić A; (2) ČARDAK EQ 16 (80m) leg. Šimić Smiljka; (3) DELIBLATO EQ 09 (80m): 7.viii.1989, leg. Vujić A; (4) FLAMUNDA EQ 08 (80m) leg. Šimić Smiljka; (5) LOVIŠTE EQ 16: 11.v.1983, leg. Šimić Smiljka, Vujić A; (6) MRAMORAK DQ 97 (90m): 22.v.1983, leg. Šimić Smiljka, Vujić A; (7) ROŠIJANA EQ 07 (80m) leg. Šimić Smiljka; (8) ŠUŠARA EQ 17 (80m) 19.v.1989, leg. Vujić A; leg. Šimić Smiljka. **NHMB**: leg. Glumac S: Deliblatska peščara (?).

Tisa valley (Potisje) (Map 5:7). Biome of South European, mostly deciduous woods in lowland and inundated areas.

Along the banks of the river Tisa there are only the remnants of former flooded willow forests that covered a large area in the river valley. The investigations were carried out in 1984-1985.

IBNS: Investigated localities (1-4): (1) EČKA (Carska bara) DR 51 (90m): 9.vii.1985, leg. Šimić Smiljka, Vujić A; (2) KANJIŽA DS 20 (80m): 19.iv.1984, leg. Šimić Smiljka, Vujić

A; (3) NOVI BEČEJ (Slano Kopovo) DR 35 (80m): 4.iv.1991, leg. Radović Dragana, Vujić A; (4) TITELSKI BREG DR 40 (100m): 12.v.1985, leg. Šimić Smiljka, Vujić A; 9.vii.1985, leg. Šimić Smiljka, Vujić A.

Isolated records. Biome of South European, mostly deciduous woodlands.

The collection of hoverflies on certain localities was done during one or two field trips. All reported habitats are characterized by South European deciduous forests of flooded (Koviljski rit, Apatin), lowland (Bač, Doroslovačka šuma, Svilojevo) or hilly type (Dilj, Kozara, Papuk). There are also a considerable number of records from collections of Langhoffer and Lucas.

IBNS: Investigated localities: APATIN CR 45 (80m): 26.v.1991, leg. Vujić A; BAČ CR 62 (60m): 13.vii.1985, leg. Vujić A; DILJ (461m): PETNJA BR 61 (300m): 21.v.1985, leg. Vujić A; 21.viii.1985, leg. Vujić A; DOROSLOVO (Doroslovačka šuma) CR 55 (90m): 9.iv.1991, leg. Vujić A; GLOGONJ DQ 68, leg. Radišić P; KOVILJSKI RIT DR 20 (100m): 24.iv.1990, leg. Vujić A; KOZARA (976m): KOZARAC XK 48 (600m): 1.v.1990, leg. Radnović D, Vujić A; MOROVIĆ CQ 58, leg. Šimić Smiljka; PAPUK (836m) YL 14 (500m): 15.iv.1991, leg. Vujić A; SVILOJEVO CR 45 (80m): 2.v.1983, leg. Vujić A; ŽABALJ DR 22, leg. Radenković Snežana. **NHMB**: leg. Glumac S: Avala DQ 65; Beograd (Košutnjak) DQ 66; Beograd (Topčider) DQ 55; leg. Stojičević: Avala DQ 56. **CNHM**: leg. Langhoffer A: Ivančica (?); Osijek CR 14, CR 24; Papuk (Jankovac) YL 04; Petrinja WL 93; Samobor (Rude) WL 56; Sljeme WL 78; Zagreb WL 77; Zemun (Ada) DQ 56. **JLC**: leg. Lucas J: Kašina WL 88; Samobor WL 57; Samobor (Rude) WL 56; Sljeme WL 78; Zagreb (Cmrok) WL 77; Zagreb (Jelenovac) WL 77; Zagreb (Maksimir) WL 77; Zagreb (Tuškanac) WL 77; Zagreb (Villa Rebba) WL 77; Zagreb (Zaprešić) WL 67; Zelina WL 99.

Moesian Hilly Regions and Foothills (B) (Map 7). The Moesian hills are located on the slopes of the east Carpathians, west Stara Planina mountain, west Rilo-Rhodopes, on the south slopes of Romanian Carpathians and over the whole territory of the central part of the Balkan Peninsula, i.e. from Čačak to Sofia and on the South to the province of Kosovo and wider vicinity of Vranje (Matvejev, 1976). This region is characteristic with Submediterranean forests of *Quercus farnetto* and *Q. cerris* and with polydominant communities of lilacs usually found in gorges. The greatest part of the Moesian region is under a strong anthropogenic influence and with extremely degraded biocenoses. Detailed investigations were done on the mountains in the vicinity of the town of Niš (Suva planina, Svrljiške mountains, Seličevica). Areas investigated over a long period include Suva planina. Areas investigated for one years include Svrljiške planine.

Suva planina (1809m) (Map 5:8). Biome of Submediterranean broad-leaved woodlands; biome of South European, mostly deciduous woodlands.

A mountain in the central part of Balkan Peninsula located southeast from the Niš. Suva planina is rich with heterogeneous plant communities that change according to the altitude. Lower zones are characterized by Submediterranean deciduous forests of *Quercus farnetto* and *Q. cerris* covering the slopes and with relict biocenoses of lilac in the gorges. More humid oak and beech woodlands grow at higher altitudes. All types of biocenoses were included in the researching over several years (1988-1994).

Map 7 Moesian hilly areas

IBNS: Investigated localities (1-6): (1) BOJANINE VODE EN 98 (700m): 2.v.1988, leg. Radnović D, Vujić A; 28.v.1988, leg. Ercegovac Ljiljana, Vujić A; 16.vii.1989, leg. Milankov Vesna, Radnović D, Radović Dragana, Vujić A; (2) ČUKLJENIK EN 89 (600m): 9.iv.1988, leg. Vujić A; 2.v.1988, leg. Radnović D, Vujić A; 28.v.1988, leg. Ercegovac Ljiljana, Vujić A; (3) GORNJA STUDENA EN 89 (400m): 2.v.1988, leg. Radnović D, Vujić A; 2.iv.1989, leg. Vujić A; (4) JELAŠNICA EN 89 (400m): 2.v.1988, leg. Radnović D, Vujić A; 2.iv.1989, leg. Vujić A; 2.iv.1991, leg. Vujić A; 13.iv.1991, leg. Radnović D, Vujić A; 2.iv.1992, leg. Vujić A; 1.v.1994, leg. Radenković Snežana, Radnović D, Vujić A; (5) KUNOVICA EN 99 (300m): 9.iv.1988, leg. Vujić A; 2.v.1988, leg. Radnović D, Vujić A; 2.iv.1991, leg. Vujić A; 13.iv.1991, leg. Radnović D, Vujić A; 2.iv.1992, leg. Vujić A; (6) SIĆEVAČKA KLISURA EN-99 (300m): 2.iv.1994, leg. Vujić A.

Svrljiške planine (1334m) (Map 5:9). Biome of Submediterranean broad-leaved woodlands.

These mountains extend between the valley of the river Nišava and Svrljig basin. They lie along the meridian direction for about 30 km; part of them is bare, the other is under the forests. Flies were collected during the year 1989.

IBNS: Investigated localities (1-4): (1) BELOINJE EP 90 (450m): 12.vii.1989, leg. Milankov Vesna, Radnović D, Radović Dragana, Vujić A; (2) CRNI VRH EP 90 (1000m): 7.vii.1989, leg. Milankov Vesna, Radnović D, Radović Dragana, Vujić A; (3) CRNI VRH/ZELENI VRH EP 90 (1000m): 11.vii.1989, leg. Milankov Vesna, Radnović D, Radović Dragana, Vujić A; (4) GULIJAN EP 90 (450m): 9.vii.1989, leg. Milankov Vesna, Radnović D, Radović Dragana, Vujić A.

Isolated records. Biome of Submediterranean broad-leaved woodlands.

The localities where the insects were collected only during one field trip are on the slopes of the mountain Povlen (southwest from the town of Valjevo), hills Seličevica (on the East of Niš) and along the river Binačka Morava (the province of Kosovo). These areas are under a strong anthropogenic influence; only the fragments of forests are present.

IBNS: BINAČKA MORAVA EM 39 (300m): 19.iv.1987, leg. Radnović D, Vujić A; JUHOR (774m) (KOLARE-DOBRE VODE) EP 15, EP 25, leg. Radišić P, Radnović D; SELIČEVICA (903m) EN 78 (600m): 2.iv.1989, leg. Vujić A, Zlatković B. **NHMB**: leg. Glumac S: Priština EN 12. **BHMS**: leg. Hilf: Požarevac EQ 14. **ZIS**: leg. Nedelkov: Dimitrovgrad (Poganovo) FN 35.

Macedonian Hilly Terrains and Foothills (B-1). Lying at the slopes of the South Dinaric mountains, North Dinaric mountains (southeastern part), Rilo-Rhodopes and North Greece mountains (Matvejev, 1976). In this region Submediterranean Adriatic deciduous woodlands are characterized by a great number of different forest types. In South Greece there mountains slopes are covered by semidesert or evergreen vegetation (Matvejev, 1976). Such habitats offer unfavorable conditions for the species of the investigated genera. Therefore, material was collected from only certain localities.

Isolated records. Biome of Submediterranean broad-leaved woodlands.

The only investigated locality was the valley of the river Bregalnica, in eastern Macedonia.

IBNS: KRIVA LAKAVICA FL 29 (500m): 13.iv.1987, leg. Radnović D, Vujić A. Leg. Glumac S: Bregalnica (?) Kočanska reka FM 14; Lukićevo (?); Radoviš FM 21.

Dacian Hilly Terrains and Foothills (B-2). The Dacian area includes the slopes of the central part of the Balkan range (Stara Planina). All examined material belongs to other museum collections (leg. Glumac, Nedelkov).

NHMB: leg. Glumac S: Ključ (Negotin) (?). **ZIS**: leg. Nedelkov: Pleven LJ 00.

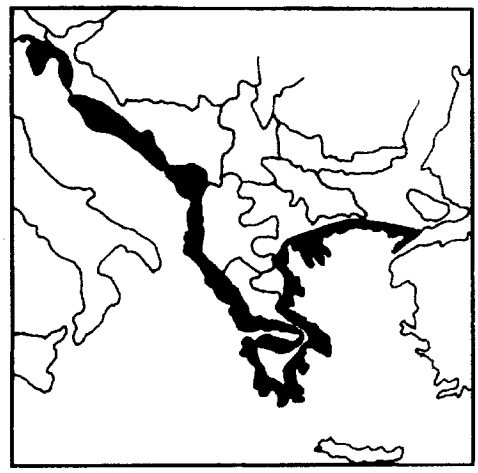
Strandža Hilly Terrains and Foothills (B-3). This region occupies the eastern most part of the Balkan Peninsula. It is characterized by somewhat more humid climate and abundance in Caucasus-Asia Minor elements of fauna (Matvejev, 1976). Only a few records in the collection of the Zoological Institute in Sofia from this region were found.

ZIS: leg. Nedelkov: Strandža planina.

4. 1. 2. 2. SEASHORES (MEDITERRANEAN AND SUBMEDITERRANEAN) (Map 8)

This biogeographical territory includes the shores of the Adriatic, Ionian, Aegean and Pontic (Black Sea) seas. The contour of the coasts was very different in the past. During the last glaciation period all the Mediterranean seas withdrew and the land made a connection with many islands (Matvejev, 1976). Biome of evergreen Mediterranean maritime woodlands and maquis occupy a narrow belt along the coasts. In the biocenoses of this biome only a modest number of *Cheilosia* species was observed. Further inland, there are the Submediterranean areas influenced by the Mediterranean fauna. The insect material was collected along the Adriatic coast, river Morača and Skadar lake. Data for Aegean seashore are from Lucas collection.

Adriatic Seashore (C). This territory includes a narrow belt along the coast and certain relict habitats further inland, near the rivers (Matvejev, 1976). In the biome of the Mediterranean evergreen woodlands a special position is occupied by the *Quercus ilex* forests. The majority of the *Cheilosia* specimens was collected in the Submediterranean forests. The following areas were investigated for one or two years.



Map 8 Mediterranean and Submediterranean

Boka Kotorska (Map 5:10). Biome of Mediterranean evergreen maritime woodlands and maquis.

The most attractive, second in size, Adriatic bay. The study was carried out at the Orijen Mountain foot, beneath Krivošija, in the holm-oak forest during the period 1990-1991.

IBNS: Investigated localities (1): (1) MORINJ CN 00 (10m): 29.iv.1990, leg. Radnović D, Vujić A; 28.iv.1990, leg. Radnović D, Šimić Smiljka, Vujić A; 12.v.1991, leg. Šimić Smiljka, Vujić A; 4-7.v.1994, leg. Vujić A; 17.v.1994, leg. Radišić P, Vujić A; 25.viii.1994, leg. Radnović Sanja, Vujić A.

The Morača canyon (Kanjon Morače) (Map 5:11). Biome of submediterranean Adriatic broad-leaved woodlands and shrubs.

The Morača river originating beneath the mountain Moračka kapa and empties into Skadar Lake. The river cut a 35 km long and up to 1000 m wide canyon valley. The Submediterranean influence is the strongest in the lower part of the canyon. The flies were collected during 1990.

IBNS: Investigated localities (1): (1) KANJON MORAČE CN 62 (300/500m): 21.ii.1990, leg. Vujić A; 4.iv.1990, leg. Vujić A; 28.iv.1990, leg. Radnović D, Vujić A.

Skadar Lake (Rumija) (Map 5:12). Biome of Submediterranean Adriatic mostly broad-leaved woodlands.

Skadar lake is the largest lake in the Balkan Peninsula and its waters fill the karst field and basin of 43 km in length with the river Morača as a tributary and the river Bojana as the arm of the lake. Although this area had been investigated for several years (Šimić, 1987) only a small number of *Cheilosia* species was collected in the biocenoses located near the lake. More abundant in species are the slopes of Rumija, a mountain located between the Adriatic coast and the Skadar lake. The mountain is covered with Submediterranean deciduous forests; the material was collected during 1990.

IBNS: Investigated localities (1-2): (1) RUMIJA CM 56 (300m): 21.ii.1990, leg. Vujić A; 5.iv.1990, leg. Vujić A; (2) BRISKA CM 66 (200m) leg. Šimić Smiljka.

Isolated records. Biome of evergreen Mediterranean maritime woodlands and maquis.

Along the seashore most *Cheilosia* species appear in early spring. The samples were collected during the interval February-April.

IBNS: BAR-KOTOR CM 19 (50m): 22.ii.1990, leg. Vujić A; BENKOVAC WJ 47 (50m), leg Radnović Sanja; SLANO YH 34 (30m): 29.iv.1990, leg. Radnović D, Vujić A; TROGIR XJ 02, leg. Nonveiller G; TRSTENO YH 43 (10m): 23.ii.1990, leg. Vujić A; ZRMANJA (vrelo) WJ 89, leg. Šimić Smiljka. **NHMB**:leg. Glumac S: Kopar VL 04; Umag UL 83. **CNHM**: leg. Langhoffer A: Rijeka VL 52; Rijeka (Lopača) VL 51. **JLC**: leg. Lucas J: Biograd na moru (WJ 36); Krk (Baška) VK 87; Krk (Punat) VK 78; Omiš XJ 31; Rijeka VL 52; Rovinj (Limski kanal) UK 99. **SNHM**: leg. Sivec I: Izola (Strunjan) UL 94. **BHMS**: leg. Winneguth: Stolac YH 47.

Aegean Seashore (C-1). The data about the investigated insect group for the Aegean coast are very poor. The conditions prevailing in these biocenoses are not suitable for the majority of *Cheilosia* species.

IBNS: XANTHI LF 25 (400m): 15.iii.1990, leg. Vujić A. **JLC**: leg. Lucas J: Euboea: (Scta) GH-48, (Steni) GH-39; Langadas-Tessaloniki FL 71.

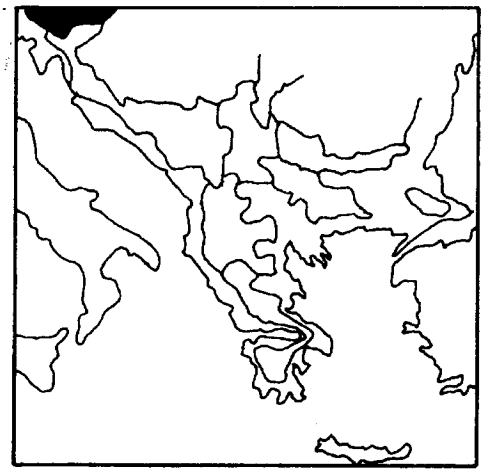
4. 1. 2. 3. MOUNTAIN SYSTEMS

Mountains predominte in the relief of the Balkan Peninsula. The ecological conditions vary through the different altitudunal zones. At the end of the Tertiary, all Balkan mountains were formed with a characteristic Pleistocene flora and fauna. During the period of glaciation and the penetration of cold climate, Tertiary biocenoses withdrew southward to the lower altitudes seeking for more favorable conditions. In northern areas they survived in the refuges - usually very deep gorges. The process of glaciation caused the formation of separate glacial biocenoses in central Europe that extended their distribution to the Balkan Peninsula. During interglacial periods these biocenoses existed on the highest mountains of the Balkan, occupying the refuge areas (postglacial groups of habitats) (Matvejev, 1976). The researching included the mountains of all biogeographical territories.

Eastern Alps (D) (Map 9). The eastern Alps border with north Dinaric mountains and contains many mutual species. Postglacial habitats are predominant on the Alps where the biome of European coniferous woodlands of boreal type and the biome of Alpine and high Nordic rocky ground and pastures are represented. Areas investigated for one or two years include Julian Alps, Kamniške and Savinjske Alps.

Julian Alps (Julijske Alpe) (2864m) (Map 5:13). Biome of European, mostly coniferous boreal type woodlands; biome of Alpine and High Nordic rock-grounds, pastures and snow patches; biome of South European, mostly deciduous foothills and montane woodlands.

Researching was conducted in the area of the Triglav National Park on a number of localities. Triglav is the highest mountain peak on the Balkan Peninsula. There are coniferous forests and open areas of Alpine, high mountains pastures and rocky grounds. Hoverflies were collected at lower altitudes also, in humid beech forests. This region has a great diversity of *Cheilosia* species.



Map 9 Eastern Alps

IBNS: Investigated localities (1-10): (1) BLED-BOHINJ VM 23 (500m): 14.vi.1988, leg. Radnović D, Vujić A; (2)

BOHINJSKA BISTRICA VM 12 (500m): 14.vi.1988, leg. Radnović D, Vujić A; (3) BOHINJSKO JEZERO-ČRNO JEZERO VM 02 (1300m): 2.vii.1989, leg. Vujić A; (4) BOHINJSKA BISTRICA-SAVICA VM 02 (600m): 14.vi.1988, leg. Radnović D, Vujić A; 22.v.1989, leg. Vujić A; (5) IZVIR SOČE-ZADNJA TRENTA VM 04, UM 94 (900/1200m): 18.vi.1988, leg. Radnović D, Vujić A; 23.v.1989, leg. Vujić A; (6) KRANJSKA GORA VM 05 (1000m): 23.v.1989, leg. Vujić A; (7) MEŽAKLA VM 24 (600m): 18.vi.1988, leg. Radnović D, Vujić A; (8) MOJSTRANA-VRATA VM 14 (900m): 23.v.1989, leg. Vujić A; (9) POKLJUKA VM 13 (1500m): 22.v.1989, leg. Vujić A; 2.vii.1989, leg. Vujić A; (10) VRŠIČ VM 04 (1611m): 18.vi.1988, leg. Radnović D, Vujić A; 23.v.1989, leg. Vujić A. **JLC**: Lucas J: Bled VM 23; Bohinj VM 12; Bohinj (Vintgar) VM 23; Bovec UM 83. **SNHM**: leg. Sivec I: Blegoš VM 31; Bohinj (Bela stena) VM 03; Bohinj (Sedmera jezera) VM 03; Bohinj (Vogar) VM 13; Bovec (Kanin) UM 83; Komna VM 03; Pokljuka (pod Tošcem) VM 13.

Kamniške and Savinjske Alps (Kamniške in Savinjske Alpe) (2558m) (Map 5:14). Biome of European, mostly coniferous boreal type woodlands; biome of Alpine and High Nordic rock-grounds, pastures and snow patches; biome of South European, mostly deciduous foothill and montane woodlands.

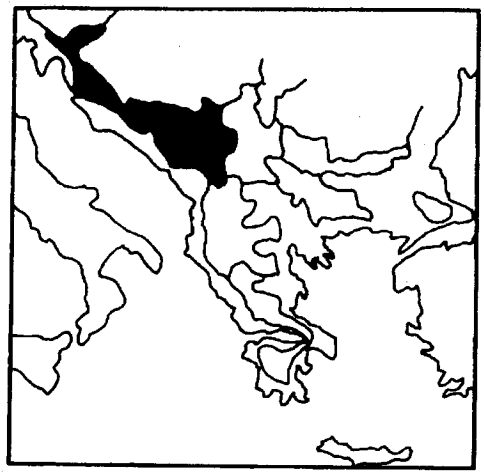
The mountain range of Kamniške and Savinjske Alps is located between the basin Gorenjska and the mountains Karavanke. The investigations included the localities in the valley of the rivers Dreta, Kamniška Bistrica and Savinja and Glacial basins (Logarska dolina, Matkov Kot). The material was collected during two years (1988-1989).

IBNS: Istraženi lokaliteta (1-6): (1) DRETA (Šmiklanž) VM 82 (500m): 16.vi.1988, leg. Radnović D, Vujić A; (2) KAMNIŠKA BISTRICA VM 63 (1000/1400m): 16.vi.1988, leg. Radnović D, Vujić A; 21.v.1989, leg. Vujić A 30.vi.1989, leg. Vujić A; (3) LOGARSKA DOLINA VM 63, VM 73, VM 74 (1000m): 17.vi.1988, leg. Radnović D, Vujić A; 25.v.1989, leg. Vujić A; 1.vii.1989, leg. Vujić A; (4) MATKOV KOT VM 64 (1400m): 25.v.1989, leg. Vujić A; 1.vii.1989, leg. Vujić A; (5) SAVINJA (LUČE) VM 73 (700m): 16.vi.1988, leg. Radnović D, Vujić A; (6) SAVINJA (SOLČAVA) VM 74 (900m): 16.vi.1988, leg. Radnović D, Vujić A; 1.vii.1989, leg. Vujić A. **JLC**: leg. Lucas J: Ljubelj (Loiblpas) VM 44.

North Dinaric (E) (Map 10). North Dinaric mountains extend along the Adriatic coast, from the Julian Alps on the north to the mountains of Kopaonik and Prokletije and the river Drim on the east. Preglacial group of habitats are distributed in seashore area and on the south mountain slopes while glacial and postglacial habitats occupy the continental region and colder slopes (Matvejev, 1976). The mountains belonging to this range are characteristic with various habitats in the form of altitudinal zones, isolated refuges and bordered zones between different biogeographical regions. North Dinaric mountains are predominant with biomes of south European deciduous woodlands and European mostly coniferous forests of boreal type. At the highest altitudes there are

elements of the biome of Alpine high mountain rocky grounds and pastures. The main study was conducted on the Dinaric mountains. The fauna of the mountain Durmitor and Kopaonik was a subject of special and detailed investigations for many years. Eleven mountains were studied during one or two seasons: Bjelasica, Bjelašnica, Gorski Kotar, Grmeč, Jahorina, Javor, Konjuh, Mala Kapela, Menina, Tara, and Volujak.

Durmitor (2522m) (Map 5:15). Biome of South European, mostly deciduous foothill and montane woodlands; biome of European, mostly coniferous boreal type woodlands; biome of Alpine and High Nordic rock-grounds, pastures and snow patches.



Map 10 North Dinaric mountains

Durmitor, in Montenegro, is one of the highest mountains within the Dinaric system. It is 50 km long and up to 20 km wide. It decends into the canyons of the rivers Tara, Piva and Sušica in steep slopes 1000 m high. During the Pleistocene, the mountain was under glaciers whose remnants in the form of cirques and basins today provide refuges of glacial biocenoses (Škrčko ždrijelo). Durmitor is protected by UNESCO and has the status of a National park of worldwide importance. The fauna of Durmitor was thoroughly studied in the period from 1981-1985. The results were published in the form of a monograph with other data on the fauna of hoverflies in Montenegro (Šimić, 1987). The abundance of *Cheilosia* species and their zogeographical importance inspired additional researching that was carried out from 1989 to 1994.

IBNS: Investigated localities (1-32): (1) ALUGE CN 58 (1400m): 17.viii.1984, leg. Šimić Smiljka, Vujić A; 26.vi.1985, leg. Vujić A; (2) BOSAČA CN 48 (1500m): 7.vii.1983, leg. Aleksić D, Šimić Smiljka, Vujić A; (3) CREPULJ POLJANA CN 48 (1800m): 4.vii.1991, leg. Radnović D, Stolić Sanja, Vujić A; (4) CRNO JEZERO CN 47 (1500m): 20.vi.1983, leg. Aleksić D, Vujić A; 25.viii.1984, leg. Šimić Smiljka, Vujić A; 4.vi.1994, leg. Vujić A; (5) CRNO JEZERO-OTOKA CN 47 (1500m): 5.viii.1982, leg. Ercegovac Ljiljana, Šimić Smiljka, Vujić A; 20/26.vi.1983, leg. Aleksić D, Vujić A; 5.vii.1983, leg. Aleksić D, Šimić Smiljka, Vujić A; 23.viii.1994, leg. Radnović Sanja, Vujić A; (6) CRNO JEZERO-SAVIN KUK CN 47 (1500/1800m): 25/27.vi.1983, leg. Aleksić D, Vujić A; (7) ČELINE CN 47 (1600m): 6.vii.1981, leg. Aleksić D, Ercegovac Ljiljana,

Šimić Smiljka, Vujić A; 27.vi.1983, leg. Aleksić D, Vujić A; (8) DONJA ALIŠNICA CN 47 (2000m): 6.vii.1991, leg. Radnović D, Stolić Sanja, Vujić A; (9) DONJA BUKOVICA CN 46 (1400m): 28.viii.1984, leg. Šimić Smiljka, Vujić A; (10) ĐURĐEVIĆA TARA CN 67 (800m): 17.viii.1984, leg. Šimić Smiljka, Vujić A; 22.v.1985, leg. Vujić A; 26.vi.1985, leg. Vujić A; (11) IVAN DO CN 47 (1500m): 14/18.viii. 1984, leg. Šimić Smiljka, Vujić A; 27.vi.1993, leg. Radnović Sanja, Vujić A; (12) JABLAN BARA CN 47 (1600m): 12.viii.1984, leg. Šimić Smiljka, Vujić A; (13) JABLAN JEZERO CN 48 (1800m): 7.vii.1991, leg. Radnović D, Stolić Sanja, Vujić A; 6.vii.1992, leg. Radović Dragana, Vujić A; (14) KANJON KOMARNICE CN 36 (1300m): 22.viii.1984, leg. Šimić Smiljka, Vujić A; 23.viii.1994, leg. Radnović Sanja, Vujić A; (15) KANJON SUŠICE CN 38 (1100/1300m): 3.viii.1982, leg. Ercegovac Ljiljana, Šimić Smiljka, Vujić A; 8.vii.1983, leg. Aleksić D, Šimić Smiljka, Vujić A; 24.viii.1984, leg. Šimić Smiljka, Vujić A; 25/28.vi.1985, leg. Vujić A; 17.viii.1988, leg. Radović Dragana, Vujić A; 9.vii.1991, leg. Radnović D, Stolić Sanja, Vujić A; 4.vii.1993, leg. Vujić A; 2.vi.1994, leg. Vujić A; 6.vii.1994, leg. Radenković Snežana, Radišić Marija, Vujić A; (16) LUKE CN 37 (1700m): 24.viii.1984, leg. Šimić Smiljka, Vujić A; 30.vi.1985, leg. Vujić A; 8.vii.1991, leg. Radnović D, Stolić Sanja, Vujić A; 1.vii.1993, leg. Vujić A; 1.vi.1994, leg. Vujić A; (17) MALI MEĐED CN 47 (2000m): 13.viii.1984, leg. Šimić Smiljka, Vujić A; (18) MALI ŠTUOC CN 48 (1700m): 9.vii.1981, leg. Aleksić D, Ercegovac Ljiljana, Šimić Smiljka, Vujić A; (19) MOTIČKI GAJ CN 47 (1500m): 8.viii.1982, leg. Ercegovac Ljiljana, Šimić Smiljka, Vujić A; 6/10.vii.1983, leg. Aleksić D, Šimić Smiljka, Vujić A; (20) PIRLITOR-KANJON TARE CN 58 (1000/1500m): 7/8.viii.1982, leg. Ercegovac Ljiljana, Šimić Smiljka, Vujić A; 29.viii.1984, leg. Šimić Smiljka, Vujić A; (21) PITOMINE CN 48 (1500m): 1.vii.1983, leg. Aleksić D, Vujić A; 5/9.vii.1983, leg. Aleksić D, Šimić Smiljka, Vujić A; 27.viii.1984, leg. Šimić Smiljka, Vujić A; (22) PRUTAŠ CN 37 (2300m): 2.vii.1993, leg. Radnović Sanja, Vujić A; (23) RAZVRŠJE CN 47 (1500m): 21.viii.1984, leg. Šimić Smiljka, Vujić A; (24) SAMAR CN 37 (2000m): 1.vii.1993, leg. Radišić P; Radnović D; Vujić A; (25) SKAKALA CN 37 (1300/1600m): 9.vii.1992, leg. Radović Dragana, Vujić A; 1/2.vii.1993, leg. Radišić P, Radnović D, Radnović Sanja, Radović Dragana, Radović N, Vujić A; 1/3.vi.1994, leg. Vujić A; 6.vii.1994, leg. Vujić A; 2.viii.1994, leg. Vujić A; (26) STOŽINA CN 47 (1700m): 4.viii.1982, leg. Ercegovac Ljiljana, Šimić Smiljka, Vujić A; (27) SUVI KLEK CN-37 (2000m): 3.vi.1994, leg. Vujić A; (28) ŠARENI PASOVI CN-37 (1900m): 2.vii.1993, leg. Radnović Sanja, Vujić A; 6.vii.1994, leg. Milankov Vesna, Radenković Snežana, Radišić Marija, Vujić A; 1.viii.1994, leg. Vujić A; (29) ŠKRČKA JEZERA CN 37 (1700m): 5.vii.1983, leg. Aleksić D, Šimić Smiljka, Vujić A; 30.vi.1985, leg. Vujić A; 9.viii.1985, leg. Vujić A; 30.vi.1993, leg. Radišić P, Radnović D; Radnović Sanja, Vujić A; 5/6.vii.1994, leg. Radenković Snežana, Radišić Marija, Vujić A; (30) ŠKRČKO ŽDRIJELO CN 37 (1900/2100m): 24.viii.1984, leg. Šimić Smiljka, Vujić A; 30.vi.1985, leg. Vujić A; 8.vii.1991, leg. Radnović D, Stolić Sanja, Vujić A; 8.vii.1992, leg. Radović Dragana, Vujić A; (31) TEPCA CN 48 (800m): 21.vi.1983, leg. Aleksić D, Vujić A; 6.vii.1983, Aleksić D, Šimić Smiljka, Vujić A; (32) ZMINJE JEZERO-MLINSKI POTOK CN 48 (1500m): 22.vi.1985, leg. Vujić A; 29.vi.1985, leg. Vujić A; 6.viii.1985, leg. Vujić A; 28.vi.1989, leg. Vujić A; 3.vii.1991, leg. Vujić A.

Kopaonik (2016m) (Map 5:16). Biome of South European, mostly deciduous foothill and montane woodlands; biome of European, mostly coniferous boreal type woodlands.

Kopaonik is the most eastern mountain in the Dinaric system and occupies a central position on the Balkan Peninsula. It lies between the rivers Ibar, Župa and the basin of Kosovo. The north part of the mountain is a National park and extends above the altitude of 700 m. The location of the mountain at the crossing of several biogeographical territories resulted in the formation of abundant and heterogeneous fauna. Kopaonik is covered with south European deciduous woodlands but at the altitudes above 1500 m there are biomes of European coniferous forests of boreal type. The studies were carried out for several years (1985-1991) on the whole mountain territory and in all habitat types.

IBNS: Investigated localities (1-28): (1) BRUS EP 00 (500m): 24.v.1987, leg. Božičić Branka, Šimić Smiljka, Vujić A; (2) BRZEĆKA REKA DN 99 (700m): 24.iv.1987, leg. Ercegovac Ljiljana, Vujić A; 24/27.v.1987, leg. Božičić Branka, Šimić Smiljka, Vujić A; 21.vi.1987, leg. Vujić A; 1.v.1992, leg. Radnović D, Radnović Sanja, Vujić A; (3) DUBOKA REKA DN 89 (1500m): 23.v.1986, leg. Radnović D, Vujić A; 18.vi.1986, leg. Božičić Branka, Šimić Smiljka, Vujić A; 6.vii.1986, leg. Radišić P, Radnović D, Vujić A; (4) GOBELJSKA REKA DP 80 (800m): 25.v.1987, leg. Božičić Branka, Šimić Smiljka, Vujić A; 24.vi.1987, leg. Vujić A; 4.viii.1987, leg. Vujić A; 2.v.1992, leg. Vujić A; (5) GRAŠEVAČKA REKA DN 99 (600m): 26.iv.1987, leg. Ercegovac Ljiljana, Vujić A; 24/27.v.1987, leg. Božičić Branka, Šimić Smiljka, Vujić A; 21.vi.1987, leg. Vujić A; (6) JABLANOVA RAVAN DN 89 (1300m): 20.v.1986, leg. Radnović D, Vujić A; 4.vii.1986, leg. Radišić P, Radnović D, Vujić A; 23.vi.1991, leg. Vujić A; 23.v.1993, leg. Vujić A; (7) JANKOVE BARE DN 89 (1400m): 15.vi.1986, leg. Božičić Branka, Šimić Smiljka, Vujić A; 2.viii.1987, leg. Vujić A; (8) JASLE-ČUKARA DN 89 (1400m): 20.v.1986, leg. Radnović D, Vujić A; 14.vi.1986, leg. Božičić Branka, Šimić Smiljka, Vujić A; 4.vii.1986, leg. Radišić P, Radnović D, Vujić A; 22/23.v.1993, leg. Radenković Snežana, Vujić A; (9) JOŠANICA DP 80 (700m): 26.v.1987, leg. Božičić Branka, Šimić Smiljka, Vujić A; 24.vi.1987, leg. Vujić A; (10) JOŠANIČKA BANJA DP 70 (600m): 29.iv.1987, leg. Ercegovac Ljiljana, Vujić A; 24.vi.1987, leg. Vujić A; 8.iv.1988, leg. Vujić A; 2.v.1991, leg. Radnović D, Vujić A; (11) KADIJEVAC DN 89 (1300m): 21.v.1986, leg. Radnović D, Vujić A; 21.vi.1991, leg. Šimić Smiljka, Vujić A; (12) KARAMAN DN 89 (1900m): 17/20.vii.1985, leg. Vujić A; 22.vi.1991 leg. Vujić A; (13) KARAMANSKI POTOK DN 89 (1700m): 20.vii.1985, leg. Vujić A; 24.v.1986, leg. Radnović D, Vujić A; 15.vi.1986, leg. Božičić Branka, Šimić Smiljka, Vujić A; 7.vii.1986, leg. Radišić P, Radnović D, Vujić A; 22.vi.1987, leg. Vujić A; 7.vi.1989, leg. Vujić A; 28.v.1994, leg. Vujić A; (14) KOKOROVAC DP 80 (1000m): 26.v.1987, leg. Božičić Branka, Šimić Smiljka, Vujić A; 2.v.1992, leg. Radnović D, Radnović Sanja, Vujić A; (15) PAJINO PRESLO DN 89 (1700m): 18.vi.1986, leg. Božičić Branka, Šimić Smiljka, Vujić A; (16) PALJEŠTIČKA REKA DN 79 (700m): 23.vi.1987, leg. Vujić A; (17) PLOČANSKA REKA DP 80 (800m): 28.iv.1987, leg. Ercegovac Ljiljana, Vujić A; (18) RADOŠIĆE DN 79 (600m): 29.iv.1986, leg. Vujić A; 17.vi.1986, leg. Božičić Branka, Šimić Smiljka, Vujić A; (19) RASINA

DP 91 (500m): 24/29.v.1987, leg. Božičić Branka, Šimić Smiljka, Vujić A; (20) SAMOKOVSKA REKA 1, DN 89 (700/1000m): 19.vii.1985, leg. Vujić A; 1/2.v.1986, leg. Božičić Branka, Vujić A; 22.v.1986, leg. Radnović D, Vujić A; 16.vi.1986, leg. Božičić Branka, Šimić Smiljka, Vujić A; 5.vii.1986, leg. Radišić P, Radnović D, Vujić A; 3.viii.1987, leg. Vujić A; 2.v.1991, leg. Radnović D, Vujić A; 22.vi.1991, leg. Šimić Smiljka, Vujić A; 2.v.1992, leg. Vujić A; 24.v.1992, leg. Vujić A; 27.v.1994, leg. Vujić A; (21) SAMOKOVSKA REKA 2, DP 70 (1000/1600m): 2.v.1986, leg. Božičić Branka, Vujić A; 22.v.1986, leg. Radnović D, Vujić A; 16.vi.1986, leg. Božičić Branka, Šimić Smiljka, Vujić A; 5.vii.1986, leg. Radišić P, Radnović D, Vujić A; 3.viii.1987, leg. Vujić A; 21/22.vi.1991, leg. Šimić Smiljka, Vujić A; 24.v.1993, leg. Vujić A; 27.v.1994, leg. Vujić A; (22) SEMETEŠ DN 89 (900m) leg. Božičić Branka; (23) SREBRNAC DN 89 (1000m): 24.v.1987, leg. Božičić Branka, Šimić Smiljka, Vujić A; 21.vi.1987, leg. Vujić A; 7.vi.1989, leg. Vujić A; 2.v.1991, leg. Radnović D, Vujić A; (24) SUNČANA DOLINA DN 89 (1600m): 4.vii.1986, leg. Radišić P, Radnović D, Vujić A; 21/23.vi.1991, leg. Šimić Smiljka, Vujić A; 22/23.v.1993, leg. Radenković Snežana, Šimić Smiljka, Vujić A; (25) SUVO RUDIŠTE DN 89 (1900m): 23.v.1992, leg. Radišić P, Radnović D, Vujić A; (26) TRESKA DN 89 (1500m): 17.vii.1985, leg. Vujić A; (27) VELIKA REKA DN 89 (1300m): 2.v.1986, leg. Božičić Branka, Vujić A; 23.v.1986, leg. Radnović D, Vujić A; 18.vi.1986, leg. Božičić Branka, Šimić Smiljka, Vujić A; 4.vii.1986, leg. Radišić P, Radnović D, Vujić A; 4.viii.1987, leg. Vujić A; (28) ŽLJEB DN 89 (1700m): 6.vii.1986, leg. Radišić P, Radnović D, Vujić A; 21.vi.1987, leg. Vujić A. **NHMB**: leg. Glumac S: Kopaonik (Glog) DN 89.

Bjelasica (2139m) (Map 5:17). Biome of South European, mostly deciduous foothill and montane woodlands; biome of European, mostly coniferous boreal type woodlands.

Bjelasica is a mountain in Montenegro, located near the town of Kolašin and between the rivers Lim and Tara. Woodlands surround the Biogradsko lake of glacial origin and has the status of National park. Studies were carried out during 1990 in *Fagus* and *Picea* forests.

IBNS: Investigated locality (1): (1) BIOGRADSKO JEZERO CN 85 (1100m): 4.iv.1990, leg. Vujić A; 28.iv.1990, leg. Radnović D, Vujić A; 5.v.1990, leg. Radović Dragana, Vujić A, 15-17.vii.1995, leg. Milankov Vesna, Radović Dragana, Vujić A.

Bjelašnica (2066m) (Map 5:18). Biome of European, mostly coniferous boreal type woodlands; biome of South European, mostly deciduous foothill and montane woodlands.

A high mountain in the central part of Bosnia southwest from Sarajevo. Specimens were collected during 1989 in beech and coniferous woods.

IBNS: Investigated localities (1): (1) BJELAŠNICA BP 74 (1000/1700m): 12.iv.1989, leg. Vujić A; 16.v.1989, leg. Vujić A; 26.vi.1989, leg. Vujić A.

Gorski Kotar (1528m) (Map 5:19). Biome of European, mostly coniferous boreal type woodlands; biome of South European, mostly deciduous foothill and montane woodlands.

Gorski Kotar is a mountain system located between Slovenia and the region of Lika, Adriatic sea and Pokuplje. It rises immediately above the bay of Rijeka, and in this part the Dinaric mountains narrow to only 35 km width. An area called Risnjak is a National park, with thick coniferous and beech forests. Fauna of hoverflies was investigated at the beginning of this century (Langhoffer, 1917-1923) and in 1990.

IBNS: Investigated locality (1): (1) RISNJAK VL 63, VL 73 (1300/1500m): 27.v.1990, leg. Vujić A. **CNHM**: leg. Langhoffer A: Bakar VL 61; Delnice VL 82; Fužine VL 71; Kuželj (Praprod) VL 83; Lokve VL 82; Mrzla vodica VL 72; Risnjak VL 73.

Grmeč (1603m) (Map 5:20). Biome of South European, mostly deciduous foothill and montane woodlands.

Grmeč is a limestone mountain located in western Bosnia between towns Bihać and Ključ, 65 km long and about 18 km wide. Flies were collected in mixed deciduous woodlands at lower altitudes in 1990.

IBNS: Investigated locality (1): (1) GRMEČ WK 94 (600m): 30.iv.1990, leg. Radnović D, Vujić A; 29.v.1990, leg. Vujić A.

Jahorina (1910m) (Map 5:21). Biome of European, mostly coniferous boreal type woodlands; biome of South European, mostly deciduous foothill and montane woodlands.

Jahorina is a mountain in central Bosnia, near Sarajevo. It is covered with beech, mixed and *Picea* forests. All type of forest communities were investigated during 1989.

IBNS: Investigated localities (1): (1) JAHORINA CP 04 (1200/1700m): 14.v.1989, leg. Vujić A; 26.vi.1989, leg. Vujić A; 31.vii.1989, leg. Radović Dragana, Vujić A; 14.vi.1991, leg. Vujić A.

Javor (1537m) (Map 5:22). Biome of South European, mostly deciduous foothill and montane woodlands.

Javor is a limestone mountain located in eastern Bosnia between the towns of Vlasenica, Han-pijesak and Kladanj. The flies were collected in beech woodlands during 1989.

IBNS: Investigated locality (1): (1) SOKOLINA CP 29 (500/600m): 10.iv.1989, leg. Vujić A; 13.v.1989, leg. Vujić A; 25.vi.1989, leg. Vujić A; 30.vii.1989, leg. Radović Dragana, Vujić A.

Konjuh (1326m) (Map 5:23). Biome of South European, mostly deciduous foothill and montane woodlands; biome of European, mostly coniferous boreal type woodlands.

Mountain Konjuh is located in eastern Bosnia, to the South of the town of Tuzla, between the rivers Krivaja, Spreča and Drinjača. It has numerous beech and coniferous forests. Researching was carried out during 1989.

IBNS: Investigated locality (1): (1) KONJUH CQ 00 (600/1000m): 10.iv.1989, leg. Vujić A; 13.v.1989, leg. Vujić A; 25.vi.1989, leg. Vujić A; 30.vii.1989, leg. Radović Dragana, Vujić A.

Mala Kapela (1297m) (Map 5:24). Biome of South European, mostly deciduous foothill and montane woodlands.

Mala Kapela is a mountain range between the Plitvice lakes and the village Mrkopalj. Studies were conducted in the area of the National Park "Plitvička jezera" in 1990. The park is located in the basin of the river Korana consisting of a system of 16 interconnected lakes. Material was collected in mixed forests.

IBNS: Investigated locality (1): (1) PLITVIČKA JEZERA WK 46 (500/700m): 30.iv.1990, leg. Radnović D, Vujić A; 29.v.1990, leg. Vujić A. **CNHM**: leg. Langhoffer A: Bunić WK 44; Klek WL 11; Plitvice WK 46; Prozor WK 26.

Menina (1508m) (Map 5:25). Biome of South European, mostly deciduous foothill and montane woodlands.

Menina is a mountain in Slovenia, to the West of the town of Celje. It is characteristic for well-preserved beech woodlands. The mountain is located in the transitional area between the Alps and Dinaric mountains. Studies were done in 1989.

IBNS: Investigated localities (1-3): (1) MENINA VM 82 (1200m): 24.v.1989, leg. Vujić A; (2) MENINA-GORNJI GRAD VM 82 (700m): 24.v.1990 leg. Vujić A; (3) MENINA-KAMNIK VM 82 (700m): 24.v.1989, leg. Vujić A.

Tara (1544m) (Map 5:26). Biome of South European, mostly deciduous foothill and montane woodlands; biome of European, mostly coniferous boreal type woodlands.

Tara is a mountain located beside the river Drina, upstream from Bajina Bašta. It is a river-karst plateau inclined towards the river Drina. It has diverse forest communities that belong to different biomes-types in intercombinations (ecotone). Flies were investigated in 1985 (leg. Radnović D.) and in 1990.

IBNS: Investigated localities (1-2): (1) MANASTIR RAČA CP 86 (600m): 3.iv.1990, leg. Vujić A; 27.iv.1990, leg. Radnović D, Vujić A; (2) MITROVAC CP 76 (1000m): 27.iv.1990,

leg. Radnović D, Vujić A. Leg. Radnović D: Gorušica CP 76; Kozja Stena CP 76; Krnja Jela CP 76; Manastir Rača CP 86; Mitrovac CP 76; Ponor CP 76; Vučjak CP 76.

Volujak (2336m) (Map 5:27). Biome of South European, mostly deciduous foothill and montane woodlands; biome of European, mostly coniferous boreal type woodlands.

Volujak is located at the border between Bosnia and Montenegro; it rises above the canyon of the river Sutjeska (Tjentište), along the mountain Maglić. It is of karst and glacial relief; at an altitude of 1700 m there is Trnovačko lake of glacial origin, surrounded by boreal biocenoses. Studies were conducted in 1989 and included various forest types.

IBNS: Investigated localities (1-2): (1) SUHA (and TJENTIŠTE) CN 19 (900m): 15.v.1989, leg. Vujić A; (2) SUHA-TRNOVAČKO JEZERO CN 19 (1200/1700m): 11.iv.1989, leg. Vujić A; 15.v.1989, leg. Vujić A; 27.vi.1989, leg. Vujić A.

Isolated records. Isolated records were collected in different habitat types: from the south European deciduous woodlands (Javornik, Maglić, Olovo, Prenj, Zelengora, Žljeb) up to the coniferous forests of boreal type (Karaula, Romanija) and Alpine high Nordic rocky grounds and pastures (Prokletije). Many authors collected material over the north Dinaric mountains. The largest number of samples from old collections come from the localities of this region.

IBNS: JAVORNIK (1060m): STUPARI CQ 10 (400m): 10.iv.1989, leg. Vujić A; KARAULA (996m) CP 19: 13.v.1989, leg. Vujić A; KOKIN BROD (KRATOVO) DP 01, leg. Božičić Branka; MAGLIĆ (2386m): PERUĆICA CN 19 (1300m): 11.iv.1989, leg. Vujić A; OLOVO CP 08 (600m): 13.v.1989, leg. Vujić A; POVLEN (1347m) CP 98 (500m): 3.iv.1990, leg. Vujić A; PRENJ (2103m) YJ 32 (500m): 14.iv.1989, leg. Vujić A; 16.v.1989, leg. Vujić A; PROKLETIJE (2693m): KROŠNJE (DN 00); LJUBOKUĆA (DN 00); VOLUŠNICA (CN 91); ROMANIJA (1652m) CP 16 (1500m): 16.v.1989, leg. Vujić A; ZELENGORA (2014m): DONJE BARE CP 00 (1400m): 11.iv.1989, leg. Vujić A; ŽLJEB (2381m) DN 33 (1200m): 3.v.1991, leg. Vujić, A. Leg. incog: Goč (Dobre vode) DP 82. **BHMS**: leg. Apfelbeck: Ivan planina BP 65; Jablanica YJ 23; Kijevo (?); Mokro CP 16; Pale: CP 05, (Stambulčić) CP 05; Sarajevo: (Ali Pašin Most) BP 85, (Ilidže) BP 85, (vrelo Bosne) BP 95; Sjetlina CP 15; Trebević BP 95; Treska (?); Troglav (Dinara) XJ 26; Višegrad CP 64. Leg. Hensch: Krapina WM 61. Leg. Hilf: Derventa (YK 28). Leg. Schneereg: Treska (?). Leg. Simmet: Jablanica YJ 23. Leg. Strobl G: Romanija (?). Leg. Thalhammer: Sarajevo (Miljacka) BP 95. Leg. Winneguth: Ilijaš BP 87; Ivan planina BP 65; Jablanica YJ 23; Krupac BP 85; Pale CP 05; Pazarić BP 75; Prača (Renovica) CP 24; Prenj (?); Sarajevo: BP 85 (Ali Pašin Most) BP 85, (Lukavica) BP 85, (Mojmilo) BP-85; Trebević BP 85; Treska (?). Leg. Mally: Sarajevo: (Bistrica) BP 85. Leg. incog: Cetinje CM 29; Crkvice CN 01. **CNHM**: leg. Langhoffer A: Bjelasica (?); Crikvenica (Velika Kapela) VL 70; Lobor Grad WM 81; Pregrada WM 51; Velebit: (Gospić) WK 23, (Krivi Put) VK 98, (Senj) VK 98; Velebit (?). **JLC**: leg. Lucas J: Bribir VL 80; Idrija VL 29; Metlika WL 25; Postojna VL 36;

Slunj WK 49; Rupa VL 43; Velebit: (Brušane) WK 22, (Oštarije) WK 13, (Štirovača) WK 04. **SNHM**: leg. Sivec I: Ig: (Iški Vitgar) VL 68, (Zgornji Ig) VL 68; Ločica VM 92; Ljubljana VL 69; Ljubljana (Botanički vrt) VL 69; Ljubljana (Ljubljansko barje) VL 69; Ribnica (Travna Gora) VL 76; Šmarje pri Jelšah WM 42; Trnovski gozd VL 18; Turjak VL 68; Velebit (Zavižan) VK 96; Veliki Snežnik VL 54; Žuženberk-Dvor VL 97.

South Dinaric (F) (Map 11). The South Dinaric mountains extend from Šar-planina to the mountains in Greece. Preglacial groups of habitats predominate while the oases of postglacial communities can be present on their northern slopes (Matvejev, 1976). The investigations included several mountains in Macedonia and Greece. Flies were collected in different biomes: the south European deciduous woodlands, coniferous forests, pastures and woodlands of Oromediterranean mountains. Šar-planina area was investigated over a long period, while Baba, Galičica, Grammos, Kožuf, Olympos, and Verno were investigated for one or two years.

Map 11 South Dinaric mountains

Šar-planina (2748m) (Map 5:28). Biome of Submediterranean, mostly broad-leaved woodlands; biome of pastures and woodlands on rocky grounds of Oromediterranean mountains; biome of South European, mostly deciduous montane woodlands; elements of European, mostly coniferous boreal woodlands and Alpine rock-grounds and pastures.

Šar-planina is situated on the borderline of Macedonia and Kosovo and is one of the largest mountains on the Balkan Peninsula. It is made of schist and limestone rocks while the remnants of glaciers (glacial lakes) are found at the highest level. A large number of different types of habitats are represented on the Šar-planina of which the relict preglacial coniferous forests of *Pinus peuce* and *P. heldreichii* are of special importance. Studies were carried out at many different localities during the period of several years (1986-88).

IBNS: Investigated localitics (1-8): (1) BISTRICA DM 86 (450m): 17.vii.1986, leg. Božičić Branka, Vujić A; (2) BREZOVICA/PILJEVAČKI POTOK DM 97 (900m): 17/19.vii.1986, leg. Božičić Branka, Vujić A; 29.vi.1988, leg. Vujić A; (3) CRNI KAMEN EM

17 (900m): 19.iv.1987, leg. Radnović D, Vujić A; (4) DUROV POTOK EM 06 (2000m): 18.vii.1986, leg. Božičić Branka, Vujić A; 27.vi.1988, leg. Vujić A; (5) GOSTIVAR DM 92 (450m): 18.iv.1987, leg. Radnović D, Vujić A; (6) OŠLJAK DM 97 (1300m): 29.vi.1988, leg. Vujić A; (7) POPOVA ŠAPKA/LEŠNICA DM 85 (1700m): 27.vii.1986, leg. Božičić Branka, Vujić A; (8) PREVALAC DM 96 (1500m): 28.vi.1988, leg. Vujić A. **NHMB**: leg. Glumac S: Šar-planina (Vata Bogunović) EM 17. **BHMS**: leg. Winneguth: Ljuboten EM 07.

Baba (2601m) (Map 5:29). Biome of Submediterranean, mostly broad-leaved woodlands; biome of South European, mostly deciduous foothill and montane woodlands.

The mountain Baba is a horst made of old rocks. It is located in the Southwest of Macedonia, between Bitola and Prespa basins. The insect material was collected in oak and beech forests during 1990.

IBNS: Investigated locality (1): (1) BABA EL 14 (500/700m): 11.iii.1990, leg. Vujić A; 20.iv.1990, leg. Vujić A; 8.v.1990, leg. Vujić A; 17.vi.1990, leg. Radnović D, Vujić A. **JLC**: leg. Lucas: Baba EL 14; Bitola-Resen EL 04.

Galičica (1801m) (Map 5:30). Biome of Submediterranean, mostly broad-leaved woodlands.

Galičica is a mountain made of limestone, situated on the South of Macedonia between Ohrid and Prespa basins, bordering with Greece. The area of National Park at this mountain includes a large number of relict deciduous and deciduous-coniferous woodlands. Flies were collected in oak forests around the Prespa lake, during 1990.

IBNS: Investigated localities (1-2): (1) GALIČICA DL 83 (1200m): 8.v.1990, leg. Vujić A; (2) OTEŠEVO DL 93 (700m): 20.iv.1990, leg. Vujić A; 17.vi.1990, leg. Vujić A. Leg. Glumac: Galičica (Carina) DL 93; Kosel DL 85; Oteševo DL 93. **JLC**: leg. Lucas J: Oteševo DL 93; Resen-Ohrid DL 95.

Grammos (2523m) (Map 5:31). Biome of Submediterranean, mostly broad-leaved woodlands.

Grammos is a mountain on the North of Greece and at the borderline with Albania and is the beginning of the Pindos mountain system. The *Cheilosia* specimens were collected in oak and relict coniferous communities during 1990.

IBNS: Investigated locality (1): (1) DROSOPIGI DK 95 (700m): 12.iii.1990, leg. Vujić A; 22.iv.1990, leg. Vujić A; 12.v.1990, leg. Vujić A.

Kožuf (2166m) (Map 5:32). Biome of Submediterranean, mostly broad-leaved woodlands; biome of pastures and woodlands on rocky grounds of

Oromediterranean mountains; biome of South European, mostly deciduous montane woodlands.

It is a mountain on the South of Macedonia at the borderline with Greece, located between the town of Gevgelija and Nidža mountain. The hoverflies were collected in oak, beech and preglacial forests on rocky ground.

IBNS: Investigated localities (1-3): (1) DOŠNICA FL 06 (1000/1500m): 16.vii.1990, leg. Gardinovački Gorana, Milankov Vesna, Radnović D, Radović Dragana, Vujić A; (2) KONSKO FL 06 (500/800m): 15.iv.1987, leg. Radnović D, Vujić A; 14.v.1990, leg. Vujić A; 19.vi.1990, leg. Radnović D, Vujić A; 11/18.vii.1990, leg. Gardinovački Gorana, Milankov Vesna, Radnović D, Radović Dragana, Vujić A; (3) VISOKA ČUKA FL 17 (1300m): 15.vii.1990, leg. Gardinovački Gorana, Milankov Vesna, Radnović D, Radović Dragana, Vujić A. Leg. Glumac S: Kožuf (Bačije) (?); Golema poljana FL 06; Konsko FL 06.

Olympos (2911m) (Map 5:33). Biome of Submediterranean, mostly broad-leaved woodlands; biome of pastures and woodlands on rocky grounds of Oromediterranean mountains; biome of South European, mostly deciduous montane woodlands.

Olympos is a mountain in Greece near the Aegean sea coast, located between the towns of Larisa and Katerina. Although in close contact with the Mediterranean, its high altitudes made possible the survival of habitats usually characteristic for central Europe (beech forests). However, the areas covered with Submediterranean and endemic coniferous communities are much more interesting. The insect material was collected during 1990.

IBNS: Investigated locality (1): (1) OLIMP FK 04 (700-1100m): 14.iii.1990, leg. Vujić A; 23.iv.1990, leg. Vujić A; 14.v.1990, leg. Vujić A. **JLC**: leg. Lucas J: Olimp (Hubbe) FK 13; Olimp (Prionia) FK 23.

Verno (2128m) (Map 5:34). Biome of Submediterranean, mostly broad-leaved woodlands; biome of pastures and woodlands on rocky grounds of Oromediterranean mountains; biome of South European, mostly deciduous montane woodlands.

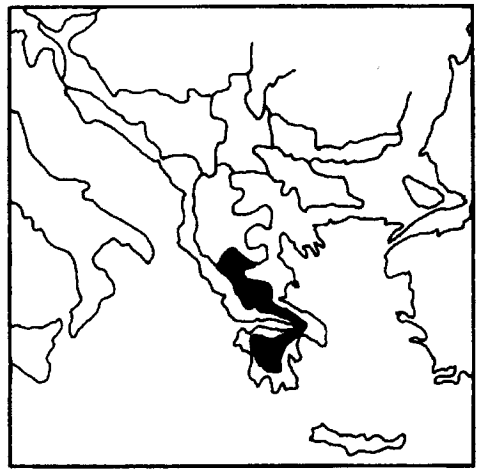
The mountain Verno is situated in Greece between Mala Prespa lake, and the towns of Florina and Trigono. The flies were captured in relict coniferous, oak and beech woods during 1990.

IBNS: Investigated localities (1-3): (1) ANDARTIKO-KASTORIA EL 10 (500m): 21.iv.1990, leg. Vujić A; (2) FLORINA-PISODERI EL 21 (1200m): 21.iv.1990, leg. Vujić A; 11.v.1990, leg. Vujić A; (3) TRIGONO EL 11 (600m): 11.v.1990, leg. Vujić A.

Isolated records. On several localities the material was collected during only one field trip. The majority belong to the biome of Submediterranean deciduous woodlands.

IBNS: KASTORIA-NEAPOLI EK 27 (500m): 21.iv.1990, leg. Vujić A; NEAPOLI EK 36 (400m): 21.iv.1990, leg. Vujić A; RADIKA DM 61 (800m): 17.iv.1987, leg. Radnović D, Vujić A; STRUGA DL 75 (600m): 7.v.1982, leg. Aleksić D, Vujić A. Leg. Glumac S: Babuna (?); Babuna (Uroševska reka) (?); Bukovik DM 91; Debar DL 69; Karaorman (Globočnica) DL 77; Mavrovo DM 71; Radika (?); Struga: DL 75, (Struško polje) DL 76. Leg. incog: Pelister EL 14. **JLC**: leg. Lucas J: Babuna EL 58; Mavrovo DM 71.

South Greece Mountains (G) (Map 12). The mountains of south Greece and Peloponnesus represent the third part of the Dinaric system. They have preglacial habitats with few postglacial elements (Matvejev, 1976). Studies were carried out only in the region of Pindos while the flies from the Peloponnesus belong to the collection of Lucas.



Map 12 South Greece mountains

Pindos (2469m) (Map 5:35). Biome of pastures and woodlands on rocky grounds of Oromediterranean mountains; biome of Submediterranean, mostly broad-leaved woodlands; biome of South European, mostly deciduous montane woodlands.

The mountain system of Pindos is located in the central part of Greece. The insect material was collected in the area of Lakmos, between Joanina and Trikala. The region contains the forests of *Pinus heldreichii*, *Pinus nigra* ssp. *pallasiana* and Moesian beech Research was conducted during 1990.

IBNS: Investigated localities (1-2): (1) METSOVO-KATARA EK 10 (1500m): 13.v.1990, leg. Vujić A; (2) KATARA EK 20 (1700m): 22.iv.1990, leg. Vujić A; 13.v.1990, leg. Vujić A. **JLC**: leg. Lucas J: Gardiki Omeilion EJ-27; Katara EK 20.

Isolated records. The faunal data of the *Cheilosia* species from the Peloponnesus and Parnasus were obtained from the results of Lucas' field trips.

JLC: leg. Lucas J: Parnassos (Arahova) FH-35; Peloponesus: (Menalon) FG-26, (Taygetos), (Taygetos-Sparta) FG-30, (Taygetos-Tripi) FG-30, (Tripi) FG 30, (Vitina).

Carpathians (H) (Map 13). The fragments of Romanian Carpathians on the Balkan Peninsula are located in eastern Serbia. The territory of south Carpathians is a mosaic of postglacial and preglacial groups of habitats. The first type of habitats are on the mountain peaks and on colder slopes and the latter types are located in lower zones (Matvejev, 1976). The researching included several mountains of medium altitudes and the gorges with heterogeneous hoverflies fauna. Areas investigated over a long period include Malinik and Kučaj mountains. Areas investigated for one years include Rtanj mountain.

Map 13 Carpathians

Kučaj: Malinik (1158m) *and Kučaj mountains* (1284m) (Map 5:36). Biome of Submediterranean, mostly broad-leaved woodlands; biome of South European, mostly deciduous foothill and montane woodlands.

Kučaj mountains are limestone mountains located in eastern Serbia between Morava and Crna reka valleys. They are overgrown with oak and beech woodlands. Insect material was collected in 1986 (Radnović D.) and during 1987-1989. Malinik is a northerneastern section of Kučaj mountains and rises above the village Zlot. The most important for the preservation of the fauna is the canyon of the Lazareva river abundant with preglacial habitats. Beech woodlads on the Malinik are located under the lower zone of oak forests. The investigations were done during the period 1989-1994.

