

## Key to females of Norwegian species of *Eupeodes* (Diptera, Syrphidae)

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### ABSTRACT

A key is presented to females of all 13 *Eupeodes* species known from Norway, taking into account the high variability in some of the species. Heads, abdomens and sternites of almost all species are figured.

Key words:

Diptera, Syrphidae, *Eupeodes*, key, Norway, variability.

### INTRODUCTION

The genus *Eupeodes* is one of the most difficult syrphid genera, because there are many similar species and great intraspecific variation. These variations arise from temperatures experienced during the pupal stage (DUŠEK & LÁSKA 1974) and on geographical origin (MAZÁNEK et al. 1998). To understanding this genus, especially distinguishing the females, a rich material from various areas is needed. When preparing his Check List of Norwegian Syrphidae, NIELSEN (1999) collected sufficient material to enable us to prepare keys to the Norwegian species. Three papers have been published during our study of Norwegian *Eupeodes*: a key to the males (MAZÁNEK et al. 1999c), results of a revision of the *E. chillcotti* type material (MAZÁNEK et al. 1999a) and description of the new species *E. duseki* (MAZÁNEK et al. 1999b). The present key to females is published separately, as it demanded different determination characters and ways, and also more revision work.

The present publication will close the work on this northern material.

### METHODS

Only females are included in the key. The external morphological variability has been studied in major part of the specimens. Due to great intraspecific variability the

determination of females, using one or two characters, will often prove insufficient. The study of more characters is necessary and basic knowledge about variability of individual characters is useful. The variability of some generally used characters depends on temperature during pupal development (see DUŠEK & LÁSKA 1974). For determination of females this variability brings some particular problems, because there is a correlation between expressions of the most often used characters (see Table 1).

Some key characters can also be partly changed during life by the loss of microtrichia on wings membrane or on frontal dust spots or due to dry conservation of specimens (the width of vertex or of face).

All species mentioned in the key were described in detail by DUŠEK & LÁSKA (1973, 1976) and MAZÁNEK et al. 1999b. The description of the features of genus *Eupeodes* was made by DUŠEK & LÁSKA (1973, p. 415 – 418) and VOCKEROTH (1969, p. 62 – 66) under the name *Metasyrphus* Matsumura, 1917.

Tab. 1: Example of range of variability of characters depending on temperature during pupal development in females of the species of *Eupeodes bucculatus*.

Character	Pale specimens (hot conditions)	Dark specimens (cold conditions)
yellow spots on tergite 2	large, reaching lateral margins of tergite	small, not reaching lateral margins of tergite
abdominal spots (yellow spots on tergites 3 and 4)	broad, connected in bands reaching lateral margins of tergites	narrow, separated and not reaching lateral margins of tergites
tergite 5	small dark spot, lateral margins completely pale	large dark spot, lateral margin can be partly dark (in very dark specimens)
dark spots on sternites	small, narrow, rather oval, often absent on some sternites	large, rather rectangular, sometimes broadly reaching lateral margins of sternites
legs	yellow	base of femora dark
long black hairs on front femur	absent, all hairs yellow or only some black hairs near apex	many black hairs, almost from the base till apex
hairs on scutellum	all yellow	mainly black hairs on disc
hairs (generally)	shorter	longer

