

## A new species of the *Sphaerophoria novaeangliae* species-group (Diptera, Syrphidae) from the Russian Far East

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*Sphaerophoria reginae* **spec. nov.** is described from the Russian Far East and assigned to the *novaeangliae* species-group. Previous records of *Sphaerophoria viridaenea* sensu Bankowska (1964) from the Russian Far East are regarded as misidentifications of either *Sphaerophoria reginae* spec. nov. or *Sphaerophoria tuvunica* Violovitsh, 1966. *Sphaerophoria tsaii* He & Li, 1992 is established as a junior synonym of *Sphaerophoria viridaenea* Brunetti, 1915, **syn. nov.** A note on the supposed phylogenetic relationships within the *novaeangliae*-group is given.

Key words: Diptera, Syrphidae, *Sphaerophoria*, *novaeangliae*-group, new species, synonymies, phylogeny, Russian Far East.

### Zusammenfassung

*Sphaerophoria reginae* **spec. nov.** wird aus dem fernöstlichen Russland beschrieben und der *novaeangliae*-Artengruppe zugerechnet. Bisherige Nachweise von *Sphaerophoria viridaenea* sensu Bankowska (1964) aus dem fernöstlichen Russland werden als Fehldeterminationen von *Sphaerophoria reginae* spec. nov. oder *Sphaerophoria tuvunica* Violovitsh, 1966 betrachtet. *Sphaerophoria tsaii* He & Li, 1992 wird als jüngeres Synonym von *Sphaerophoria viridaenea* Brunetti, 1915 festgestellt, **syn. nov.** Die Arbeit enthält Anmerkungen zu den vermuteten phylogenetischen Verwandtschaftsbeziehungen innerhalb der *novaeangliae*-Gruppe.

### Introduction

Seven species of the *Sphaerophoria novaeangliae* species-group (Knutson 1973) are currently recognized from the temperate zone of the holarctic region (*S. novaeangliae* Johnson, 1916; *S. shirchan* Violovitsh, 1957; *S. tuvunica* Violovitsh, 1966; *S. tsaii* He et Li, 1992) and from the southern slopes of the Himalayas (*S. viridaenea* Brunetti, 1915; *S. assamensis* Joseph, 1970; *S. angulata* Claussen & Weipert, 2003).

Bankowska (1964) applied the name *S. viridaenea* Brunetti to a *Sphaerophoria* from the eastern part of the Palaearctic (East Siberia, Russian Far East, Korea, Mongolia),

based on the then available informations on *S. viridaenea*, but not on the study of the types. This supposed identity of *S. viridaenea* of Bankowska (1964) with the oriental *S. viridaenea* Brunetti has been in question for a long time (Vockeroth 1969: 134). Subsequent review of the types of *S. viridaenea* (Joseph 1967, 1970), and recent studies on *S. viridaenea* from Nepal (Claussen & Weipert 2003) revealed apparent differences between structures of the male terminalia, in oriental material and populations of *S. viridaenea* sensu Bankowska from the Russian Far East (Bankowska 1964, Skufjin 1980, Violovitsh 1983, Mutin & Barkalov 1999). These discrepancies prompted the present re-examination of Russian material, which proved to be misidentified, leaving *Sphaerophoria viridaenea* of Bankowska (1964) without a valid name. The species is described in the present paper, and its supposed phylogenetic relationships within the *novaeangliae* species-group are briefly discussed.

### Material and methods

We studied specimens, collected by various collectors in the Russian Far East and identified previously by V. Mutin as "*Sphaerophoria viridaenea*", and of *S. tuvunica*, including the holotype of that latter taxon, which is kept in the Zoological Institute of the Russian Academy of Sciences, Saint-Peterburg.

Material of the remaining species of the *novaeangliae* species-group, except for *S. tsaii*, was also studied by at least one of the authors. Additional information on *S. novaeangliae* was taken from the detailed redescription and figures provided by Knutson (1973) and Vockeroth (1969). The material assigned to *S. viridaenea* by Bankowska (1964) was not available for study.

The terminology recommended by Merz & Haenni (2000) is followed here for general morphological features. The terms used for features of the male terminalia are adopted from Sinclair (2000) and Knutson (1973). Some terms used for portions of the surstylus and the gonostylus are explained in Figs 4 and 11.

Measurements of body length are taken from the distance between the anterior margin of the subcranial cavity and the apex of the abdomen.