IBNS: Investigated localities (1-12): (1) BELJAVINA (EP 77): 15.v.1994, leg. Vujić A; (2) DEMIZLOK (EP 77): 1.iv.1994, leg. Vujić A; 14.v.1994, leg. Milankov Vesna, Radenković Snežana, Vujić A; 12.vi.1994, leg. Milankov Vesna, Radišić P, Radnović Sanja, Vujić A; 14.vi.1994, leg. Vujić A; (3) DUBAŠNICA LUNGA (EP 78): 16.v.1993, leg. Vujić A; 5/6.vi.1993, leg. Radišić P, Radnović D, Radnović Sanja, Vujić A; 2.iv.1994, leg. Vujić; 15.v.1994, leg. Milankov Vesna, Radenković Snežana, Radnović D, Vujić A; (4) KLISURA LAZAREVE REKE EP 77 (700m): 28.iii.1989, leg. Vujić A; 29/31.iv.1989, leg. Radišić P, Radović Dragana, Vujić A; 5.vi.1989, leg. Radišić P, Radnović D, Vujić A; 8.vii.1989, leg. Radnović D, Vujić A; 14.iv.1991, leg. Radnović D, Vujić A; 15.v.1993, leg. Milankov Vesna, Vujić A; 3.vi.1993, leg. Radišić P, Radnović Sanja, Vujić A; 16.vii.1993, leg. Radišić P, Radnović D, Vujić A; 1.iv.1994, leg. Vujić; 13.v.1994, leg. Radenković Snežana, Vujić A; 11.vi.1994, leg. Vujić A; 13.viii.1994, leg. Šimić Smiljka, Vujić A; (5) MALINIK EP 77 (800/1100m): 1.v.1989, leg. Radišić P, Radović

Dragana, Vujić A; 3.vi.1989, leg. Radišić P, Radnović D, Vujić A; 13.v.1994, leg. Vujić A; 10.vi.1994, leg. Vujić A; (6) MIKULJSKA REKA (EP 77): 4.vi.1993, Radišić P, Radnović D, Radnović S, Vujić A; (7) PAPRATNO EP 46 (500m): 22.vii.1987, leg. Radnović D, Vujić A; (8) PRERAST (EP 78): 12.viii.1994, leg. Šimić Smiljka, Vujić A; (9) RAVANICA EP 46 (400m): 29.iii.1989, leg. Vujić A; (10) RESAVICA EP 47 (300m): 29.iii.1989, leg. Vujić A; (11) SISEVAC EP 46 (450m): 24.vii.1987, leg. Radnović D, Vujić A; (12) VOJALA (EP 78): 17.vii.1993, leg. Radišić P, Vujić A. Leg. Radnović D: Crnica EP 46 (400m); Jablanica EP 46 (500m); Papratno EP 46 (500m); Požarc EP 46 (500m); Rávanica EP 46 (400m); Rcsavica EP 47 (300m); Sisevac EP 46 (450m).

Rtanj (1565m) (Map 5:37). Biome of Submediterranean, mostly broad-leaved woodlands; biome of South European, mostly deciduous foothill and montane woodlands.

Rtanj is the mountain in eastern Serbia situated between Crna reka valley and Sokobanja basin. It present the most southern part of the Carpathians, lying in the transitional region towards the Balkan range. Studies were carried out in oak woodlands.

IBNS: Investigated locality (1): (1) RTANJ EP 74 (500/700m): 14.iv.1991, leg. Radnović D, Vujić A; 1.v.1991, leg. Radnović D, Vujić A.

Isolated records. There are several data about *Cheilosia* species found in the oak forests along the river Pek, in the area of villages of Debeli Lug and Žagubica, and on the mountain Deli Jovan.

IBNS: DEBELI LUG: EQ 71 (400m): 28.iv.1989, leg. Vujić A; (Todorova reka) EQ 71 (300m): 28.iv.1989, leg Vujić A; 2.v.1993, leg. Milankov Vesna, Radović Dragana, Vujić A; DELI JOVAN (1141m) EP 99 (500m): 27.iii.1989, leg Vujić A; KLISURA PEKA EQ-71 (300m): 3.v.1993, leg. Milankov Vesna, Vujić A; KUČEVO EQ 52 (200m): 30.iv.1993, leg. Milankov Vesna, Vujić A; ŽAGUBICA (reka Do) EP 69 (500m): 14.vii.1993, leg. Radišić P, Radović Dragana, Vujić A. **NHMB**: leg. Glumac S: Homoljske planine (Blagojev kamen) EQ 63. Leg. Stojičević: Homoljske planine (Blagojev kamen) EQ 63.

Stara Planina (Balkan Range) (I) (Map 14). Fauna in the Balkan mountain range is similar to the south Carpathians. Its west part is in the Moesian hilly area, its central part is located near Subdacian, and the east part in Subpontic. Preglacial habitats occupy piedmont and warmer slopes; postdiluvial are located on mountain tops and on colder slopes (Matvejev, 1976). Studies of hoverflies on Stara Planina were caried out on the Serbian part.

Stara planina (2169m) (Map 5:38). Biome of Submediterranean, mostly broad-leaved woodlands; biome of South European, mostly deciduous montane

Map 14 Stara Planina (Balkan range)

woodlands; biome of European, mostly coniferous boreal type woodlands; biome of pastures and woodlands on rocky grounds of Oromediterranean mountains.

Stara planina is a large mountain range in east Serbia, northeast from the town of Pirot, on the borderline towards Bulgaria. Its configuration is made of limestone rocks and red sandstone. Stara Planina is rich in different habitat types, both forestral and pastural. The area was investigated over long period, and the largest part of flies were collected in oak, beech and spruce forests during 1988 and 1989.

IBNS: Investigated localities (1-11): (1) ARBINJE FN 49 (1500m): 26.vi.1987, leg. Vujić A; 11.viii.1987, leg. Vujić A; (2) CRNI VRH FP 20 (600m): 8.v.1988, leg. Radnović D, Vujić A; 31.v.1988, leg. Ercegovac Ljiljana, Vujić A; (3) DOJKINAČKA REKA FN 48, FN 49 (1000/1500m): 29.v.1987, leg Božičić Branka, Šimić Smiljka, Vujić A; 26.vi.1987, leg. Vujić A; 6.v.1988, leg. Radnović D, Vujić A; 30.v.1988, Ercegovac Ljiljana, Vujić A; (4) KALNA FP 10 (450m): 8.v.1988, leg. Radnović D, Vujić A; 31.v.1988, leg. Ercegovac Ljiljana, Vujić A; (4) MALA LUKANA FN 38 (600m): 1.v.1987, leg. Ercegovac Ljiljana, Vujić A; (5) PILJ FP 40 (1200m): 28.v.1987, leg. Božičić Branka, Šimić Smiljka, Vujić A; 25.vi.1987, leg. Vujić A; 7.v.1988, leg. Radnović D, Vujić A; (6) PLANINICA FN 38 (900m): 27.v.1987, leg. Božičić Branka, Šimić Smiljka, Vujić A; 27.vi.1987, leg. Vujić A; 8.v.1988, leg. Radnović D, Vujić A; 29.v.1988, leg. Ercegovac Ljiljana, Vujić A; (7) RSOVCI FN 48 (700m): 2.v.1987, leg. Ercegovac Ljiljana, Vujić A; (8) RŽANA FN 48 (600m): 12.iv.1988, leg. Vujić A; (9) TEMSKA FN 29 (300m): 30.iv/1.v.1987, leg. Ercegovac Ljiljana, Vujić A; 12.iv.1988, leg. Vujić A; 5.iv.1992, leg. Milankov Vesna, Radnović D, Radović Dragana, Vujić A; (10) TEMSKA-TOPLI DO FN 39 (300/800m) 30.iv.1987, leg. Vujić A; 28.v.1987, leg. Božičić Branka, Šimić Smiljka, Vujić A; 10.viii.1987, leg. Vujić A; 7.v.1988, leg. Radnović D, Vujić A; (11) TOPLI DO FP 30 (800m): 30.iv.1987, leg. Vujić A; 28.v.1987, leg. Božičić Branka, Šimić Smiljka, Vujić A. Leg. Dožić Nataša: Temštica FN 29; Zavojsko jezero FN 39. Leg. Milankov Vesna: Golema reka FP 30. **ZIS**: leg. Buresch: Lozenska planina (Germanski manastir) GN 02. Leg. Nedelkov: Ihtimanska Sredna Gora (Ihtiman) GN 30; Svoge FN 95. Leg. Urumova: Lozenska planina (Germanski manastir) GN 02.

Rilo-Rhodopes (J) (Map 15). Rilo-Rhodopes mountain massif consists of massive mountains in Moesian hilly area and large massifs of Rila, Pirin

and Rhodopes. It extends to the Aegean sea. Postglacial habitat groups are located on the north slopes and on peaks, while south mountain sides and piedmont area are occupied with preglacial habitats (Matvejev, 1976). Studies included several mountains in east Serbia while the region in Bulgaria was investigated by other authors (Drenski, Bankowska).

Bosilegrad (Božička river) (Map 5:39). Biome of Submediterranean, mostly broad-leaved woodlands.

It is within the Rhodopes system at the very borderline between Serbia and Bulgaria. The flies were collected in oak woodlands during 1988-1989.

IBNS: Investigated localities (1-3): (1) BOSILEGRAD FN 20 (800m): 5.v. 1988, leg. Radnović D, Vujić A; 31.iii.1989, leg. Vujić A; 14.vii.1989, leg. Radnović D, Vujić A; (2) KARAMANICA FM 18 (600m): 31.iii.1989, leg. Vujić A; (3) LISINA-BOŽICA FN 11 (900m): 31.iii.1989, leg. Vujić A.

Map 15 Rilo-Rhodopes

Čemernik (1638m) *and Vlasinsko jezero* (Map 5:40). Biome of South European, mostly deciduous montane woodlands.

Čemernik belongs to Rhodopes range of mountains and is located in east Serbia, above the village of Vlasotince and Vrla river, towards the Bulgarian border. Vlasina lake is located at 1200 m, being the highest artificial lake in Serbia. Studies were carried out in oak woodlands along the rivers Vlasina and Vrla that originate on the lake plateau. The mountain Čemernik was investigated in 1988 and 1993.

IBNS: Investigated localities (1-6): (1) ČEMERNIK FN 03 (1400m): 19.vii.1993, leg. Radović Dragana, Vujić A; (2) DONJI ORAH FN 04 (600m): 11.iv.1988, leg. Vujić A; 3.v.1988, leg. Radnović D, Vujić A; (3) SASTAV REKA-CRNA REKA FN 04 (800m): 11.iv.1988, leg. Vujić A; 3.v.1988, leg. Radnović D, Vujić A; 1.vi.1988, leg. Vujić A; (4) TEGOŠNICA-SASTAV REKA FN 04 (700m): 11.iv.1988, leg. Vujić A; 3.v.1988, leg. Radnović D, Vujić A; (5) VLASINSKO JEZERO FN 03 (1200m): 20.vii.1993, leg. Radović Dragana, Vujić A; (6) VRLA FN 02 (900m): 4.v.1988, leg. Radnović D, Vujić A.

Kukavica (1440m) (Map 5:41). Biome of South European, mostly deciduous montane woodlands.

It is located in central Serbia, above the river Južna Morava and between the towns of Vranje and Leskovac. It is the most western part of Rhodopes massif, covered with beech and oak woodlands. The flies were collected during 1989.

IBNS: Investigated locality (1): (1) VUČJE-KUKAVICA EN 74, EN 75 (400/800m): 30.iii.1989, leg. Vujić A; 2.v.1989, leg. Vujić A; 6.vi.1989, leg. Vujić A; 18.vii.1989, leg. Milankov Vesna, Radnović D, Radović Dragana, Vujić A.

Isolated records. Studies were conducted on a few more localities at lower altitudes, in oak forests. The largest number data about *Cheilosia* species collected in Rilo-Rhodopes region come from the museum material kept in Sofia.

IBNS: DRAMA KF 66 (300m): 15.iii.1990, leg. Vujić A; GRDELIČKA KLISURA EN 94 (400m): 1.iv.1989, leg. Vujić A; PČINJA (Manastir Prokop Pčinjski) EM 78 (500m): 1.iv.1989, leg. Vujić A; ZVONAČKA BANJA FN 35 (400m): 5.vi.1991, leg. Radišić P, Radnović D, Vujić A. Leg. Glumac S: Maleševske planine (?); Maleševske planine (Nevičanske planine) (?); Ogražden (?); Osogovske planine (Zletovska reka) (?). **ZIS**: leg. Buresch: Rila (Kostenec) GM 28. Leg. Drenski: Rila: FM 97, (Borovec-Čam Kuria) GM 18, (Parangalica) FM 95; Rodopi: (Čehlovo) GM 44, (Ladani) (?), (Sjutkja) KG 54. Leg. Nedelkov: Osogovske planine (Kjustendil) FM 38; Vitoša: (Dragalevci) FN 81, Vitoša (Sofia) FN 82, FN 92. Leg. incog: Rila (Rilski manastir) FM 97. **JLC**: leg. Lucas J: Pirin GM 10; Vitoša (Sofia) FN 82.

4. 1. 2. 4. UNIDENTIFIED LOCALITIES (?)

IBNS: Drenova (?). **NHMB**: Rudina (leg. Glumac); Severna Srbija (leg. Stojičević). **SNHM**: Gabrje (leg. Sivec). **CNHM**: Draga (leg. Langhoffer); Orehovica (leg. Langhoffer). **BHMS**: Banja Stijena (leg. Winneguth); Gravosa (leg. Apfelbeck); M. Josip (leg. Winneguth); Rujšte (leg. Apfelbeck). **ZIS**: C. Bare (leg. Nedelkov); Timja (leg. Nedelkov).

5. SURVEY OF THE FAUNA

5.1. GENUS *PORTEVINIA* GOFFE, 1944

Type species: *Eristalis maculatus* Fallen, 1817

Only three species of this genus are known. Their ranges are separated and encircle the regions of Palaearctic. *Portevinia dispar* Her.-Baz. is distributed in the east part (China and the Far East), *P. altaica* Stack. in the central (Siberia and Mongolia) and *P. maculata* in the western part (North and Central Europe).

1. ***Portevinia maculata*** (Fallen, 1817)

VERIFIED REFERENCES: Šimić, 1987 (as *Cheilosia*).

Examined material (30m 8f; June 28/July 9; 1300/1500 m). PUBLISHED RECORDS. Šimić (1987): *Cheilosia maculata*: Durmitor (E), Kanjon Sušice 28.vi.1985, 11m 1f; Luke 30.vi.1985, 4m 1f, (IBNS). NEW DATA. **Mtg**: Durmitor (E), Kanjon Sušice 9.vii.1991, 9m 3f; 29.vi.1993, 5m 2f; Luke 1.vii.1993, 1m 1f, (IBNS).

Distribution (Map 43). RANGE. West, North and Central Europe; from South Norway to North Spain, from Great Britain to Romania. BALKAN PENINSULA: Mtg; (BT: E); (B: 4).

Remarks: Of all investigated Balkan regions *P. maculata* appears only in Škrčko-Sušički basin on Durmitor - refugial area for a great number of hoverflies species (Šimić, 1987).

Biology. Preferred environment: mountain beech forest (*Fagetum montanum*) on high altitudes (1300/1500 m). Adult habitat: in the vicinity of streams in canyons, flying among woodland vegetation and settling on leaves and flowers of *Allium ursinum*. Flight period: end of June and August; Larva: described by Speight (1986) and Rotheray (1991); phytophagous, mining in the stalks and bulbs of *Allium ursinum*.

5. 2. GENUS *NIGROCHEILOSIA* SHATALKIN, 1975

Type species: *Eristalis pubera* Zetterstedt, 1838

This genus is characteristic for Central Europe, especially for the Alps. The majority of species live at high altitudes (*crassiseta, derasa, gagatea, grisella, impudens, insignis, laeviseta, loewi, personata* etc.); some species (*antiqua, nigripes, pubera, vicina*) can be found at lower altitudes and have a wider distribution (North and West Europe, north and west part of Siberia). Caucasus is the other center of speciation for this taxon but with far less number of species.

2. ***Nigrocheilosia antiqua*** (Meigen, 1822)

UNVERIFIED REFERENCES. BH: Strobl, 1898 (in part); Blg: Bankowska, 1967 (Pirin).

ERRONEOUS REFERENCES. BH: Strobl, 1898 (=*frontalis*); Cro: Langhoffer,1917-1923 (=*nigripes*); Blg: Drenski, 1934 (=*soror*).

Cheilosia nigripes of Glumac, 1955b

Cheilosia impudens of Šimić, 1987 (in part)

Examined material (322m 76f; April 10/June 30; 300/2000 m). PUBLISHED RECORDS. Glumac, 1955b: Sarajevo (E) (Ali Pašin most) 1914, 1m (leg. Apfelbeck, det. Glumac as *C. nigripes*); 1f (leg. Winneguth, det. Glumac as *C. nigripes*), (BHMS); Šimić, 1987: Durmitor (E), Škrčko ždrijelo 30.vi.1985, 3m (det. Šimić as *C.impudens*), (IBNS). NEW DATA. **Slo**: Julijske Alpe (D), (4,6,9: 22/23.v, 24m 4f); Kamniške in Savinjske Alpe (D), (2,3: 21.v/1.vii, 1m 2f); Menina (E), 24.v.1989 1m 1f, (IBNS); **Cro**: Gorski Kotar (E), 27.v.1990, 4m; Mala Kapela (E), (1: 30.iv.1990, 2m 2f), (IBNS); Velebit (E): (Oštarije) 26.v.1972, 1m 3f; (Štirovača) 14.vi.1969, 1f; Samobor (A) (Rude) 23.v.1972, 3f, (JLC). **BH**: Grmeč (E), 30.v.1990, 77m 10f; Jahorina (E), 14.v.1989, 13m 1f; 14.vi.1991, 6m; Javor (E), (1: 10.iv.1989, 10m); Konjuh (E), 13.v.1989, 2m; Prenj (E), 14.iv.1989, 1m; Volujak (E), (2: 15.v.1989, 5m), (IBNS); Pale (E), 1f; (Stambulčić) v.1916, 6m 5f; Sarajevo (E) (Ilidža) 3f, (BHMS); **Mtg**: Durmitor (E), (4,15,25: 2/4.vi.1994, 4m), (IBNS); **Srb**: Suva planina (B), (1: 2.v.1988, 1m); Kopaonik (E): (3,5,8, 13,14,20,21,24,26: 1.v/22.vi, 73m 14f); Stara Planina (I), (3,5: 28/29.v, 11m 5f), (IBNS); **Gre**: Verno (F), (2: 11.v.1990, 25m 11f); Pindos (G), (1,2: 13.v.1990, 51m 9f), (IBNS).

Distribution (Map 16). RANGE. Whole Europe and West Siberia. BALKAN PENINSULA: Slo,Cro,BH,Mtg,Srb,Blg,Gre; (BT: A,B,D-G,I,); (B: 3,4). First record for: Slo,Cro,Mtg,Srb,Gre.

Remarks: Mountain species; appears over the larger part of forest region on the Balkan, from the Alps, west Pannonic mountains, Dinaric mountains, Stara Planina and Rilo-Rhodopes up to the mountains in central Greece.

Biology. Preferred environment: broad leaved woodlands, coniferous forests, montane pastures. Adult habitat: woods, in the vicinity of standing of running water, flying among wetland vegetation and settling on leaves or flowers. Flowers visited *Caltha palustris*, *Ranunculus*, *Stellaria*. Flight period: spring, April-June. Larva: described by Rotheray (1991), feed within the roots of *Primula* species.

3. ***Nigrocheilosia caerulescens*** (Meigen, 1822)

VERIFIED REFERENCES: Šimić, 1987 (in part).

ERRONEOUS REFERENCES. Cro: Langhoffer, 1917-1923 (=*Myiolepta vara*); Mac: Glumac, 1968 (=*herculana*).

Cheilosia laeviventris of Šimić, 1987

Examined material (21m 9f; June 2/August 24; 1500/1800 m). PUBLISHED RECORDS. Šimić (1987): Durmitor, Kanjon Sušice 24.viii.1984, 1m (det. Šimić as *C. laeviventris*) 1f (det. Šimić as *C. caerulescens*), (IBNS). NEW DATA. **Mtg**: Durmitor (E), Škrčko ždrijelo 8.vii.1991, 2m 2f; Kanjon Sušice 9.vii.1991, 4m 1f; 1.vii.1993, 1m; 2.vi.1994, 1f; Luke 1.vi.1994, 2m; Prutaš 2.vii.1993, 1m 1f; Skakala 9.vii.1992, 2m 1f; 1-2.vii.1993, 5m; 2-3.vi.1994 2m 1f; Prokletije (E), Krošnje 28.vii.1994, 1m 1f, (IBNS).

Distribution (Map 17). RANGE. Central Europe: the Alps, Dinaric mountains, the Carpathians; from Germany and France to central Russia (as subspecies *C. caerulescens calculosa* Skufjin). BALKAN PENINSULA: Mtg; (BT: E); (B: 5).

Remarks: *N. caerulescens* is recorded in the Škrčko-Sušički basin on Durmitor and in the Montenegro part of the mountain Prokletije.

Biology. Preferred environment: Alpine rock-grounds and pastures above the forest zone in high mountains. Adult habitat: open area, among rocks; fly within a 1,5-3 meter of the ground over the rocks. Flowers visited: *Allium ursinum, Ranunculus*. Flight period: June-August. Larva: leaf-miner of *Sempervirum* spp, *Geum montanum, Solidago virgaurea* and *Tussilago farfara* (Aguilar & Coutin, 1988).

4. ***Nigrocheilosia crassiseta*** Loew, 1859

VERIFIED REFERENCES (Barkalov & Stahls, in press). Cro: Loew, 1859; Becker, 1894.

ERRONEOUS REFERENCES. Cro: Langhoffer,1917-1923 (= *Nigrocheilosia* sp.)

Examined material: (5m 3f; June 18/July 2; 1500/1800m). NEW DATA. **Slo**: Julijske Alpe (D), Bohinjsko jezero-Savica 2.vii.1989, 1f; Vršič 18.vi.1988, 5m 2f, (IBNS).

Distribution (Map 19). RANGE. Central European mountains (from Germany, Czech Republic, Slovakia, Alps: Austria, Italy, Switzerland, Slovenia, Croatia to Romania). BALKAN PENINSULA: Slo,Cro (BT: D); (B: 4,5). First record for: Slo.

Remarks: *N. crassiseta* is recorded only on the border of the Balkan Peninsula, in Alpine region.

Biology. Preferred environment: Alpine coniferous forests and high montane pastures. Adult habitat: clearings, open grounds; fly low, over montane grassland, settle on flowers of *Ranunculus*. Flowers visited: *Ranunculus*. Flight period: June-beginning of July. Larva: undescribed.

5. ***Nigrocheilosia derasa*** (Loew, 1857)

VERIFIED REFERENCES: Langhoffer, 1917-1923.

ERRONEOUS REFERENCES. Mtg: Šimić, 1987 (=*gagatea*; =*vicina*).

Examined material (67m 25f; May 27/July 9; 800/1700 m). PUBLISHED RECORDS. Langhoffer, 1917-1923: Bjelasica (E) v.1897, 1m 1f (det. Langhoffer as *Chilosia derasa*), (CNHM). NEW DATA. **Slo**: Julijske Alpe (D), Bohinjsko jezero-Savica 14.vi.1988, 2m 1f; Vršič 18.vi.1988, 1m; Kamniške in Savinjske Alpe (D), Savinja 16.vi.1988, 1m; **Cro**: Gorski Kotar (E), Risnjak 27.v.1990, 20m 1f; **BH**: Jahorina (E), 26.vi.1989, 1m; **Mtg**: Durmitor (E), (15,16,22,25: 2.vi/9.vii, 41m 22f), (IBNS).

Distribution (Map 20). RANGE. Alps, Dinaric and Carpathians mountains; Central Europe (France, Italy, Austria, Switzerland, Romania). BALKAN PENINSULA: Slo,Cro,BH,Mtg; (BT: D,E); (B: 4). First record for: Slo,BH,Mtg.

Remarks: Besides its distribution in the Alpine and pre-Alpine region, *N. derasa* has been also recorded on high altitudes of Dinaric mountains (Gorski Kotar, Jahorina) all over to the Durmitor.

Biology. Preferred environment: open ground inside or toward the upper margin of *Picea* and *Fagus montanus* forests. Adult habitat: clearings, stream margins; flying among *Petasites* or settled on *Petasites* leaves and Apiaceae flowers. Flowers visited: Apiaceae, *Ranunculus*. Flight period: end of May-beginning of July. Larva: undescribed.

6. ***Nigrocheiloisa faucis*** (Becker, 1894)

VERIFIED REFERENCES: Strobl, 1902.

ERRONEOUS REFERENCES. Mtg: Šimić, 1987 (=*albitarsis*).

Examined material (2m 1f; June 2; 1500/1700 m). PUBLISHED RECORDS. Strobl, 1902: Apfelbeck: Troglav (E) 1f, (BHMS). NEW DATA. **Mtg**: Durmitor (E), Skakala 2.vi.1994, 2m, (IBNS).

Distribution (Map 21). RANGE. Pyrenees (Spain), Alps (Switzerland, Italy), Dinaric mountains (BH, Mtg) and Carpathians (Romania). BALKAN PENINSULA: BH,Mtg; (BT: E); (B: 5). First record for: Mtg.

Remarks: *N. faucis* was found for the first time on the Balkan Peninsula in Bosnia (Strobl, 1902). Only recent record is from Durmitor mountain in Montenegro.

Biology. Preferred environment: high mountain canyons and valleys. Adult habitat: open ground up to the woods, beside the streams; flying among *Salix* branches and settled on willow catkin. Flowers visited: *Salix*. Flight period: early spring, beginning of June. Larva: undescribed.

7. ***Nigrocheilosia gagatea*** (Loew, 1857)

VERIFIED REFERENCES: Šimić, 1987 (in part).

UNVERIFIED REFERENCES. BH: Strobl, 1898; Blg: Bankovska, 1967 (Banderica, Vitoša, Knjaževo).

Cheilosia derasa of Šimić, 1987 (in part)

Cheilosia nivalis of Šimić, 1987

Cheilosia pedemontana of Šimić, 1987

Cheilosia sahlbergi of Šimić, 1987 (in part)

Examined material: (86m 65f; May 2/9 July; 700/1900 m). PUBLISHED RECORDS. Šimić, 1987: Durmitor (E), Kanjon Sušice 8.vii.1983, 2m (1m det. Šimić as *C. gagatea*; 1m as *C. nivalis*) 4f (3f det. Šimić as *C. derasa*; 1f as *C. pedemontana*); 3.viii.1982, 1m 4f (1m 1f det. Šimić as *C. sahlbergi*; 3f as *C. nigripes*); Luke 24.viii.1984, 1f (det. Šimić as *C. gagatea*), (IBNS). NEW DATA. **Slo**: Julijske Alpe (D), Pokljuka 22.v.1989, 1f (IBNS); Pokljuka-pod Tošcem 20.viii.1971, 1f, (SNHM); Kamniške in Savinjske Alpe (D), Kamniška Bistrica 21.v.1989, 1m; Matkov Kot 1.vii.1989, 1f, (IBNS); **BH**: Volujak (E), Suha 15.v.1989, 2m; Suha-Trnovačko jezero 27.vi.1989, 1m, (IBNS); Pale (E) 1f, (BHMS); **Mtg**: Durmitor (E), (3,4,8,13,15,16,21,22,25,29: 1.vi/9.vii, 79m 49f); Prokletije (E), Krošnje 28.vii.1994, 1f, (IBNS); **Srb**: Kopaonik (E), Samokovska reka 2.v.1986, 2f, (IBNS).

Distribution (Map 22). RANGE. Central European mountains (France, Poland, Switzerland, Austria, Romania) and Balkan Peninsula. BALKAN PENINSULA: Slo,BH,Mtg,Srb,Blg; (BT: D,E,J). First record for: Slo,Srb.

Remarks: On the Balkan Peninsula *N. gagatea* appears only at high altitudes of the Alpine and Dinaric mountains and Rilo-Rhodopes with the range from the Julian Alps to the mountains Kopaonik, Durmitor and Pirin.

Biology. Preferred environment: open ground on montane pastures, vegetation of Alpine high mountain rocks in gorges and canyons. Adult habitat: rocky and grassy areas; fly over the ground vegetation, settle on flowers and leaves. Flowers visited: Apiaceae, *Ranunculus*. Flight period: May-July. Larva: undescribed.

8. ***Nigrocheilosia grisella*** (Becker, 1894)

Examined material: (95m 20f; May 2/July 5; 600/1700 m). NEW DATA. **Slo**: Julijske Alpe (D), Pokljuka 22.v.1989, 8m; Vršič 23.v.1989, 1m 2f; Menina (E), 24.v.1989, 3m; **Cro**: Gorski Kotar (E), Risnjak 27.v.1990, 1f; **BH**: Jahorina (E), 14.v.1989, 2m; 26.vi.1989, 2f; 14.vi.1991, 3m 1f; Volujak (E), Suha-Trnovačko jezero 15.v.1989, 1f; **Mtg**: Durmitor (E), Kanjon Sušice 2.vi.1994, 1m; Škrčka jezera 5.vii.1983, 1f; **Srb**: Kopaonik (E), (2-4, 6, 8, 13, 15, 20, 21, 23, 24, 26: 2.v/18.vi, 77m 12f), (all in: IBNS).

Distribution (Map 23). RANGE. High Central European mountains, from Germany and Poland to Romania and Russia. BALKAN PENINSULA: Slo, Cro,BH,Mtg,Srb; (BT: D,E); (B: 3,4). First record for: Balkan Peninsula (Slo, Cro,BH,Mtg,Srb).

Remarks: *N. grisella* appears at high altitudes of the Alps and Dinaric mountains all over to the mountains Kopaonik and Durmitor.

Biology. Preferred environment: wetland and peat bog beside streams and rivers in coniferous and beech forests. Adult habitat: clearings, beside streams and lakes; fly low over the vegetation and settle on leaves and flowers of *Caltha palustris*. Flowers visited: *Caltha palustris, Ranunculus*. Flight period: May-beginning of July. Larva: undescribed.

9. ***Nigrocheilosia herculana*** (Bradescu, 1982)

Cheilosia coerulescens of Glumac, 1968

Cheilosia caerulescens of Šimić, 1987 (in part)

Examined material (5m 8f; June 2/August 30; 800/2000 m). PUBLISHED RECORDS. Glumac, 1968: Radika (F) 30.viii.1959, 1m (det Glumac as *C. coerulescens*), (IBNS); Šimić, 1987: Durmitor (E), Mali Međed 13.viii.1984, 1m (det. Šimić as *C. caerulescens*); Pirlitor- Kanjon Tare 29.viii.1984, 3f (det. Šimić as *C. caerulescens*), (IBNS). NEW DATA. **Mtg**: Durmitor (E): Kanjon Komarnice 23.viii.1994, 1f; Kanjon Sušice 9.vii.1991, 1m 1f; Luke 8.vii.1991, 1f; Prutaš 2.vii.1993, 1m; Skakala 29.vi.1993, 1m; 1.vii.1993, 1f; 2.vi.1994, 1f, (IBNS).

Distribution (Map 24). RANGE. Carpathians and mountains in central part of the Balkan Peninsula. BALKAN PENINSULA: Mtg,Mac; (BT: E,F) (B: 3). First record for: Balkan Peninsula (Mtg,Mac).

Remarks: *N. herculana* was described from the Carpathians and recorded in two localities from the central part of Balkan, mountain Durmitor in Montenegro and the valley of the river Radika in Macedonia.

Biology. Preferred environment: broad-leaved woodlands, usually beech forests at higher altitudes. Adult habitat: clearings, open ground, rocky areas; often settle on stones in the sun; males hover at 2-4 meters. Flowers visited: *Ranunculus*, *Alyssum*. Flight period: June-August. Larva: undescribed.

10. ***Nigrocheilosia hercyniae*** (Loew, 1857)

UNVERIFIED REFERENCES. Srb: Glumac, 1955a (specimen lost).

ERRONEOUS REFERENCES. Cro: Langhoffer, 1917-1923 (=*Cheilosia latifacies*).

Examined material: (28m 15f; June 1/August 2; 1400/1800 m). NEW DATA. **Mtg**: Durmitor (E), Kanjon Sušice 9.vii.1991, 6m 2f; Luke 9.vii.1991, 1f; 1.vi.1994, 4m; 2.viii.1994. 1m; Prutaš 2.vii.1993, 1m 2f; Skakala 1.vii.1993, 2m 1f; 1/3.vi.1994, 12m 8f; 6.vii.1994. 2m; Prokletije (E), Ljubokuća 27. vii.1994, 1f, (IBNS).

Distribution (Map 25). RANGE. Central Europe (Alps, Carpathians, high mountains on the Balkan Peninsula). BALKAN PENINSULA: Mtg,Srb; (BT: E); (B: 5). First record for: Mtg.

Remarks: *N. hercyniae* was recorded in refuge of Alpine and Central European species on Durmitor, in Škrčko-Sušički basin, and at high altitudes of the mountain Prokletije.

Biology. Preferred environments: open ground in high mountain rocks and pastures of Alpine type, isolated canyons at high altitudes. Adult habitat: rocky and grassy open ground up to the forest; fly among *Salix* branches and stream-side vegetation, males hover at 2-5 meters. Flowers visited: *Salix* (in early spring), *Senecio*, Apiaceae. Flight period: June-July. Larva: undescribed.

11. ***Nigrocheilosia impudens*** (Becker, 1894)

ERRONEOUS REFERENCES. Cro: Langhoffer, 1917-1923 (=*Cheilosia albitarsis*); Mtg: Šimić, 1987 (=*antiqua*, =*nigripes*).

Examined material: (19m 5f; May 14/June 26; 700/1500 m). NEW DATA. **Slo**: Julijske Alpe (D), Mojstrana-Vrata 23.v.1989, 1m; Pokljuka 22. v.1989, 2m; Kamniške in Savinjske Alpe (D), Matkov Kot 25.v.1989, 2m; Menina (E), 24.v.1989, 3m, (IBNS); **Cro**: Gorski Kotar (E): Risnjak 27.v.1990, 4m 1f; Mala Kapela (E): Plitvička jezera 30.iv.1990, 1m 1f, (IBNS); Sljeme (E) 23/27.v.1969, 8m 9f; 18.v.1970, 4m; 12.v.1972, 1m 2f; Zagreb (E) (Villa Rebba) 19.v.1970, 1f; 12.v.1972, 1f, (JLC) **BH**: Bjelašnica (E), 26.vi.1989, 1f; Jahorina (E), 14.v.1989, 2m; Konjuh (E): 13.v.1989, 4m 2f, (IBNS).

Distribution (Map 26). RANGE. Central European mountains, from Germany and Poland to Romania and Caucasus. BALKAN PENINSULA: Slo,Cro,BH; (BT: D,E); (B: 3,4). First record for: Balkan Peninsula (Slo, Cro,BH).

Remarks: *N. impudens* appears in coniferous forests of boreal type in the Alpine region and on certain Dinaric mountains (Gorski Kotar, Jahorina, Bjelašnica) in the west part of the Balkan.

Biology. Preferred environment: *Picea* and *Fagus* woodlands beside streams and rivers. Adult habitat: clearings, tracksides, fly low and usually settle on leaves in sunlight. Flowers visited: *Ranunculus*. Flight period: May-June. Larva: undescribed.

12. ***Nigrocheilosia insignis*** (Loew, 1857)

Examined material: (49m 19f; April 30/June 1; 700/1700 m). NEW DATA. **BH**: Grmeč (E): 30.iv.1990, 4m 1f; **Mtg**: Durmitor (E): Kanjon Sušice 1/2.vi.1994, 5m; Luke 1.vi.1994, 1m 3f; Skakala 1/3.vi.1994, 29m 16f, (IBNS).

Distribution (Map 27). RANGE. Central Europe (from Germany and Poland to Montenegro and Romania) at high altitudes. BALKAN PENINSULA: BH,Mtg; (BT: E); (B: 3,5). First record for: Balkan Peninsula (BH,Mtg).

Remarks: *N. insignis* is registered on two localities of the west Dinaric mountains - Grmeč and Durmitor.

Biology. Preferred environment: *Fagus* mountain forests and Alpine rock and snow-patches. Adult habitat: rocky open ground beside streams and snow patches; flying in early spring, after snow melting, low over the ground and

settle on stones, rocks and leaves. Flowers visited: *Salix*, *Muscari*. Flight period: May-beginning of June. Larva: undescribed.

13. ***Nigrocheilosia kerteszi*** (Szilady, 1938)

Examined material (2m 1f; April 14/May 3; 300-500 m). NEW DATA. **Srb**: Rtanj (H) 14.iv.1991, 1f; Klisura Peka (H) 3.v.1993, 1m 1f, (IBNS).

Distribution (Map 16). RANGE. Carpathians: Romania and Serbia. BALKAN PENINSULA: Srb; (BT: H); (B: 3). First record for: Balkan Peninsula (Srb).

Remarks: *N. kerteszi* is described on the basis of the material collected in Romania, i.e. on the slopes of the Carpathians. The only record of the species on the Balkan Peninsula is from the mountain Rtanj, suggesting that Carpathians fauna spreads up to this region.

Biology. Preferred environment: deciduous forest on low mountains, in canyons and gorges. Adult habitat: clearings along streams, males hover at 2-5 meters. Flowers visited: *Salix*, *Ranunculus*. Flight period: early spring, April-May. Larva: undescribed.

14. ***Nigrocheilosia laeviseta*** (Claussen, 1987)

Cheilosia laevis of Šimić, 1987

Examined material (46m 50f; June 1/August 1; 1200/2200 m). PUBLISHED RECORDS. Šimić, 1987: Durmitor (E), Škrčko ždrijelo 30.vi.1985, 1f (det. Šimić as *C. laevis*), (IBNS). NEW DATA. **Mtg**: Durmitor (E), Kanjon Sušice 9.vii.1991, 2f; 6.vii.1994, 1f; Luke 9.vii.1991, 1m 3f; 1.vi.1994 1m; Prutaš 2.vii.1993, 5m 4f; Samar 1/2.vii.1993, 2m 3f; Skakala 4.vi.1994, 1m 2f; Škrčko ždrijelo 8.vii.1991, 35m 32f; 6.vii.1994, 1m 1f; 1.viii.1994, 1f, (IBNS).

Distribution (Map 18). RANGE. The Alps (Italy, Switzerland), Durmitor (Montenegro). BALKAN PENINSULA: Mtg; (BT: E); (B: 5). First record for: Balkan Peninsula (Mtg).

Remarks: Škrčko-Sušički basin - a refuge of Alpine species on the mountain of Durmitor - is the only locality of *N. laeviseta* registered on the Balkan Peninsula. The other localities registered so far for this species is in Switzerland and Italy (Stahls, pers. com.).

Biology. Preferred environment: high mountain valleys and canyons, vegetation of rock, pastures, snow-patches above forest zone. Adult habitat: rocky and grassy areas; settle on rocks and stones in the sun, fly through and over pasture vegetation. Flowers visited: *Ranunculus*. Flight period: June-July. Larva undescribed.

15. ***Nigrocheilosia loewi*** (Becker, 1894)

VERIFIED REFERENCES: Strobl, 1898.

UNVERIFIED REFERENCES. Cro: Langhoffer, 1917-1923 (specimen not found in Coll. of CNHM); Srb: Kula, 1985.

ERRONEOUS REFERENCES. Mtg: Šimić, 1987 (=*Cheilosia impressa*).

Examined material: (1m 2f; May 21/June 27; 1400/1700 m). PUBLISHED RECORDS. Strobl, 1898: Trebević (E) 1f, (BHMS). NEW DATA. **Slo**: Kamniške in Savinjske Alpe (D), Kamniška Bistrica 21.v.1989, 1m; **Mtg**: Durmitor (E), Ivan Do 27.vi.1993, 1f, (IBNS).

Distribution (Map 28). RANGE. Central Europe (from Germany and Poland, to Romania). BALKAN PENINSULA: Slo,Cro,BH,Mtg; (BT: D,E); (B: 4,5). First record for: Slo,Mtg.

Remarks: *N. loewi* is a rarely found species on the Balkan Peninsula, appearing in the Alpine region and certain localities in west Dinaric mountains.

Biology. Preferred environment: montane coniferous forests and Alpine pastures. Adult habitat: clearings, open ares towards the forest limit. Flowers visited: *Ranunculus*. Flight period: May-June. Larva: undescribed.

16. ***Nigrocheilosia nigripes*** (Meigen, 1822)

VERIFIED REFERENCES: Glumac, 1955a; 1956a; 1959; Vujić & Glumac, 1994; Vujić & Šimić, 1994.

UNVERIFIED REFERENCES. Blg: Bankowska, 1967 (Smoljan); Mtg: Coe, 1960; Srb,BH: Cula, 1985.

ERRONEOUS REFERENCES. Mtg: Šimić, 1987 (=*gagatea*; =*pubera*).

Chilosia antiqua of Langhoffer, 1917-1923

Chilosia flavissima of Drenski, 1934

Chilosia melanopa of Drenski, 1934

Cheilosia recens of Glumac, 1955b

Cheilosia impudens of Šimić, 1987 (in part)

Examined material: (246m 159f; April 28/July 18; 150/1700 m). PUBLISHED RECORDS. Langhoffer, 1917-1923: *Chilosia antiqua*: Sljeme (A) 1.vi.1898, 1f; Zagreb (A) 28.v.96, 2f; Bakar (E) 27.v.1886, 1f; 8.v.1888, 1m; Krivi Put (E) 30.v.1891, 1m 4f (1m det. Langhoffer as *Chrysogaster chalybeatus*); Orehovica (?) 9.v.1888, 1m; 1.v.1889, 1f, (CNHM); Drenski, 1934: Vitoša (J) (Sofia) iv.1908, 2m (det. Drenski as *C. melanopa* and *C. flavissima*); Poganovo (B) viii.1908, 1f (det. Drenski as *C. melanura*) (ZIS); Glumac, 1955a: Beograd (A), (Košutnjak) 22.v.1954, 6m (det. Glumac as *C. nigripes*), (NHMB); Glumac, 1955b: Sarajevo (E), 1f (det. Glumac as *C. nigripes*); (Ali Pašin most) 1914, 1f (det. Glumac as *C. recens*), (BHMS); Glumac, 1956a: Kopar (C) 1.v.1955, 1m (det. Glumac as *C. nigripes*), (NHMB); Glumac, 1959: Fruška gora (A), (Stražilovo) 28.iv.1957, 2m (det. Glumac as *C. nigripes*), (NHMB); Šimić, 1987: Durmitor (E), Zminje jezero-Mlinski potok 22.vi.1985, 1f (det. Šimić as *C. impudens*), (IBNS); Vujić & Glumac, 1994: Fruška gora (A), all records, (IBNS, NHMB); Vujić & Šimić, 1994: Vršačke planine (A), all records (IBNS). NEW DATA. **Slo**: Julijske Alpe (D), (2,4,10: 22 v/14 vi, 7m 5f); Kamniške in Savinjske Alpe (D), (2,3: 21.v/30.vi, 29m 37f); Menina (E), 24.v.1989, 1m 1f, (IBNS); Ljubljana (E) (Ljubljansko barje) 2.v.1972, 4m, (SNHM); **Cro**: Samobor (A) 25.v.1970, 3f; 19.v.1972, 1f; Zagreb (A) (Jelenovac) 22.v.1969, 1m; (Rude) 23.v.1972, 1f; (Tuškanac) 22.v.1969, 1f; (Villa Rebba) 24.v.1969, 1m; 19.v.1970, 1m 1f; 12.v.1972, 1f; Krk (C) (Baška) 10.v.1983, 1f; Omiš (C) 5.v.1983, 1m; Velebit (E): (Brušani) 13.vi.1969, 1f; (Oštarije) 26.v.1972, 2m, (JLC); **BH**: Kozara (A): Kozarac 1.v.1990, 1m; Bjelašnica (E), 26.vi.1989, 1f; Grmeč (E), 30.iv.1990, 2m; Javor (E), (1: 13.v.1989, 1f); Konjuh (E), 13.v.1989, 1m; Volujak (E), Suha 15.v.1989, 4m 1f, (IBNS); Banja Stijena (?) 1913, 1m; Jablanica (E) 1f; Krapina (E) 1m 1f; Sarajevo (E) (Miljacka) 1f; Ivan planina (E) 1911, 2m, (BHMS); **Mtg**: Kanjon Morače (C), 28.iv.1990, 2m; Durmitor (E), Kanjon Sušice 1.vi/9.vii, 2m 4f, (IBNS); **Srb**: Suva planina (B), (1,4: 1/28.v, 8m 1f; Kopaonik (E), (2-5, 8,20,21,22: 1.v/6.vii, 43m 8f); Debeli Lug (H), 28.iv.1989, 2m; Kučaj (H): (2,4,5: 13.v/29.vi, 7m 5f); Stara Planina (I), (2,3: 8/31.v, 25m 5f); Šar-planina (F), Durov potok 18.vii.1986, 1m; 27.vi.1988, 2f, (IBNS); **Mac**: Kožuf (F), Konsko 14.v.1990, 1m 1f; Mavrovo (F) 30.v.1960, 2m, (IBNS); **Gre**: Olympos (F): 23.iv.1990, 5m; Pindos (G): (1,2: 13.v.1990, 14m 9f), (IBNS).

Distribution (Map 17). RANGE. Europe, Siberia, Mongolia. BALKAN PENINSULA: Slo,Cro,BH,Mtg,Srb,Mac,Blg,Gre; (BT: A-J); (B: 1-5,7). First record for: Slo,Mac,Gre.

Remarks: *N. nigripes* is the most widely distributed species of genus *Nigrocheilosia*. It is found in all types of forest communities from Submediterranean to Pannonic mountains. The species is numerously represented in the biome of South European, mostly deciduous woodlands.

Biology. Preferred environment: deciduous woodlands, especially oak forests; Adult habitat: clearings in woodlands; settle on the leaves of low plants and bushes. Flowers visited: *Stellaria holostea, Ranunculus, Caltha palustris,*

Myosotis, white Apiaceae. Flight period: end of April-July at higher altitudes. Larva: undescribed.

17. ***Nigrocheilosia personata*** (Loew, 1857)

VERIFIED REFERENCES: Langhoffer, 1917-1923; Šimić,1987.

UNVERIFIED REFERENCES. BH: Kula, 1985.

Examined material: (49m 24f; May 29/August 24; 700/1900 m). PUBLISHED RECORDS. Langhoffer, 1917-1923: Bjelasica (E) 9.vii.1901, 1f (det. Langhoffer as *Chilosia personata*), (CNHM); Šimić, 1987: *C. personata*: Durmitor (E), Kanjon Sušice 3.viii.1982, 1f; 8.vii.1983, 1m 1f; Luke 24.viii.1984, 1f, (IBNS). NEW DATA. **Slo**: Julijske Alpe (D), (1,5,7,9: 14/18.vi, 13m 4f), (IBNS); Bohinj 21/28.vii, 5f; Komna 30.vii.1971, 2f; Ljubljana (E) 29.v.1973, 1f, (SNHM); Kamniške in Savinjske Alpe (D), (2,3,4: 16.vi/1.vii, 3m 1f), (IBNS); **Cro**: Gorski Kotar (E), (1: 27.v.1990, 2m); Mala Kapela (E): (1: 29.v.1990, 1f), (IBNS); Samobor (A) (Rude) 23.v.1972, 2m; Ledenica 28. vi.1981, 1m 2f (JLC); Velebit (E) (Zavižan) 16.vii.1972, 2f, (SNHM); **BH**: Grmeč (E): 29.v.1990, 2m; Jahorina (E): 26.vi.1989, 1m 2f, (IBNS); Treska 1912, 1m, (BHMS); **Mtg**: Durmitor (E), (5,10,13,15,16,21,29,31,32: 24.vi/ 24.viii, 24m 10f); Prokletije (E), Krošnje 28.vii.1994 1f, (IBNS); **Srb**: Kopaonik (E), (20: 5.vii.1986, 1f); Stara Planina (I), (6: 27.vi.1987, 2m 1f), (IBNS).

Distribution (Map 29). RANGE. Pyrenees, Alps, Carpathians, Dinaric mountains, Stara Planina mountain. BALKAN PENINSULA: Slo,Cro,BH, Mtg, Srb; (BT: D,E,I); (B: 4-6). First record for: Slo,Srb.

Remarks: *N. personata* is recorded in the Alpine region, Dinaric mountains and on the mountain Stara Planina at the altitudes above 700 m.

Biology. Preferred environment: beech forests at high altitudes; coniferous woodlands. Adult habitat: open rocky ground, tracksides in woods; fly low, through and over vegetation, settle on leaves or flowers in the clearings. Flowers visited: *Saxifraga*, white Apiaceae. Flight period: end of May-August. Larva: undescribed.

18. ***Nigrocheilosia pubera*** (Zetterstedt, 1838)

VERIFIED REFERENCES: Langhoffer, 1917-1923.

UNVERIFIED REFERENCES. Blg: Bankowska, 1967 (Pirin, Rila).

Examined material: (77m 42f; May 2/July 26; 700/1700 m). PUBLISHED RECORDS. Langhoffer, 1917-1923: Orehovica 1f (det. Langhoffer as *Chilosia pubera*), (CNHM). NEW DATA. **Slo**: Julijske Alpe (D), (5,8,9,10: 22.v/18.vi, 25m 11f), (IBNS); Vogar-Bohinj 14.vi.1973,

1m, (SNHM); **BH**: Sarajevo (E) (Stambulčić) v.1916, 1m 4f, (BHMS); **Srb**: Kopaonik (E), (3,6,13, 20,21,24,26: 2.v/6.vii, 49m 25f); Stara Planina (I): Arbinje 26.vi.1987, 1m 1f, (IBNS).

Distribution (Map 30). RANGE. Europe (except Mediterranean), West Siberia. BALKAN PENINSULA: Slo,Cro,BH,Srb,Blg; (BT: D,E,I,J); (B: 3,4). First record for: Slo,BH,Srb.

Remarks: *N. pubera* is a species of northern Europe. Besides Alpine region other records of the species on the Balkan Peninsula are from only several high mountains (Kopaonik, Stara planina, Rilo-Rhodopes).

Biology. Preferred environment: peat bog, marshy area along streams in montane forests. Adult habitat: along stream-sides; an early spring species flies over wetland vegetation, settles on leaves and flowers of *Caltha palustris*. Flowers visited: *Caltha palustris, Ranunculus*. Flight period: May-July at lower altitudes. Larva undescribed.

19. ***Nigrocheilosia sahlbergi*** (Becker, 1894)

VERIFIED REFERENCES: Šimić, 1987.

UNVERIFIED REFERENCES: Blg: Bankowska, 1967 (Vitoša, Banderica).

Examined material: (13m 8f; April 9/July 6; 700/2000 m). PUBLISHED RECORDS. Šimić, 1987: Durmitor (E), Škrčko ždrijelo 30.vi.1985, 2f (det. Šimić as *C. sahlbergi*), (IBNS). NEW DATA. **Mtg**: Durmitor (E), Prutaš 2.vii.1993, 3m 1f; Samar 1.vii.1993, 2m; Skakala 1.vii.1993, 1m; Šareni pasovi 6.vii.1994, 7m 5f, (IBNS).

Distribution (Map 31). RANGE. North Europe (from Norway to Russia), Central Europe (from Great Britain to Romania and Caucasus), Dinaric mountains (Durmitor). BALKAN PENINSULA: Mtg,Blg; (BT: E); (B: 4,5).

Remarks: On the Balkan Peninsula *N. sahlbergi* is recently recorded only in the refuge of the Alpine species on the mountain Durmitor.

Biology. Preferred environment: open ground, Alpine high mountain rocks, pastures and snow-patches above forest zone. Adult habitat: open ground up to the upper altitudinal forest limit; appear after snow melting, fly fast and low, settle on rocks and stones. Flowers visited: *Ranunculus*. Flight period: April-May at low altitudes, end of June/beginning of July at high altitudes. Larva: undescribed.

20. ***Nigrocheilosia vicina*** (Zetterstedt, 1849)

syn. *Chilosia nasutula* Becker, 1894

VERIFIED REFERENCES: Glumac, 1959 (as *nasutula*); Vujić & Glumac, 1994; Vujić & Šimić, 1994.

Chilosia melanopa of Drenski, 1934 (in part)

Cheilosia derasa of Šimić, 1987 (in part)

Examined material: (296m 59f; April 5/July 8; 150/1800m). PUBLISHED RECORDS. Drenski, 1934: (1415) 1m (det. Drenski as *C. melanopa*), (ZIS); Šimić, 1987: Durmitor (E), Škrčko ždijelo 23.viii.1984, 1f (det. Šimić as *C. derasa*), (IBNS); Vujić & Glumac, 1994: Fruška gora (A), all records (IBNS, NHMB); Vujić & Šimić, 1994: Vršačke planine (A), all records (IBNS). NEW DATA. **Slo**: Julijske Alpe (D), (1,2,4-6,8-10: 22.v/2.vii, 45m 4f); Kamniške in Savinjske Alpe (D), (2-4: 21.v/5.vii, 65m 10f), (IBNS); **Cro**: Gorski Kotar (E), Risnjak 27.v.1990, 1m 1f, (IBNS); Zagreb (A) (Villa Rebba) 12.v.1972, 1f, (JLC); **BH**: Jahorina (E), 14.v.1989, 1f; 26.vi.1989, 2m 1f; Volujak (E), (2: 27.vi.1989, 2m), (IBNS); **Mtg**: Durmitor (E), (8,13,15,16,25,28-30: 28.vi/8.vii, 42m 7f), (IBNS); **Srb**: Vlašić (A), (1: 12.v.1989, 1m); Kopaonik (E), (2,5,6,20,21,22: 1.v/22.vi, 39m 10f); Kučaj (H), (2,5,6: 13.v/12.vi, 23m 3f); Stara planina (I), (2,3,10: 28/31.v.5m 2f), (IBNS); **Mac**: Kožuf (F), Konsko 14.v.1990, 1m (IBNS); **Gre**: Pindos (G), Katara 13.v.1990, 2m 1f, (IBNS).

Distribution (Map 32). RANGE. Europe, West Siberia. BALKAN PENINSULA: Slo,Cro,BH,Mtg,Srb,Blg,Mac,Gre; (BT: A,D-J); (B: 2-5). First record for: Slo,Cro,BH,Mtg,Blg,Mac,Gre.

Remarks: *N. vicina* lives in forest communities of almost all biogeographical territories. It is especially numerous in beech and oak woods. No records are found in Mediterranean and Submediterranean regions.

Biology. Preferred environment: widespread in deciduous and coniferous forests. Adult habitat: woodland clearings, fly within 2 meters of the ground through and over vegetation, settle on leaves and flowers. Flowers visited: *Stellaria holostea, Ranunculus, Taraxacum, Potentilla*. Flight period: April-beginning of July at high altitudes. Larva: undescribed.

21. ***Nigrocheilosia*** **sp.**

Chilosia crassiseta of Langhoffer, 1917-1923

Remarks: This taxon probably represents one undescribed species.

Examined material: (10m 16f; May 23/July 8; 1000/1800 m). PUBLISHED RECORDS. Langhoffer, 1917-1923: *Chilosia crassiseta*: Rijeka (E) 18/19.iv.1897, 1m 1f; Crikvenica (E) 9.iv.1898, 1m; Bakar (E) 13.iv.1898, 2m; Senj (E) 28.iv.1889, 1f; 2.v.1889, 1f; 14.v.1889, 1f, (CNHM). NEW DATA. **Slo**: Julijske Alpe (D), Bohinjsko jezero-Črno jezero 2.vii.1989, 1m; Izvir Soče-Zadnja Trenta 23.v.1989, 1m, (IBNS); **Mtg**: Durmitor (E), Luke 8.vii.1991, 1f; Skakala 9.vii.1992, 1f; 29.vi/1.vii.1993, 8f; 1.vi.1994, 4m 1f; Škrčka jezera 30.vi.1993, 1f, (IBNS).

Distribution (Map 32). RANGE. Slovenian Alps, Dinaric mountains (Croatia, Montenegro). BALKAN PENINSULA: Slo,Cro,Mtg; (BT: E); (B: 4,5).

Remarks: This species appears at high altitudes of the Slovenian Alps and some Dinaric mountains.

Biology. Preferred environment: Alpine high montane rock, pastures, snow-patches and avalanches. Adult habitat: rocky open ground, grassy areas, clearings; fly fast, within 1 meter of the ground, settle on the rocks, in the sun. Flowers visited: *Ranunculus*. Flight period: June-beginning of July. Larva: undescribed.

5. 3. GENUS *CHEILOSIA* MEIGEN, 1822

Type species: *Syrphus flavipes* Panzer, 1798

The genus consists of approximately 330 species in Palaearctic. The larger number of the species appear in the Holarctic zone of deciduous forests while far less number live in boreal forests and Mediterranean. Beyond these regions the number of species belonging to this genus is minimal.

22. ***Cheilosia aerea*** Dufour, 1848

syn. *Chilosia zetterstedti*, Becker, 1894

VERIFIED REFERENCES (as *zetterstedti*): Glumac 1955a, 1968; Vujić & Glumac, 1994.

UNVERIFIED REFERENCES. BH: Strobl, 1898; Srb: Strobl, 1902; Cro: Coc, 1956; Blg: Bankowska, 1968; Mac: Coe, 1960.

Chilosia barbata of Drenski, 1934 (in part)

Chilosia bigoti of Drenski, 1934

Chilosia langhofferi of Drenski, 1934

Chilosia melanopa of Drenski, 1934 (in part)

Chilosia morio of Drenski, 1934

Chilosia mutabilis of Drenski, 1934

Chilosia vulpina of Drenski, 1934 (in part)

Chilosia velutina of Drenski, 1934 (in part)

Chilosia proxima of Langhoffer, 1917-1923

Cheilosia gemina of Glumac, 1955a

Cheilosia proxima of Glumac, 1955a (in part)

Cheilosia vernalis of Glumac, 1955a (in part)

Cheilosia correcta of Glumac, 1959

Cheilosia montana of Glumac, 1959

Cheilosia ruficollis of Glumac, 1968

Cheilosia trisulcata of Glumac, 1968

Remarks: Many erroneous determinations are the results of great variability of species and existence of morphological differences between spring and summer generations. Claussen (1996b) reinstates the old synonym *Cheilosia aerea* Dufour as valid species and proposes many new synonym of this species.

Examined material (312m 97f; March 31/August 31; 50/1600 m). PUBLISHED RECORDS. Langhoffer, 1917-1923: Rijeka (C) 1f; Senj (E) 2m 3f (det. Langhoffer as *Chilosia proxima*), (CNHM); Drenski, 1934: Strandža planina (B-3) 1m (det. Drenski as *Chilosia langhofferi*); Ihtimanska Sredna Gora (I) 1m 2f (det. Drenski 1m as *Chilosia morio*, 1f as *C. bigoti*); (Ihtiman) 4m 2f (det. Drenski 2m as *Chilosia morio*, 1m 2f as *C. langhofferi*, 1m as *C. velutina*) Stara Planina (I) (Svoge) 1m (det. Drenski as *Chilosia melanopa*); Vitoša (J) (Sofia) 5m 4f (det. Drenski 1m 2f as *Chilosia barbata*, 1m 1f as *C. langhofferi*, 1m as *C. melanopa*, 1m as *C. mutabilis*, 1m as *C. vulpina*), (ZIS); Glumac, 1955a: all records of *zetterstedti*; Beograd (A), (Avala) 1m (det. Glumac as *C. proxima*); (Topčider) 1m (det. Glumac as *C. gemina*); Ključ 2m (det. Glumac as *C. proxima*); Homolje (H) (Blagojev Kamen) 2m (det. Glumac 1m as *C. vernalis*, 1m as *C. gemina*), (NHMB); Glumac, 1959: Fruška gora (A), (Stražilovo) 1m (det. Glumac as *C. correcta*); (Petrovaradin) 1m (det. Glumac as *C. montana*), (NHMB); Glumac, 1968: all records of *C. zetterstedti*; Ohrid (F) (Kosel) 1f (det. Glumac as *C. ruficollis*); Ogražden (J) 1f (det. Glumac as *C. trisulcata*), (IBNS); Vujić & Glumac, 1994: Fruška gora (A), all records of *C. zetterstedti* (IBNS). NEW DATA. **Cro**: Krapina (E) 2f, (BHMS); Biograd (C) 1m; Omiš (C) 1m, (JLC); **BH**: Prenj (E), 16.v, 1f, (IBNS); 1f, (BHMS); Sarajevo (E), (Ilidže) 1f; (Vrelo Bosne) 1f, (BHMS); **Mtg**: Kanjon Morače (C), 4/28.iv, 39m 11f; Durmitor: (14: 23.viii, 1f), (IBNS); **Srb**: Apatin (A), 26.v, 1f; Fruška gora (A), (9: 12.iv, 1m); Koviljski rit (A), 24.iv, 5f; Juhor (B) 6/12.vii, 2m 2f; Suva planina (B), (2: 2.v, 2m); Svrljiške planine (B), (3: 11.vii, 1m); Kopaonik (E), (5,18,20,21,23: 26.iv/3.vii, 4m 6f); Tara (E) 17.vii, 1f; Šar-planina (F), (1,2,6: 29.vi/17.vii, 9m 3f); Klisura Peka (H), 3.v, 1f; Kučaj (H), (1-4,6,11,12: 31.iv/13.viii, 14m 15f); Kučevo (H), 30.iv, 1m; Žagubica (H), 14.vii, 1m; Stara Planina (I), (3,4,10: 1.v/18.vii, 10m 3f); Bosilegrad (J), 31.iii/5.v, 2m; Kukavica (J), (1: 18.vii, 1m); Pčinja (J), 1.iv, 1f; Čemernik and Vlasinsko jezero (J), (4: 3.v, 1f), (IBNS); **Mac**: Baba (F), 20.iv/17.vi, 16m 4f; Galičica (F), (1,2: 20.iv/8.v,

10m 3f); Kožuf (F), (1,2: 14.v/18.vii, 17m 11f), (IBNS); Babuna (F) 3f; Bitola-Resen (F) 1m; Oteševo (F) 18m 13f; Resen-Ohrid (F) 2f, (JLC); **Gre**: Xanthi (C-1), 15.iii, 1m; Kastoria-Neapoli 21.iv, 10m 1f; Olympos (F), 14.iii/14.v, 15m 2f; Verno (F), (2,3: 21.iv/11.v, 15m 3f); Pindos (G), (1: 13.v, 1m), (IBNS); Olympos (F) 1f; Parnassos (G) (Arahova) 2m 1f; Peloponesus (G), (Menalon) 1m; (Taygetos) 1f; (Taygetos-Sparta) 12m 1f; (Taygetos-Tripi) 1m; (Tripi) 1f; (Vitina) 1m 1f; Pindos (G) (Katara) 7m 13f; (Gardiki Omelion) 1m, (JLC).

Distribution (Map 20). RANGE. Central and South Europe. BALKAN PENINSULA: Cro,BH,Mtg,Srb,Mac,Blg,Gre; (BT: A-C,E-J); (B: 1-3). First record for: Mtg,Gre.

Remarks: *C. aerea* is recorded on the whole territory of the Balkan, except in the Alpine region. The species is especially numerous in southern parts and at lower altitudes.

