

Surimyia, a new genus of Microdontinae, with notes on *Paragodon* Thompson, 1969 (Diptera, Syrphidae)

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Reemer, M. *Surimyia*, a new genus of Microdontinae, with notes on *Paragodon* Thompson, 1969 (Diptera, Syrphidae).

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Surimyia, a new genus of Microdontinae (Diptera: Syrphidae) is described, based on specimens from Suriname. *Surimyia* is the only known genus of Syrphidae in which the katatergum (ventral part of lateral postnotal sclerite of mesonotum) lacks microtrichia. Within Microdontinae, the genus is unique in the absence of pilosity on the postpronotum. It is also remarkable in the presence of strong, black setae on thorax and abdomen, a character rarely found in Syrphidae. The genus is superficially similar in external morphology and colouration to *Paragodon* Thompson, 1969, but clearly different in the characters mentioned above, as well as in the structure of the male genitalia. Two species are assigned to *Surimyia*: *S. minutula* (van Doesburg, 1966) and *S. rolanderi* spec. nov. Generic morphology is discussed. Differences between the species are described and illustrated.

Introduction

Hoverflies of the subfamily Microdontinae have puzzled taxonomists in many ways. Although traditionally considered as part of the Syrphidae, several authors have advocated family status for this group. Recently it was Thompson (1969, 1972) who proposed to raise the group to family level. This was supported by Speight (1987), but not followed by others. A recent, comprehensive phylogenetic analysis of Syrphidae based on both morphological and molecular characters (Ståhls et al., 2003) placed the Microdontinae as a sister-group of all other Syrphidae. These results do not necessitate family status for the group, nor do they reject it. Another recent analysis, based on an extended set of exclusively morphological characters (Hippa & Ståhls 2005), placed Microdontinae entirely within Syrphidae. Probably, the classification of Microdontinae will remain a matter of debate for some time to follow.

Not only adult Microdontinae are challenging, the larvae too have quite a turbulent taxonomic history of their own. In the 19th and 20th century, these larvae had been found in ant nests by several biologists, who initially failed to recognize them as Diptera-larvae. Their unusual, convex appearance is reminiscent of that of slugs, so much even that they have been described as molluscs on at least four occasions (Haas, 1924, Torres Minguez, 1924, Wheeler, 1908). The connection between these peculiar 'slugs' and the adult flies of the genus *Microdon* Meigen, 1803 had already been established by Elditt (1845), but it would take several decades for this knowledge to become commonly known.

At the time of Linnaeus things were simple: he described two *Musca*-species, which are nowadays placed in *Microdon*. One of them, *Musca mutabilis* Linnaeus, 1758, would later be designated as the type species of *Microdon* by Meigen (1803). At present, ap-

proximately 400 species of Microdontinae are described, the majority of which are still placed in *Microdon*. The group is well-represented in all major zoogeographic regions and is most speciose in the tropics, especially the neotropics. Approximately 150 species are known from South America, divided among about 15 supraspecific taxa (Thompson et al., 1976).

Supraspecific taxonomy of Microdontinae has received little attention. Hull (1949) published the only overview so far, and another one is about to be published by Cheng & Thompson (in press). Still, many taxa remain poorly defined and relationships are unclear. The present description of a new genus from Suriname is a small contribution to change this situation. For the author, this is the first step in a comprehensive study on the taxonomy and phylogeny of Microdontinae.

The genus described here superficially resembles *Paragodon* Thompson, 1969. Upon its description, two species were assigned to *Paragodon*: *P. minutulus* (van Doesburg, 1966), based on one male from Suriname, and *P. paragoides* Thompson, 1969, based on one male from Mexico. Since then no species were added to the genus. The recent collection in Suriname of what seemed to be a third *Paragodon* species prompted a re-examination of the two other species. This revealed that the two species from Suriname, including *P. minutulus*, actually do not belong to *Paragodon*, but to a previously undescribed genus. This new genus and a new species belonging to it, will be described in this paper. The morphology of the genus is discussed and a comparison with *Paragodon* is made. A future paper will deal with its phylogenetic relationships, based on both morphological and molecular data.

Material and methods

The specimens of *Surimyyia rolanderi* spec. nov. were collected in 2006 with malaise traps in the former coffee- and cocoa-plantation Peperpot (district Commewijne, Suriname), in the southern part, in the La Liberté area (05°46'08,0"N-55°07'33,2"W) (fig. 1). One malaise trap operated between 2.ii and 27.iv, while a second one operated at the same site (five metres away) between 29.iii and 27.iv. The habitat can be described as moist secondary forest on clay soil.