### Results

#### *Sphaerophoria reginae* **spec.nov.**

= *Sphaerophoria viridaenea* sensu Bankowska, 1964: 309, nec Brunetti, 1915

Holotype: Male. Russia, Primorskii Krai, 30 km N Ternej, on flowers of *Anthriscus sylvestris*, 14.VI. 1982, V. Mutin.

Paratypes: Russia: 2 males, with the same label as the holotype; 1 male, Southern Primorie, the reserve "Kedrovaya pad", 25.VIII 1982, V. Mutin; 1 male, Primorskiy Krai, Vladivostok, 27.VIII 1980, A. Meshcherikov; 1 female, Southern Primorie, Kame-

nushka, 11.VI.1981, V. Mutin; 1 female, Primorskii Krai, Anisimovka, 30.VII.1974, A. Berezantsev; 1 female, Primorskiy Krai, Vladivostok, Sedanka, 21.VIII.1982, V. Mutin; 1 female, Amurskaya oblast, Malyi Khingan Range, Kuldur, 22.VII.1988, V. Makarkin; 1 male, Amurskaya Oblast', Zeya Sity, 30.VI.1979, A. Shatalkin; 1 male, in the same place, 20.VI.1981, A. Ozerov; 1 female, Korea, Gangwon-do, Jeongseon Nam-myeon, Mt. Mindungsan from Yupyeong-ri to 1119 m peak, 14.VI.2004, H.-W. Byun et al.

Depository of the types: the holotype and a part of the paratypes are kept in the Institute of Biology and Soil Science (IBSS), the Far Eastern Branch of the Russian Academy of Sciences, Vladivostok; further paratypes are located in the personal collection of V. Mutin and in the Zoological Museum of Moscow State University, Moscow.

**Etymology:** The new species is named in honour of the Polish dipterist Dr. Regina Bankowska, who carried out the studies basal to present understanding of palaeartic *Sphaerophoria*.

**Diagnosis:** Closely similar to *Sphaerophoria tuvinica* (figs 3, 6, 17, 24), *S. viridaenea* (figs 13, 25) and *S. angulata* (figs 14, 26), but differing from them by characters of the male genitalia and the colouration of the 1<sup>st</sup> tergite:

- 1<sup>st</sup> tergite black with a pair of large, latero-basal, semicircular yellow maculae, which almost reach the apical margin of the tergite;
- ventral lobe of surstylus narrow, apically not enlarged (fig. 4);
- dorsal lobe of surstylus tapering, rather strongly bent ventrad (figs 1, 2, 4, 5);
- base of surstylus moderately wide, and forming almost a right angle behind the cerci (figs 1, 2, 4);
- dorsal margin of gonostylus subapically sinuous (fig. 16).