Biology. Preferred environment: deciduous forests, especially Submediterranean broad-leaved woodlands and shrubs. Adult habitat: clearings, meadows; males hover at 1-5 meters; settle on leaves and flowers. Flowers visited: Apiaceae, *Euphorbia*. Flight period: end of March-August, with the two peak, spring (April-May) and summer (July-August). Larva: undescribed.

23. ***Cheilosia albipila*** Meigen, 1838

VERIFIED REFERENCES: Šimić, 1987 (in part); Vujić & Glumac, 1994; Vujić & Šimić, 1994.

UNVERIFIED REFERENCES. Cro: Strobl, 1902; Blg: Bankowska, 1967 (Vitoša); Srb: Glumac, 1955a (specimen not found in Coll. of NHMB).

ERRONEOUS REFERENCES. Blg: Drenski, 1934 (=*cynocephala*; =*aerea*).

Cheilosia grossa of Glumac, 1955b

Examined material (106m 24f; March 17/July 9; 50/1700 m). PUBLISHED RECORDS. Glumac, 1955b: Pale (A) 1913, 1m (det. Glumac as *C. grossa*), (BHMS); Šimić, 1987: Durmitor (E), Luke 30.vi.1985, 1f (det. Šimić: *C. albipila*), (IBNS); Vujić & Glumac, 1994: Fruška gora (A), all records (IBNS, NHMB); Vujić & Šimić, 1994: Vršačke planine (A), all records (IBNS). NEW DATA. **Slo**: Julijske Alpe (D), (9: 22.v.1989, 3m 4f), (IBNS); **Cro**: Sljeme (A) 18.v.1970, 1f, (JLC); **BH**: Grmeč (E), 30.iv.1990, 2m; Jahorina (E), 14.vi.1991, 2m; Javor (E), Sokolina 10.iv.1989, 2m; Volujak (E), (2: 11.iv.1989, 1m 1f; 15.v.1989, 1m), (IBNS); **Mtg**: Durmitor (E), (15,25: 3.vi/9.vii, 2m 3f), (IBNS); **Srb**: Doroslovo (A), Doroslovačka šuma 9.iv.1991, 1m; Ečka (A) 4.iv.1991, 7m; Obedska bara (A), (1: 3.iv.1988, 4m; 15.iv.1990, 4m); Suva planina (B), (4: 2.iv.1989, 1m); Kopaonik (E), (4,19-23: 29.iv/23.v, 22m 6f); Žljeb (E), 3.v.1991, 2m; Debeli Lug (H), 28.iv.1989, 2m; Kučevo (H) 30.iv.1993, 1f; Kučaj (H), (2,3,6,9: 29.iii/5.v, 9m 1f); Rtanj (H), 14.iv.1991, 2m; 1.v.1991, 2m 1f; Stara Planina (I), Ržana 12.iv.1988, 1m; Pčinja (J),

Manastir Prokop Pčinjski 1.iv.1989, 6m, (IBNS) **Mac**: Kriva Lakavica (B-1): 13.iv.1987, 1f; Šar-planina (F), Crni Kamen 19.iv.1987, 1m, (IBNS) **Gre**: Langadas-Tessaloniki (C-1) 3/8.iv.1956, 1f, (JLC).

Distribution (Map 33). RANGE. Europe, Siberia. BALKAN PENINSULA: Slo,Cro,BH,Mtg, Srb,Mac,Blg,Gre; (BT: A-F, H-J); (B: 2,3). First record for: Slo,BH,Mac,Gre.

Remarks: *C. albipila* is found on the whole territory of the Balkan Peninsula in oak and beech woods, except in south Greece.

Biology. Preferred environment: deciduous woodlands. Adult habitat: wetland, in vicinity of rivers, streams, lakes and marshes; fly high, males hover at 2-5 meters; often settle on ground or vegetation in the sun. Flowers visited: *Salix*, Rosaceae. Flight period: March-July at high altitudes. Larva: described by Andrews (1944) and Rotheray, (1988); internal feeder in stems of *Cirsium* spp and *Carduus crispus*.

24 and 25. ***Cheilosia albitarsis*** (Meigen, 1822)

Cheilosia* aff. *albitarsis Doczkal, in litt.

syn. *Cheilosia viduata* Schiner (nec Fabricius), 1857

Remarks: This taxon has been only recently divided into two separate species, disabling subsequent checking of the material that has been returned to museum collections before the finalization of this monograph. The following data refer to both species.

VERIFIED REFERENCES: Strobl, 1898 (as *viduata*); Langhoffer, 1917-1923; Glumac, 1955b.

UNVERIFIED REFERENCES. Mtg: Coe, 1960; Blg: Bankowska, 1967; Srb,BH: Kula, 1985.

Chilosia carbonaria of Langhoffer, 1917-1923

Chilosia impudens of Langhoffer, 1917-1923

Chilosia vulpina of Drenski, 1934 (in part)

Pipiza festiva of Drenski, 1934

Examined material: (25m 27f). PUBLISHED RECORDS. Strobl, 1898: Derventa (A) 1m (det. Strobl as *Chilosia viduata*), (BHMS); Langhoffer, 1917-1923: *Chilosia albitarsis*: Zemun (A) (Ada) 8.v.1900, 1m 1f; Fužine (E) 21.v. 1888, 3m; 21.ix.1888, 1f; Orehovica (?) 30.v.1887, 1m 1f; Lobor grad (E) 9.v.1907, 1m (det. Langhoffer as *C. carbonaria*); Zagreb (A) 16.v.1896,

1f (det. Langhoffer as *C. impudens*), (CNHM); Drenski, 1934: Rodopi (J) (Kostenec) 14.v.1912, 1m (det. Drenski as *C. vulpina*); Drenski: Rila (J) (Borovec/Čam Kuria) 5.viii.1933, 1f; (det. Drenski as *C. vulpina*); Vitoša (J) (Sofia) vii.1908, 1f (det. Drenski as *Pipiza festiva*), (ZIS); Glumac, 1955a: Beograd (A) (Košutnjak) 10.v.1953, 1m, (NHMB); Glumac, 1955b: Pale (E), 1m 1f; (Stambulčić) 4m, (BHMS). NEW DATA. **Slo**: Ljubljana (E) (Botanički vrt) 5.vi.1972, 1f, (SNHM); **Cro**: Krapina 3m 6f, (BHMS); **BH**: Mokro (E) 1f; Jablanica (E) 3m 2f; Kijevo (E) 1913, 1f; Sjetline (E) vi.1916, 5f; Sarajevo (E) 1m 4f; Pale: (E) 1913, 2m; (Stambulčić) 1f (BHMS); **Mtg**: Cetinje (C) 1m, (BHMS); **Blg**: Rila (J) (Rilski Manastir) 8/9.vi.1916, 1m 2f, (ZIS).

24. ***Cheilosia albitarsis*** (Meigen, 1822)

VERIFIED REFERENCES. Šimić, 1987 (in part); Vujić & Glumac, 1994 (in part); Vujić & Šimić, 1994 (in part).

Cheilosia faucis of Šimić, 1987

Examined material (395m 179f; March 9/July 2; 0/1700 m). PUBLISHED RECORDS: Šimić, 1987: Durmitor (E), 20/27.vi, 2m 3f (det. Šimić: 2m as *C. albitarsis*; 3f as *C. faucis*), (IBNS); Vujić & Glumac, 1994: Fruška gora (A), 9.iii/22.vi, 100m 32f, (IBNS); Vujić & Šimić, 1994: Vršačke planine (A), 25.iv/8.vi, 60m 46f, (IBNS). NEW DATA: **Slo**: Julijske Alpe (D), 22.v/2.vii.37m 11f; Kamniške in Savinjske Alpe (D), 21.v/1.vii, 26m 5f; Menina (E), 24.v.1989, 4m; **Cro**: Gorski Kotar (E), 27.v.1990, 9m 1f; Mala Kapela (E), 30.iv/29.v, 1m; **BH**: Kozara (A), 1.v.1990, 1m; Jahorina (E), 14/26.vi, 4m; Javor (E), 13.v.1989, 3m 2f; Konjuh (E), 25.vi.1989, 1f; **Mtg**: Boka Kotorska (C), 5.v.1991, 2f; Kanjon Morače (C), 28.iv.1990, 1f; **Srb**: Fruška gora (A): 19/22.v, 2m 2f; Deliblatska peščara (A), 11.v.1983, 1m 2f; Obedska bara (A), 6.v.1986, 6m 4f; Vlašić (A), 9.iv/12.v, 1m 1f; Suva planina (B), 2.v./28.v, 2m; Kopaonik (E), 22.v/20.vii, 49m 16f; Debeli Lug (H) 28.iv.1989, 28m 5f; Deli Jovan (H), 27.iii.1989, 1m; Kučaj (H), 31.iv/16.vii, 13m 5f; Stara Planina (I), 8.v/27.vi, 22m 20f; Čemernik and Vlasinsko jezero (J), 1.vi.1988, 1m 1f; Kukavica (J), 6.vi. 1989, 2m 3f **Mac**: Baba (F), 8.v/17.vi, 1m 8f; Galičica (F), 17.vi.1990, 1f; Kožuf (F), 14.v/14.vi, 1m 2f; **Gre**: Olympos (F), 14.v.1990, 1m; Verno (F), 11/13.v, 7m 3f; Pindos (G), 13.v.1990, 10m 2f, (all in: IBNS).

Distribution (Map 18). RANGE. Palaearctic. BALKAN PENINSULA: Slo,Cro,BH,Mtg,Srb, Mac,Blg,Gre; (BT: A-J); (B: 1-4).

Remarks: One of the most frequent and most numerous species on the Balkan Peninsula. *C. albitarsis* has been recorded in all examined regions.

25. ***Cheilosia* aff. *albitarsis*** Doczkal, in litt.

Cheilosia albitarsis of: Šimić, 1987 (in part)

Cheilosia albitarsis of Vujić & Glumac, 1994 (in part)

Cheilosia albitarsis of Vujić & Šimić, 1994 (in part)

Examined material (137m 67f; April 25/July 10; 100/1700 m). PUBLISHED RECORDS (as *albitarsis*). Šimić, 1987: Durmitor (E), 20.vi/10.vii, 14m 6f, (IBNS); Vujić & Glumac, 1994: Fruška gora (A), 25.iv/9.vi, 21m 19f, (IBNS); Vujić & Šimić, 1994: Vršačke planine (A), 25.iv/19.v, 36m 16f, (IBNS). NEW DATA. **Slo**: Kamniške in Savinjske Alpe (D), 21.v/1.vii, 8m; **Cro**: Mala Kapela (E), 30.iv/29.v, 1m; Gorski Kotar (E), 27.v.1990, 3m 2f; **BH**: Javor (E), 13.v.1989, 2m 1f; Volujak (E), 15.v.1989, 1m; Tjentište (E) 2.vi.1990, 1m 3f; Prenj (E), 16.v.1989, 2m; Romanija (E), 16.v.1989, 1m; Grmeč (E), 29.v.1990, 1m 3f; Jahorina (E), 14.vi, 1m; **Mtg**: Durmitor (E): 7.vii.1991, 1f; **Srb**: Morović (A) 19.v.1981, 1m; Obedska bara (A), 6.v.1986, 4m 2f; Vlašić (A), 5.iv, 1m; Suva planina (B), 2.v, 3m; Kopaonik (E), 22/27.v, 15m 8f; Tara (E), 27.iv.1990, 2m; Kučaj (H), 14.v/4.vi, 6m 2f; Stara Planina (I), 8/31.v, 10m 3f; Zvonačka banja (J) 5.vi.1991, 3m 1f, (all in: IBNS).

Distribution (Map 18). RANGE. Existing data are still insufficient. *C.* aff. *albitarsis* appears together with previously mentioned species in the majority of examined regions. BALKAN PENINSULA: Slo,Cro,BH,Mtg,Srb,Blg; (BT: A,B,D,E,H-J); (B: 2-4). First record for: Balkan Peninsula (Slo,Cro,BH,Mtg, Srb).

Remarks: The species appears sympatrically with *C. albitarsis* over the majority of examined localities, except in the Mediterranean and south part of the Balkan Peninsula (*C.* aff. *albitarsis* is not present in South Dinaric mountains and more southward).

Biology (for both species). Preferred environment: forests clearings. Adult habitat: meadows, pastures, edges of woodlands; males hover at 1-5 meters; settle on leaves of shrubs and low growing plants and flowers of *Ranunculus*. Flowers visited: *Ranunculus*, *Caltha palustris, Taraxacum*. Flight period: March -July, with peak in May. Larva: phytophagous on *Ranunculus* (Rotheray, 1991).

Remarks: Further investigations into the biology of these two species will help better separation of them. The differences certainly exist but have not been recognised so far due to their extreme similarity in morphology and appearance.

26. ***Cheilosia balkana*** Vujić, 1994

VERIFIED REFERENCES: Vujić, 1994b.

Examined material (84 m 112f; June 17/July 18; 1000/2000 m). PUBLISHED RECORDS. Vujić, 1994b: all records: Slo (Julijske Alpe; Kamniške Alpe); Mtg (Durmitor: type locality); Srb (Šar-planina), (IBNS, NHMB, CCC). NEW DATA. **Slo**: Julijske Alpe (D), Pokljuka 22.v.1989, 1m; **Mtg**: Durmitor (E), (13,22,25: 29.vi/9.vii, 8m); Prokletije (E), Ljubokuća

27.vii.1994, 1m, (IBNS). Additional data: **Italy**: Dolomiten, M. Scilar, Valle dei Ciamin, 1400-1800 m, 14.vii.1988, 1m 1f, (CCC).

Distribution (Map 34). RANGE. high Balkans mountains, Italian (Dolomites) and Slovenian Alps. BALKAN PENINSULA: Slo,Mtg,Srb; (BT: D,E); (B: 5).

Remarks: *C. balkana* is an endemic species for the region of Dinaric mountains and the Alps on the Balkan peninsula and in eastern Italia. It is recorded on three localities in Slovenia, one in Italia and on the mountains of Durmitor, Prokletije and Šar-planina.

Biology. Preferred environment: open ground in high mountain rocks, pastures and avalanches. Adult habitat: up to the woodlands zone, rocky and grassy areas; males hover at 5-7 meters; settle on blossoms of *Alyssum*. Flowers visited: *Alyssum*. Flight period: June-July. Larva: undescribed.

27. ***Cheilosia barbata*** Loew, 1857

VERIFIED REFERENCES: Langhoffer, 1917-1923; Drenski, 1934 (in part); Glumac, 1959;1968; Šimić, 1987; Vujić & Glumac, 1994; Vujić & Šimić, 1994.

UNVERIFIED REFERENCES. BH: Strob, 1898; Blg: Bankovska, 1967 (Rila); Slo: Lambeck, 1968.

Chilosia pascuorum of Langhoffer, 1917-1923

Chilosia fasciata of Drenski, 1934

Chilosia impressa of Drenski, 1934

Chilosia proxima of Drenski, 1934 (in part)

Chilosia vulpina of Drenski, 1934 (in part)

Cheilosia intonsa of Šimić, 1987

Cheilosia vulpina of Šimić, 1987 (in part)

Examined material (512m 175f; March 9/August 30; 0/1600 m). PUBLISHED RECORDS. Langhoffer 1917-1923: Mrzla vodica (E) 1m 1f; Risnjak (E) 1f; Orehovica (?) 1m 2f (det. Langhoffer as *Chilosia barbata*); Sljeme (A) 1m 1f (det. Langhoffer as *Chilosia pascuorum*); Zagreb (A) 31.v.1898, 1m (det. Langhoffer as *Chilosia pigra*), (CNHM); Drenski, 1934: Vitoša (J), (Sofia), 3m 2f (det. Drenski 1m as *Chilosia barbata*, 1m as *C. fasciata*, 1f as *C. impressa*, 1m as *C. vulpina*); Osogovske planine (J) (Kjustendil) 1m (det. Drenski as *Chilosia proxima*), (ZIS); Glumac, 1968: Maleševske planine (J) 1f (det. Glumac as *C. barbata*), (IBNS); Šimić, 1987: Durmitor (E), records of *C. barbata*; Ivan Do 18.vi.1984, 1m (det. Šimić as *C. vulpina*); Pitomine 9.vii.1983, 1f (det. Šimić as *C. vulpina*); Kanjon Sušice 3.viii.1982, 1f (det. Šimić as

C. intonsa), (IBNS); Vujić & Glumac, 1994: Fruška gora (A), all records (IBNS,NHMB); Vujić & Šimić, 1994: Vršačke planine (A), all records (IBNS). NEW DATA. **Slo**: Julijske Alpe (D), 22.v/3.vii, 37m 6f (IBNS); Blegoš 1f, (SNHM); Bled (D), 1m; Bohinj (D), 2m 4f; Bovec (D), 2m 1f, (JLC); Kamniške in Savinjske Alpe (D), 21.v/1.vii, 84m 17f; Menina (E), 24.v, 26 m, (IBNS); Ljubelj (D), 1m 1f; Rupa (E), 2m 1f, (JLC); **Cro**: Dilj (A), 21.v, 2m 1f; Gorski Kotar (E), (1: 27.v, 24m 1f); Mala Kapela (E), (1: 29.v, 1m), (IBNS); Samobor (A), 7m 9f; Sljeme (A) 5m 3f; Zagreb (A), 2m 17f; Velebit (E), 1m 2f, (JLC); **BH**: Bjelašnica (E), 16.v, 1m; Jahorina (E), 26.vi, 1m; Javor (E), 13.v, 2m 2f; Konjuh (E), 13.v/30.vii, 30m 10f; Volujak (E), (1,2: 15.v/27.vi, 9m 2f, (IBNS); Jablanica (E), 3m; Ivan planina (E), 1m, (BHMS); **Mtg**: Boka Kotorska (C), (1: 12.v, 1f); Durmitor (E), 22.vi./27.viii, 96m 52f, (IBNS); **Srb**: Suva planina (B), (3,4: 2.v, 2m); Svrljiške planine (B), (2,4: 7/9.vii, 2m 5f); Kopaonik (E), (2,20-22: 1.v/3.viii, 43m 10f); Tara (E), 22.vii, 1m; Šar-planina (F), (1: 17.vii, 2f); Kučaj (H), (4,5,7,11: 29.iv/3.vi, 3m 7f); Žagubica (H), 14.vii, 3f; Stara Planina (I), (1-3: 6.v/11.viii, 9m 7f); Čemernik and Vlasinsko jezero (J), 20.vii, 1f, (IBNS); **Mac**: Baba (F), 8.v/17.vi, 3m 2f; Šar-planina (F), (7: 27.vii, 1m); Mavrovo (E), 1m 1f, (IBNS); **Gre**: Verno (F), 11.v, 11m 1f, (IBNS).

Distribution (Map 25). RANGE. Europe (except Mediterranean and Russia). BALKAN PENINSULA: Slo,Cro,BH,Mtg,Srb,Mac,Blg,Gre; (BT: A-F,H-J); (B: 2-4). First record for: Gre.

Remarks: *C. barbata* is recorded all over the Balkan (except in its south part) in forest communities of mountains and hills.

Biology. Preferred environment: forests. Adult habitat: clearings, meadows in woodlands; usually in the vicinity of streams and rivers; males hover at 2-5 meters; settle on leaves or flowers. Flowers visited: Apiaceae, *Euphorbia*, *Ranunculus*. Flight period: March-August at high altitudes; more than one generation in many localities. Larva: undescribed.

28. ***Cheilosia bergenstammi*** Becker, 1894

Cheilosia vernalis of Glumac, 1955b

Cheilosia confinis of Šimić, 1987

Cheilosia mixta of Šimić, 1987

Cheilosia rufimana of Šimić, 1987

Examined material (17m 17f; May 22/August 12; 800/1900 m). PUBLISHED RECORDS. Glumac, 1955b: Treska (?) 1912, 1f (det. Glumac as *C. vernalis*), (BHMS); Šimić, 1987: Durmitor (E), Bosača 7.vii.1983, 1f (det. Šimić as *C. mixta*); Čeline 6.vii.1981, 4m (det. Šimić as *C. confinis*); Jablan bara 12.viii.1984, 1f (det. Šimić as *C. rufimana*); Kanjon Sušice 24.viii.1984, 1f (det. Šimić as *C. mixta*), (IBNS). NEW DATA. **BH**: Jahorina (E), 26.vi.1989, 4m 1f, (IBNS); Ivan planina (E) 1m; Treska planina (?) 1f, (BHMS); **Mtg**: Durmitor (E), (5,13,15,16,22,25,32: 2.vi/2.viii, 21m 9f), (IBNS); **Srb**: Kopaonik (E), (8,20,21,23,26: 22.v/6.vii, 2m 4f); Šar-planina (F), Durov potok 27.vi.1988, 2f; (IBNS).

Distribution (Map 35). RANGE. Scandinavia to Spain, Ireland to European part of Russia. BALKAN PENINSULA: BH,Mtg,Srb; (BT: E,F); (B: 3-5). First record for: Balkan Peninsula (BH,Mtg,Srb).

Remarks: *C. bergestammi* is registered only in the region of Dinaric, on several high mountains (Jahorina, Durmitor, Kopaonik, Šar-planina).

Biology. Preferred environment: beech and coniferous forests. Adult habitat: clearings, open ground in woodlands; montane meadows; males hover at 1-3 meters; settle on ground or leaves. Flowers visited: *Caltha palustris, Senecio, Taraxacum,* Apiaceae. Flight period: end of May-August. Larva: described by Smith (1979); internal feeder in roots steams of *Senecio jacobaea*.

29. ***Cheilosia bracusi*** Vujić et Claussen, 1994

VERIFIED REFERENCES: Vujić & Claussen, 1994a.

Chilosia schineri of Drenski, 1934

Cheilosia chloris of Glumac, 1956a; 1968

Cheilosia chloris of Šimić, 1987 (in part)

Examined material (61m 30f; April 5/July 28; 500/1700 m). PUBLISHED RECORDS. Drenski, 1934: Rila (J) 1m 8f (det. Drenski 4f as *Chilosia schineri*, 3f as *C. vulpina*, 1m as *C. variabilis*, 1f as *C. vulpina*), (ZIS); Glumac, 1968: Maleševske planine (J) 2f (det. Glumac as *C. chloris*), (IBNS); Šimić, 1987: Durmitor (E), Crno jezero/otoka 1m 1f (det. Šimić as *C canicularis*); Kanjon Sušice 4m (det. Šimić as *C. chloris*); Luke 1m (det. Šimić as *C. chloris*), (IBNS); Vujić & Claussen, 1994: all records: Slo (Julijske Alpe; Menina); Cro (Gorski Kotar); BH (Jahorina; Javor; Olovo; Pale; Ilijaš); Mtg (Durmitor); Srb (Vlašić; Kopaonik: type locality; Stara Planina; Rtanj; Čemernik); Mac (Baba); Gre (Verno, Pindos); Blg (Rodope), (IBNS, NHMB, SNHM, BHMS, ZIS, CCC, ZFMK). NEW DATA. **Mtg**: Durmitor (E) Kanjon Sušice 2.vi.1994, 2m 1f; **Srb**: Kopaonik (E), (4,8,11,20,21,23: 28m 2f); Kučaj (H), (2,3,6: 4.v/4.vi, 6m 1f), (IBNS).

Distribution (Map 36). RANGE. Pyrenees, Alps, Apennine and Balkan Peninsulas. BALKAN PENINSULA: Slo,Cro,BH,Mtg,Srb,Mac,Blg,Gre; (BT: D-J); (B: 3-4).

Remarks: *C. bracusi* is distributed all over the Balkan Peninsula in mountain regions above 500 m altitudes.

Biology. Preferred environment: montane woodlands, especially beech forests. Adult habitat: clearings along streams and rivers; males hover at 1-5 meters; settle on leaves of wet meadow vegetation. Flowers visited: *Aposeris*

foetida, Doronicum austriacum, Telekia speciosa, Senecio, Ranunculus. Flight period: April-July. Larva: undescribed.

30. ***Cheilosia brunnipennis*** Becker, 1894

Chilosia brunnipennis Becker, 1894: 417. (description of male)

Chilosia sareptana Becker, 1894: 418. (description of female) **syn.n.**

Remarks: The checking of type material and Balkan populations made by Claus Claussen and author himself show that Becker (1894) was described the male and female of one species as two different taxa. There are male types of *brunnipennis* present in the collection of Becker and this would be the main argument to use this name for the species (Claussen, pers. comm.). Barkalov (1993b) considers both, *brunnipennis* and *sareptana*, as different species. In spite of the slight differences in population from southern Italy, Balkan Peninsula and southern Russia, after analyze of large number of specimens, we are of opinion that *brunnipennis* and *sareptana* are one species.

UNVERIFIED REFERENCES (as *sareptana*). Cro: Strobl, 1902; Mac: Glumac, 1955a (specimen not found in Coll. of NHMB).

Chilosia langhofferi of Langhoffer, 1917-1923

Chilosia barbata of Drenski, 1934 (in part)

Examined material (36m 20f; February 21/May 5; 100/500m). PUBLISHED RECORDS. Langhoffer, 1917-1923: Senj (E) 2/5.v.1889, 2f (det. Langhoffer as *Chilosia langhofferi*); Draga (E) 20.iv.1887, 1f (det. Langhoffer as *Chilosia vernalis*), (CNHM); Drenski, 1934: Vitoša (J) (Sofia) iv.1907, 1m (det. Drenski as *Chilosia barbata*), (ZIS). NEW DATA. **Mtg**: Kanjon Morače (C), 4.iv.1990, 6m 2f; Skadarsko Jezero (C), Rumija 21.ii.1990, 2m; **Srb**: Suva planina (B), Jelašnica 2.iv, 20m 12f; Kunovica 2.iv, 4m 1f; Kopaonik (E), Samokovska reka 2.v.1992, 1m; Kučaj (H), (2,4: 1.iv/14.v, 9m 1f); Rtanj (H), 1.v.1991, 1m; Stara Planina (I), Topli Do 3.iv.1987, 1m 2f; Bosilegrad (J), 31.iii.1989, 1f; Karamanica 31.iii.1989, 2m; **Mac**: Kožuf (F), Konsko 15.iv. 1987, 1m, (all in: IBNS).

Distribution (Map 37). RANGE. East Mediterranean (s.l.), (Switzerland, Italy, Balkan Peninsula, Israel, Caucasus). BALKAN PENINSULA: Cro,Mtg, Srb,Mac,Blg; (BT: B,C,E,F,H-J); (B: 1,2). First record for: Mtg,Srb,Blg.

Remarks: *C. brunnipennis* lives in biomes of Submediterranean mostly oak woodlands, especially along the Adriatic coast and in Moesian hills.

Biology. Preferred environment: Submediterranean deciduous woodlands. Adult habitat: beside rivers and streams; flies fast among *Salix* trees; settle on

catkins and branches. Flowers visited: *Salix*, *Petasytes*. Flight period: early spring, February-beginning of May. Larva: undescribed.

31. ***Cheilosia canicularis*** (Panzer, 1801)

VERIFIED REFERENCES: Strobl, 1898; Langhoffer, 1917-1923; Glumac, 1955b; 1959; 1968; Šimić, 1987; Vujić & Glumac, 1994.

UNVERIFIED REFERENCES. Srb: Glumac, 1955a; Slo: Coe, 1960; Blg: Bankowska, 1967 (Stara Planina); Srb: Kula, 1985.

Cheilosia trisulcata of Glumac, 1955b

Examined material (179m 204f; April 5/August 13; 150/1900 m). PUBLISHED RECORDS. Strobl, 1898: Treska planina (?) 1f (det. Strobl as *Chilosia canicularis*), (BHMS); Langhoffer, 1917-1923: Sljeme (A) 1m 2f; Zagreb (A) 1m; Bunić (E) 1m; Velebit (E) 2m; Pregrada (E) 1m (det. Langhoffer as *Chilosia canicularis*), (CNHM); Glumac, 1956a: Pale (E) (Stambulčić) 1m 1f (det. Glumac 1m as *C. canicularis*, 1f as *C. trisulcata*), (BHMS); Šimić, 1987: Durmitor (E), all records (IBNS); Vujić & Glumac, 1994: Fruška gora (A), all records (IBNS, NHMB). NEW DATA. **Slo**: Julijske Alpe (D), 22.v/2.vii, 12m 9f, (IBNS) Blegoš 22.viii, 3m; (SNHM); Bled (D) 9.ix, 4f; Bohinj (D) 10.ix, 2m 4f, (JLC); Kamniške in Savinjske Alpe (D), 21.v/1.vii, 27m 28f; Menina (E), 24.v, 6m 3f, (IBNS); Ločica (E) 20.v, 2m 1f; Ribnica (E) (Travna Gora) 18.vi, 2f; Šmarje pri Jelšah (E) 4.vi, 3f, (SNHM); **Cro**: Dilj (A), 21.viii, 1f; Gorski Kotar (E), 27.v, 6m 1f, (IBNS); Velebit (E) (Zavižan) 16.vii, 4m 3f, (SNHM); (Oštarije) 23.viii, 1f; (Štirovača) 22.vii, 5m 2f, (JLC); Krapina (E) 1m 1f, (BHMS); Sljeme (A) 28.v.1969, 1f, (JLC); **BH**: Jahorina (E), 14/26.vi, 3m 4f; Javor (E), 13.v, 5m; Konjuh (E), 13.v, 2m 3f, (IBNS); Treska planina (?) 1f, (BHMS); **Mtg**: Durmitor (E), 1.vi/27.viii, 11m 8f; Prokletije (E), 29.vii, 3f, (IBNS); **Srb**: Fruška gora (A), 25.iv/19.v, 3m 1f; Suva planina (B), 1/28.v, 3m 1f; Goč (E) (Dobre vode) 8/11.viii, 2f; Kopaonik (E), 1.v/4.viii, 57m 56f; Tara (E) 12/14.vii, 2m; Žljeb (E), 3.v.1991, 1m; Šar-planina (F) 29.vi, 1m; Debeli Lug (H), 28.iv, 10m 4f; Kučaj (H), 14.v/6.vi, 2m 7f; Stara Planina (I), 28.v/11.viii, 11m 9f, (IBNS) **Mac**: Kožuf (F) 14.v/19.vi, 2m 2f; Šar-planina (F), 27.vii, 2f, (IBNS); **Blg**: Rila (J) (Kostenec) 1m (det. Szilady as *C. canicularis*), (ZIS).

Distribution (Map 21). RANGE. South Sweden to Pyrenees, Belgium through mountainous part of Central Europe to Balkan Peninsula, European parts of Russia to Caucasus and North Turkey, through Siberia to the Far East. BALKAN PENINSULA: Slo,Cro,BH,Mtg,Srb,Mac,Blg; (BT: A,B,D-F,H-J); (B: 2-4). First record for: Slo.

Remarks: Its range covers the greater part of the Balkan Peninsula (except the south); *C. canicularis* appears on Pannonic hills and up to high Alpine and Dinaric mountains.

Biology. Preferred environment: deciduous and coniferous forests. Adult habitat: wetlands, clearings along streams and rivers; males hover at 1-2 meters; settle on leaves of *Petasites* and other stream-side vegetation. Flowers visited: Asteraceae, especially *Taraxacum, Senecio, Petasites*; *Ranunculus*. Flight period: April-August, with two generations, in May and July (August at higher altitudes). Larva: described by Dušek & Laska (1962); internal feeder in the rhizomes of *Petasites* spp.

32. ***Cheilosia carbonaria*** Egger, 1860

VERIFIED REFERENCES: Šimić, 1987.

UNVERIFIED REFERENCES. Slo: Coe, 1960; Blg: Bankowska, 1967 (Pirin).

ERRONEOUS REFERENCES. Cro: Langhoffer, 1917-1923 (=*albitarsis*); Srb: Glumac, 1955a (=*cynocephala*).

Examined material (56m 59f; May 1/July 17; 500/1600 m). PUBLISHED RECORDS. Langhoffer, 1917-1923: Zagreb (E) 1m (det. Langhoffer as *Chilosia rhynchops*), (CNHM); Šimić, 1987: Durmitor (E), Luke 30.vi.1985, 1m 1f (det. Šimić as *C. carbonaria*), (IBNS). NEW DATA. **Slo**: Julijske Alpe (D), (4,7: 22.v/18.vi, 2m 1f); Kamniške in Savinjske Alpe (D), (2,4,6: 16.vi/1.vii, 1m 7f), (IBNS); Veliki Snežnik (E) 17.vii.1972, 2m 1f, (SNHM); **BH**: Jahorina (E), 26.vi.1989, 1f; 31.vii.1989, 1f, (IBNS) **Mtg**: Durmitor (E), (13,15,16, 22,25,30,32: 28.vi/9.vii, 48m 41f), (IBNS); **Srb**: Kopaonik (E), (5,21,24: 1.v/5. vii, 1m 4f); Šar-planina (F), Ošljak 29.vi.1988, 1f, (IBNS) **Mac**: Kožuf (F), Došnica 16.vii.1990, 1f, (IBNS).

Distribution (Map 38). RANGE. Scandinavia to Pyrenees; England through Central Europe to European part of Russia; Siberia. BALKAN PENINSULA: Slo,Cro,BH,Mtg,Srb,Mac,Blg; (BT: D-F,J); (B: 3-4). First record for: Cro,BH,Srb,Mac.

Remarks: *C. carbonaria* is recorded on several mountains at high altitudes - the Alps, Dinaric mountains and Rilo-Rhodopes.

Biology. Preferred environment: beech and coniferous forests. Adult habitat: clearings in woodlands along streams and rivers; fly low; settle on leaves and flowers. Flowers visited: *Caltha palustris, Ranunculus*, Apiaceae. Flight period: May-July. Larva: undescribed.

33. ***Cheilosia chloris*** (Meigen, 1822)

UNVERIFIED REFERENCES. Srb: Kula, 1985 (?).

ERRONEOUS REFERENCES. Cro: Langhoffer, 1917-1923 (=*melanura*; =*lenis*); BH: Glumac, 1955b (=*bracusi*); Mac: Glumac, 1968 (=*bracusi*); Mtg: Šimić, 1987 (=*bracusi*; =*melanura*).

Examined material (9m 38f; April 10/July 1; 400/1500 m). NEW DATA. **Slo**: Julijske Alpe (D), (1,2,4,9: 22.v/14.vi, 1m 4f); Kamniške in Savinjske Alpe (D), (2,3,5: 21.v/1.vii, 1m 8f); Menina (E), 24.v.1989, 1f, (IBNS); Ljubljana (E), 31.iii/27.v, 4m 16 f, (SNHM); Ljubelj (D) 15.v.1983, 1f; Metlika (E) 05,1983, 1m 1f, (JLC); **Cro**: Papuk (A), 15.iv.1991, 1f; Mala Kapela (E), Plitvička jezera 30.iv.1990, 1m; (IBNS); Samobor (A) (Rude) 23.v.1972, 3f; Sljeme (A) 23/30.v.1969, 1m 8f; Zagreb (A), 17/24.v, 3f, (JLC); **BH**: Konjuh (E), 10.iv/13.v.1989, 1m 4f, (IBNS); Pale (E), 1912, 1f; (Stambulčić) v.1916, 1m; Sjetlina (E) vi.1916, 4f, (BHMS).

Distribution (Map 36). RANGE. Europe (except Great Britain and southern areas); West Siberia. BALKAN PENINSULA: Slo,Cro,BH; (BT: A,D,E); (B: 3-4). First verified record for: Balkan Peninsula (Slo,Cro,BH).

Remarks: *C. chloris* is registered in the Alps and west Peripannonic region as well as on some localities on north Dinaric mountains (Mala Kapela, Konjuh, Jahorina). In the Alpine region and on the mountains surrounding Sarajevo it appears sympatrically with *C. bracusi*.

Biology. Preferred environment: forests. Adult habitat: meadows, open ground, clearings; fly low; settle on foliage of over ground vegetation. Flowers visited: *Caltha palustris, Salix, Ranunculus, Tusillago*. Flight period: early spring April-June at higher altitudes. Larva: mining in *Carduus* and *Scrophularia* (Kormann, 1988).

34. ***Cheilosia chrysocoma*** (Meigen, 1822)

VERIFIED REFERENCES: Glumac, 1959; Vujić & Glumac, 1994; Vujić & Šimić, 1994.

Examined material (37m 6f; March 25/July 3; 150/1700 m). PUBLISHED RECORDS. Vujić & Glumac, 1994: Fruška gora (A), all records (IBNS, NHMB); Vujić & Šimić, 1994: Vršačke planine (A), all records (IBNS). NEW DATA. **Slo**: Julijske Alpe (D), (4: 22.v.1989, 1m); Kamniške in Savinjske Alpe (D), (2: 21.v.1989, 4m); **Cro**: Gorski Kotar (E), Risnjak 27.v.1990, 1m; **BH**: Javor (E), Sokolina 10.iv.1989, 1m; Javornik (E), Stupari 10.iv.1989, 1m; **Mtg**: Durmitor (E), (5,15,16: 1.vi/3.vii, 5m 2f); **Srb**: Vršačke planine (A), Široko bilo 6.iv.1989, 1m; Kopaonik (E), (13,21: 3.v/16.vi, 9m 1f); Šar-planina (F), Prevalac 28.vi.1988, 1m; Stara Planina (I), (1,5,11: 7.v/26.vi, 4m 1f); **Gre**: Verno (F), Florina-Pisoderi 11.v.1990, 1m, (all in: IBNS).

Distribution (Map 39). RANGE. Europe (except Mediterranean) and Siberia. BALKAN PENINSULA: Slo,Cro,BH,Mtg,Srb,Gre; (BT: A,D-F,I) (B: 3,4). First record for: Slo,Cro,BH,Mtg,Gre.

Remarks: Mountain species, registered in the Alpine region on the Dinaric mountains, Stara Planina and Pannonic hills.

Biology. Preferred environment: deciduous forests. Adult habitat: stream margins, clearings; males hover at 1-2 meters; settle on vegetation or ground in the sun. Flowers visited: *Salix*, *Crataegus*. Flight period: early spring species: March-beginning of July at high altitudes. Larva: undescribed.

35. ***Cheilosia clama*** Claussen et Vujić, 1995

VERIFIED REFERENCES: Claussen & Vujić, 1995.

Examined material (5m 1f; May 14/June 16; 1000/2000 m). PUBLISHED RECORDS. Claussen & Vujić, 1995: all records: BH (Jahorina); Srb (Kopaonik: type locality), (IBNS, NHMB).

Remarks: Status of one female recorded from Fruška gora (Vujić & Glumac, 1994) cannot be cleared out of additional material (Claussen & Vujić, 1995).

Distribution (Map 40). RANGE. Central Europe (France, Germany, Bosnia and Herzegovina, Serbia). BALKAN PENINSULA: BH,Srb; (BT: E); (B: 3,4).

Remarks: *C. clama* is found only on few high mountains of Central Europe.

Biology. Preferred environment: coniferous and beech forests. Adult habitat: clearings in woodlands; usually in the vicinity of streams and rivers. Flowers visited: *Salix*, *Caltha palustris*, *Tussilago farfara*. Flight period: early spring: May-June (at high altitudes). Larva: undescribed.

Remarks: Only a few samples of the species are collected, probably due to a short flight period on high mountains in early spring and completely unknown biology. The fact that only six, of total 12000 samples of this genus collected on the Balkan Peninsula, belong to this species has induced the authors to name it after the Latin word "clam" which means mysterious, hidden.

36. ***Cheilosia cumanica*** Szilady, 1938

VERIFIED REFERENCES: Vujić & Glumac, 1994; Vujić & Šimić, 1994.

Cheilosia gracilis of Glumac, 1959

Examined material (303m 63f; March 28/August 13; 150/500 m). PUBLISHED RECORDS. Vujić & Glumac, 1994: Fruška gora (A), all records (IBNS, NHMB); Vujić & Šimić, 1994: Vršačke planine (A), all records (IBNS). NEW DATA. **BH**: Konjuh (E), 13.v.1989, 1f; **Mtg**: Durmitor (E), Kanjon Sušice 6.vii.1994, 1m; Skakala 2.vii.1993, 3m; **Srb**: Kopaonik (E), Brzećka reka 24.v.1987, 3m; Debeli Lug (H), 28.iv.1989, 6m 1f; Kučaj (H), (2,4,8,12: 28.iii/13.viii, 88m 21f); Rtanj (H), 1.v.1991, 8m 2f; Žagubica (H), reka Do 14.vii.1993, 2m 3f; Stara Planina (I), Temska 30.iv.1987, 1f; Temska-Topli Do 30.iv.1987, 2m 2f; **Mac**: Babuna (F) 4.vi.1960, 2m (all in: IBNS).

Distribution (Map 26). RANGE. Carpathians (Romania, Serbia), central part of the Balkan Peninsula. BALKAN PENINSULA: BH,Mtg,Srb,Mac; (BT: A,E,F,H,I); (B: 2,3). First record for: BH,Mtg,Mac.

Remarks: *C. cumanica* is found in the central part of the Balkan, at lower altitudes, in oak woods of Peripannonic hills, Carpathians in east Serbia, on slopes of several high Dinaric mountains (Durmitor, Kopaonik, Konjuh) and on mountain Stara Planina.

Biology. Preferred environment: deciduous forests, especially oak woodlands in Carpathians. Adult habitat: clearings, tracksides; fly low, settle on foliage of bushes and *Smirnium perfoliatum*. Flowers visited: *Smirnium perfoliatum*, white Apiaceae. Flight period: end of March-August; polyvoltine species. Larva: undescribed.

37. ***Cheilosia cynocephala*** Loew, 1840

VERIFIED REFERENCES: Glumac, 1955a.

UNVERIFIED REFERENCES. Cro: Langhoffer, 1917-1923 (specimen not found in Coll. of CNHM); Blg: Bankowska,1967 (Vitoša).

Cheilosia carbonaria of Glumac, 1955a

Cheilosia pascuorum of Šimić, 1987

Examined material (17m 21f; April 23/September 4; 50/1500m). PUBLISHED RECORDS. Langhoffer, 1917-1923: Pregrada (E) 4.ix.1888, 1f (det. Langhoffer as *Chilosia modesta*), (CNHM); Drenski, 1934: Rila (J) (Kostenec) 15.vii.1933, 1f (det. Drenski as *Chilosia albipila*), (ZIS); Glumac: Beograd (A) (Košutnjak) 27.iv.1952, 4m (det. Glumac 3m as *C. cynocephala*, 1m as *C. carbonaria*), (NHMB); Šimić, 1987: Skadarsko jezero (C) (Vilusi) 26.viii.1982, 1f (det. Šimić as *C. pascuorum*), (IBNS). NEW DATA. **Cro**: Krapina (E) 1m 1f, (BHMS); **BH**: Sarajevo (E) (Ali Pašin most) 1914, 1f, (BHMS); **Mtg**: Durmitor (E), (5,14,15,25: 4.vii/24.viii, 2m 8f), (IBNS); **Srb**: Obedska bara (A), (1: 23.iv/15.v, 1m 1f); Titel (A), Titelski breg 26.viii.1982, 1f; Juhor (B) 14.vii.1984, 2f; Kopaonik (E), (5: 1/25.v, 5m 1f); Kučaj (H),

(3,4: 31.iv/15.v, 1m 2f), (IBNS); **Mac**: Baba (F), 8.v.1990, 1f, (IBNS); **Gre**: Verno (F), Trigono 11.v.1990, 3m, (IBNS).

Distribution.(Map 38). RANGE. Europe (except Ireland and Portugal); Siberia. BALKAN PENINSULA: Cro,BH,Mtg,Srb,Mac,Blg,Gre; (BT: A-C,E,F, H,J); (B: 2-3). First record for: BH,Mtg,Mac,Gre.

Remarks: Rare species, distributed over the whole Balkan Peninsula; recorded on few localities and on low altitudes.

Biology. Preferred environment: lowland forests; meadows and pastures close to rivers and streams. Adult habitat: open ground in woodlands; grassy areas; fly low over ground vegetation. Flowers visited: Apiaceae, *Senecio*. Flight period: usually two generations at low altitudes, end of April-May and July-August; July-September at higher altitudes. Larva: internal feeder in the stems of *Carduus nutans* (Dušek & Laska, 1962).

38. ***Cheilosia fasciata*** Schiner et Egger, 1853

VERIFIED REFERENCES: Langhoffer, 1917-1923; Vujić & Glumac, 1994; Vujić & Šimić, 1994.

ERRONEOUS REFERENCES. Blg: Drenski, 1934 (=*barbata*); Mtg: Šimić, 1987 (=*semi-fasciata*).

Examined material (186m 40f; March 26/Jun 26; 100/1500 m). PUBLISHED RECORDS. Langhoffer, 197-1923: Bjelasica (E) 2.vi.1906, 1f (det. Langhoffer as *Chilosia fasciata*), (CNHM); Vujić & Glumac, 1994: Fruška gora (A), all records (IBNS); Vujić & Šimić, 1994: Vršačke planine (A), all records (IBNS). NEW DATA. **Cro**: Papuk (A), 15.iv.1991, 1m 2f; **BH**: Bjelašnica (E), 26.vi.1989, 1m; Javor (E), (1: 10.iv.1989, 14m 1f); Konjuh (E), 10.iv.1989, 1m 2f; Maglić (E), Perućica 11.iv.1989, 11m 6f; Volujak (E), (2: 11.iv.1989, 9m 1f; 15.v.1989, 2f); Tjentište (E) 2.vi.1990, 1f; Zelengora (E), Donje bare 11.iv.1989, 2m; **Mtg**: Durmitor (E), Kanjon Sušice 1/2.vi.1994, 3f; Bjelasica (E), (1: 4.iv/5.v, 22m 5f); **Srb**: Vlašić (A), Zavlaka 5.iv.1989, 1f; Povlen (B), Poćuta 3.iv.1990, 1m; Suva planina (B), (1,3: 2.iv/28.v, 38m 5f); Kučaj (H), (3,4,10: 28.iii/5.v, 7m 2f); Rtanj (H), 1.v.1991, 1m; Stara Planina (I), (3,6: 6/8.v, 7m 5f); Kukavica (J), (1: 30.iii.1989, 12m 3f); **Mac**: Šar-planina (F), Crni Kamen 19.iv.1987, 55m 5f; Kožuf (F), Konsko 15.iv.1987, 1m, (all in: IBNS).

Distribution (Map 19). RANGE. Central Europe (from Germany to Romania). BALKAN PENINSULA: Cro,BH,Mtg,Srb,Mac; (BT: A,B,E,F,H-J); (B: 2,3). First record for: BH,Mtg,Mac.

Remarks: *C. fasciata* is characteristic for beech forests of the central Balkan.

Biology. Preferred environment: wetlands in deciduous woodlands, especially beech forests in the vicinity of streams. Adult habitat: clearings, along running-waters; fly low and slow among vegetation and settle on the leaves and flowers of *Allium ursinum*. Flowers visited: *Ranunculus*, *Allium ursinum*. Flight period: March-end of June at high altitudes. Larva: mines the leaves of *Allium ursinum*.

39. ***Cheilosia flavipes*** (Panzer, 1798)

VERIFIED REFERENCES: Glumac, 1959; Vujić & Glumac, 1994; Vujić & Šimić, 1994.

UNVERIFIED REFERENCES. Blg: Bankowska, 1934 (Pirin); Srb: Kula, 1985.

Examined material (69m 46f; April 2/July 28; 150/1500 m). PUBLISHED RECORDS. Glumac, 1959: all records (NHMB); Vujić & Glumac, 1994: Fruška gora (A), all records (IBNS, NHMB); Vujić & Šimić, 1994: Vršačke planine (A), all records (IBNS). NEW DATA. **Slo**: Julijske Alpe (D), (5,9: 22/23.v, 4m 2f); Kamniške in Savinjske Alpe (D), (3: 25.v.1989, 5m 1f); Menina (E), 24.v.1989, 1m 2f, (IBNS) **Cro**: Zagreb (A) (Villa Rebba) 19.v.1970, 1m; (Zaprešić) 29.v.1969, 1f; Velebit (E) (Oštarije) 26.v.1972, 5m 2f, (JLC); **BH**: Bjelašnica (E), 16.v.1989, 1f; Jahorina (E), 14.v.1989, 10m 2f; 26.vi.1989, 1f; Konjuh (E), 10.iv.1989, 1f; 13.v.1989, 8m 2f; Volujak (E), (2: 15.v.1989, 3m 1f), (IBNS); **Mtg**: Boka Kotorska (C) (1: 17.v.1994, 1f), (IBNS); **Srb**: Deliblatska peščara (A) (Čardak) 19.iv.1979, 2m 1f; (Mramorak) 28.vii.1981, 1f; Suva planina (B), (3,5: 13.iv/2.v, 2m 2f); Kopaonik (E), (2,4,5,8,10,11,18,20,21: 29.iv/2.vi, 16m 11f); Žljeb (E), 3.v.1991, 1m; Debeli Lug (H), 28.iv.1989, 1m 1f; Klisura Peka 3.v.1993, 1m; Kučaj (H), (2-4: 14.iv/15.v, 7m 3f); Stara Planina (I), (2,10,11: 30.iv/28.v, 3m 2f); Čemernik and Vlasinsko jezero (J), (3: 3.v.1988, 1m), (IBNS).

Distribution (Map 22). RANGE. North and Central Europe, Siberia. BALKAN PENINSULA: Slo,Cro,BH,Mtg,Srb,Blg; (BT: A-E,H-J); (B: 2-4). First record for: Slo,Cro,BH,Mtg.

Remarks: *C. flavipes* is registered in a number of European countries but it is characteristic for North Europe. More to the south it appears at high altitudes. *C. flavipes* is recorded on a many of the Balkan mountains, especially at the altitudes between 500-700 m. A small number of samples is found on low mountains of Pannonic region. Quite exceptional is the finding from Boka Kotorska, as the only one from the narrow zone of Eumediterranean.

Biology. Preferred environment: many type of forests, but especially beech woodlands (at low attitudes less abundant). Adult habitat: clearings,

tracksides; fly low, settle on the low-growing vegetation or *Taraxacum* flowers. Flowers visited: *Salix, Taraxacum, Caltha, Ranunculus*. Flight period: April-June at higher altitudes (with occasional specimens into July). Larva: undescribed.

40. ***Cheilosia fraterna*** (Meigen, 1830)

Examined material (7m 3f; May 2/Juny 21; 700/1500 m). NEW DATA. **Slo**: Julijske Alpe (D), Pokljuka 22.v.1989, 2m 1f; Kamniške in Savinjske Alpe (D), Matkov Kot 25.v.1989, 1f, (IBNS); **BH**: Palc (E) (Stambulčić) v.1916, 2m 1f, (BHMS); **Srb**: Kopaonik (E), (4,20: 2v/21.vi, 3m), (IBNS).

Distribution (Map 41). RANGE. Scandinavia to Spain; Ireland through Central Europe and European part of Russia to Siberia. BALKAN PENINSULA: Slo,BH,Srb; (BT: D,E); (B: 3-4). First record for: Balkan Peninsula (Slo,BH, Srb).

Remarks: *C. fraterna* is found in the Alpine region and on two mountains of North Dinaric (Kopaonik and Jahorina).

Biology. Preferred environment: forests at high mountains. Adult habitat: clearings, wetland along streams and river; fly low; settle on leaves. Flowers visited: *Caltha palustris, Ranunculus, Taraxacum, Salix*. Flight period: May-June, early spring in high altitudes. Larva: described by Rotheray (1988); internal feeder in stems of *Cirsium palustre*.

41. ***Cheilosia frontalis*** Loew, 1857

VERIFIED REFERENCES: Langhoffer, 1917-1923.

UNVERIFIED REFERENCES. Blg: Bankowska, 1967 (Pirin, Vitoša).

Examined material (98m 34f; April 24/July 26; 700/1800 m). PUBLISHED RECORDS. Strobl, 1898: Derventa 1m (det. Strobl as *Chilosia antiqua*), (BHMS); Langhoffer, 1917-1923: 1m (det. Langhoffer as *Chilosia frontalis*), (CNHM). NEW DATA. **Slo**: Julijske Alpe (D), (5,9: 22.v/23.v, 2m); **BH**: Jahorina (E), 26.vi.1989, 1m; Konjuh (E), 13.v.1989, 1m; **Mtg**: Bjelasica (E), (1: 28.iv/5.v, 30m 15f); Durmitor (E), Skakala 1.vi.1994, 1m; **Srb**: Kopaonik (E), (2,3,6,8,11-15,20-23,26: 24.iv/23.vi, 77m 45f); Tara (E), Mitrovac 27.iv. 1990, 3m; Žljeb (E), 3.v.1991, 12m 8f; Stara Planina (I), (3: 29.v.1987, 1f); Čemernik (J), Vrla 4.v.1988, 1m 1f; (all in: IBNS).

Distribution (Map 37). RANGE. Europe (Scandinavia to Pyrenees, France through Alps and mountainous part of Central Europe to the European part

of Russia). BALKAN PENINSULA: Slo,Cro,BH,Mtg,Srb,Blg; (BT: D,E,I,J); (B: 3-4). First record for: Slo,BH,Mtg,Srb.

Remarks: *C. frontalis* is collected on high Balkan mountains in the Alps, North Dinaric, Stara Planina and Rilo-Rhodopes.

Biology. Preferred environment: beech and coniferous forest. Adult habitat: peat bogs; wet clearings along streams and rivers; settle on flowers and branches of *Salix*. Flowers visited: *Salix, Petasytes, Anemone.* Flight period: early spring species; end of April-July at higher altitudes. Larva: undescribed.

42. ***Cheilosia gigantea*** (Zetterstedt, 1838)

VERIFIED REFERENCES: Strobl, 1898; Šimić, 1987.

UNVERIFIED REFERENCES. Blg: Bankowska, 1967 (Rila, Vitoša).

Chilosia vulpina of Drenski, 1934 (in part)

Examined material (72m 96f; April 28/August 2; 500/1900 m). PUBLISHED RECORDS. Strobl, 1898: Derventa 1f (det. Strobl as *Chilosia gigantea*), (BHMS); Drenski, 1934: Vitoša (J) (Dragalevci) 15.v, 1m (det. Drenski as *Chilosia vulpina*), (ZIS); Šimić, 1987: Durmitor (E), Motički Gaj 10.vii.1983, 1m (det. Šimić as *C. gigantea*), (IBNS). NEW DATA. **Slo**: Julijske Alpe (D), (4,10: 22/23.v.1989, 4m 3f); Menina (E), 24.v.1989, 7m 1f, (IBNS); **BH**: Jahorina (E), 14.v/26.vi, 6m 3f; Konjuh (E), 13.v.1989, 4m 1f; Volujak (E), (1,2: 15.v/27.vi, 7m 2f), (IBNS); Ivan (E) 1911, 2f, (BHMS); **Mtg**: Durmitor (E), (13,15,16,22,24,29: 1.vi/9.vii, 9m 13f), (IBNS) **Srb**: Kopaonik (E), (3,6,15, 21,22,23,26: 2.v/4.vii, 29m 30)f; Šar-planina (F), (2,4,6,8: 27/29.vi, 2m 9f); Debeli Lug (H), 28.iv.1989, 5f; Kučaj (H) (2-6: 13.v/16.vii, 2m 8f); Stara Planina (I), (1,3,5: 28.v/30.vi, 1m 15f), (IBNS) **Mac**: Ogražden (J) 7.vi.1960, 1f, (IBNS).

Distribution (Map 42). RANGE. North and Central Europe, Siberia, Far East. BALKAN PENINSULA: Slo,BH,Mtg,Srb,Mac,Blg; (BT: D-F,H-J); (B: 3-5). First record for: Slo,Srb,Mac.

Remarks: *C. gigantea* is found at high altitudes of all mountain systems, except on the mountains in Greece.

Biology. Preferred environment: open ground at high altitudes, within or over the woodlands zone. Adult habitat: montane pastures and meadows; males hover at 2-5 meters; settle on grass and rocks. Flowers visited: Apiaceae; *Caltha palustris, Taraxacum*, *Ranunculus*. Flight period: May-August. Larva: undescribed.

43. ***Cheilosia griseifacies*** Vujić, 1994

VERIFIED REFERENCES: Vujić, 1994a.

Cheilosia sp. of Vujić & Šimić, 1994

Examined material (17m 32f; April 6/May 18; 50/400m). PUBLISHED RECORDS. Vujić, 1994a: Srb (Fruška gora: type locality; Obedska bara; Vršačke planine); BH (Javor), (IBNS, NHMB, CCC). NEW DATA. **BH**: Konjuh (E), 13.v.1989, 1m; **Srb**: Fruška gora (A), Glavica 25.iv.1994, 1f, (IBNS).

Distribution (Map 37). RANGE. Pannonian basin and Peripannonian mountains, (Central Europe: Germany, Hungary). BALKAN PENINSULA: BH,Srb; (BT: A,E); (B: 3).

Remarks: *C. griseifacies* is recorded in Pannonian Plain, on its margins and on low mountains in Central Europe (Thuringen, Germany and Javor, BH).

Biology. Preferred environment: deciduous woodlands in lowland and inundated areas. Adult habitat: marsh and swamp biotopes; fly among *Salix* branches and settle on catkins, leaves of *Smirnium perfoliatum* and flowers of *Euphorbia lucida*. Flowers visited: *Salix*, *Euphorbia lucida* (for more information see: Šimić et al, 1994). Flight period: April-May; Larva: undescribed.

44. ***Cheilosia grossa*** (Fallen, 1817)

VERIFIED REFERENCES: Langhoffer, 1917-1923; Drenski, 1934; Glumac, 1955a; Glumac, 1959; Vujić & Glumac, 1994; Vujić & Šimić, 1994.

UNVERIFIED REFERENCES. Cro: Strobl, 1898.

ERRONEOUS REFERENCES. BH: Glumac, 1955b (=*albipila*).

Examined material (27m 15f; March 6/May 2; 0/700 m). PUBLISHED RECORDS. Langhoffer, 1917-1923: *Chilosia grossa*: Osijek (A) 1m; Draga (?) 7m 3f, (CNHM); Drenski, 1934: Pleven (B-2), iii.1907, 1m (det. Drenski as *Chilosia grossa*), (ZIS); Glumac, 1955a; 1959: all records (NHMB); Vujić & Glumac, 1994: Fruška gora (A), all records (IBNS, NHMB); Vujić & Šimić, 1994: Vršačke planine (A), all records (IBNS). NEW DATA. **Cro**: Benkovac (C): 20.iii.1992, 2f; **Mtg**: Kanjon Morače (C), 21.ii.1990, 2f; **Srb**: Doroslovo (A), Doroslovačka šuma 9.iv.1991, 1f; Fruška gora (A), (9: 1.iii.1994, 1m); Glogonj (A) 30.iii.1985, 1m; Novi Bečej (A), Slano Kopovo 4.iv.1991, 1m; Vršačke planine (A), Široko Bilo 20.iii.1991, 1f; Žabalj (A) 14.iii.1994, 2m; Suva planina (B), (4,5: 2.iv, 6m 1f); Kopaonik (E), Srebrnac 2.v.1991, 1f; Kučaj (H), (4: 28.iii/1.iv, 1m 1f); Rtanj (H), 14.iv.1991, 1m; Stara Planina (I), Temska 12.iv.1988, 1m; Bosilegrad (J), 31.iii.1989, 2f; **Mac**: Baba (F), 11.iii.1990, 2m; **Gre**: Grammos (F), Drosopigi 12.iii.1990, 2f, (all in: IBNS).

Distribution (Map 28). RANGE. Europe, Siberia, Oriental region. BALKAN PENINSULA: Cro,BH,Mtg,Srb,Mac,Blg,Gre; (BT: A-C,E,F,H-J); (B: 2,3). First record for: BH,Mtg,Mac,Gre.

Remarks: *C. grossa* is registered on hills, lowlands and lower altitudes of the majority of Balkan mountains.

Biology. Preferred environment: deciduous forests. Adult habitat: in the vicinity of standing or running waters, beside rivers, streams and lakes; settle on *Salix* catkins or branches. Flowers visited: *Salix*, *Tussilago* (for more see: Radišić et al., 1992). Flight period: early spring, March-April. Larva: internal feeder in the stems of *Cirsium palustre* and *Carduus* spp.

45. ***Cheilosia hypena*** Becker, 1894

VERIFIED REFERENCES: Vujić & Šimić, 1994.

Examined material (102m 78f; March 28/August 16; 150/900 m). PUBLISHED RECORDS. Vujić & Šimić, 1994: Vršačke planine (A), all records (IBNS). NEW DATA. **Slo**: Julijske Alpe (D), Mojstrana-Vrata 23.v.1989, 1m; Kamniške in Savinjske Alpe (D), Logarska dolina 1.vii.1989, 1m, (IBNS); **Cro**: Sljeme (A) 23.v.1969, 1m; 16.viii.1971, 1m; 12.v.1972, 1f, (JLC); **Srb**: Vršačke planine (A): Guđurički vrh 10.vii.1988, 1f; Lisičja glava 8.vii.1988, 1f; 6.iv. 1989, 1m; Debeli Lug (H), 28.iv.1989, 1f; Kučaj (H), Demizlok 12.vi.1994, 24m 4f; Klisura Lazareve reke 28.iii.1989, 1m; 31.iv.1989, 8m 11f; 3.vi.1993, 1m 1f; Malinik 10.vii.1985, 2f; 3.vi.1989, 17m 10f; 13.v.1994, 2m, (IBNS).

Distribution (Map 30). RANGE. Central Europe (Switzerland, Austria, Romania, southern Russia), South Europe (Spain, Italy, Balkan Peninsula). BALKAN PENINSULA: Slo,Cro,Srb; (BT: A,D,H); (B: 2,3). First record for: Slo,Cro.

Remarks: *C. hypena* is registered on Subpannonic mountains and low Carpathians and only few records originate from the Alpine region at lower altitudes.

Biology. Preferred environment: deciduous forests, oak and polydominant woodlands. Adult habitat: clearings; usually settle on leaves and flowers of *Smirnium perfoliatum*, male hover at 1-2 meters. Flowers visited: white Apiaceae, *Smirnium perfoliatum* (spring generation). Flight period: end of March-August; polyvoltine species. Larva: undescribed.

46. ***Cheilosia illustrata*** (Harris, 1780)

syn. *Syrphus oestracea* Schell (nec Linnaeus), 1803

VERIFIED REFERENCES: Strobl, 1898 (as *oestracea*); Langhoffer, 1917-1923; Glumac, 1959; Glumac, 1968; Šimić, 1987; Vujić & Glumac, 1994.

UNVERIFIED REFERENCES. Blg: Bankowska, 1967 (Vitoša); Slo: Lambeck, 1968.

ERRONEOUS REFERENCES. Blg: Drenski, 1934 (=*Blera fallax*) (in part).

