

Two new species of *Brachyopa* Meigen from Germany, with notes on *B. grunewaldensis* Kassebeer (Diptera, Syrphidae)

Dieter Doczkal and Frank Dziock

Doczkal, D.; Dziock, F. (2004): Two new species of *Brachyopa* Meigen from Germany, with notes on *B. grunewaldensis* Kassebeer (Diptera, Syrphidae). – *Volucella* 7, 35-59. Stuttgart.

Two new *Brachyopa* species of the guild with a grey thorax and short-haired arista are described from Germany: *Brachyopa bimaculosa* **spec. nov.** and *Brachyopa silviae* **spec. nov.** The former is also recorded from Greece. Lectotypes are designated for *B. bicolor* and *B. insensilis*. The female of *B. grunewaldensis* is described. A key to the central European *Brachyopa* species with a grey thorax and short-haired arista is presented.

Key words: *Brachyopa*, Europe, new species, key, Syrphidae.

Zusammenfassung

Aus der Gilde der *Brachyopa*-Arten mit grauem Thorax und kurz behaarter Arista werden zwei neue Arten aus Deutschland beschrieben: *Brachyopa bimaculosa* **spec. nov.** und *Brachyopa silviae* **spec. nov.** Erstere wird auch aus Griechenland gemeldet. Lectotypen für *B. bicolor* und *B. insensilis* werden festgelegt. Das Weibchen von *B. grunewaldensis* wird beschrieben. Für die mitteleuropäischen *Brachyopa*-Arten mit grauem Thorax und kurz behaarter Arista wird ein Bestimmungsschlüssel vorgelegt.

Introduction

The genus *Brachyopa* Meigen is a well characterised taxon of (among the Syrphidae) peculiar appearance and might be confused only with the closely related genus *Hamerschmidtia* Schummel (regarded as congeneric with *Brachyopa* by several authors, e.g. Thompson & Rotheray 1998). Many *Brachyopa* species are rarely or never observed on flowers. They are most often found in the immediate vicinity of their breeding sites, sap runs on trees and other decaying material under bark. While a few species are rather common in central Europe, others are among the rarest species in collections.

Brachyopa taxonomy at the species level was in a rather poor state in the early part of the 20th century. Sack (1928-1932) only treated six *Brachyopa* species from the Palearctic, i.e. one quarter of the number known currently. In particular, the group of very similar species with a grey thorax was misunderstood at that time, with only *B.*

arcuata (now *B. maculipennis*) and *B. bicolor* then recognised. A major step towards the current understanding of the genus was taken by Collin (1939), who described three new species from Europe, all from the guild with a grey thorax. The confused nomenclature of Palaearctic *Brachyopa* species was further unravelled by Thompson (1980), who provided a new key to the then known species from the Palaearctic (except for *B. maritima* Virolovitsh). Two additional European species have since been described by Thompson & Torp (1982) and Kassebeer (2000a). This increased to 13 the number of *Brachyopa* species known from Europe. A total of four new species have recently been described by Kaplan & Thompson (1981) and Kassebeer (2000b, 2001, 2002), from Israel and North Africa. Six further species are restricted to eastern parts of the Palaearctic. These Eastern Palaearctic species are not considered here because a brief examination of specimens and/or descriptions revealed that all are clearly different from the taxa treated here.

Examination of large numbers of *Brachyopa*, mainly from Germany, has revealed the existence of two additional taxa. Both belong to the group of species with a grey thorax and short haired arista ("*bicolor* guild" in the present paper), but – in contrast to all other species known so far from central Europe – have conspicuously shining black spots on the scutum, that contrast strongly with the grey "pollen" covering the rest of the scutum. This character is otherwise only known from the S Mediterranean *B. quadrimaculosa* and *B. atlantea*. The hitherto unknown female of *B. grunewaldensis* was also found in the material studied.

The description of *Brachyopa grunewaldensis* (Kassebeer 2000a), in conjunction with the illustrations of male terminalia of some *Brachyopa* species by Pellmann (1998), has caused some uncertainty concerning the identity of the true *B. insensilis* (Speight 2003). We have thus studied the syntypes of *B. bicolor* (the oldest available name of a species of the "*bicolor* guild") and *B. insensilis*, as well as the holotype of *B. grunewaldensis*. Because the new species described below have several characters in common with taxa related to *B. quadrimaculosa* we also examined the types of *B. atlantea* Kassebeer, *B. tabarkensis* Kassebeer and specimens (no types) of *B. quadrimaculosa* from Israel, identified by M. Kaplan (coll. C. Kassebeer).

B. grunewaldensis and the new species are obviously very rare or very difficult to find. At least, we did not find any specimens in the collections of German museums. The majority of the available specimens are from Malaise traps.

Methods

In general, the morphological terminology of McAlpine (1981) has been followed. Where no appropriate term was found there the terminology of Speight (1987) has been adopted. The terminology of the antenna follows Stuckenberg (1999) and that of male terminalia Sinclair (2000).

The length of the postpedicellus refers to the distance between its dorsoproximal end and the apex. The length of the clypeus (anteclypeus) is taken from the median line, its width is taken at its proximal end. The length of the subcranial cavity is taken from its posterior end to the anterolateral corner. The length of the female frons is the distance from the anterior margin of anterior ocellus to the anterior margin of the lunule,

the width is measured at the anterior ocellus. The data given for the body length are imprecise, as the abdomen is bent downwards in all available specimens. The wing length is the distance from the base of the epaulet to the apex of the wing.

The drawings have been prepared from dry specimens except for the figures of male terminalia, which have been treated with 10% KOH and then stored in glycerol.

Abbreviations: f = femur (e.g. f1 = fore femur); L/H = ratio length : height; L/W = ratio length : width; ma1 = anterior flat part of mesanepisternum; ma2 = posterior convex part of mesanepisternum; S = sternite(s); T = tergite(s) (e.g. T2 = 2nd tergite); t = tibia (e.g. t3 = hind tibia), ta = tarsus (e.g. ta1:2 = 2nd tarsomere of fore tarsus). SMNS = Staatliches Museum für Naturkunde Stuttgart. ZMUC = Zoological Museum of the University of Copenhagen.

A few of the characters we have employed are rarely used in syrphid taxonomy and are explained here in order to facilitate their correct understanding:

The hypostomal bridge (sensu Speight 1987, not McAlpine 1981) is the mid-ventral plate of the head, delimited anteriorly by the subcranial cavity (mouth opening), laterally by the hypostomal sulci and posteriorly by the occipital foramen. In *Brachyopa* it is either blackish, as are the more dorsal parts of the posterior surface of the head, or it is yellowish to red. In most species it is entirely covered in microtrichia, but most specimens of *B. insensilis* have a pair of moderate to large bare spots anterolaterally.

In most Syrphidae the occiput is differentiated into a \pm narrow stripe along the eyes, the post-ocular orbit, that projects to some extent before curving ventrally into the tempora (cf. Speight 1987). In most species of *Brachyopa* there is no clear border between the post-ocular orbit and the tempora, but a few species, particularly *B. grunewaldensis*, have a well developed border between these parts.

The mediotergite (mesopostnotum) is the median thoracic sclerite between the scutellum (separated by a membrane) and the base of the abdomen (actually it is joined with the metanotum ventrally, but the metanotum is usually not externally visible in Syrphidae without removing the abdomen), and delimited laterally by the laterotergites. Its convex dorsal portion is called the subscutellum. The distribution of microtrichia ("pollinosity") on the part below the subscutellum is species specific in *Brachyopa* (figs 20-23), with little intraspecific variation.

In *Brachyopa* the proepimeron is either bare or hairy. However, if it is hairy the hairs are usually very sparse (sometimes only a single hair present) and restricted to the anterior end of the proepimeron.

At the sides of the scutum anterior to the transverse sulcus there is an oblique impressed line separating the so-called "notopleuron" from the scutum, the notopleural sulcus. This sulcus is usually well developed in *Brachyopa* but nearly obliterated in *B. bicolor*, where it is usually only detectable by a narrow gap in the pilosity.

Results

Definition of the "*Brachyopa bicolor* guild"

A well supported basis for division of the genus *Brachyopa* into species groups is not available. As recognised here, the *bicolor* guild¹⁾ contains all species of *Brachyopa* with a grey thorax, orange tergites, and the hairs on the arista shorter than the maximum width of the arista (figs 3-5). These features show little variation (except for the tergites which are often more or less discoloured) and therefore allow for the correct assignment of each specimen. In the W Palaearctic the *bicolor* guild contains the taxa *B. atlantea*, *B. bicolor*, *B. bimaculosa*, *B. grunewaldensis*, *B. insensilis*, *B. quadrimaculosa*, *B. silviae*, and *B. tabarkensis*. In *B. maculipennis* the aristal hairs are about as long as the maximum width of the arista. This taxon is easily distinguished from similar taxa by

¹⁾ The term "guild" is used instead of "group" in order to express the heuristic nature of this grouping.

its peculiar wing markings. The N Palaearctic species *Brachyopa cinerea* Wahlberg (not examined) is probably also closely related but can be readily distinguished by its shining black tergites and its black mid and hind coxae.