## KEY TO FEMALES

- 1 a) Metasternum bare; vein  $r_{4+5}$  strongly dipped in the middle (Fig. 1). Holarctic. Body length 10 - 11.5 mm, wing length 9 - 10.5 mm. (sg. *Lapposyrphus* Dušek & Láška). . . . . *E. lapponicus* (Zetterstedt, 1838)
- b) Metasternum hairy; vein  $r_{4+5}$  only slightly curved in the middle (Figs. 2, 3). (sg. *Eupeodes* Osten Sacken). . . . . 2
- 2 a) Microtrichia covering about 2/3 of wing membrane, second basal cell almost bare, discal cell partly bare (Fig. 2). Holarctic. Body length 9 - 13 mm, wing length 8 - 10.2 mm. . . . . *E. lundbecki* (Soot-Ryen, 1946)
- b) Microtrichia covering more than 2/3 of wing membrane, second basal cell covered in microtrichia on at least apical part, discal cell almost completely covered in microtrichia (Fig. 3). . . . . 3
- 3 a) Basal part of alula with bare area in the middle and scutellum normally pale haired; frontal dust spots triangular and rather small, placed largely on yellow ground-colour, frons long yellow, only black for about posterior 1/3 of space between anterior ocellus and antennal sockets in normally coloured specimen (Fig. 32); abdominal spots connected or separated, reaching or not reaching lateral margins of tergites (Fig. 4 and 5); dark spots on sternites oval and rather small (Fig. 17), in pale specimens sometimes reduced to dots. Palearctic, Afrotropical. Body length 6.8 - 9.8 mm, wing length 5.4 - 8.5 mm. . . . . *E. corollae* (Fabricius, 1794)
- b) Alula completely covered in microtrichia and/or scutellum black haired on disc; frons differing. . . . . 4
- 4 a) Basal part of alula with bare area in the middle (Fig. 3); abdominal spots separated and not reaching lateral margins of tergites (Figs. 7, 8, 9) or almost so (Fig. 6). . . . . 5
- b) Alula completely covered in microtrichia, if small bare area present on alula then abdominal spots connected in bands (Fig. 16) or at least reaching lateral margins of tergites (Fig. 11). . . . . 7
- 5 a) Frontal dust spots absent; face very broad about 50% of width of head (Fig. 33); abdominal spots oblique (Fig. 8); tergite 5 completely yellow or with triangular dark spot or lateral margins partly dark in mountain specimens; dark spots on sternites 2 and 3 rather rectangular (Fig. 18), sternite 4 completely yellow or with narrow dark spot. Boreoalpine. Body length 9.2 - 10.8 mm, wing length 7.5 - 9 mm. . . . . *E. tirolensis* (Dušek & Láška, 1973)
- b) Frontal dust spots present; face less broad and abdominal spots less oblique (Figs. 6, 7, 9). . . . . 6
- 6 a) Clypeus short, less than 1.3 times longer than wide; lateral margins of tergite 5 pale (Figs. 6, 7); frontal dust spots large, spreading considerably across frons, so that between them the exposed black ground-colour is narrower than the ocellar triangle (Fig. 34); the long hairs on the posterior-basal dark part of front femur all yellow (as in Fig. 31); dark spots on sternites more or less oval (Fig. 19). Palearctic. Body length 8.8 - 11 mm, wing length 7.2 - 9.5 mm. . . . . *E. luniger* (Meigen, 1822)
- b) Clypeus elongated, about 1.4 - 1.9 times longer than wide; lateral margins of

- tergite 5 mainly dark (Fig. 9); frontal dust spots smaller, only narrowly spreading across the frons, so that between them the exposed black ground-colour is mostly broader than the ocellar triangle (Fig. 35); the long hairs on the posterior-basal part of front femur almost all black (Fig. 27); dark spots on sternites rather rectangular (Fig. 20). Northern and central Europe. Body length 8 - 12.5 mm, wing length 6.5 - 9.8 mm. ....  
 ..... *E. nielseni* (Dušek & Láška, 1976)
- 7 a) Frontal dust spots absent (Fig. 36); lateral margins of tergite 5 always pale (Fig. 10); abdominal spots normally connected as broad bands reaching lateral margins (Fig. 10), in dark specimens the spots can be separated. Holarctic. Body length 7 - 9.5 mm, wing length 6.5 - 7.8 mm. .... *E. latifasciatus* (Macquart, 1829)
- b) Frontal dust spots present, lateral margin of tergite 5 pale or dark. .... 8
- 8 a) Vertex broad, distinctly broader than the distance between lateral outlines of antennal sockets (Fig. 38); dark spot on sternite 4 absent or noticeably smaller than that on sternite 3 (Figs. 21, 22). .... 9
- b) Vertex narrow, about as broad as the distance between lateral outlines of antennal sockets (Fig. 39); sternites 3 and 4 with dark spots of about equal size (Figs. 23, 24, 25, 26). .... 10
- 9 a) Hairs on scutellum rather long and fine, at least some long hairs on margin of scutellum tortuous in apical part (Fig. 43). Vertex about three times broader than the distance between the posterior ocelli (Fig. 37); abdominal spots narrow, tergite 5 with a well developed black spot (Fig. 11). The posterior-basal long hairs on front femur almost all black, the longest are longer than width of femur (Fig. 28); third antennal segment elongate oval; hairs on notum (in lateral view) off-white to pale yellow; alula at base with rather thin microtrichia, sometimes forming a small bare area; sternites (Fig. 21). Northern Holarctic. Body length 7.6 - 10.5 mm, wing length 7.2 - 8.2 mm. ....  
 ..... *E. punctifer* (Frey in Kanervo, 1934)
- b) Hairs on scutellum rather short and brushlike, straight also in apical part (Fig. 44); vertex narrower (Fig. 38) and abdominal spots broader than in *E. punctifer*, black spot on tergite 5 rather small (Fig. 12) or almost absent. The posterior-basal long hairs on front femur as long as width of femur (Fig. 29); third antennal segment oval; hairs on notum (in lateral view) yellowish to golden yellow; alula normally completely covered in microtrichia; sternites (Fig. 22). Northern Holarctic. Body length 7 - 9.4 mm, wing length 6.6 - 7.5 mm. .... *E. abiskoensis* (Dušek & Láška, 1973)
- 10 a) More than 60% of second basal cell covered in microtrichia; abdominal spots usually separated (Figs. 13, 14); dark spots on sternites rather oval (Figs. 23, 24); frontal dust spots always large, spreading considerably across frons, so that between them the exposed black ground-colour is distinctly narrower than the ocellar triangle (Figs. 39, 40). .... 11
- b) About half of second basal cell covered in microtrichia; abdominal spots usually connected into bands (Figs. 15, 16); dark spots on sternites laterally elongated, often clearly rectangular (Figs. 25, 26); frontal dust spots could be smaller, often not spreading much across frons, so that between them the exposed black ground-colour is about as broad as the ocellar triangle or broader (Fig. 41). .... 12
- 11 a) 99-100 % of second basal cell covered in microtrichia; sternite 5 pale or with