Examined material (74m 20f; April 5/August 24; 150/1700 m). PUBLISHED RECORDS. Strobl, 1898: Romanija (E) 1m (det. Strobl as *Chilosia oestracea*), (BHMS); Langhoffer, 1917-1923: *Chilosia illustrata*: Lokve (E); Pregrada (E), (CNHM); Glumac, 1968: *C. illustrata*: Debar (F) 31.v.1960, 1m; Šar-planina (F) (Vata Bogunović) 7.vi.1959, 1f, (IBNS); Šimić, 1987: all records (IBNS); Vujić & Glumac, 1994: Fruška gora (A), all records (IBNS, NHMB). NEW DATA. **Slo**: Julijske Alpe (D), (1,3,4: 22.v/2.vii, 5m), (IBNS); Bohinj (Sedmera jezera) 1m; Bovec (Kanin) 1f; Pokljuka (pod Toščem) 2f, (SNHM); Bled (D) 31.vii.1967, 2m; 9.ix.1981, 1m 3f; Bovec vii.1981, 14m 2f, (JLC); Kamniške in Savinjske Alpe (D), (2,4: 21.v/16.vi, 3m), (IBNS); Trnovski gozd (E) 1m; Turjak (E) 1m 1f; Veliki Snežnik (E) 1m 2f; Gabrje 2m 1f, (SNHM); **Cro**: Samobor (A) 19.v.1972, 1m; Sljeme (A) 23/30.v.1969, 3m 3f; Zagreb: (A) (Cmrok) 25.v.1969, 1f; (Villa Rebba) 19.v.1970, 1m, (JLC); **BH**: Javor (E), (1: 10.iv.1989, 1m; 13.v.1989, 4m 1f), (IBNS); Ivan (E) 1911, 1f; Prenj (E) 1f; Treska planina (E) 2m; Troglav (E) 1909, 1f, (BHMS); **Mtg**: Durmitor (E), (4,11,15,16,21,25: 24.vi/24.viii, 19m 4f), (IBNS); **Srb**: Vlašić (A), Zavlaka 9.iv.1989, 3m; Kopaonik (E), (5,10,21,22: 22.v/24.vii, 11m 4f); Kučaj (H), (Zlot) 2.vi.1983, 1m; Šar-planina (F), (2,4: 17/18.vii, 1m 1f), (IBNS); **Mac**: Baba (F), 17.vi.1990, 2m; Šar-planina (F), (7: 27.vii.1986, 3m); Pelister (F) 14.vii.1987, 1m, (IBNS).

Distribution (Map 44). RANGE. Europe, Siberia. BALKAN PENINSULA: Slo,Cro,BH,Mtg, Srb,Mac,Blg; (A,D-F,H,J); (B: 2-4).

Remarks: *C. illustrata* is found on many mountains, from the Alps to the Vitoša in the east and from Fruška gora to Baba in the south.

Biology. Preferred environment: deciduous forests at higher altitudes. Adult habitat: clearings; fly over bushes and settle on foliage of shrubs; males hover at 1-4 meters. Flowers visited: Apiaceae, especially *Heracleum sphondylium*. Flight period: April-August. Larva: found in *Pastinaca* sp. (Vappula, 1941).

47. ***Cheilosia impressa*** Loew, 1840

syn. *Chilosia geniculata* Strobl, 1909

VERIFIED REFERENCES: Langhoffer, 1917-1923; Glumac, 1959, 1968; Šimić, 1987; Vujić & Glumac, 1994; Vujić & Šimić, 1994.

UNVERIFIED REFERENCES. BH: Strobl, 1898; Slo: Coe, 1960; Lambeck, 1968; Srb: Glumac, 1955a; Kula, 1985; Blg: Bankowska, 1967 (Pirin, Rila, Vitoša).

ERRONEOUS REFERENCES: Drenski, 1934 (=*barbata*).

Chilosia melanopa of Drenski, 1934 (in part)

Cheilosia atriseta of Glumac, 1959

Cheilosia honesta of Šimić, 1987 (in part)

Cheilosia loewi of Šimić, 1987

Examined material (515m 173f; April 25/September 10; 200/ 1900 m). PUBLISHED RECORDS. Langhoffer, 1917-1923: Petrinja (A); Zagreb (A); Rijeka (C); Delnice (E), (CNHM); Drenski, 1934: Vitoša (J) (Sofia) v.1908, 2m (det. Drenski as *Chilosia melanopa*), (ZIS); Glumac, 1959: all records of *C. impressa*; Fruška gora (A) (Zmajevac) 10.v.1956, 1f (det. Glumac as *C. atriseta*), (NHMB); Šimić, 1987: Durmitor (E), 22m 13f det. Šimić as *C. impressa*; Motički Gaj 10.vii.1983, 1m as *C. loewi*; Škrčka jezera 5.vii.1983, 3f as *honesta*; (IBNS); Vujić & Glumac, 1994: Fruška gora (A), all records (IBNS); Vujić & Šimić, 1994: Vršačke planine (A), all records (IBNS). NEW DATA. **Slo**: Julijske Alpe (D), 14.vi./2.vii, 32m 4f; Kamniške in Savinjske Alpe (D), 25.v./1.vii, 63m 13f; Menina (E), 24.v.1989, 23m 1f, (IBNS); Trnovski gozd (E) 18.viii, 1m 1f, (SNHM); Bled (D) 31.vii, 1f; Bohinj (D) 10.ix, 1m; Rupa (E) 6.ix, 3m, (JLC); **Cro**: Dilj (A), Petnja 21.viii, 1f; Gorski Kotar (E), (1: 27.v, 1m 1f), (IBNS); Krapina (E) 1.ix.1910, 2f, (BHMS); Samobor (A), 19/23.v, 2m 2f; Sljeme (A) 23.v, 5m 5f; Zagreb (A), 17/29.v, 3f; Zelina (A) 23.vii, 1f; Velebit (E) 20.viii, 1m, (JLC); **BH**: Jahorina (E), 14.v/31.vii, 18m 4f; Javor (E), Sokolina 13.v/30.vii, 6m 2f; Konjuh (E), 13.v/30.vii, 24m 8f; Volujak (E), (1,2: 15.v/27.vi, 18m 3f), (IBNS); Ivan planina (E) 3m; Jablanica (E) 1m; Mojmilo (E) 1911, 1f; Treska (?) 1f, (BHMS); **Mtg**: Durmitor (E), 24.vi./9.vii, 46m 36f; Prokletije (E): 27/29.vii, 3m, (IBNS); **Srb**: Deliblatska peščara (A) 4.vi, 1f; Goč (E) 8/11.viii, 3m 2f; Suva planina (B), 2.v, 2m; Kopaonik (E), 1.v./17.viii, 150m 44f; Šar-planina (F), 27.vi/19.vii, 20m 13f; Debeli Lug (H), 28.iv, 9m; Dubašnica and Kučajske planine (H), 6.vi/12.viii, 19m 3f; Žagubica (H) 14.vii, 1m 2f; Stara Planina (I), 30v/11.viii, 11m 3f; Čemernik and Vlasinsko jezero (J), Vrla 4.v, 1m; Kukavica (J), 2.v/18.vii, 7m 6f, (IBNS); **Mac**: Baba (F), 17.vi, 1m 2f; Kožuf (F), 14.v/16.vii, 6m 4f; Šar-planina (F), 27.vii, 3m 2f, (IBNS); **Blg**: Lozenska planina (I) (Germanski Manastir) 15.viii.1911, 1f, (ZIS); **Gre**: Verno (F), Trigono 11.v, 1m, (IBNS).

Distribution (Map 45). RANGE. Europe, Siberia, Far East. BALKAN PENINSULA: Slo,Cro,BH,Mtg,Srb,Mac,Blg,Gre; (BT: A-F,H-J); (B: 2-5). First record for: Gre.

Remarks: *C. impressa* is registered in forest communities on the whole territory of the Balkan Peninsula except in Mediterranean region.

Biology. Preferred environment: forests; montane pastures. Adult habitat: open ground; clearings; marsh; males hower at 2-5 meters; settle on foliage of vegetation. Flowers visited: *Ranunculus*, *Euphorbia*, Apiaceae. Flight period: end of April-June, July-September. Larva: undescribed.

48. ***Cheilosia katara*** Claussen et Vujić, 1993

VERIFIED REFERENCES: Claussen & Vujić, 1993

Examined material (7m 5f; April 22; 1700 m). PUBLISHED RECORDS. Claussen & Vujić, 1993: Pindos (G), Katara 22.iv.1990, 7m 5f, (IBNS, NHMB, CCC).

Distribution (Map 26). RANGE. Pindos mountains. BALKAN PENINSULA: Gre; (BT: G); (B: 7).

Remarks: *C. katara* has been found only at the high altitude of Pindos mountains.

Biology. Preferred environment: forests of relict conifer types *(Pinus heldreichii* and *Pinus nigra* ssp. *pallasiana*) on high oromediterranean mountains. Adult habitat: marshy places in woodland; the adults is stocky with short wings which results in its clumsy and short flight range, similar to the *Microdon* species. Flowers visited: *Ranunculus*. Flight period: early spring; April. Larva: undescribed.

49. ***Cheilosia lasiopa*** Kowarz, 1885

honesta auct., nec Rondani, 1868

UNVERIFIED REFERENCES. Srb: Kula, 1985 (Šušara) (?).

ERRONEOUS REFERENCES (as *honesta*). Mtg: Šimić, 1987 (=*pascuorum*; =*impressa*).

Examined material (2m 3f; May 13/July 1; 700/1200 m). NEW DATA. **Slo**: Julijske Alpe (D), Mojstrana-Vrata 23.v.1989, 2m 1f; Kamniške in Savinjske Alpe (D), Matkov Kot 1.vii.1989, 1f, (IBNS); **Cro**: Velebit (E) (Oštarije) 26.v.1972, 1m 10f, (JLC); **BH**: Konjuh (E), 13.v.1989, 1f, (IBNS).

Distribution (Map 43). RANGE. North, Central and West Europe, Siberia, Mongolia. BALKAN PENINSULA: Slo,Cro,BH; (BT: D,E); (B: 3-5). First verified records for: Balkan Peninsula (Slo,Cro,BH).

Remarks: *C. lasiopa* is collected only in the western part of the Balkan Peninsula, in the Alpine region and on North Dinaric mountains Velebit and Konjuh.

Biology. Preferred environment: deciduous and coniferous woodlands at high altitudes. Adult habitat: woodland clearings; fly low and settle on leaves

of shrubs. Flowers visited: *Stellaria holostea, Taraxacum*. Flight period: May-beginning of July. Larva: undescribed.

50. ***Cheilosia latifacies*** Loew, 1857

VERIFIED REFERENCES: Langhoffer, 1917-1923; Šimić,1987; Vujić & Šimić, 1994.

UNVERIFIED REFERENCES, Srb,BH: Kula, 1985.

Cheilosia intonsa of Glumac, 1955b (in part)

Examined material (33m 16f; April 17/September 5; 0/1300 m). PUBLISHED RECORDS. Langhoffer, 1917-1923: *Chilosia latifacies*: Rijeka (C) 10.iv.1998, 1m; Bakar (E) 18.iv.1888, 1m; 27.iv.1888, 1f; Pregrada (E) 5.ix. 1886, 1m; Senj (E) 7.iv.1890, 1f; 30.iv.1890, 1m, (CNHM); Glumac, 1956a: Crkvice (E), vi.1918, 1m (det. Glumac as *C. intonsa*), (BHMS); Šimić, 1987: Durmitor (E), all records (IBNS); Vujić & Šimić, 1994: Vršačke planine (A), all records (IBNS). NEW DATA. **Slo**: Žužemberk-Dvor (E) 20.vii.1972, 1m, (SNHM); Bled (D) 9.ix.1981, 1f; Bohinj (D) 10.ix.1981, 2m 4f; Metlika (E) v.1983, 1f; Rupa (E) 6.ix.1981, 1m, (JLC); **Cro**: Krapina (E) 11.vii.1910, 3f, (BHMS); Samobor (A), 25.v.1970, 1m; 19.v.1972, 1m; (Rude) 23.v.1972, 1f; Slunj (A) vii.1981, 1m; Rijeka (C) 6.ix.1981, 3f; Velebit (E) (Oštarije) 24. vi.1969, 1f, (JLC); **BH**: Grmeč (E), 30.iv.1990, 1m; Javor (E), Sokolina 10.iv. 1989, 2m, (IBNS); **Mtg**: Boka Kotorska (C), 5.v.1991, 2m; 4/7.v.1994, 10m 2f; Kanjon Morače (C), 28.iv.1990, 3m; Durmitor (E), (5,15,25: 28.vi/23.viii, 3m 4f), (IBNS); **Srb**: Kopaonik (E), (18,21: 1.v/17.vi, 2m 1f), (IBNS); **Mac**: Galičica (F), Prespansko jezero 20.iv.1990, 2m 1f; Radika (F), 17.iv.1987, 1m, (IBNS).

Distribution (Map 39). RANGE. Central Europe, Mediterranean (s.l.). BALKAN PENINSULA: Slo,Cro,BH,Mtg,Srb,Mac; (BT: A,C-F); (B: 1,2,3). First record for: Slo,Cro,Mac.

Remarks: *C. latifacies* is characteristic for Mediterranean and Submediterranean zone but it is also found on some Dinaric and Pannonian mountains.

Biology. Preferred environment: deciduous woodlands. Adult habitat: tracksides, clearings; fly among vegetation and settle on leaves. Flowers visited: *Smirnium perfoliatum*, Apiaceae. Flight period: April-September; univoltine at higher altitudes, two generation lower. Larva: undescribed.

51. ***Cheilosia latifrons*** (Zetterstedt, 1843)

syn. *Cheilosia intonsa* Loew, 1857

VERIFIED REFERENCES (as *intonsa*): Langhoffer, 1917-1923; Glumac, 1955a; 1959; Vujić & Glumac, 1994; Vujić & Šimić, 1994.

UNVERIFIED REFERENCES. Blg: Drenski, 1934 (*intonsa*).

ERRONEOUS REFERENCES. BH: Glumac, 1955b (=*latifacies*; =*variabilis*); Mtg: Šimić, 1987 (=*barbata*).

Cheilosia maroccana of Glumac, 1955a

Cheilosia brachyptera of Glumac, 1956a; 1956b.

Examined material (15m 9f; February 22/August 30; 0/200 m). PUBLISHED RECORDS. Langhoffer 1917-1923: Bakar (E) 6.iv.1888, 1f (det. Langhoffer as *Chilosia intonsa*); Draga (?) 12.iv.1895, 2f, (CNHM); Glumac, 1955a: Beograd (A) (Košutnjak) 30.viii.1952, 1m (det. Glumac as *C. intonsa*); 7.iv.1954, 1m, (det. Glumac as *C. maroccana*), (NHMB); Glumac, 1956a: Kopar (C) 4.x.1956, 2f (det. Glumac as *C. brachyptera*), (NHMB); Vujić & Glumac, 1994: Fruška gora (A), (as *C. intonsa*), (NHMB); Vujić & Šimić, 1994: Vršačke planine (A), (as *C. intonsa*), (IBNS). NEW DATA. **Cro**: Slano (C), 29.iv.1990, 1m; Trsteno (C), 23.ii.1990, 1m, (IBNS); Zagreb (A) (Maksimir) 20.v.1970, 1f, (JLC); **BH**: Mojmilo (?) 1911, 1f, (BHMS); **Mtg**: Bar-Kotor (C), 22.ii.1990, 7m; Skadarsko jezero (C), Rumija 5.iv.1990, 1m, (IBNS); **Srb**: Potisje (A), Ečka (Carska bara) 9.vii.1985, 1m 1f; Kanjiža 19.iv.1984, 1f; Kopaonik (E), Samokovska reka 3.v.1992, 1m, (IBNS).

Distribution (Map 27). RANGE. Europe, West Siberia. BALKAN PENINSULA: Cro,BH,Mtg, Srb,Blg; (BT: A,C,E); (B: 1-3). First record for: BH, Mtg.

Remarks: Almost all records are from the Adriatic coast and Pannonic depression while in mountain regions of the Balkan Peninsula *C. latifrons* is very rare (Kopaonik).

Biology. Preferred environment: open ground, meadows, mixed forests. Adult habitat: along running or standing waters; fly low, through and over low-growing vegetation; settle on leaves of grass or branches of bushes. Flowers visited: *Taraxacum, Salix, Ranunculus*. Flight period: two generations, February-May and July- August. Larva: undescribed.

52. ***Cheilosia lenis*** Becker, 1894

Chilosia chloris of Langhoffer, 1917-1923 (in part)

Cheilosia omissa of Vujić et al, 1993-1994

Examined material (141m 77f; April 15/July 9; 400/2000 m). PUBLISHED RECORDS. Langhoffer, 1917-1923: Sljeme (A) 2f (det. Langhoffer as *Chilosia chloris*), (CNHM); Drenski, 1934: Rodopi (J) (Čehlovo) 1m (det. Drenski as *Chilosia melanopa*), (ZIS); Vujić et al., 1993-1994 (as *omissa*): Slo: Julijske Alpe (D), (8,9: 22/23.v, 38m 12f); Kamniške in Savinjske Alpe (D), (2,4,5: 21.v/16.vi, 1m 4f); Menina (E), 24.v.1989, 2f; Cro: Papuk (A), 15.iv. 1989, 1f; Mala Kapela (E), (1: 30.iv.1990, 1f); BH: Palc (E) 1913, 1f; Mtg: Bjelasica (E), (1: 28.iv/5.v, 5m);

Durmitor (E), (8,15,16,30: 2.vi/9.vii, 5m 3f), (IBNS); Srb: Kopaonik (E), (3,6,11,13,15,20,21, 23,26: 2.v/23.vi, 84m 47f); Tara (E), (2; 27.iv.1990, 1m); Šar-planina (F), (4: 27.vi.1988, 1f); Stara Planina (I), (1,3,5,11: 28v/26.vi.1987, 6m 3f), (IBNS, BHMS).

Distribution (Map 33). RANGE. Central Europe (Netherlands, Poland, Austria, Italy, Romania); Caucasus. BALKAN PENINSULA: Slo,Cro,BH,Mtg, Srb,Blg; (BT: A,D-F,I,J); (B: 3-4). First record for: Balkan Peninsula (Slo,Cro, BH,Mtg,Srb,Blg).

Remarks: Large populations of *C. lenis* are found on the Alps, north Dinaric mountains and Stara Planina. More northward and southward the species is infrequent and less numerous.

Biology. Preferred environment: coniferous and beech woodlands. Adult habitat: clearings in the vicinity of streams and river in high montane forests; fly over stream-side vegetation; settle on leaves and flowers; males hover at 1-5 meters. Flowers visited: *Caltha palustris, Ranunculus, Taraxacum*. Flight period: April-July. Larva: internal feeder in roots of *Senecio nemorensis* (Dušek, 1962).

53. ***Cheilosia lenta*** Becker, 1894

VERIFIED REFERENCES: Vujić & Šimić, 1994; Vujić et al., 1993-1994.

Examined material (11m 7f; April 9/July 9; 150/1500 m). PUBLISHED RECORDS. Vujić & Šimić, 1994: Vršačke planine (A), all records (IBNS); Vujić et al., 1993-1994: Slo: Julijske Alpe (D); Cro: Papuk (A); BH: Jahorina (E); Javor (E); Srb: Kopaonik (E); Stara Planina (I); Blg: Pirin (J); Gre: Pindos (G); (IBNS, CCC).

Distribution (Map 46). RANGE. Central Europe (Switzerland, Hungary, Balkan Peninsula). BALKAN PENINSULA: Slo,Cro,BH,Srb,Blg,Gre; (BT: A, D,E,G-J); (B: 3,4).

Remarks: *C. lenta* appears at lower altitudes of Pannonic hills and the majority of mountain systems on the Balkan Peninsula.

Biology. Preferred environment: deciduous forests. Adult habitat: beside streams and rivers; fly low over vegetation; settle on flowers or leaves. Flowers visited: *Ranunculus, Caltha palustris, Myosotis*. Flight period: April-July at higher altitudes. Larva: undescribed.

54. ***Cheilosia longula*** (Zetterstedt, 1838)

ERRONEOUS REFERENCES. Mtg: Šimić, 1987 (=*scutellata*; =*mutabilis*).

Examined material (9m 1f; June 14/July 17; 700/1900 m). NEW DATA. **Slo**: Julijske Alpe (D), Bohinjsko jezero-Savica 14.vi.1988, 1m; Izvir Soče-Zadnja Trenta 18.vi.1988, 1m, (IBNS); Bohinj (D) 10.ix.1981, 1f (JLC); Kamniške in Savinjske Alpe (D), Matkov Kot 1.vii.1989, 5m, (IBNS); Veliki Snežnik (E) 17.vii.1972, 1m 1f, (SNHM); **Srb**: Kopaonik (E), Treska 17.vii.1985, 1m, (IBNS).

Distribution (Map 27). RANGE. Scandinavia to Spain, Italy and Romania, Ireland through Eurasia to East Siberia. BALKAN PENINSULA: Slo,Srb; (BT: D,E); (B: 4). First record for: Balkan Peninsula (Slo,Srb).

Remarks: *C. longula* is widely distributed in the north Europe and Siberia. Its populations on the Balkan Peninsula are small in numbers and rarely found. Beyond the Alpine region it has been registered only on Kopaonik mountain.

Biology. Preferred environment: coniferous forests. Adult habitat: clearings; fly at up to 3 meters, settle on low-growing vegetation. Flowers visited: *Potentilla, Galium, Achilea*. Flight period: June-July. Larva: internal feeder in mushrooms (*Boletus, Leccinium, Suillus*).

55. ***Cheilosia melanopa*** (Zetterstedt, 1843)

UNVERIFIED REFERENCES. Srb: Kula, 1985 (Beograd).

ERRONEOUS REFERENCES: Drenski, 1934 (=*impressa* =*nigripes*; =*vicina*; =*aerea*).

Diagnostic features. Facial profile flat (Fig.3:a,d); face and eyes with long hairs; arista with short pubescence.

MALE: Mesoscutum covered with long hairs (Fig.3:b); scutellum with long marginal hairs; legs black, knees and base of tibiae sometimes pale; abdomen with very long hairs; male genitalia on Fig.4.

FEMALE: Mesoscutum covered with shorter, partly adpressed hairs and some longer hairs (Fig.3:e); postalar calli and scutellum margin with long hairs; tibiae sometimes pale at both ends, covered with short adpressed hairs.

Distribution (Map 43). RANGE: *C. melanopa* is registered in North and Central European countries (from Norway to North European part of Russia and from Germany to Romania).

Remarks: The analysis of the material from the Balkan Peninsula and adjacent regions has indicated the existence of two subspecies. Subspecies *C. melanopa melanopa* is distributed more in northern areas and at higher altitudes in the southern part of this range. The second, *C. melanopa redi* ssp. n., had a range in Central and South Europe at low altitudes.

55a. ***Cheilosia melanopa* ssp. *melanopa*** (Zetterstedt, 1843)

Cheilosia variabilis of Šimić, 1987 (in part)

Examined material (15m 19f; June 25/August 1; 1300/1900 m). PUBLISHED RECORDS. Šimić, 1987: Durmitor (E), Motički Gaj 2.vii.1983, 1f (det. Šimić as *C. variabilis*), (IBNS). NEW DATA. **Mtg**: Durmitor (E), (8,13,15,16,25,28,29: 25.vi/1.viii, 13m 11f), (IBNS); **Srb**: Šar-planina (F), Durov potok 27.vi.1988, 6m 11f; Prevalac 28.vi.1988, 1m, (IBNS).

Morphological characteristics. Smaller subspecies (8-10mm); predominantly covered with black hairs.

MALE: Body hairs black, except the combination of black and pale hairs on tergites, differently arranged, and pale hairs on sternites; wing veins dark.

FEMALE: Face with pale hairs; mesoscutum with pale and black hairs (longer are black); abdomen with pale hairs laterally and adpressed black hairs in the middle of tergites; tibiae brownish basally.

Distribution (Map 43). RANGE. North and Central Europe (southern at high altitude). BALKAN PENINSULA: Mtg,Srb; (BT: E,F); (B: 4,5). First records for: Balkan Peninsula (Mtg,Srb).

Remarks: This subspecies is registered on only two high Dinaric mountains - Durmitor and Šar-planina.

Biology. Preferred environment: high mountain pastures and rocks, coniferous woodlands. Adult habitat: in open areas towards the upper altitudinal limit of forests; clearings in the high montane *Pinus* and *Fagus* forests; settle on rocks and leaves. Flowers visited: *Ranunculus*. Flight period: end of June-July. Larva: undescribed.

55b. ***Cheilosia melanopa redi* ssp. n.**

VERIFIED REFERENCES (as *melanopa*): Vujić & Glumac, 1994; Vujić & Šimić, 1994.

Chilosia pigra of Strobl, 1898

Examined material (54m 57f; March 25/28 May; 50/900 m). **Holotype**: male, Serbia, Vršačke planine (A), Fiseš 14.iv.1986 (NHMB: Coll. 595773: Inv. No. 19). **Allotype**: female, same locality 25.iv.1986, (NHMB: Coll. 595773: Inv. No. 20). **Paratypes**: PUBLISHED MATERIAL. Strobl, 1898: Sarajevo (E) (Vrelo Bosne) 1911, 1f; Troglav (E) 1f (det. Strobl as *Chilosia pigra*); Jablanica (E) 28.iv.1897, 1m (det. Strobl as *Chilosia pigra*), (BHMS); Vujić & Glumac, 1994: Fruška gora (A), all records (IBNS); Vujić & Šimić, 1994: Vršačke planine (A), all records (IBNS). NEW DATA. **BH**: Grmeč (E), 30.iv. 1990, 1m; Jahorina (E), 14.v.1989, 1m; Javor (E), (1: 11iv/13.iv.1989, 2m 6f); Konjuh (E), 13.v.1989, 1m 1f; Olovo (E), 13.v.1989, 1m

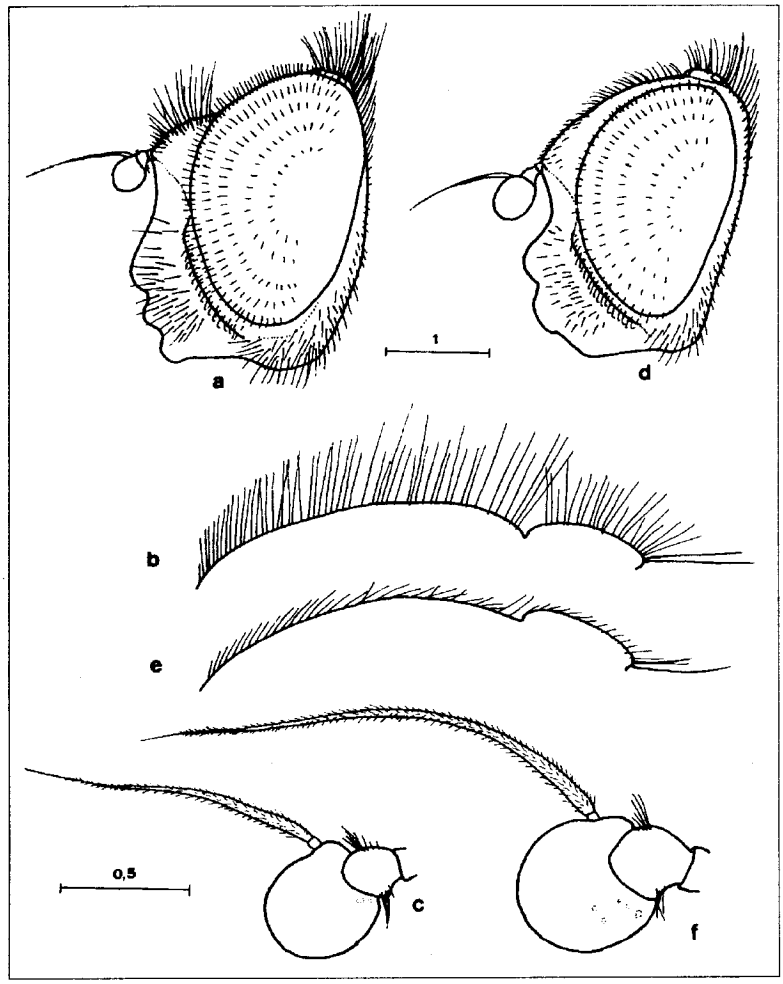


Fig.3 Cheilosia melanopa redi ssp. n. a-c: male; d-f: female. (a) head, lateral view; (b) mesonotum, lateral view; (c) right antenna, internal view; (d) head, lateral view; (e) mesonotum, lateral view; (f) right antenna, internal view. Scale in mm.

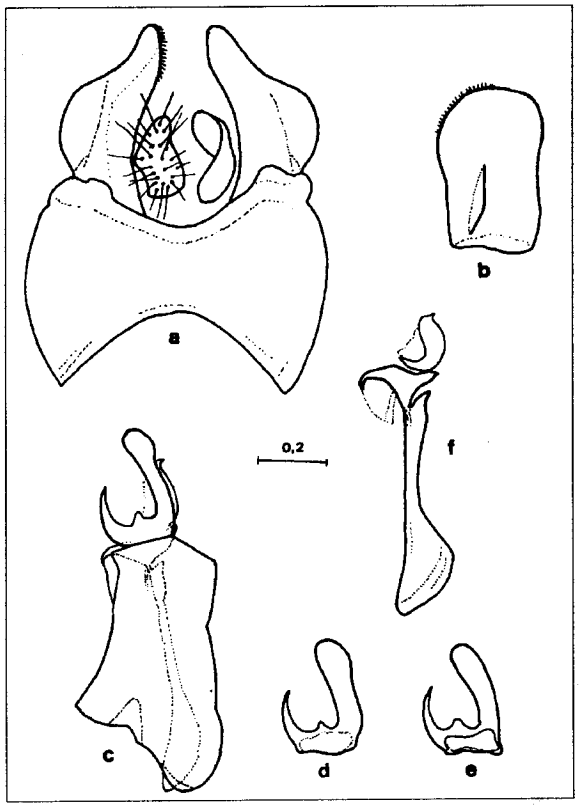


Fig.4 Cheilosia melanopa redi ssp. n., male genitalia. (a) epandrium, dorsal view; (b) right surstilus, lateral view; (c) hypandrium, lateral view; (d) lobus superior, external view; (e) lobus superior, internal view; (f) aedeagus, lateral view. Scale in mm.

1f; Volujak (E), (1: 15.v.1989, 1f), (IBNS); **Srb**: Cer (A), Petkovica 12.v.1989, 1f; Vlašić (A), Zavlaka 5.iv.1989, 1m; Seličevica (B), 22.iv.1989, 3f; Povlen (E), 3.iv.1990, 3m 1f; Kopaonik (E) (10,20: 29.iv/22.v, 3m 1f); Žljeb (E), 3.v.1991, 1m; Debeli Lug (H), 28.iv.1989, 1m 1f; 2.v.1993, 1f; Kučaj (H) (2-5: 31.iv/16.v.10m 22f); Rtanj (H), 1.v.1991, 1f; Stara Planina (I) (2,5,10: 8/28.v, 4m 2f); Bosilegrad (J), 5.v.1988, 1m; Čemernik (J), (4: 3.v.1988, 1f), (IBNS); **Mac**: Baba (F), 20.iv.1990, 4m 3f, (IBNS); **Blg**: Rila (J), 2.iv.1982, 2f, leg. S. Toth, (CCC); Strumešnica, 17.v.1982, 1f, leg. S. Toth, (CCC); **Gre**: Olympos (F), 23.iv.1990, 1f; 14.v.1990, 1f, (IBNS). Additional material: **Hungaria**: Porva, Kek-hegy, 1.v.1983, 1m, leg. S. Toth (CCC); **Romania**: Herculana, 23.iv/7.v, 4m, leg. Vl. Bradescu, (CCC); **Slovakia**: mer.-occ. Devinska Kobyla, 7.v.1990, 1f, leg. M. Kozanek, (CCC); **Czech Republic**: Kašperske Hory, 2km SW nr. Losenice, 600m, 9.vii.1994, 1f, leg. Bartak (MBC).

Morphological characteristics (Fig.3,4). Larger subspecies (10-12mm); covered with reddish hairs.

MALE: Body hairs reddish (from yellow-reddish to brown-reddish); black hairs can be found on tergites, sometimes on mesoscutum (on postalar calli) and scutellum margin; wings with brown veins.

FEMALE: Body covered with adpressed yellow-reddish hairs; legs paler than in *C. melanopa melanopa*; tibiae pale in basal third and on apex.

Distribution (Map 43). RANGE. Central and Southern Europe (lower altitudes). BALKAN PENINSULA: BH,Srb,Mac,Gre; (BT: A,B,E,F,H-J); (B: 2,3). First record for: BH,Mac,Gre.

Remarks: *C. melanopa redi* sp. n. is registered on the greater part of investigated territory, except Alps, Mediterranean and Submediterranean. In relation to *C. melanopa melanopa* this subspecies appears at lower altitudes.

Biology. Preferred environment: deciduous forests at lower altitudes. Adult habitat: in the vicinity of streams and rivers; males hover at 2-3 meters; settle on leaves. Flowers visited: *Salix, Stellaria, Caltha palustris*. Flight period: early spring March-May. Larva: undescribed.

56. ***Cheilosia melanura*** Becker, 1894

UNVERIFIED REFERENCES. Blg: Bankowska, 1967 (Vitoša).

Diagnostic features. An extremely variable species of medium to large body length (7-12,5 mm). *C. melanura* differs from related species by the presence of marginal bristles on scutellum (differences to *C. chloris*) and black hairs on tergites at least so at hind margins of tergites 3 and/or 4 (differences to *C. bracusi* and *C. chloris*).

MALE: Eyes with long black hairs; in profile facial tubercle as pronounced as mouth edge (Fig.5:a); third antennal segment oval, yellow-reddish to brown; arista long, with short pubescence (Fig.5:c); frons shiny, with black hairs.

Mesoscutum slightly dusted, covered with long hairs (Fig.5:b) of various color; in the posterior half there are also short black hairs; scutellum margin with long black hairs; legs dark: tibiae with broad, dark ring or pale only at apex; tarsi partly pale; on wing upper marginal cross-vein meeting radial vein r4+5 with an right angle.

Tergites with long, erect hairs of extremely various color (in some specimens hairs almost completely pale except for few black hairs on pregenital

segments, in others almost entirely covered with black hairs); male genitalia on Fig.6.

FEMALE: Mesoscutum with short adpressed, pale and black hairs and some longer hairs (Fig.5:e); hairs on tergites pale, short and partly adpressed; the middle of tergites 2 and 3 usually with short black hairs.

Distribution (Map 47). RANGE. Alps, Carpathians, Caucasus and Balkan mountains; West Siberia.

Remarks: On the basis of the material collected in the south of the Balkan Peninsula one new subspecies is described.

56a. ***Cheilosia melanura* ssp. *melanura*** Becker, 1894

VERIFIED REFERENCES: Langhoffer, 1917-1923; Šimić, 1987.

Chilosia chloris of Langhoffer, 1917-1923 (in part)

Cheilosia pictipennis of Glumac, 1955b

Cheilosia chloris of Šimić, 1987 (in part)

Examined material (107m 68f; April 28/July 9; 400/1900 m). PUBLISHED RECORDS. Langhoffer, 1917-1923: Sljeme (A) 29.iv.1897, 1f; 19.v. 1898, 1f; Zagreb (A) 14.vi.1896, 1f (det. Langhoffer as *Chilosia chloris*); Risnjak (E) 21.vi.1898, 1f (det. Langhoffer as *Chilosia melanura*), (CNHM); Glumac, 1955b: Pale (E) (Stambulčić) v.1916, 1f (det. Glumac as *C. pictipennis*), (BHMS); Šimić, 1987: Durmitor (E), Crno jezero-Otoka 20.vi.1983, (det. Šimić as *C. canicularis*); Kanjon Sušice 28.vi.1985, 1f (det. Šimić as *C. chloris*); Luke 30.vi.1985, 1m 1f (det. Šimić as *C. chloris*); Škrčko ždrijelo 30.vi.1985, 1f (det. Šimić as *C. melanura*), (IBNS). NEW DATA. **Slo**: Julijske Alpe (D), (4,5,8-10: 22.v/18.vi, 22m 10f); Kamniške in Savinjske Alpe (D), (2,4: 21/25.v, 7m 4f), (IBNS); Bohinj (E) (pri Beli steni) 21.vii.1973, 1f, (SNHM); **Cro**: Gorski Kotar (E), (1: 27.v.1990, 1m), (IBNS); **BH**: Jahorina (E), 14.v/26.vi, 22m 17f; Konjuh (E), 10.iv/13.v, 5m 4f; Volujak (E), (2: 11.iv/27.vi, 2m 3f), (IBNS); **Mtg**: Bjelasica (E), (1: 28.iv.1990, 3m); Durmitor (E), (13,15,16,25: 1.vi/9.vii, 2m 19f), (IBNS); **Srb**: Kopaonik (E), (2,3,9,11,13,21-23,26,27: 2.v/24.vi, 42m 21f); Stara Planina (I), (3: 30.v.1988, 1f); Čemernik and Vlasinsko jezero (J), (2: 3.v.1988, 1m), (IBNS).

Morphological characteristics. Smaller subspecies (7-11 mm); pale body hairs white to yellow; tibiae with dark ring, usually pale at both ends.

MALE: Hairs on mesoscutum, may be predominantly black; tergites with black and pale hairs, extremely variously arranged; sternites covered with pale hairs; wing veins dark-brown.

FEMALE: Mesoscutum with pale and black hairs (longer are black); tergites with pale lateral hairs, on the middle with adpressed black hairs.

Distribution (Map 47). RANGE. Alps, North Balkan mountains, Carpathians, Caucasus, West Siberia. BALKAN PENINSULA: Slo,Cro,BH,Mtg,Srb, Blg; (BT: A,D,E,I,J); (B: 3,4). First record for: Slo,BH,Srb.

Remarks: *C. melanura melanura* is registered on the mountains in the north Balkan, at the altitude above 1000 m.

Biology. Preferred environment: beech and coniferous forests at high altitudes. Adult habitat: in the vicinity of streams and rivers; small clearings in woodlands; open ground up to the *Picea* zone; males hover at 2-4 meters; settle on leaves of *Caltha* and *Gentiana*. Flowers visited: *Caltha palustris, Ranunculus, Euphorbia*. Flight period: end of April-beginning of July at higher altitudes. Larva: undescribed.

56b. ***Cheilosia melanura rubra*** **ssp. n.**

Examined material (34m 27f; May 11/July 19; 1000/2000 m). **Holotype**: male, Serbia, Šar-planina (F), Durov potok 27.vi.1988, (NHMB: Coll. 595773: Inv. No. 17). **Allotype** female, same locality and date, (NHMB: Coll. 595773: Inv. No. 18). **Paratypes**: **Mtg**: Bjelasica (E), Biogradsko jezero, 28.iv.1990, 1m (CCC); 15/17.vii.1995, 2f, (IBNS); **Srb**: Šar-planina (F), Brezovica-Piljevački potok 19.vii.1986, 1f; 29.vi.1988, 1f; Durov potok 18.vii.1986, 1m 2f; 27.vi.1988, 6m 7f; Ošljak 29.vi.1988, 1f; Prevalac 28.vi.1988, 1m 2f, (IBNS); **Mac**: Šar-planina (F), Vata Bogunović 7.vi.1959, 1f, (IBNS); Ljuboten.vii1935, 1f, (BHMS); **Gre**: Verno (F), Florina-Pisoderi 11.v.1990, 23m 10f, (IBNS, CCC).

Morphological characteristics (Fig.5,6). Bigger subspecies (10-12,5 mm); pale body hairs red to reddish-brown; tibiae of male pale only basally; abdomen pale haired (except tergite 4 and pregenital segments of male).

MALE: Hairs on mesoscutum predominantly pale; tergites with reddish hairs, except some black hairs on tergite 4 and pregenital segments; wing veins in basal part black.

FEMALE: Mesoscutum with short, adpressed, pale, and some black hairs on posterior half; tip of tibiae only narrowly pale; tergites with yellow-red to reddish-brown adpressed hairs.

Distribution (Map 47). RANGE. Southern-central part of the Balkan Peninsula; endemic of South Dinaric mountains. BALKAN PENINSULA: Mtg, Srb,Mac,Gre; (BT: F); (B: 7). First record of species for: Mac,Gre.

Remarks: Endemic subspecies to the south Dinaric mountains with the habitats at high altitudes of Šar-planina and Verno. *C. melanura rubra* ssp. n.

appears at the same altitudes and similar types of habitats as subspecies *C. melanura melanura* in other parts of the Balkan Peninsula.

Biology. Preferred environment: woodlands on rocky grounds of Oro-mediterranean mountains; especially edges of *Pinetum peucis* forests. Adult habitat: open ground in the vicinity of streams; montane pastures from within the forest zone upwards; males hover at 2-5 meters; settle on rocks, leaves of *Gentiana*, *Rhododendron ferrugineum* and grasses. Flowers visited: yellow Ranunculaceae and Asteraceae. Flight period: end of May-July. Larva: undescribed.

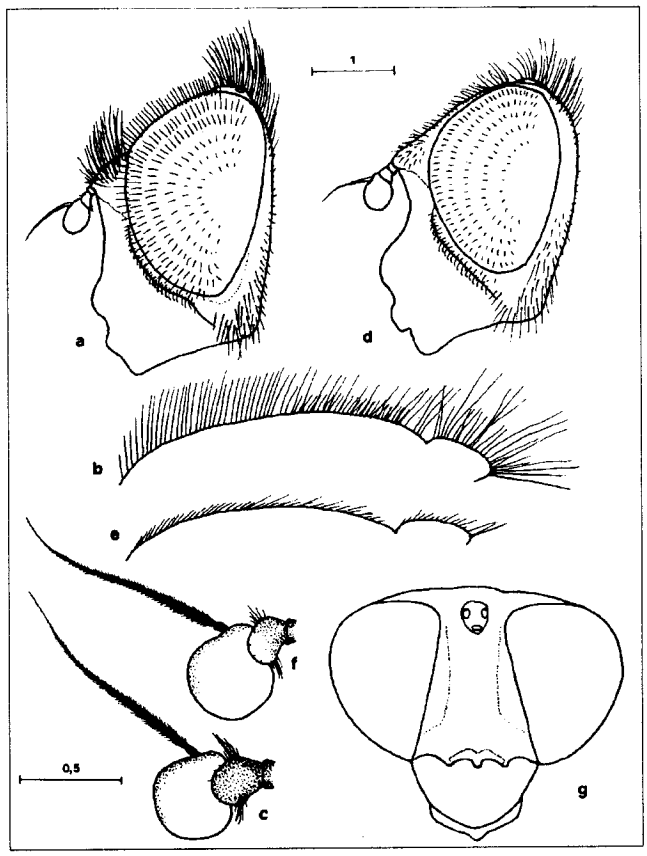


Fig.5 Cheilosia melanura rubra ssp. n. a-c: male; d-g: female. (a) head, lateral view; (b) mesonotum, lateral view; (c) right antenna, internal view; (d) head, lateral view; (e) mesonotum, lateral view; (f) right antenna, internal view; (g) head, dorsal view. Scale in mm.

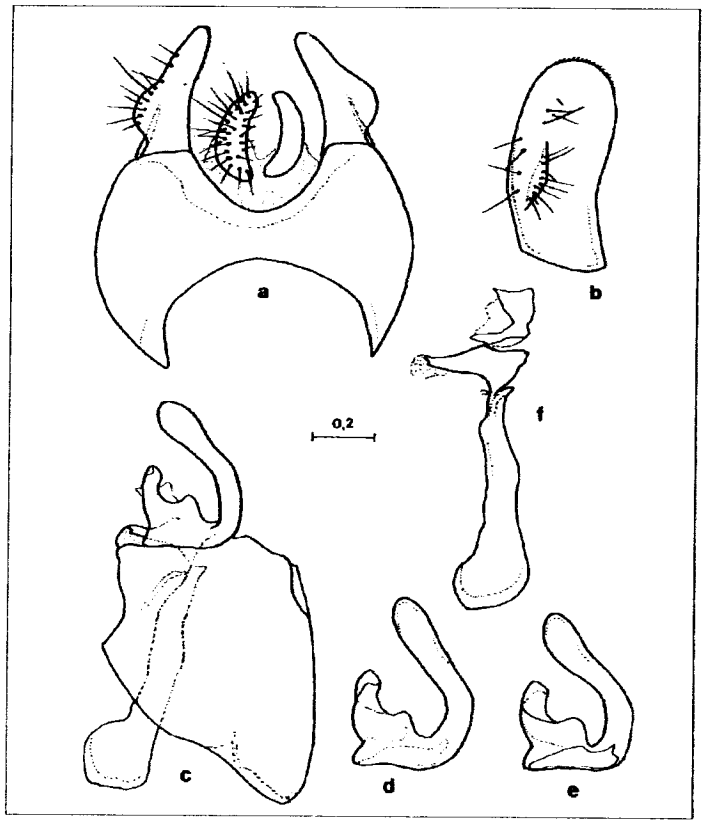


Fig.6 Cheilosia melanura rubra ssp. n., male genitalia. (a) epandrium, dorsal view; (b) right surstilus, lateral view; (c) hypandrium, lateral view; (d) lobus superior, external view; (e) lobus superior, internal view; (f) aedeagus, lateral view. Scale in mm.

57. ***Cheilosia morio*** (Zetterstedt, 1838)

UNVERIFIED REFERENCES. Blg: Bankowska, 1967 (Vitoša).

ERRONEOUS REFERENCES. Blg: Drenski, 1934 (=*aerea*).

Examined material (5m 5f; May 2/22; 700/1500 m). NEW DATA. **Slo**: Julijske Alpe (D), Pokljuka 22.v.1989, 2m, (IBNS); **BH**: Pale (E) 1913, 1f, (BHMS); **Srb**: Kopaonik (E), Samokovska reka (2) 2.v.1991, 1f; 24.v.1992, 1m; Sunčana dolina 22/23.v.1993, 2m 3f, (IBNS).

Distribution (Map 19). RANGE. Central, North and East Europe, Siberia. BALKAN PENINSULA: Slo,BH,Srb,Blg; (BT: D,E,J); (B: 4). First record for: Slo,BH,Srb.

Remarks: *C. morio* is primarily a boreal insect of North Palaearctic. This species is found only on two localities on the Balkan Peninsula, on the Alps and Kopaonik (with the record from Bosnia from the beginning of the century).

Biology. Preferred environment: coniferous forests: *Pinus* and *Picea* boreal woodlands in high mountains. Adult habitat: usually beside streams and river, flying among *Salix* branches and settling on catkins. Flowers visited: *Salix*. Flight period: early spring, May at high altitudes. Larva: found in bark wounds of pine (Tragardh, 1939, after Smith, 1979).

58. ***Cheilosia mutabilis*** (Fallen, 1817)

VERIFIED REFERENCES: Langhoffer, 1917-1923; Glumac, 1955a, 1959, 1968; Vujić & Glumac, 1994; Vujić & Šimić, 1994.

UNVERIFIED REFERENCES. BH: Strobl, 1898; Mtg: Glumac, 1956b (specimen not found in Coll. of NHMB); Blg: Bankowska, 1967: (Banderica; Strandža: Malko Tarnovo, Kočerinovo; Vitoša); Srb: Kula, 1985.

ERRONEOUS REFERENCES. Blg: Drenski, 1934 (=*aerea*).

Chilosia proxima of Drenski, 1934 (in part)

Cheilosia longula of Šimić, 1987 (in part)

Cheilosia planifacies of Šimić, 1987

Examined material (453m 70f; April 10/July 19; 0/1600 m). PUBLISHED RECORDS. Langhoffer, 1917-1923: Bakar (E) 3m 2f; Draga (?) 1m 1f, (CNHM); Drenski, 1934: Stara Planina (I) (Svoge) vi.1907, 1m (det. Drenski as *Chilosia modesta*: =*proxima*), (ZIS); Glumac, 1956a: Umag (C) 12.vi.1955, 1m (det. Glumac as *Heringia maculipennis*), (NHMB); Šimić, 1987: Durmitor (E), Drenova gora 11.vii.1983, 1f (det. Šimić as *C. longula*); Tepca 21.vi.1983, 1m (det. Šimić as *C. planifacies*), (IBNS); Vujić & Glumac, 1994: Fruška gora (A), all records (IBNS, NHMB); Vujić & Šimić, 1994: Vršačke planine (A), all records (IBNS). NEW DATA. **Slo**: Julijske Alpe (D), (2,3,5: 23.v/2.vii, 8m); Kamniške in Savinjske Alpe (D), (5,6: 16.vi/1.vii, 10m), (IBNS) **Cro**: Slano (C), 29.iv.1990, 1m, (IBNS); Samobor (A), 7m; Zagreb (A), 6m 4f; Krk (C), 2m; Bribir (E) 2f, (JLC); **BH**: Konjuh (E), 13.v/30.vii, 7m 9f; Karaula (E), 13.v.1989, 1m, (IBNS); Pale (E) (Stambulčić) v.1916, 1m; Stolac (C) 1f, (BHMS); **Mtg**: Boka Kotorska (C), (1: 4/17.v, 15m 2f); Durmitor (E), (1,4,10: 22.v/25.viii, 7m 1f), (IBNS); **Srb**: Deliblatska peščara (A), (3,5: 11/19.v, 21m 1f); Obedska bara (A), (1: 11.vi.1986, 1m); Vlašić (A), Zavlaka 12.v.1989, 2m; Kopaonik (E), (2,4,5,9,10: 27.v/24.vi, 88m); Šar-planina (F), (2,4: 27.vi/19.vii, 2m); Kučaj (H), (2,4,12: 29.iv/17.vii, 28m 10f); Žagubica (H), reka Do 14. vii.1993, 3m 1f; Bosilegrad (J), 14.vii.1989, 1f; Kukavica (J), 6.vi.1989, 1f, (IBNS); **Mac**: Baba (F), 17.vi.1990, 5m; Galičica (F), Oteševo 17.vi.1990, 2m 5f; Kožuf (F), Konsko 14.v.1990, 4m, (IBNS); Mavrovo (F) 29.vii.1964, 1f, (JLC) **Gre**: Olympos (F) (Prionia) 3/13.vi.1956, 2m 1f, (JLC).

Distribution (Map 23). RANGE. Europe, North Africa, South-West Siberia. BALKAN PENINSULA: Slo,Cro,BH,Mtg,Srb,Mac,Blg,Gre; (BT: A,C-F,H-J); (B: 1-4). First record for: Slo.

Remarks: *C. mutabilis* appears all over the Balkan Peninsula.

Biology. Preferred environment: deciduous and coniferous forests; Mediterranean maquis; shrubs; montane pastures. Adult habitat: clearings; males hover at 1-2 meters or settle on leaves of bushes. Flowers visited: Apiaceae, *Ranunculus*, *Cotinus*. Flight period: April-July. Larva: internal feeder, mining in the rhizome of *Carduus acanthoides* (Rossi, 1848).

59. ***Cheilosia nebulosa*** (Verrall, 1871)

syn. *Syrphus flavicornis* Meigen (nec Fabricius), 1822

syn. *Chilosia langhofferi* Becker, 1894

VERIFIED REFERENCES: Vujić & Glumac,1994; Vujić & Šimić, 1994.

UNVERIFIED REFERENCES. Blg: Bankowska, 1967 (Pirin) (as *langhofferi*).

ERRONEOUS REFERENCES. Cro: Langhoffer, 1917-1923 (=*brunipennis*).

Examined material (9m 10f; March 25/May 25; 100/1800m). PUBLISHED RECORDS. Langhoffer, 1917-1923: Draga (?) 5.iv.1886, 1f (det. Langhoffer as *Chilosia vernalis*), (CNHM); Vujić & Glumac, 1994: Fruška gora (A), all records (IBNS); Vujić & Šimić, 1994: Vršačke planine (A), all records (IBNS). NEW DATA. **Cro**: Draga (?) 5.iv.1886, 1m (det. Langhoffer as *Chilosia flavicornis*; nonpublished), (CNHM); **BH**: Jahorina (E), 14.v.1989, 1m, (IBNS); **Srb**: Fruška gora (A), Glavica 13.iv.1994, 1f; Potisje (A), Kanjiža 19.iv.1984, 1m; Suva planina (B), Gornja Studena 2.v.1988, 1f; Kopaonik (E), Jošanička Banja 29.iv.1987, 1m; Sunčana Dolina 23.v.1993, 1f; Kučaj (H), Demizlok 1.iv.1994, 1f, (IBNS).

Distribution (Map 48). RANGE. Europe (Great Britain through Central Europe to European part of Russia; Finland to Serbia and Bulgaria). BALKAN PENINSULA: Cro,BH,Srb,Blg; (BT: A,B,E,H,J); (2,3). First record for: Cro, BH.

Remarks: *C. nebulosa* is recorded in Pannonic Plain, Subpannonian and Moesian hills and on certain Dinaric mountains (Kopaonik, Jahorina), Carpathians and Rilo-Rhodopes.

Biology. Preferred environment: deciduous forests. Adult habitat: beside rivers and streams; males hover at 1-3 meters; settle on *Salix* catkins and branches. Flowers visited: *Salix*, *Crataegus monogyna*, *Ficaria verna*. Flight period: early spring, March-May at higher altitudes. Larva:. undescribed.

60. ***Cheilosia orthotricha*** Vujić et Claussen, 1994

VERIFIED REFERENCES: Vujić & Claussen, 1994b; Vujić & Glumac, 1994.

Chilosia chloris of Langhoffer, 1917-1923 (in part)

Examined material (70m 43f; February 25/Juny 26; 150/1300 m). PUBLISHED RECORDS. Langhoffer, 1917-1923: Sljeme (A) 30.v.1897, 1m (det. Langhoffer as *Chilosia chloris*), (CNHM); Vujić & Claussen, 1994b: all records: Cro (Papuk); BH (Konjuh; Zelengora; Maglić; Volujak; Jahorina; Sarajevo); Mtg (Bjelasica); Srb (Fruška gora; Kukavica: type locality; Bosilegrad; Kopaonik; Suva Planina; Čemernik; Stara Planina; Debeli Lug; Klisura Peka), (IBNS, NHMB, BHMS, CCC); Vujić & Glumac, 1994: Fruška gora, all records (IBNS). NEW DATA. **Srb**: Fruška gora (A), Glavica 13.iv.1994, 1f; Kučaj (H), Demizlok 1.iv.1994, 2m, (IBNS).

Distribution (Map 44). RANGE. Central Europe (Belgium through Germany, Switzerland, Czech Republic, Slovakia and Hungary to Croatia, Bosnia and Serbia). BALKAN PENINSULA: Cro,BH,Mtg,Srb; (BT: A,B,E,H,I,J); (B: 2-4).

Remarks: *C. orthotricha* is found on Pannonic and Moesian hills, and at lower altitudes of mountains in the central part of the Balkan.

Biology. Preferred environment: deciduous forests, especially oak and beech woodlands. Adult habitat: in the vicinity of streams and rivers; settle on ground or flowers of *Petasites*; males hover at 1-3 meters. Flowers visited: *Petasites, Salix, Taraxacum*. Flight period: early spring, always before *C. canicularis*; February-July at high altitudes. Larva: undescribed.

61. ***Cheilosia pagana*** (Meigen, 1822)

syn. *Cheilosia pulchripes* Loew, 1857

VERIFIED REFERENCES: Langhoffer, 1917-1923; Drenski, 1934; Glumac, 1959; Vujić & Glumac, 1994; Vujić & Šimić, 1994.

UNVERIFIED REFERENCES. BH: Strobl, 1898 (as *pulchripes*); Slo: Coe, 1960; Lambeck, 1968; Mtg: Šimić, 1987 (specimens not found in Coll. of IBNS).

Examined material (142m 56f; March 17/September 6; 50/1100 m). PUBLISHED RECORDS. Langhoffer, 1917-1923: Zagreb (A) 19.vi.1898, 2m 1f, (CNHM); Drenski, 1934: Vitoša (J) (Sofia) vi.1907, 1m, (ZIS); Vujić & Glumac, 1994: Fruška gora (A), all records (IBNS, NHMB); Vujić & Šimić, 1994: Vršačke planine (A), all records (IBNS). NEW DATA. **Slo**: Julijske Alpe (D), (2: 14.vi.1988, 1m 1f); Kamniške in Savinjske Alpe (D), (6: 16.vi.1988, 1m); Menina (E), 24.v.1989, 1m, (IBNS); Ljubljana (E), 28.iii/2.v, 2m 4f, (SNHM); Bled (D) 31.vii.1967, 2m 1f; Bohinj (D) 10.ix.1981, 1m 1f; Postojna (E) 30.vii.1967, 1m; Rupa (E) 6.ix.1981, 1m, (JLC); **Cro**: Dilj (A) Petnja 21.v.1985, 1f; Mala Kapela (E), (1: 30.iv.1990, 1m

2f) (IBNS); Plitvice, 22. vii.1986, 1m, (SNHM); Krapina (E) 1m 1f, (BHMS); Samobor (A) 19.v.1972, 1f; Zagreb (A), 3.v/3.vi, 4m 2f, (JLC); **BH**: Konjuh (E), 10.iv/13.v, 5m 2f, (IBNS); Mojmilo (E) 1912, 1m, (BHMS); **Srb**: Obedska bara (A), (1: 15.iv. 1990, 1f); Suva planina (B), (1,4,5: 2.iv/16.vii, 7m 2f); Kopaonik (E), (2,10,19-21: 29.iv/19.vii, 19m 9f); Tara (E), Rača 3.iv.1990, 1f; Debeli Lug (H) 2.v.1993, 2f; Deli Jovan (H), 27.iii.1989, 1m; Dubašnica and Kučajske planine (H), Demizlok 14.v/12.vi, 1m 1f; Klisura Peka (H), 3.v.1993, 1m; Stara Planina (I), (8,11: 12/30.iv, 4m 1f); Čemernik and Vlasinsko jezero (J), (2,6: 11.iv/4.v, 1m 1f), (IBNS).

Distribution (Map 35). RANGE. Europe, Siberia, Far East, Mongolia, Nearctic. BALKAN PENINSULA: Slo,Cro,BH,Mtg,Srb,Blg; (BT: A,B,D,E,H-J); (B: 2-4).

Remarks: *C. pagana* is recorded on Pannonic and Moesian hills and on many Balkan mountains at lower altitudes. No records have been found in the south of the Balkan Peninsula and in the Mediterranean.

Biology. Preferred environment: deciduous forests. Adult habitat: clearings in woodlands; shrubs; marsh; males hover at 1-3 meters; settle on leaves and flowers of low-growing plants. Flowers visited: *Salix*, Ranunculaceae, *Ficaria verna, Caltha palustris, Taraxacum* etc. Flight period: March/May and August-September; species with two generations. Larva: internal feeder in roots of *Anthriscus silvestris*.

62. ***Cheilosia pascuorum*** Becker, 1894

ERRONEOUS REFERENCES. Cro: Langhoffer, 1917-1923 (=*barbata*); Mtg: Šimić, 1987 (=*cynocephala*).

Cheilosia honesta of Šimić, 1987 (in part)

Examined material (40m 1f; April 9/July 9; 50/1800m). PUBLISHED RECORDS. Šimić, 1987: Durmitor (E), Škrčka jezera 5.vii.1983, 1m (det. Šimić as *C. honesta*), (IBNS). NEW DATA. **BH**: Jahorina (E), 14.v.1989, 1m; 26.vi. 1989, 1m; **Mtg**: Durmitor (E), (15,16,22,29,30: 1.vi/9.vii, 12m 1f); **Srb**: Doroslovo (A), Doroslovačka šuma 9.iv.1991, 2m; Kopaonik (E), (2,5,20,21: 1.v/21.vi, 7m); Kučaj (H), (2,4,6: 14.v/4.vi, 6m); Stara Planina (I), (10: 30.iv.1987, 1m); Bosilegrad (J), 5.v.1988, 4m; Čemernik and Vlasinsko jezero (J), Vrla 4.v.1988, 4m; **Mac**: Mavrovo (F) 30.v.1960, 1m, (all in: IBNS).

Distribution (Map 42). RANGE. Europe (Sweden, Germany, Austria, Romania, Russia), Balkan Peninsula. BALKAN PENINSULA: BH,Mtg,Srb, Mac; (BT: A,E,F,H-J); (B: 3). First record for: Balkan Peninsula (BH,Mtg,Srb, Mac).

Remarks: *C. pascuorum* is rare species on the Balkan Peninsula and only several records are registered in various types of deciduous forests (from Pannonic oak to montane beech woods).

Biology. Preferred environment: deciduous woodlands. Adult habitat: clearings, tracksides; males hover at 2-5 meters or settle on ground and flowers. Flowers visited: *Ficaria verna, Alyssum*. Flight period: early spring, April-July at higher altitudes. Larva: internal feeder in *Cynoglossum officinale* (Toševski, unpublished data).

63. ***Cheilosia pictipennis*** Egger, 1860

syn. *Cheilosia bureschi* Delkeskamp, 1942

VERIFIED REFERENCES. Blg: Delkeskamp, 1942 (as *bureschi*); Claussen, 1996a.

UNVERIFIED REFERENCES. Srb: Glumac,1955a (specimen not found in Coll. of NHMB).

ERRONEOUS REFERENCES. BH: Glumac, 1955b (=*melanura*).

Cheilosia albipila of Šimić, 1987 (in part).

Examined material (27m 4f; May 21/July 9; 700/2000 m). PUBLISHED RECORDS. Šimić, 1987: Durmitor (E), Škrčka jezera 5.vii.1983, 1m (det. Šimić as *C. albipila*), (IBNS); Blg: Claussen, 1996a: Pirin (J), (CCC). NEW DATA. **Slo**: Kamniške in Savinjske Alpe (D), Kamniška Bistrica 21.v.1989, 1f; **Mtg**: Durmitor (E), (3,15,16,22,24,25,30,32: 1.vi/9.vii, 21m 3f); **Srb**: Kopaonik (E), Samokovska reka 24.v.1992, 4m; Srebrnac 24.v.1987, 1m, (all in: IBNS).

Distribution (Map 48). RANGE. Alps (Italy, Switzerland), Balkan Peninsula (high mountains). BALKAN PENINSULA: Slo,Mtg,Srb,Blg; (BT: D,E, J); (B: 4,5). First record for: Slo,Mtg.

Remarks: *C. pictipennis* is found in the Alpine region and on few high mountains: Durmitor, Kopaonik and Pirin.

Biology. Preferred environment: from the upper altitudinal limit of high mountain forests upwards into Alpine rocks and pastures. Adult habitat: clearings and avalanches; males hover at 2-5 meters or settle on stones; females fly fast. Flowers visited: Apiaceae. Flight period: May-beginning of July. Larva: undescribed.

64. ***Cheilosia psilophthalma*** Becker, 1894

VERIFIED REFERENCES: Vujić & Šimić, 1994.

Examined material (37m 18f; April 2/July 9; 150/2200 m). PUBLISHED RECORDS. Vujić & Šimić, 1994: Vršačke planine (A), all records (IBNS). NEW DATA. **Mtg**: Durmitor (E), Suvi Klek 3.vi.1994, 3m; **Srb**: Suva planina (B), Jelašnica 2.iv.1989, 1m; Kunovica 2.iv.1992, 9m; Kopaonik (E), Samokovska reka (2) 2.v.1986, 1m; Sunčana Dolina 22/23.v.1993, 4m; Suvo Rudište 23.v.1991, 1m; Stara Planina (I), Temska 5.iv.1992, 1m; **Gre**: Verno (F), Florina/Pisoderi 18.v.1990, 1m, (all in: IBNS).