Additional common characters of the species of the *Brachyopa bicolor* guild are: small *Brachyopa* with body length 5-8mm. Posterior 2/3 of female frons with blackish ground colour, densely pollinose. Median occipital sclerite (postvertex) and occiput down to the ventral end of the hypostomal sulcus black. Scutum blackish, at most postalar callus and supra-alar area \pm reddish, with two pairs of blackish, rather shining (though microtrichose), longitudinal submedian and sublateral streaks. Scutellum about twice as wide as long or a little longer, with well developed black marginal bristles that are half the length of the scutellum or longer. Mediotergite black. Pleurae blackish, or with ill-defined yellowish to reddish areas. Metasternum, coxae, trochanters, femora and tibiae orange, but tarsi \pm darkened. Dorsal katapisternal hair patch present.

Brachyopa bicolor (Fallén, 1816)

Two specimens are present in the Fallén collection, a male and a female. Both are in good condition ($\text{\textcircled{f}}$ slightly mouldy) and fully agree with the original description. The male labelled "*R. bicolor* $\text{\textcircled{m}}$ Ostrog." is here designated as the lectotype ("Lectotype *Brachyopa bicolor* (Fallén 1816) des. Doczkal & Dziock 2004"), in order to fix the use of the name and to ensure its consistent future interpretation. It fully agrees with Collin's (1939) description of British specimens, that was followed by all subsequent European authors and by Thompson (1980). The female is labelled as paralectotype.

Diagnosis: Postpedicellus with a distinct sensory pit. Notopleural sulcus not impressed (only detectable by a gap in the pilosity). Notopleuron black haired. Centre of scutellum with a transverse depression. Vein M strongly curved just before junction with dm-cu (fig. 34). Many specimens with a few short setulae dorsally on distal part of R1 (along pterostigma)²⁾. $\text{\textcircled{m}}$ with a sharp transverse edge across nearly full width of the apex of t3, ventrally (fig. 26). $\text{\textcircled{f}}$ with black hairs on frons. Additional features are listed in table 1. $\text{\textcircled{m}}$ terminalia cf. Pellmann (1998).

Brachyopa insensilis Collin, 1939

In the Verrall-Collin collection in Oxford there are eight specimens (five males, three females) that agree with the description and provenance data given by Collin (1939). Each of these specimens bears a label "VC-TYPE 576". A male specimen labelled "m Elm Cambridge 1907" and "VC-TYPE 576 *Brachyopa insensilis* $\text{\textcircled{m}}$ " is here designated as the lectotype ("Lectotype *Brachyopa insensilis* Collin 1939 des. Doczkal & Dziock 2004") in order to fix the use of the name and to ensure its consistent future interpretation. The other specimens are labelled as paralectotypes.

²⁾ Although these setulae are missing in many specimens the character is mentioned here because the presence of setulae on R1 is most unusual among Syrphidae.

Diagnosis: Small species (body length ca. 5-7mm). Postpedicellus without sensory pit. Hypostomal bridge yellow, usually with a pair of large anterolateral spots without microtrichia. Thorax completely microtrichose except for the postalar callus and the scutellum, where the microtrichia are restricted to the anterior margin. Pilosity short, on pleura ca. 0.15-0.2mm. Proepimeron bare. ♂: the sharp apico-ventral edge of t3 very short (ca. 1/5 the width of t3) (fig. 24). Additional features are listed in table 1. ♂ terminalia cf. Pellmann (1998).

Brachyopa grunewaldensis Kassebeer, 2000

Specimens examined: ♂ (type) Germany, Berlin, Grunewald, Jagen 4, 52°28'N 13°16'E, 28 April 2000, leg. & coll. C. Kassebeer. ♂ Germany, Rheinland-Pfalz, Dörscheid, Roßstein, Malaise trap 28 April-6 May 2000, leg. M. Niehuis, coll. F. Malec. ♂ dto. 6-18 May 2000. ♀ Germany, Baden-Württemberg, Gaggenau-Oberweier, Hasensprung, 240m, 18 May 1992, leg. & coll. D. Doczkal. ♀ Germany, Baden-Württemberg, Nürtingen-Oberensingen, Waldhauser Holz/Riedern, 2 May 1994, leg. A. Grossmann, coll. U. Schmid. ♀ Germany, Rheinland-Pfalz, Kirchheimbolanden, nature reserve Albertskreuz, Malaise trap 2-23 May 2002, leg. & coll. D. Doczkal. ♀ Germany, Sachsen-Anhalt, Steckby NW Dessau, TK4037SO, RIVA-project, Malaise trap 14-26 May 1998, leg. & coll. Frank Dziock. ♀ Germany, Sachsen-Anhalt, NW Wörlitz, TK4140NW Schleusenheger Wiesen, RIVA-project, Malaise trap 11-28 May 1998, leg. & coll. Frank Dziock.

Diagnosis: Face short (Kassebeer 2000a: fig. 1a). Characteristic pattern of bare areas on vertex (figs 6, 9). Hypostomal bridge blackish. Median 3/5 of mediotergite below subscutellum with microtrichia restricted to upper margin (fig. 21). Scutal microtrichia comparatively long and "woolly". Apicoventral edge of t3 in the ♂ sharp for the posterior 3/4 of its length (fig. 25). S2-4 only slightly wider than long, with large undusted areas. Additional features are listed in table 1. ♂ terminalia cf. Kassebeer (2000a).

Remarks on the male: Kassebeer's (2000a) description is in general detailed and correct. However, there are a few points which cannot be confirmed from the re-examination of the type specimen and the additional males now available. In particular, the description of S1 as being longer than wide is misleading. A close examination revealed that it does not differ markedly from the shape observed in other *Brachyopa* species. The new specimens and the comparison with a long series of *B. insensilis* revealed that the following characters mentioned in Kassebeer's diagnosis and key are unreliable: the shape of the ocellar triangle; the narrow stripe separating the ♂ eyes; the colour of scutal pile; width of scutellum; basal swelling of arista. The major differences between *B. grunewaldensis* and other taxa of the *bicolor* guild are listed in table 1.

In addition to features alluded to in the original description we have observed the following taxonomically important characters: L/W of subcranial cavity 1.33-1.36. L/W

Table 1: Morphological differences between adults of central European species of the *Brachyopa bicolor* guild.

→ pp 40-43

character	<i>B. bicolor</i>	<i>B. insensilis</i>	
no. of specimens examined/ origin	26♂ 8♀ / Germany, Sweden	80♂ 28♀ / Germany, Great Britain	
face	strongly protruding	little protruding	
L/W of clypeus	2.2-2.5 (figs 11-12)	1.2-1.6 (figs 16-17)	
♀: hair colour on frons	partly black	entirely pale	
♀: pollinosity on frons	complete	with a narrow (max. as wide as the anterior ocellus) undusted median line along full length	
♂: distance posterior ocellus - eye	about as wide as 1 ommatidium	about as wide as 1 ommatidium	
pollinosity on vertex	complete	complete	
border between dorsal part of post-ocular orbit and tempora	indistinct (occiput curving ventrally immediately from the eye margin)	indistinct (occiput curving ventrally immediately from the eye margin)	
colour of hypostomal bridge	yellow	yellow	
microtrichia covering on hypostomal bridge	complete	usually a pair of large bare spots present anterolaterally	
sensory pit of postpedicellus	ca. 2x the max. width of arista	absent or rudimentary	
notopleural sulcus	± absent (detectable by a gap in the pilosity)	strong	
colour of notopleural pilosity	black	pale	
a small spot without microtrichia posteromedian to the postpronotum	absent	absent	
spot without microtrichia at the median end of the transverse sulcus	absent	absent	
microtrichia on postalarcallus	complete	partly bare	
shape of scutellum	semi-circular	semi-circular (fig. 32)	
impression on scutellar disc	strong	absent	
colour of pilosity on scutellar disc (hind margin not considered)	black	black	

	<i>B. grunewaldensis</i>	<i>B. bimaculosa</i>	<i>B. silviae</i>
	3♂ 5♀ / Germany	2♀ / Germany, Greece	3♂ 3♀ / Germany
	little protruding	strongly protruding	intermediate
	1.3-1.7 (figs 14-15)	1.8-2.1 (fig. 13)	1-1.5 (figs 18-19)
	entirely pale	entirely pale	entirely pale
	with a narrow undusted median line not reaching the anterior end of the dusted area and widening towards the anterior ocellus where it is wider than the ocellus (fig. 9)	the median 1/5 with less dense dusting (fig. 8)	with a narrow (max. as wide as the anterior ocellus) undusted median line not reaching the anterior ocellus (fig. 10)
	about as wide as 2 ommatidia (fig. 6)	?	about as wide as 1 ommatidium (fig. 7)
	centre of ocellar triangle ± undusted, also the para-sagittal sulci, in the ♂ also the space between posterior ocelli and the eye and in the ♀ a wide stripe running obliquely from the posterior ocelli to the para-sagittal sulci (figs 6, 9)	complete (fig. 8)	centre of ocellar triangle ± undusted (figs 7, 10)
	indicated by a bend (post-ocular orbit about 1 ½ x as wide as an ocellus and slightly sloping, then suddenly curving ventrally)	indistinct (occiput curving ventrally immediately from the eye margin)	rather indistinct (visible but less obvious than in <i>grunewaldensis</i>)
	blackish	yellow	blackish, anteriorly ± pale
	complete	complete	complete
	minute (less than max. width of arista)	minute (less than max. width of arista) (fig. 3)	minute (less than max. width of arista) (figs 4-5)
	strong	strong	strong
	pale	pale	pale
	± distinct	absent	present
	absent	present, ± round (fig. 28)	present, triangular (fig. 29)
	partly bare	complete	complete
	trapezoidal (fig. 31)	semi-circular (fig. 30)	trapezoidal (fig. 33)
	weak	absent	absent
	♂ black with a few pale hairs, ♀ pale or mixed black and pale	pale	black with a few pale hairs anteriorly

