

New Data on the Structure of the Genus *Temnostoma* with Redescription of *Temnostoma meridionale* (Diptera, Syrphidae)

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Abstract—Study of the *Temnostoma bombylans*, *T. apiforme*, and *T. vespiforme* species groups has revealed significant differences between the *T. bombylans* group, on the one hand, and the *T. apiforme* and *T. vespiforme* groups, on the other. The necessity of distinguishing two subgenera (*Temnostoma* Le Peletier et Serville and *Temnostomoides* subg. n.) within the genus *Temnostoma* is substantiated. *T. meridionale* Krivosheina et Mamaev is re-described; its female and male genitalia are described for the first time. The species is similar to *T. vespiforme*, but its genitalia are more similar to those in *T. apiforme*. According to larva characteristics, this species occupies an intermediate position between the aforementioned species.

The genus *Temnostoma* Le Peletier et Serville was described as a subgenus of the genus *Milesia* Latreille, 1804. The genus *Microrhincus* Lioy, 1864 was described later. *Milesia bombylans* Fabr. was designated as the type species for both genera (Coquillett, 1910; Goffe, 1946). The second name of the genus was lowered to a junior synonym. In addition, the genus *Tritonia* Meigen, 1800 was described with *Musca vespiforme* L. designated as the type species (Coquillett, 1910), but the name of the genus had turned to be pre-occupied.

Study of representatives of the genus *Temnostoma* distributed in the forest zone of Russia (Krivosheina, 2002, 2003, 2004), has revealed sharp differences in the shape of the body and structure of the genitalia in the adult and the terminal part of the body in the larva between the *T. bombylans* group, on the one hand, and the *T. apiforme* and the *T. vespiforme* groups, on the other. These differences give grounds for distinguishing two subgenera in the genus *Temnostoma* Le Peletier et Serville: nominotypical subgenus and *Temnostomoides* Krivosheina subg. n.

In the present communication, a new subgenus is described, the results of comparative analysis of three European species of the genus are given, the female of *T. meridionale* Kriv. et Mam. is described for the first time, and the previously unstudied male characters, including the structure of the genitalia, are described.

Subgenus **TEMNOSTOMA** Le Peletier et Serville
1828

Type species *Milesia bombylans* Fabr.

Type locality: Pyrenees (France).

Description. Face rather short, only slightly projecting beyond lower margin of eye. Middle part of face situated above, or at level of lower margin of eye. Abdominal segment I distinctly narrowed at base. Abdominal tergites II and III in male as long as wide along entire length; in female, tergite II as long as wide at base and tergite III less more than half as long as wide. Central part of hypandrium in male with pair of tapered teeth on inner side. Apical process of hypandrium narrow along entire length. Sclerotized structures of central part of female genital capsule parallel-sided, not approximate at ends; bases of 3 long setae situated between apical parts of these structures. In larva, each posterior stigmal plate with 4 small teeth at margin.

Subgenus **TEMNOSTOMOIDES** Krivosheina subg. n.

Type species *Musca vespiforme* Linnaeus, 1758.

Type locality: Europe.

Description. Face elongate, distinctly projecting below level of eye. Abdominal segment I in male very weakly narrowing toward base. Abdominal tergites II and III nearly half as long as wide in male and no more