Distribution (Map 30). RANGE. Central Europe (Germany, France, Italy, Poland, former Czechoslovakia, Balkan Peninsula), east part of European Russia (Leningrad and Yaroslavl region). BALKAN PENINSULA: Mtg,Srb,Gre; (BT: A,B,E,F,I); (B: 2-5). First record for: Mtg,Gre.

Remarks: *C. psilophthalma* is recorded on the Dinaric mountains, on Stara Planina and on Moesian and Subpannonic hills.

Biology. Preferred environment: forests. Adult habitat: in the vicinity of streams, rivers; montane pastures after melting of snow; males hover at 1-2 meters; settle on ground or leaves of *Chrysosplenium alternifolium*. Flowers visited: *Salix*, *Chrysosplenium alternifolium*, *Ranunculus*. Flight period: early spring, April-July at high altitudes. Larva: undescribed.

65. ***Cheilosia praecox*** (Zetterstedt, 1843)

(sensu Claussen & Kassebeer, 1993)

syn. *Cheilosia ruralis* of authors

VERIFIED REFERENCES. (as *praecox*): Strobl, 1898; (as *ruralis*): Langhoffer, 1917-1923; Šimić, 1987; Vujić & Glumac, 1994; Vujić & Šimić, 1994.

UNVERIFIED REFERENCES (as *ruralis*). Blg: Drenski, 1934; Bankowska, 1967 (Banderica, Vitoša).

Cheilosia argentifrons of Glumac, 1959

Examined material (1863m 503f; February 21/July 9; 0/1800m). PUBLISHED RECORDS. Strobl, 1898: Rujšte (?) 1f (det. Strobl: *Chilosia praecox*), (BHMS); Langhoffer: Zagreb (A), Rijeka (C), Crikvenica (E), Senj (E), (CNHM); Glumac, 1959: Fruška gora (A) (Stražilovo) 21.iv.1956, 1m (det. Glumac as *C. argentifrons*); Šimić, 1987: Durmitor (E), all records (IBNS); Vujić & Glumac, 1994: Fruška gora (A), all records (IBNS, NHMB); Vujić & Šimić, 1994: Vršačke planine (A), all records (IBNS). NEW DATA. **Slo**: Julijske Alpe (D), (4,5,8-10: 22/23.v, 32m 8f); Kamniške in Savinjske Alpe (D), (2,3: 21/25.v, 14m), (IBNS); Ljubljana (E) 10.v, 1m, (SNHM); **Cro**: Papuk (A), 15.iv.1991, 1f; Mala Kapela (E), (1: 30.iv, 2m), (IBNS); Krapina (E) 3m 1f, (BHMS); Sljeme (A) 18/30.v, 5m 3f; Zagreb (A), 4/19.v, 1m 1f, (JLC); **BH**: Bjelašnica (E), 12.iv, 1m 1f; Grmeč (E), 30.iv, 2m 6f; Karaula (E), 13.v, 1f; Konjuh (E), 13.v, 1f; Jahorina

(E), 14.v, 1m; Javor (E), (1: 10.iv, 27m); Javornik (E), Stupari 10.iv, 7m; Maglić (E), Perućica 11.iv, 1m; Prenj (E), 16.v, 1f; Volujak (E), (1,2: 15.v, 1m 2f), (IBNS); Sarajevo (E) 1f; Višegrad (E) 1m, (BHMS); **Mtg**: Kanjon Morače (C), 4.iv, 10m 9f; Skadarsko jezero (C), Rumija 21.ii/5.iv, 8m 9f; Bjelasica (E), (1: 4/28.iv, 9m 1f); Durmitor (E), (3,15: 2.vi/4.vii, 3m 3f), (IBNS); **Srb**: Fruška gora (A), (5: 13.iv, 6m 6f); Cer (A), Petkovica 9.iv, 6m; Doroslovo (A), Doroslovačka šuma 9.iv, 2m 1f; Obedska bara (A), (1: 15/23.iv, 4m); Potisje (A), (4: 9.vii, 2m); Vlašić (A), Zavlaka 9.iv, 26m 1f; Binačka Morava (B), 19.iv, 27m 7f; Selićevica (B), 2.iv, 2m; Suva planina (B), 2.iv/2.v, 138m 43f; Kopaonik (E), 26.iv./23.vi, 256m 85f; Povlen (E), 3.iv, 2m 1f; Tara (E), (1,2: 3/27.iv, 3m); Žljeb (E), 3.v, 35m 14f; Debeli Lug (H), 28.iv, 14m 1f; Deli Jovan (H), 27.iii.1989, 17m; Kučaj (H), 29.iii/15.v, 77m 23f; Rtanj (H), 1.v, 7m 2f; Stara planina (I), 12.iv/30.v, 417m 82f; Bosilegrad (J), (1-3: 31.iii, 33m 16f); Čemernik and Vlasinsko jezero (J), 11.iv/4.v, 187m 43f; Grdelička klisura (J), Jelašnica 1.iv, 22m 2f; Kukavica (J), (1: 30.iii, 28m 4f); Pčinja (J), 1.iv, 10m; Šar-planina (F), (5: 18.iv, 2m), (IBNS); **Mac**: Kriva Lakavica (B-1): 13.iv, 1m; Baba (F), 11.iii/20.iv, 5m 3f; Galičica (F), 8.v, 1f; Kožuf (F), Konsko 14.v, 1m; Radika (F), 17.iv, 36m 6f; Struga (F), 7.v, 2f; Mavrovo (F) 30.v.1960, 4f; Radika 31.v.1960, 2m 1f; Ogražden (J) 30.vi.1959, 1f, (IBNS); **Blg**: Pirin (J) 21.v.1982, 1m, (JLC); **Gre**: Kastoria/Neapoli (F), 21.iv, 2m 3f; Neapoli (F), 21.iv, 2f; Olympos (F), 14.iii/23.iv, 3m 1f; Verno (F), (1,2: 21.iv/11.v, 19m 13f); Pindos (G), (1: 13.v, 2m 1f); Drama (J), 15.iii, 3m 2f, (IBNS); Euboea (C-1) (Seta) 27.iv.1987, 6m 3f; Peloponesus (G), (Taygetos-Sparta) 6.v.1990, 1m 4f; (Taygetos-Tripi) 5.v.1990, 1f, (JLC).

Distribution (Map 49). RANGE. Europe, Siberia. BALKAN PENINSULA: Slo,Cro,BH,Mtg, Srb,Mac,Blg,Gre; (BT: A-J); (B: 1-5). First record for: Slo,Mac.

Remarks: *C. praecox* is the most frequent and the most numerous species in investigated region. It is registered in all types of forest communities on the Balkan Peninsula.

Biology. Preferred environment: forests. Adult habitat: beside streams and rivers; clearings, tracksides; male hover at 1-2 meters or settle on ground and low-growing vegetation. Flowers visited: *Salix*, *Chrysosplenium alternifolium, Caltha, Anemone*, *Ficaria verna* etc. Flight period: early spring, February-July at higher altitudes. Larva: eggs were laid in the rosettes of *Hieracium* sp. (Claussen, 1980).

66. ***Cheilosia proxima*** (Zetterstedt, 1843)

syn. *Cheilosia decidua* Verrall (nec Egger), 1870

VERIFIED REFERENCES: Glumac, 1955a (in part); 1955b; 1959; 1968; Šimić, 1987; Vujić & Glumac, 1994, Vujić & Šimić, 1994.

UNVERIFIED REFERENCES. Blg: Bankowska, 1967 (Pirin, Vitoša, Stara Planina); Srb: Kula, 1985.

ERRONEOUS REFERENCES. Cro: Langhoffer, 1917-1923 (=*aerea*); Blg: Drenski, 1934 (=*mutabilis*; =*barbata*).

Examined material (256m 58f; March 25/August 28; 50/1500 m). PUBLISHED RECORDS. Glumac, 1955a: Beograd (A) (Košutnjak) 13.iv.1952, 1m, (NHMB); Glumac, 1955b: Sarajevo (E) (Ali Pašin most) 1914, 2f, (BHMS); Glumac, 1959: Fruška gora (A), all records, (NHMB); Glumac, 1968: Radoviš (B-1); Bukovik (F); Ohrid (F); Oteševo (F); Struga (F); Kočanska reka (J); Ogražden (J); Osogovske planine (J); Nevićanska reka; Urošcvska reka, (IBNS); Šimić, 1987: Durmitor (E), Donja Bukovica 28.viii.1984, 4m (3m det. Šimić as *C. proxima*, 1m as *C. vernalis*), (IBNS); Vujić & Glumac, 1994: Fruška gora (A), all records (IBNS); Vujić & Šimić, 1994: Vršačke planine (A), all records (IBNS). NEW DATA. **Slo**: Julijske Alpe (D), (7,9: 18.vi/2.vii, 1m); Kamniške in Savinjske Alpe (D), (2: 16.vi, 1m), (IBNS); Ljubelj (D) 15.v, 1m, (JLC); **Cro**: Krapina (E) 1f, (BHMS); Velebit (E), 24.vii, 1f, (JLC); **BH**: Grmeč (E), 30.iv, 1m; Javor (E), (1: 10.iv, 9m); Konjuh (E), 13.v.1989, 2m 2f, (IBNS); **Mtg**: Kanjon Morače (C), 4/28.iv, 16m 3f; Durmitor (E), (5,14,15,25,32: 1.vi/ 23.viii, 2m 4f), (IBNS); **Srb**: Bač (A), 13.vii, 1m; Deliblatska peščara (A), (1,2: 21.iv/7.viii, 15m); Dilj (A), 21.viii, 1m; Fruška gora (A), (5: 25.iv, 6m); Koviljski rit (A), 24.iv, 2m 1f; Obedska bara (A), (1: 15/23.iv, 9m); Vlašić (A), 9.iv, 3m 1f; Vršačke planine (A), (1: 23.vi, 1m); Suva planina (A), (2: 2/28.v, 1m 2f); Svrljiške planine (B), (1,4: 9/12.vii, 6m 1f); Kopaonik (E), (2,4,5,10,23: 2.v/17.viii, 10m 2f); Povlen (E), 3.iv, 2m; Tara (E), (1: 27.iv, 2m); Šar-planina (F), (2,4: 27.vi/19.vii, 1m 1f); Kučaj (H), (4,11: 3.vi/26.vii, 7m); Stara Planina (I), (3,5,10,11: 30.iv/25.vi, 5m 1f); Čemernik and Vlasinsko jezero (J), (6: 4.v, 3m), (IBNS) **Mac**: Baba (F), 20.iv/17.vi, 23m 19f; Galičica (F), (2: 17.vi, 1m 1f); Kožuf (F), (1,2: 14.v/17.vii, 7m 3f), (IBNS); **Gre**: Kastoria- Neapoli (F), 21.iv, 20m 6f; Verno (F), Trigono 11.v, 3m 2f, (IBNS).

Distribution (Map 34). RANGE. Europe, Siberia. BALKAN PENINSULA: Slo,Cro,BH,Mtg, Srb,Mac,Blg,Gre; (BT: A-F,H-J); (B: 2-4). First record for: Slo,Cro,Gre.

Remarks: *C. proxima* is found over the whole territory of the Balkan Peninsula, in different forest communities, except in southern Greece.

Biology. Preferred environment: forests. Adult habitat: woodland edges, small clearings; males hover at 1-3 meters, settle on leaves of bushes and trees. Flowers visited: Apiaceae, *Euphorbia*. Flight period: end of March-August; one or two generations. Larva: mines roots of *Cirsium palustre* (Rotheray, 1988).

67. ***Cheilosia rhynchops*** Egger, 1860

VERIFIED REFERENCES: Langhoffer, 1917-1923; Šimić, 1987.

UNVERIFIED REFERENCES. Blg: Bankowska, 1967 (Rila, Vitoša).

Examined material (218m 137f; May 2/July 17; 700/2000 m). PUBLISHED RECORDS. Langhoffer, 1917-1923: Risnjak (E), 1f (det. Langhoffer as *Chilosia rhynchops*), (CNHM); Drenski, 1934: Rila (J), 1m (det. Drenski as *Chilosia vulpina*), (ZIS); Šimić, 1987: Durmitor (E), Škrčka jezera 5.vii.1983, 1m 1f (det. Šimić as *C. rhynchops*), (IBNS). NEW DATA. **Slo**: Julijske Alpe (D), (3,5,8-10: 22.v/18 vi: 43m 7f); Kamniške in Savinjske Alpe (D), (2-4: 21/25.v, 10m 1f); Menina (E), 24.v.1989, 4m 2f, (IBNS); **Cro**: Gorski Kotar (E), 27.v.1990, 6m 2f, (IBNS); **BH**: Jahorina (E), 14.v.1989, 7m 5f; 14.vi.1991, 2f; Volujak (E), (2: 15.v/27.vi, 1m 1f), (IBNS); Sarajevo (E), Bistrica 1m, (BHMS); **Mtg**: Durmitor (E), (13,15,16,28-30: 30.vi/9.vii, 25m 20f), (IBNS); **Srb**: Kopaonik (E), (3,6,7,11-13,21-23,26: 2v/23.vi, 93m 78f); Stara Planina (I), (1,3,11: 28.v/26.vi, 8m 15f), (IBNS); **Gre**: Verno (F), (2: 11.v.1990, 17m 2f), (IBNS).

Distribution (Map 46). RANGE. Central Europe (high mountains). BALKAN PENINSULA: Slo,Cro,BH,Mtg,Srb,Blg,Gre; (BT: D-F,I,J); (B: 3,4). First record for: Slo,BH,Srb,Gre.

Remarks: *C. rhynchops* is registered on high altitudes of the Alps, Dinaric mountains, Stara Planina and Rilo-Rhodopes.

Biology. Preferred environment: beech and coniferous forests. Adult habitat: small patches in woodlands; clearings; along streams and rivers; settle on leaves of *Caltha*, *Petasytes* etc. Flowers visited: *Myosotis silvatica, Caltha palustris, Ranunculus*. Flight period: May-July. Larva: undescribed.

68. ***Cheilosia rufimana*** Becker, 1894

UNVERIFIED REFERENCES. Blg: Bankovska, 1967 (Vitoša, Pirin).

Examined material (24m 13f; May 2/June 22; 700/1500 m). NEW DATA. **BH**: Karaula (E), 13.v.1989, 1m; Konjuh (E), 13.v.1989, 3f; **Srb**: Kopaonik (E), (6-8,20,21,26: 2.v/22.vi, 23m 10f), (IBNS).

Distribution (Map 50). RANGE. North and Central Europe (Sweden, Finland, Denmark, Germany, Poland, Belgium, Switzerland, Romania), Balkan Peninsula. BALKAN PENINSULA: BH,Srb,Blg; (BT: E,J); (B: 3). First record for: BH,Srb.

Remarks: Rare species, found only on several north Dinaric mountains besides the unchecked records from Rilo-Rhodopes.

Biology. Preferred environment: deciduous forests. Adult habitat: clearings in beech woodlands, beside rivers and streams; males hover at 2-6 meters and settle on leaves or ground. Flowers visited: *Caltha palustris, Taraxacum, Salix*. Flight period: May-June. Larva: undescribed.

69. ***Cheilosia schnabli*** Becker, 1894

syn. *Chilosia nigritarsis* Strobl, 1898

VERIFIED REFERENCES: Strobl, 1898 (as *nigritarsis* forma of *schnabli*); Vujić & Glumac, 1994; Vujić & Šimić, 1994.

UNVERIFIED REFERENCES. Mtg: Glumac, 1956b (material not found in Coll. of NHMB).

Examined material (28m 9f; May 11/July 8; 100/400 m). PUBLISHED RECORDS. Strobl, 1898: Derventa (A) 1f (det. Strobl as *Chilosia schnabli*) (BHMS); Vujić & Glumac, 1994: Fruška gora (A), all records (IBNS); Vujić & Šimić, 1994: Vršačke planine (A), all records (IBNS). NEW DATA. **Srb**: Juhor (B) (Kolare-Dobre vode) 8.vii.1984, 1f; **Gre**: Verno (F), Trigono 11.v. 1990, 1m, (IBNS).

Distribution (Map 45). RANGE. Caucasus, Balkan Peninsula. BALKAN PENINSULA: BH,Mtg,Srb,Gre; (BT: A,B,F); (B: 2,3). First record for: Gre.

Remarks: *C. schnabli* is registered only on the Caucasus and Balkan Peninsula. It can be defined as Balkan-Caucasian endemic. This species is found on several low mountains of Subpannonic and Moesian regions and on south Dinaric mountains.

Biology. Preferred environment: deciduous forests, usually oak woodlands (not found in same localities with *C. impressa*). Adult habitat: pastures; clearings; open grounds; males hover at 1-3 meters; settle on leaves or flowers. Flowers visited: *Ranunculus steveni*, *Euphorbia cyparissias*. Flight period: May-July. Larva: undescribed.

70. ***Cheilosia scutellata*** (Fallen, 1817)

VERIFIED REFERENCES: Strobl, 1898; Langhoffer, 1917-1923; Glumac, 1955a, 1956b, 1959, 1968; Šimić, 1987; Vujić & Glumac, 1994; Vujić & Šimić, 1994.

UNVERIFIED REFERENCES. Slo, Mtg, Srb: Coc, 1960; Blg: Bankowska, 1967 (Rodopi, Strandža).

Cheilosia longula of Šimić, 1987 (in part)

Chilosia sentellata of Drenski, 1934

Examined material (158m 121f; April 29/August 28; 0/1800 m). PUBLISHED RECORDS. Strobl, 1898: *Chilosia scutellata*: Ivan planina (E) 1m, (BHMS); Langhoffer, 1917-1923: *Chilosia scutellata*: Gospić (E) 1f Mrzla Vodica (E) 1m; Pregrada 1f; Senj (E) 1m; Draga (?) 1m, (CNHM); Drenski, 1934: Timja (?) 1m (det. Drenski as *Chilosia sentellata*) (ZIS); Glumac,

1955a; 1956b; 1959; 1968: all records (IBNS, NHMB); Šimić, 1987: all records of *C. scutellata*; Durmitor (E) Drenova gora 11.vii.1983, 1f (det. Šimić as *C. longula*), (IBNS); Vujić & Glumac, 1994: all records (IBNS, NHMB); Vujić & Šimić, 1994: all records (IBNS). NEW DATA. **Slo**: Bohinj (D) 1m 3f; Bovec (D) 1m, (JLC); **Cro**: Krapina (E) 12.vi.1910, 1m, (BHMS); Omiš (C) 1m; Bribir (E) 1m 2f; Velebit (E), (Brušane) 1m; (Oštarije) 2m 8f; (Štirovača) 2m; Slunj (E) 1f, (JLC); **BH**: Konjuh (E), 13.v.1989, 1f; 25.vi.1989, 5m 2f; Javor (E), 30.vii.1989, 1m; Volujak (E), 15.v.1989, 1m, (IBNS); Jablanica (E) 1902, 3m; Prača (E) (Renovica) 1912, 1f; Sarajevo (E) (Lukavica) 1912, 1f; Treska 1912, 1f, (BHMS); **Mtg**: Boka Kotorska (C), 4.v/25.viii, 2m 1f; Durmitor (E), (4,5, 11,14,15,20,21,31,32: 8m 15f), (IBNS); **Srb**: Deliblatska peščara (A), Mramorak 22.v.1982, 4m; Rošijana 3.vi.1982, 1f; 17.vii.1983, 1f; Vlašić (A) Zavlaka 12.v.1989, 1m; Svrljiške planine (B), (1,3,4: 3m 3f); Goč (B) (Dobre vode) 8/11.viii.1983, 1m 1f; Kopaonik (E), (5,16,18,20-22,25,26: 29.iv/4.viii, 15m 17f); Tara (E) 12/20.vii.1985, 5m 14f; Kokin Brod (E) 1.vii.1983, 1f; Šar-planina (F), (1,2: 17.vii/6.viii, 12m 11f); Kučaj (H), (4,7,8,10-12: 29.iv/12.viii, 61m 20f); Žagubica (H) (reka Do) 14.vii.1993, 2m; Stara Planina (I), (1,3,4,10: 4m 1f); Vlasinsko jezero and Čemernik (J), (1,5: 20/21.vii.1993, 5m 4f), (IBNS); **Mac**: Kožuf (F), (1,2: 11/16.vii.1m 3f); Bačije 14.vi.1975, 4m 2f, (IBNS); Mavrovo (F) 29.vii.1964, 1f; 1.viii.1964, 1m, (JLC); **Gre**: Euboea (C-1) (Steini) 9.vi.1983, 1m; Pindos (G) (Katara) 5/8.viii.1963, 2f, (JLC).

Distribution (Map 31). RANGE. Palaearctic. BALKAN PENINSULA: Slo,Cro,BH,Mtg,Srb,Mac,Blg,Gre; (BT: A-J); (B: 1-4).

Remarks: *C. scutellata* is species with very wide range occupies the greater part of Palaeartic. It appears on the whole Balkan Peninsula.

Biology. Preferred environment: all type of forest. Adult habitat: clearings, tracksides, woodlands edges; fly low, settle on leaves and flowers of Apiaceae. Flowers visited: many species; predominantly Apiaceae. Flight period: end of April-end of August. Larva: developing in the tissues of basidiomycete fungi (*Boletus, Suillus*).

71. ***Cheilosia semifasciata*** Becker, 1894

VERIFIED REFERENCES: Šimić, 1987; Vujić & Glumac, 1994; Vujić & Šimić, 1994.

UNVERIFIED REFERENCES. Blg: Bankowska, 1967 (Vitoša).

Cheilosia fasciata of Šimić, 1987

Cheilosia rhynchops of Šimić, 1987

Examined material (191m 23f; March 14/July 7; 150/1800 m). PUBLISHED RECORDS. Šimić, 1987: *C. semifasciata*: all records; Durmitor (E), Luke 30.vi.1985, 6m (det. Šimić as *C. fasciata*); Škrčka jezera 5.vii.1983, 2m (det. Šimić as *C. rhynchops*), (IBNS); Vujić & Glumac, 1994: Fruška gora (A), all records (IBNS); Vujić & Šimić, 1994: Vršačke planine (A), all records

(IBNS). NEW DATA. **BH**: Grmeč (E), 30.iv.1991, 3m; Volujak (E), 27.vi.1989, 1m; **Mtg**: Bjelasica (E), (1: 28.iv.1990, 1f); Durmitor (E), (13,25: 29.vi/6vii, 5m 2f); **Srb**: Suva planina (B), Čukljenik 9.iv.1988, 1m; Jelašnica 13.iv.1991, 1m; Kopaonik (E), (3,4,10,21: 1.v/22.vi, 41m 4f); Debeli Lug (H), 28.iv.1989, 1m; Deli Jovan (H), 27.iii.1989, 1m; Kučaj (H), (4: 31.iv.1989, 11m); Rtanj (H), 1.v.1991, 5m; Stara Planina (I), (5,6,9,10,11: 3.iv/29.v, 25m 3f); Grdelička klisura (J), 1.iv.1989, 1m; Kukavica (J), (1: 30.iii.1989, 3m); Pčinja (J), 1.iv. 1989, 3m; **Mac**: Kriva Lakavica (B-1), 13.iv.1987, 30m 5f; Kofuf (F), Konsko 15.iv.1987, 2m; **Gre**: Olympos (F), 14.iii.1990, 1m, (all in: IBNS).

Distribution (Map 29). RANGE. Central, North and West Europe. BALKAN PENINSULA: BH,Mtg,Srb,Mac,Blg,Gre; (BT: A,B,E,F,H-J); (B: 2,3). First record for: BH,Mac,Gre.

Remarks: *C. semifasciata* is registered in the central part of the Balkan Peninsula, from the Pannonic hills to the South Dinaric mountains.

Biology. Preferred environment: deciduous forests, especially beech woodlands. Adult habitat: clearings along streams, in the woods; fly low among vegetation, males hover at 1-3 meters; settle on foliage of grasses or on ground in sun. Flowers visited: *Ranunculus*, *Sedum*. Flight period: March-beginning of July at higher altitudes. Larva: leaf-mining, the food plants belong to Crassulaceae (*Umbilicus rupestris*, *Sedum telephium*); larva described by Rotheray (1988).

72. ***Cheilosia soror*** (Zetterstedt, 1843)

VERIFIED REFERENCES: Strobl, 1902; Langhoffer, 1917-1923; Drenski, 1934 (in part); Glumac, 1955a, 1955b, 1956b, 1959, 1968; Šimić & Vujić, 1984; Šimić, 1987; Vujić & Glumac, 1994 (as *rufipes*); Vujić & Šimić, 1994.

UNVERIFIED REFERENCES. BH: Strobl, 1898; Slo, Srb: Coe, 1960; Slo: Lambeck, 1968; Srb,BH: Kula, 1985.

Chilosia gagatea of Drenski, 1934

Chilosia antiqua of Drenski, 1934 (in part)

Examined material (116m 97f; March 9/August 26; 0/1300 m). PUBLISHED RECORDS. Strobl, 1902: Požarevac 2f, (BHMS); Langhoffer, 1917-1923: Zagreb (A); Rijeka (C); Krivi Put (E); Plitvice (E); Prozor (E), (CNHM); Drenski, 1934: Lozenska planina (I) (Germanski Manastir) 18.viii.1914, 1m (det. Drenski as *Chilosia gagatea*); Vitoša (J) (Sofia).vii.1907, 2m 1f (1m det. Drenski as *Chilosia antiqua*, 1m as *C. gagatea*, 1f as *C. soror*) (ZIS); Glumac, 1955a, 1955b, 1956b, 1959, 1968: all records (IBNS, NHMB, BHMS); Šimić & Vujić, 1984: Trogir (C) 07/08 1978, 1f, (IBNS); Šimić, 1987: all records (IBNS); Vujić & Glumac, 1994 (as *rufipes*): all records: (IBNS, NHMB); Vujić & Šimić, 1994: all records (IBNS). NEW DATA. **Slo**: Bled

(D) 2m; Bohinj (D) 10.ix.1981, 3f, (JLC); **Cro**: Krapina (E) 1m 3f, (BHMS); Sljeme (A) 1m 1f; Zagreb (A), 4m; Zelina (A) 1m; Omiš (C) 7m 13f; Rovinj (C) 1m 1f; 5.v.1983, 1m; Velebit (E) 2m, (JLC); **BH**: Javor (E), (1: 30.vii.1989, 6m 2f), (IBNS); Jablanica (E) 2m 2f; Krupac (E) 1f; Trebević (E) 1f; Sarajevo (E) (Ilidže) 1m 4f; Zrmanja (C) (vrelo) 12.vii.1990, 2m 1f, (BHMS); **Mtg**: Boka Kotorska (C), (1: 4.v/25.viii, 3m 6f); Durmitor (E), (9,14,15: 17/28.viii, 6f), (IBNS); **Srb**: Deliblatska peščara (A), Flamunda; Šušara; Rošijana; Mramorak 22.v/9.vi, 8m 4f; Obedska bara (A), Obrež 26.viii.1989, 1f; Svrljiške planine (B), (1,3: 11/12.vii, 3f); Kokin Brod (E) 1f; Tara (E) (Vučjak) 13.vii.1985, 1f; Kučaj (H), (4,5,7,10-12: 21m 9f); Stara Planina (I), Zavojsko jezero 13.vii.1992, 1f; Vlasinsko jezero and Čemernik (J), (5: 1/5.viii.1991, 1m), (IBNS); **Mac**: Galičica (F), Otešcvo 17.vi.1990, 3f; Kožuf (F), Konsko 14.v.1990, 1m; 19.vi. 1990, 1m; 11-18.vii.1990, 3m 1f, (IBNS); Baba (F) (Otešcvo) 10/13.viii.1963, 3m 7f; Mavrovo (F) 29.vii.1964, 2m, (JLC); **Gre**: Pindos (G) (Katara) 5/8. viii.1963, 2m; Peloponesus (G) (Taygetos-Sparta) 6.v.1990, 1f, (JLC).

Distribution (Map 41). RANGE. Palaearctic. BALKAN PENINSULA: Slo,Cro,BH,Mtg,Srb, Mac,Blg,Gre; (BT: A-J); (1-4).

Remarks: *C. soror* is distributed all over the Balkan Peninsula, from the sea coast, over mountains to the Pannonic Plain.

Biology. Preferred environment: from Mediterranean maquis to European coniferous forest. Adult habitat: tracks, clearings; fly low, settle on shrubs and vegetation. Flowers visited: Apiaceae, *Crataegus*, *Ranunculus*. Flight period: March-August. Larva: developing in the tissues of various mushrooms (*Boletus, Gyroporus, Leccinium, Pholiota, Suillus, Xerocomus*).

73. ***Cheilosia subpictipennis*** Claussen, 1996

VERIFIED REFERENCES: Claussen, 1996a.

Examined material (6m 6f; March 26/June 13; 0/700 m). PUBLISHED RECORDS: Claussen, 1996a: Greece, Olympos (F), (CCC). NEW DATA. **Slo**: Julijske Alpe (D), Vršič-Kranjska Gora 23.v.1989, 1f, (IBNS); Izola (C) (Strunjan) 26.iii.1972, 4m 1f, (SNHM); **Cro**: Krapina (E) 2m, (BHMS); **Mac**: Kožuf (F) (Konsko) 13.vi.1975, 4f, (IBNS).

Distribution (Map 48). RANGE. South and Central Europe (Germany, France, Austria, Switzerland, Italy, Balkan Peninsula). BALKAN PENINSULA: Slo,Cro,Mac,Gre; (BT: C-F); (B: 2,3). First record for: Slo,Cro,Mac.

Remarks: *C. subpictipennis* is recorded on only few localities near the sea coast and in the south of the Balkan Peninsula.

Biology. Preferred environment: deciduous woodlands. Adult habitat: tracksides and clearings; males hover at 2-4 meters; fly fast and settle on leaves of shrubs. Flight period: spring species; March-June at higher altitudes. Larva: undescribed.

74. ***Cheilosia uviformis*** Becker, 1894

syn. *Cheilosia argentifrons* Hellen, 1913

VERIFIED REFERENCES: Vujić & Glumac, 1994.

ERRONEOUS REFERENCES. Srb: (as *argentifrons*) Glumac, 1959 (=*praecox*).

Examined material (7m 1f; March 22/May 22; 100/1000 m). PUBLISHED RECORDS. Vujić & Glumac, 1994: Fruška gora (A), all records (IBNS). NEW DATA. **Slo**: Julijske Alpe (D), Pokljuka 22.v.1989, 1m; **Srb**: Kopaonik (E), Samokovska reka (2) 2.v.1986, 2m; Stara Planina (I), Temska/Topli Do 30.iv.1987, 2m; (all in: IBNS).

Distribution (Map 49). RANGE. Europe (Great Britain through Central Europe to Serbia; Sweden to France). BALKAN PENINSULA: Slo,Srb; (BT: A,D,E,I); (B: 3,4). First record for: Slo.

Remarks: *C. uviformis* is found on several mountains, from the Pannonic region (Fruška gora), over Kopaonik and Stara Planina to the Alps.

Biology. Preferred environment: deciduous woodlands. Adult habitat: clearings; males hover at great height 3-5 meters; in lower temperature settle on low-growing vegetation or *Salix* catkins. Flowers visited: *Salix*, *Caltha palustris*. Flight period: very early spring, March-May at higher altitudes. Larva: undescribed.

75. ***Cheilosia variabilis*** (Panzer, 1798)

VERIFIED REFERENCES. Strobl, 1898; Glumac, 1955a, 1959, 1968; Vujić & Glumac, 1994; Vujić & Šimić, 1994.

UNVERIFIED REFERENCES. Blg: Bankowska, 1967 (Pirin, Vitoša); Srb, BH: Kula, 1985; Slo: Coe, 1960.

Chilosia vulpina of Drenski, 1934 (in part)

Cheilosia intonsa of Glumac, 1955b (in part)

Examined material (493m 93f; April 5/August 11; 0/1700 m). PUBLISHED RECORDS. Strobl, 1898: Jablanica (E) 1m 2f, (BHMS); Langhoffer, 1917-1923: Ivančica (A); Papuk (A) (Jankovac); Samobor (A) (Rude); Zagreb (A); Klek (E), (CNHM); Drenski, 1934: Rodopi (J)

(Sjutkja) 7.viii.1925, 1f (det. Drenski as *Chilosia vulpina*); C. Bare (?) 1f (det. Drenski: *Chilosia vulpina*), (ZIS); Glumac, 1955b: Pazarić (E) 1912, 1m (det. Glumac as *C. intonsa*), (BHMS); Glumac, 1955a; 1959; 1968: all records (IBNS, NHMB); Šimić, 1987: all records (IBNS); Vujić & Glumac, 1994: all records (IBNS, HNMB); Vujić & Šimić, 1994: all records (IBNS). NEW DATA. **Slo**: Julijske Alpe (D) 23.v/2.vii, 31m 6f; Kamniške in Savinjske Alpe (D) 25.v/1.vii, 23m 6f; Menina (E) 24.v. 10m, (IBNS); Ig (E) (Iški Vintgar) 1m; Turjak (E) 1f, (SNHM); Idrija (E) 1m; Metlika (E) 1m; Rupa (E) 1f, (JLC); **Cro**: Krapina (E) 3m, (BHMS); Samobor (A) 1m 1f; Sljeme (A) 3m 7f; Zagreb (A), 9m 3f; Velebit (E) (Oštarije) 2m 1f, (JLC); **BH**: Bjelašnica (E) 16.v, 1m; Grmeč (E) 29.v, 3m; Jahorina (E) 14.v/26.vi, 5m 1f; Javor (E) 10.iv/30.vii, 15m 5f; Javornik (E) 10.iv, 1m; Konjuh (E) 13.v/25.vi, 6m 2f; Prenj (E) 16.v, 2m 1f; Volujak (E) 15.v/27.vi, 2m 1f, (IBNS); Pale (E) 1912, 1f; Ivan planina (E) 1911, 1m; Banja stijena (?) 1912, 1m; Crkvice (E) 1918, 1f; Treska (?) 2m, (BHMS); **Mtg**: Durmitor (E) 22.v/10.vii, 37m 11f, (IBNS); **Srb**: Cer (A) 9.iv, 14m; Obedska bara (A) 15/23.iv, 11m; Vlašić (A) 5.iv/12.v, 12m 1f; Suva planina (B) 28.v, 20m; Kopaonik (E) 1.v/19.vii, 97m 9f; Tara (E) 12/20.vii.1982, 16m 6f; Šar-planina (F) 27/29.vi, 4m 2f; Debeli Lug (H) 28.iv, 24m 5f; Klisura Peka (H) 3.v, 1m; Kučaj (H) 14.iv/1.v, 26m 5f; Rtanj (H) 1.v, 2m; Žagubica (H) 14.vii, 3m; Stara Planina (I) 8.v/25.vi, 17m 2f; Kukavica (J) 6.vi/18.vii, 3m 1f; Vlasinsko jezero (J) 1/5.viii, 3m 1f, (IBNS); **Mac**: Kožuf (F) 14.v/19.vi, 3m 1f, (IBNS).

Distribution (Map 24). RANGE. Europe, Siberia. BALKAN PENINSULA: Slo,Cro,BH,Mtg,Srb,Mac,Blg; (BT: A-F,H-J); (B: 2-5).

Remarks: *C. variabilis* is one of the most abundant species on the Balkan Peninsula. It appears in almost all types of forest communities, except in the south of Greece and in the Mediterranean area.

Biology. Preferred environment: deciduous forest, especially oak and beech woodlands. Adult habitat: edges of clearings, tracksides; settle on leaves of bushes in the sun; males hover at 1-2 meters. Flowers visited: Apiaceae, *Ranunculus*, *Euphorbia*, etc. Flight period: April-August at high altitudes. Larva: mines the roots of *Scrophularia nodosa* (Dušek & Laska, 1962).

76. ***Cheilosia velutina*** Loew, 1840

UNVERIFIED REFERENCES. Blg: Bankowska, 1967 (?); Mac: Coe, 1960 (?).

ERRONEOUS REFERENCES. Blg: Drenski, 1934 (=*aerea*).

Examined material (1m; -; 500m). NEW DATA. **BH**: Kijevo (E) 1912, 1m (BHMS).

Distribution (Map 47). RANGE. Europe, Siberia. BALKAN PENINSULA: BH; (BT: E); (B: 3). First verified record for: Balkan Peninsula (BH)

Remarks: *C. velutina* is registered in the larger part of Europe (especially in the northern and central parts). The only reliable record of this species on the Balkan Peninsula comes from the Dinaric mountains from 1912. In literature it is reported for Bulgaria, but the examination of the material from the Drenski's collection has indicated that specimens belong to related species *C. aerea*. Bankowska (1967) reported the records of three females in Bulgaria (on the mountains of Pirin and Rilo-Rhodopes). A separation of *C. velutina* female from the samples of summer generation of species *C. aerea* is very difficult and therefore put the previously mentioned data in question as well as the record of one female in Macedonia (Coe, 1960). Only additional research can answer the question whether this species has disappeared from the Balkan or is extremely rare in this region.

Biology (after Torp, 1994). Flowers visited: *Cicuta virosa, Pimpinella saxigraga, Berula erecta, Angelica sylvestris, Daucus carota, Cirsium arvense,* and many other species. Flight period: late June to late August, with the peak in late July to early August. Larva: phytophagous, mining in the rhizome of *Scrophularia nodosa* (Brischke, 1880 as *gigantea*).

77. ***Cheilosia vernalis*** (Fallen, 1817)

VERIFIED REFERENCES: Langhoffer, 1917-1923; Glumac,1959; Šimić, 1987; Vujić & Glumac, 1994; Vujić & Šimić, 1994.

UNVERIFIED REFERENCES. Cro: Glumac, 1956a; Blg: Bankowska, 1967 (Pirin).

ERRONEOUS REFERENCES. Blg: Drenski, 1934 (=*vulpina*); Srb: Glumac, 1955a (=*aerea*) (in part); BH: Glumac, 1955b (=*bergestammi*).

Cheilosia brachysoma of Glumac, 1959

Remarks: greatly variable species with distinct seasonal dimorphism; it is possible that there are many different names that should be synonymized with *C. vernalis*.

Examined material (183m 57f; February 25/August 28; 50/1500 m). PUBLISHED RECORDS. Langhoffer, 1917-1923: Delnice (E) 1m; Fužine (E) 1m; Mrzla vodica (E) 3m (det. Langhoffer as *Chilosia vernalis*); Draga (?) 1f (det. Langhoffer as *Chilosia vernalis*), (CNHM); Drenski, 1934: Vitoša (J) (Sofia) 1m (det. Drenski as *Chilosia impressa*); Lozenska planina (I) (Germanski Manastir) 1m (det. Drenski as *Pipiza festiva*), (ZIS); Glumac, 1959: Fruška gora (A), records of *C. vernalis*; Stražilovo 28.iv.1957, 1f (det. Glumac as *C. brachysoma*); (NHMB); Šimić, 1987: Durmitor (E), Donja Bukovica 28.viii. 1984, 2f (det. Šimić as *C. vernalis*); Razvršje 21.viii.1984, 1m (det. Šimić as *C. vernalis*), (IBNS); Vujić & Glumac, 1994: Fruška gora (A), all records (IBNS, NHMB); Vujić & Šimić, 1994: Vršačke planine (A), all records (IBNS). NEW

DATA. **Slo**: Julijske Alpe (D), (8-10: 22/23.v, 5m 2f); Kamniške in Savinjske Alpe (D), (2,4,6: 21.v/16.vi, 3m 1f), (IBNS); Ig (E) 12.viii, 1m; Ljubljana (E) 24.vi, 1f, (SNHM); Bled (D) 9.ix, 1m; Rupa (E) 6.ix, 1f, (JLC); **Cro**: Papuk (A), 15.iv, 2m 2f; Mala Kapela (E), (1: 30.iv, 6m 3f), (IBNS); Krapina (E) 1m, (BHMS); Sljeme (A) 18.v, 1f; Zagreb (A) 3.v, 2m; Velebit (E) (Štirovača) 25.viii, 1m, (JLC); **BH**: Grmeč (E), 30.iv, 22m 7f; Jahorina (E), 14.vi, 1m 1f; Javor (E), 10.iv, 5m; Javornik (E), Stupari 10.iv, 3m, (IBNS); Sarajevo (E) 1m, (BHMS); **Mtg**: Durmitor (E), (15,16,21,26: 1.vi/28.viii, 3m 3f), (IBNS); **Srb**: Deliblatska peščara (A), (1: 21.iv, 2m); Fruška gora (A), (5: 13.iv, 2m 1f); Obedska bara (A), (1: 15.iv/14.v, 1m 1f); Vlašić (A), Zavlaka 25.ii/9.iv, 11m; Povlen (B), 3.iv, 1f; Suva planina (B), (4: 2.iv, 5m); Kopaonik (E), (1,2,4-6,10,12-14,17,20-23,25,26: 8.iv/4.viii, 84m 27f); Tara (E), (1,2: 27.iv /18.vii, 16m 3f); Šar-planina (F), (4: 18.vii, 1f); Kučaj (H), (3: 15.v, 1f); Rtanj (H), 1.v, 1f; Stara Planina (I), (2,10: 5.iv/13.vii, 8m 2f); Čemernik and Vlasinsko jezero (J), (6: 4.v, 4m 1f), (IBNS); **Mac**: Šar-planina (F), (5: 18.iv, 3m 1f), (IBNS).

Distribution (Map 40). RANGE. Europe (except Greece and Portugal); Siberia to the Pacific coast. BALKAN PENINSULA: Slo,Cro,BH,Mtg,Srb, Mac,Blg; (BT: A,B,D-F,I-J); (B: 2-4). First record for: Slo,Mac.

Remarks: *C. vernalis* is distributed all over the Balkan Peninsula (except south). It is more abundant at lower altitudes.

Biology. Preferred environment: forests, pastures, meadows. Adult habitat: clearings, forests edges; males hover at 1-2 meters; settle on leaves, flowers or ground. Flowers visited: *Ficaria verna, Ranunculus, Salix, Caltha palustris, Taraxacum*. Flight period: end of February-end of August; two generations. Larva: internal feeder in the steams of *Chamomilla* and *Sonchus oleracues* (Bankowska, 1980).

78. ***Cheilosia vulpina*** (Meigen, 1822)

syn. *Chilosia conops* Becker, 1894

syn. *Cheilosia pigra* Loew, 1840

VERIFIED REFERENCES: Strobl, 1898 (as *pigra*); Langhoffer, 1917-1923 (as *conops*); Drenski, 1934 (in part); Glumac, 1955a; 1959 (as *conops* and *vulpina*); 1968 (as *conops*); Šimić, 1987; Claussen & Speight, 1988 (Blg); Vujić & Glumac, 1994; Vujić & Šimić, 1994.

UNVERIFIED REFERENCES. Blg: Bankowska, 1967; BH, Srb: Kula, 1985.

Chilosia vernalis of Drenski, 1934 (in part)

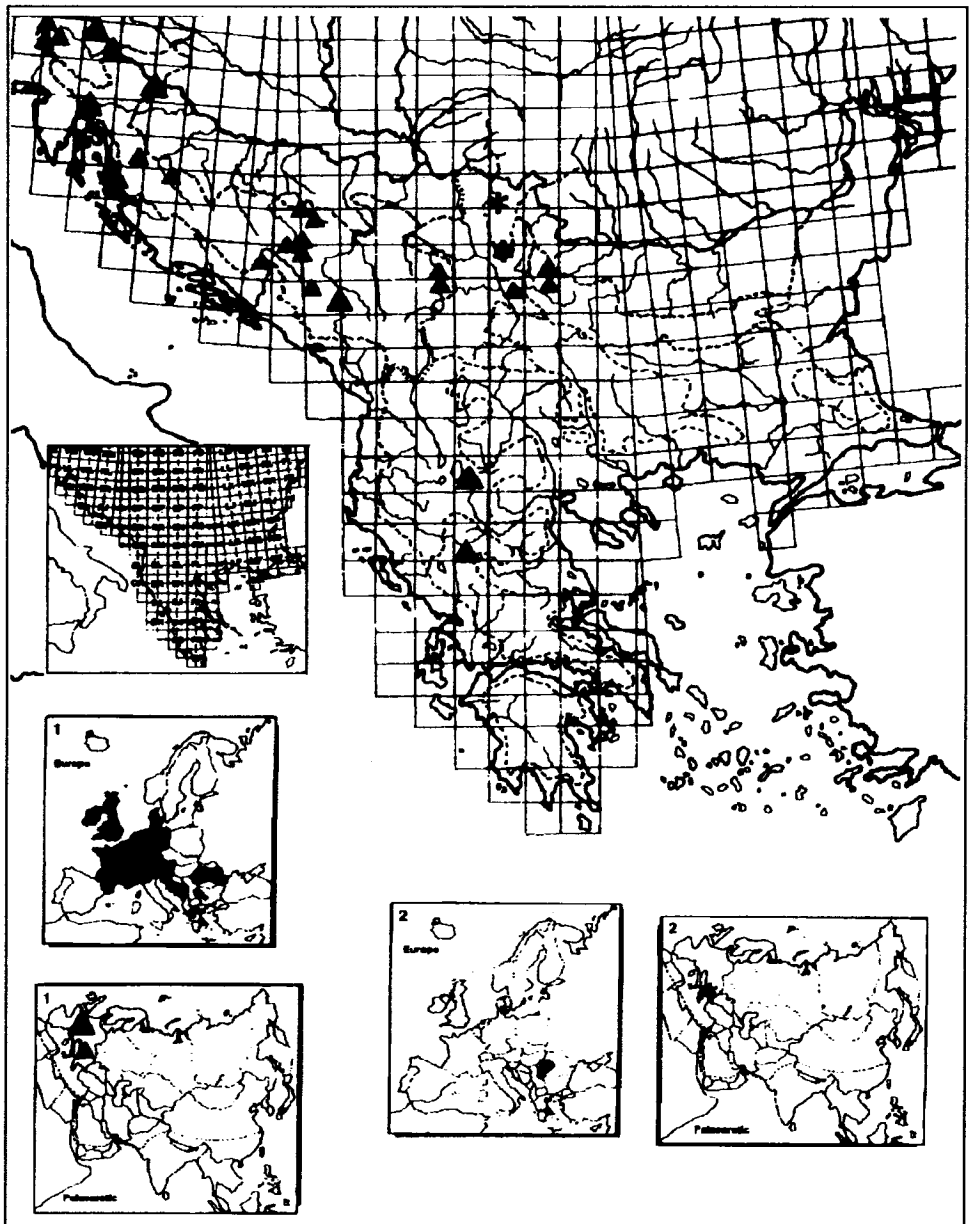
Examined material (93m 51f; April 4/August 28; 50/1500 m). PUBLISHED RECORDS. Strobl, 1898: Sarajevo (E) (Miljacka) 1f (det. Strobl as *Chilosia pigra*), (BHMS); Langhoffer, 1917-1923: Mrzla Vodica (E) 1m 1f (det. Langhoffer as *Chilosia conops*); Kuželj (E) (Praprod)

1f, (CNHM); Drenski, 1934: Vitoša (J) (Sofia) 3m 5f (det. Drenski 3m as *Chilosia vernalis*, 5f as *C. vulpina*); Dimitrovgrad (B) (Poganovo) 1m (det. Drenski as *Chilosia mutabilis*); Osogovske planine (J) (Kjustendil) 1m; Rodopi (J) (Ladani) 1m (det. Drenski as *Chilosia albipila*), (ZIS); Glumac, 1955: Homolje (H) (Blagojev Kamen) 1m, (NHMB); Glumac, 1959, 1968: all records of *conops* and *vulpina* (IBNS, NHMB); Šimić, 1987: Durmitor (E) all records of *conops* and *vulpina* (IBNS); Vujić & Glumac, 1994: Fruška gora (A) all records (IBNS, NHMB); Vujić & Šimić, 1994: Vršačke planine (A) all records (IBNS). NEW DATA. **Slo**: Julijske Alpe (D), (9,10: 23v/2.vii, 3m); Menina (E), 24.v.1989, 8m, (IBNS); **Cro**: Sljeme (A) 24.v.1969, 1m; Zagreb (A) (Villa Rebba) 19.v.1970, 1m 1f, (JLC); **BH**: Volujak (E), (1: 15.v.1989, 1m), (IBNS); Mokro (E) 1m; Sarajevo (E) (Vrelo Bosne) 1m; Banja stijena (?) 4m, (BNMS); **Mtg**: Kanjon Morače (C), 4/28.iv.1990, 3m; Durmitor (E), (5,13-15,32: 4m 4f); Prokletije (E) 26/30.vii.1994, 1m, (IBNS); **Srb**: Deliblatska peščara (A) (Flamunda) 4.vi. 1982, 1f; Fruška gora (A), (9,13: 30.iv/11.v, 1m 1f); Svilojevo (A), 2.v.1983, 2m; Suva planina (B), (2: 28.v.1988, 1f); Goč (B) (Dobre vode) 8/11.viii.1983, 2m; Kopaonik (E), (5,8: 1/23.v, 1m 1f); Debeli Lug (H), 28.iv/2.v, 3f; Kučaj (H), (2,7,11: 11.v/27.vii, 6m 1f); Kučevo (H), 30.iv.1993, 1m; Stara Planina (I), (3,5: 29.v/25.vi, 1m 2f), (IBNS); **Mac**: Baba (F), 20.iv/8.v.1990, 5m 3f; Galičica (F), (2: 17.vi.1990, 1f); Kožuf (F), (2: 14.v/18.vii.1990, 4m 2f), (IBNS); Mavrovo (F) 29.vii.1964, 1f; Oteševo (F) 10/13.viii.1963, 1f, (JLC); **Blg**: Sofia (F) 28.vii.1983, 2m 1f, (JLC); **Gre**: Kastoria-Neapoli (F), 21.iv.1990, 2m 1f; Verno (F), (3: 11.v.1990, 5m 1f), (IBNS).

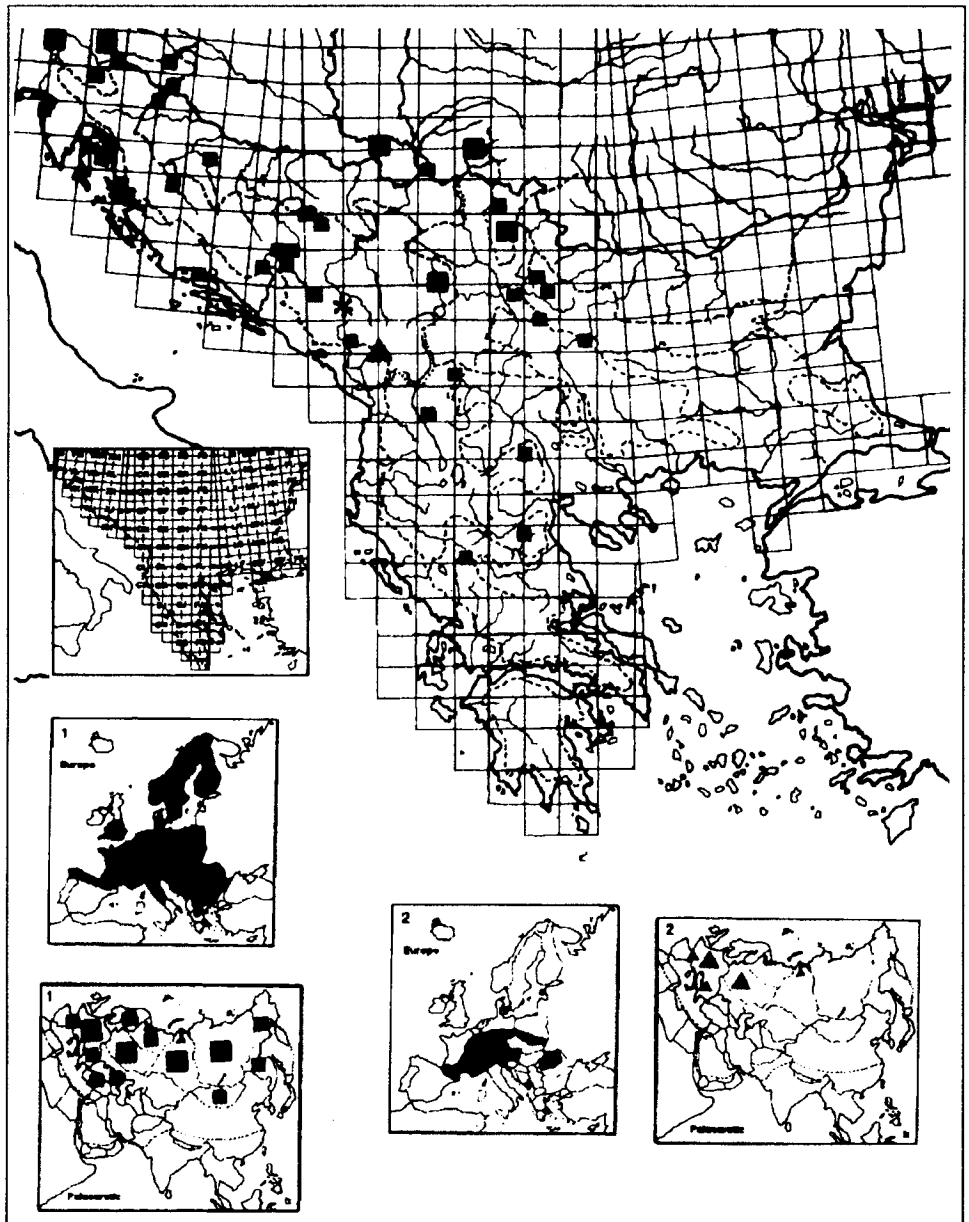
Distribution (Map 50). RANGE. Europe (except Scandinavia); West Siberia. BALKAN PENINSULA: Slo,Cro,BH,Mtg,Srb,Mac,Blg,Gre; (BT: A-F,H-J); (B: 2-4). First record for: Slo,Gre.

Remarks: *C. vulpina* is found over the Balkan Peninsula, from Submediterranean and Pannonic forests up to the highest Dinaric mountains.

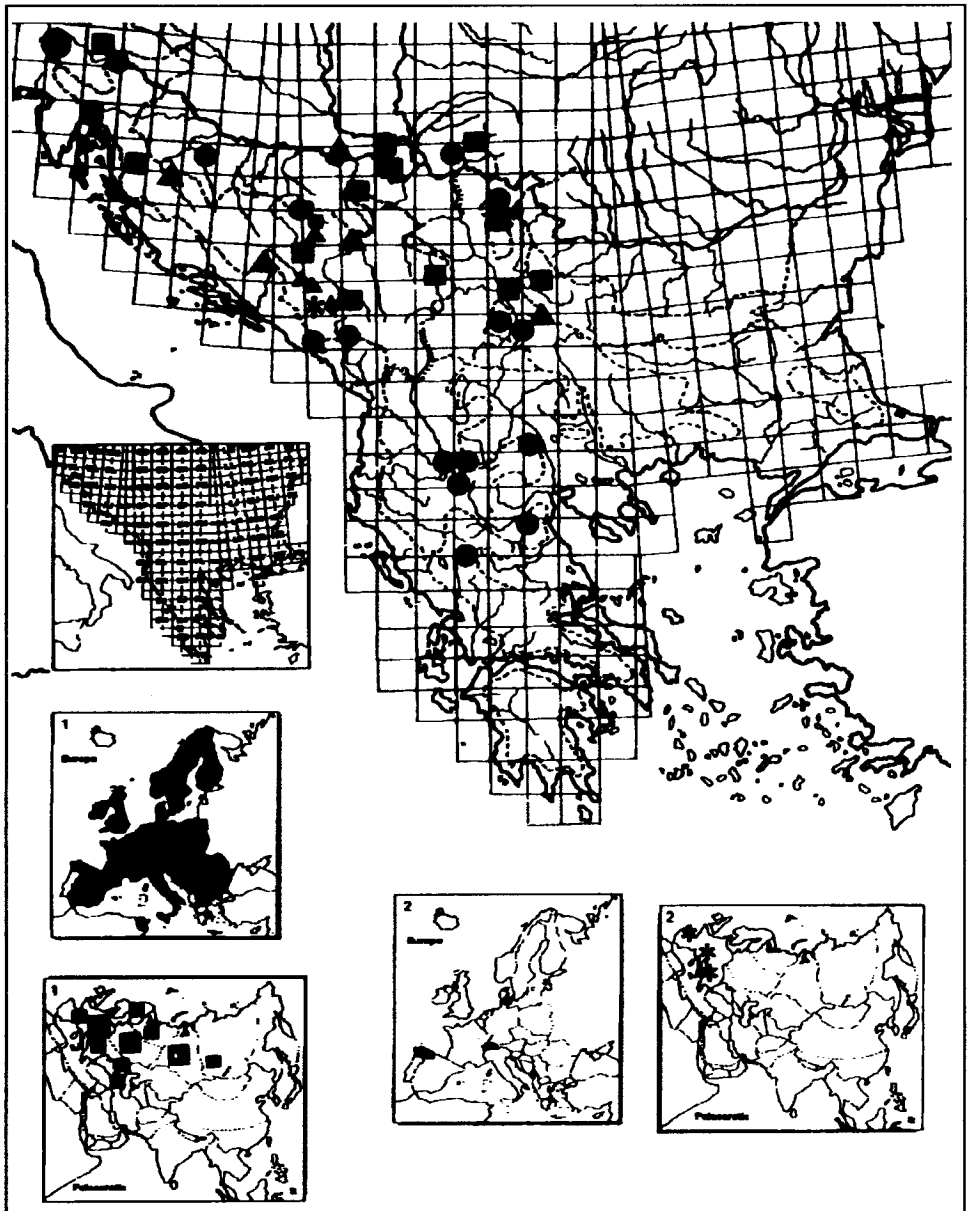
Biology. Preferred environment: forests. Adult habitat: clearings, open ground; males hover at 2-5 meters; settle on stones, leaves or flowers. Flowers visited: Apiaceae, *Ranunculus*, *Euphorbia*. Flight period: April-August. Larva: internal feeder in roots of *Cirsium arvense, C. palustre*, *Cynara scolimus* (Brunel & Cadou, 1990).



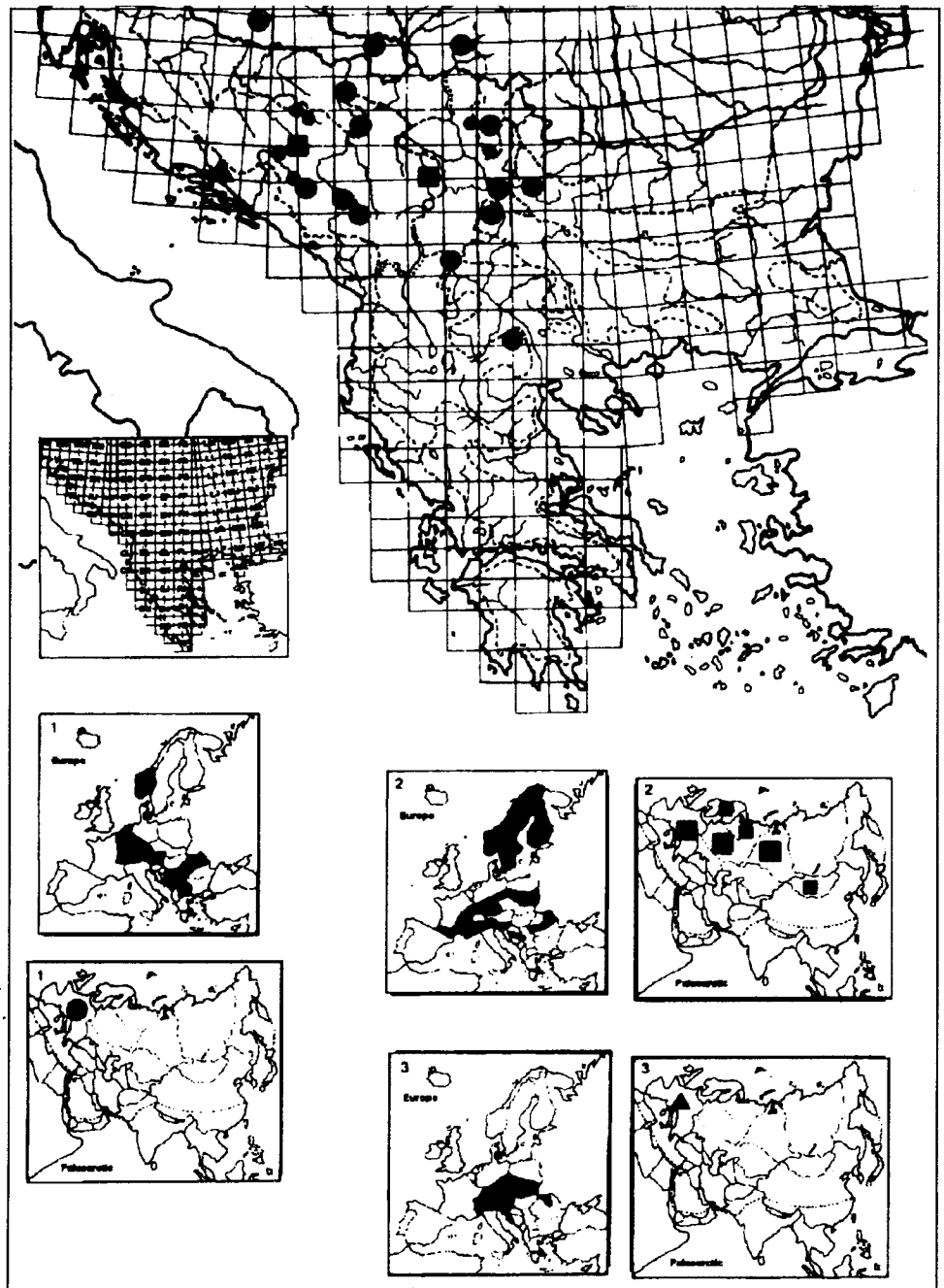
Map 16 Distribution of: (1) Nigrocheilosia antiqua (▲) and (2) N. kerteszi (∗) in Palaearctic, Europe and the Balkan Peninsula.