character	<i>B. bicolor</i>	<i>B. insensilis</i>	
microtrichial covering of scutellum	complete	restricted to the outermost anterior margin	
structure of microtrichia on scutellar disc	with bent tips, slightly different from mesoscutal microtrichia	–	
ventral scutellar fringe	absent	absent	
microtrichose area of medio-tergite below subscutellum	microtrichose on upper 2/3-3/4	(almost) entirely microtrichose (fig. 22)	
length of pleural hairs	♂ ca. 0.33 mm, ♀ ca. 0.25 mm	♂ ca. 0.15 mm, ♀ ca. 0.15 mm	
proepimeron	bare or hairy	bare	
posterior surface of mid coxa	bare	a few hairs present	
L/W of f3	♂ 4.2-4.7, ♀ 4.8-5	♂ 5.2-5.7, ♀ 5.7-6	
♂: length of the sharp edge at the apex of t3 ventrally	across nearly full width (fig. 26)	short (fig. 24)	
colour of ta1:5 dorsally	black	dark brown	
relative length of the pale apical annulus of ta1:2	≤ 1/6 the length of the tarsomere	1/3 or less the length of the tarsomere	
colour of pilosity on t1-3	pale, t2 with a few black hairs mixed in	pale	
predominant colour of hairs on dorsal side of ta1-3	pale	pale	
black hairs on T2-4	♀: predominantly black on T2+3, with ± extensive pale hairs anterolaterally, only sparse black hairs on T4, ♂: usually less extensive, especially on T2, but lateral margin of T2 always black haired	♀ with ± extensive black hairs on T2 posteromedially, with or without sparse black hairs on T3, ♂: with or without sparse black hairs on T2+3, only exceptionally extensively black haired on T2	
distribution of microtrichia on T2-4	extensively microtrichose with the posterior margins of T3 narrowly, of T4 for ca. 1/4-2/5 the length of T4 and small posterolateral spots on T2 and large lateral spots on T3+4 bare of microtrichia	T2 medially pollinose for full length (♀) or with a narrow bare margin (♂), with small (♀) or large (♂) bare areas laterally, ♂ with narrow microtrichose bands at anterior margin of T3+4, ♀ T3 microtrichose on anterior 3/5, on T4 on anterior 2/5	
distribution of microtrichia on S2-4	entirely pollinose	entirely pollinose	

	<i>B. grunewaldensis</i>	<i>B. bimaculosa</i>	<i>B. silviae</i>
	complete	complete	complete
	erect, very different from mesoscutal microtrichia	with bent tips, not different from mesoscutal microtrichia	erect, very different from mesoscutal microtrichia
	present	absent	present
	median 3/5 microtrichose on upper ¼, outer parts microtrichose on almost entire length (fig. 21)	microtrichose on upper half (fig. 20)	microtrichose on upper half (fig. 23)
	♂ ca. 0.33 mm, ♀ ca. 0.23 mm	♀ ca. 0.3 mm	♂ ca. 0.42 mm, ♀ ca. 0.35 mm
	hairy	hairy	hairy
	a few hairs present	bare	a few hairs present
	♂ 3.9 – 4.5, ♀ 4.7 (n=2)	♀ 4.7 – 5.0	♂ 3.9 – 4.0, ♀ 3.9 – 4.1
	about 3/4 of the ventral apical margin (fig. 25)	?	across full width (fig. 27)
	± darkened	dark brown	orange or at least much paler than the preceding tarsomere
	1/3 - 2/5 the length of the tarsomere	ca. 1/6 the length of the tarsomere	ca. ¼ the length of the tarsomere
	pale, with or without some black hairs mixed in	predominantly black	f1+3 pale with at most sparse black hairs, t2 mixed black and pale
	pale	black	pale
	absent	absent	absent
	T2 with narrow (♀) or wide (♂) bare posterior margin, T3 on ca. anterior ¼ microtrichose, T4 with a narrow pollinose band at anterior margin	microtrichia on T2 almost reaching posterior margin (less than 1/10 bare), with large bare areas at posterolateral corners, T3 narrowly microtrichose at anterior margin, T4 without microtrichia	T2 medially with narrowly bare posterior margin, with large bare areas posterolaterally, microtrichia of T3 on anterior 3/5 medially, T4 with the anterior margin narrowly microtrichose
	S2 with small bare posteromedian spot, S3+4 posteriorly extensively to predominantly bare	entirely pollinose	S2 with small bare posteromedian spot, S3+4 posteriorly extensively to predominantly bare

of clypeus 1.3-1.7. Hypostomal bridge blackish and entirely microtrichose. A spot posterolaterally to the posterior ocelli bare of microtrichia (figs 6, 9). Distinct border between dorsal part of postocular orbits and tempora. Notopleural sulcus impressed. Postalar callus partly bare of microtrichia. Scutal microtrichia longer and more "woolly" than in *B. insensilis* (the difference is difficult to describe but very obvious when observed at high magnification). Scutellum trapezoidal (fig. 31), entirely covered in microtrichia which are erect (except for at the anterior margin). A rudimentary ventral scutellar fringe, represented by a few hairs at the extreme of the lateral margin of the scutellum, ventrally. Type with pilose subscutellum (probably aberrant!). Median 3/5 of mediotergite below subscutellum with microtrichia restricted to upper margin (fig. 21). Proepimeron hairy. With a sharp transverse edge on the posterior 3/4 of the apex of t3, ventrally (fig. 25). Posterior surface of mid coxa with one or a few hairs. Vein M slightly curved just before junction with dm-cu (as in fig. 35). T2 extensively microtrichose, posterior margin (about 1/5 the length of the T) and large areas at the posterolateral corner bare, T3+4 narrowly microtrichose along anterior margins, S1+2 with or without a small posteromedian spot bare of microtrichia, S3+4 extensively bare of microtrichia. Bacilliform sclerite with a large ventral bulge (Kassebeer 2000a: fig. 2b).

The females are identified as *B. grunewaldensis* because they have all the diagnostic characters in which the male differs from related species (except for the sex-dependent characters). The only difference not expected, from the usual differences between the sexes, is the densely dusted submedian stripes on the female scutum, whereas in the male these stripes bear only scattered microtrichia and therefore appear more shining.

Description of the female: L/W of frons 1.8, ground colour of the dusted part of frons black across full width, with an undusted median line not reaching the anterior end of the dusted area and widening towards the anterior ocellus where it is wider than the ocellus (fig. 9). The facial pollinosity not connected with the frontal pollinosity. Postpedicellus moderately larger than in male, with a minute sensory pit (no more than half the width of the arista). Scutum entirely microtrichose except for the postalar callus, with presutural area largely white haired. Scutellum predominantly white haired with a few black hairs intermixed. S somewhat wider, S3 ca. 0.7x as long as wide.

Habitat: The specimen from Nürtingen was collected in flight beside a *Quercus* sp. tree in a mixed forest, the specimen from Gaggenau was at a small sap run on *Castanea sativa* in a mixed forest. The specimen from Kirchheimbolanden is from a dry oak-hornbeam forest, where the trap was placed between two oaks at the S facing edge of a small clearing. Within 100m around the trap *Quercus petraea*, *Carpinus betulus*, *Acer campestre*, *Acer monspessulanum*, *Tilia cordata*, *Fagus sylvatica*, *Fraxinus excelsior*, *Rosa canina*, *Crataegus laevigata*, *Ligustrum vulgare*, *Prunus spinosa*, *Sorbus torminalis* and *Hedera helix* were present. The specimen from Steckby was caught in the Elbe floodplain on seasonally flooded, unimproved eutrophic grassland (Macrohabitat 231212, Macrohabitat classification after Speight et al. 2003). Other habitats within 250m around the trap were: 641 Reeds, 642 Tall sedges, 713o temporary pool in open ground, 182 *Pinus sylvestris* plantation, 1521 Alluvial hardwood forest, overmature, 1511 Alluvial

softwood forest, overmature, and 19121 scattered, very old, overmature *Quercus* trees (often with *Cerambyx cerdo*) in the grassland. The specimen from Wörlitz is from a trap situated in the river Elbe floodplain on intensively grazed, seasonally flooded grassland (233 intensive grassland). Other Macrohabitats 100m around the trap are: 1521 Alluvial hardwood forest, overmature, 641 Reeds, 642 Tall sedges, 713 temporary pool in open ground, 19161 scattered *Salix* trees in open ground, overmature, and 19151 a large, overmature *Populus nigra* in open ground. The specimens from Dörscheid have been caught in a thermophilous *Quercus petraea* forest on a southfacing slope in the Rhine valley, many clearings, rich in dead wood, scattered *Carpinus betulus*, *Crataegus* spp., *Prunus spinosa*, *Rosa canina*, *Rubus* spp., and *Ribes alpinum*.