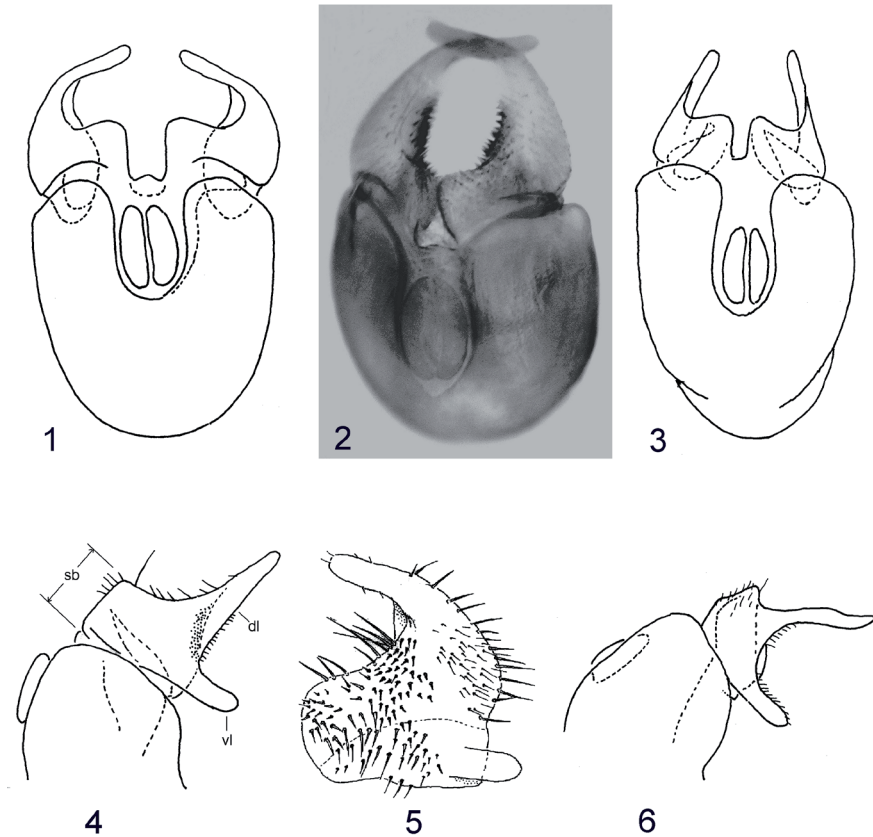
### Description

♂: Head: Face with wide black vitta, its width nearly 1/3-1/2 as wide as width of face above facial tubercle. Frons mainly with black pile.

Thorax: Scutum with yellow stripe along sides of presutural portion. – Wing membrane with bare areas on basal cells. – Legs mainly yellow, except for coxae, trochanters and dorsal surface of metatarsi which are brownish; sometimes also mid femur submedially and mid tibia basally and subapically very weakly darkened. The spine-like setae on the ventral surface of mid metatarsus black to dark brown.

Abdomen: Tergites (fig. 10) mainly with short black hairs. 5<sup>th</sup> tergite yellow, except for a dark macula on middle, which is covered by longer black hairs. 1<sup>st</sup> tergite black with a pair of large latero-basal, semicircular, yellow maculae. 2<sup>nd</sup>, 3<sup>rd</sup> and 4<sup>th</sup> tergites yellow, with dark basal and apical (or subapical) fasciae; basal fascia strongly enlarged towards lateral margin, but not connected with apical (subapical) fascia, which is tapering laterally. Apical margin of 3<sup>rd</sup> tergite narrowly yellow, apical margin of 4<sup>th</sup> tergite widely yellow. – Genitalia (figs 1-2, 4-5, 7, 16, 23): Cerci located in a deep groove of apical margin of epandrium.

Length: body 7.5-8.0 mm; wing 5.5-6.0 mm.

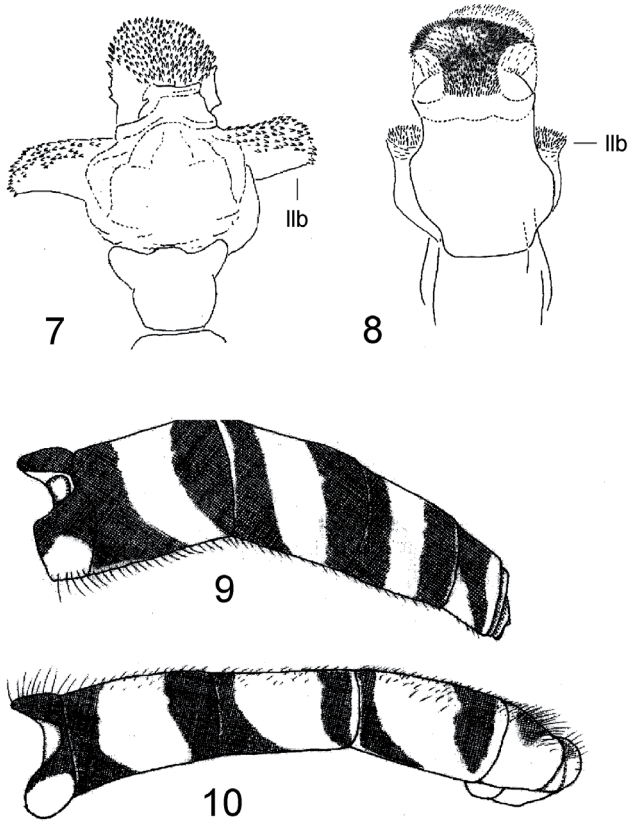


**Figs 1-2, 4-5: *Sphaerophoria reginae* spec. nov., ♂.** – 1. epandrium with surstyli, dorsal; – 2. epandrium with surstyli, dorso-lateral; – 4. epandrium with surstylus, detail, lateral; – 5. surstylus, inner surface, lateral. – **Figs 3, 6: *Sphaerophoria tuvonica* Virolvitsh, ♂.** – 3. epandrium with surstyli, dorsal; – 6. epandrium with surstylus, detail, lateral. – sb = width of surstylar base; dl = dorsal lobe of surstylus; vl = ventral lobe of surstylus.