a small vague spot only (Fig. 23); abdomen (Fig. 13); head (Fig. 39). Northern Holarctic. Body length 7 - 9 mm, wing length 6.3 - 7.2 mm. . . . . *E. curtus* (Hine, 1922)

b) 60-90 % of second basal cell covered in microtrichia; sternite 5 with dark spot (Fig. 24); abdomen (Fig. 14); head (Fig. 40). Northern Palaearctic. Body length: 7.5 - 9.8 mm, wing length 6.5 - 8 mm. . . . . *E. duseki* Mazánek, Láska & Bičík, 1999

12 a) The long hairs on the posterior-basal part of front femur mainly dark (Fig. 30); sternites 3 and 4 with rectangular dark spots usually with elongated anterolateral corners (Fig. 25); abdominal spots connected in narrow bands usually reaching lateral margins of tergites (Fig. 15); tergite 5 with large, dark spot usually reaching lateral margin, the margin often partly dark (Fig. 15); frontal dust spots small, not spreading much across frons, so that between them the exposed black ground-colour is broader than the ocellar triangle (Fig. 41); alula completely covered in microtrichia. Palaearctic. Body length 9 - 11 mm, wing length 6.7 - 8.8 mm. . . . . *E. nitens* (Zetterstedt, 1843)

b) The long hairs on the posterior-basal part of front femur yellow (Fig. 31); dark spots on sternites usually without elongated anterolateral corners (Fig. 26); abdominal spots connected in bands reaching or not lateral margins of tergites (Fig. 16), in dark specimens the abdominal spots sometimes separated; dark spot on tergite 5 smaller, not reaching lateral margin, the margin yellow (Fig. 16); frontal dust spots usually larger, spreading across frons, so that between them the exposed black ground-colour is as broad as the ocellar triangle or narrower (Fig. 42); alula at base with rather thin microtrichia, sometimes forming a small bare area. Palaearctic. Body length 7.3 - 12 mm, wing length 6.2 - 10.2 mm. . . . . *E. bucculatus* (Rondani, 1857)

Figured specimens (all females)

*Eupeodes abiskoensis* (Dušek & Láska, 1973): Norway, Spiterstulen, On: Lom, 1.7.1974, 4.7.1975, leg. T.R. Nielsen.

*E. bucculatus* (Rondani, 1857): Norway, Grefsgard, Bv: Nore, 1.7.1970, leg. T.R. Nielsen; Norway, EIS 28 AK Ås: Ås, 23.7.1988, leg. L. Aarvik.

*E. corollae* (Fabricius, 1794): Norway, FN, Berlevåg: Berlevåg, EIS 189, *Ranunculus acris*, 7.7.2002, leg. T.R. Nielsen; Bohemia, Zubří, sq.6260, 20.9.1996, leg. L. Mazánek; Norway, Baerum-lake Osternvannet, 15.8.1994, leg. L. Mazánek.

*E. curtus* (Hine, 1922): Norway, FI, Kautokeino: Suolovuobme (EIS 165), 24.6.1984, leg. T.R. Nielsen.

*E. duseki* Mazánek, Láska, Bičík, 1999: Norway, Vaggetem, Fø: Sør-Varanger, 30.6.1977, (paratype No. 23), leg. I. & T. Nielsen; Sweden, T. Lpm. Abisko, 17.6.1973, (paratype No. 18), leg. A. Fjellberg.

*E. latifasciatus* (Macquart, 1829): Norway, Baerum-lake Osternvannet, 14.8.1994, leg. L. Mazánek.

*E. luniger* (Meigen, 1822): Finland, St: Reposari, 1.9.1959, leg. V. Laurc, coll. Mus. Zool. Helsinki, Loan. No. D4129; Moravia, Huslenky-1km N, distr. Vsetín, sq.6674, leg. L. Mazánek.