Descriptions of new species

Brachyopa bimaculosa **spec. nov.**

Holotype: ♀ Germany, Baden-Württemberg, Baden-Baden, Sauersbosch, 260-310m, 31 March 1998, leg. D. Doczkal, coll. SMNS.

Other specimen studied: ♀ Greece, Ipiros, Peristéri Mts., 1,200-1,700m, 24–28 May 1994, leg. S. Andersen, coll. ZMUC. (This specimen shares all the diagnostic characters with the holotype, but due to the presence of several differences of still unknown importance [see description] its identity is uncertain).

Etymology: The specific epithet means "with two patches" and refers to the pair of "undusted" spots on the scutum.

Diagnosis: In its overall appearance similar to *Brachyopa bicolor*. Face protruding (fig. 1). Clypeus slender (fig. 13). Postpedicellus small with a minute sensory pit (less than the maximum width of arista) (fig. 3). Scutum with a pair of small round patches without microtrichia at the median ends of the transverse sulcus (fig. 28). All tibiae and tarsi dorsally black haired. Posterior side of mid coxa bare. Differences from central European taxa of the *bicolor* guild are listed in table 1; differences from related S Mediterranean taxa are listed in table 2.

Description

♂: unknown.

♀ (where the specimen from Greece is different its data are given in square brackets):

H e a d: L/H of head = 0.92 [0.96]. Face strongly protruding (fig. 1). Length of clypeus about twice its shortest width (2.1x) [1.8] (fig. 13). L/W of subcranial cavity 1.83 [1.7], nearly twice as wide (1.86x) [2.1] as the shortest distance from the eye to the subcranial cavity. Frons narrow, L/W 2.2 [2.1] (fig. 8). Hairs on all parts of the head capsule pale (nearly white with a yellowish tinge). The undusted anterior part of the frons orange, the dusted posterior part with blackish ground colour except on the

Table 2: Morphological differences in the *Brachyopa quadrimaculosa* group sensu Kassebeer (2002).

character	<i>B. quadrimaculosa</i>	<i>B. atlantea</i>	
no. of specimens examined	1♂, 1♀	1♂ (type), 1♀ (paratype)	
face	strongly protruding (Kassebeer 2002 fig. 1a)	strongly protruding (Kassebeer 2002 fig. 2a)	
L/W of subcranial cavity	♂ 1.65, ♀ 1.71	♂ 1.66, ♀ 1.44	
colour of hypostomal bridge	♂ black, ♀ paler	yellow	
microtrichia on hypostomal bridge	a pair of large bare spots anterolaterally	a pair of small bare spots anterolaterally	
♂: width of orbital strip	0.07 mm (ca. 2x max. width of arista)	0.06mm (ca. 2x max. width of arista)	
♂: eye contiguity	shorter than ocellar triangle	shorter than ocellar triangle	
♂: pollinosity on lower face	nearly entirely microtrichose except for small bare areas at the anterior corners of the mouth edge	with a bare stripe from the tentorial sulcus to the mouth edge	
facial pollinosity below antennae	interrupted by a pair of large bare spots	interrupted by a pair of large bare spots	
size of postpedicellus	large (Kassebeer 2002: fig. 1a), ♀ much larger than ♂, its length ca. 1/3 the width of head	small, ♀ little larger than ♂, ♀ ca. ¼ (0.27) the width of head	
spots bare of microtrichia at the median ends of transverse sulcus	present, large, ± round	present, ± round	
spots bare of microtrichia anterior to transverse suture and median to notopleural sulcus	present, large	present, large	
microtrichia on postalar callus	with a bare spot	with a bare spot	
colour of hairs on postpronotum	pale	anteriorly pale, posteriorly black	
colour of hairs on notopleuron	all (♂) or predominantly (♀) black	black	
colour of scutellum	ca. anterior half black	anterior margin narrowly black	
microtrichia covering of scutellum	posterior half undusted	anterior 1/3 (♂) or ½ (♀)	
proepimeron	hairy	hairy	
dorsal katapisternal hair patch	well developed	well developed	

	<i>B. tabarkensis</i>	<i>B. bimaculosa</i>	<i>B. silviae</i>
	1♂ (type)	2♀ (incl. type)	3♂ 3♀ (type + paratypes)
	short (Kassebeer 2002 fig. 3a)	strongly protruding (fig. 1)	intermediate (fig. 2)
	♂ 1.47	♀ 1.7-1.8	1.4-1.5
	yellow	yellow	black, ± reddish anteriorly
	entirely microtrichose	entirely microtrichose	entirely microtrichose or narrowly bare at anterolateral margin
	0.09 mm (ca. 3x max. width of arista)	?	0.03 mm (ca. 1x max. width of arista)
	as long as ocellar triangle	?	longer than ocellar triangle
	with a bare stripe from the tentorial sulcus to the mouth edge	?	with a bare stripe from the tentorial sulcus to the mouth edge
	interrupted by a pair of small bare spots	type: complete; specimen from Greece: with a pair of small bare spots	complete
	small	small, ca. 1/5 (0.2-0.21) the width of head	small, ♀ little larger than ♂, ♀ ca. 1/5-1/4 (0.22-0.24) the width of head
	absent (the spot is covered by brown microtrichia)	present, ± round (fig. 28)	present, triangular (fig. 29)
	rudimentary	absent	absent
	with a bare spot	complete	complete
	black	pale	pale, with or without a few black hairs
	black	type: pale, specimen from Greece: predominantly black	entirely or predominantly pale
	entirely orange	anterior margin narrowly black	usually entirely orange (1♂ darkened anteriorly)
	narrow stripe at anterior margin	complete	complete
	bare	hairy	hairy
	strongly reduced, with only a single hair present at posterodorsal corner (aberrant?)	well developed	well developed

Table 2 (continued): Morphological differences in the *Brachyopa quadrimaculosa* group.

character	<i>B. quadrimaculosa</i>	<i>B. atlantea</i>	
length of hairs on anepimeron	♂ ca. 0.25 mm, ♀ ca. 0.2 mm	♂ ca. 0.33 mm, ♀ ca. 0.2 mm	
dark spot at r-m	absent	absent, but r-m ca. twice as wide as adjacent veins	
posterior surface of mid coxa	with 1 hair	with 2 hairs	
L/H of f3	♂ 5.0, ♀ 5.4	♂ 4.1, ♀ 4.0	
♂: black bristles on f3	only on ventral surface	also present on apical 2/5 of anterior surface	
♂: sharp edge at the ventral apex of t3	short, restricted to posterior half of t3	across full width	
hairs on t	pale	pale with sparse black hairs on t1+2	
pollinosity on S	complete	complete	
black hairs on T	absent	absent	

median line (ca. 1/5 the frontal width), which is reddish. The light grey frontal pollinosity rather sparse on the red median part, ocellar triangle and vertical region completely microtrichose (fig. 8). A very narrow (ca. as wide as width of arista) pollinose stripe running from the dusted area of the frons downward along the eye margin (fig. 8), widening beside the lunule and merging with the wide pollinose cross band that covers the dorsal part (1/4-1/3) of the face [cross band interrupted by a pair of undusted spots, one below each antenna]. Occiput curving ventrally immediately from the eye margin, without distinct border between postocular orbit and tempora. Hypostomal bridge yellow, entirely microtrichose. L/H of postpedicellus 1.42 [1.44], small, its length 0.22x [0.21] the width of head, with a minute sensory pit (ca. half the diameter of the arista) (fig. 3). Arista with very short hairs (ca. 1/3 the max. width of arista), orange at base, dark brown apically.

T h o r a x : Black, entirely and densely covered in grey microtrichia except for at the median ends of the transverse sulcus, where a pair of small (about as large as half depth of the postpedicellus) round black spots without microtrichia is present (fig. 28). Notopleural sulcus impressed. Thoracic bristles: 2 [ca. 4] on notopleuron, 2 [3] on supra-alar area (the anterior bristle strong, the posterior one hardly longer than scutal hairs), 2 [1] on postalar callus, 1 strong + 1-2 [0] weak bristles in front of scutellum laterally, 2 [1] at posterodorsal corner of ma2. Postpronotum pale haired [mixed with a few black hairs]. Scutum largely black haired except for a few pale hairs at the anterior end, just in front of the scutellum and at the supra-alar area, but the notopleuron

	<i>B. tabarkensis</i>	<i>B. bimaculosa</i>	<i>B. silviae</i>
	♂ ca. 0.18 mm	♀ ca. 0.25 mm	♂ ca. 0.45 mm, ♀ ca. 0.3mm
	present	absent	absent
	bare	bare	a few hairs present
	♂ 5.2	♀ 4.7-5	♂ 3.9-4.0, ♀ 3.9-4.1
	only on ventral surface	?	some of the black hairs on apical 1/3 of anterior surface ± bristle-like
	very short, restricted to posterior ca. 1/3	?	across full width (fig. 27)
	pale	predominantly black	t1+3 pale with at most sparse black hairs, t2 mixed black and pale
	complete	complete	S2 with a small posteromedian bare spot, S3+4 extensively bare
	T1+2 extensively black haired medially	absent	absent

[predominantly black] predominantly and the postalar callus completely pale haired. Scutellum semi-circular (fig. 30), without depression, orange with anterior margin narrowly [ca. 1/3] black, with 2 pairs of strong + 2 pairs of weak marginal bristles, entirely pale haired, entirely microtrichose, the microtrichia on the disc with bent apices and not different from the scutal microtrichia, though less dense. Without ventral scutellar fringe. Mediotergite below subscutellum microtrichose on upper half (fig. 20). Proepimeron hairy. ma1 almost bare (1 hair present). Dorsal katapisternal hair patch well developed. Hairs on anepimeron ca. 0.3mm long. ta1-3 dorsally darkened, the apical segments darker than the basal, apices of ta1-3:1-3 narrowly pale, the pale annulus of ta1:2 about 1/6 [1/5] the length of the tarsomere. Coxae, trochanters, f1-3 and t1-3 orange. ta1-3 dorsally, t1 dorsally and posteriorly, t2 nearly completely and t3 dorsally and anteriorly with predominant black hairs, apices of femora narrowly black haired, apex of f2 posteriorly with 1-2 weak bristles subapically, f3 ventrally with the usual short black bristles. f1-3 entirely microtrichose except for the basal 1/3 of the ventral surface of f2. L/H of f3 = 4.7 [5]. Max. height of ta3:1 equals the apical height of t3. Posterior surface of mid coxa bare. Wing without dark spots. Vein M slightly curved just before junction with dm-cu (fig. 35). A short black bristle present on dorsal surface of apical part of R1 of the left wing [absent]. Lower calypter with broadened marginal hairs (probably aberrant) [normal].

