

# Description of *Phaonia acponti* sp. n. from Greece and resurrection of the erroneously synonymized Norwegian *Phaonia maculipennis* (Storm, 1896) (Diptera, Muscidae)

EBERHARD ZIELKE

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A species very similar to *Phaonia laeta* (Fallén, 1823) and *Phaonia pratensis* (Robineau-Desvoidy, 1830) is described as *Phaonia acponti* **sp. n.** from Greece. The newly described species is not only striking due to its body size and conspicuously yellow legs, but it is also the only one of these similar looking species to have some small hairs on the proepisternal depression. When comparing the species material provided by different institutions for the investigations, it was noticed that the holotype of *Aricia maculipennis* Storm, 1895 described from Norway was erroneously synonymized with *Phaonia pratensis*. The species is therefore revalidated in the present contribution as *Phaonia maculipennis* (Storm, 1895). The species-specific taxonomic characteristics of the now five taxa of this species-complex are valued and the species are compared in an identification key.

**Key words:** Diptera, Muscidae, *Phaonia laeta-pratensis*-complex, species-characterizations, new species, revalidation, identification key.

Eberhard Zielke, Institute of Biodiversity and Ecosystem Research, Bulgarian Academy of Sciences, 1 Tsar Osvoboditel Blvd, 1000 Sofia, Bulgaria. E-mail: eo.zielke@abv.bg

## Introduction

A few years ago, a muscid male from Greece that resembled *Phaonia laeta* (Fallén, 1823) and *Phaonia pratensis* (Robineau-Desvoidy, 1830) was described as *Phaonia parnia* Zielke, 2018, mainly because it differed significantly from the other two *Phaonia* Robineau-Desvoidy, 1830 species in the markings of the abdomen but also in some other taxonomic features (Zielke 2018). Recently, four unidentified male specimens of *Phaonia*, also from Greece and similar to *P. pratensis*, were kindly made available by Adrian Pont (Oxford, Great Britain) for comparison with *P. parnia* and eventual identification. When comparing the specimens with the male holotype

of *P. parnia*, it quickly became clear that they were two different species, which differed significantly in the abdominal patterns and taxonomic features of the head. Using the available identification keys the males lead to *P. pratensis*, although some characteristics of the four specimens that are not considered in the keys, are more similar to the males of *P. laeta*. Moreover, their relatively large body size and striking yellow tibiae made them almost macroscopically different from most specimens of the two similar species. However, comparisons with several males from *P. laeta* and male syntypes from *Phaonia laetabilis* Collin, 1951, a species synonymized with *P. laeta*, showed clear differences in the coloration of the frons and legs and the length of the arista hairs

documenting that the specimens did not belong to *P. laeta*. Type specimens of *P. pratensis* and of taxa, synonymized with *P. pratensis*, seem to no longer exist. But the comparison with the characterizations of *P. pratensis* available in the literature and with males from the Natural History Museum, London that were collected in Great Britain and identified as *P. pratensis* also revealed distinct differences between *P. pratensis* and the males from Greece. Therefore, the latter were considered as representatives of an unknown species which is described further below as *Phaonia acponti* sp. n.

Hennig (1964) mentioned *Phaonia maculipennis* (Storm, 1896) as a possible synonym of *P. pratensis* and Rognes reported in 1986 the species' holotype from the Norwegian Tromsø University Museum and confirmed Ringdahl's (1944) synonymizing of the species with *P. pratensis*. Since no type material of *P. pratensis* exists, the museum was asked for borrowing the holotype for comparison. The request was kindly granted. The male holotype of *P. maculipennis* (originally *Aricia maculipennis*, Storm, 1896) was then compared with the other available taxa and the characterizations and identification keys prepared by Hennig (1964) and subsequently by d'Assis Fonseca (1968) and Gregor *et al.* (2002, 2016). The investigations revealed that *P. maculipennis* is obviously an independent species erroneously synonymized with *P. pratensis*. Thus, *P. maculipennis* is characterized as a revalidated species below.

Collin showed in 1951 that specimens, each of two different species, had previously been assigned to *P. laeta*. Since then, a distinction has been made between *P. pratensis* and *P. laeta*, with both species named differently at times. A total of three additional species have now been added that resemble the two known species, but are ultimately closer to *P. pratensis* due to the colouration of the frons. To facilitate the correct assignment of specimens to the different species, the characters that have been used in the past to distinguish *P. laeta* and *P. pratensis* are revised and the essential differences between the five species of this group are highlighted.

## Material and methods

Identification of the species relied largely on the keys and species characterizations provided by Hennig (1964), and Gregor *et al.* (2016). In addition, at some occasions the keys of d'Assis-Fonseca (1968) and Gregor *et al.* (2002) were consulted as well. Furthermore, *P. laeta* and *P. pratensis* and the three added species are also named "*P. laeta-pratensis* complex". To underline that there is no intention of creating a formal taxonomic group the term "group" is avoided wherever possible.

Morphological terminology follows McAlpine (1981), but postpedicel (Stuckenberg 1999) is used instead of "first flagellomere" as proposed by McAlpine. The width of the postpedicel seen from the lateral side is called "depth" and the greatest depth of the postpedicel is always used for comparisons and ratio calculations. The length of postpedicel was measured from the most anterior margin of pedicel to the tip of the postpedicel. Information about the width of frons always refer, if not stated otherwise, to the shortest distance between the margins of the eyes. The anterior width of frons is measured directly above the upper margin of lunule. Only the postsutural intralar setae are called as such. The so-called intralar setae of the presutural part of mesonotum are referred to as posthumeral and presutural setae. When the length of setae or hairs of the femur is compared to the depth of femur, the depth always refers to the point of insertion of the seta or hair. Body length is measured in millimetres (mm). External morphological features of the specimens were studied using a Zeiss Stemi SV6 stereomicroscope. The illustrations were created by means of an AxioCam ERc5s camera combined with a Zeiss Discovery 8 stereomicroscope. For further processing of the images Helicon Focus 6 and Adobe Photoshop CS2 were applied. The unidentified Greek *Phaonia* males were generously made available by A. C. Pont from the Oxford University Museum (Great Britain). Apart from a few specimens of *P. laeta* and *P. pratensis* collected in Bulgaria and stored in the collection of the Institute of Biodiversity and Ecosystem Research (IBER), Sofia, Bulgaria most

of the *Phaonia* specimens used for comparison were on loan. The syntypes of *P. laeta* (Fallén) were borrowed by the Swedish Museum of Natural History, Stockholm. The holotype of *A. maculipennis* came from the Tromsø University Museum, Norway, and the syntypes of *P. laetabilis* from the Oxford University Museum of Natural History (OUMNH), Oxford, Great Britain. The holotype of *P. parnia* is from the Moravian Museum, Brno, Czech Republic. Several *Phaonia* males and females collected in Great Britain and identified as *P. laeta* by d'Assis Fonseca and as *P. pratensis* from New Forest by C. J. Wainwright and from Wood Walton Fen. by F. W. Edwards were kindly provided by the Natural History Museum (NHM), London.