One of the paratypes of *S. rolanderi* spec. nov. was donated to the collection of the Finnish Museum of Natural History, Helsinki, Finland (MZH), as a DNA voucher specimen. Another paratype has been deposited in the United States National Museum (Smithsonian Institution) in Washington D.C., U.S.A. (USNM). The holotype of *Cerato-phyia minutula* Van Doesburg, 1966 has been studied (coll. RMNH, Leiden). A specimen of *Paragodon paragoides* Thompson, 1969 has been examined from the collection of the Snow Entomological Museum, University of Kansas (SEMC).

Male genitalia were macerated in a cold 10% KOH solution for twelve hours, then rinsed in water and subsequently stored in glycerine. The drawings were made with aid of a drawing tube attached to a microscope. The pictures were taken with an Olympus motorized stereozoom microscope SZX12 using Analysis Extended Focal Imaging Software.

Morphological terminology is based on Thompson (1999), supplemented by some terms used by Hippa & Ståhls (2005).



Fig. 1. Collection site of *Surimyia rolanderi* spec. nov.: Peperpot, Suriname, a former coffee- and cocoa-plantation with secondary forest on moist clay soil.

Descriptions

Surimyia gen. nov.

Type species.— *Surimyia rolanderi* spec. nov.

Description.— Very small (4-5 mm) flies. Face convex, without facial or frontal tubercle. Gena hardly developed, therefore eye bordering the buccal cavity. Antenna with scape at least three times as long as pedicel. Thorax about as long as wide. Postpronotum bare. Sides of mesonotum, postalar callus and scutellum with strong setae. Anepisternum and anepimeron with setae, other pleura bare. Legs without cicatrices, except in some specimens vaguely expressed at the base of the metafemur. Wing: vena spuria absent, apical crossveins straight, without appendix of vein R4+5 into cell R4+5, crossvein r-m located close to base of discal cell. Abdomen oval, about as long as head and thorax together; lateral margins rolled under ventrally; tergites with setae along posterior margins; sternites with many scattered setae. Male genitalia with bifid aedeagus (furcation point around half the aedeagal length), unsclerotized ejaculatory sac and sclerotized, mushroom-shaped ejaculatory apodeme.

Diagnosis.— Differs from all other known Syrphidae by the absence of microtrichia on the katatergum (= ventral part of lateral postnotal sclerite, also known as pleurotergite). It differs from all other known Microdontinae by the absence of pilosity on the

postpronotum and otherwise by the presence of strong black setae on thorax, tergites and sternites.

Etymology.— The name is a combination of Suriname, where the only known specimens of the genus have been found, and *myia*, the Greek word for fly. The name is feminine.

***Surimya minutula* (van Doesburg, 1966) comb. nov.**

Figs 2-5

Ceratophya minutula van Doesburg, 1966: 89

Paragodon minutulus (van Doesburg, 1966): Thompson (1969)

Holotype.— ♂ (RMNH), Suriname, Zanderij, Malaise trap, 13-16.viii.1964, leg. D.C. Geijskes.

Notes on the type specimen.— The holotype is the only known specimen of *S. minutula*. In this specimen the left wing is missing. Thompson (1969) did not study this type, but included this species in *Paragodon* based on the drawing by Van Doesburg (1966), which shows many similarities in external morphology and colouration to *P. paragoides* Thompson. Examination of the holotype revealed that it corresponds to the characters described above as diagnostic for *Surimya* (see discussion). The genitalia are figured in fig. 5.

There are two minor dissimilarities between the type specimen and the drawing in Van Doesburg (1966). Firstly, the wing is not entirely microtrichose, as the drawing suggests, but there are some bare areas basally (fig. 4). Secondly, the proportions of the anterior and posterior part of vein BM-Cu are not entirely accurate in the drawing: these should be approximately as 1.5 (anterior) : 1 (posterior) (as in fig. 4).

According to Van Doesburg (1966) the face of *S. minutula* is parallel-sided. Examination of the holotype revealed that the sides of the face are actually slightly converging towards the oral margin (fig. 2).

***Surimya rolanderi* spec. nov.**

Figs 6-13.