A b d o m e n : T and S orange except for T1, which is partly grey laterally [T with ill-defined and asymmetric dark pattern, probably aberrant], hairs all pale (nearly white

with yellow tinge). T1 entirely microtrichose; T2 extensively covered with microtrichia except for the posterior margin narrowly and large areas at the posterolateral corners, which are bare; T3 anteriorly with a narrow band of microtrichia but otherwise bare, as are T4+5; S entirely densely microtrichose; S2 more than 1.5x wider than long; S3 about twice as wide as long.

Size: Body length ca. 7mm [6mm], wing length 7.5mm [7.2mm].

Habitat: The habitat requirements are still largely unknown. The species is on the wing in spring. The type specimen was caught on flowers of *Salix aurita* at a site with very diverse vegetation. Within 200m of the spot where the specimen was found there are: a gallery wood dominated by *Alnus glutinosa*; orchards with various fruit trees (mostly apple); an old *Prunus spinosa* hedge; mixed forest with *Pinus sylvestris*, *Abies alba*, *Picea abies*, *Quercus* sp., *Castanea sativa*, *Fagus sylvatica*, *Carpinus betulus*, *Populus tremula* and *Corylus avellana*.

Brachyopa silviae spec. nov.

Holotype: ♂ Germany, Hessen, 1.3 km SE Haueda, UTM square NC10, 2 May 2001, leg. F. Malec, will be deposited in coll. Naturhistorisches Museum Mainz.

Paratypes: ♂ Germany, Thüringen, Hainich National Park, 2km SW Weberstedt, Schönstedter Holz, MTB4928-2, Malaise trap, 26 April-6 May 2000, leg. F. Dziock & M. Jessat; ♂ dto, but 5-16 May 2000, coll. F. Dziock; ♀ Germany, Sachsen-Anhalt, N Dessau, nature reserve Saalberghau, R45139 H57488, MTB4139NW, Malaise trap, 26 May-6 June 2002, leg. & coll. F. Dziock; 2♀ Germany, Rheinland-Pfalz, Dörscheid, Roßstein, Malaise trap, 28 April-6 May 2000, leg. M. Niehuis, coll. F. Malec.

Etymology: I (FDz) name this species for my wife Silvia in recognition of her long-standing friendship and her continuing support. It is to be treated as a noun in the Latin genitive case.

Diagnosis: In its overall appearance similar to *Brachyopa bicolor*. Clypeus short (figs 18-19). Scutum with a pair of small patches without microtrichia, posteromedian to the postpronotum, and with a pair of larger triangular bare spots at the median ends of the transverse sulcus (fig. 29). f1-3 thickened, f3 about 4 times as long as deep. ♀ with swollen ta3:1. ♂ with a sharp edge across full width of t3, ventro-apically (fig. 27). S2-4 partly undusted. Differences from central European taxa of the *bicolor* guild are listed in table 1, differences from the related S Mediterranean taxa are listed in table 2.

Description

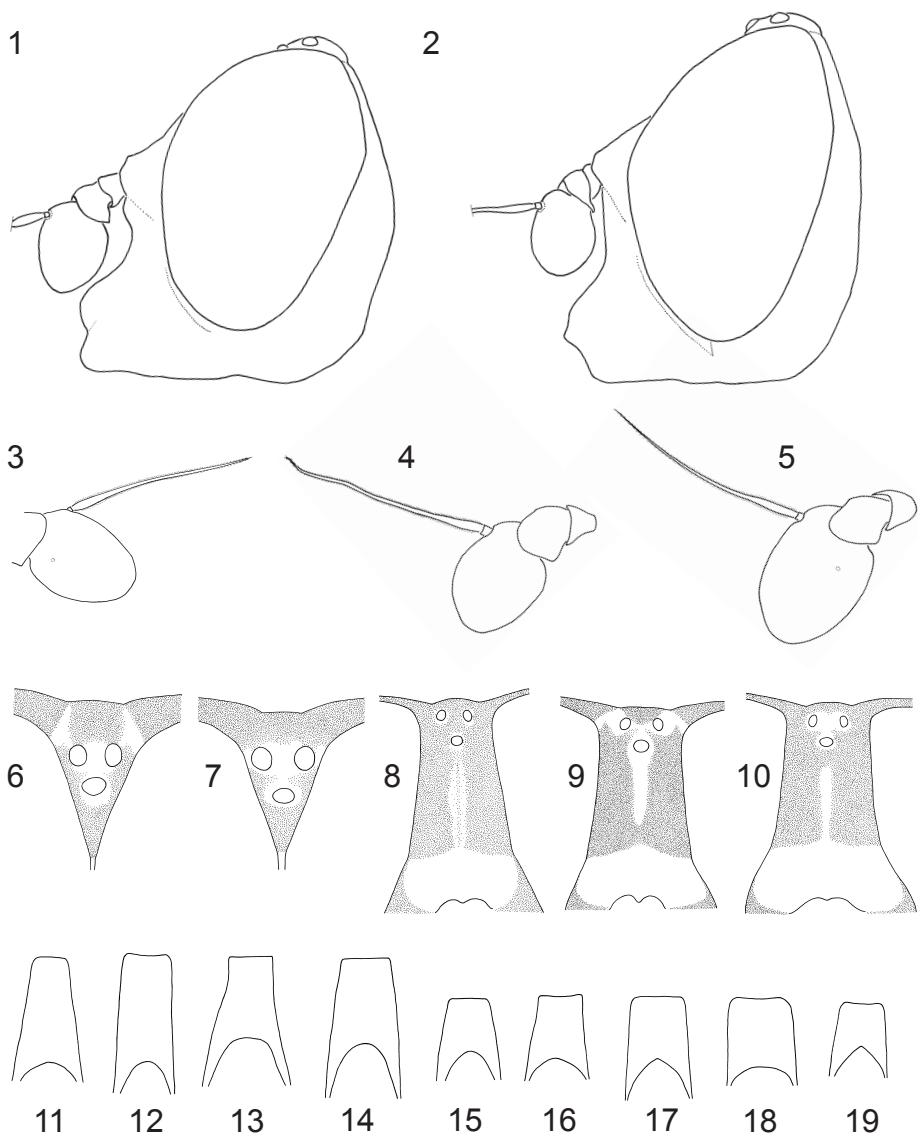
♂:

Head: L/H of head 0.79-0.85. Face moderately protruding (fig. 2). L/W of clypeus 1-1.4. L/W of subcranial cavity 1.42-1.51, 1.9-2.5x as wide as the shortest distance from the eye to the subcranial cavity. Orbital strip very narrow, as wide as the max.