## Results

*Phaonia acponti* sp. n. (Figures 1–5, 10, 12, 16)

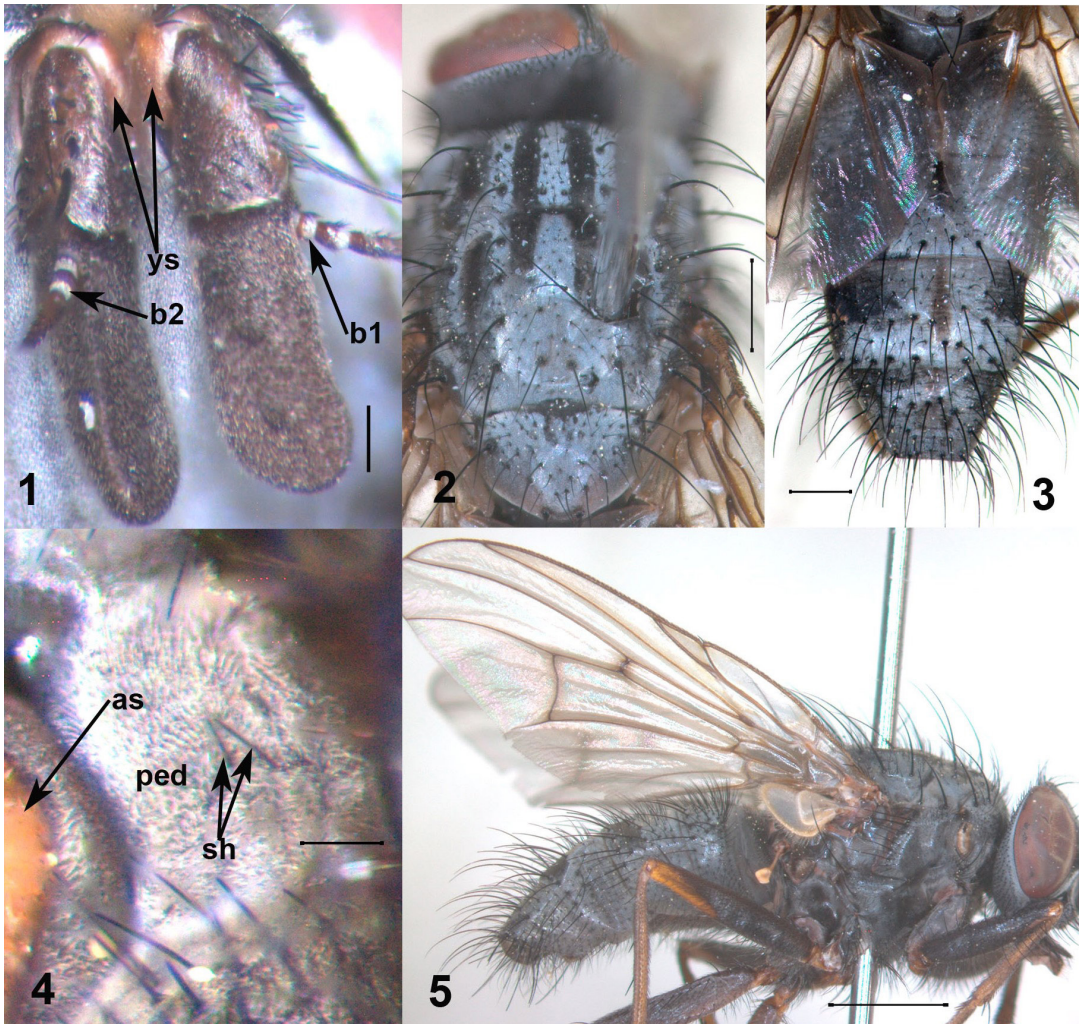
**Material examined.** Male holotype comes from a locality described on the label as "GREECE Peloponnese Prov. Lakonia, Taygetos Mts. Langadikka Valley SW of Parori W of Sparti 37°03'35"N 022°22'49"E 310 m 05.v.2017 leg. C. Lange & J. Ziegler". Two male paratypes have the same label as the holotype, and one male paratype is labelled as "GR Platania/Volos 18.5.2015 leg. K. Standfuss." The holotype is slightly soiled, a few setae and the tarsomeres of the right mid leg are missing. Both paratypes from the same locality are lacking the left hind leg, and the majority of setae of the frons, the right side of head is somewhat indented in one male. The male paratype from Platania is in good condition, however the setae of head are lost as well, but as in the other paratypes the scars of lost setae are well visible. In agreement with Adrian Pont the holotype will be located in the Natural History Museum, London; and a paratype each will go to the OUMNH, Oxford, UK, to the IBER, Sofia, BG and to the Natural History Museum, Berlin, Germany.

**Etymology.** It is my pleasure to name this interesting *Phaonia* species after Adrian C. Pont from the Oxford University Museum in recognition of his clarifying contributions to the

nomenclature and the assignment of different taxa to the two species *P. laeta* sensu Fallén not authors and *P. pratensis* (Robineau-Desvoidy). Since the epithet "*ponti*" is already occupied for this genus by *Phaonia ponti* Coelho, 1998, the epithet "*acponti*" was chosen, a noun in the genitive case.

**Description.** *Head.* Ground-colour dark, almost black, at certain incidence of light densely whitish dusted. Eyes densely covered with hairs about as long as twice the diameter of anterior ocellus; shortest distance between eyes slightly wider than depth of postpedicel. Width of fronto-orbital plate at shortest distance between eyes about as broad as diameter of anterior ocellus; fronto-orbital plates separated all over the length of frons by a frontal vitta, at middle of frons barely half as wide as width of frons at that level, but distinctly dilated towards anterior margin (Figure 10). Parafacial at basis of antenna somewhat broader than depth of postpedicel distinctly tapering downwards, at midlength about half as wide as depth of postpedicel in holotype. In profile (Figure 16): upper mouth margin is about half the depth of postpedicel behind profrons; parafacial well visible along its entire length; genal depth below lowest eye margin at most a quarter as high as maximum height of eye. When viewed from anterior (Figure 12), parafacial and anterior gena surface predominantly dusted greyish-white; fronto-orbital plate, ocellar tubercle and frontal vitta black, in posterodorsal view (Figure 10) frontal vitta almost velvet black, ocellar tubercle very sparsely dusted grey, fronto-orbital plate silvery-grey. In lateral view at certain incidence of light parafacial and fronto-orbital plate dark brown, frontal vitta somewhat dusted greyish. Ground-colour of antennal segments dark brown, the scape with a striking narrow orange-yellow anterior margin (Figure 1), contrasting to the dark adjacent surroundings e.g. in direct lateral view; ground-colour of pedicel darker than in postpedicel and dusted grey; postpedicel dark with brownish-grey pollinosity. Postpedicel is about three times as long as its depth and barely twice as long as pedicel. Arista dark brown to black, at least twice as long as length of postpedicel; the basal two segments of arista are marked apically by a white ring each (Figure 1); the longest dorsal