Holotype.— ♂ (RMNH), Suriname, Commewijne, Peperpot (plantation), 05°46'08"N-55°07'33"W, malaise trap, 17-24.ii.2006, leg. M. Reemer.

Paratypes.— All from same location, year and leg. as holotype. 1 ♂, 17-24.ii (DNA voucher specimen, MZH), 1 ♂ 2-9.ii (USNM), 1 ♂ 20-27.iv, 3 ♀♀ 6-14.iv, 2 ♀♀ 14-20.iv (RMNH).

Body length.— 4.5-5.0 mm.

Male.— Head (figs. 6, 7).— Eyes bare, in dorsal view separated over a distance of about 1/3 of width of head. Face in frontal view narrowing from width of an eye at level of ocellar triangle to about half this width at level of oral margin, slightly wider at level of antennal fossa. Antennal fossa about as wide as high. Face in profile convex, without frontal prominence and facial tubercle, oral margin not produced. Face, oral margin and genae yellow, shining, sparsely covered with short yellow pile. Frons, vertex and occiput shining blackish, except for yellow lateral parts of anterior half of frons.

Frons only anterolaterally with some short yellow pile, otherwise bare. Vertex posteriorly with short reddish pile. Occiput mainly with bristly yellow pile, except for some black ones at level of antennae. Ocellar triangle clearly elevated relative to vertex, with frontal angle of approximately 80°.

Antenna: black, or scape and pedicel paler ventrally. Total length of antenna more than the distance of frontal ocellus to lunula. Scape as long as pedicel and basoflagellomere together or slightly longer; four times the length of pedicel. Arista somewhat paler, about as long as 2/3 of basoflagellomere.

Thorax.— Mesoscutum with three broad, connected, shining black vittae, leaving only some yellow along the margins; posteriorly two narrow, unclear yellowish lines in between the black vittae are visible; sparsely covered with semi-erect, reddish pile; with long, appressed black setae along lateral margins.

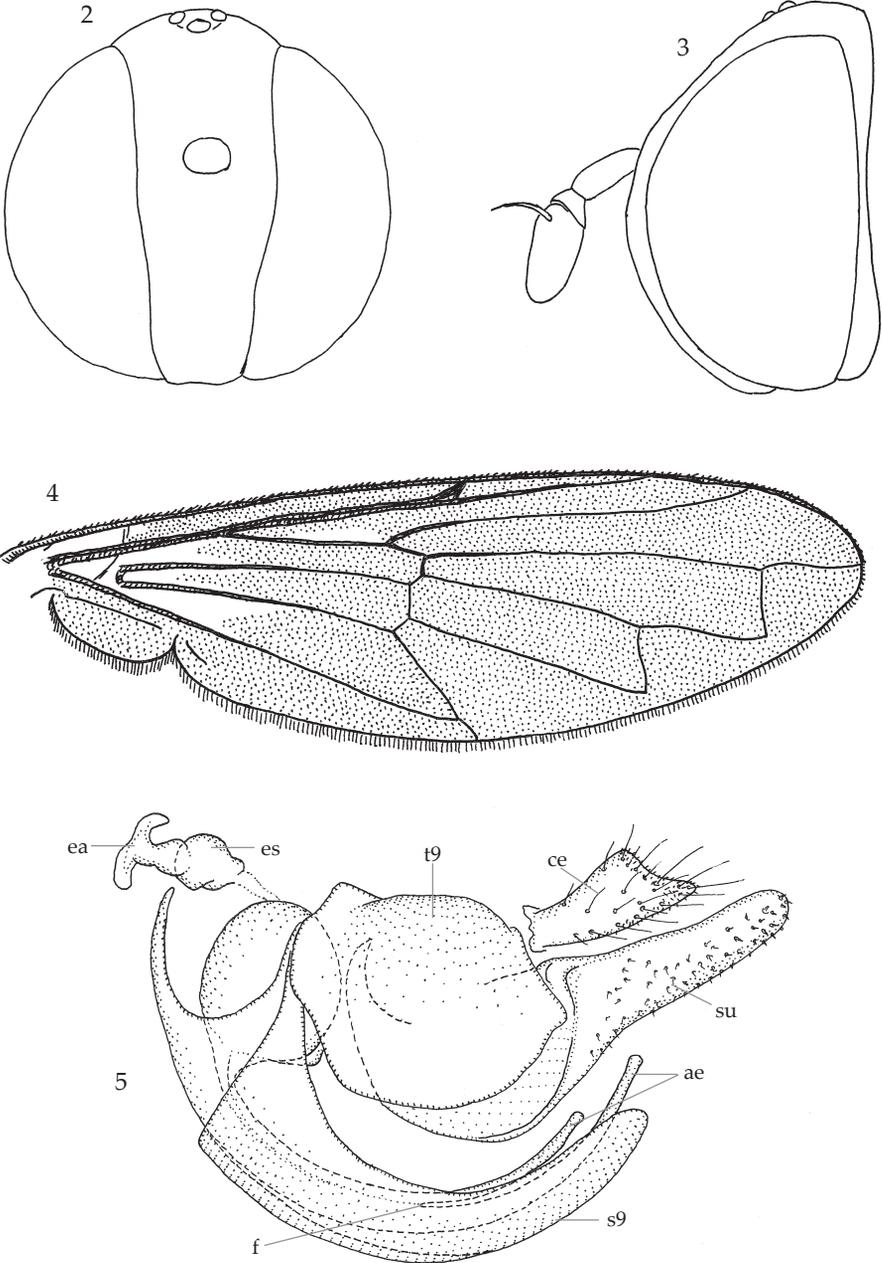
Postpronotum shining yellow, bare. Postalar callus shining yellow, with a variable number of long and short black setae, predominantly anteriorly. Scutellum shining black, sparsely covered with semi-erect, reddish pile and with long, black, irregularly arranged setae along margins. Postnotum shining black, with obvious 'arciform crest' (see Hippa & Ståhls 2005).