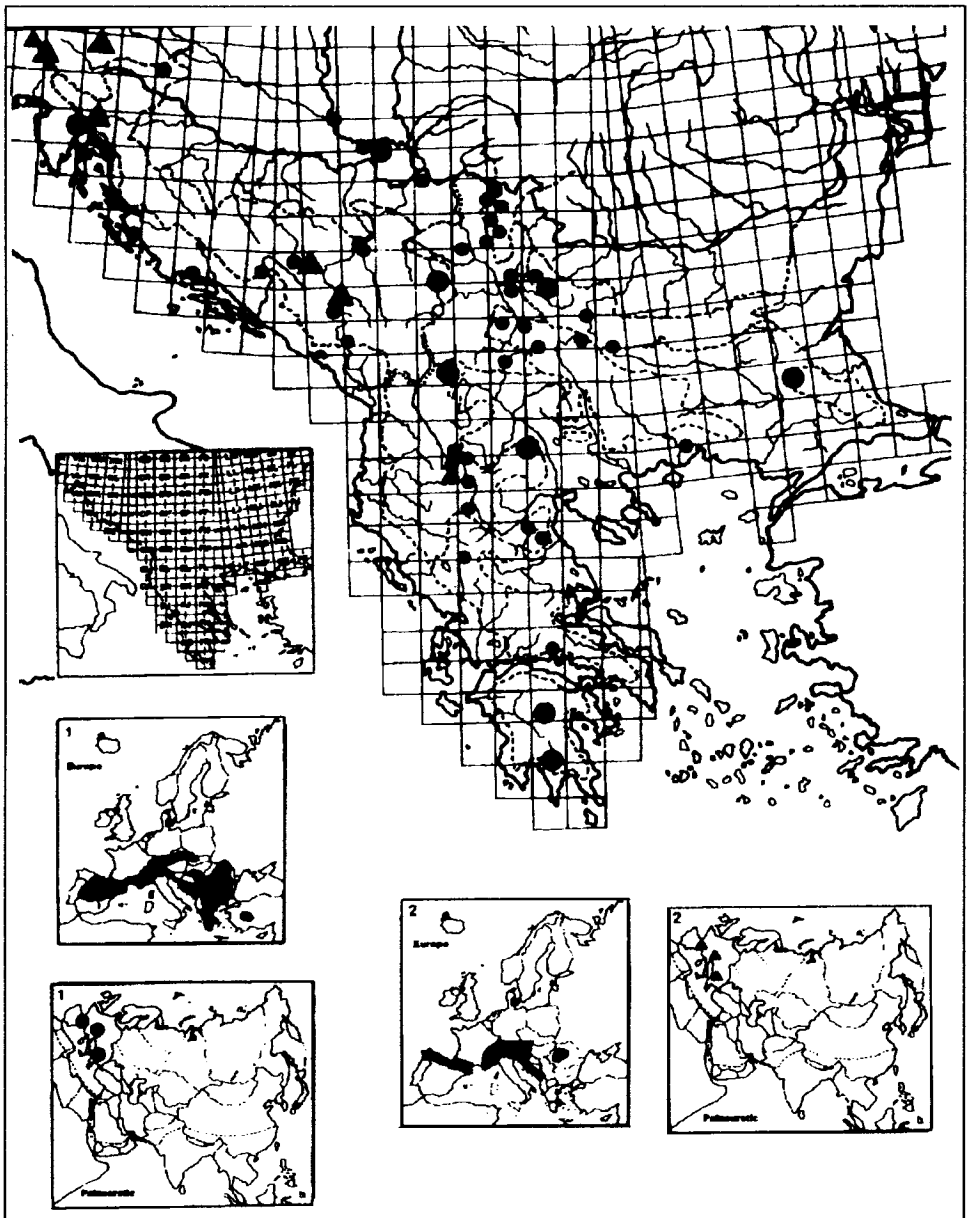
*Map 17 Distribution of: (1) Nigrocheilosia nigripes (■) and (2) N. caerulescens (▲) in Palaearctic, Europe and the Balkan Peninsula; (*) both species sympatrically.*



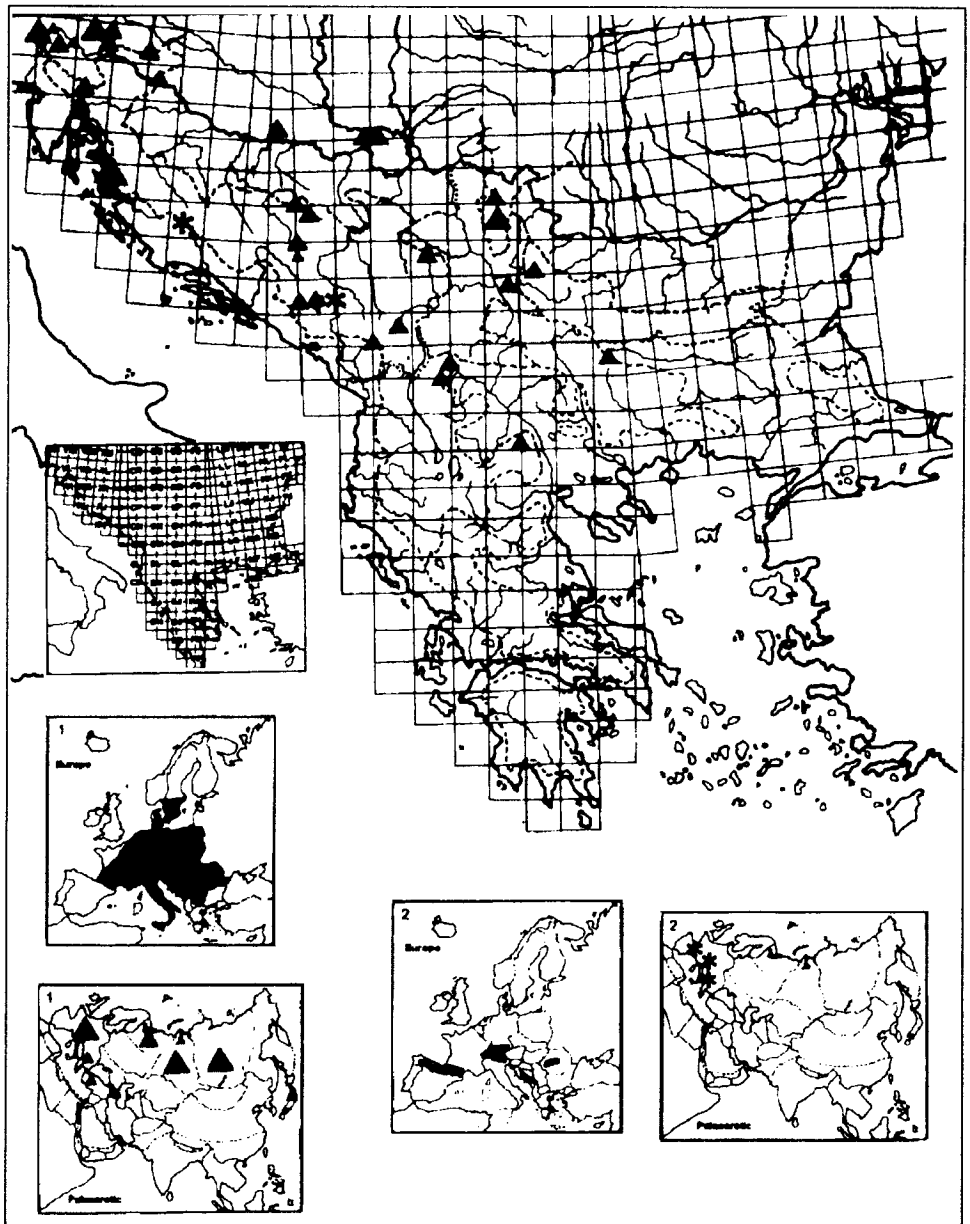
*Map 18 Distribution of: (1) Cheilosia albitarsis (●), C. aff. albitarsis (▲), (■) both species sympatrically), and (2) Nigrocheilosia laeviseta (*) in Palaearctic, Europe and the Balkan Peninsula.*



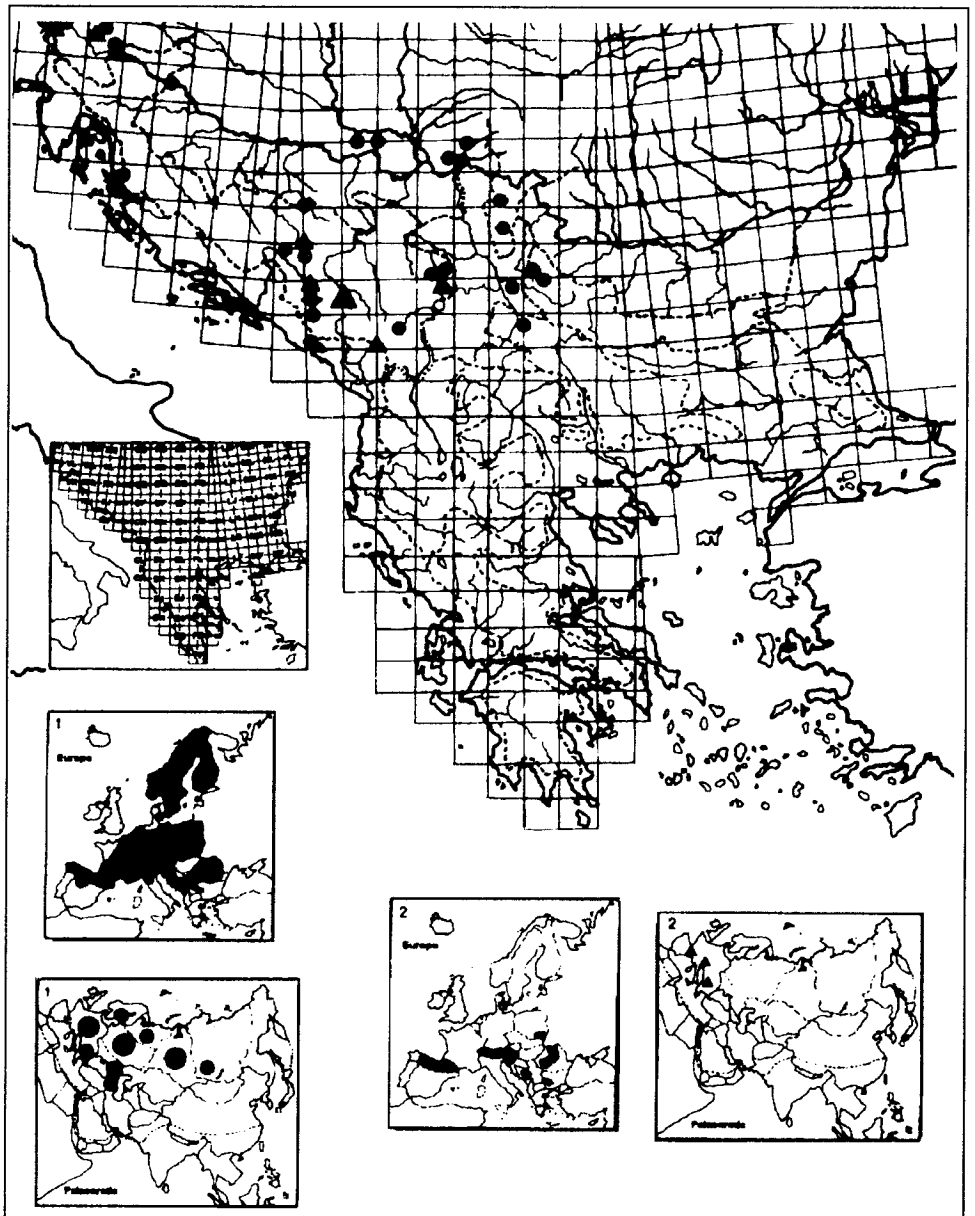
Map 19 Distribution of: (1) Cheilosia fasciata (●), (2) C. morio (■) and (3) Nigrocheilosia crassiseta (▲) in Palaearctic, Europe and the Balkan Peninsula.



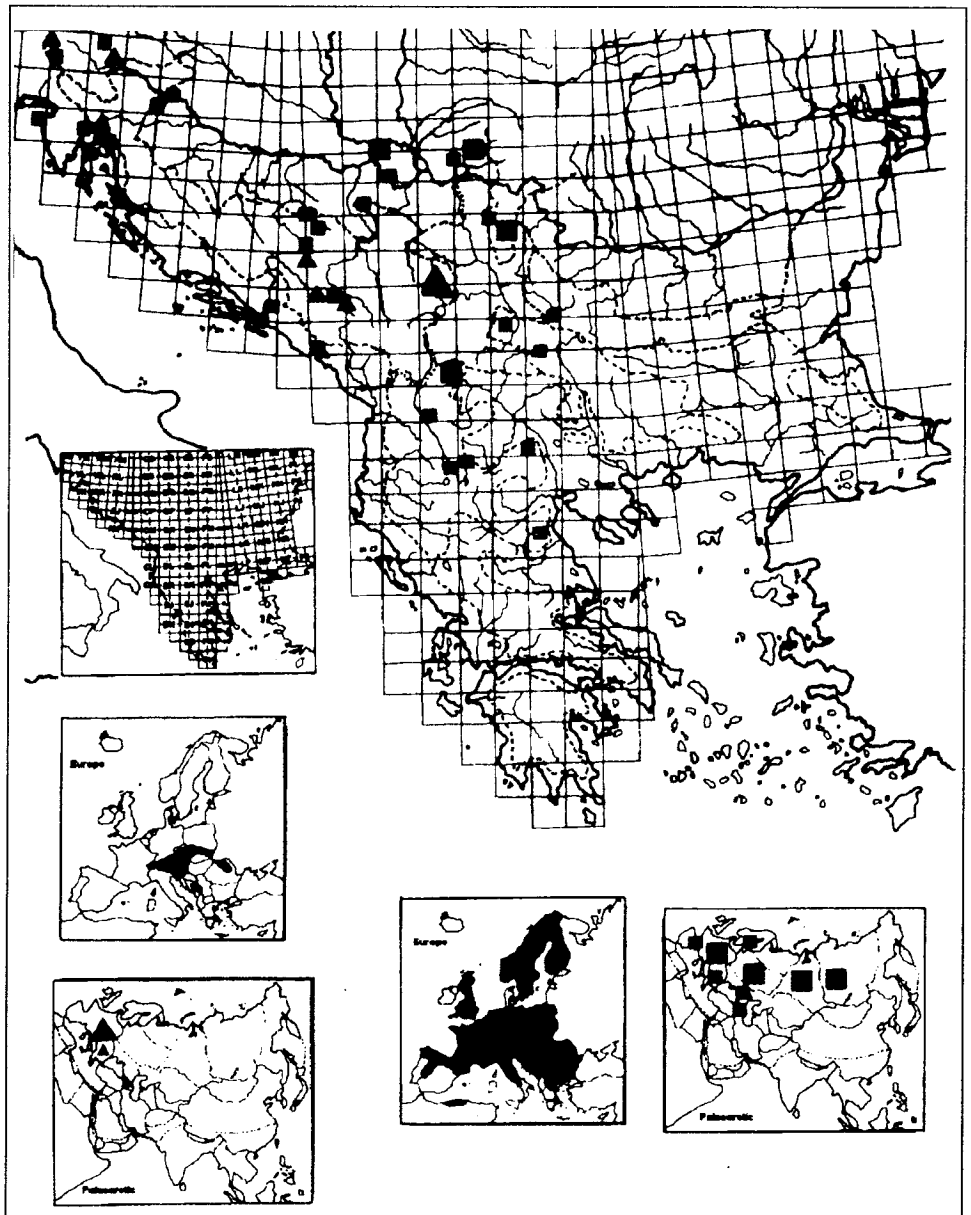
Map 20 Distribution of: (1) Cheilosia aerea (●) and (2) Nigrocheilosia derasa (▲) in Palaearctic, Europe and the Balkan Peninsula.



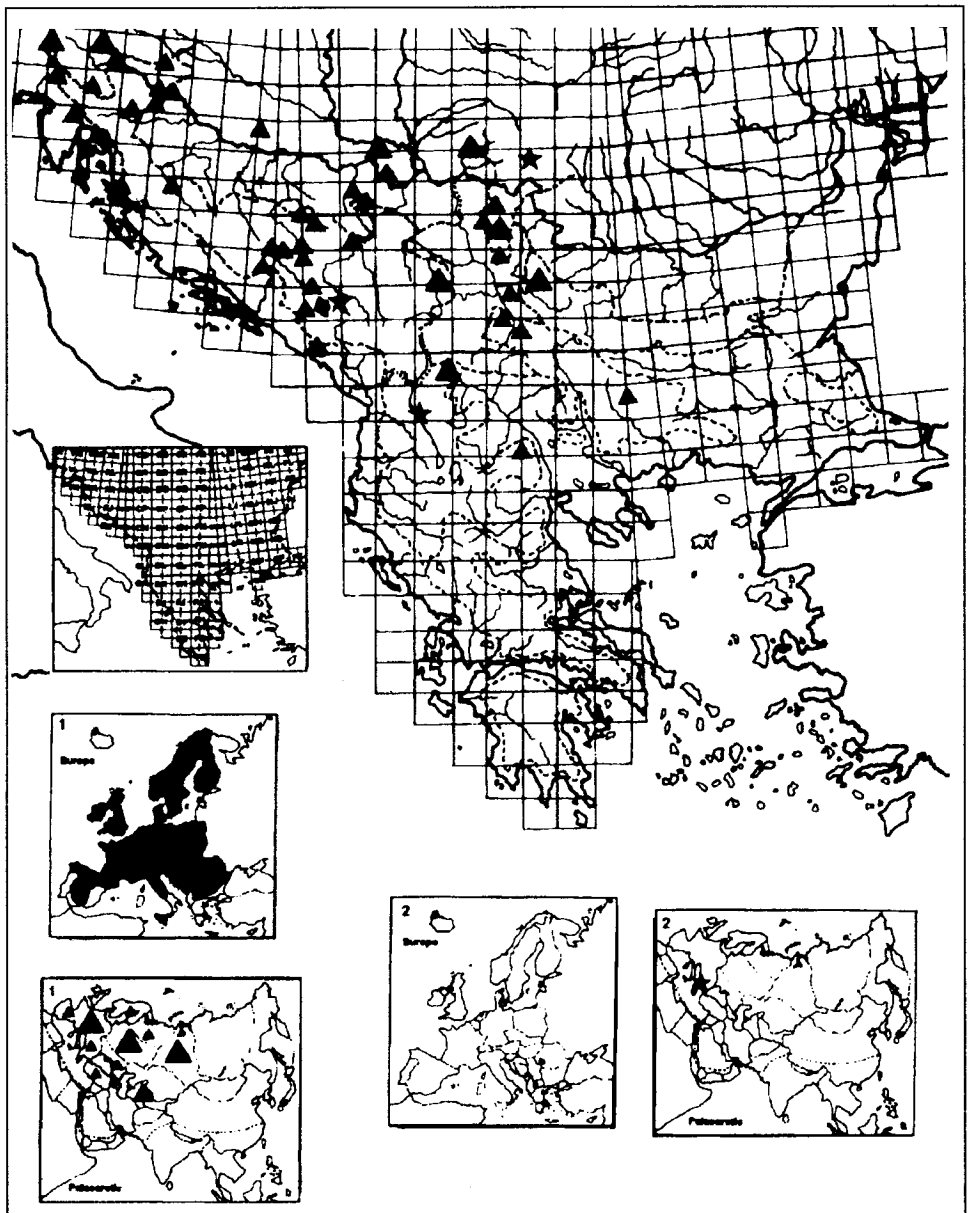
*Map 21 Distribution of: (1) Cheilosia canicularis (▲) and (2) Nigrocheilosia faucis (*) in Palaearctic, Europe and the Balkan Peninsula.*



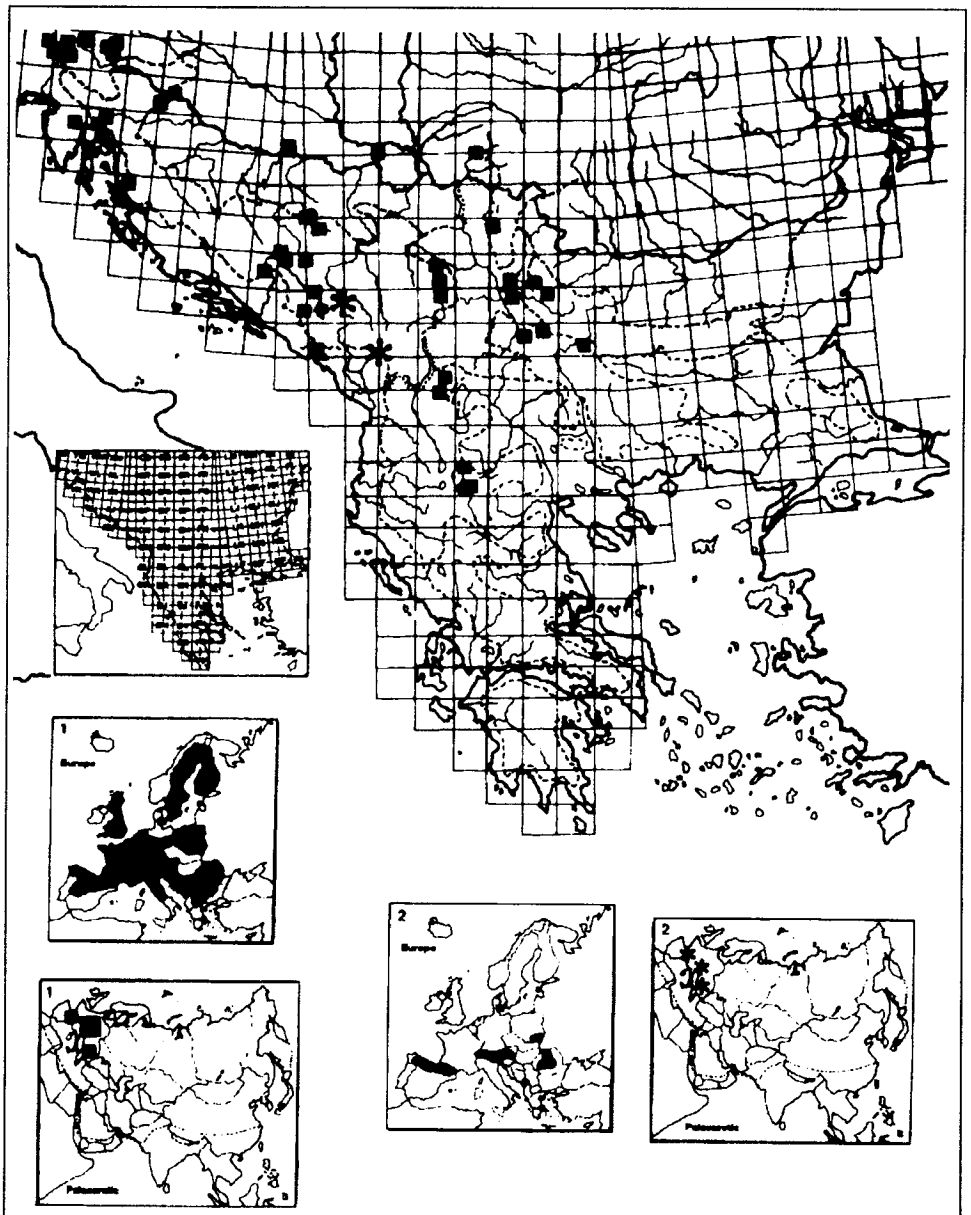
Map 22 Distribution of: (1) Cheilosia flavipes (●) and (2) Nigrocheilosia gagatea (▲) in Palaearctic, Europe and the Balkan Peninsula.



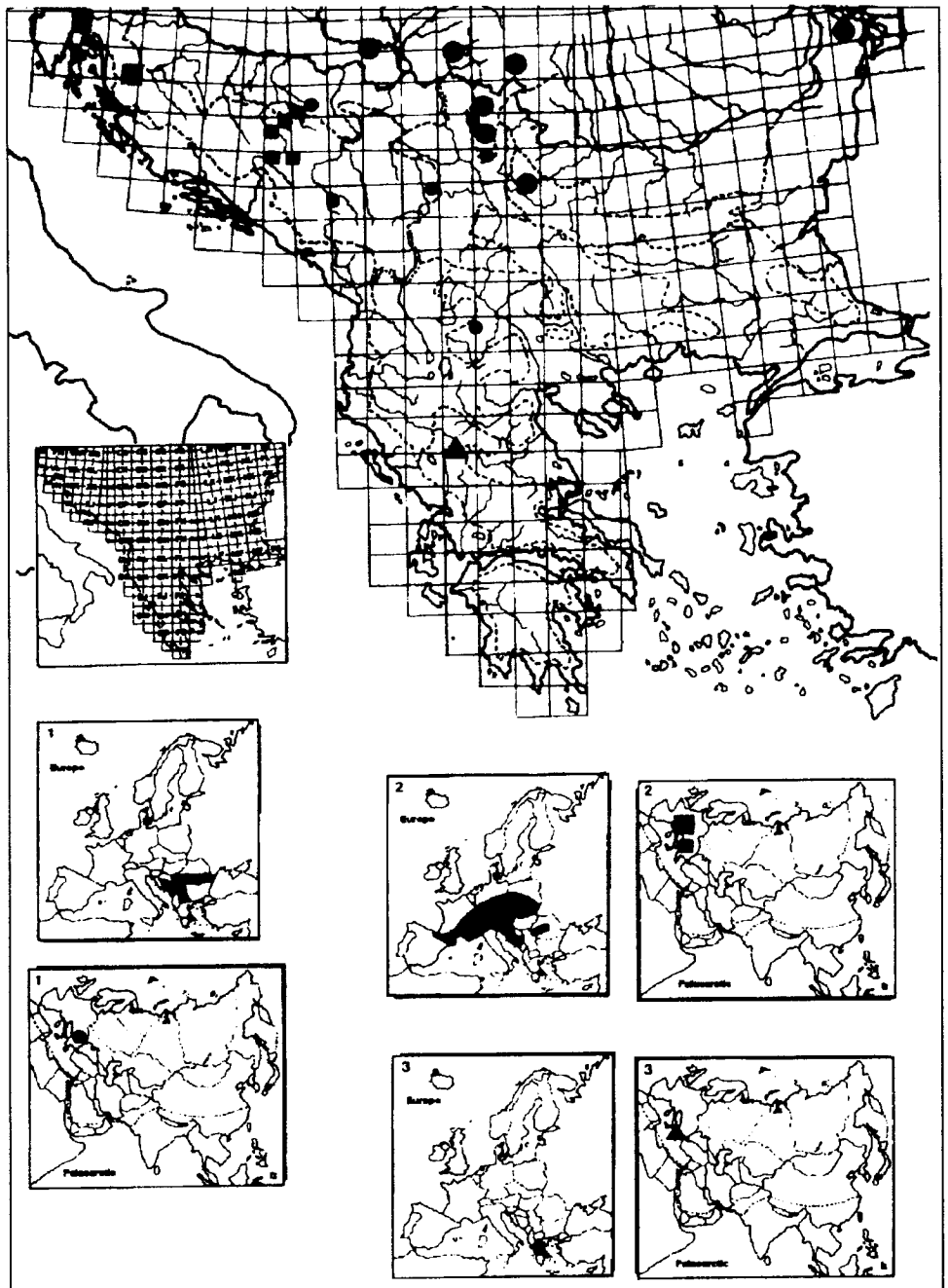
Map 23 Distribution of: (1) Nigrocheilosia grisella (▲) and (2) Cheilosia mutabilis (■) in Palaearctic, Europe and the Balkan Peninsula.



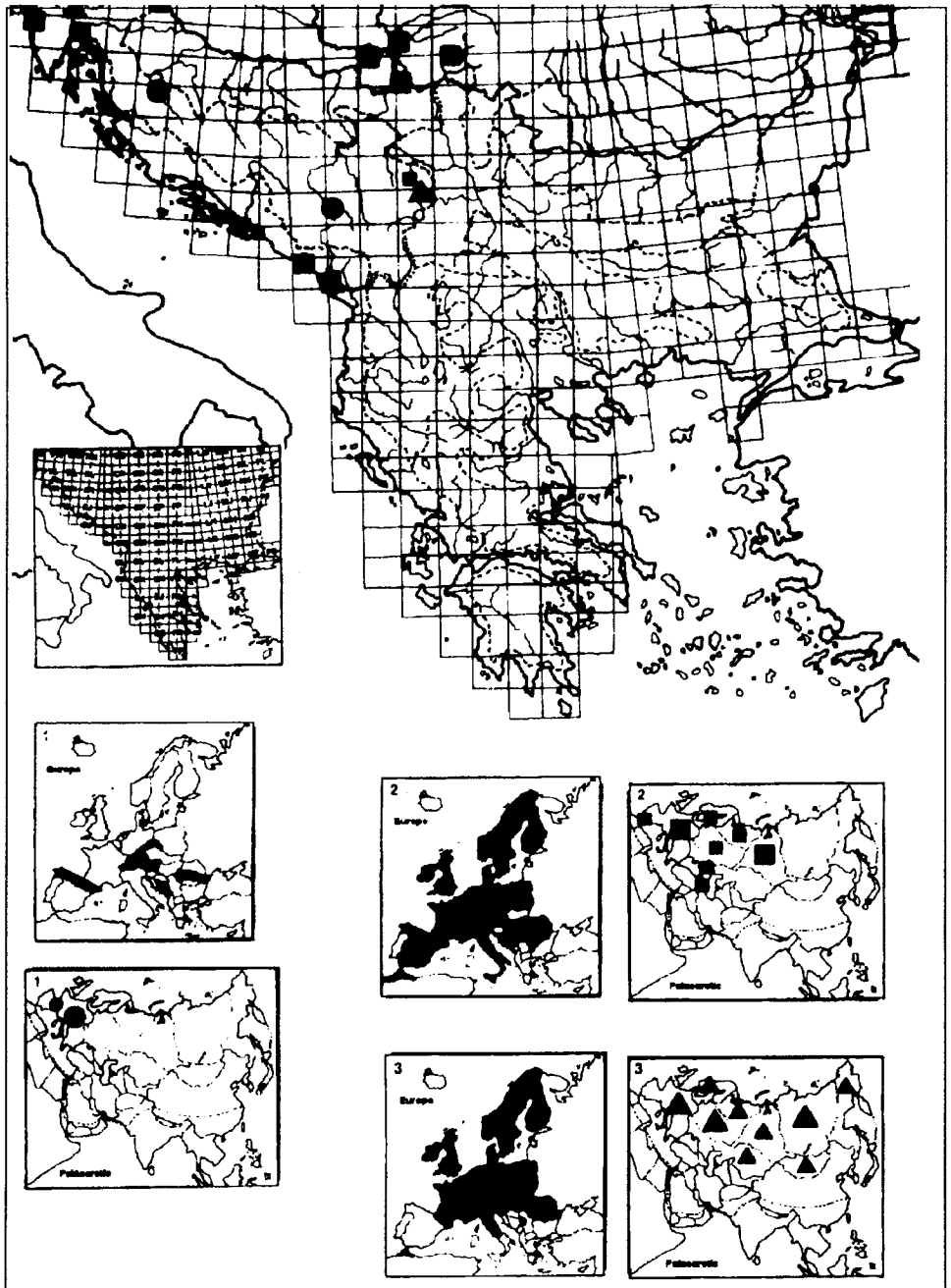
Map 24 Distribution of: (1) Cheilosia variabilis (▲) and (2) Nigrocheilosia herculana (★) in Palaearctic, Europe and the Balkan Peninsula.



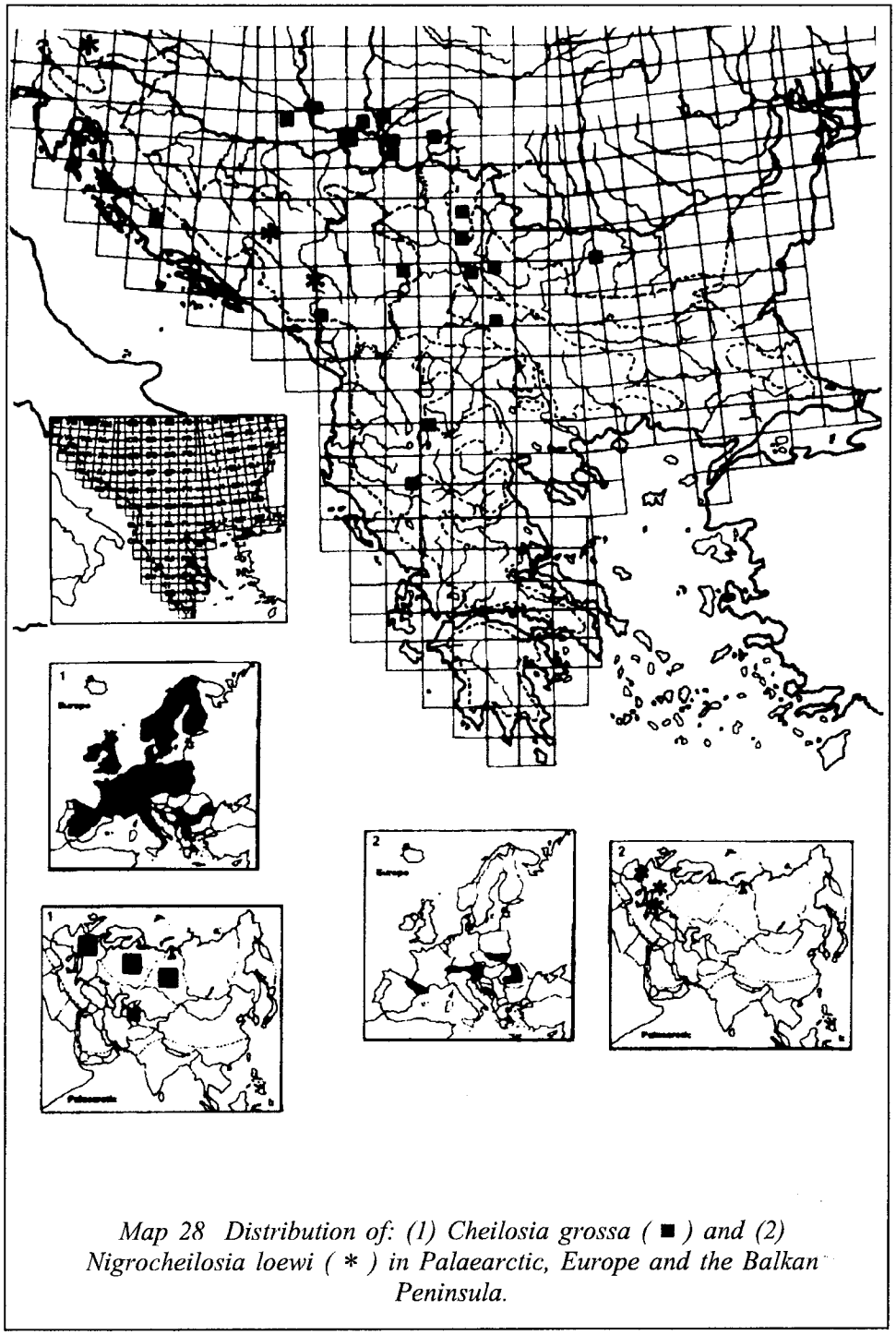
Map 25 Distribution of: (1) Cheilosia barbata (■) and (2) Nigrocheilosia hercyniae (★) in Palaearctic, Europe and the Balkan Peninsula.



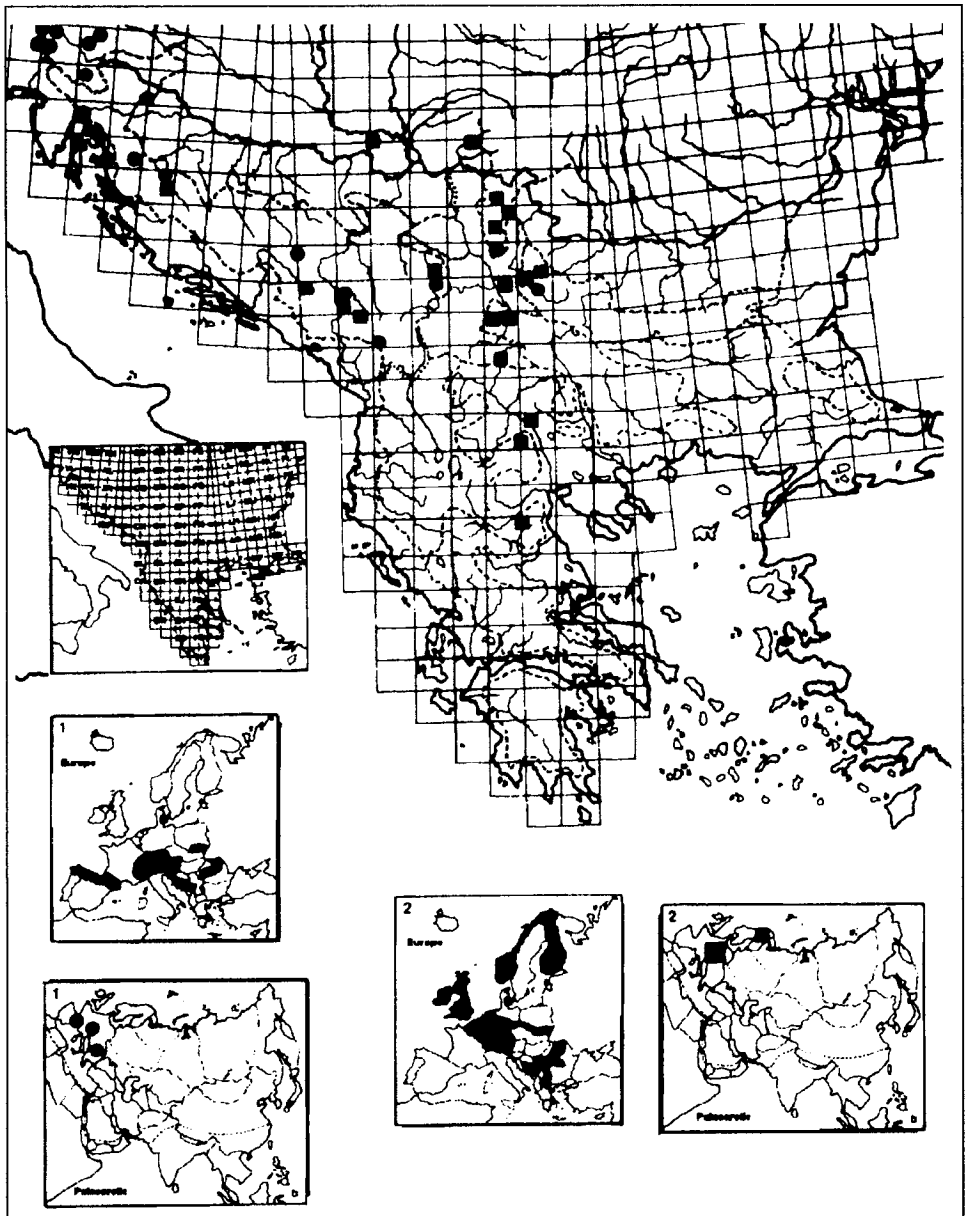
Map 26 Distribution of: (1) Cheilosia cumanica (●), Nigrocheilosia impudens (■) and (3) C. katara (▲) in Palaearctic, Europe and the Balkan Peninsula.



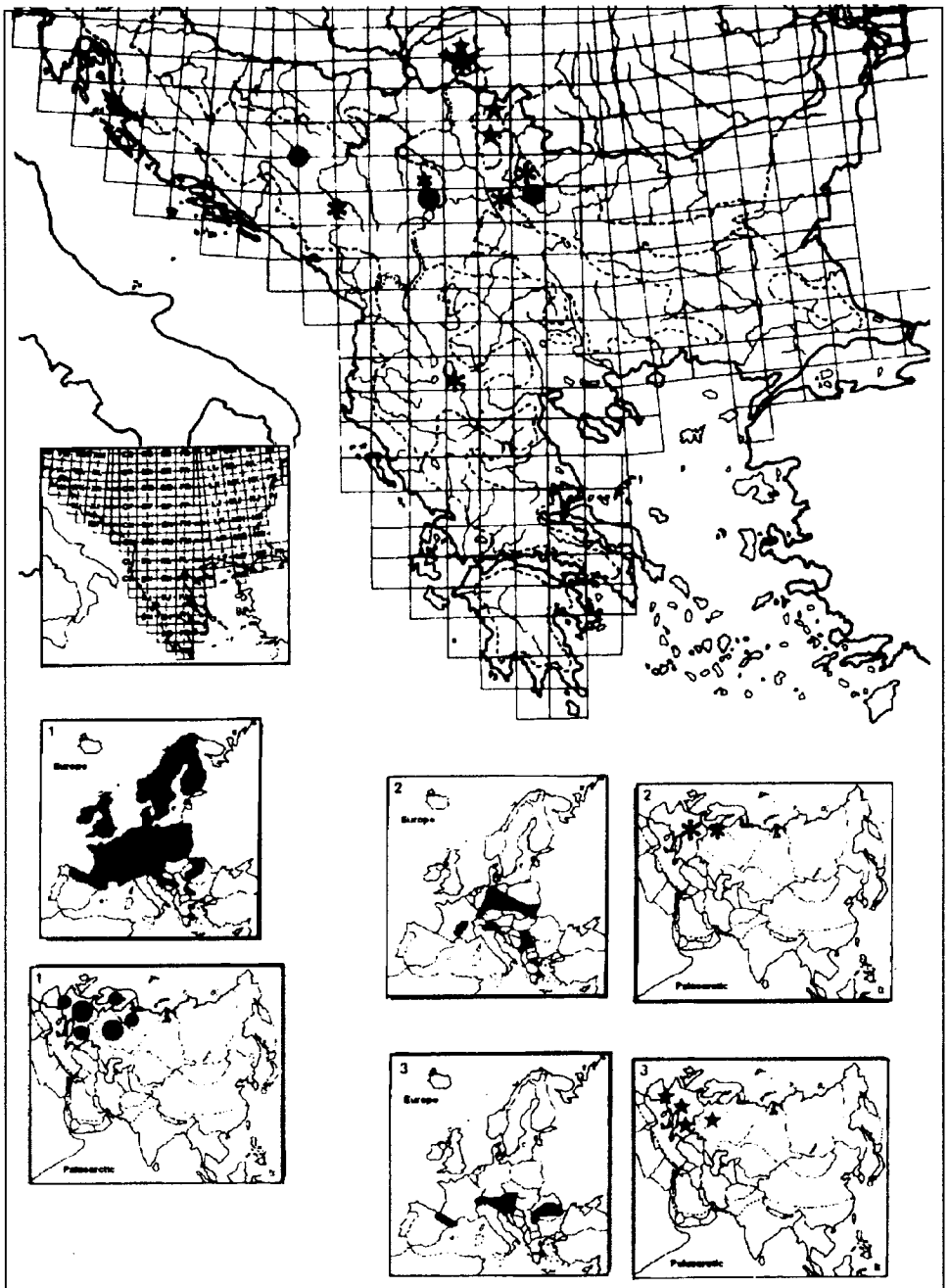
Map 27 Distribution of: (1) Nigrocheilosia insignis (●), (2) Cheilosia latifrons (■) and (3) C. longula (▲) in Palaearctic, Europe and the Balkan Peninsula.



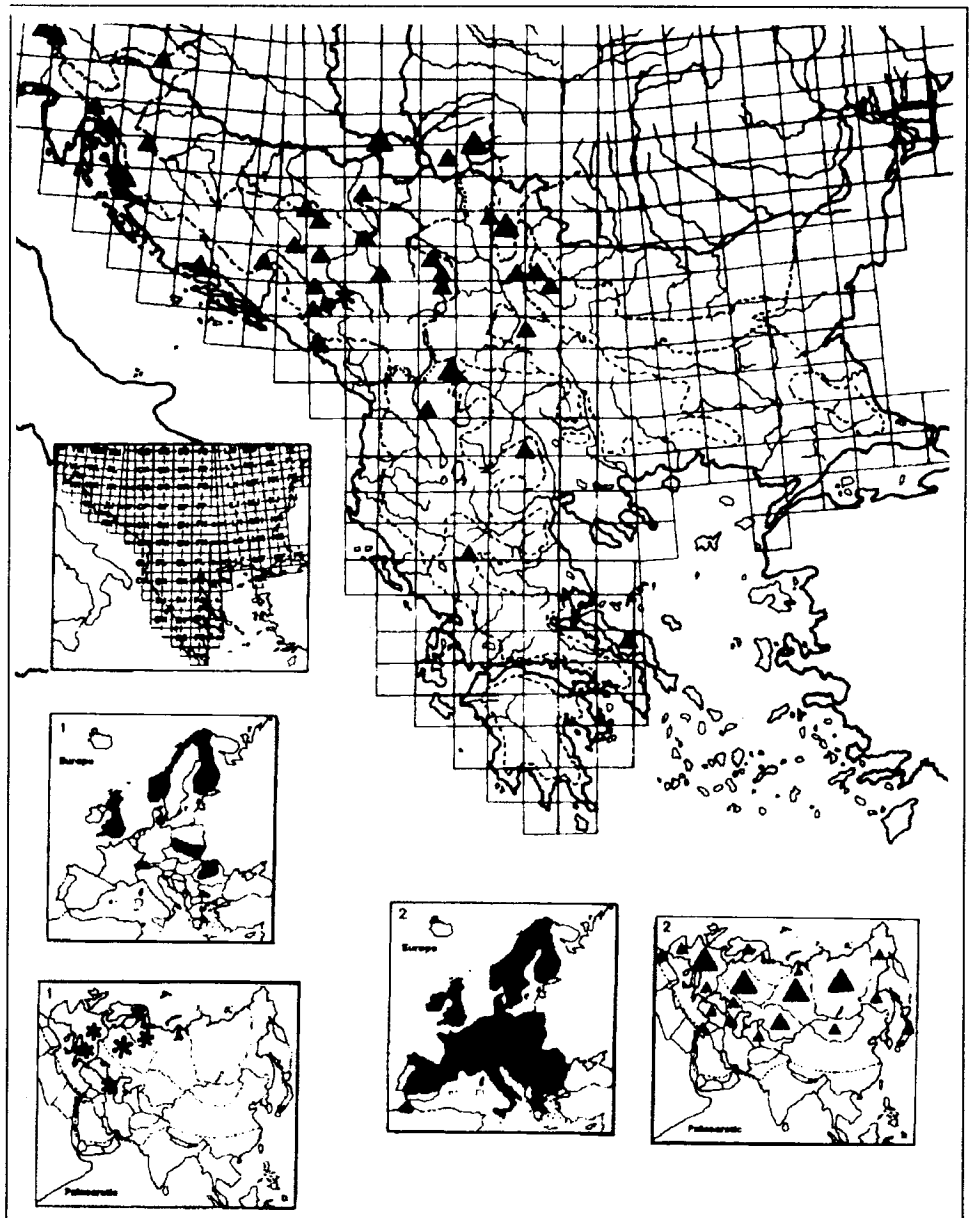
*Map 28 Distribution of: (1) Cheilosia grossa (■) and (2) Nigrocheilosia loewi (*) in Palaearctic, Europe and the Balkan Peninsula.*



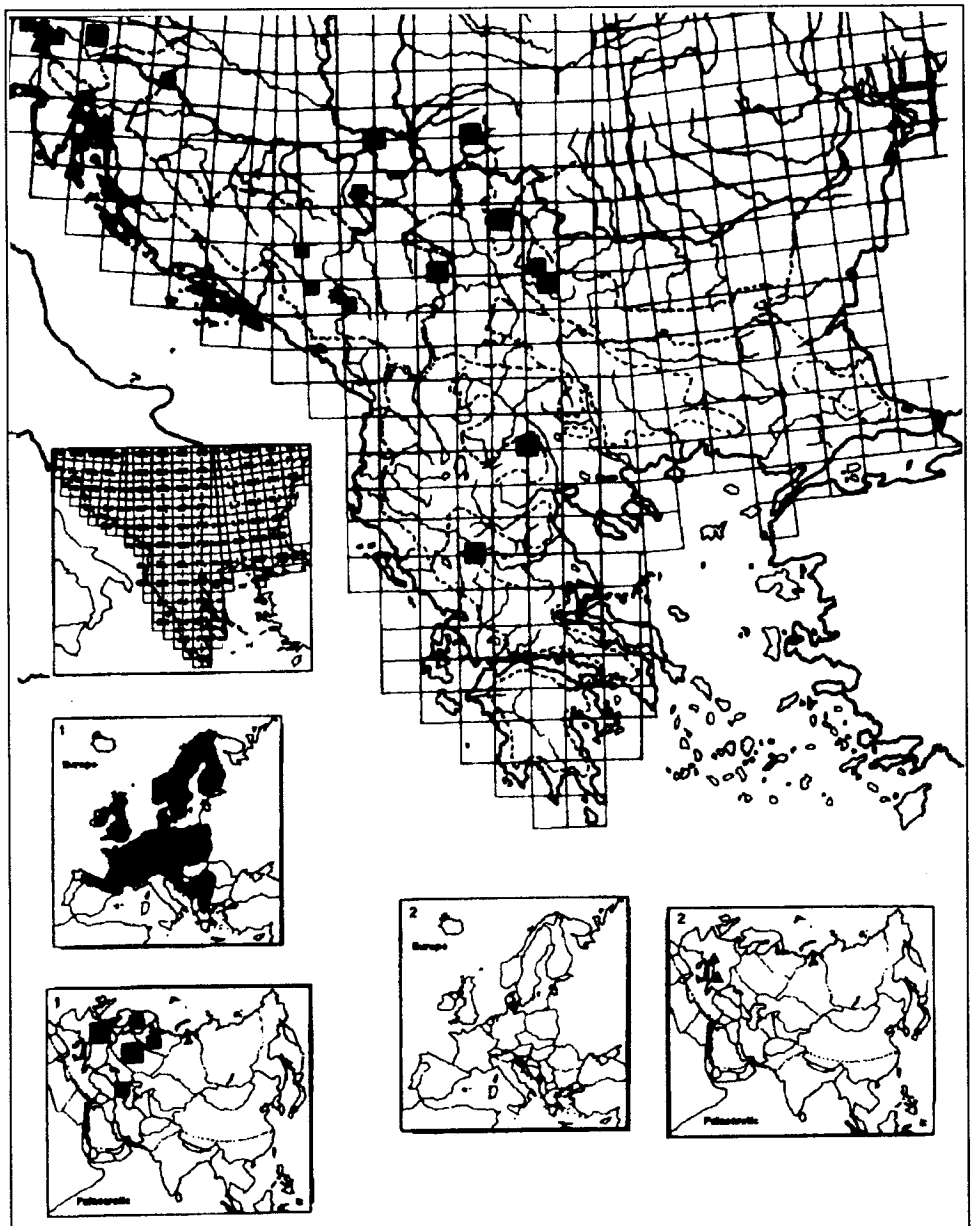
Map 29 Distribution of: (1) Nigrocheilosia personata (●) and (2) Cheilosia semifasciata (■) in Palaearctic, Europe and the Balkan Peninsula.



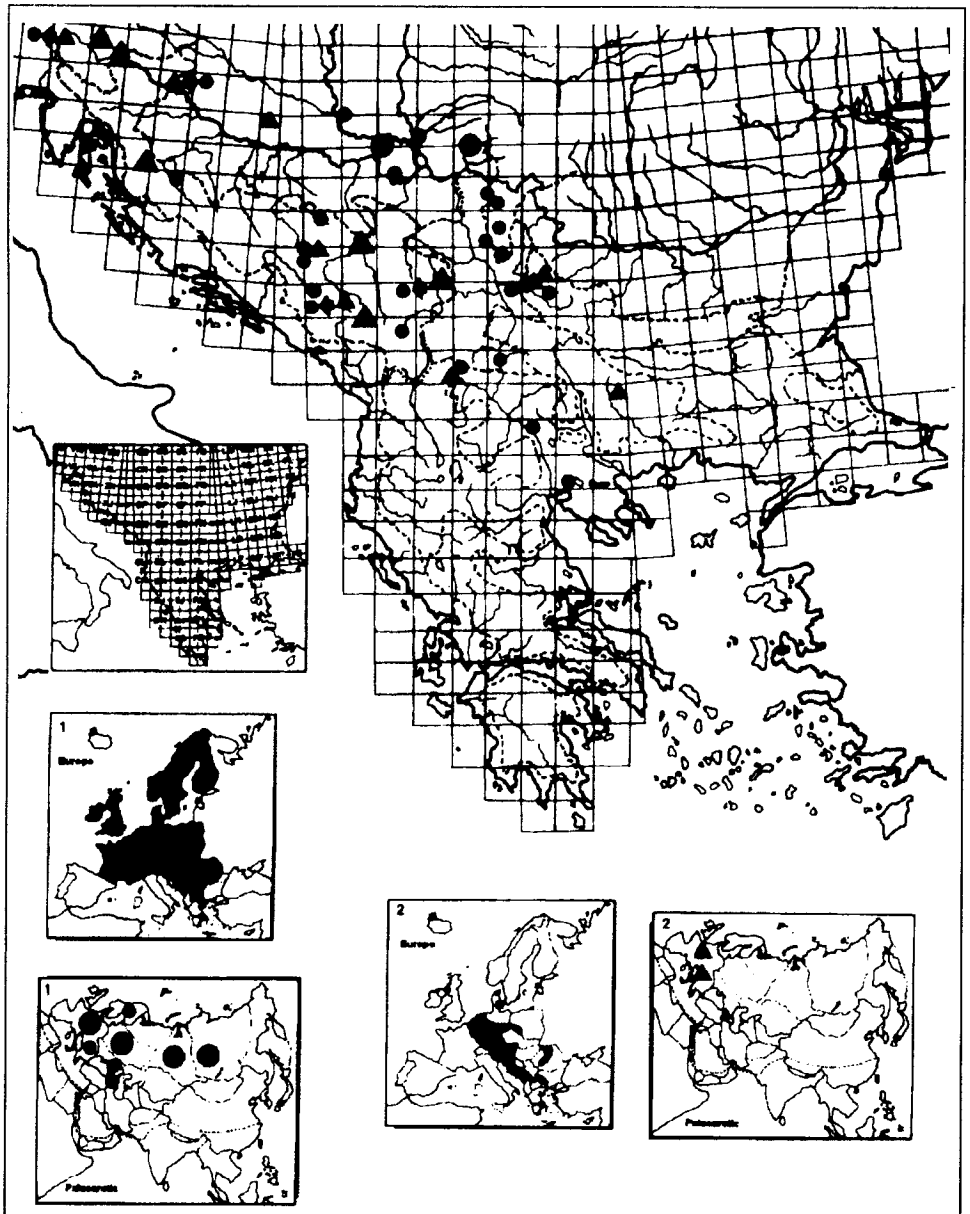
*Map 30 Distribution of: (1) Nigrocheilosia pubera (●), (2) Cheilosia psilophthalma (★) and (3) C. hypena (*) in Palaearctic, Europe and the Balkan Peninsula.*



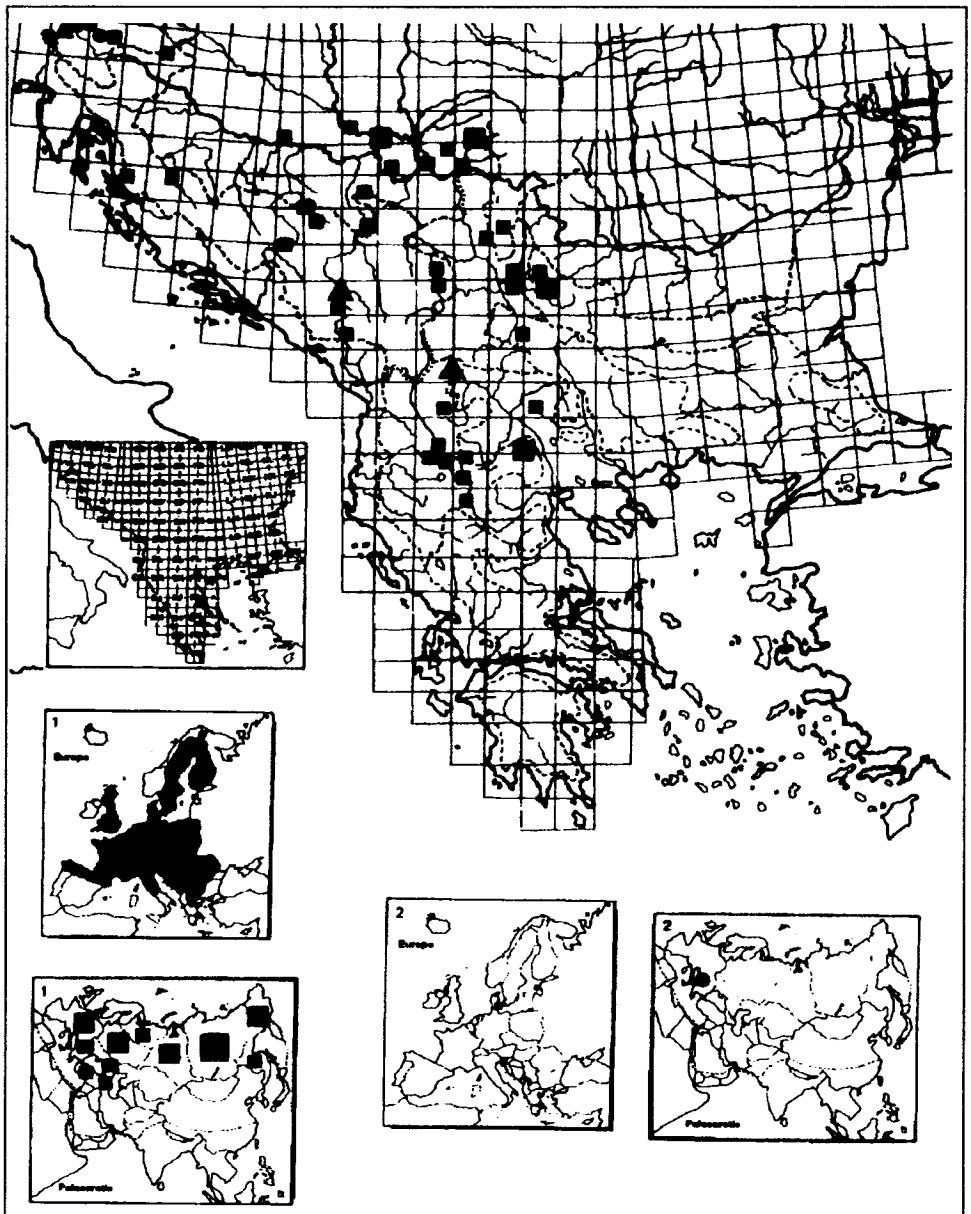
*Map 31 Distribution of: (1) Nigrocheilosia sahlbergi (*) and (2) Cheilosia scutellata (▲) in Palaearctic, Europe and the Balkan Peninsula.*



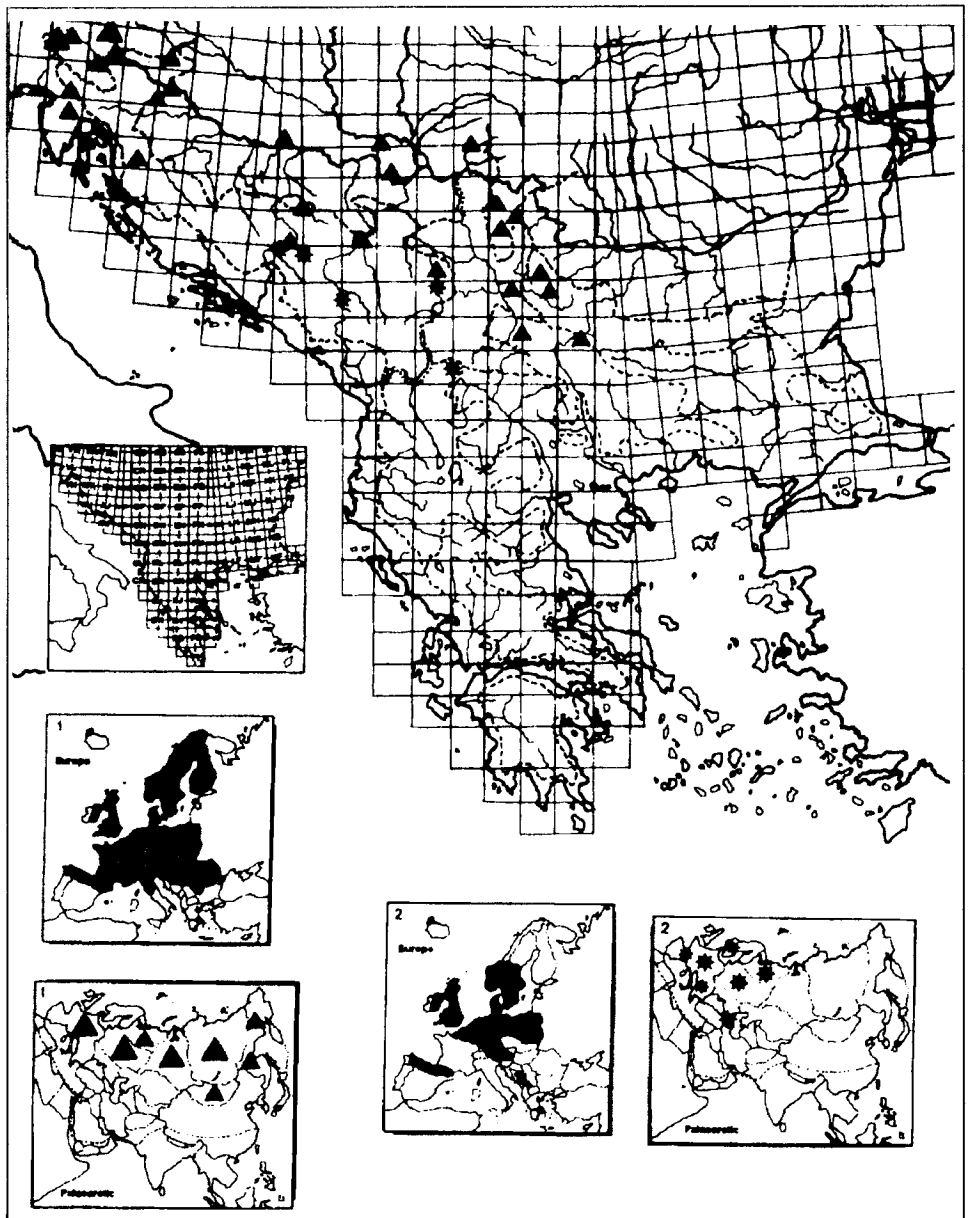
Map 32 Distribution of: (1) Nigrocheilosia vicina (■) and (2) N. sp. (▲) in Palaearctic, Europe and the Balkan Peninsula; (✱) both species sympatrically.