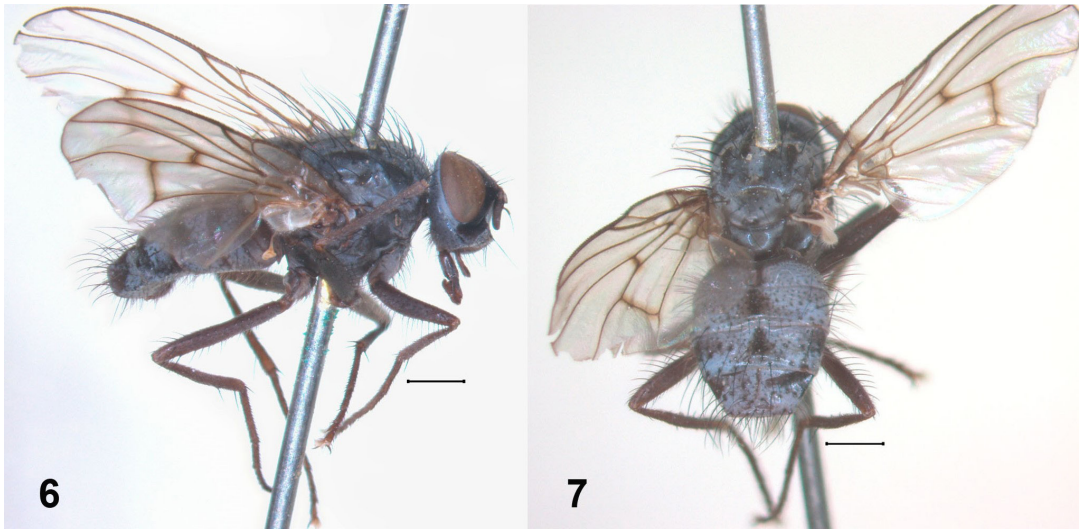




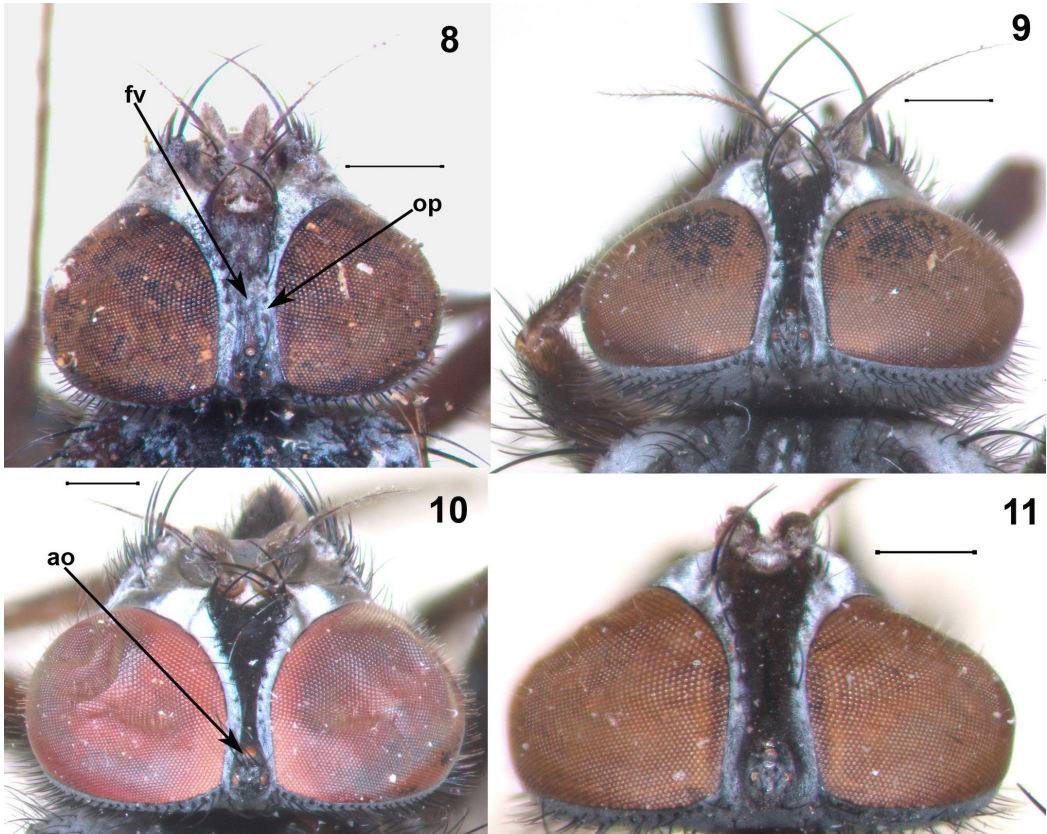
**FIGURES 1–5.** *Phaonia acponti* sp. n. male holotype. **1.** Antennae, scape with yellow-orange anterior margin (ys), and aristal basal segments (b1 and b2) with white apical markings; (bar = 0.2 mm). **2.** Posterodorsal view of mesonotum with dark longitudinal stripes; (bar = 1 mm). **3.** Dorsal view of abdomen, tergite 4 with median longitudinal stripe and shifting lateral dark patches; (bar = 1 mm). **4.** Proepisternal depression (ped) with two short hairs (sh) in anterior half, anterior margin of anterior spiracle (as); (bar = 0.1 mm). **5.** Lateral view, with yellow tibiae and partly yellow apical surfaces of femora; (bar = 2 mm).

hairs of arista usually about half as long as depth of postpedicel, a few extremes, however, might reach in some flies about three quarters of the depth of postpedicel. Fronto-orbital plate throughout its length almost up to the ocellar tubercle with about seven inclinate frontal setae and one or two interstitial hairs in anterior half, the setae long and strong, only the two most upper ones distinctly shorter and hair-like. At level of anterior tip of ocellar triangle one short fine reclinate hair and a

shorter reclinate hair somewhat below. Para-facial bare. Vibrissal seta and surrounding peristomal setae strong, vibrissal about 1.3 times longer than the longest peristomal setae. Upper two thirds of lateral surface of gena bare, lower margin with seta-like black hairs. Subgena, postgenal and post-occipital surfaces densely covered with dark seta-like hairs. Proboscis short, fairly strong and dark; length of labella about one and a half times as long as depth of proboscis; prementum at certain



**FIGURES 6–7.** *Phaonia maculipennis* (Storm, 1896) holotype. **6.** Lateral view with brown legs; (bar = 1 mm). **7.** Posterodorsal view of abdomen with triangular-shaped median longitudinal markings on tergites 3 and 4; (bar = 1 mm).