Pleura shining yellow, except for dark anterior part of anepisternum, ventral half of katepisternum, meron (meropleuron) and katatergum. Long black setae on dorsal parts of anepisternum (7-11) and anepimeron (8-10) (these setae break off easily, but the sockets should always be visible under sufficient magnification). Katatergum bare, without microtrichia. Metasternum narrow and bare. Metapleura hardly sclerotized and barely connected, touching in one point.

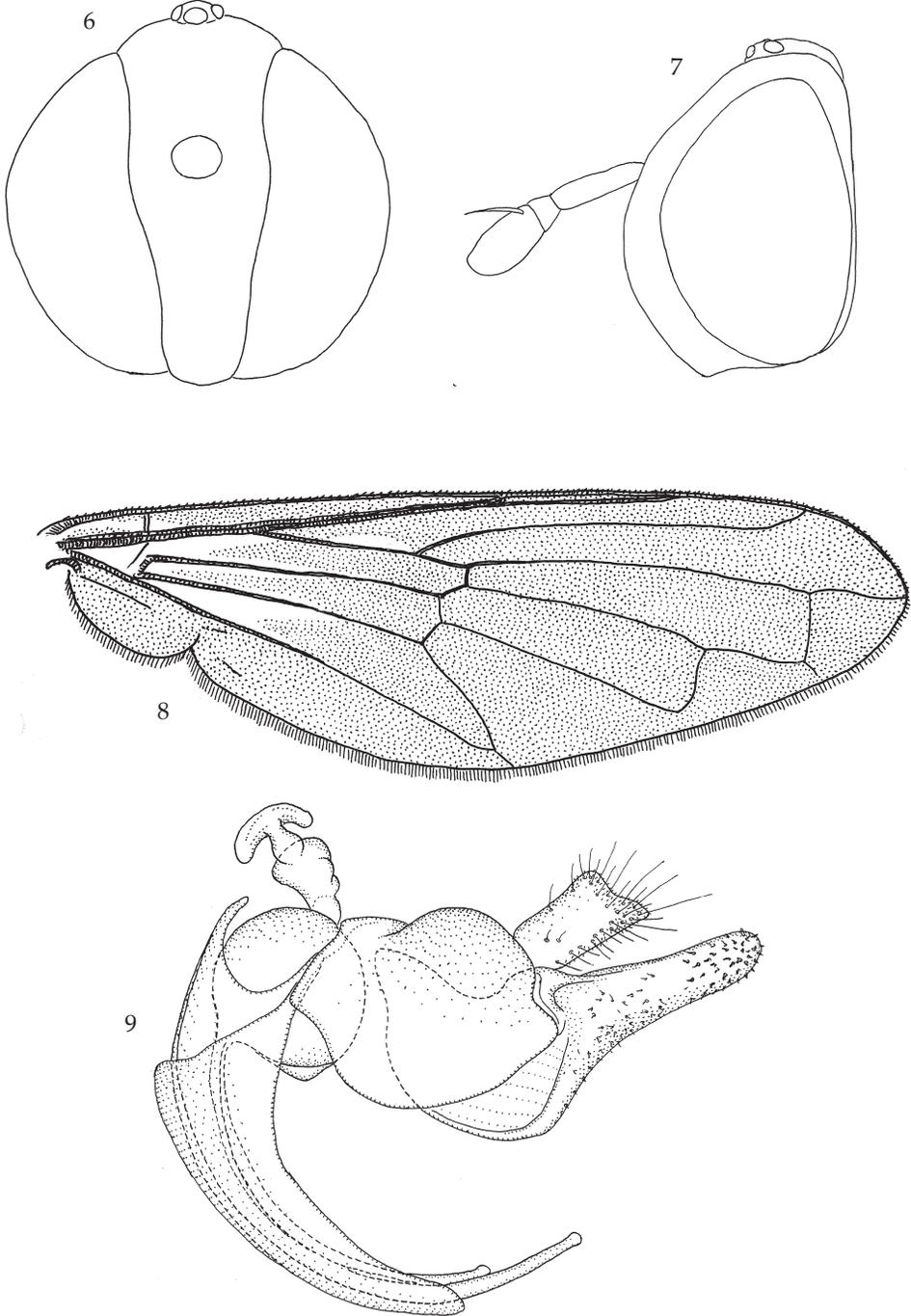
Legs. Coxae black or blackish, sparsely with reddish pile. Coxae 2 and 3 posteriorly with microtrichia. Trochanters yellowish to brown with some short reddish and black pile. Legs without noticeable cicatrices, except vaguely expressed in some specimens at the base of the posterior femora. Legs 1 and 2 yellow, tarsae a little reddish. Femora 1 and 2 sparsely with short black pile, especially dorsally and posteriorly, other parts predominantly with short yellow pile. Tibiae and tarsae of legs 1 and 2 with short yellow pile. Femur 3 dark brown, except for yellow basal 1/3 and narrowly some yellow at the top. Tibia 3 yellow on basal 2/3, dark on distal 1/3. Tarsus 3 reddish brown, first tarsomere a little darker. Leg 3 entirely with short yellow pile, except for some black ones dorsally on femur. All tarsal claws dark, paler on basal half.

Wing (fig. 8) hyaline. Covered with microtrichiae except on first costal cell, anterior and posterior parts of basal half of cell R (with a strip of microtrichia inbetween), on 3/4 of posterior half of cell BM, and on basal 1/3 of cell CuP. Calypter pale with dark margins. Halter yellow.