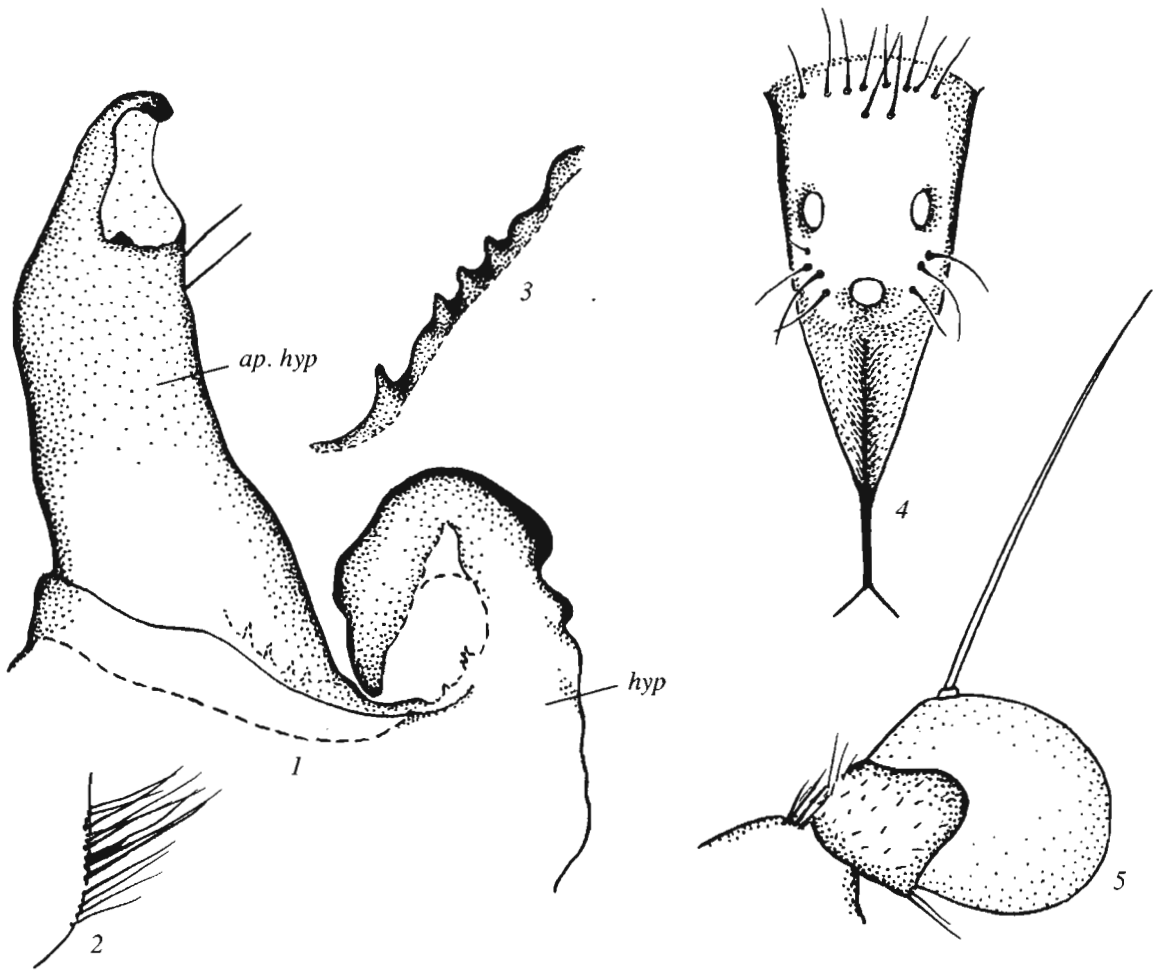


Fig. 1. Male of *T. meridionale* Kriv. et Mam.: (1) hypandrium, lateral view; (2) chaetotaxy of lower part of hypandrium; (3) row of teeth on inner side of apical process of hypandrium; (4) frons; (5) antenna, view from inner side; *ap. hyp*, apical process of hypandrium; *hyp*, hypandrium.

than 0.4 times as long as wide in female. Central part of hypandrium in male without paired teeth, but with small single tubercle on inner side. Apical process of hypandrium widened, at least at base. Sclerotized structures of central part of female genital capsule arcuately curved to form oval; bases of long setae situated in its central part. In larva, each posterior stigmal plate with 1 large tooth.

Differences between the above subgenera are essential enough for a possible further separation them in genera. This supposition is substantiated by a detailed study of *T. meridionale* Kriv. et Mam., which has revealed a close relationships between the *T. apiforme* and *T. vespiforme* groups and a significant remoteness from them of the *T. bombylans* group. *T. meridionale* was described from the northern Caucasus from the male, no data on the female were given (Krivosheina and Mamaev, 1962).