♀: Head: Face yellow, with narrow, dark, medial vitta, which reaches base of antennae. Frons yellow, with black vitta, its width more than half as wide as frons posteriorly. Hairs of frons and vertex mainly black. Antenna yellow, darker dorsally.

Thorax: Scutum with short pale hairs and with yellow lateral stripe on its presutural portion; postalar callus mainly yellow or darkened and translucent. Scutellum mainly with rather long yellow hairs. – Legs yellow, sometimes metatarsus weakly darkened dorsally. Hairs of hind legs mainly black. Mid femur mainly with short yellow hairs, except for long black ones on apical half, postero-ventrally.

Abdomen (fig. 9): 1<sup>st</sup> tergite mainly black, except for lateral yellow maculae. Tergites 2-4 with black basal and apical fasciae; posterior margin of 4<sup>th</sup> tergite narrowly

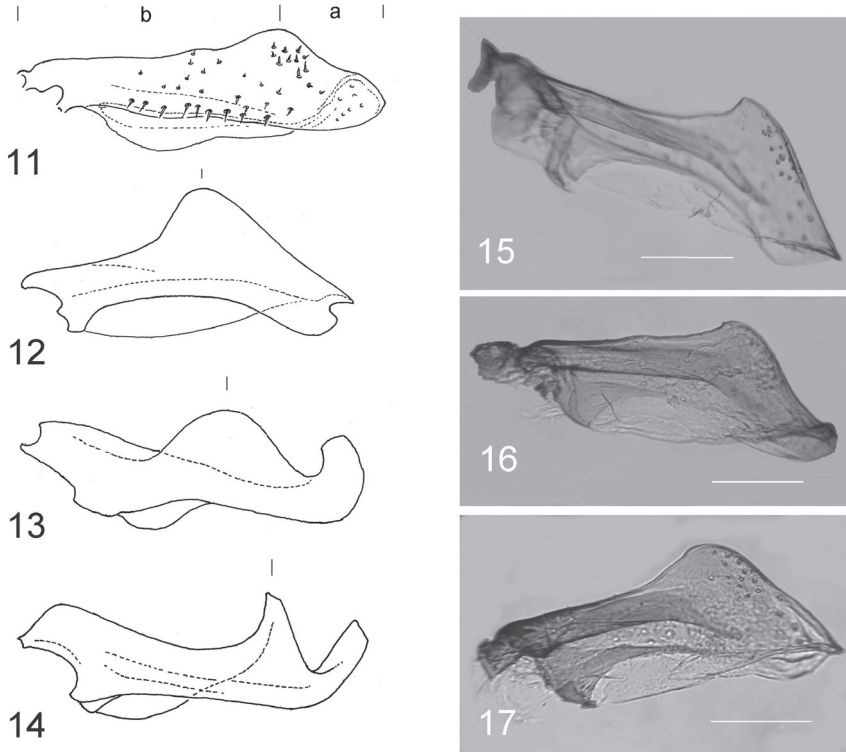


**Figs 7-8: Apical portion of phallus, ventral.** – 7. *Sphaerophoria reginae* spec. nov.; – 8. *Sphaerophoria assamensis* Joseph, Nepal. – **Figs 9-10: *Sphaerophoria reginae* spec. nov. abdomen.** – 9. ♀; – 10. ♂. – llb = lateral lobe.

yellow; sides of 2<sup>nd</sup>, 3<sup>rd</sup> and 4<sup>th</sup> tergites very narrowly yellow for almost their entire length.

Length: body 5.5-8.0 mm; wing 4.5-6.0 mm.

Distribution: Russia: Primorskii Krai, Amurskaya oblast, Korea, and Japan (Ikezaki & Ikezaki 1996, under the name *S. viridaenea*). Bagatshanova (1990) found only *S. tuvunica* in Jakutia. It is possible that a part of the Siberian material, identified by R. Bankowska (1964) as *S. viridaenea*, belongs to *S. tuvunica*. For that reason previous records of *S. viridaenea* from Transbaikal, Jakutia, Altai, northern China, Mongolia and Afghanistan (Bankowska 1964, 1968; Skufjin 1980) are questionable and the specimens on which they are based should be re-examined to clarify their true identities.