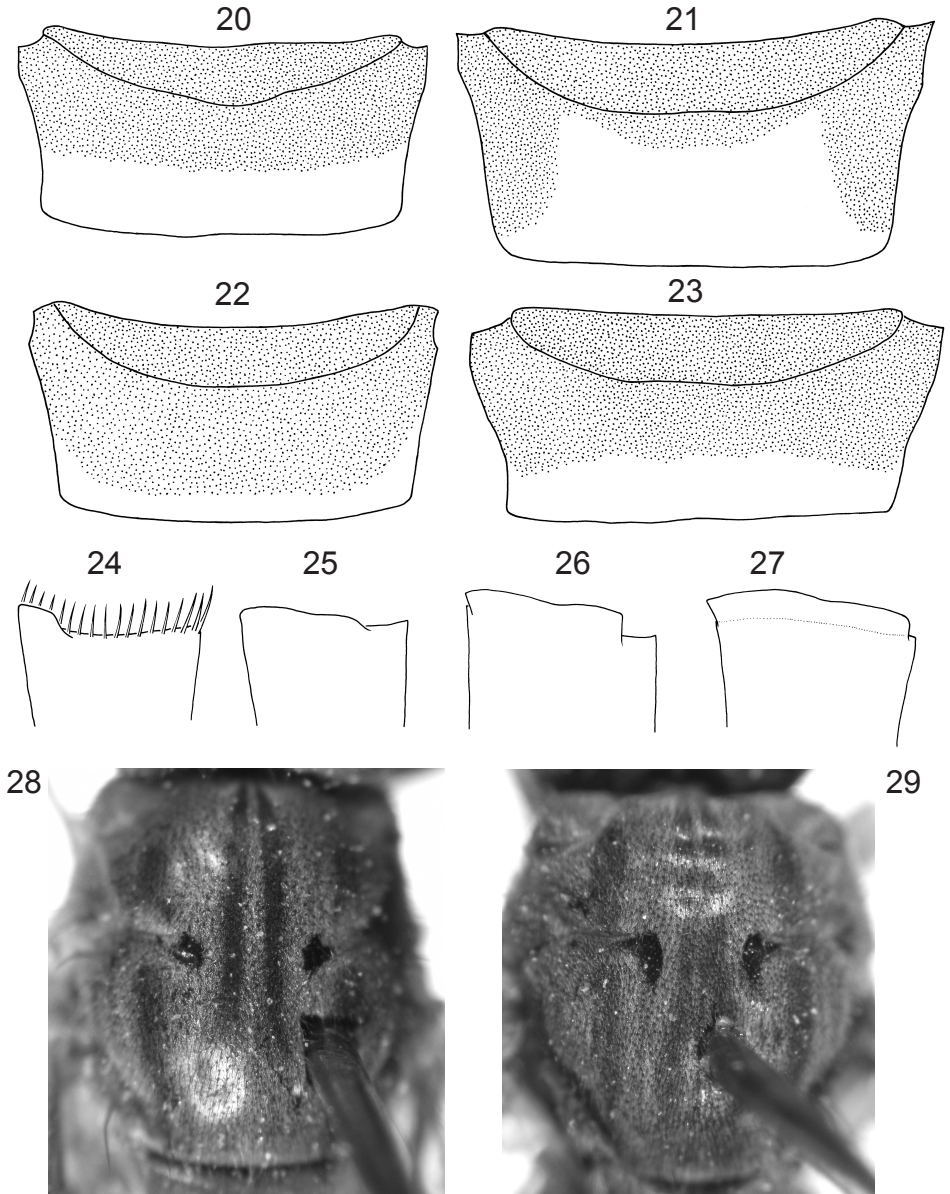
width of arista. Hairs on all parts of the head capsule pale (nearly white with a yellowish tinge). Area between the ocelli without, or almost without, microtrichia. Length of eye contiguity ca. 0.6x the length of frons. Distance between posterior ocellus and eye margin about equal to one ommatidium diameter (fig. 7). Border between dorsal part of postocular orbit and tempora indicated by a bend (although less obvious than in *B. grunewaldensis*). Hypostomal bridge mostly dark grey but reddish anteriorly to a variable extent, entirely microtrichose. Face microtrichose except for a wide band from the tentorial sulcus to the mouth edge. L/H of postpedicellus 1.27-1.43 (fig. 4), without a sensory pit. Arista with very short hairs (shorter than 1/3 the max. width of arista), entirely orange or \pm darkened apically.

T h o r a x : Black except for the post-alar callus, which is \pm reddish and the metasternum, metakatepisternum and metepimeron which are \pm yellow, entirely densely covered in grey microtrichia except for a pair of small, shining black spots posteromedian to the postpronotum and a pair of larger, triangular, shining black spots at the median ends of the transverse sulcus (fig. 29). Notopleural sulcus impressed. Thoracic bristles (the bristles are partly not well differentiated from the hairs and are therefore difficult to count): 2-10 on notopleuron, 0-1 on supra-alar area, 2-4 on postalar callus, ca. 2-3 in front of scutellum laterally, 7-14 at posterodorsal corner of ma2. Postpronotum pale haired, with or without a few black hairs mixed in. Scutum largely black haired except for its anterior margin and the notopleuron, which are pale haired, a few pale hairs that are present at the supra-alar area and in front of the scutellum, and the postalar callus, that is extensively pale haired. Scutellum rather trapezoidal (fig. 33), without a distinct depression, orange, with or without the anterior margin darkened, with 6-8 pairs of marginal bristles, black haired except for sparse pale hairs laterally, entirely covered with erect microtrichia which are very different from the microtrichia on the scutum. A rudimentary ventral scutellar fringe represented by a few hairs at the extremity of its ventro-lateral margin. Mediotergite microtrichose below subscutellum, on upper half (fig. 23). Dorsal katepisternal hair patch well developed. Hairs on anepimeron ca. 0.4mm long. Proepimeron and ma1 hairy. Posterior surface of mid coxa with one or a few hairs. Legs orange, ta1-3 \pm infuscated, but 5th tarsomere pale, apices of ta1:1-3 narrowly pale, apex of ta1:2 about 1/4 the length of the tarsomere. Legs pale haired except for the usual black bristles on f3 ventrally, a few black \pm bristly hairs subapically on f1 and f2 (posterodorsally ca. 10 bristles), subapically on dorsal surface of f3, few scattered black hairs on dorsal surface of ta1-3 and on t1+3, t2 dorsally and posteriorly with extensive or predominant black hairs. f1-3 microtrichose, except for the posterior surface of f1+2. f3 thick, L/H = 3.9-4.1. Apex of t3 with a sharp edge across full width, ventrally (fig. 27). Wing without dark spots. Vein M slightly curved just before junction with dm-cu (as in fig. 35).

A b d o m e n : T and S orange, with pale (nearly white with yellowish tinge) hairs. T1 entirely microtrichose, T2 extensively covered with microtrichia except for the posterior margin narrowly and large areas at the posterolateral corners, which are bare. T3 anteriorly with a narrow band of microtrichia which is extended beyond the middle

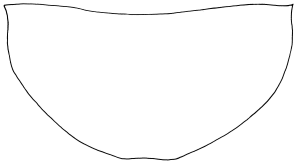


Figs 1-2: Head, lateral view. – 1. *Brachyopa bimaculosa* ♀; – 2. *Brachyopa silviae* ♂. – **Figs 3-5: Antenna.** – 3. *Brachyopa bimaculosa* ♀; – 4. *Brachyopa silviae* ♂; – 5. *Brachyopa silviae* ♀. – **Figs 6-7: Vertex, ♂, dorsal view.** – 6. *Brachyopa grunewaldensis*; – 7. *Brachyopa silviae*. – **Figs 8-10: Frons, ♀.** – 8. *Brachyopa bimaculosa*; – 9. *Brachyopa grunewaldensis*; – 10. *Brachyopa silviae*. Stippling showing distribution of microtrichia. Hairs are omitted. – **Figs 11-19: Clypeus.** – 11-12. *Brachyopa bicolor*; – 13. *Brachyopa bimaculosa*; – 14-15. *Brachyopa grunewaldensis*; – 16-17. *Brachyopa insensilis*; – 18-19. *Brachyopa silviae*.

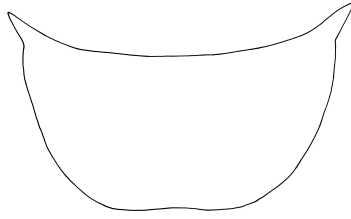


Figs 20-23: Mediotergite. Stippling showing distribution of microtrichia. – 20. *Brachyopa bimaculosa*; – 21. *Brachyopa grunewaldensis*; – 22. *Brachyopa insensilis*; – 23. *Brachyopa silviae*. – **Figs 24-27: Apex of t3 ventrally** (fine hairs are omitted, strong apical setae only drawn in fig. 24). – 24. *Brachyopa insensilis*; – 25. *Brachyopa grunewaldensis*; – 26. *Brachyopa bicolor*; – 27. *Brachyopa silviae*. **Figs 28-29: Scutum.** – 28. *Brachyopa bimaculosa* ♀; – 29. *Brachyopa silviae* ♀.