Temnostoma meridionale Krivosheina et Mamaev
(Figs. 1–4)

Material. Male from the type locality, labelled "Novo-Prokhladnoe, Krasnodar Territory, emergence on 8.V.1959. Mamaev. *Temnostoma meridionale* Kriv. et Mam. Barkalov det. 1990," was found in the collection of the Zoological Institute, Russian Academy of Sciences, St. Petersburg [ZIN]. Specimens of the type series (Krasnodar Territory, 27.VI.1959, 2 ♂), including the holotype, were not been found.

Other material. 1 ♂ "Teberda, M. Khotinar Mt. Range. Klukhor. [in Cyrillic] Distr., Georgia," 14.VII.1939 (Stepanov); 1 ♂ "Eversmann's collection. *T. meridionale* Kriv. et Mam. Barkalov det. 1990;" 1 ♂, "*Spilomyia vespiformis* L." Sv. Gory [in Cyrillic]. 8.V.1882. Yaroshevskii's collection; 1 ♀, Borzhomi, 10.VII.1998 (Zakharov).

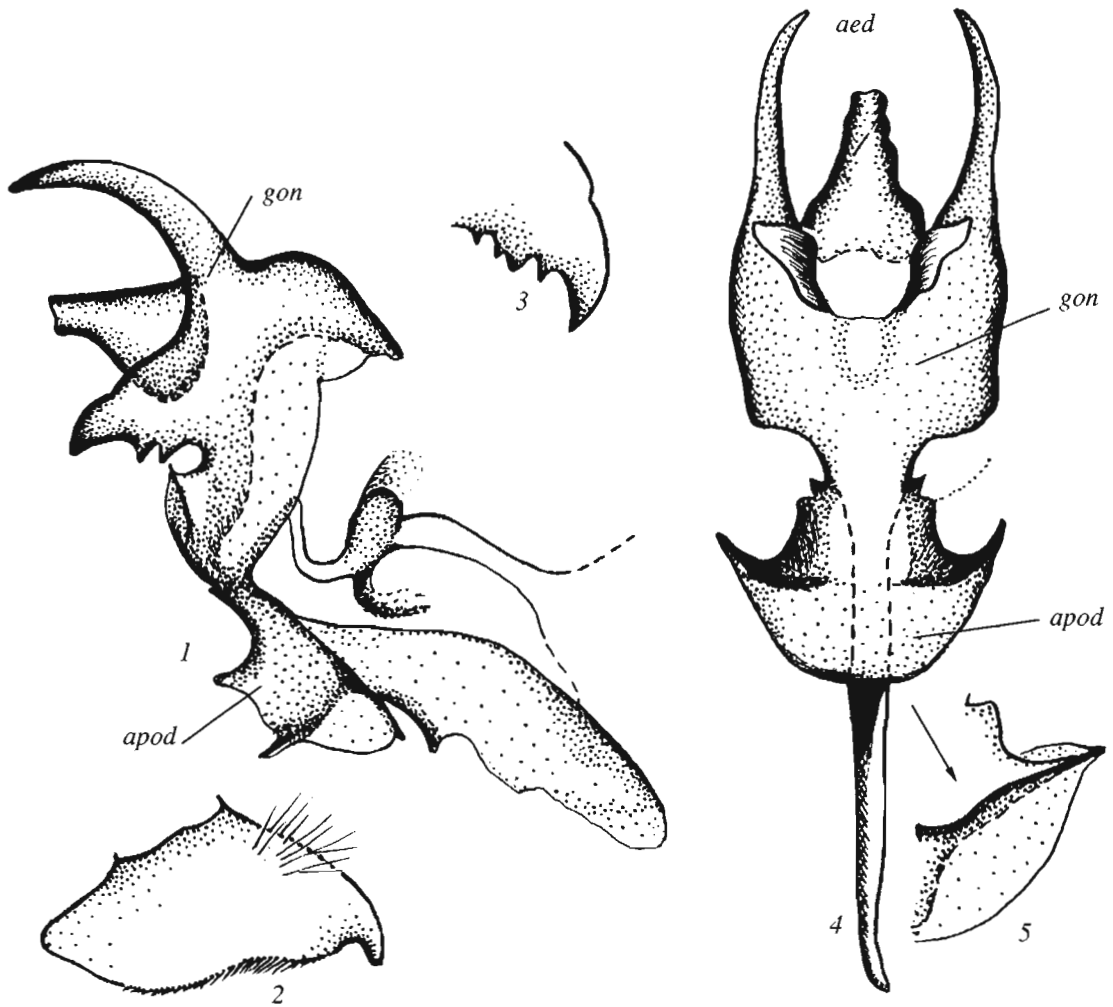


Fig. 2. Male genitalia of *T. meridionale* Kriv. et Mam.: (1, 4) complex of structures of aedeagus, lateral and dorsal view; (2) surstylus, lateral view; (3) lower tooth of gonapophyses; (5) half of apodema of aedeagus; *aed*, aedeagus; *apod*, apodema; *gon*, gonapophyses.

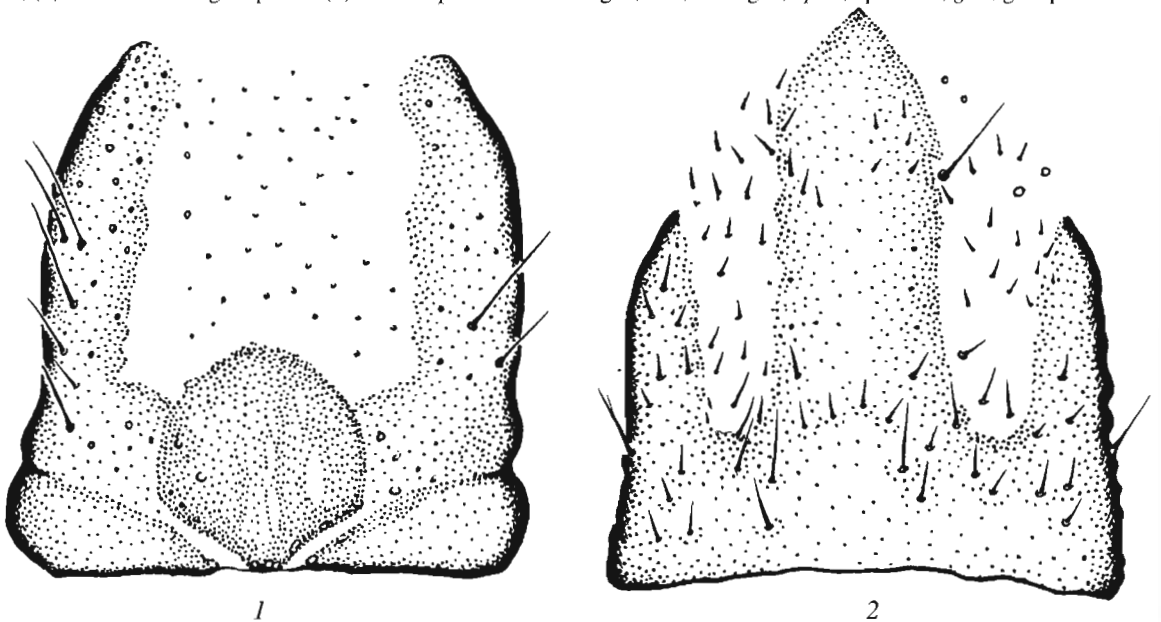


Fig. 3. Female of *T. meridionale* Kriv. et Mam.: (1, 2) sclerotized structures of sternite and tergite VIII.