Abdomen (figs 10-11).— Four unmodified pregenital segments. Tergite 1 yellow, dark along posterior margin, laterally with short black setae. Tergite 2, 3 and 4 yellow with large lateral black marks, not reaching posterior margin, and with median black vittae over entire length of tergite, converging towards anterior margin. Tergites entirely covered with short, appressed black (sometimes yellow on yellow parts of tergite) setae. Tergite 2 laterally with long black setae. Tergites 2 and 3 with 8 to 10 long black setae along posterior margin, sometimes with some long setae on the middle of the tergite. Tergite 4 posteriorly with some long setae.



Figs 2-5. *Surimymia minutula* (van Doesburg) ♂, 2. head frontally, 3. head laterally, 4. wing, 5. genitalia laterally (ae = aedeagus, ce = cercus, ea = ejaculatory apodeme, es = ejaculatory sac, f = furcation point of aedeagus, su = surstylus, s9 = sternite 9, t9 = tergite 9).



Figs 6-9. *Surimya rolanderi* spec. nov. ♂, 6. head frontally, 7. head laterally, 8. wing, 9. genitalia laterally.



Figs 10-13. *Surimya rolanderi* spec. nov. ♂, 10. habitus dorsally, 11. abdomen, laterally, 12. thorax, dorsally, with setae on anepisternum and anepimeron well visible. 13. scutellum, laterally.

Sternite 1 pale coloured and weakly sclerotized, except for stronger sclerotized blackish triangular portion basomedially; with appressed black setae along posterior margin. Other sternites yellow and occupied with randomly arranged short and long black setae (fig. 11). Genitalia as in fig. 9.