*E. nielseni* (Dušek & Láska, 1976): Norway, Haukedal, Hoy: Åsane, 10.8.1967, leg. J. Haugsbø.

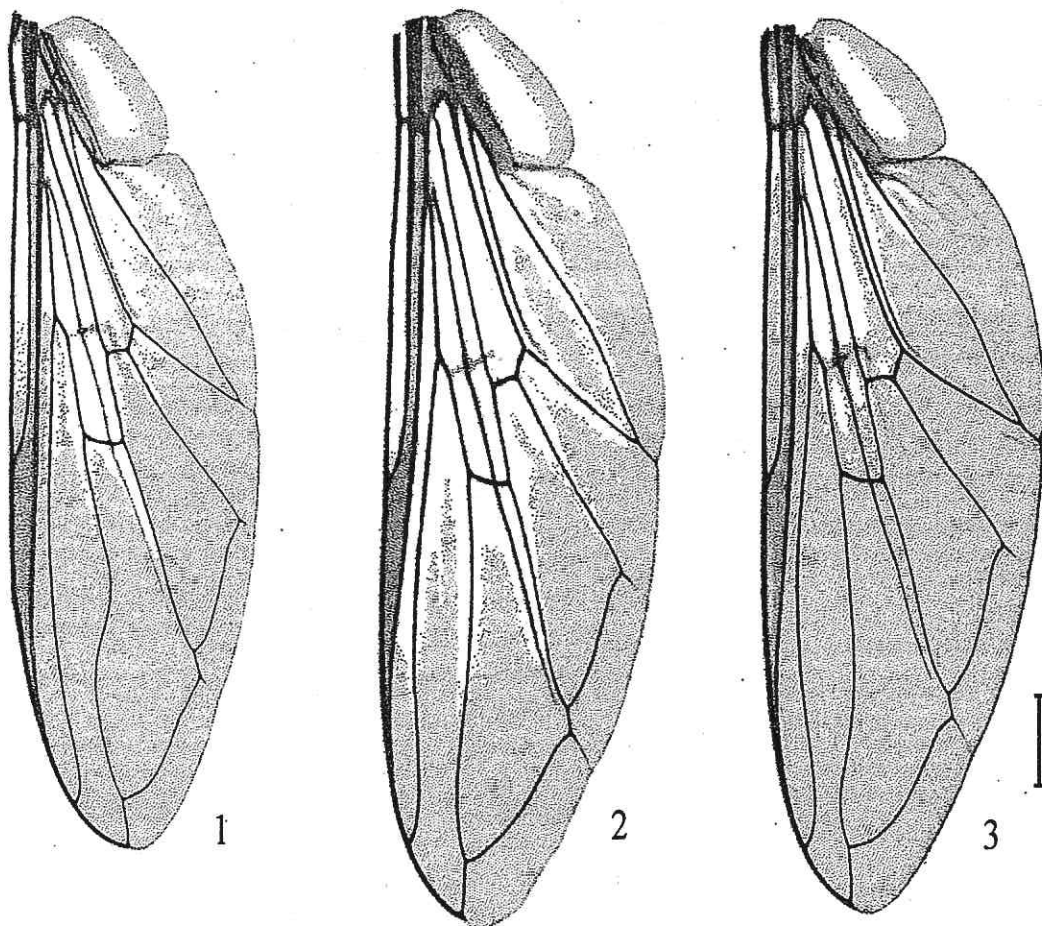
*E. nitens* (Zetterstedt, 1843): Norway, Elgsjø, TEi: Notodden, 11.7.1976, leg. T.R. Nielsen.

*E. punctifer* (Frey in Kanervo, 1934): Norway, Fiskevann, Fø: Sør-Varanger, 17.7.1969, leg. I. & T. Nielsen; Norway, Lyngmo, Fø: Sør-Varanger, 22.7.1969, leg. T.R. Nielsen.