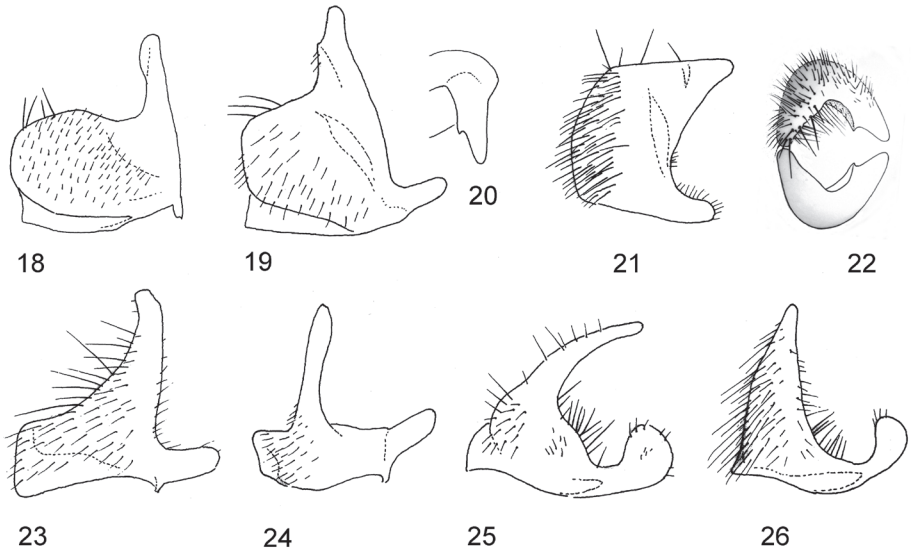


**Figs 11-17: *Sphaerophoria* spec. ♂, right gonostylus, lateral.** – 11. *S. assamensis* Joseph; – 12. *S. shirchan* Violovitsh; – 13. *S. viridaenea* Brunetti; – 14. *S. angulata* Claussen & Weipert; – 15. *S. novaeangliae* Johnson; – 16. *S. reginae* spec. nov.; – 17. *S. tuvinica* Violovitsh. – b = basal portion; a = apical portion. – Scales: 0.1 mm.

Remarks on *S. tsaii* and *S. tibetensis*: To judge from the English diagnosis and the figures given in the original description of *S. tsaii*, especially the shape of the surstylus and the gonostylus, there is no doubt that *S. tsaii* He et Li, 1992 is a junior synonym of *S. viridaenea* Brunetti, 1915, **syn. nov.**

*S. "tibetensis* Hu", a name used in the identification key of He & Li (1992) for a species close to *S. viridaenea*, has not yet been formally published (Cheng, pers. comm.) and is therefore not available.

Relationships (fig. 27): The *Sphaerophoria novaeangliae*-group is well supported as monophyletic by the synapomorphies indicated in fig. 27 (nrs. 2-5). *S. assamensis* is apparently highly plesiomorphic in having the lateral lobes of the apical portion of the phallus only little developed (fig. 8), and in lacking the ventral surstylar lobe (fig. 18). *S. novaeangliae* (figs. 15, 19, 20) and *S. shirchan* (figs 12, 21, 22) seem to be closely

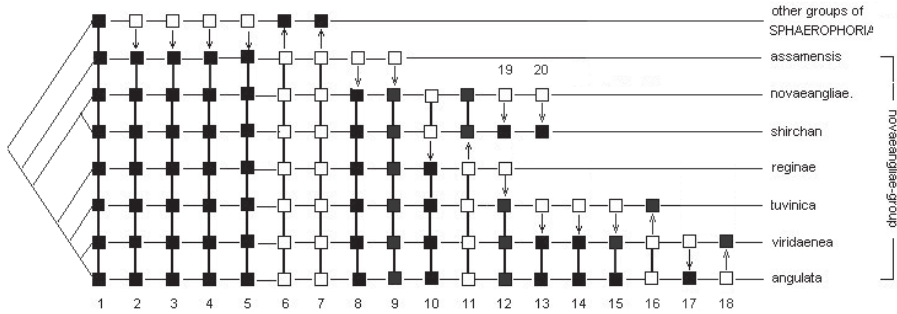


**Figs 18-26: *Sphaerophoria* spec. ♂, surstylus.** – 18. *S. assamensis* Joseph, lateral; – 19. *S. novaeangliae* Johnson, lateral; – 20. *S. novaeangliae* Johnson, left dorsal lobe, dorsal; – 21. *S. shirchan* Violovitsh, lateral; – 22. *S. shirchan* Violovitsh, dorsal; – 23. *S. reginae* spec. nov., lateral; – 24. *S. tuvinica* Violovitsh, lateral; – 25. *S. viridaenea* Brunetti, lateral; – 26. *S. angulata* Claussen & Weipert, lateral.

related in sharing the short dorsal lobe of the surstylus, with its subapical tooth. *S. reginae* spec. nov. seems to be most closely related to the Asian species *S. viridaenea*, *S. angulata* and *S. tuvinica* through the long dorsal lobe of the surstylus (fig. 27, nr. 10) and the lack of the small inner tooth on the dorsal surstylar lobe, which is considered as a synapomorphy of *S. shirchan* + *S. novaeangliae* (figs 20, 22).