Female.— Except for genitalia and number of unmodified pregenital segments (five), there is no sexual dimorphism. Even the eyes do not seem to be separated wider than in the male, although this is hard to assess in the available specimens, because the heads have become somewhat wrinkled because of storage in alcohol.

Etymology.— The specific epithet honours Daniel Rolander (1725-1793), one of the seventeen pupils of Linnaeus, who are sometimes called his 'apostles'. Rolander is remembered as the 'forgotten apostle', for his work has fallen into oblivion long ago. Until recently, Rolander used to be depicted as a querulous, alcoholic person, who turned insane during a collecting journey to Suriname. Recent evidence, however, suggests that these stories are not entirely accurate.

In 1754, Rolander was offered the opportunity by Linnaeus to sail off to Suriname, a Dutch colony at that time, in order to collect and describe the indigenous flora and fauna. Rolander would be the first to systematically explore the wildlife of this exotic

country. When Rolander returned to Sweden in 1756, he and Linnaeus would soon no longer be on speaking terms. Rolander was disappointed by Linnaeus, who did not support him the way he expected during his journey. This made him decide not to share his results with Linnaeus, which was a bad career move. From then on Linnaeus thwarted Rolander's academic aspirations, and Rolander never acquired an academic position, nor was he granted the possibility of publishing his results. Linnaeus even broke into Rolander's apartment to steal some particular specimens he wanted to examine. Rolander died in poverty and obscurity (Pain, 2007).

Rolander had sold his Surinamese journal to the University of Copenhagen, where it has remained unopened for many years. Recent investigations of the journal and a translation into English revealed the surprising quality of its contents (Pain, 2007). Had this journal been published while Rolander was alive, he might have gained an equally respectable reputation as the other 'apostles' of Linnaeus. It seems a bit sour now that Rolander never received any credits for his work. Attributing this new species from Suriname to him, on the 250th anniversary of zoological nomenclature, should be considered as a consolation prize, to make up for a tiny bit of his misfortune.

Paragodon paragoides Thompson, 1969

Thompson, 1969: 81.

Studied specimen.— ♂ (SEMC), Panama, Panama Prov., Perlas Islas, Isla San Telmo, 13.iv.1981, leg. R.W. Brooks. Pro- and mesolegs missing.

The studied specimen agrees quite well with the original description of *Paragodon paragoides*. The following differences were noted (in parentheses the state of the character according to Thompson 1969): face in profile evenly rounded (slightly produced),

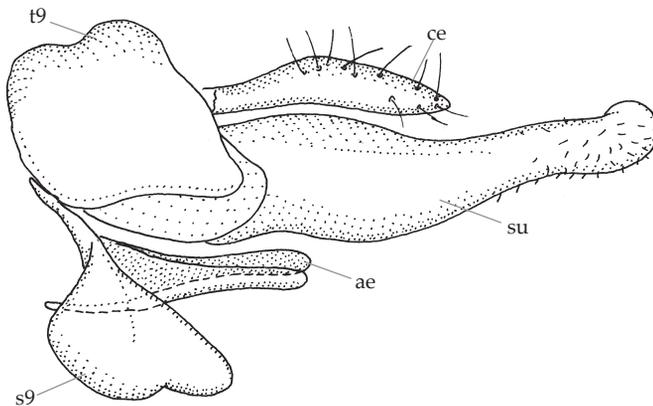


Fig. 14. *Paragodon paragoides* Thompson ♂, Panama (coll. SEMC), genitalia laterally (ae = aedeagus, ce = cercus, su = surstylus, s9 = sternite 9, t9 = tergite 9).

face yellow (with diffuse medial brown stripe), basoflagellomere evenly rounded apically (pointed), metafemur yellow (largely black), left [not right!] anepimeron dorsally with one long black seta (bare). Genitalia as in fig. 14 (the unsclerotized ejaculatory sac and apodeme could not be found, possibly because of too long maceration in KOH). In addition to the description the presence of an obvious 'arciform crest' on the postnotum can be noted.

The presence of a single long black seta on the left anepimeron is interesting, because so far the lack of pilosity on the anepimeron has been considered as an autapomorphy of *Paragodon* within the Microdontinae (Thompson, 1969, 1999). Apparently this character is variable, or these setae might break off easily.