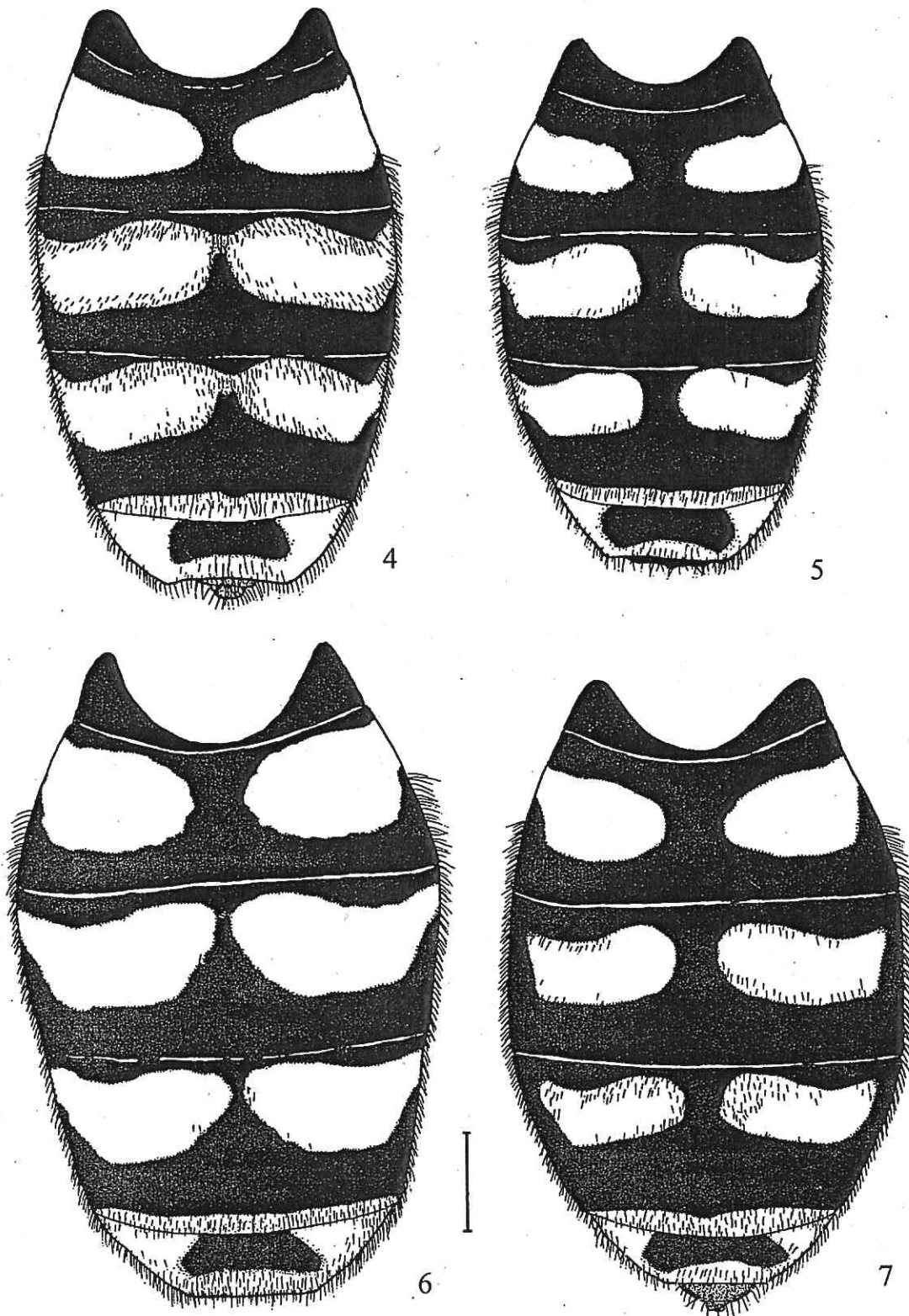
*E. tirolensis* (Dušek & Láška, 1973): Norway, STI, Oppdal: Kongsvoll, EIS 79, *Saxifraga aizoides*, 8.8.1995, leg. T.R. Nielsen.