**FIGURES 8–11.** Dorsal view of male heads. **8.** *Phaonia laeta* (Fallén, 1823). **9.** *Phaonia pratensis* (Robineau-Desvoidy, 1830). **10.** *Phaonia acponti* sp. n. holotype. **11.** *Phaonia maculipennis* (Storm, 1896). (Representing all four heads fv = frontal vitta, op = fronto-orbital plate, ao = anterior ocellus; bar = 0.5 mm in Figures 8–11).



viewing angle shiny dark brown. Palpus slender, dark and somewhat longer than prementum.

*Thorax.* Ground-colour dark and uniformly densely dusted grey. Mesonotum predominantly greyish. In postero-dorsal view with two dark paramedian longitudinal stripes inside and along the rows of dorsocentral setae. The rows practically not interrupted at transverse suture and reaching in posterodorsal view at least the second or third (Figure 2), or in strictly posterior view even the level of the fourth postsutural dorsocentral seta. Outside of the row of presutural dorsocentrals a dark patch-like stripe between dorsocentrals and posthumeral and presutural setae not reaching the transverse suture. Postsutural between dorsocentral and intra-alar setae a short, dark stripe extending from level of first to third postsutural seta. Only in direct dorsal view mesonotum with an additional black median stripe more or less throughout the entire postsutural part, the paramedian stripes then reaching only level of second postsutural dorsocentral seta. All dark stripes shiny. Scutellum predominantly dusted greyish. Anterior spiracle pale brownish (Figure 4), posterior spiracle darker brownish. Mesonotum covered with fine hairs of different lengths; dorsocentral setae 3+4; acrostichals 2+2, the presutural setae of different lengths and thickness, but clearly recognizable as longer presutural acrostichal setae; only the prescutellar acrostichal seta long and strong, the anterior acrostichals much shorter; postpronotal setae 3, the outer and middle setae longer than the inner one; posthumeral seta 1 and presutural seta 1, both setae very long; anterior notopleural seta distinctly longer than posterior seta, in general no additional hairs on notopleuron, however in two males one or two setulae near to the posterior notopleural seta present on one side of the body; pre-alar seta about twice as long as posterior postpronotal seta; intra-alar setae 2, supra-alar setae 2, postalar setae 2, all setae long and distinct. Proepisternal depression with at least one, usually with two dark short hairs, isolated in the middle of the anterior half of the otherwise bare depression (Figure 4). Prosternum, anepimeron and katepimeron bare, meron with a few fine hairs below the spiracle. Katepisternum and anepisternum covered with

fine long hair; katepisternal setae 1+2, the lower seta much closer to the posterior upper one than to the anterior seta, the posterior seta strikingly longer than the two other setae. Anepisternal setae 1+8, anterior anepisternal seta small, posterior row of about eight long seta-like hairs and numerous interstitial hairs almost as long as the setae. Scutellum with long apical and lateral setae; preapical and basal setae not as long as the major setae and not much longer than the long discal setae present on scutellum in addition to long ground-hair; ventral and lateral surfaces of scutellum bare.

*Wing.* Membrane hyaline with a weak brownish tinge, cross-veins infuscate with some dark clouding of the adjacent membrane (Figure 5). Tegula brownish, basicosta dark brown; veins brown to dark. Costal spine only about half as long as cross-vein r-m but very distinct when compared with the adjacent very short setae of costa. Radial node and basis of R4+5 dorsally and ventrally bare. Veins M and R4+5 diverge strongly in the apical part of wing. Cross-vein r-m about at level where vein R1 enters costa, distal cross-vein dm-cu somewhat oblique and sinuous. Upper calypter partially hyaline, margin predominantly whitish with a weak yellowish tinge, lower calypter matt whitish, margin broad and yellowish, lower calypter about 1.5 times as long as upper calypter (Figure 5). Haltere with stem and knob yellow.

*Legs.* Coxae dark brown, almost black, depending on incidence of light shiny or slightly greyish dusted; trochanters contrasting brownish-yellow (Figure 5). Fore femur predominantly shiny dark brown to black, apex with a narrow yellow band, ventral surface in apical third with one or two yellowish longitudinal stripes; mid and hind femora predominantly shiny blackish, in apical third the ventral surface yellow (Figure 5), the dorsal surface and lateral surface in upper part blackish, apex yellow. Tibiae uniformly yellow, at certain viewing angle with a weak brownish tinge. Tarsi depending on incidence of light yellow or more or less infuscate; brownish pulvilli and claws about equally long and about as long as length of the fifth tarsomere. Hind coxa bare on posterior inner surface. Fore femur with complete rows of posteroventral, posterodorsal and posterior setae;

the setae at least as long as depth of femur, the posteroventrals clearly longer, posterior surface of femur densely covered with fine long hair. Fore tibia without median posterior seta. Mid femur in basal half with a row of anteroventral setae, about half as long as depth of femur; on posteroventral surface almost throughout the total length of femur a complete row of long hair-like setae, the longest setae almost twice as long as depth of femur, the more apical ones about as long as the depth of femur; preapical one strong anterior and four strong posterior to almost dorsal bristles, and a short row of about six posteroventral bristles standing closely together. Mid tibia in all four specimens with only two strong posterior setae distinctly longer than diameter of tibia. Hind femur with complete rows of strong anterodorsal and anteroventral setae and of posteroventral hair-like setae; the anteroventrals at apical third not very long but strong, almost spine-like, basal anteroventrals more hair-like; posteroventral setae somewhat shorter than the corresponding anteroventrals, at apical third the setae bristle-like, not as long as the corresponding anteroventrals; preapical two strong posterior to posterodorsal bristles. Hind tibia with two anterodorsal setae somewhat longer than diameter of tibia; one or two anteroventral setae smaller than the anterodorsal ones, and one posterodorsal seta at apical third.