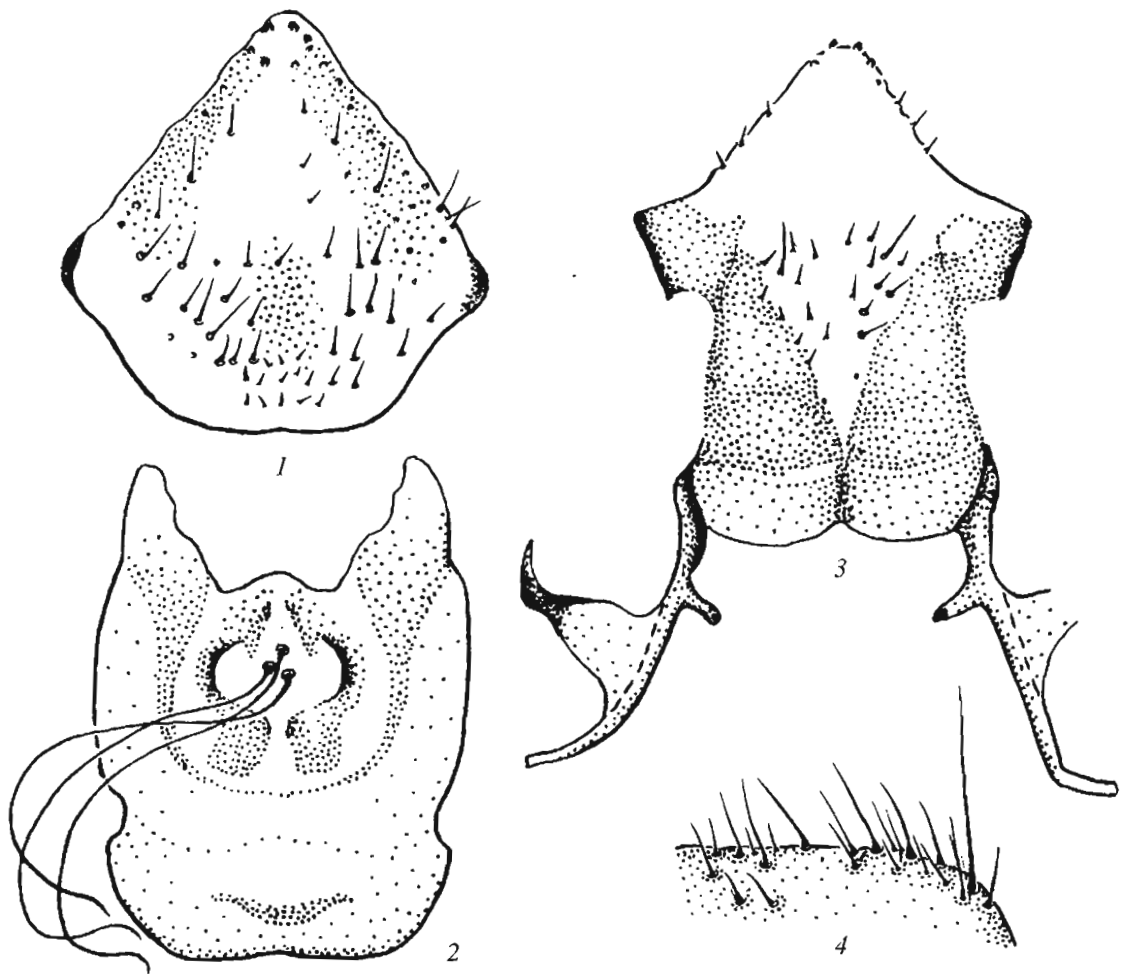


Fig. 4. Female of *T. meridionale* Kriv. et Mam.: (1) sternite IX; (2) genital capsule; (3) sclerotized structures of tergite IX; (4) anterior margin of abdominal tergite VII.

Description. Male (Figs. 1, 2). Eyes approximate along distance subequal to half length of upper frontal triangle. The latter with deep median furrow, with dense golden pruinosity not reaching median ocellus. Lower frontal triangle and lunula with dense golden pubescence nearly along entire length. Face with similar pubescence; dark shining median stripe nearly parallel-sided, 0.4 times as wide in middle part as the pubescent lateral stripe, with fine pruinosity immediately below antennae. Antennal arista considerably distant from base and situated nearly at level of inner prominence of 2nd segment. Abdomen with distinct pale stripes along anterior and posterior margins of tergites II–IV; these stripes similar in structure to those in *T. vespiforme* L., but anterior pale stripe on tergite II continuous, not divided by dark longitudinal stripe in middle part, and not narrowed. Anterior pale stripe on tergite III widest, median one interrupted, remaining as a tooth. In some specimens, longitudinal