#### ACKNOWLEDGEMENTS

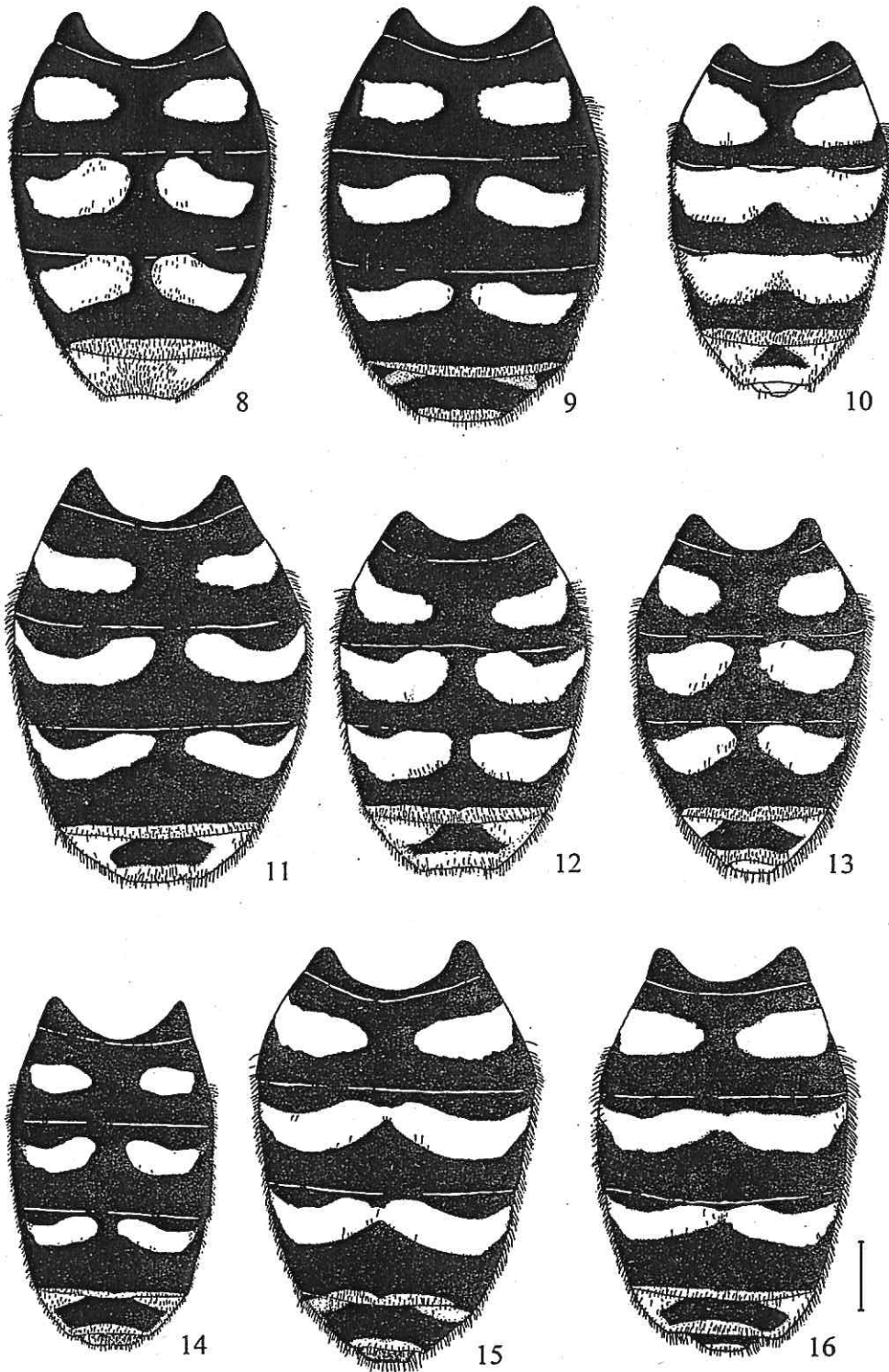
We want to express our gratitude to J. Richard Vockeroth, Biosystematics Research Institute, Research Branch, Ottawa (Canada); Claus Claussen, Flensburg (Germany); Jeroen van Steenis, Department of Systematic Zoology, Evolutionary Biology Centre, Uppsala University, Uppsala (Sweden); Sarah Whitman, Museo Zoologico de "la Specola" sezione del museo di storia naturale Firenze (Italy); Heikki Hippa, Swedish Museum of Natural History, Stockholm (Sweden) for letting us study types or specimens in their care, for valuable information or for help with literature. Roger Morris, English Nature (U.K.) has kindly checked the English.



Figs. 1-3. Wings of females: 1 – *Eupeodes (Lapposyrphus) lapponicus*. 2 – *E. lundbecki*. 3 – *E. luniger*. (Scale 1 mm).