**Abdomen.** Uniformly dusted pale grey. Each tergite with a dark median longitudinal marking depending on viewing angle extending from the anterior to the posterior margin or somewhat shorter; syntergite 1+2 with a very broad, triangular to almost trapezoidal patch; tergite 3 with a triangular-shaped patch; tergites 4 and 5 marked by a median longitudinal dark stripe, rather distinct on tergite 4 (Figure 3), and shorter on tergite 5 with the visibility depending on viewing angle. The shape of the median longitudinal pattern does not change fundamentally when light incidence changes, although intensity and size may vary slightly. However, changing viewing angles result in rapidly changing dark "shifting patches" occurring on the posterior margin and/or on the side surfaces of the tergites. The ventral parts of the tergites are uniformly greyish. Syntergite 1+2 with a complete row of very long marginal setae

and tergites 3 to 5 each with a complete row of marginals and discal setae, all setae strikingly long. Sternites uniformly dark greyish dusted, sternite 1 bare.

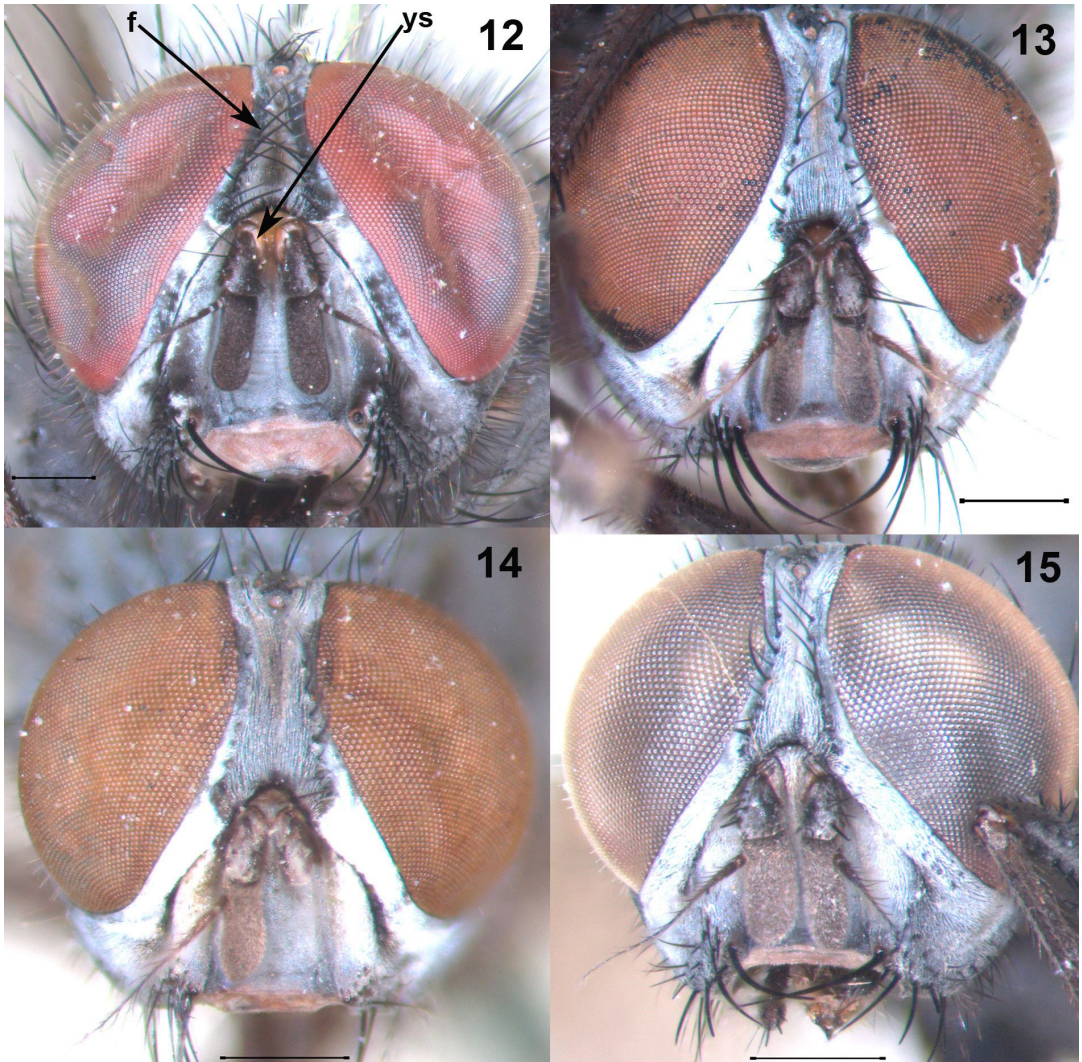
**Male genitalia.** Hypopygium not very pronounced. Posterior lobes of sternite 5 rounded, in one male dark and pollinose, in the others shiny yellowish. The species is clearly distinguished by morphological characters from other species of the genus. The identification does not depend on comparison of characters of male terminalia. Therefore, to avoid damage on the only available specimens of this new species, the genitalia were not extracted.

**Measurements.** Length of body 10–11 mm; length of wing about 9–10 mm.

**Female.** Not known.

## Diagnosis

All four males of *Phaonia acponti* sp. n. stand out from most specimens of the *P. laeta-pratensis* complex due to their considerable body length of about 10 mm, whereby they are relatively slender. In addition, they are marked by strikingly yellow tibiae and apical ventral to lateroventral surfaces of the femora which are in strikingly contrast to the rather dark surface of the remaining parts of the femora. The two basal segments of the arista each have a distinct white ring (Figure 1), which in the other species is less conspicuous, if present at all. The margin of the scape of the antenna is marked yellowish which was not noticed in the other taxa examined. The mid femur is rather densely haired, with a row of rather long posteroventral hairs, distinctly longer than the depth of the femur, some hairs even reach almost twice the length. In addition, *Phaonia acponti* sp. n. is clearly identified by one or two fine hairs on the proepisternal depression (Figure 4), while the latter is naked in the other four species. Other distinguishing features are discussed further below in the section "Taxonomic differences between the species of the *Phaonia laeta-pratensis* complex".