stripe on tergite III continuous. Posterior pale stripe slightly narrower, as wide as median dark stripe. On tergite IV, posterior stripe slightly wider than anterior one. Both stripes connected by longitudinal pale stripe. Separated dark stripes no more than half as wide as anterior, and 0.4 times as wide as posterior pale stripe. Some parts of genitalia differing in structure from those in species of the *T. bombylans* and *T. vespiforme* groups, and more similar to those in species of the *T. apiforme* group. Cerci transversely oval, with long dense pale hairs. Surstyli subtriangular, with rounded obtuse apical prominence and elongate ventrolateral angle; apical half of their inner side with long dense dark setae, length of which exceeding width of surstylus. Middle part of hypandrium with wide obtuse tubercle on outer side, without teeth. Apical process of hypandrium rather narrow, without wide lateral lobe typical of species of the *T. vespiforme* group. Its width at base no more than 1.5 times width in middle part.

Differences between the three European species of the genus *Temnostoma*

<i>T. apiforme</i>	<i>T. meridionale</i>	<i>T. vespiforme</i>
Male		
Setae on 1st and 2nd antennal segments black	As those in <i>T. apiforme</i>	Setae on 1st 2nd antennal segments rufous
Hind femur with black hairs on lower side at apex	As that in <i>T. apiforme</i>	Hind femur with yellow hairs on lower side
Pale transverse stripe of mesoscutum continuous, half as wide as spot on prealary tubercle	Pale transverse stripe of mesoscutum short, in the form of oval spot, nearly as wide as spot on prealary tubercle	Pale transverse stripe of mesoscutum continuous, 0.67 times as wide as spot on prealary tubercle
Pale spots at sides of mesoscutum near postalary tubercle absent	Pale spots at sides of mesoscutum present, but not extending onto postalary tubercles	Pale spots at sides mesoscutum present, their base extending onto postalary tubercles
Surstyli elongate, length to width ratio 5.5 : 3.0	Surstyli elongate, length to width ratio 6.3 : 3.0	Surstyli large and wide, length to width ratio 5 : 4
Upper process of hypandrium narrow, strongly widened only at base, twice as wide there as in middle part	Upper process of hypandrium narrow, no more than 1.5 times as wide at base as in middle part	Upper process of hypandrium with wide lateral lobe
Transverse plate of apodema of aedeagus transversely stretched, with small tapered posterior prominence	Transverse plate of apodema of aedeagus weakly transversely stretched, rounded in posterior part	Transverse plate of apodema of aedeagus nearly triangular, with attenuate posterior margin
Female		
Vertex to eye width ratio at level of lateral ocelli 1 : 2	As that in <i>T. apiforme</i>	Vertex to eye width ratio at level of lateral ocelli 1.0 : 2.7
Pubescent stripes of frons gradually narrowing toward apex, not reaching level of median ocellus, 0.25 times as wide at boundary with lunula as the dark median dark	Vertex pubescent	Pubescent stripes wide along entire length, no less than 1.5 times as wide as the dark median stripe
Vertex with singular hairs at level of lateral ocelli	Pubescent stripes of frons wide, narrowed at apex, as wide as median stripe at level of median ocellus and 0.67 times as wide as it at boundary with lunula	Vertex lateral ocelli glabrous and shining at sides of lateral ocelli
Lateral sclerotized processes of tergite VIII long, slightly shorter than median one, their apices approximate to it	Lateral sclerotized processes of tergite VIII short, their apices not approximate to median process	Lateral sclerotized processes of tergite VIII reaching 2/3 of length of median process, their apices not approximate to it
Sclerites of genital capsule forming transversely oval structure	As those in <i>T. apiforme</i>	Sclerites of genital capsule forming longitudinally oval structure
Median sclerotized spot at base of sternite VIII rounded	As that in <i>T. apiforme</i>	Median sclerotized spot at base of sternite VIII oblong-oval

Inner row of teeth parallel to lateral margin of process. Gonapodes with long, narrow, slightly arcuate, curved apical tooth.