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**Fig. 27: Phylogenetic relationships within the *S. novaeangliae* group.** Black squares indicate apomorphic states, white squares indicate plesiomorphic states. Synapomorphies and synplesiomorphies are linked by a thick line.

Character states (plesiomorphic states in parenthesis): – 1. Male terminalia with greatly enlarged spherical tergum 9 (not spherically enlarged). – 2. Face with wide dark median stripe reaching antennal fossae at full width (pale or with narrow or incomplete dark median markings). – 3. Basal portion of gonostylus (figs 11–17) as long as or longer than apical portion (shorter than apical portion). – 4. Male tergum 5 medially, on posterior half, with a cluster of long black pile (tergum 5 with evenly spaced short pile). – 5. Metatarsus of midleg on ventral side with black spine-like setae (with yellowish to pale brownish spine-like setae). – 6. Male tergum 9 sclerotised behind cerci (membranous behind cerci). – 7. Gonostylus apicodorsally with long setae (with minute setulae). – 8. Surstylus with ventral lobe (without ventral lobe). – 9. Apical portion of phallus with lateral lobes long (lateral lobes short). – 10. Dorsal lobe of surstylus longer than width of surstylar base above cerci (shorter than width of surstylar base). – 11. Dorsal lobe of surstylus with subapical tooth (without tooth). – 12. Tergite 1 black (laterally with large yellow maculae). – 13. Surstylus with ventral lobe curved (straight). – 14. Ventral lobe of surstylus apically widened (not widened, finger-shaped). – 15. Gonostylus apically curved dorsad (apically directed ventrad). – 16. Surstylus with dorsal lobe parallel-sided (tapering from base to apex). – 17. Dorsal margin of gonostylus in apical portion angular (sinuous). – 18. Ventral lobe of surstylus apically strongly widened (less strongly widened). – 19. Base of surstylus greatly enlarged (less enlarged). – 20. Tergite 1 black (laterally with large yellow maculae).

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**Lyneborg, L.; Barkemeyer, W. (2005): The Genus *Syritta*. A world Revision of the Genus *Syritta* Le Peletier & Serville, 1828 (Diptera: Syrphidae). – Entomonograph 15. 224pp. Stenstrup (Apollo Books). ISBN 87-88757-53-6. ISSN 0106-2808.**

The genus *Syritta* is a well-defined taxon with most species occurring in the Afrotropical region. Starting from the observation that there are many more species in Africa than known so far the authors decided to treat the whole world fauna. This enabled them to erect a system of species-groups that should hold also outside the initial study area. The 57 species are arranged in 16 species-groups. One might doubt if the species-groups all are monophyletic (a phylogenetic treatment is not given). But they are pragmatic and this is undoubtedly very useful. 33 species are described as new, most of them from Africa. This number reflects the insufficient knowledge of the Afrotropical fauna of Syrphidae we still have. This new book of Leif Lyneborg and Werner Barkemeyer should be taken as a starting point for a systematic treatment of the remaining 42 genera known from that region.

The book starts with a chapter on the morphology of *Syritta*. All the features used in the keys and the descriptions are well explained, often accompanied by instructive drawings. In the chapter "Distributional notes" hypotheses on the origin and dispersal of species groups are given. A check-list summarizes the species, listed by species-groups, and gives data on the range of each species. Then keys for males and females are given. This part contains very fine colour drawings of hind femora and the frons of many species. The major part of the book contains the descriptions of each species, arranged by species groups. Due to the long experience of both authors in writing extensive scientific contributions the entire text is comprehensive without unnecessary length. Congratulations for this fine book!

There is one important thing missing: a definition of the taxon *Syritta* (most of the relevant characters are mentioned but scattered in the morphology chapter) with a clear delimitation from related genera. A few of the papers cited in the text are missing in the references. Apart from this the whole work is very thoroughly prepared.

The book is very well produced on a high quality paper, is perfectly printed and has a hard-cover. It is to be recommended to anyone interested in hoverflies and is simply a must for anyone dealing with Afrotropical Syrphidae.

Dieter Doczkal

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