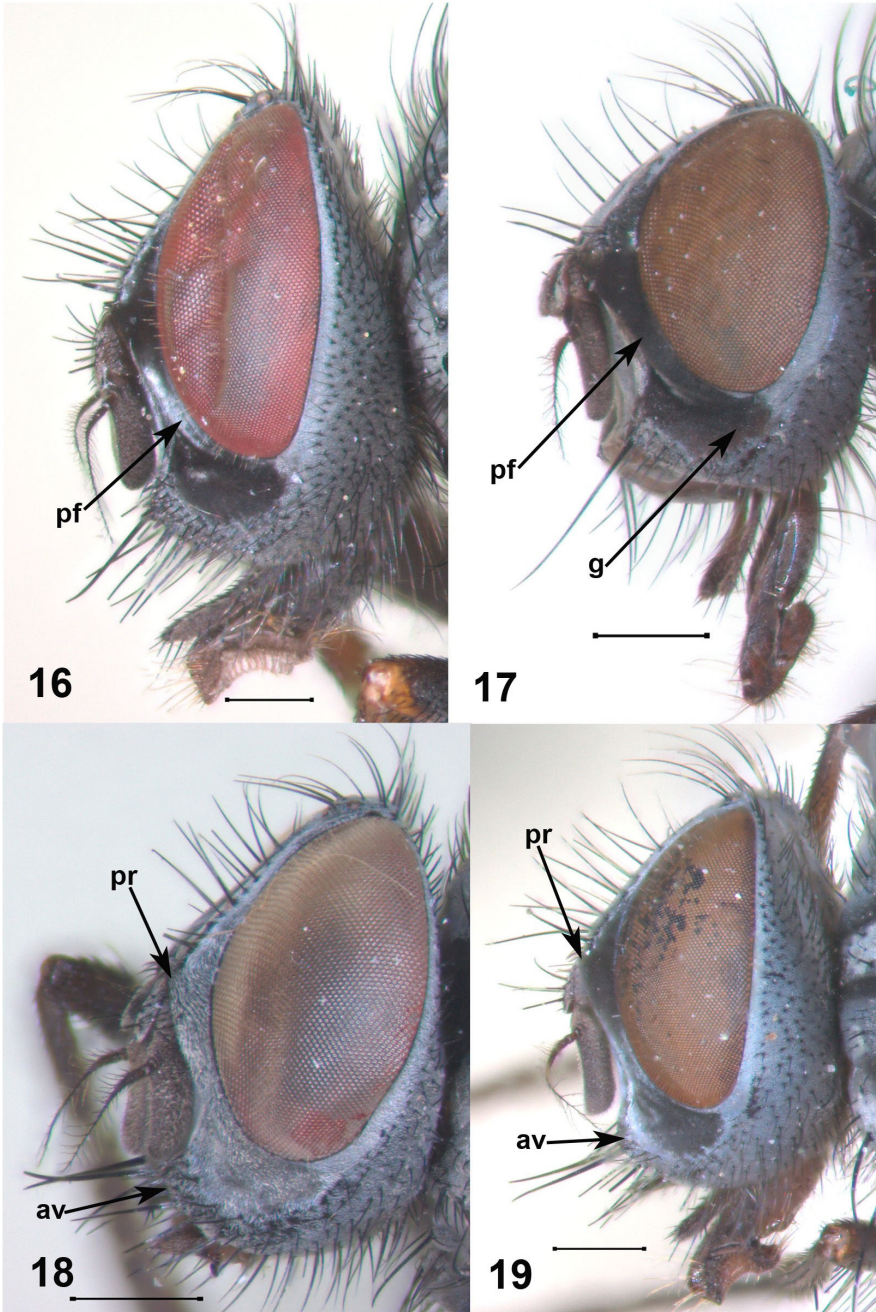
**FIGURES 12–15.** Anterior to anterodorsal view of male heads. **12.** *Phaonia acponti* sp. n. holotype, predominantly dark frons (f) also in anterior view, and with scape marked yellow. **13.** *Phaonia pratensis* (Robineau-Desvoidy, 1830). **14.** *Phaonia maculipennis* (Storm, 1896) holotype. **15.** *Phaonia parnia* Zielke, 2018 holotype; (bar = 0.5 mm in Figures 12–15).

### Resurrection of *Phaonia maculipennis* (Storm, 1896) (Figures 6 & 7, 11, 14, 17)

As already mentioned in the introduction, the species *Aricia maculipennis*, described by Storm in 1896, was also considered a possible synonym of *P. pratensis* by Hennig (1964) based on a report by Ringdahl (1944). According to Hennig, the holotype was supposed to be in the Trondheim Museum, where it was not found at the time. More

than twenty years later, however, Rognes (1986) stated in a check-list of Norwegian Muscidae that he saw the "Storm types, rediscovered in the Tromsø collection" and he included in his compilation "*Aricia maculipennis* Storm, 1896: 238 (holotype ♂ in Tromsø Museum) (= *Phaonia pratensis* Rob-Desv.)". The study of Ringdahl's (1944) article cited by Hennig (1964) revealed that Ringdahl equated *A. maculipennis* with *P. laeta* (Fallén, 1823), whereby at the time virtually





**FIGURES 16–19.** Lateral view of male heads. **16.** *Phaonia acponti* sp. n. holotype, with narrow parafacial. **17.** *Phaonia maculipennis* (Storm, 1896) holotype, with parafacial and gena noticeably broad, and distinctly different shape of head and eye than the other three species. **18.** *Phaonia parnia* Zielke, 1918 holotype, upper mouth margin slightly in front of profrons. **19.** *Phaonia pratensis* (Robineau-Desvoidy, 1830), upper mouth margin behind profrons. (Representing all four heads pf = parafacial, g = gena, av = upper mouth margin; (bar = 0.5 mm in Figures 16–18). See also the calculated ratios of length and width of various head features for the four species in Table 1.

**TABLE 1.** Comparison of the males of *Phaonia acponti* sp. n., *Phaonia pratensis* (Robineau-Desvoidy, 1830), *Phaonia maculipennis* (Storm, 1896) and *Phaonia parnia* Zielke, 2018 in regard of differentiating key taxonomic features. (The calculated ratio e.g. of the height vs the depth of the eye is shown as: Eye: height/depth. If several specimens have been investigated the mean value is presented and the range is indicated in brackets. Markings used: \* = characteristic unique to the species; <sup>1</sup> = ratio of depth of postpedicel vs width of parafacial; <sup>2</sup> = in profile, the distance of upper mouth margin to the level of profrons behind (-) or beyond (+) compared with the depth of postpedicel; 3 = length of longest arisal hair vs depth of postpedicel; 4 = frontal vitta, measured at midlength of frons; <sup>5</sup> = fronto-orbital plate at midlength of frons; <sup>6</sup> = proepisternal depression; <sup>7</sup> = number of posterior setae, if more than one specimen was examined, in brackets number of males showing the result vs number of examined males.)