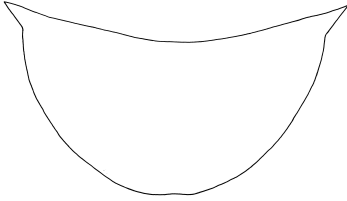
30



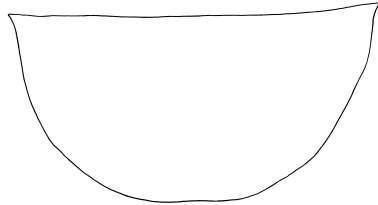
31



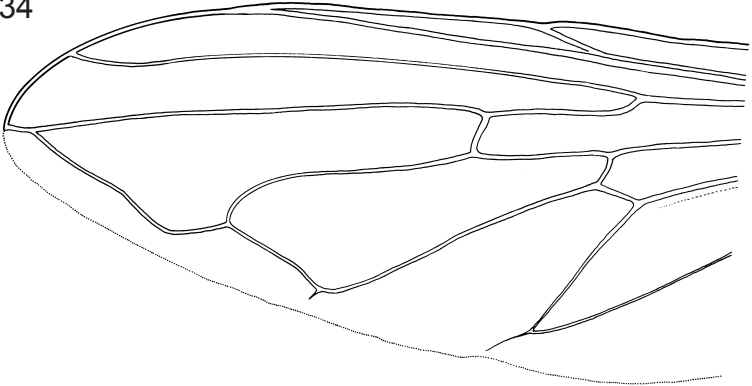
32



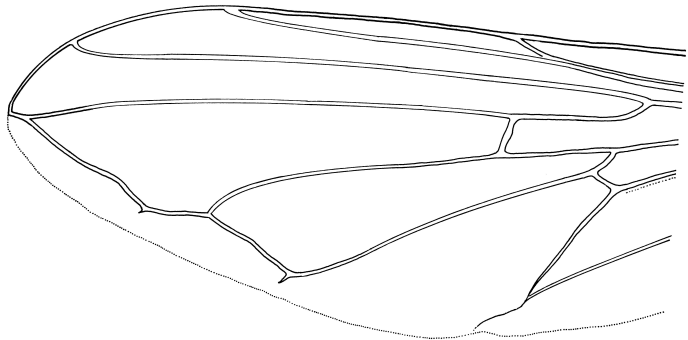
33



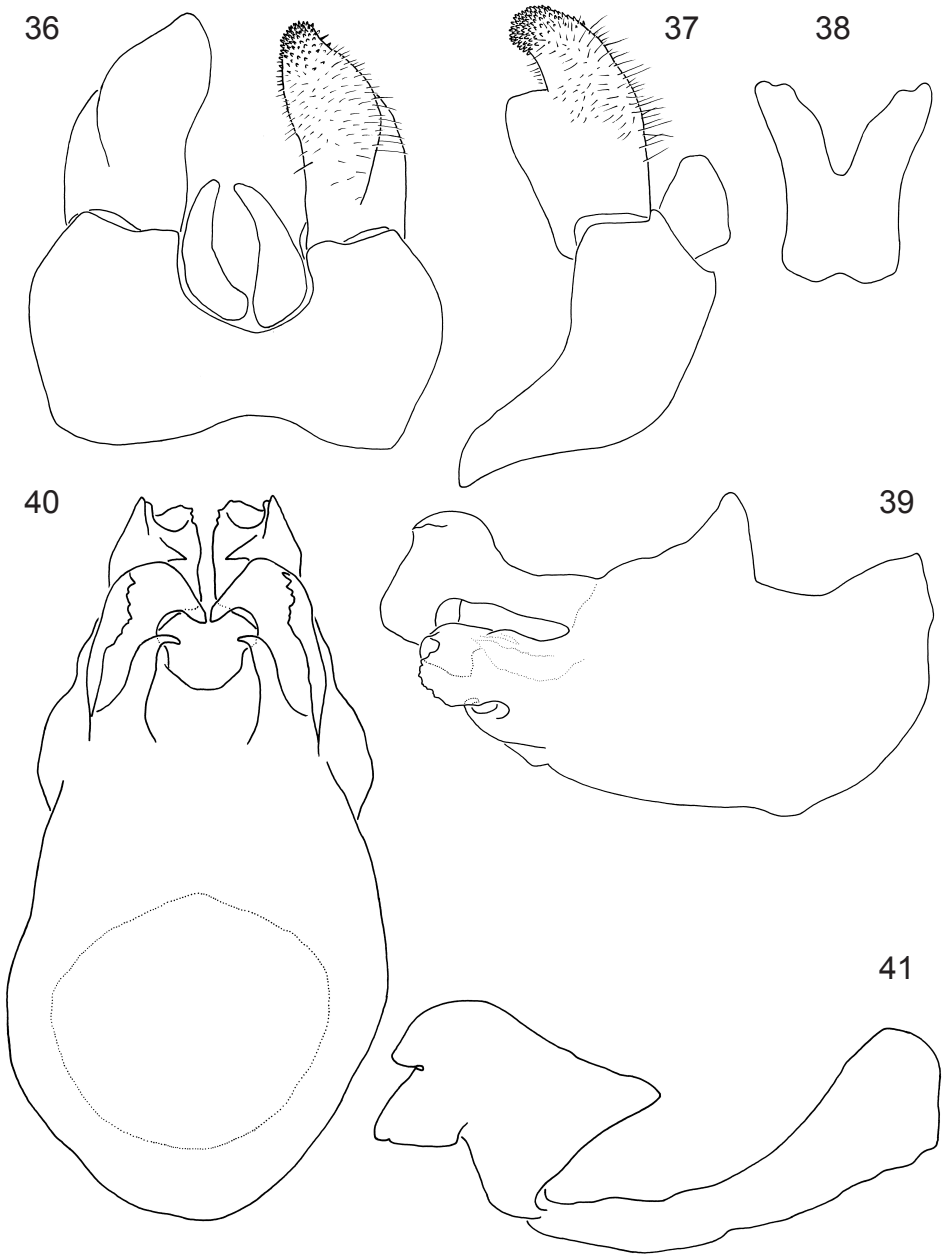
34



35



Figs 30-33: Scutellum. – 30. *Brachyopa bimaculosa*; – 31. *Brachyopa grunewaldensis*; – 32. *Brachyopa insensilis*; – 33. *Brachyopa silviae*. – **Figs 34-35: Left wing.** – 34. *Brachyopa bicolor*; – 35. *Brachyopa bimaculosa*.



Figs 36-41: *Brachyopa silviae* ♂ terminalia. – 36. Epandrium dorsally; – 37. Epandrium laterally; – 38. Bacilliform sclerite; – 39. Hypandrium laterally; – 40. Hypandrium ventrally; – 41. Edeagus laterally.

near the median line, T4 with a narrow microtrichose band at anterior margin. S2 with a postero-median spot bare of microtrichia, S3+4 extensively bare. S2+3 about twice as wide as long. Terminalia figs 36-41. Ventral lobe of surstylus (fig. 37) small, about twice as long as wide, its ventral margin almost straight. Hypandrium wide (about half as wide as long), ventrally smooth, with complex dorsal and ventral apical appendages of characteristic shape (figs 39-40).

Size: Body length ca. 8mm, wing length 7.7-8mm.

♀: differs from the ♂ in the following characters: L/W of frons 1.64-1.9 (fig. 10). Frons with a narrow (ca. as wide as the anterior ocellus) undusted median line not reaching the anterior ocellus (fig. 10). The dusted posterior part of the frons with black ground colour across full width. The facial pollinosity not connected with the frontal pollinosity (fig. 10). Orbital strips partly without microtrichia. Hypostomal bridge narrowly bare of microtrichia at the mouth edge laterally. L/H of postpedicellus 1.33-1.44 (fig. 5), its length 0.22-0.24 the width of the head (a little larger than in male), with a minute sensory pit (no more than half the width of the arista). ta3:1 swollen.

Habitat: The type locality is a track at the edge of a limestone *Fagus* forest with numerous bushes and some dead wood. The specimens from Dörscheid have been caught in a thermophilous *Quercus petraea* forest on a southfacing slope in the Rhine valley, many clearings, rich in dead wood, scattered *Carpinus betulus*, *Crataegus* spp., *Prunus spinosa*, *Rosa canina*, *Rubus* spp., and *Ribes alpinum*. The specimens from Hainich National Park were caught in a Malaise trap installed at the edge of a pond in a humid *Fagus* forest (transition to *Fagus* rich oak-hornbeam-forest). A single *Picea abies* could be found nearby. Of the macrohabitats defined in Speight et al. (2003) "1121a *Fagus* forest, overmature", "7462f edge, permanent pool under canopy", and "642 tall sedges" were present. On the site near Dessau the Malaise trap was placed in the river Elbe floodplain at the edge of a *Pinus sylvestris* forest on a dune. Macrohabitats sensu Speight et al. (2003): "182 *Pinus sylvestris* plantation", "1922 scattered mature conifers in open ground", "23112 dry/semi-arid unimproved grassland, no stones", and at a distance of 250m "1521 alluvial hardwood forest, overmature".

Key to the central European species of the *Brachyopa bicolor* guild

- 1 Length of hairs on arista more than maximum width of arista. Scutum of most species completely or extensively reddish. Postpedicellus with a distinct sensory pit other *Brachyopa* spp.
- Length of hairs on arista less than maximum width of arista. Ground colour of scutum (with exclusion of the postalar callus and the bare part of the supra-alar area) entirely black. Postpedicellus with or without a small sensory pit (figs 3-5) 2