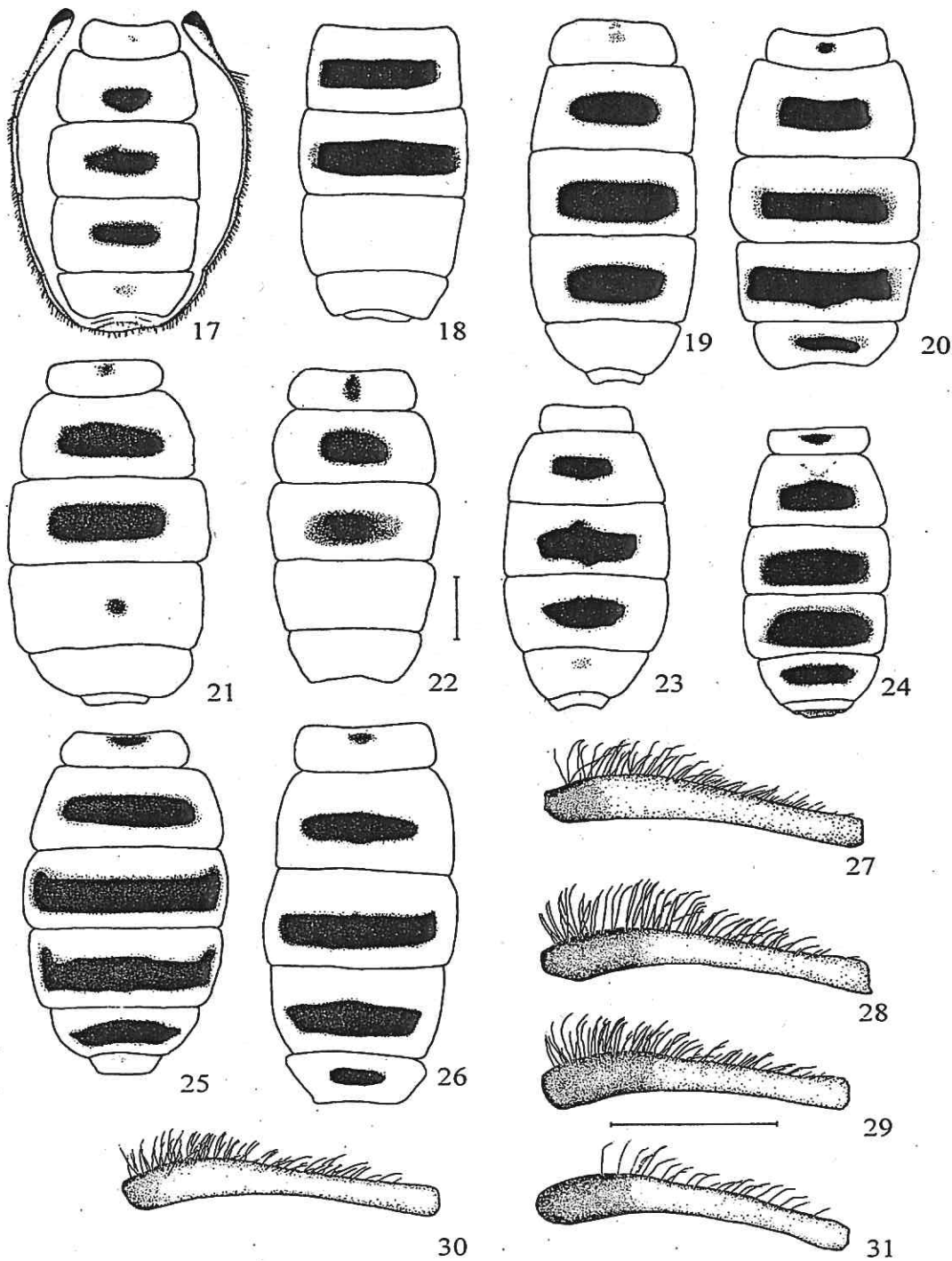


Figs. 4–7. Abdomens of females (only black hairs are figured): 4–5. *Eupeodes corollae*, 4 – Berlevåg (paler specimen), 5 – Zubří. Figs. 6–7. *E. luniger*, 6 – Reposari (paler specimen), 7 – Huslenky (darker specimen). (Scale 1 mm).