Taxonomic features	<i>P. acponti</i> sp. n.	<i>P. pratensis</i>	<i>P. maculipennis</i>	<i>P. parnia</i>
Eye: height/depth	2.2 (2.1–2.6)	2.2 (2.2–2.7)	1.5*	1.7
Postped.: length/depth	3.2 (2.7–3.2)	3.7 (2.5–3.7)	4	2.7
Length: postped./pedicel	1.9 (1.5–1.9)	1.8 (1.6–1.9)	1.9	1.6
Parafacial/postpedicel <sup>1</sup>	0.7 (0.4–0.7)	0.6 (0.5–0.6)	1*	0.6
Profrons to mouth margin <sup>2</sup>	-0.6 (0.3–0.6)	-1.4 (0.8–1.4)	-0.6	+0.2*
Head: height/width	2.1 (2.0–2.1)	2.1 (2.1–2.5)	1.4	1.5
Height: gena/head	0.21 (0.16–0.21)	0.19 (0.16–0.20)	0.23	0.14
Height: gena/eye	0.27 (0.19–0.27)	0.25 (0.21–0.25)	0.31*	0.16
Aristal hair/postped. <sup>3</sup>	0.5 (0.4–0.7)*	0.9 (0.7–1.1)	0.9	0.7
Width: frons/postped.	1.5	2.0	2.9*	1.4
Width: vitta <sup>4</sup> /frons	0.4	0.7	0.6	0.4
Width: plate <sup>5</sup> /vitta <sup>4</sup>	0.8	0.8	0.3*	1
Hairs on proepist. depr. <sup>6</sup>	1–2*	0	0	0
Post. seta on fore tibia <sup>7</sup>	0 (4 / 4)	1 (5 / 6)*	0	0
Abdomen shifting spots	yes	yes	yes	no*

no distinction was made between *P. laeta* and *P. pratensis* where *P. laeta* was the more common name (Hennig 1964). The male holotype, kindly provided by the Tromsø Museum for comparative studies, has three labels in different handwriting, which bear the following inscriptions: 1. "*Ar: maculipennis* n. sp." 2. "*Phaonia laeta* Fall." and the 3<sup>rd</sup> label with red ground-colour "HOLOTYPE ♂ *Aricia maculipennis* Storm 1895: 238 [K Rognes 11.ii.1983]". There is no locality label, but since the species is listed by Rognes in the compilation "A check-list of Norwegian Muscidae (Diptera)" it can be assumed that the species originates from this country.

Using the available keys published by Hennig (1964), d'Assis Fonseca (1968), and Gregor *et al.* (2016) the male holotype of *A. maculipennis* leads directly to the couplets with *P. laeta* and *P. pratensis* and due to the black coloured frontal vitta (Figure 11) it is assigned without great hesitation to *P. pratensis*. When comparing the holotype

with the characterizations of *P. pratensis* provided by Hennig (1964) and Gregor *et al.* (2016) several taxonomic characteristics listed by the authors agree also with those of the male holotype. For example, the upper fronto-orbital setae are short and hair-like, the eyes are densely and distinctly haired, arista is plumose and the arisal hairs are somewhat shorter than depth of postpedicel. In addition, femora are dark, tibiae are more or less brownish, the cross-veins of wings are distinctly fuscate (Figures 6 & 7) and with different light incidence, the shape of the dark lateral patches of the abdomen changes. However, there are also some clear differences between the taxonomic features of the *P. pratensis* male and those of the holotype of *A. maculipennis* such as the frontal vitta of the latter species is distinctly broader (Figures 11, 14) than and parafacials are about as wide as depth of postpedicel, the latter is even four times as long as its depth (Figure 17), and the fore tibia has no posterior seta (Figure 6). On

the other hand, the frontal vitta and parafacial of the *P. pratensis* males are not as wide as the depth of postpedicel (Figures 9, 13) and the latter is about three times as long as its depth (Figure 19), the fore tibia bears usually 1–2 posterior median setae.

These differences shown above, of which several are not considered when using only the available identification keys, raise doubts as to whether the Norwegian specimen is actually a typical *P. pratensis*. A direct comparison of the holotype with six *P. pratensis* males from the muscid collection of the Natural History Museum, London, that largely corresponded to the identification key and descriptions of *P. pratensis* by Hennig and by Gregor *et al.*, revealed in addition clear differences. They are summarized in Table 1 for the ratios of maximum eye height to maximum eye width, for the height of gena below lowest eye margin to the eye height, the distance between the eyes and postpedicel's depth, and the width of the fronto-orbital plate to the width of the frontal vitta. Since the holotype also clearly differs from the other species close to *P. pratensis*, namely *P. parnia* and *Phaonia acponti* sp. n. (Table 1), and is obviously not synonymous with *P. pratensis*, the species *Phaonia maculipennis* (Storm, 1986) is revalidated and must be recognized as a good species, clearly distinguished from *P. pratensis* which was previously also named by several authors including Ringdahl (1944) *P. laeta*.

### Taxonomic differences between the species of the *Phaonia laeta-pratensis* complex

When Collin (1951) documented the existence of two very similar *Phaonia* species, both of which had been classified up to then by most authors as *Phaonia laeta*, he chose the already commonly used name “*laeta*” for the species with the predominantly lighter tibiae. The flies with the darker tibiae and their taxonomic characters were assigned to the newly described *Phaonia laetabilis* Collin, 1951. In doing so, he deliberately ignored the original description of *Phaonia laeta* by Fallén (1823), in which uniformly dark legs and pronounced plumose antennae are mentioned

as specific characters of the species. Hennig (1964) synonymized *P. laetabilis* with the earlier described *Phaonia trigonalis* (Meigen, 1826) and assigned *P. laeta* of authors, which also included Collin's *P. laeta*, to the little-known species *Phaonia pratensis* (Robineau-Desvoidy, 1830). Pont (1984) then pointed out that *P. trigonalis* is a synonym of the original *P. laeta* sensu Fallén and has to be named as such. Thus, the two species identified by Collin were ultimately renamed, *P. laeta* of authors (including Collin) became *P. pratensis*, and *P. laetabilis* Collin is now a *P. laeta* (Fallén).