- 2 Wing with distinct dark brown spots at vein r-m and at the distal end of vena spuria. Arista with hairs about as long as maximum width of arista. Apical third or more of f3 black haired on anterior and dorsal surface (in addition to the usual black ventral spinules) *B. maculipennis* Thompson
- Wing without dark spots at r-m and at the distal end of vena spuria. Arista with hairs no longer than half the maximum width of arista (figs 3-5). f3 anteriorly and dorsally at most with sparse black hairs near apex (*Brachyopa bicolor* guild) ... 3
- 3 Notopleuron black haired. Notopleural sulcus not or weakly impressed. Postpedicellus with a distinct sensory pit (at least as large as the maximum width of the arista). Scutellum with a ± strong transverse depression. Vein M strongly curved just before junction with dm-cu (fig. 34). At least T3 with extensive black hairs. Microtrichia of T4 reaching apical half
..... *B. bicolor* (Fallén)
- Notopleuron pale haired or with mixed black and pale hairs. Notopleural sulcus deeply impressed. Postpedicellus without a distinct sensory pit (if a pit is detected at close examination, its diameter is smaller than the maximum diameter of the arista) (figs 3-5). Scutellum without a depression, at most with traces. Vein M slightly curved just before junction with dm-cu (fig. 35). T3 without black hairs or with few black hairs only (some specimens of *B. insensilis*). T4 at most on anterior ¼ microtrichose 4
- 4 Scutellum largely bare of microtrichia except for the anterior margin. Mediotergite almost entirely microtrichose (fig. 22). f3 slender, L/W: ♂ >5, ♀ >5.5. Proepimeron bare. Hypostomal bridge usually with a pair of large, undusted spots anteriorly. ♀ with ± extensively black haired T2 (esp. posteromedially) ...
..... *B. insensilis* Collin
- Scutellum entirely covered in microtrichia. Mediotergite below subscutellum bare of microtrichia in lower half (figs 20, 21, 23). f3 thicker, L/W: ♂ ≤4.5, ♀ <5. Proepimeron with a few hairs anteriorly. Hypostomal bridge completely dusted. T without black hairs 5
- 5 Scutum with one pair of undusted round spots at the transverse suture (fig. 28). Clypeus slender (L/W 1.8-2.1) (fig. 13). t1-3 and dorsal surface of ta1-3 black haired. Mid coxa posteriorly bare. Hypostomal bridge yellow. Ocellar triangle densely covered in microtrichia, matt (fig. 8). All S entirely dusted
..... *B. bimaculosa* spec. nov.
- Scutum either with a triangular spot bare of microtrichia at the transverse suture (fig. 29) or without a bare spot there. Clypeus more truncate (L/W 1-1.7) (figs 14, 15, 18, 19). t1+3 and dorsal surface of ta1-3 entirely pale haired or at most with few black hairs mixed in. Mid coxa posteriorly with one or a few hairs. Hypostomal bridge blackish. At least centre of ocellar triangle bare of microtrichia, shining black (figs 6, 7). More than half of the surface of S3+4 undusted 6

- 6 Scutum with a pair of triangular spots at the inner ends of the transverse suture bare of microtrichia (shining black) (fig. 29). Face more protruding (fig. 2). Without bare spots posterior to the posterior ocelli (figs 7, 10). Postalar callus entirely microtrichose. Mediotergite below subscutellum microtrichose on upper half (fig. 23). ♂: Apex of t3 ventrally with a narrow, sharp edge across full width (fig. 27) *B. silviae* spec. nov.
- Scutum without such spots. Face less protruding (fig. 1a in Kassebeer 2000a). With a spot bare of microtrichia posterolateral to the posterior ocelli (figs 6, 9). Postalar callus with a spot bare of microtrichia. Median 3/5 of mediotergite below subscutellum with microtrichia restricted to upper margin (fig. 21). ♂: Apex of t3 ventrally with a narrow sharp edge restricted to the posterior 3/4 of the apical margin (fig. 25) *B. grunewaldensis* Kassebeer

Acknowledgements

Dr Franz Malec and Ulrich Schmid provided important specimens from their collections and Claus Claußen passed on a specimen from the ZMUC. Due to the kindness of Christian F. Kassebeer we could study the types of *B. grunewaldensis* and *B. atlantea* and a couple of *B. quadrimaculosa* from his collection. Thanks are due to the following curators for the loan of type specimens and other material: Mr Fiedler (Museum für Naturkunde Chemnitz), James Hogan (Oxford University Museum of Natural History), Christian Kehlmaier (Staatliches Museum für Tierkunde Dresden), Dr Marion Kotrba and Wolfgang Schacht (Zoologische Staatssammlung München), Dr Rudolf Meier (Zoological Museum, University of Copenhagen), Dr Thomas Pape (Swedish Museum of Natural History), Dr Hans Pellmann (Museum für Naturkunde Magdeburg), and Dr Karla Schneider (Entomological collections, Martin-Luther-Universität Halle-Wittenberg). Dr Adrian Pont kindly arranged the loan from the collections in Oxford. Manfred Großmann permitted and organized the installation of two Malaise traps in the Hainich National Park. Mike Jessat and Wolfgang Apfel aided in the installation of the Malaise trap and the collection of the trap bottles from the field. Thanks to Dr Peer Schnitter from the Landesamt für Umweltschutz Sachsen-Anhalt and to the team from the biosphere reserve "Flusslandschaft Mittlere Elbe" for their support in finding suitable trap sites and obtaining authorisations. Thanks also to the RIVA-Team! Some of the specimens referred to this paper were caught in the course of the RIVA-project "Übertragung und Weiterentwicklung eines robusten Indikationssystems für ökologische Veränderungen in Auen" funded by the Bundesministerium für Bildung, Wissenschaft, Forschung und Technologie, FKZ 0339579, and during the project "Charakterisierung der Fauna mitteleuropäischer Auen mittels funktionaler Gilden – dargestellt am Beispiel der Schwebfliegenfauna (Diptera, Syrphidae) der Mittleren Elbe in Sachsen-Anhalt", funded by the Kultusministerium des Landes Sachsen-Anhalt, Germany, FKZ 3367A/0021B. Many thanks to Dr Martin C.D. Speight for stimulating discussion and for checking the English.

References

- Collin, J.E. (1939): Notes on Syrphidae (Diptera). III. – Entomologists monthly Magazine 75, 104-109.
- Kaplan, M.; Thompson, F.C. (1981): New Syrphidae (Diptera) from Israel. – Proceedings of the Entomological Society of Washington 83(2), 198-212. Washington D.C.
- Kassebeer, C.F. (2000a): Eine neue *Brachyopa* Meigen, 1822 (Diptera, Syrphidae) aus dem Grunewald. – Dipteron 3(1), 7-12. Kiel.
- Kassebeer, C.F. (2000b): Eine neue *Brachyopa* Meigen, 1822 (Diptera, Syrphidae) aus dem Atlas. Beiträge zur Schwebfliegenfauna Marokkos X. – Dipteron 3(2), 141-148. Kiel.

- Kassebeer, C.F. (2001): Über eine ungewöhnliche *Brachyopa* Meigen, 1822 (Diptera, Syrphidae) aus Tunesien. – *Dipteron* 4 (1), 37-42. Kiel.
- Kassebeer, C.F. (2002): Eine weitere *Brachyopa* Meigen, 1822 (Diptera, Syrphidae) aus Tunesien. – *Dipteron* 4 (2), 201-208. Kiel.
- McAlpine, J.F. (1981): Morphology and Terminology – Adults. – In: McAlpine, J.F.; Peterson, B.V.; Shevell, G.E.; Teskey, H.J.; Vockeroth, J.R.; Wood, D.M. (eds.): *Manual of Nearctic Diptera*. Vol. 1, 9-63. Ottawa.
- Pellmann, H. (1998): Die Gattung *Brachyopa* Meigen, 1822 (Insecta, Diptera, Syrphidae) in entomologischen Sammlungen sächsischer Museen und die Möglichkeit der Artunterscheidung anhand der Genitalien der Männchen. – *Studia dipterologica* 5(1), 95-112. Halle (Saale).
- Sack, P. (1928-1932): 31. Syrphidae. – In: Lindner, E. (ed.): *Die Fliegen der paläarktischen Region*, Vol. 4, part 6, 451p. Stuttgart.
- Sinclair, B.J. (2000): Morphology and terminology of Diptera male terminalia. – In: Papp, L.; Darvas, B. (eds.): *Contributions to a Manual of Palaearctic Diptera*. Vol. 1. p. 53-74. Budapest.
- Speight, M.C.D. (1987): External morphology of adult Syrphidae (Diptera). – *Tijdschrift voor Entomologie* 130, 141-175.
- Speight, M.C.D. (2003): Species accounts of European Syrphidae (Diptera) 2003. – In: Speight, M.C.D.; Castella, E.; Sarthou, J.-P.; Ball, S. (eds.): *Syrph the Net: the database of European Syrphidae* (Diptera). Vol. 39. 209 pp. Syrph the Net publications, Dublin.
- Speight, M.C.D.; Castella, E.; Obrdlik, P. (2003): Macrohabitat preferences of European Syrphidae (Diptera) 2003. – In: Speight, M.C.D.; Castella, E.; Obrdlik, P.; Ball, S. (eds.): *Syrph the Net: the database of European Syrphidae* (Diptera). Vol. 33. Syrph the Net publications, Dublin.
- Stuckenberg, B.R. (1999): Antennal evolution in the Brachycera (Diptera), with a reassessment of terminology relating to the flagellum. – *Studia dipterologica* 6, 33-48. Halle (Saale).
- Thompson, F.C. (1980): The problem of old names as illustrated by *Brachyopa "conica" Panzer*", with a synopsis of Palaearctic *Brachyopa* Meigen (Diptera: Syrphidae). – *Entomologica Scandinavica* 11, 209-216. Lund.
- Thompson, F.C.; Rotheray, G. (1998): Family Syrphidae. – In: Papp, L.; Darvas, B. (eds.): *Contributions to a Manual of Palaearctic Diptera*. Vol. 3. p. 81-139. Budapest.
- Thompson, F.C.; Torp, E. (1982): Two new palaearctic Syrphidae (Diptera). – *Entomologica Scandinavica* 13, 441-444. Lund.

Addresses of authors:

Dieter Doczkal, Königsberger Str. 4, 76316 Malsch, Germany.

E-mail: Dieter.Doczkal@t-online.de

Dr Frank Dziock, Umweltforschungszentrum Leipzig-Halle GmbH, Dept. Naturschutzforschung, Permoser Str. 15, 04318 Leipzig, Germany.

E-mail: Frank.Dziock@ufz.de