Female (Figs. 3, 4). Unfortunately, a single specimen of female is damaged. Coloration of head and thorax indistinct because of fat stains. Frons to eye

width ratio 2.0 : 3.3 at level of median ocellus, and 3.0 : 3.3 at boundary with lunula. Pubescent lateral stripes of frons wide, slightly narrowed toward vertex, reaching level of median ocellus, at least 1.5 times as wide as the glabrous median stripe. Face with wide glabrous median stripe, which only 0.67 times as wide

as the pubescent lateral stripe in middle part and as long as it in lower part before mouth opening. Antennae and arista rufous, with short black setae at anterior margin on dorsal and lateral surfaces. Base of arista situated on inner side nearly at level of apical prominence of 2nd antennal segment. Ocellar tubercle slightly projecting. Distance from ocellar tubercle to margin of eye equal to width of tubercle. Upper margin of occiput with long brownish hairs. Genae and ventrolateral angles of head behind eyes with long pale hairs.

Mesoscutum and scutellum with long pale hairs on periphery and shorter dark hairs on rest of surface. Pale spot on mesoscutum near postalar tubercle elongate, not extending onto surface of tubercle, similarly to that in male. Legs yellow fuscous. Fore leg with rufous apical 1/3 of femur and base of tibia. Middle leg rufous on greater part, femur darkened in basal 2/3. Hind leg rufous, with femur darkened on lower side. Halteres rufous.

Abdominal tergites II–V with large anterior and posterior pale stripes widely merging along margin of tergites. Anterior pale stripe of tergite II continuous, its width only slightly less than half of tergite length. Posterior pale stripe gradually narrowing toward midline of tergite, interrupted there along significant distance. Anterior pale stripe of tergite III continuous, with small triangular posterior prominence, its width 0.33 times length of tergite. Posterior pale stripe continuous, nearly 0.67 times as wide as anterior one, dark stripe separating them nearly as wide as posterior pale stripe. Pale stripes on tergites IV and V large, of subequal width (posterior one slightly narrower), connected by longitudinal pale stripe; paired dark stripes separating them narrow, no more than half as wide as the pale stripe. Tergite VIII with long large sclerotized median process and shorter and narrower lateral ones. Tergite IX with weakly sclerotized longitudinal plates approximate at bases and bearing groups of setae. Posterior sclerotized processes with short inner rods in middle part, not widened distally. Genital capsule large, rectangular, sclerites in middle part forming transversely oval structure. Sternite VIII with long lateral sclerotized processes nearly reaching its posterior margin. Sclerotized basal part with rounded dark median spot without posterior prominence. Sternite IX with numerous erect setae mainly on periphery in apical half and at base of middle part. Middle part of sternite glabrous.

For the essential differences between the three European species of the genus, see the table above.

According to the original description, *T. meridionale* Kriv. et Mam. is similar to *T. vespiforme* L. in the large body up to 15 mm long, coloration of the mesoscutum, including the presence of pale spots at the postalar tubercles, shape of the pale stripes of the abdominal tergites, and presence of wide pubescent stripes on the frons in the female. At same time, its significant similarity to *T. apiforme* Fabr. in such essential features of the structure of the adult as the coloration of setae on the antennae and femora and the structure of the surstyli, apical process of the male hypandrium, and sclerotized formations of female tergite VIII and genital capsule indicates that the species is more closely related to the *T. apiforme* group. Thus, the species occupies an intermediate position between the *T. apiforme* and *T. vespiforme* groups, which is substantiated by data on the larval morphology (Krivosheina and Mamaev 1962).

According to these data, species of the *T. apiforme* and *T. vespiforme* groups are rather closely related to each other and considerably differ from species of the *T. bombylans* group (Krivosheina, 2002). This circumstance validates the separation of two subgenera in the genus *Temnostoma*.

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