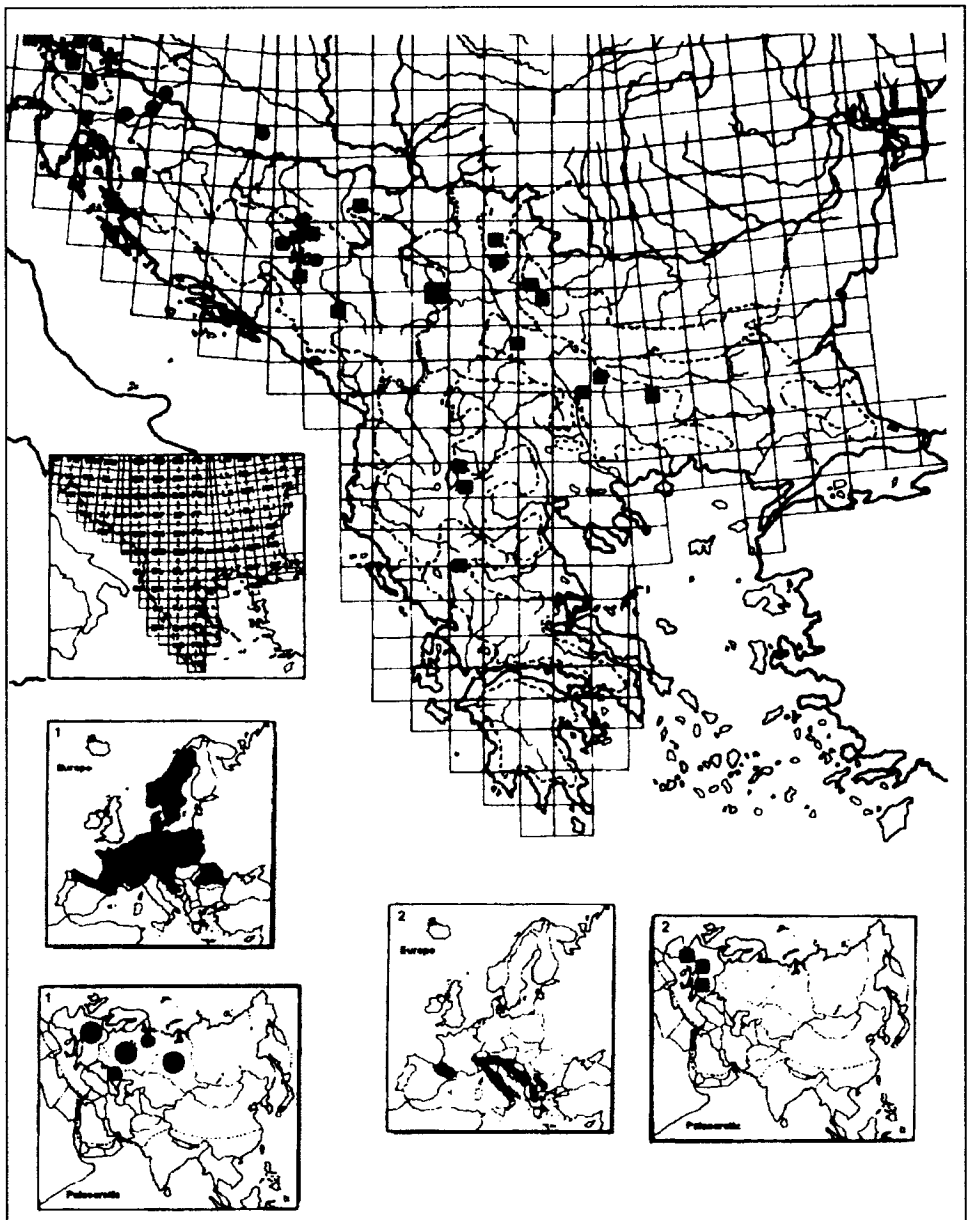
Map 33 Distribution of: (1) Cheilosia albipila (●) and (2) C. lenis (▲) in Palaearctic, Europe and the Balkan Peninsula.



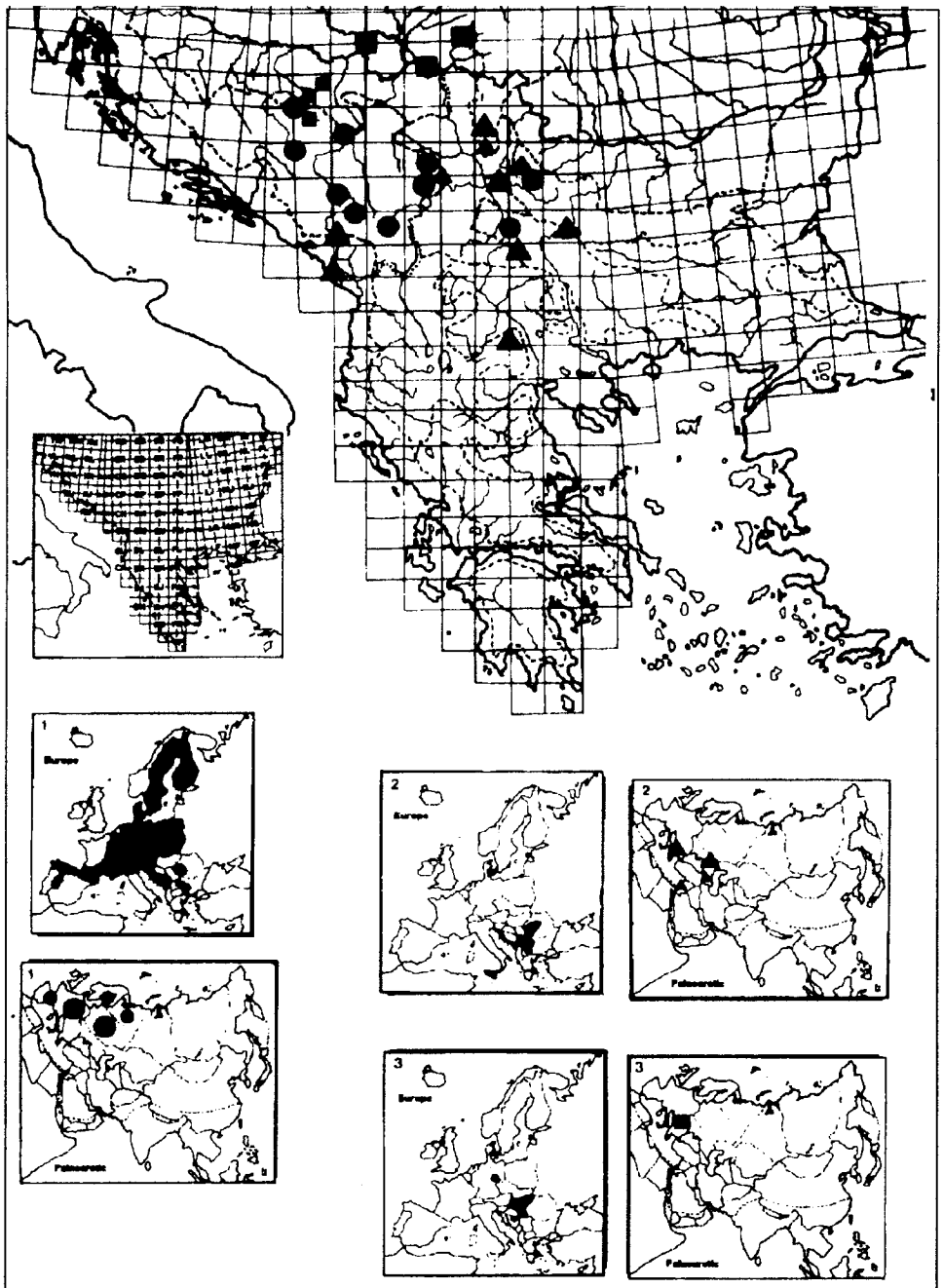
Map 34 Distribution of: (1) Cheilosia proxima (■) and (2) C. balkana (●) in Palaearctic, Europe and the Balkan Peninsula; (▲) both species sympatrically.



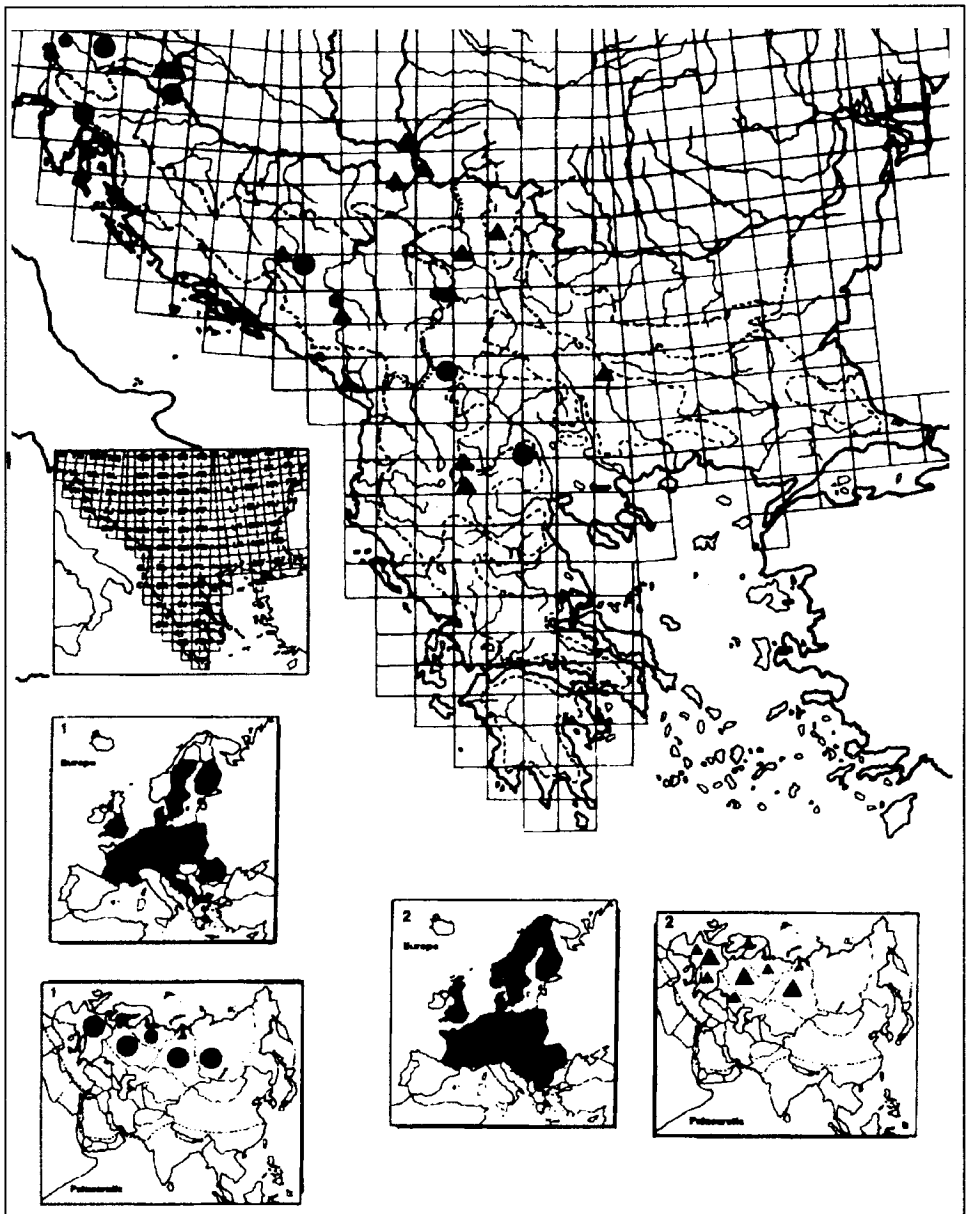
Map 35 Distribution of: (1) Cheilosia pagana (▲) and (2) C. bergestammi (✱) in Palaearctic, Europe and the Balkan Peninsula.



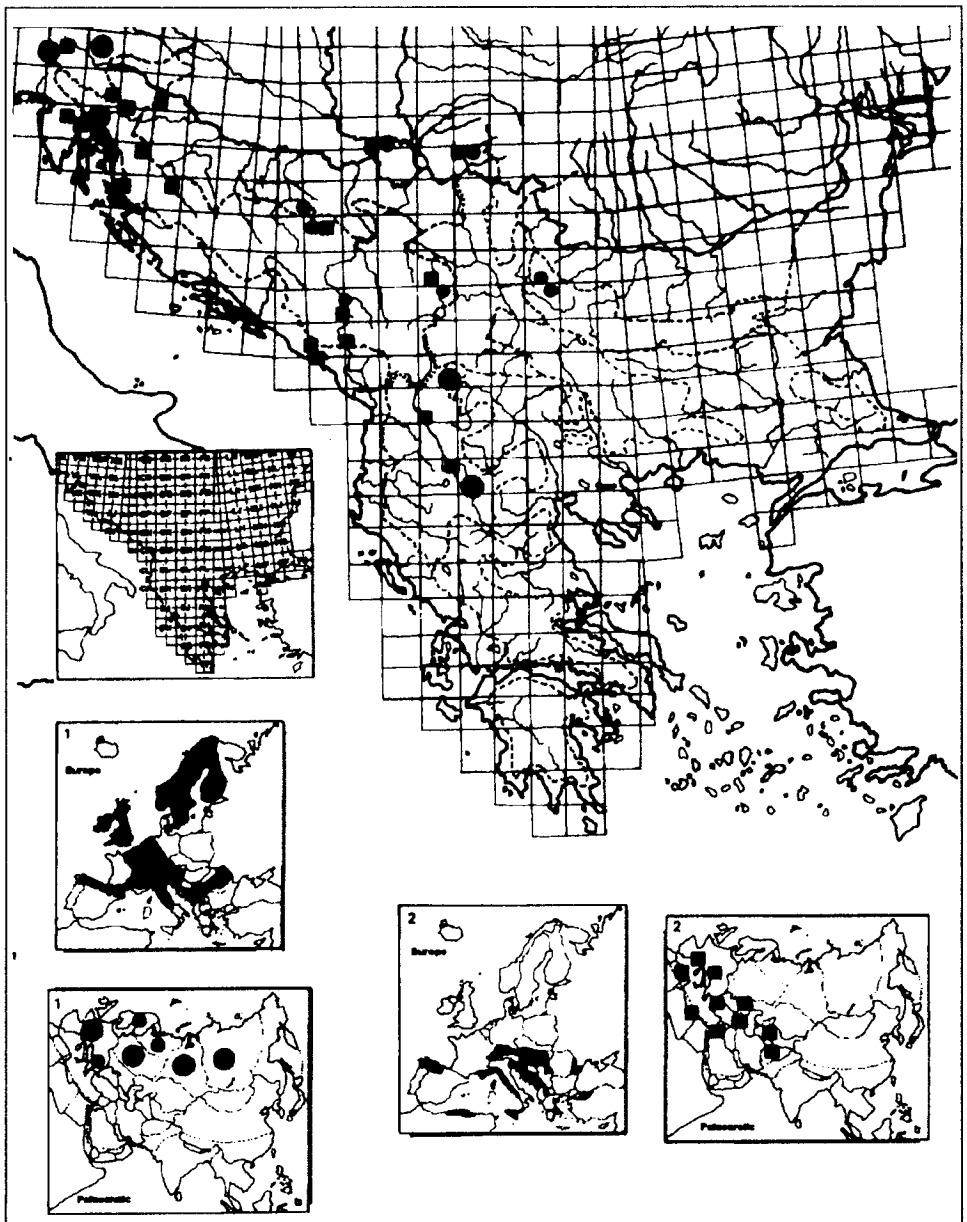
*Map 36 Distribution of: (1) Cheilosia chloris (●) and (2) C. bracusi (■) in Palaearctic, Europe and the Balkan Peninsula; (*) both species sympatrically.*



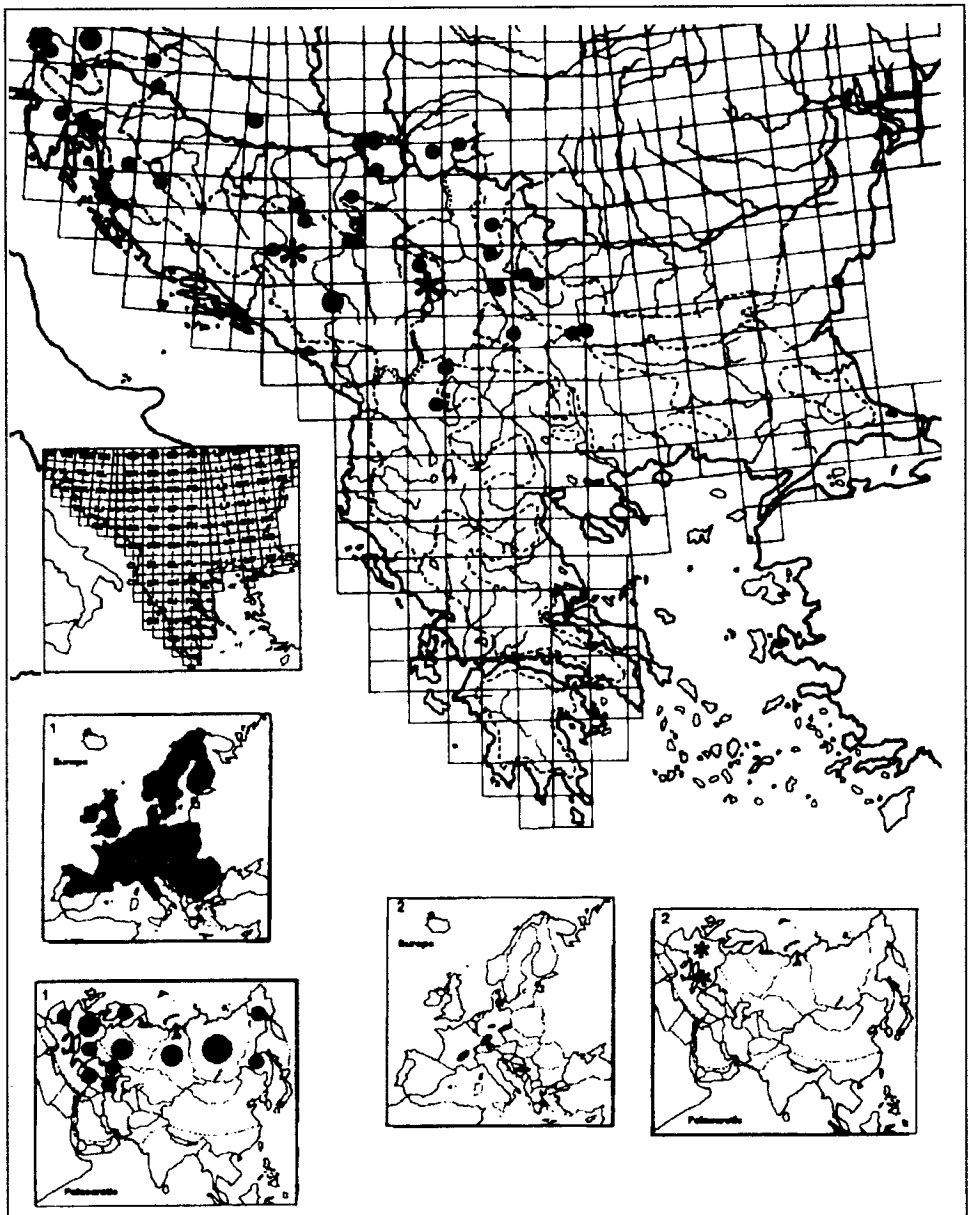
Map 37 Distribution of: (1) Cheilosia frontalis (●), (2) C. brunnipennis (▲) and (3) C. griseifacies (■) in Palaearctic, Europe and the Balkan Peninsula.



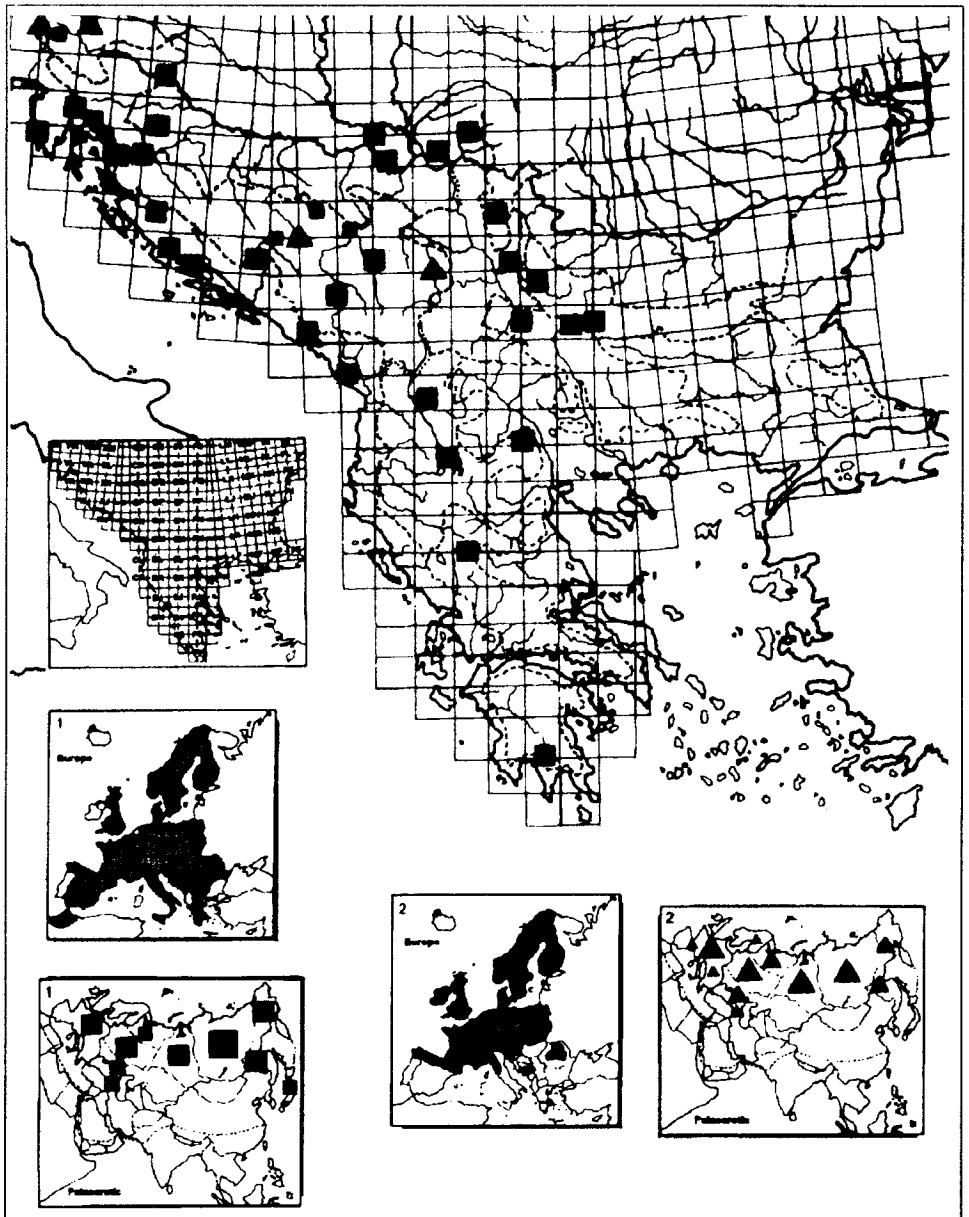
Map 38 Distribution of: (1) Cheilosia carbonaria (●) and (2) C. cynocephala (▲) in Palaearctic, Europe and the Balkan Peninsula.



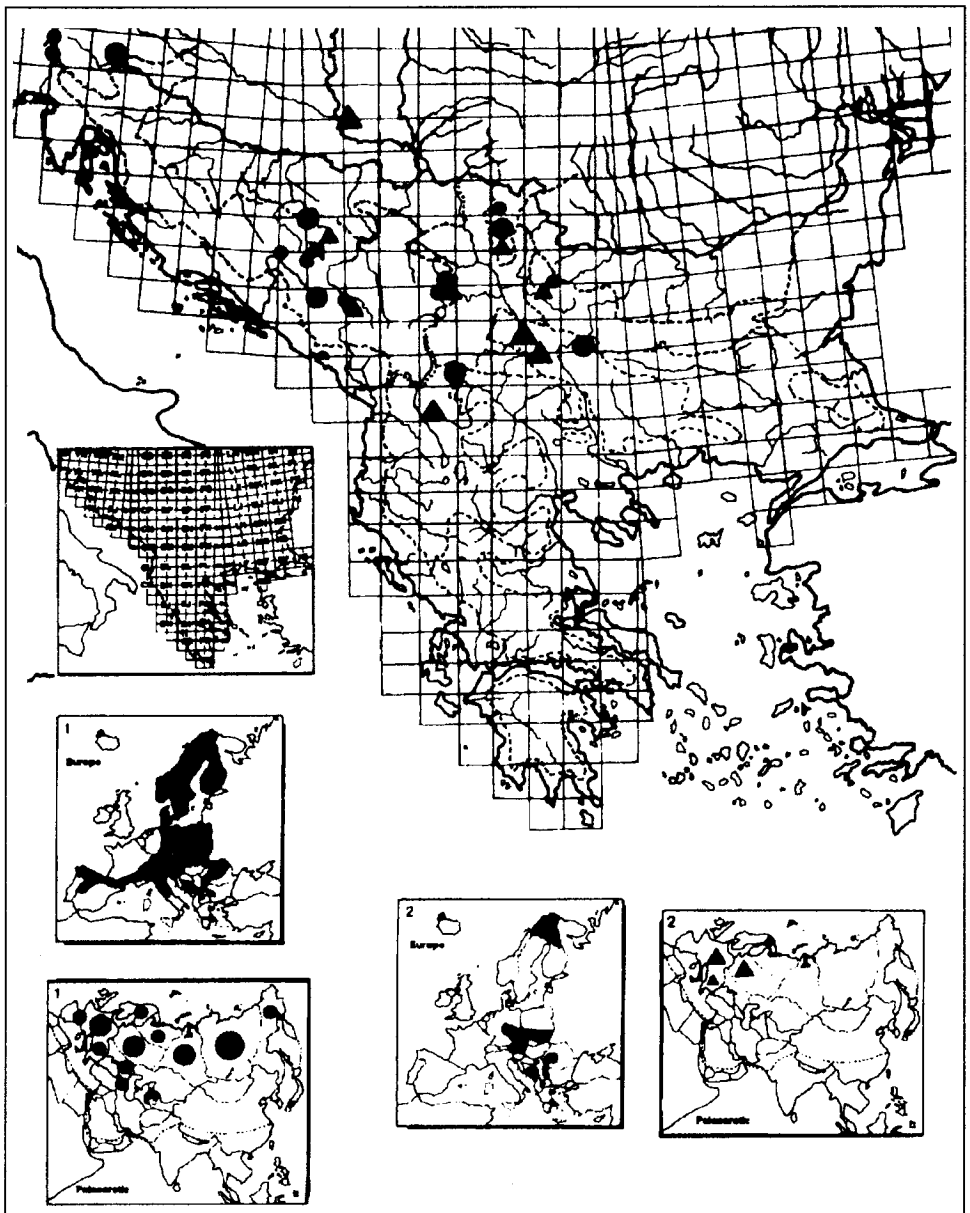
Map 39 Distribution of: (1) Cheilosia chrysocoma (●) and (2) C. latifacies (■) in Palaearctic, Europe and the Balkan Peninsula.



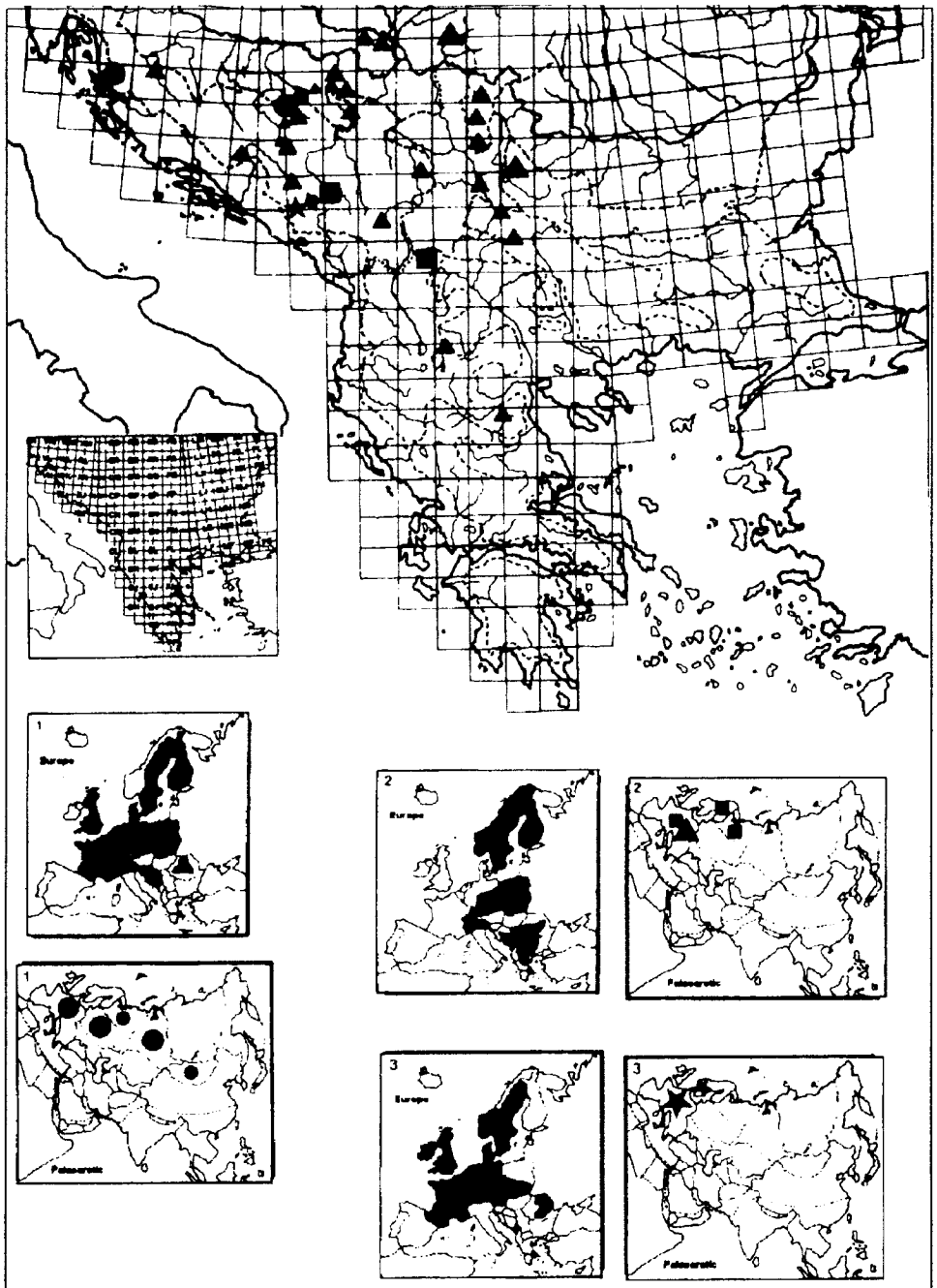
*Map 40 Distribution of: (1) Cheilosia vernalis (●) and (2) C. clama (* both species sympatrically) in Palaearctic, Europe and the Balkan Peninsula.*



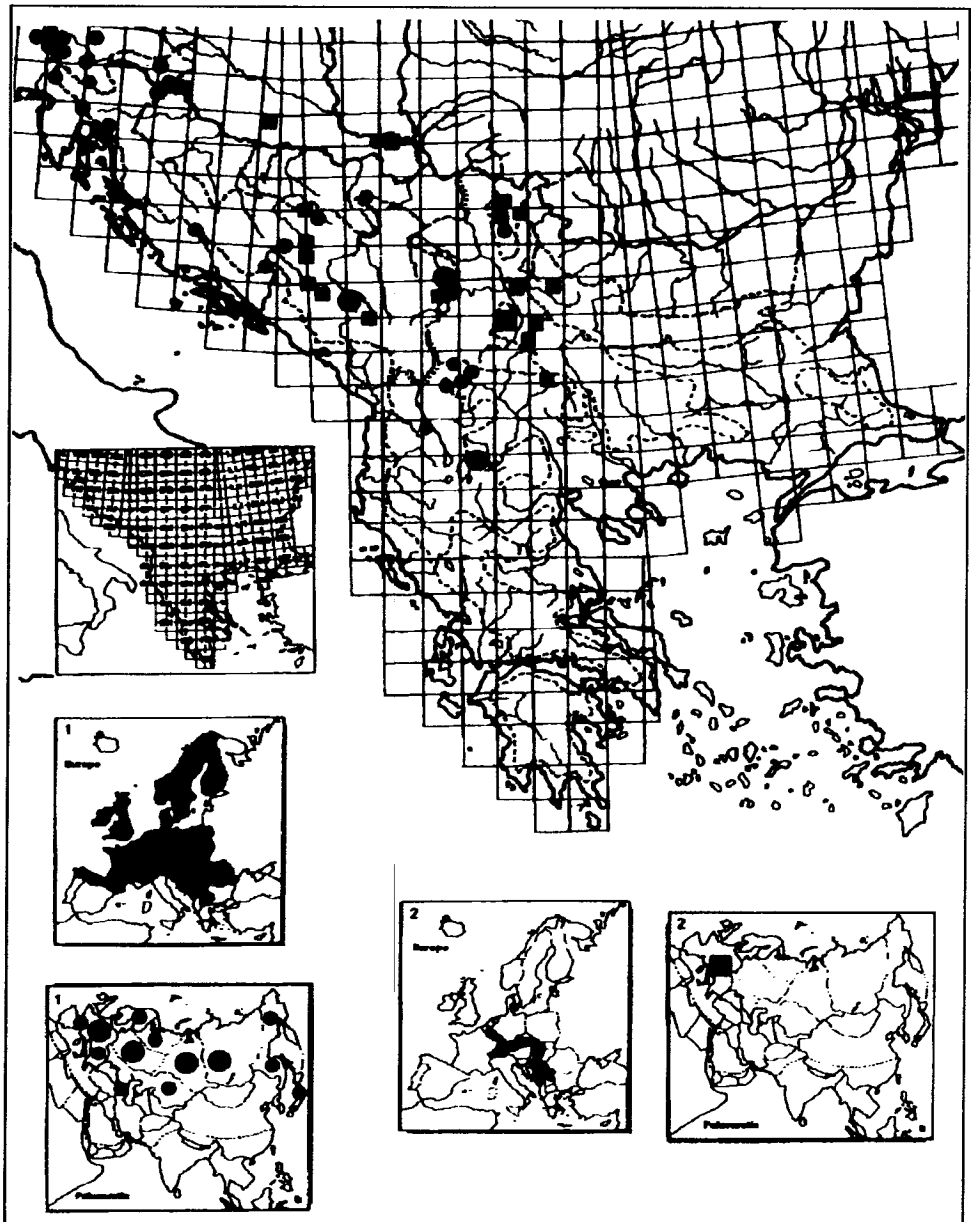
Map 41 Distribution of: (1) Cheilosia soror (■) and (2) C. fraterna (▲) in Palaearctic, Europe and the Balkan Peninsula.



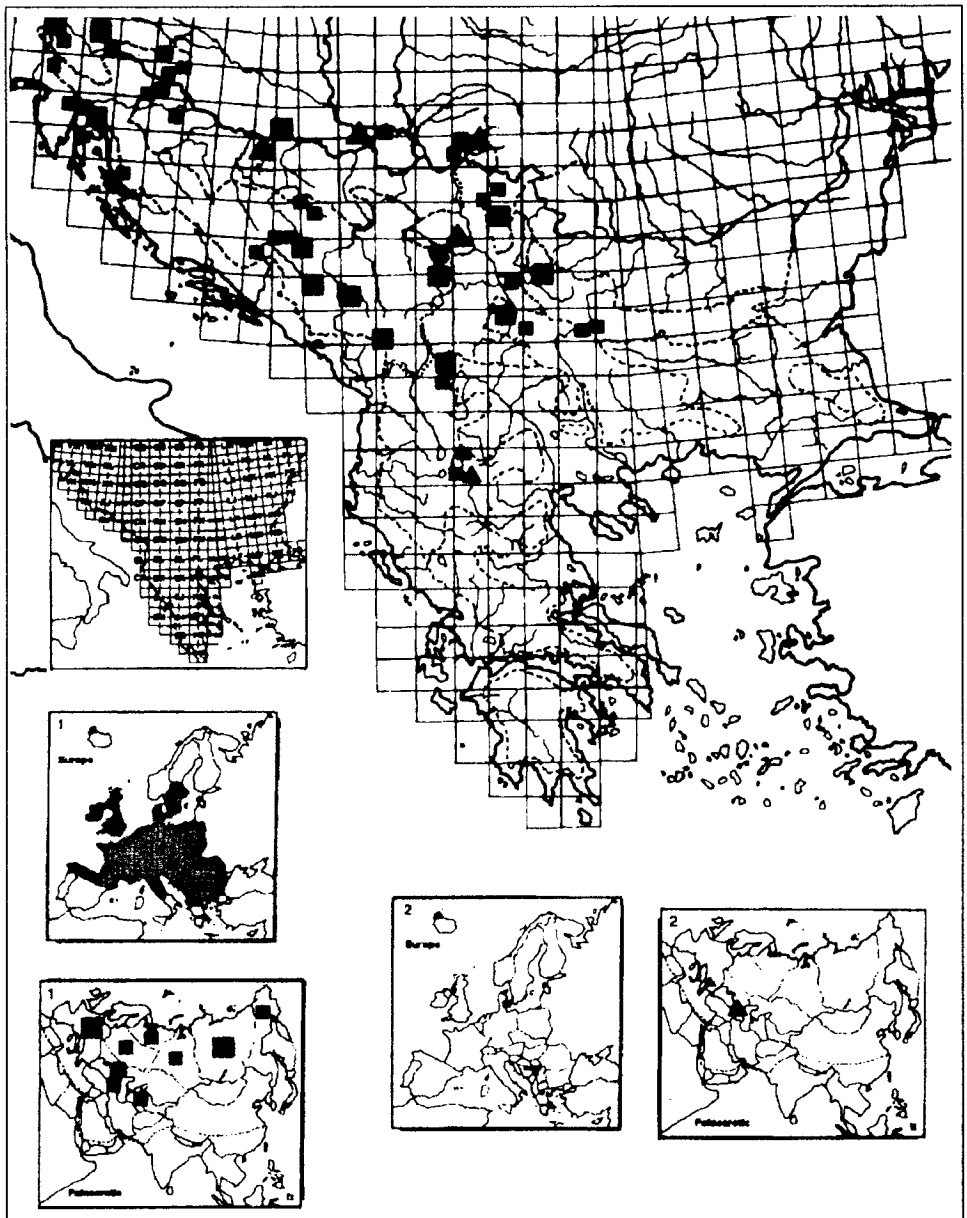
Map 42 Distribution of: (1) Cheilosia gigantea (●) and (2) C. pascuorum (▲) in Palaearctic, Europe and the Balkan Peninsula.



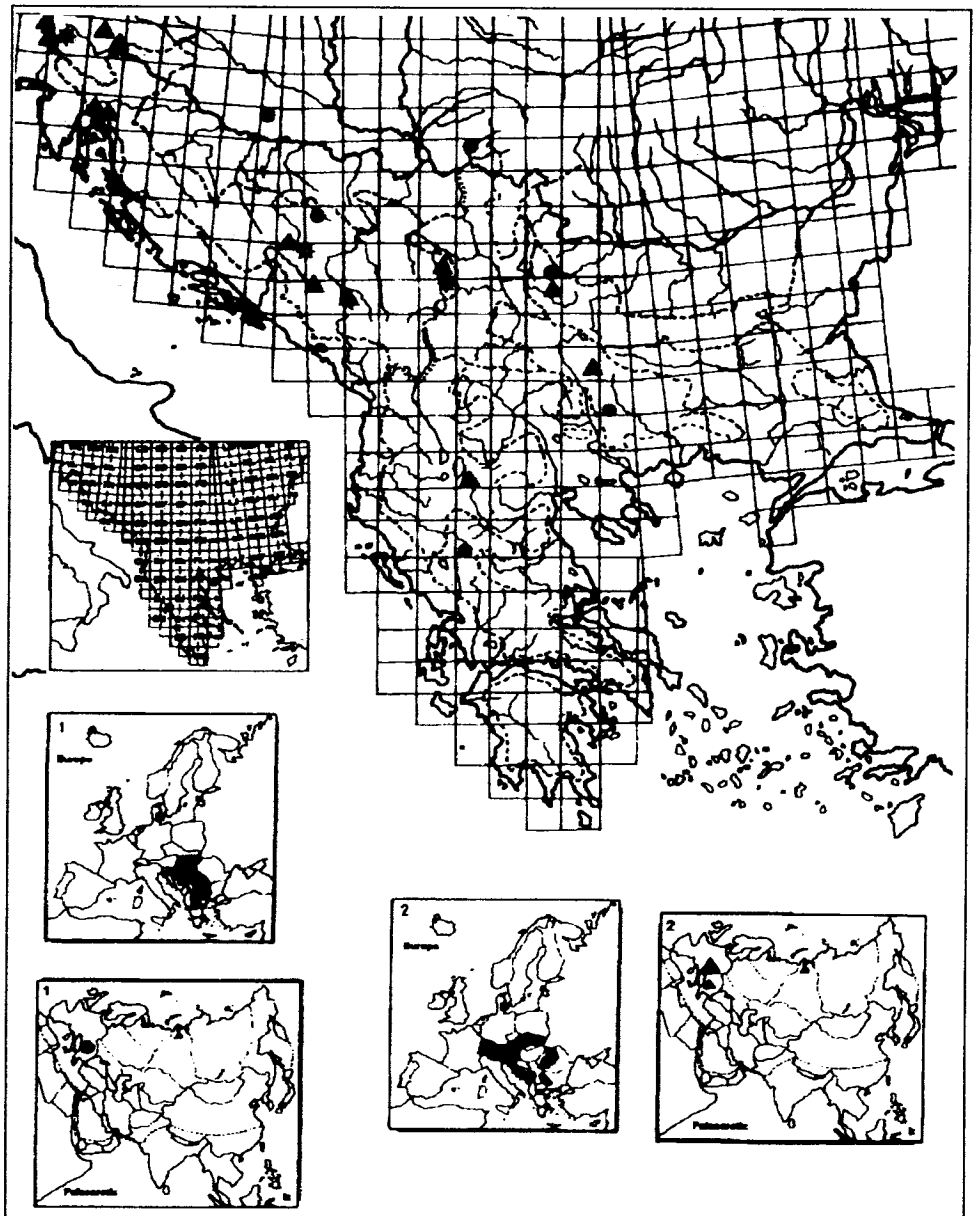
Map 43 Distribution of: (1) Cheilosia lasiopa (●), (2) C. melanopa ssp. melanopa (■), C. melanopa ssp. redi (▲) and (3) Portevinia maculata (★) in Palaearctic, Europe and the Balkan Peninsula.



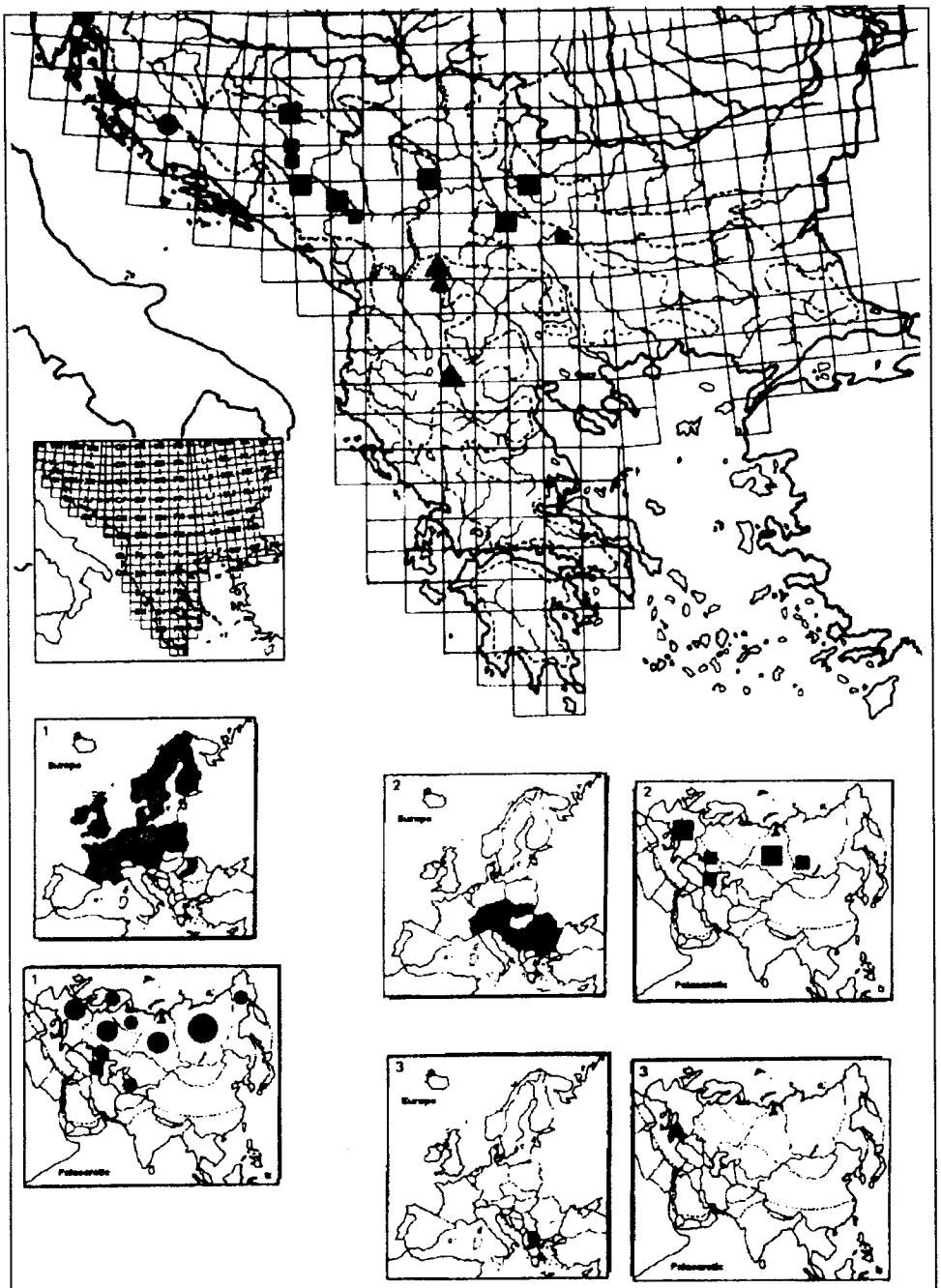
Map 44 Distribution of: (1) Cheilosia illustrata (●) and (2) C. orthotricha (■) in Palaearctic, Europe and the Balkan Peninsula.



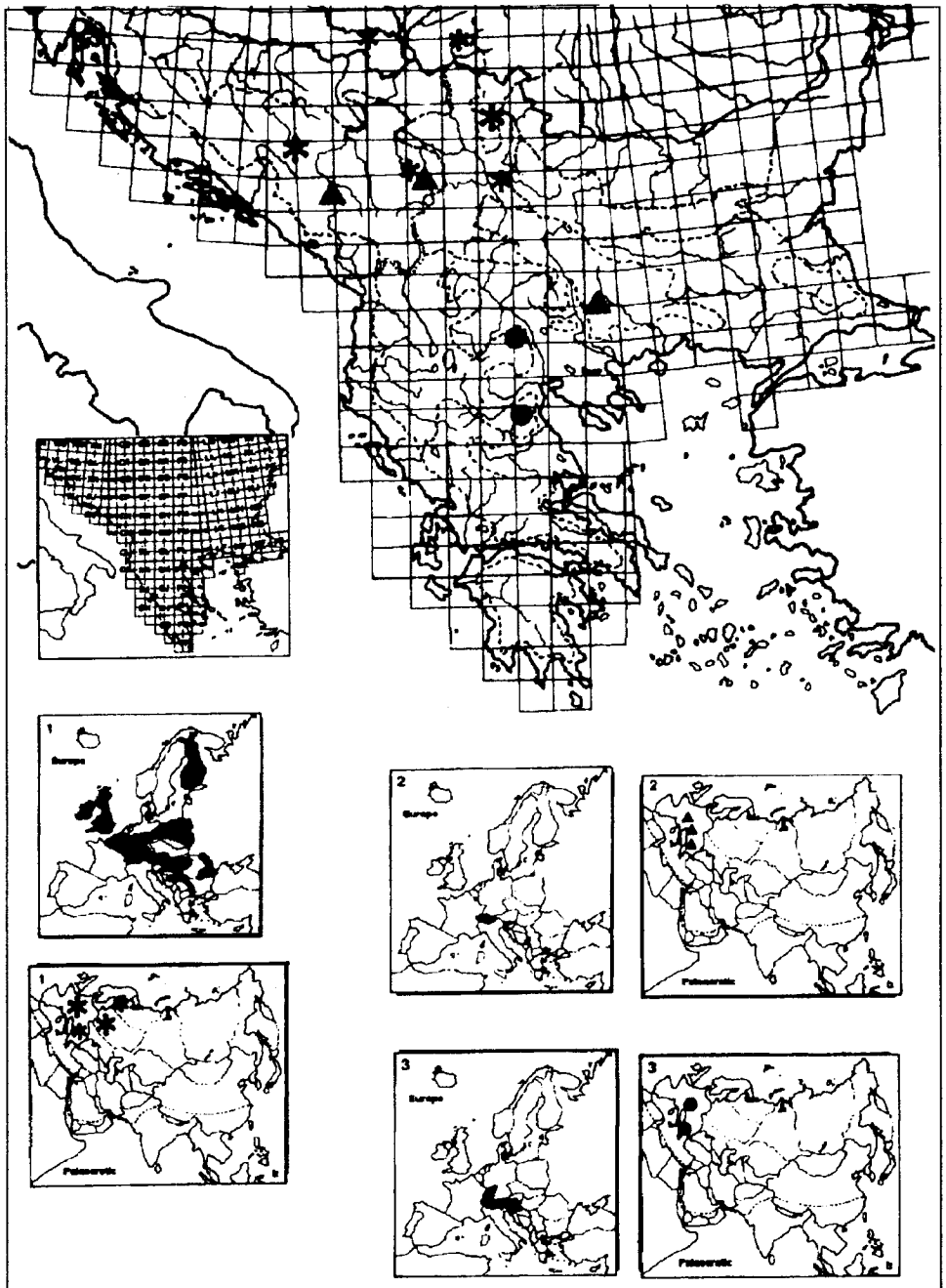
Map 45 Distribution of: (1) Cheilosia impressa (■) and (2) C. schnabli (▲) in Palaearctic, Europe and the Balkan Peninsula.



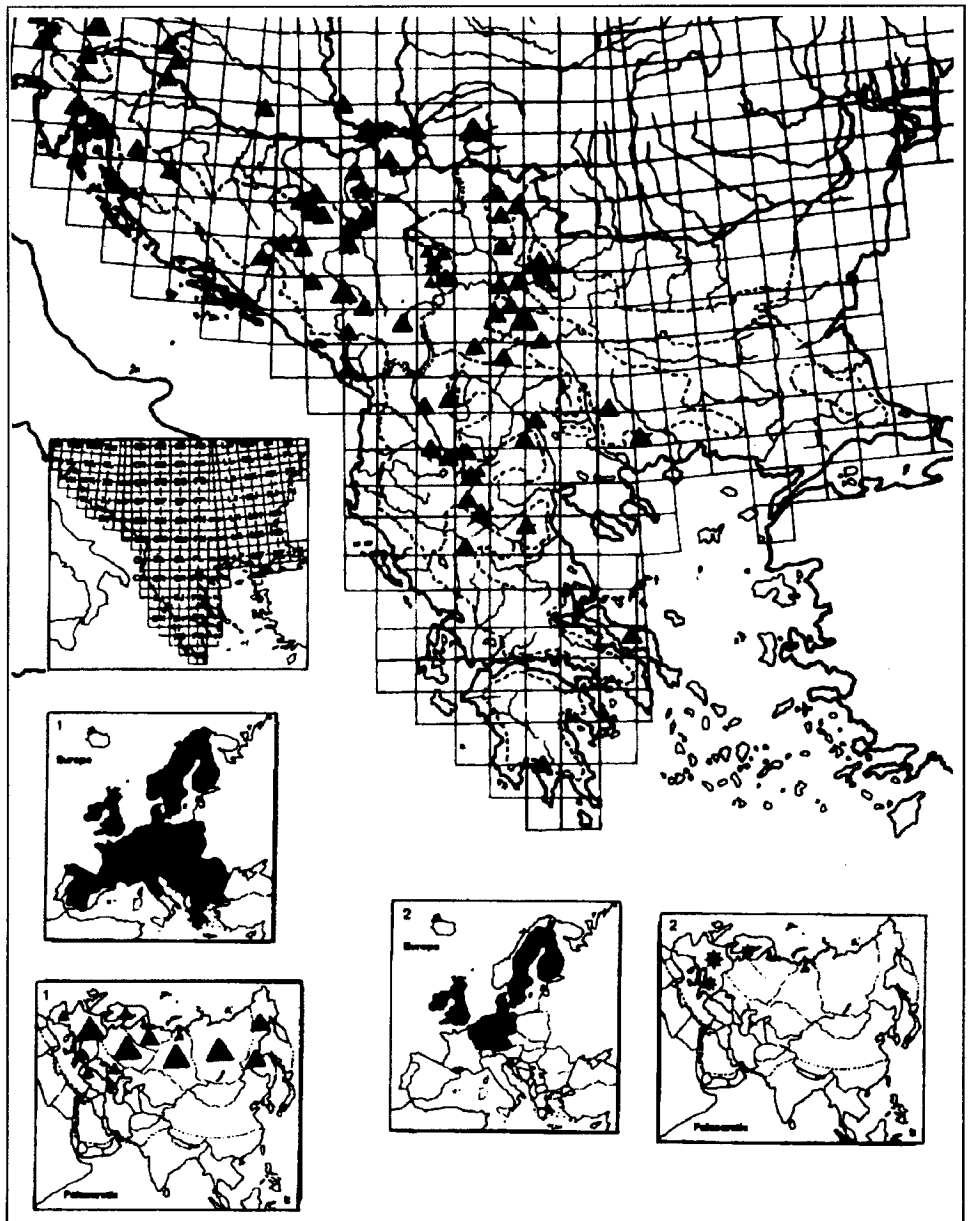
Map 46 Distribution of: (1) Cheilosia lenta (●) and (2) C. rhynchops (▲) in Palaearctic, Europe and the Balkan Peninsula; (✱) both species sympatrically.



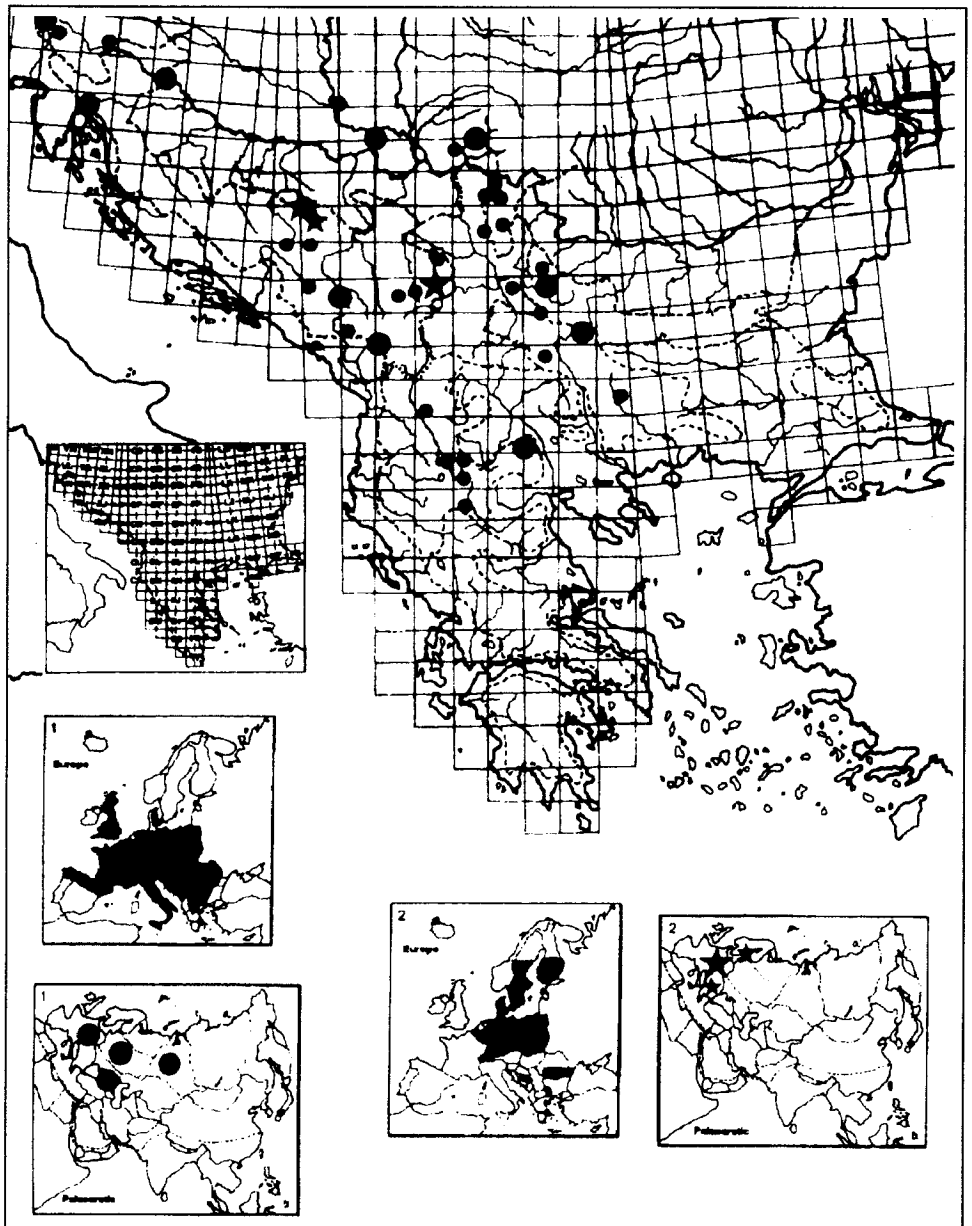
Map 47 Distribution of: (1) Cheilosia velutina (●), (2) C. melanura ssp. melanura (■) and C. melanura ssp. rubra (▲) in Palaearctic, Europe and the Balkan Peninsula.



*Map 48 Distribution of: (1) Cheilosia nebulosa (*), (2) C. pictipennis (▲) and (3) C. subpictipennis (●) in Palaearctic, Europe and the Balkan Peninsula.*



Map 49 Distribution of: (1) Cheilosia praecox (▲) and (2) C. uviformis (✱ both species sympatrically) in Palaearctic, Europe and the Balkan Peninsula.



Map 50 Distribution of: (1) Cheilosia vulpina (●) and (2) C. rufimana (★) in Palaearctic, Europe and the Balkan Peninsula.

5. 4. DIVERSITY OF GENUS *CHEILOSIA* AND RELATED GENERA ON THE BALKAN PENINSULA

On the basis of the results presented in the Survey of the Fauna following data should be stated to be of special faunal importance:

- A total number of 78 species from three genera (*Cheilosia, Nigrocheilosia* and *Portevinia*) are registered of that 77 have been recorded during the recent field work and one species (*C. velutina*) has been found only in the museum material.
- Six new species have been recently described on the basis of the samples collected on the Balkan:

1. *C. balkana* Vujić, 1994 (type locality: Durmitor, Montenegro);
2. *C. bracusi* Vujić et Claussen, 1994 (type locality: Kopaonik, Serbia);
3. *C. clama* Claussen et Vujić, 1995 (type locality: Kopaonik, Serbia);
4. *C. griseifacies* Vujić, 1994 (type locality: Fruška gora, Serbia);
5. *C. katara* Claussen et Vujić, 1993 (type locality: Katara, Pindos, Greece);
6. *C. orthotricha* Vujić et Claussen, 1994 (type locality: Kukavica, Serbia);

- Two new subspecies have been described in the present paper:

1. *C. melanopa redi* ssp. n. (type locality: Vršačke planine, Serbia);
2. *C. melanura rubra* ssp. n. (type locality: Šar-planina, Serbia).

- Fourteen species have been recorded on the Balkan Peninsula for the first time:

1. *Nigrocheilosia grisella, N. herculana, N. impudens, N. insignis, N. kerteszi, N. laeviseta;*
2. *Cheilosia* aff. *albitarsis, C. bergestammi, C. fraterna, C. lasiopa, C. lenis, C. longula, C. pascuorum, C. velutina.*

- In relation to the species distribution over the Balkan states it can bee seen that an equal number of species is present in the majority of them (from 48-61). The number of species is somewhat lower in Bulgaria (41) due to less through investigations and in Macedonia (32) and Greece (27) because of less faunal diversity of investigated genera:

1. 49 species have been recorded in Slovenia (38 for the first time);
2. in Croatia 48 (18 for the first time);
3. in Bosnia and Herzegovina 60 (32 for the first time);
4. in Montenegro 59 (29 for the first time);
5. in Serbia at the most, 61 (20 for the first time);

6. in Macedonia 32 (19 for the first time);

7. in Bulgaria 41 (3 for the first time);

8. in Greece the least, 27 (19 for the first time).

Within the total number of species in each country there are several unconfirmed species - from one in Macedonia to four in Croatia and Bosnia and Herzegovina and even 16 species in case of Bulgaria on account of the unchecked material from the collection published in the paper of Bankowska (1967).

- Seventy-one species have been registered in FR Yugoslavia (Serbia and Montenegro) - 20 species have been recorded in this area for the first time.

5. 4. 1. Species and Names Excluded from The Balkan Fauna (synonyms and redeterminations)

The majority of the material collected on the Balkan Peninsula, and stored different colections, was checked. It was noticed that colections by certain authors, such as Drenski (ZMS), have many incorrect determinations, while other have less, but still considerable number. Data have been given for each analysed sample in the Survey of the Fauna.

The following 30 species are cited in the literature but their presence on the Balkan Peninsula has not been confirmed by checking of the museum collections, or their names have been recently synonymized:

1. *Cheilosia argentifrons* Hellen, 1914

The species was mentioned by Glumac (1959) on Fruška gora; sample from the collection belongs to the species *C. praecox*. The name *argentifrons* is established as a synonym of *C. uviformis* Becker (synonymy: Claussen, 1988).

2. *Cheilosia atriseta* (Oldenberg, 1916)

It was reported for Fruška gora (Glumac, 1959). The validity of this species is doubtful. Analysed female specimen from Italy are characterized by thickened and hairy arista and probably belong to some of *Nigrocheilosia* species (suggestion of Claussen, pers. comm.). In Glumac collection it is a female sample of *C. impressa* with abberant arista.

3. *Cheilosia bigoti* Becker, 1894

Drenski (1934) mentioned a record in Bulgaria. Checking of the material from the collection proved it to be a sample of *C. aerea*.

4. *Cheilosia brachyptera* Palma, 1864

The records were cited for Istria (Glumac, 1956a) and southern Adriatic coast (Glumac, 1956b); samples from the collections are redetermined as *C. latifrons*.

5. *Cheilosia brachysoma* Egger, 1860

It was registered on Fruška gora (Glumac, 1959). This sample belongs to the extremely variable species *C. vernalis*.

6. *Cheilosia bureschi* Delkeskamp, 1942

It has been established (Claussen, 1996a) as the synonym of species *C. pictipennis*.