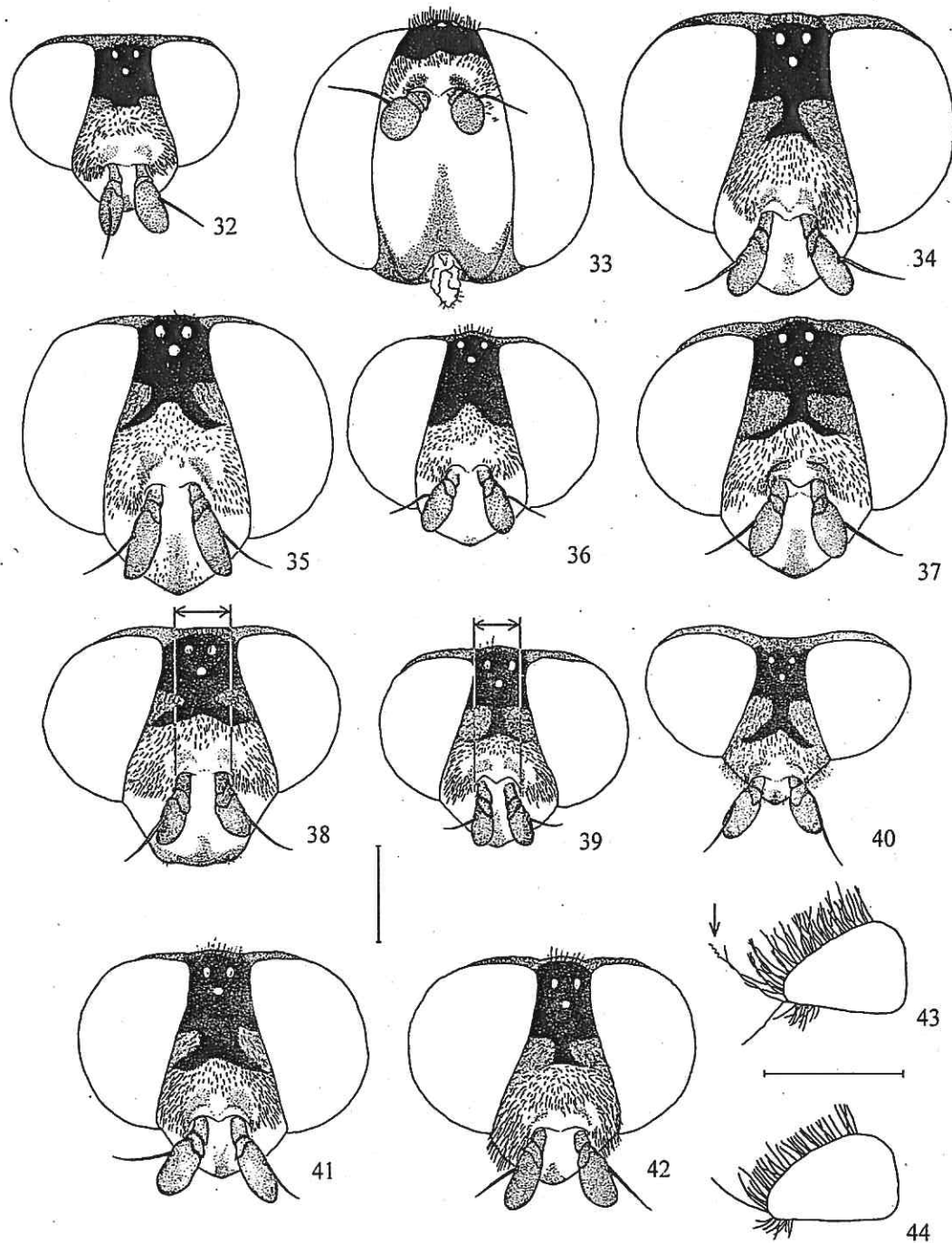


Figs. 8–16. Abdomens of females (only black hairs are figured). 8 – *Eupeodes tirolensis* (Kongsvoll). 9 – *E. nielseni* (Haukedal). 10 – *E. latifasciatus* (Baerum). 11 – *E. punctifer* (Fiskevann). 12 – *E. abiskoensis* (Spiterstulen 4.7.1975). 13 – *E. curtus* (Suolovuobme). 14 – *E. duseki* (Sør-Varanger). 15 – *E. nitens* (Elgsjø). 16 – *E. bucculatus* (Grefsgard). (Scale 1 mm).





Figs. 17-31. 17 - 26. Sternites of females. 17 - *Eupeodes corollae* (Zubří). 18 - *E. tirolensis* (Kongsvoll). 19 - *E. luniger* (Reposaari). 20 - *E. nielseni* (Haukedal). 21 - *E. punctifer* (Fiskevann). 22 - *E. abiskoensis* (Spiterstulen, 4.7.1975). 23 - *E. curtus* (Suolovuobme). 24 - *E. duseki* (Sør-Varanger). 25 - *E. nitens* (Elgsjø). 26 - *E. bucculatus* (Ås). Figs. 27 - 31. Black hairs on front femora (only black hairs are figured). 27 - *E. nielseni* (Haukedal). 28 - *E. punctifer* (Fiskevann). 29 - *E. abiskoensis* (Spiterstulen, 4.7.1975). 30 - *E. nitens* (Elgsjø). 31 - *E. bucculatus* (Ås). (Scales 1 mm).



Figs. 32–44. 32 – 42. Heads of females in dorsal view (only black hairs are figured, 38 and 39 with marked distance between lateral outlines of antennal sockets). 32 – *Eupeodes corollae* (Baerum). 33 – *E. tirolensis*, frontal view (Kongsvoll). 34 – *E. luniger* (Reposaari). 35 – *E. nielseni* (Haukedal). 36 – *E. latifasciatus* (Baerum). 37 – *E. punctifer* (Fiskevann). 38 – *E. abiskoensis* (Spiterstulen, 4.7.1975). 39 – *E. curtus* (Suolovuobme). 40 – *E. duseki* (Abisko). 41 – *E. nitens* (Elgsjø). 42 – *E. bucculatus* (Grefsgard). Figs. 43 – 44. Scutella of females in lateral view. 43 – *E. punctifer* (Lyngmo, arrow shows tortuous end of hair). 44 – *E. abiskoensis* (Spiterstulen, 1.7.1974). (Scales 1 mm).

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