The taxonomic significance of the noted differences between the studied specimen from Panama and the description of *P. paragoides* is hard to assess with so few specimens of *Paragodon* available. Therefore, the studied specimen is considered to belong to *P. paragoides*.

Discussion

Generic morphology

It is easy to see why Thompson (1969) included *Ceratophya minutula* Van Doesburg in *Paragodon*. This species is superficially very similar to *P. paragoides* Thompson in external morphology and colouration. However, some characters of *Surimyia* immediately set the genus apart from other Syrphidae and Microdontinae, including *Paragodon*. The bare postpronotum is unique among Microdontinae (Cheng & Thompson in press, Thompson 1999), and the lack of microtrichia on the katatergum is apparently unique among all Syrphidae (see Hippa & Ståhls 2005). Another striking character of the *Surimyia*-species is the presence of bristly pile on the thorax (anepisternum, anepimeron, mesonotum, postalar callus, scutellum) and abdomen (sternites and tergites). Thoracic bristly pilosity is uncommon among Syrphidae and known to occur only in a small number of genera (like *Brachyopa*, *Cheilosia*, *Copestylum* and *Volucella*). Bristly pilosity on the abdomen, especially on the sternites, is very rare among Syrphidae. Only *Tachinosyrphus* Hull has abdominal bristles on the fourth tergite (Thompson 1972).

Attempts to identify *Surimyia*-specimens with Thompson (1999) will fail at the first couplet, because the bare postpronotum conflicts with the number of unmodified pregenital segments, as stated in this couplet. In the key of Cheng & Thompson (in press) specimens of *Surimyia* will run to *Afromicrodon* Thompson (type species: *Microdon johannae* van Doesburg, 1957), an African genus which differs from *Surimyia* in the pilose postpronotum, the microtrichose katatergum and the absence of bristly pile on thorax and abdomen.

Because of their unique characters, the species of *Surimyia* do not fit properly into any other genus of Microdontinae. Ideally, one should describe a new genus only when this does not cause other taxa to become paraphyletic. However, since a cladistic analysis of the phylogenetic relationships within Microdontinae has not yet been performed, it seems best to emphasize the singularity of the taxon by rendering it generic status. Generic taxonomy and phylogeny of the subfamily will be assessed in a future paper.

Table 1. Diagnostic morphological characters of *Surimyia* gen. nov. and *Paragodon* Thompson.

<i>Surimyia</i>	<i>Paragodon</i>
Postpronotum bare	Postpronotum pilose
Katatergum without microtrichia	Katatergum with microtrichia
Thorax and abdomen with many strong setae	Thorax and abdomen without setae, only with pilosity
Aedeagus furcate, curved	Aedeagus unfurcate, straight
Ejaculatory apodeme weakly sclerotized, mushroom-shaped	Ejaculatory apodeme not sclerotized, without clear shape (see Thompson 1969)

Table 2. Morphological differences between *Surimyia minutula* and *S. rolanderi* spec. nov.

<i>Surimyia minutula</i> (Van Doesburg)	<i>Surimyia rolanderi</i> spec. nov.
Head	
Scape short: shorter than pedicel and basoflagellomere together, 3 times length of pedicel	Scape long: approximately as long as pedicel and basoflagellomere together, 4 times length of pedicel
Total length of antenna approximately equal to distance of frontal ocellus to antennal fossa	Total length of antenna greater than the distance of frontal ocellus to antennal fossa
Ocellar triangle in frontal view hardly elevated	Ocellar triangle in frontal view clearly elevated relative to vertex
Thorax	
Anepimeron with 3 setae	Anepimeron with 8-10 setae (if broken off, then sockets usually still visible)
Posterior part of BM-Cu about 60% of length of anterior part	Posterior part of BM-Cu about as long as anterior part
Male genitalia	
Cerci basally clearly narrower than apically (FIG)	Cerci basally almost as wide as apically (FIG)
Base of surstylus narrower (FIG)	Base of surstylus wider (FIG)

Specific characters

Table 2 lists some morphological differences between *Surimyia minutula* and *S. rolanderi*. Apart from these characters, *S. minutula* (4 mm) appears to be slightly smaller than *S. rolanderi* (4.5-5 mm). Compared to *S. rolanderi*, *S. minutula* seems to be less 'bristly' on thorax and abdomen. However, several setae may have broken off in the only specimen available. The black vitta on the frons is wider in *S. rolanderi*, but the variability of this character is hard to assess with so few specimens.

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