7. *Cheilosia confinis* Becker, 1894

It was registered on Durmitor (Šimić, 1987). All samples from the collection belong to species *C. bergenstammi*.

8. *Cheilosia conops* Becker, 1894

Claussen & Speight (1988) have established that the name is a synonym of *C. vulpina*.

9. *Cheilosia correcta* Becker, 1894

This species was mentioned by a number of authors (Strobl, 1898; Glumac, 1959; Bankovska, 1967). The analysis of the samples from the Balkan Peninsula has identified them all to belong to the *C. aerea*.

10. *Cheilosia flavissima* Becker, 1894

Drenski (1934) reported the records of this species in Bulgaria. The samples from the collection determined as *C. flavissima* actually belong to *Nigrocheilosia nigripes* and *C. albitarsis*.

11. *Cheilosia gemina* Becker, 1894

It was recorded in Serbia and Macedonia (Glumac, 1955a). The samples from museum material belong to a variable species *C. aerea*.

12. *Cheilosia gracilis* Hellen, 1914

Glumac (1959) cited the record on Fruška gora. This specimen is redeterminated as *C. cumanica*.

13. *Cheilosia imperfecta* (Becker, 1921)

The validity of this species is unclear. The material collected on the Balkan Peninsula (Šimić & Vujić, 1987; Šimić, 1987) belong to species *C. albitarsis* with darker front tarsi.

14. *Cheilosia intonsa* Loew, 1857

This name was cited by authors for Balkan Penisula. Recentlly, *C. latifrons* is recognized as the senior synonym for *C. intonsa* (Speight & Lucas, 1992).

15. *Cheilosia laevis* Becker, 1894

Šimić (1987) reported the species on Durmitor. However, this name is a junior homonym of one Nearctic species and Claussen (1987) proposed the new name for European species, *C. laeviseta*.

16. *Cheilosia laeviventris* Loew, 1857

The only specimen found on Durmitor (Šimić, 1987) shows all the morphological features of *Nigrocheilosia caerulescens*.

17. *Cheilosia langhofferi* Becker, 1894

It has been found that this name is a synonym of species *C. nebulosa* (Claussen & Speight, 1988).

18. *Cheilosia maroccana* Becker, 1894

Glumac (1959) cited this species for Serbia. These samples belong to *C. latifrons*.

19. *Cheilosia mixta* Becker, 1894

Two samples were reported for Durmitor (Šimić, 1987), but both actually belong to *C. bergenstammi*.

20. *Cheilosia montana* Egger, 1860

Two records on the Balkan Peninsula are cited in literature: on Fruška gora (Glumac, 1959) and Bulgaria (Bankovska, 1967). The sample from Fruška gora belongs to *C. aerea*. Claussen (1996a) checked the material from Bulgaria (E. Torp collection, Jelling, Denmark) determined by Bankowska and found that all specimens were misidentified and conspecific with *C. melanura*.

21. *Cheilosia nasutula* Becker, 1894

The name is the synonym of *Nigrocheilosia vicina* (Lucas et al., 1995).

22. *Cheilosia nivalis* Becker, 1894

The samples, quoted for Durmitor (Šimić, 1987), are redeterminated as *Nigrocheilosia gagatea* and *N. personata*.

23. *Cheilosia omissa* Becker, 1894

This name was used for populations of *C. lenis* found on the Balkan mountains (Vujić et al., 1993-1994).

24. *Cheilosia pedemontana* Rondani, 1857

This alpine species was cited for Durmitor (Šimić, 1987). Its checking shows that the male sample from the collection belongs to *Nigrocheilosia personata* and female to *N. gagatea*.

25. *Cheilosia planifacies* Becker, 1894

The only specimen, reported in literature for Durmitor (Šimić, 1987), is conspecific with *C. mutabilis*.

26. *Cheilosia recens* Becker, 1894

The species was cited for Bosnia and Herzegovina (Glumac, 1955b). This sample was redetermined as *Nigrocheilosia nigripes*.

27. *Cheilosia rufipes* (Preyssler, 1793)

Peck (1988) mentioned this name as a senior synonym of *C. soror*. On this basis, Vujić & Glumac (1994) cited both names for Fruška gora.

28. *Cheilosia ruralis* (Meigen, 1822)

This name was reported by many authors for the Balkan Peninsula. All records belong to species *C. praecox* (sensu Claussen & Cassebeer, 1993).

29. *Cheilosia sareptana* Becker, 1894

The species was cited for Bosnia (Strobl, 1902) and Macedonia (Glumac, 1955a). This name is a synonym of *C. brunnipennis*, established in this paper, after the proposal made by Claussen (pers. comm.).

30. *Cheilosia trisulcata* Becker, 1894

Specimens quoted for Bosnia and Herzegovina (Glumac, 1955b) and Macedonia (Glumac, 1968) belong to *C. aerea*.

The list of other misdeterminations is a long and all the rest of the species are presented in the Survey of the Fauna.

5. 4. 2. Lost and Unchecked Material

It was not possible to check the records from literature in the cases of 6 species and they remain as species that may potentially exist on the Balkan Peninsula:

1. *Cheilosia drenowskii* Szilady, 1936

The species was described according to the material from Bulgaria (Szilady, 1936) and afterwards it has not been recorded again. It may be assumed, following the description, that this name is only a synonym of *C. lenta*.

2. *Cheilosia rotundicornis* Hellen, 1914

The species was reported for Serbia (Glumac, 1972). *C. rotundicornis* was described on the basis of the material from Finland and there have been no records since. Barkalov (1993b) had checked the female type of *C. rotundicornis* and had synonymized it with *C. vernalis* Fallen. Claussen (pers. comm.) is of opinion that Hellen described the male of one species as *C. argentifrons* (synonym of *C. uviformis*) and female of same species as *C. rotundicornis*.

3. *Cheilosia ruficollis* Becker, 1894

C. ruficollis was registered in Bulgaria (Bankovska, 1967) and Macedonia (Glumac, 1968). Examination of the samples found in Macedonia has shown that they belong to *C. aerea*. Specimens found in Bulgaria have not been examined.

4. *Cheilosia schineri* Egger, 1860

The species was described on the basis of one male specimen from Italy. Afterwards, it was reported for Dalmatia (Strobl, 1900). The record from Bulgaria (Drenski, 1934) belongs to *C. bracusi* (Vujić & Claussen, 1994a).

5. *Cheilosia submodesta* Becker, 1922

The species was described according to one female sample from Vlašić (BH) as *Chilosia modesta* (Becker, 1921) and renamed to *Chilosia submodesta* by Becker (1922). Afterwards, it has not been reported in literature again. The type material has been lost and it is not possible to check whether it is a separate species or only a synonym.

6. *Cheilosia umbrisquama* Becker, 1894

The species is described (Becker, 1894) according to a single female found in the vicinity of Thessaloniki (Greece). Type material was lost and therefore, confirmation of the validity and real existence of this species is very difficult.

6. ZOOGEOGRAPHICAL ANALYSIS

Zoogeographical analysis of investigated species deals with the problems of the faunal character, the influence and the relations with the fauna of other regions and the importance of the Balkan as the center of speciation. List 1. shows the survey of species with their distribution in different biogeographical territories, zoogeographical importance (1-6, after Tepavčević & Vujić, 1996) and world range.

6. 1. ZOOGEOGRAPHICAL CHARACTERISTICS

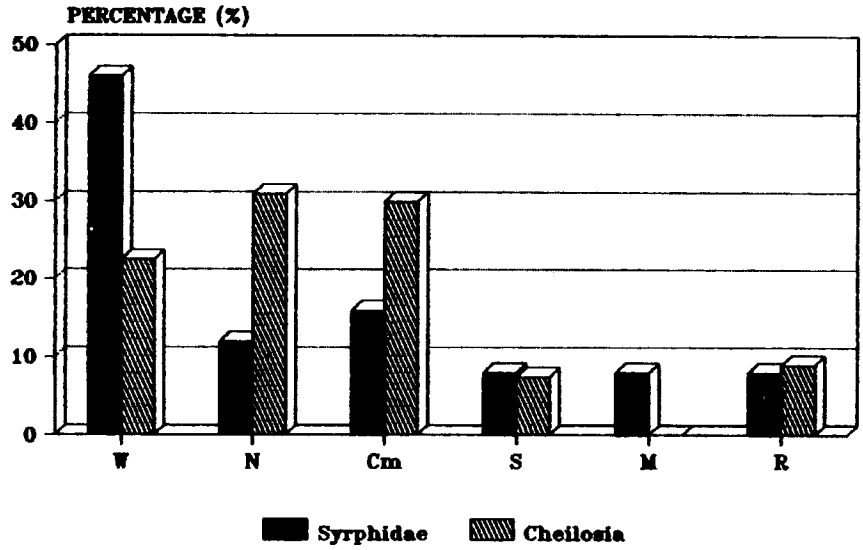
There are range limits of many species on the Balkan Peninsula. The analysis of their distribution reveals new and confirms previously established biogeographical regularities.

6. 1. 1. Different Zoogeographical Elements

Among investigated genera, species distributed in Central (Cm) and North Europe (N) are proportionally more represented on the Balkan Penisula than in the family of hoverflies (Graph.1).

1. **Species with wide distribution (W)**. The presence of 18 species with distribution over Europe, and beyond, have been confirmed. The most numerous are Euro-Siberian (11), there are a few Palaearctic species, one with range in Europe, Siberia and the Far East, and only one with Holarctic range. The differences in the fauna of the tribe Cheilosiini between the Eurasian (*Portevinia*, *Nigrocheilosia*) and the American (*Hiatomyia*) regions of the Holarctic, in the level of genera and subgenera, show that Cheilosiini was the taxon where the process of adaptive radiation occured after the Paleogen when the Laurasian territory divided into Eurasian and North American lands.

2. **Species with northern distribution (N)**. Among 24 species with northern distribution, five have ranges in Central and North Europe and the rest are distributed through Europe (and Siberia), except for the south, or just the Mediterranean. This type of range is more frequent with *Cheilosia* species than with other hoverflies in general. Species distribution in Central and North



Graph.1 Different range-types in Cheilosia group of genera and in family Syphidae on the the Balkan Peninsula. W range in all Europe and wider; N range in north and central parts of Europe or Palaearctic; Cm range in Central Europe and mountainous part of South Europe; S range in South Europe or Mediterranean, and Central Europe; M range in Mediterranean; R endemic and relicts.

Europe and on high Balkan mountains points out two possibilities of their genesis. One group of taxa is of Arcto-Tertiary origin, being evidence of the type of species that lived in North Europe before the Quarternary. The other possibility of their genesis could be that during the period of glaciation new taxa were formed in refuges on the south and withdrew to the north during interglacial periods. In the south, these species remained only on high mountains.

3. **Central European species (C)**. Among 26 species of Central European distribution, there are several smaller groups characterized with specific types of ranges.

- The Central European-high mountain group of species (21) consist of those species having the center of distribution in the Alps, Dinaric mountains or the Carpathians. They can also be found in various combinations on two or all three mountain systems. In addition, they can have a wider distribution reaching the Cantabrian mountains, Pyrenees, other Balkan mountains or Caucasus. Within 21 species, three smaller groups can be indicated: the Alpine species which besides the Alps appear on Dinaric mountains and sometimes on the Pyrenees

and Cantabrian mountains (5); high mountain species with habitats on the majority of afore mentioned mountains (14); and the Carparhians species with a distribution limited to the Carpathians and Balkan mountains (2). All these taxa indicate the importance of glacial periods in the development of Pleistocene fauna. Those of *Nigrocheilosia* are predominant among them (14 of total 21), especially in the Alpine group of species. The populations of these taxa live on very high altitudes, in the biome of high mountain tundra. However, only a few species have the range outside the borders of Central Europe. The absence of these species in Nordic tundra can associate their genesis with climatic changes in Quarternary. Apparently during the glaciation, the species had a wider range, reaching far to the south. In periods when climate became warmer, species retreated to their previous habitats in the Alps and on the high peaks of Balkan mountains (and Pyrenees), which are the refuge areas today. In this way the distribution of these species was extremely divided and included many separated populations. Further interglaciation changes in the past could have easily caused and accelerated the process of speciation. The result was the appearance of many new species that widened their range during the next glacial period and therefore in following warmer period a larger number of species retreated to their original habitats. This is a possible explanation for a great diversity of *Nigrocheilosia* species in the Alps and small number of taxa in northern Europe. A similar process happened with the Carparhians species, the appearance of the *caerulescens* group of species in this region with two endemic taxa (*N. herculana* and *N. kerteszi*) being a good illustration.

- The rest of Central European taxa (5) have a similar history, except for their habitats which are in the biomes of South European beech woodlands, although they can be found also in the biome of coniferous forests of boreal type. Species related to *Cheilosia lenis* and *C. melanura* have this type of range and present Pleistocene elements of fauna.

4. **Species with southern distribution (S)**. A small number of species (7) of these genera are distributed in South and Central Europe, in the wider Mediterranean area, and one species in the east Mediterranean. On the Balkan Peninsula, there are no records of species with narrow Mediterranean distribution (M) that are much represented as in the case of some other hoverfly genera (*Merodon*). This fact exemplifies the relation of the genus *Cheilosia* with the habitats of the temperate zone of the Holarctic region and the assumption of the genus origin in an Arcto-mountain-boreal center of speciation, of the Neogene age (stated by Matvejev, 1961). South European (Mediterranean) type

of range is characteristic for only a small number of species related to *C. latifacies*.

5. **Endemic, relicts, species with narrow range (R)**. A large number of species are in a certain ways endemic and relict, but only a few taxa (6) are actually characterized with an especially narrow range. Four of them are Balkan endemic (*Cheilosia balkana*, *C. katara*, *C. melanura rubra* ssp. n., and *Nigrocheilosia* sp.) one is Pannonic (*C. griseifacies*) and one Carpathians (*N. kerteszi*).

6. 1. 2. The Connections with other Regions

The studied group is rich in species with occurence limited to small areas. The study of this group aids to better the understand the zoogeographical relationship between the Balkan Peninsula and neighboring and distinct regions. The large number of species give evidence of the degree and direction of interaction between the Balkan fauna and the fauna of these regions.

Central Europe (sensu stricto). The largest number of common species belonging to the fauna of *Cheilosia* species on the Balkan Peninsula are found in Central Europe (areas from Germany and Austria to Poland and Hungary) and in the biomes of south European deciduous forests. The continuity of these biocenoses along the margins of the Pannonic depression and over the Alps and the Carpathians mountains, provides a uniform arrangement of the species over the whole territory of Central Europe and up to the South Dinaric mountains.

North Europe (and Siberia). The species in common to the Balkan Peninsula and North Europe are a single European species of genus *Portevinia* and many other species of genus *Cheilosia*. A great number of these species have been recorded on only a few localities on the Balkan suggesting that they are of Arcto-Tertiary origin, have reached their current southern areas under the influence of glaciations (*Portevinia maculata*, *Cheilosia morio*, *C. longula*, *C. melanopa* ssp. *melanopa*, *C. uviformis*, *C. rufimana*, *C. bergestammi*, *C. carbonaria*, *C. frontalis*). The most important refuge areas for these species are the spruce boreal forests of the North Dinaric mountains. A great many species having this type of range are registered on Durmitor but not as many as on the mountain of Kopaonik.

The Alps. The existence of a large number (16) of species common for the Alps and the Balkan reflects an intensive interchange of fauna between these two adjoining regions. Out of this number 13 species are represented only at high altitudes of the North Dinaric mountains.

Of special importance was the mountain Durmitor and the refuge of Alpine species in the Škrčko-Sušički basin, where out of 11 registered Alpine species, two have not been recorded in other parts of the Balkan Peninsula. Zoogeographical importance of this refuge for Central European species has

been already observed (Šimić, 1987), while resulting from new investigations the number of documented species has been encreased for Alpine elements (*Nigrocheilosia derasa, N. faucis, N. hercyniae, N. insignis, N. laeviseta, N. loewi,* and *Cheilosia pictipennis*). In the case of some of mentioned species, only individual records are captured for the Balkan Peninsula: *N. insignis* has been also found on the mountain Grmeč, *N. faucis* and *N. loewi* in central Bosnia, *N. hercyniae* on the mountain of Prokletije, and *C. pictipennis* on Kopaonik and Rhodopes.

Species *N. crassiseta* is the only Alpine *Nigrocheilosia* species from the Balkan Peninsula not registered on Durmitor. During the study, the species was found in the National Park of Triglav which is on the borderline between the Alps and Dinaric mountains (Slovenia).

The Carpathians. Twelve species of limited range were mutual for the region of the Balkan Peninsula and the Carpathians. Of special importance are the species related to *Nigrocheilosia caerulescens* of which *N. herculana* is distributed only on the Carpathians and the Balkan (Durmitor, South Dinaric mountains), and *N. kerteszi* only on the Carpathians (on the Balkan only on the south Carpathians in east Serbia).

Pyrenees and Cantabrian mountains. Three species were considered as a connection between the fauna of the Balkan Peninsula and the Pyrenees and Cantabrian mountains over the Alps (*Nigrocheilosia faucis, N. personata* and *Cheilosia bracusi*). These species were recorded on the Cantabrian mountains (Marcos-Garcia, 1990), Pyrennes (Marcos-Garcia, 1985), the Alps and North Dinaric mountains. *N. faucis* and *N. personata* were also found on the Carpathians and *C. bracusi* on the Apennine Peninsula.

Caucasus. The species *Cheilosia schnabli* was registered on the margin of the Pannonic depression (Vršačke planine, Fruška gora) and in the central part of the Balkan Peninsula (up to northern Greece). This species was described according to material from the Caucasus, while records in other regions have not been registered. It is similar to *C. impressa* in morphology, time of appeaance, and habitat type, but the two species have never been found together. Both species occur on low Subpannonic mountains but in spatially separated localities. The phenomenon of the vicariation of these species remains a question for future research.

6. 1. 3. The Balkan Peninsula as a Center of Speciation

The importance of the Balkan Peninsula as a center of speciation can be recognized to a great extent in case of *Cheilosia* group. The presence of endemic species and the changes in isolated populations of some species along the margins of their ranges demonstrates the process of speciation which testifies to the importance of Balkan Peninsula in the formation of European fauna.

6. 1. 3. 1. THE BALKAN ENDEMIC

The Pannonic endemo-relict species. *Cheilosia griseifacies* has been recorded only on the territory of the Pannonic Plain and at lower altitudes of the Subpannonic hills. It belongs to a group of well-known *Cheilosia* species in Europe. The limited distribution probably presents a specific reflection of its origin. One possibility related to its genesis is that *C. griseifacies* represents an ancient Pannonic relict from the Tertiary which has disappeared over a wider territories. The only specimens out of its current range were collected in the vicinity of Thurningen, Germany, during 1923 and 1928 (Vujić, 1994a).

Dinaric endemic species. *Cheilosia balkana* is a species recorded at high altitudes of North and South Dinaric mountains and in small populations on the Italian and Slovenian Alps (Vujić, 1994b). The range of *Nigrocheilosia* sp. occupies the North Dinaric mountains and the Slovenian Alps at altitudes between 1000 and 2300 m.

South Dinaric endemic subspecies. *C. melanura rubra* ssp. n., a subspecies described in this work, has been recorded on the South Dinaric mountains, in the biome of Oromediterranean forests of *Pinus peuce* and *P. heldreichii*. Its morphological features separate it clearly from the Central European subspecies *C. melanura* ssp. *melanura*. It is quite probable that the present distribution of subspecies *rubra* is of relict character (it might have had a wider range in the Tertiary). An extremely variable and highly adaptive subspecies *melanura* can be found more to the north.

The endemic (relict) of Pindos. *C. katara* has a special position within the genus *Cheilosia*. Its range is limited to Pindos mountain in central Greece and represents the most southward mountainous *Cheilosia* species on the Balkan Peninsula.

Central European relict species. *Cheilosia clama* has been recorded on several localities in Central Europe and on two Balkan mountains (Claussen & Vujić, 1995). Type locality is the deep canyon of the Samokovska river on the mountain Kopaonik. This area contains very important refuge habitats for many *Cheilosia* species.

6. 1. 3. 2. THE TAXA IN DEVELOPMENT

A detailed morphological analysis has revealed distinct differences between certain populations of a larger number of species. This phenomenon is especially visible in the case of the taxa related to *Cheilosia rhynchops* and *C. melanura*. These are very young monophiletic groups where the process of speciation has not yet been completed. Many populations are separated from their basic range, particularly on the Balkan Peninsula.

Separate morphological characteristics of many peripherally isolated populations indicate the multiplication of species. The differences between the

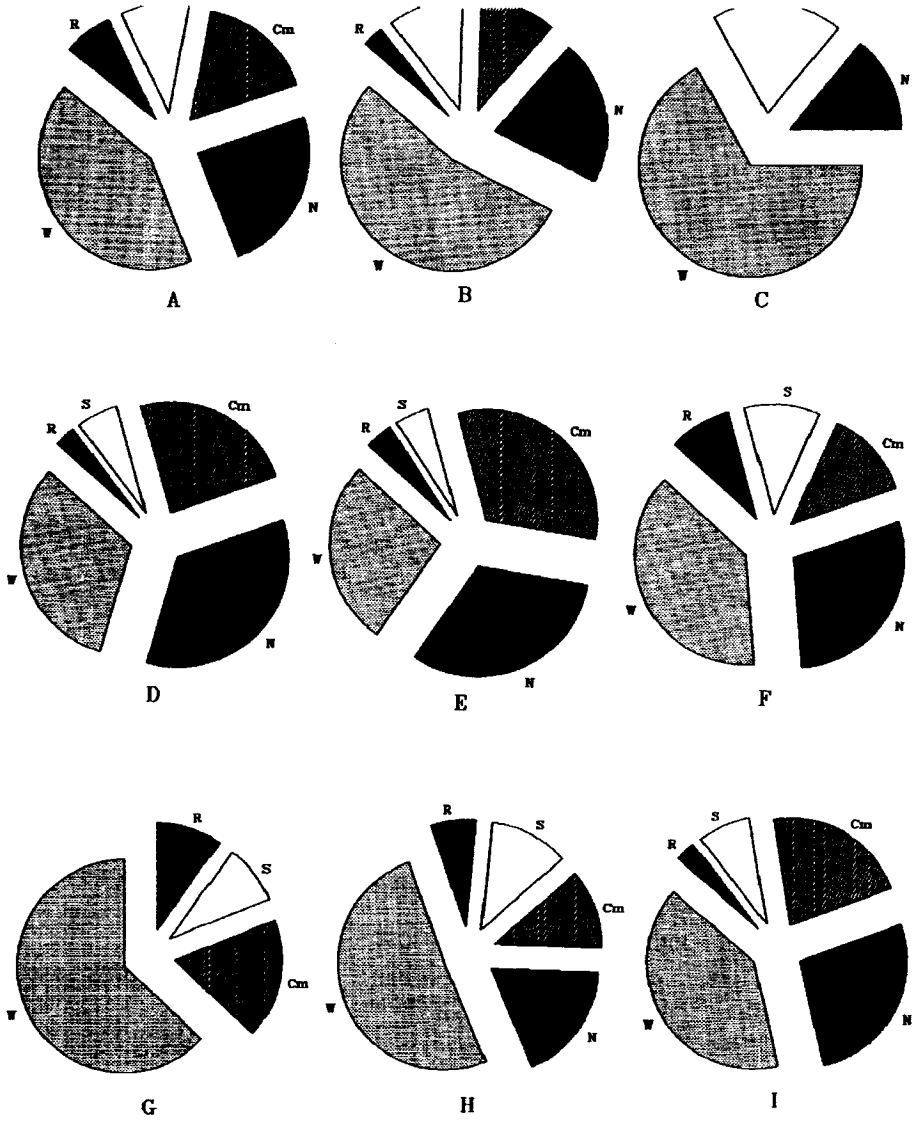
populations from the continuous parts of range and ones on the periphery, are more observable in more southern populations. These clinal variations are probably a result of ecological conditions which are different on the Alps and the mountains of central Greece. This is of particular importance for *Cheilosia rhynchops, C. lenta, C. lenis,* and *C. melanura*, which are variable on the whole territory of their ranges. The variability is so distinguished that in the case of some populations (from Kopaonik, Julian Alps, Grammos) the validity of certain pairs of taxa (*lenis-melanura*; *rhynchops-lenta*) is in question. These taxa are clearly divided in the Central European part of their ranges. They may be examples of semispecies, taxa without completely developed reproductive isolating mechanisms, or borderline cases between species and subspecies. How far the process of new taxa development has progressed is the subject for further investigations.

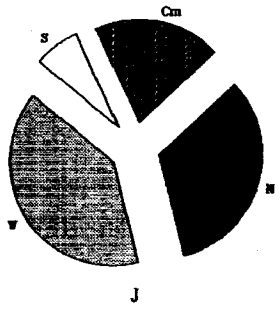
6. 2. BIOGEOGRAPHICAL TERRITORIES

A detailed analysis of confirmed species according to different biogeographical territories has shown that the arrangement of the *Cheilosia* group is mainly in accordance with the division of the Balkan Peninsula given by Matvejev (1976). However, it is necessary to mention that some characteristics of this group reduce the number of biogeographical territories. The *Cheilosia* species manifest an exceptionally high degree of association with forest habitats, which is caused by the pattern feeding, and the history of their origin. The areas without continuous and autochthonous woodlands are therefore very poor in these flies. Only widely distributed, frequently occuring, and numerous species are registered in these regions. In this way, some of the territories and biomes that are zoogeographically attractive for plants and many other animal groups, such as biomes of steppes, are of little importance for the fauna of *Cheilosia* and related genera. All separated biogeographical territories that have been analyzed here consist of many woodlands landscapes. Out of the 13 areas mentioned by Matvejev (1976) three territories have been excluded from further analysis. They are the Dacian region (6 species), Strandža hills (4), and Aegean seashore (4). In the case of hilly areas data is lacking partly due to insufficient field work, while the Aegean coast is poor in species.

The remaining ten territories represent high mountain systems, hilly areas, and the Adriatic coast. The zoogeographical characteristics for each of the territories are shown in Graph.2:

- **Pannonic hills** (Graph.2:A). All types of range are represented within 42 registered species, with a higher percentage of wide distributed species and species with southern preference.
- **Moesian hills** (Graph.2:B). This area is characterized by a high level of widely distributed species and the absence of Alpine elements among 29 confirmed species.



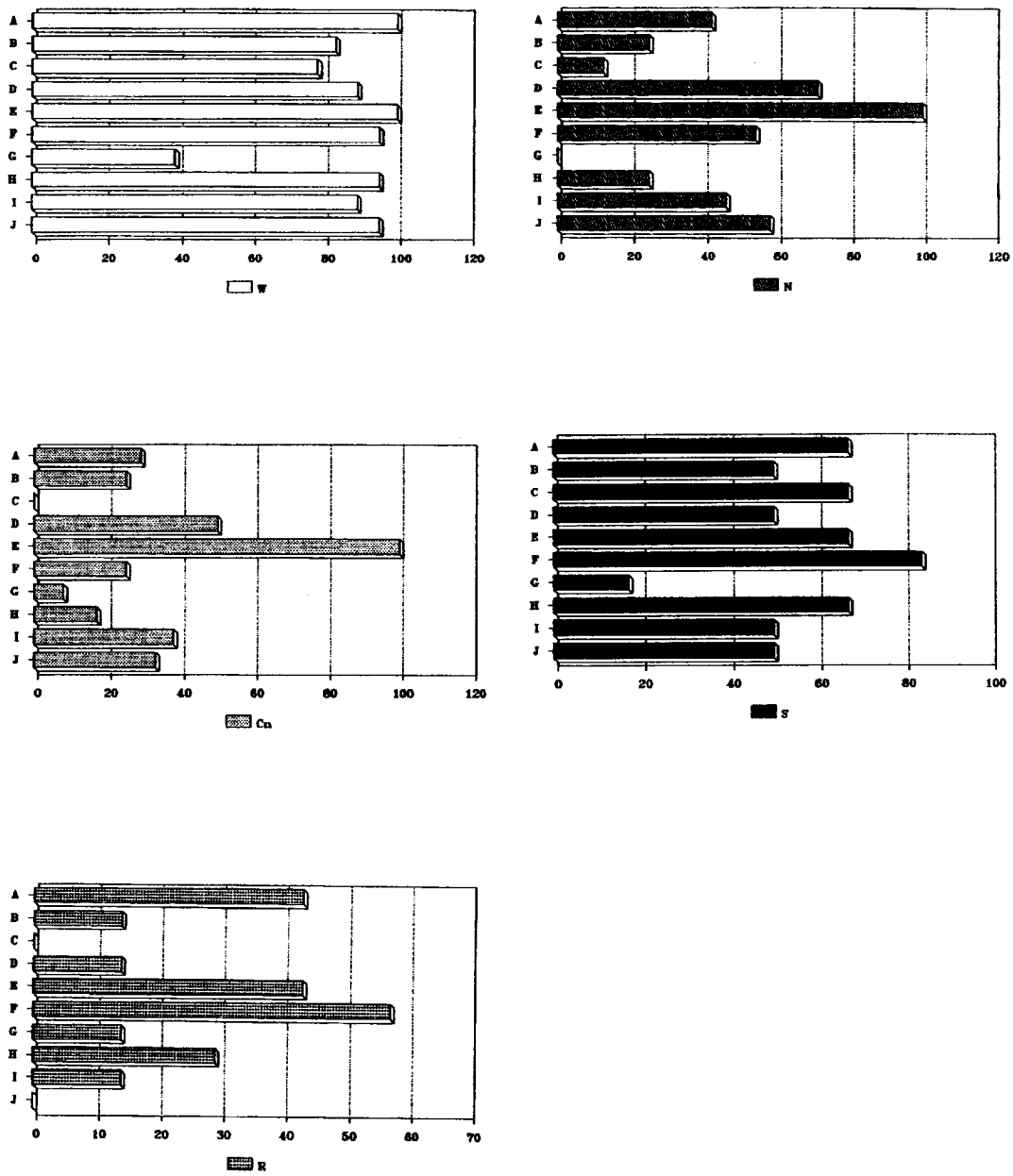


Graph. 2 Different range-types in biogeographical territories on the Balkan Peninsula. A-J: Biogeographical territories. (A) Pannonian and Subpannonian; (B) Moesian hilly areas; (C) Mediterranean and Submediterranean; (D) Eastern Alps; (E) North Dinaric mountains; (F) South Dinaric mountains; (G) South Greece mountains; (H) Carpathians; (I) Stara Planina; (J) Rilo-Rhodopes; (W, N, Cm, S, M, R: as in Graph.1).

- **Adriatic seashore** (Graph.2:C). In the Mediterranean area a small number of species is found (21), usually with wide ranges. A high percent of South European species was recorded. Central European and endemic species are absent, while the presence of some North European elements is the result of the position of the Dinaric mountains which rise directly above the north part of seashore. This is the place of the faunal intermix of two regions, Mediterranean and European, each with a different structure and origin.
- **The Alps** (Graph.2:D). The Alpine region is second in relation to the number of recorded species (49). The most abundant are the mountainous Central European species and species with a range in North and Central Europe.
- **North Dinaric** (Graph.2:E). This area is the richest in species (74 from 80 taxa). In this way the proportion of certain zoogeographical elements is similar to the whole territory of the Balkan Peninsula.
- **South Dinaric** (Graph.2:F). Forty five species have been recorded in this area, of which the percentage of Alpine elements is significantly reduced because they do not penetrate so deep into the territory of the peninsula.
- **The south Greece mountains** (Graph.2:G). Of the total number of 11 species the most important is the presence of endemic species (3).
- **The Carpathians** (Graph.2:H). Thirty three species have been registered on the south Carpathians, the most important of which are those with a narrow range (many of them are endemic Carpathians species). There are no Alpine species.
- **Stara Planina** (Graph.2:I). Fourty species are found in this region, which is represented with all zoogeographical elements. More abundant are species with ranges in Central and North Europe.
- **Rilo-Rhodopes** (Graph.2:J). Forty two species have been recorded. Species with different types of range are represented in similar percentage as on Stara Planina mountain.

The presence of different range-types at biogeographical territories shows some others characteristics of these regions (Graph.3):

- Almost all species with a wide distribution (18) have been recorded on the Dinaric mountains, Alps, Stara Planina, Rilo-Rhodopes and Pannonic hills (Graph.3:W). The mountains in south Greece were characterized by a small number of species of the *Cheilosia* group, with this range-type. An explanation could be found in the origin of these flies, the unfavorable living conditions in Mediterranean climate, and in the peninsula's effect. This phenomena is related to the reduced number of species in terminal areas of peninsulas oriented in a north-



Graph. 3 Range -types in different biogeographical territories on the Balkan Peninsula. (W, N, Cm, S, M, R: as in Graph. 1); (A-J: Biogeographical territories as in Graph. 2).

south direction (Cook, 1969, Tramer, 1974, Massa, 1982, after Vasić, 1984).

- All species with a northern distribution (Graph.3:N) have been found on the North Dinaric. The Alps, Rilo-Rhodopes, and South Dinaric have a high percentage of these species. A very small number of these faunal elements (below 20%) have been registered in the Moesian hills, south Carpathians, and Adriatic coast, while there are no traces of these species in the south Greece mountains.

Table 1 Table of determined fuzzy quasi-ordering relation. (A-J: Biogeographical territories as in Graph.2).

	A	B	C	D	E	F	G	H	I	J
A	6	0	1	0	3	1	0	1	1	1
B	1	6	1	0	2	1	0	1	1	3
C	2	0	6	0	2	2	0	1	1	1
D	1	0	1	6	3	1	0	1	1	1
E	1	0	1	0	6	1	0	1	1	1
F	1	0	1	0	2	6	0	1	1	1
G	1	1	1	1	5	5	6	1	5	1
H	1	0	1	0	2	1	0	6	1	3
I	1	0	1	0	2	1	0	1	6	2
J	1	0	1	0	2	1	0	1	1	6

Table 2 Table of the corresponding similarity relation. (A-J: Biogeographical territories as in Graph.2).

	A	B	C	D	E	F	G	H	I	J
A	6	0	1	0	1	1	0	1	1	1
B	0	6	0	0	0	0	0	0	0	0
C	0	0	6	0	0	0	0	0	0	0
D	0	0	0	6	0	0	0	0	0	0
E	1	0	0	0	6	1	0	1	0	1
F	1	0	0	0	1	6	0	1	0	1
G	0	0	0	0	0	0	6	0	0	0
H	1	0	0	0	1	1	0	6	0	1
I	0	0	0	0	0	0	0	0	6	0
J	1	0	0	0	1	1	0	1	0	6

- Central European mountainous species (Graph.3:Cm) were characteristic for the North Dinaric and Alps. They have not been found in the Mediterranean, and are very rare in south Greece, the Moesian hills and low Carpathians.
- Due to the central Holarctic distribution of this group only a small number of species with a Mediterranean and south European range-type have been recorded. These species have been found in the seashore, South and North Dinaric, Carpathians and Moesian hills (Graph.3:S).
- Endemic species have not been found in the Mediterranean and on the Rilo-Rhodopes, while most of them have been registered on the South Dinaric mountains (Graph.3:R).

6. 2. 1. The Connections between Biogeographical Territories

A new method of fuzzy relation (Tepavčević & Vujić, 1996) was aplied (Table 1,2), in order to perform a more detailed zoogeographical analysis. As shown in Diag.1-5, such an analysis clarified the character and the degree of interconnection among biogeographical territories.

Diag.1 shows the relations of similarity and order of biogeographical territories on the basis of species with wide range. All territories are connected at three different levels depend of number of collected species.

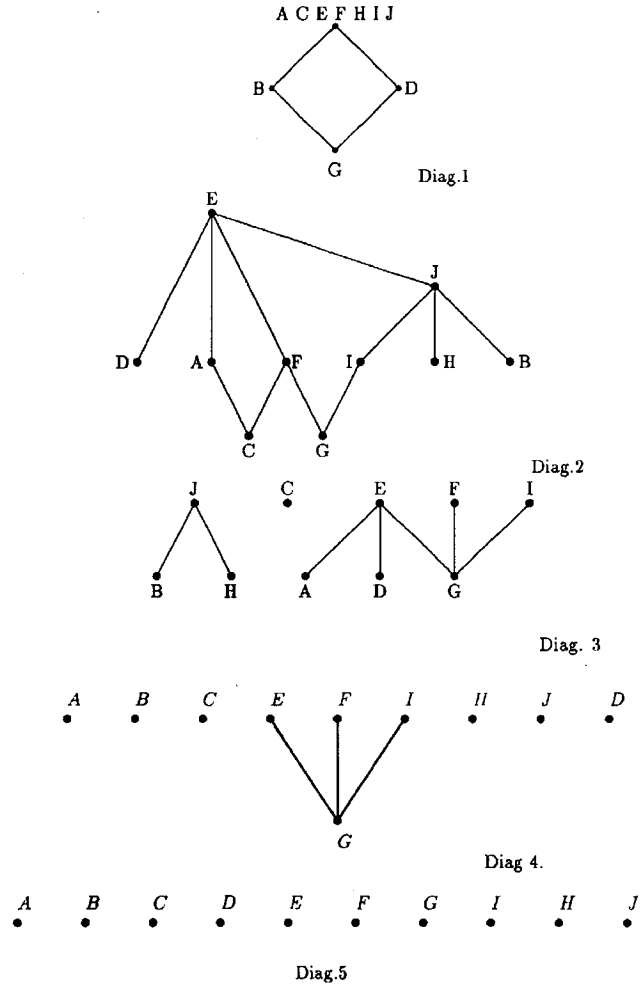
Diag.2 presents the similarity and order according to species with zoogeographical importance 2. These species clarify the relations between biogeographical territories. The lowest level is occupied by the Mediterranean (C) and south Greece mountains (G) as regions poor for the fauna of the *Cheilosia* group. The North Dinaric (E) and Rilo-Rhodopes (J) occupy the highest levels as the two central mountainous areas on the peninsula, connected with all other territories. The Alps (D) are directly in connection with the North Dinaric, as well as the Moesian hills (B) and Carpathians (H) are with the Rilo-Rhodopes. North and South (F) Dinaric and south Greece mountains are connected and form one chain. The Mediterranean, the Pannonic hills (A) and the North Dinaric form another line of similarity, that shows an interchange of faunistical elements due to geographical connections as well as historical reasons: the Pannonic plain was part of the Mediterranean for 30 million years in Pliocene and Pleistocene periods.

When analyzing the relations and order of biogeographical territories on the basis of species with third level of zoogeographical importance (Diag.3) the beginning of distinction of teritories can be seen. The Mediterranean is independent on this level. The Moesian hills, Carpathians and Rilo-Rhodopes are independently connected and separated from other territories.

Diag.4 presents the relations and order at high levels of zoogeographical importance (4 and 5). All territories are independent except the south Greece

mountains. They are connected with the South and North Dinaric and Rilo-Rhodopes and lies lower than other territories, due to small number of *Cheilosia* species.

At the endemic level (Diag.5), a complete separation and independence of all territories can be noticed. All territories belong to separate equivalence classes and are incomparable. This result confirms the biogeographical division of the Balkan Peninsula into separate areas with differently developed faunas.



Diag.1-5: (1) Level 1 of importance (of the fuzzy ordering relation);(2) Level 2 of importance; (3) Level 3 of importance; (4) Levels 4 and 5 of importance; (5) Level 6 of importance. (A-J: Biogeographical territories as in Graph.2).

List 1 Balkan species of genera *Portevinia, Nigrocheilosia* and *Cheilosia*. A-J: Biogeographical territories (as in Graph.2).1-6: zoogeographical importance of species (after Tepavčević & Vujić, 1996).Range: A-Alps; B-The Balkan Peninsula; C-Carpathians; Ca-Caucasus; D-Dinaric; E-Europe; F-Far East; H-Holarctic; M-Mediterranean; P-Palaearctic; Pa-Pannonian; Pi-Pindos; Py-Pyrennes; R-Rilo-Rhodopes; S-Siberia; c-central; ex-except; m-mountanous; n-north; s-south; s.l.-senso lato.

	species	A	B	C	D	E	F	G	H	I	J	RANGE
	Portevinia Goffe 1944											
1	*maculata* Fall.	0	0	0	0	4	0	0	0	0	0	ncE
	Nigrocheilosia Shatalkin 1975											
2	*antiqua* Meig.	0	2	0	2	2	2	2	0	2	0	ES
3	*caerulescens* Meig.	0	0	0	0	4	0	0	0	0	0	cE(m)
4	*crassiseta Loew*	0	0	0	4	4	0	0	0	0	0	cE(m)
5	*derasa* Loew	0	0	0	4	4	0	0	0	0	0	cE(m)
6	*faucis* Beck.	0	0	0	0	5	0	0	0	0	0	PyADC
7	*gagatea* Loew	0	0	0	3	3	0	0	0	0	3	cE(m)
8	*grissela* Beck.	0	0	0	3	3	0	0	0	0	0	cE(m)
9	*herculana* Brad.	0	0	0	0	5	5	0	0	0	0	DC
10	*hercyniae* Loew	0	0	0	0	5	0	0	0	0	0	ADC
11	*impudens* Beck.	0	0	0	3	3	0	0	0	0	0	cE(m)
12	*insignis* Loew	0	0	0	0	5	0	0	0	0	0	ADC
13	*kerteszi* Szil.	0	0	0	0	0	0	0	6	0	0	C
14	*laeviseta* Cl.	0	0	0	0	5	0	0	0	0	0	PyAD
15	*loewi* Beck.	0	0	0	4	4	0	0	0	0	0	ADC
16	*nigripes* Meig.	1	1	1	1	1	1	1	1	1	1	ES
17	*personata* Loew	0	0	0	3	3	0	0	0	3	0	PyADC
18	*pubera* Zett.	0	0	0	3	3	0	0	0	3	3	ES(exM)
19	*sahlbergi* Beck.	0	0	0	0	4	0	0	0	0	4	ncE
20	*vicina* Zett.	2	0	0	2	2	2	2	2	2	2	ES
21	sp.	0	0	0	0	5	0	0	0	0	0	AD
	Cheilosia Meigen 1822											
22	*aerea* Duf.	2	2	2	0	2	2	2	2	2	2	csE
23	*albipila* Meig.	1	1	1	1	1	1	0	1	1	1	ES

24	*albitarsis* Meig.	1	1	1	1	1	1	1	1	1	1	P
25	aff. *albitarsis*	1	1	1	1	1	1	0	1	1	1	P(exM)
26	*balkana* Vuj.	0	0	0	6	6	0	0	0	0	0	AD
27	*barbata* Loew	1	1	1	1	1	1	0	1	1	1	E(exM)
28	*bergenstammi* Beck.	0	0	0	0	5	5	0	0	0	0	ncE
29	*brucusi* Vuj.-Cl.	4	0	0	4	4	4	4	4	4	4	PyAB(m)
30	*brunnipennis* Beck.	0	3	3	0	0	3	0	3	3	3	eM(s.l.)
31	*canicularis* Panz.	2	2	0	2	2	2	0	2	2	2	P
32	*carbonaria* Egg.	0	0	0	4	4	4	0	0	0	4	ncES
33	*chloris* Meig.	4	0	0	4	4	0	0	0	0	0	ES(ex s)
34	*chrysocoma* Meig.	3	0	0	3	3	3	0	0	3	0	ES(exM)
35	*clama* Cl.-Vuj.	0	0	0	0	6	0	0	0	0	0	cE(m)
36	*cumanica* Szil.	4	0	0	0	4	4	0	4	4	0	cBC
37	*cynocephala* Loew	2	2	2	0	2	2	0	2	0	2	ES
38	*fasciata* Sch. et Egg.	3	3	0	0	3	3	0	3	3	3	cE
39	*flavipes* Panz.	3	3	3	3	3	0	0	3	3	3	ncES
40	*fraterna* Meig.	0	0	0	4	4	0	0	0	0	0	ES(ex s)
41	*frontalis* Loew	0	0	0	3	3	0	0	0	3	3	ncE
42	*gigantea* Zett.	0	0	0	2	2	2	0	2	2	2	ncESF
43	*griseifacies* Vuj.	6	0	0	0	6	0	0	0	0	0	Pa(s.l.)
44	*grossa* Fall.	1	1	1	0	1	1	0	1	1	1	ES
45	*hypena* Beck.	4	0	0	4	0	0	0	4	0	0	csE
46	*illustrata* Harr.	2	0	0	2	2	2	0	2	0	2	ES
47	*impressa* Loew	1	1	1	1	1	1	0	1	1	1	ESF
48	*katara* Cl. et Vuj.	0	0	0	0	0	0	6	0	0	0	Pi
49	*lasiopa* Kow.	0	0	0	4	4	0	0	0	0	0	ES(ex s)
50	*latifacies* Loew	2	0	2	2	2	2	0	0	0	0	cEM
51	*latifrons* Zett.	4	0	4	0	4	0	0	0	0	0	ES
52	*lenis* Beck.	2	0	0	2	2	2	0	0	2	2	cE(m)
53	*lenta* Beck.	3	0	0	3	3	0	3	0	3	3	cE
54	*longula* Zett.	0	0	0	4	4	0	0	0	0	0	ncES
55	*melanopa* Zett.	0	0	0	4	4	0	0	0	0	0	ncE

56	*melanopa* ssp. *redi*	3	3	0	0	3	3	0	3	3	3	csE
57	*melanura* Beck.	3	0	0	3	3	0	0	0	3	3	ncES
58	*melanura* ssp. *rubra*	0	0	0	0	0	6	0	0	0	0	sD
59	*morio* Zett.	0	0	0	3	3	0	0	0	0	3	ncES
60	*mutabilis* Fall.	1	0	1	1	1	1	0	1	1	1	P
61	*nebulosa* Verr.	3	3	0	0	3	0	0	3	0	3	ncE
62	*orthotricha* Vuj. et Cl.	4	4	0	0	4	0	0	4	4	4	cE
63	*pagana* Meig	2	2	0	2	2	0	0	2	2	2	nH
64	*pascuorum* Beck.	3	0	0	0	3	3	0	3	3	3	cE
65	*pictipennis* Egg.	0	0	0	4	4	0	0	0	0	4	ADR
66	*psilophthalma* Beck.	4	4	0	0	4	4	0	0	4	0	cE
67	*praecox* Zett.	1	1	1	1	1	1	1	1	1	1	ES
68	*proxima* Zett.	1	1	1	1	1	1	0	1	1	1	ES
69	*rhynchops* Egg.	0	0	0	3	3	3	0	0	3	3	cE(m)
70	*rufimana* Beck.	0	0	0	0	4	0	0	0	0	4	ncE
71	*schnabli* Beck.	5	5	0	0	0	5	0	0	0	0	CaB
72	*scutellata* Fall.	1	1	1	1	1	1	1	1	1	1	P
73	*semifasciata* Beck.	2	2	0	0	2	2	0	2	2	2	E(ex s)
74	*soror* Zett.	1	1	1	1	1	1	1	1	1	1	P
75	*subpictipennis* Cl.	0	0	3	3	3	3	0	0	0	0	csE
76	*uviformis* Beck.	3	0	0	3	3	0	0	0	3	0	E(ex se)
77	*variabilis* Panz.	1	1	1	1	1	1	0	1	1	1	ES
78	*velutina* Loew	0	0	0	0	4	0	0	0	0	0	ES(ex s)
79	*vernalis* Fall.	2	2	0	2	2	2	0	0	2	2	E(ex s)
80.	*vulpina* Meig.	1	1	1	1	1	1	0	1	1	1	ES

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8. САЖЕТАК

РОД *CHEILOSIA* MEIGEN И СРОДНИ РОДОВИ (DIPTERA: SYRPHIDAE) НА БАЛКАНСКОМ ПОЛУОСТРВУ

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Током 14 година теренског рада (1981-1994) на Балканском полуострву, истражена су 42 подручја са 249 локалитета током 547 излазака на терен и прикупљено 12873 јединки врста рода *Cheilosia* и сродних родова. Поред теренских истраживања прегледано је 720 примерака из доступних, публикованих и непубликованих збирки.

Утврђено је 78 врста и две подврсте из три рода: *Cheilosia, Nigrocheilosia* и *Portevinia.* Од тога је 14 врста први пут регистровано на Балканском полуострву: *Cheilosia* aff. *albitarsis, C. bergestammi, C. fraterna, C. lasiopa, C. lenis, C. longula, C. pascuorum, C. velutina, Nigrocheilosia grisella, N. herculana, N. impudens, N. insignis, N. kerteszi* и *N. laeviseta.*

Шест врста је описано на основу материјала прикупљеног током ових истраживања: *Cheilosia balkana* Вујић, 1994 (типски локалитет: Дурмитор, Црна Гора); *C. bracusi* Вујић et Claussen, 1994 (типски локалитет: Копаоник, Србија); *C. clama* Claussen et Вујић, 1995 (типски локалитет: Копаоник, Србија); *C. griseifacies* Вујић, 1994 (типски локалитет: Фрушка гора, Србија); *C. katara* Claussen et Вујић, 1993 (типски локалитет: Катара, Пиндос, Грчка) и *C. orthotricha* Вујић et Claussen, 1994 (типски локалитет: Кукавица, Србија). *Nigrocheilosia* sp. је вероватно неописана врста.

Две нове подврсте су описане у овој монографији: *C. melanopa redi* ssp. n. (типски локалитет: Вршачке планине, Србија); *C. melanura rubra* ssp. n. (типски локалитет: Шар-планина, Србија).

За назив *Chilosia sareptana* Becker, 1894 је утврђено да представља синоним врсте *Chilosia brunnipennis* Becker, 1894. Како је аутор у истом раду дао описе мужјака и женке исте врсте као посебних таксона, на

основу типског материјала који још постоји у збиркама, предложено је да име *sareptana* буде пребачено у синониме врсте *C. brunnipennis*.

За већину балканских држава забележен је подједнак број врста (од 48 до 61). У Бугарској је тај број нешто мањи (41), због слабије истражености, као и у Македонији (32) и Грчкој (27) због мањег диверзитета фауне на југу Балканског полуострва. У Словенији је регистровано 49 врста (38 по први пут); у Хрватској 48 (18 први пут); У Босни и Херцеговини 60 (32 први пут). У Црној Гори 59 (29 први пут); у Србији највише, 61 (20 први пут); у Македонији 32 (19 први пут); у Бугарској 41 (3 први пут) и у Грчкој најмање, 27 (19 први пут). На територији СР Југославије забележена је 71 врста, од чега 20 први пут.

У раду је дата листа од 30 врста које се наводе у литератури, а искључене су из фауне Балканског полуострва на основу редерминације музејског материјала и резултата нових таксономских истраживања. За 6 врста није постојала могућност да се изврши провера, јер је музејски материјал био недоступан или је потпуно изгубљен.

У прегледу фауне дати су сви подаци о регистрованим врстама: синоними, погрешне детерминације; проверени и непроверени налази; нови подаци; распрострањење врсте на Балканском полуострву и у Палеарктику; заступљеност врсте у различитим биогеографским територијама и биомима; подаци о биологији врсте, из литературе и сопствени. За све врсте су дате и карте распрострањења у Палеарктику, Европи и на Балканском полуострву. Географска карта Балкана је допуњена UTM мрежом величине поља 50 x 50 km, као и биогеографском поделом овог простора.

Биогеографском анализом су дефинисане основне зоогеографске одлике истраживане групе на Балканском полуострву, истакута је важност овог подручја за формирање европске фауне и потврђена оправданост поделе полуострва на биогеографске територије.

У истраживаној групи, у односу на фамилију осоликих мува у целини, утврђен је далеко већи проценат врста распрострањењем везаних за средњу и северну Европу. Посебно је бројна група средњеевропских високопланинских врста. Многе од њих на Балканском полуострву имају бројне изоловане популације на високим планинама. Ова подручја вероватно играју значајну улогу у настанку нових таксона и обогаћивању европске фауне. Анализа ових популација је указала на разлике које постоје у односу на популације из континуираног дела ареала. Код неколико група сродних врста уочени су таксони за које се може предпоставити да су полуврсте (*C. lenis-C. melanura; C. lenta-C. rhynchops*).

У фауни Балканског полуострва утврђено је неколико ендема и реликата од којих су најзначајнији: панонски ендемореликт, врста *Chei-*

losia griseifacies; динарски ендеми, врсте *C. balkana* и *Nigrocheilosia* sp.; ендем јужних Динарида, подврста C. melanura rubra ssp. n.; ендем, а вероватно и реликт Пинда, врста C. katara; карпатски ендем, врста C. kerteszi; као и један изузетно редак средњевропски ендем, врста *C. clama*.

Анализа распореда врста на подручју Балканског полуострва показала је оправданост издвајања посебних биогеографских територија (Матвејев, 1976), као и значај дефинисања различитих биома (Матвејев & Пунцер, 1989). Употреба методе расплинутих релација дала је математичку потврду различитости фауне испитиване групе на издвојених 10 биогеографских територија, и указала на степен њихове међусобне повезаности. Највећи број врста је забележен на подручју северних Динарида, а посебна разноврсност је уврђена на Дурмитору и Копаонику. Разлика се јавља у случају врста карактеристичних за биом високопланинских камењара и пашњака алпско-високонордијског типа који на Копаонику није заступљен. Зато је Дурмитор богатији врстама рода Nigrocheilosia, а на Копаонику је регистрован већи број средњеевропских и северноевропских врста рода *Cheilosia*, везаних за букове и смрчеве заједнице.

ПРИЛОГ

Потписи испод слика, мапа, табела, графика, дијаграма и списка врста на српском језику

Слика 1 Морфолошке карактеристике *Cheilosia* врста.

(A) *Cheilosia albitarsis* (дорзално): a-антена; b-глава; c-торакс; d-скутелум; e-абдомен (1-4 абдоминални сегменти); f-предња нога; g-средња нога; h-задња нога; i-основа крила.

(B) Глава: a-чело; b-потиљак; c-теме; d-грбица лица; e-руб уста; f-очна маргина; g-образи.

(C) *Cheilosia albitarsis* (латерално): a-стернит; b-хипопигијум; c-тергити (1-4); d-рубне чекиње на скутелуму; e-скутелум; f-посталарни калус; g-мезоскутум; h-предња спиракула; i-хумерус; j-задња нога; k-халтера; l-постериорна спиракула; m-хипоплеура; n-метастернум; o-протоплеура; p-мезоплеура; q-стерноплеура; r-средња нога; s-предња нога.

(D) Задња нога: a-кокса; b-трохантер; c-тибија; d-метатарзус; e-тарзални сегменти (1-5).

(E) Антена: a-први сегмент; b-други сегмент; c-трећи сегмент; d-ариста.

(F) Крило: a-сквама; b-алула; c-друга базална ћелија; d-прва базална ћелија; e-вена спуриа; f-дискална ћелија; g-доња попречна рубна вена;

h-горња попречна рубна вена; i-стигма; j-костална ћелија; вене (R; R1; R2+3; R4+5; Sc; M1+2); попречне вене (m-cu; r-m); ћелије (r1; r3; r5).

Слика 2 Генитални апарат мужјака (*Nigrocheilosia kerteszi*), латерално.

(A) Епандриум, a-c: a-сурстил; b-церкус; c-тергит 9.

(B) Хипандриум, d-l: d-супериорни лобус; e-вентро-апикални наставак; f-дорзо-апикални наставак; g-даљи део едеагуса; h-пиксис; i-едеагус; j-спермална пумпа; k-ејакулаторна аподема; l-тека.

Скала у мм.

Слика 3 *Cheilosia melanopa redi* ssp. n.

a-c: мужјак; d-f: женка. (a) глава, латерално; (b) мезонотум, латерално; (c) десна антена, са унутрашње стране; (d) глава, латерално; (e) мезонотум, латерално; (f) десна антена, са унутрашње стране.

Скала у мм.

Слика 4 *Cheilosia melanopa redi* ssp. n., генитални апарат мужјака.

(a) епандриум, дорзално; (b) десни сурстил, латерално; (c) хипандриум, латерално; (d) супериорни лобус, са спољне стране; (e) супериорни лобус, са унутрашње стране; (f) едеагус, латерално.

Скала у мм.

Слика 5 *Cheilosia melanura rubra* ssp. n.

a-c: мужјак; d-f: женка. (a) глава, латерално; (b) мезонотум, латерално; (c) десна антена, са унутрашње стране; (d) глава, латерално; (e) мезонотум, латерално; (f) десна антена, са унутрашње стране.

Скала у мм.

Слика 6 *Cheilosia melanura rubra* ssp. n., генитални апарат мужјака.

(a) епандриум, дорзално; (b) десни сурстил, латерално; (c) хипандриум, латерално; (d) супериорни лобус, са спољне стране; (e) супериорни лобус, са унутрашње стране; (f) едеагус, латерално.

Скала у мм.

Мапе 1-4 Балканско полуострво.

(1) Истраживани локалитети.

(2) Балканске државе.

(3) УТМ мрежа са ознакама.

(4) Бигеографске територије: A-Панонија и субпанонија; B-Мезијско брдско подручје; B-1-Македонско брдско подручје; C-Медитеран и субмедитеран (C-Јадрански; C-1-Егејски); D-Источни Алпи; E-Северни Динариди; F-Јужни Динариди; G-Планине јужне Грчке; H-Карпати; I-Стара Планина (Балкански венац); J-Рило-Родопи.

Мапа 5. Балканско полуострво. Истраживана подручја: (1) Фрушка гора; (2) Вршачке планине; (3) Обедска бара; (4) Цер; (5) Влашић; (6) Делиблатска пешчара; (7) Потисје; (8); Сува планина; (9) Сврљишке планине; (10) Бока Которска; (11) Кањон Мораче; (12) Румија; (13) Јулијске Алпе; (14) Камнишке ин Савињске Алпе; (15) Дурмитор; (16) Копаоник; (17) Бјеласица; (18) Бјелашница; (19) Горски Котар; (20) Грмеч; (21) Јахорина; (22) Јавор; (23) Коњух; (24) Мала Капела; (25) Менина; (26) Тара; (27) Волујак; (28) Шар-планина; (29) Баба; (30) Галичица; (31) Грамос; (32) Кожуф; (33) Олимп; (34) Верно; (35) Пинди; (36) Малиник и Кучајске планине; (37) Ртањ; (38) Стара Планина; (39) Босилеград; (40) Чемерник и Власинско језеро; (41) Кукавица.

Мапа 6 Панонска и субпанонска биогеографска територија

Мапа 7 Мезијско брдско подручје

Мапа 8 Медитеран и субмедитеран

Мапа 9 Источни Алпи

Мапа 10 Северни Динариди

Мапа 11 Јужни Динариди

Мапа 12 Планине јужне Грчке

Мапа 13 Карпати

Мапа 14 Стара Планина (Балкански венац)

Мапа 15 Рило-Родопи

Мапе 16-50 Распрострањење врста у Палеарктику, Европи и на Балканском полуострву

График 1 Различити типови арела у *Cheilosia* групи родова и у фамилији Syphidae на Балканском полуострву.

W - ареал у целој Европи и шире; N - ареал у северним и централним деловима Европе или Палеарктика; Cm - ареал у централној Европи и планинским деловима јужне Европе; S - ареал у јужној Европи или Медитерану и централној Европи; M - ареал у Медитерану; R - ендеми и реликти.

График 2 Различити типови ареала у биогеографским територијама на Балканском полуострву.

A-J: Биогеографске територије. A-Панонија и субпанонија; B-Мезијско брдско подручје; B-1-Македонско брдско подручје; C-Медитеран и субмедитеран (C-Јадраснки; C-1-Егејски); D-Источни Алпи; E-Северни Динариди; F-Јужни Динариди; G-Планине јужне Грчке; H-Карпати; I-Стара Планина (Балкански венац); J-Рило-Родопи; (W, N, Cm, S, M, R:као на графику.1).

График 3 Типови ареала у различитим биогеографским територијама на Балканском полуострву.

(W, N, Cm, S, M, R: као на графику 1); (A-J: Биогеографске територије као на графику 2).

Табела 1 Табела одређених фази квази-уређених релација.

(A-J: Биогеографске територије као на графику 2).

Табела 2 Табела одговарајућих релација сличности.

(A-J: Биогеографске територије као на графику 2).

Дијаграм 1-5: (1) Ниво 1 значајности (фази-уређених односа); (2) Ниво 2 значајности; (3) Ниво 3 значајности; (4) Нивои 4 и 5 значајности; (5) Ниво 6 значајности.

(A-J: Биогеографске територије као на графику 2).

Списак 1 Балканске врсте родова *Portevinia, Nigrocheilosia* и *Cheilosia.*

A-J: Биогеографске територије (као на графику 2).

1-6: зоогеографски значај врста (према Тепавчевић & Вујић, 1996).

Ареал: A-Алпи; B-Балканско полуострво; C-Карпати; Ca-Кавказ; D-Динариди; E-Европа; F-Далеки Исток; H-Холарктик; M-Медитеран; P-Палеарктик; Pa-Панонија; Pi-Пинди; Py-Пиринеји; R-Рило-Родопи; S-Сибир; c-централни; ex-изузев; м-планински; n-северни; s-јужни; s.l.-senso lato.

9. ABSTRACT

GENUS *CHEILOSIA* MEIGEN AND RELATED GENERA (DIPTERA: SYRPHIDAE) ON THE BALKAN PENINSULA

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This monograph deals with 78 species of the genera *Cheilosia*, *Nigrocheilosia* and *Portevinia*, found on the Balkan Peninsula. Two new subspecies are described and figured: *C. melanopa redi* ssp. n. (type locality: Vršačke planine, Serbia) and *C. melanura rubra* ssp. n. (type locality: Šar-planina, Serbia). *C. sareptana* Becker is synonymised with *C. brunnipennis* Becker. The faunistic results are based on fourteen years (1981-1994) of systematic collecting on 42 areas and 249 localities, selected according to biogeographic characteristics. Fourteen species have been recorded on the Balkan Peninsula for the first time: *C.* aff. *albitarsis* Doczkal, *C. bergenstammi* Becker, *C. fraterna* Meigen, *C. lasiopa* Kowarz, *C. lenis* Becker, *C. longula* Zetterstedt, *C. pascuorum* Becker, *C. velutina* Loew, *N. laeviseta* Claussen, *N. grisella* Becker, *N. herculana* Bradescu, *N. impudens* Becker, *N. insignis* Loew and *N. kerteszi* Szilady. Six species have been recently described. The faunistic data are quoted with check-lists of mostly previous collected samples from published and unpublished museum's collections. For each of 80 taxa, a review is presented of available information on the Balkans and world range with UTM maps, preferred environment, adult habitat, flowers visited and flight period. The annotated list of 30 species and names excluded from Balkan fauna is presented. It was not possible to check six species cited in literature. The zoogeographical characteristics of registered fauna are given with underlining of endemic and relict species. The importance of the Balkan Peninsula in formation of European fauna is discussed. Previous biogeographical division of Balkan was confirmed by fuzzy relations mathematical method.

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10. INDEX OF TAXA

References to the main treatment are in **bold type**.

CONTENTS

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