As Collin already reported, both species are very similar to each other. The reliability of the differences between the two species listed by him was partly questioned by Hennig (1964) based on studies on specimens from different provenances. Consistent distinguishing feature in both sexes, agreed by both authors, is the predominantly whitish-grey dusted frontal vitta in *P. laeta*. Independent from incidence of light the frontal vitta does not or only weakly contrast with the densely whitish-grey dusted fronto-orbital plates (Figure 8). In *P. pratensis*, however, at certain viewing angles, the frontal vitta is predominantly or entirely black and then clearly contrasts to the whitish-grey fronto-orbital plates (Figure 9). In addition, the longest arista hairs in *P. laeta* are about as long or longer than the depth of the postpedicel, whereas in *P. pratensis* the hairs are usually not quite as long as the depth of the postpedicel. The male frons is narrower in *P. laeta* than in *P. pratensis*, of which the fronto-orbital plates are separated by a frontal vitta that is only slightly narrower than the depth of the postpedicel. The fore tibia in *P. laeta* is always without a median posterior seta, but in *P. pratensis* it usually has 1–2 such setae and is rarely without a seta. Furthermore, at least in males of *P. laeta* the pair of strong postvertical setae are in front of an imaginary connecting line between the inner vertical setae, whereas the postverticals of *P. pratensis* are in line with or behind such a connecting line. The distinction between the two species in the identification tables of subsequent authors obviously refers to Hennig's studies. D'Assis Fonseca (1968) limits



the distinction to the different position of the post-vertical setae, the presence or absence of the posterior setae on the fore tibia and the colouring of the frontal vitta, although the author mentions qualifying that the colour differences can only be "seen from directly above and illuminated from in front". Gregor *et al.* (2001, 2016) distinguish the two species in the identification table of the more recent review of Central European muscids based on the colour of the frontal vitta, the length of the arisal hairs and whether the fore tibia has a posterior seta or not. The short characterizations of *P. laeta* and *P. pratensis* presented in the review are largely based on the descriptions given by Hennig (1964), including certain contradictions to Collin's observations. For example, according to Hennig, the meron of *P. pratensis* is bare, while Collin highlighted the distinct hairs on the meron below the spiracle as common to both species. The hairs on the meron of *P. laeta* are mentioned in the review of the Central European Muscidae, but no information is given by Gregor *et al.* about the meron of *P. pratensis*. The review also contains information on the previously little-known species-specific differences of sternite 5, whose posterior lobes are rounded and dusted in *P. laeta* and pointed and shiny in *P. pratensis*.

The three species that have recently been added to these two species lead to *P. pratensis* due to the dark frontal vitta in certain lighting conditions. However, they do not have median posterior setae on the fore tibia and, as can be seen in Table 1, they also differ from *P. pratensis* in other taxonomic characters. In order to integrate the three species, of which unfortunately only the males are known, into the latest identification key for the *Phaonia* species, the following amendments to the key created by Gregor *et al.* (2016) are proposed:

**56.** Practically independent of viewing angle and incidence of light frontal vitta almost as whitish-grey as fronto-orbital plates; longest arisal hairs usually as long or longer than depth of postpedicel, fore tibia usually without a median posterior seta ..... *P. laeta* (Fallén, 1823)  
– At certain viewing angle and incidence of light (e.g. seen from directly above and illuminated from in front) frontal vitta black and contrasting

with whitish-grey dusted fronto-orbital plates; longest arisal hairs usually shorter than or rarely about as long as depth of postpedicel; fore tibia with or without a median posterior seta ..... 82

[Couplets 57–81 unchanged]

**82.** Maximum height of eye at least twice as long as maximum width; anterior mouth margin behind profrons ..... 83

– Maximum eye height significantly shorter than twice the maximum eye width; upper mouth margin either clearly behind or level with profrons or even slightly beyond ..... 84

**83.** Proepisternal depression with one or two distinct hairs in anterior half; scape of antenna with a yellow-orange margin; fore tibia without median posterior seta; mid femur rather densely haired and with posteroventral hair-like setae longer than depth of femur .....

..... *Phaonia acponti* sp. n.

– Proepisternal depression usually without any hairs; scape of antenna dark; fore tibia usually with at least one median posterior seta; mid femur not densely haired and without long posteroventral hair-like setae but with strong blunt posteroventral to ventral setae, about as long as depth of femur ..... *P. pratensis* (Robineau-Desvoidy)

**84.** Postpedicel about four times as long as its depth; gena below lowest margin of eye almost one third as wide as height of eye; frons at midlength about three times as wide as depth of postpedicel; mouth margin behind profrons; abdomen with shifting lateral dark patches .....

..... *P. maculipennis* (Storm, 1895)

– Postpedicel barely three times as long as its depth; gena below lowest margin of eye not even a quarter as wide as height of eye; frons at midlength at most one and a half times as wide as depth of postpedicel; mouth margin at least level with profrons if not slightly beyond; abdomen without shifting dark lateral patches .....

..... *P. parnia* Zielke, 2018

## Discussion

With the revalidation of *P. maculipennis*, probably the last option expired of choosing a type specimen from the various species synonymous with *P. pratensis* as a replacement for the lost holotype of *P. pratensis*. Thus, as already mentioned by Hennig (1964), the interpretation and assignment of the old names of *P. laeta* and *P. pratensis* will continue to be arbitrary to a certain extent. The present investigations on several specimens of *P. laeta* and *P. pratensis* from different provenances and the discovery of three additional species have contributed to an even better definition of the taxonomic characteristics of each of the two species. As can be seen from Table 1, each of the newly added species has at least two species-specific features that supports a reliable identification. The revalidated species *P. maculipennis* even has five of such criteria. In addition, the added species also differ from *P. pratensis* by combinations of other taxonomic characteristics, which indirectly contributes to a more precise definition of *P. pratensis*. The current investigations confirmed the coloration of the frons as a valid distinguishing feature for all five species, i.e. only in *P. laeta* do the frontal vitta and fronto-orbital plates remain almost uniformly dusted whitish-grey, even when changing the light incidence or viewing angle. In *P. pratensis*, *P. maculipennis* and *P. parnia* the fronto-orbital plates are also predominantly dusted whitish-grey (Figures 13–15), but at certain light incidence or viewing angle, for example from antero-dorsal or dorso-lateral, the frontal vitta is contrastingly uniformly black or dark with at most rather sparsely greyish pollinosity. An exception is *Phaonia acponti* sp. n., of which the frons is in general mainly dark albeit sparsely dusted greyish white and with the frontal vitta is in general predominantly blackish, regardless of the incidence of light (Figure 12). *Phaonia acponti* sp. n. stands also out in comparison to *P. pratensis* due to one or two distinct hairs on the proepisternal depression (Figure 4), which were also not seen in the other species examined. In addition, the basal two segments of arista are more distinctly marked apically by a white ring each (Figure 1) than in

the other species, of which the white markings are only weakly or not developed, and the yellowish-orange margin of the antennal scape were also only observed in the new species. The yellow tibiae and the apical lateroventral areas of the posterior femora are conspicuous of this new species and they remain yellow also under changing light conditions. In literature (e.g. Hennig 1964, Gregor *et al.* 2016) yellow legs of *P. pratensis* are mentioned. The current investigations on the *P. pratensis* males revealed, that the tibiae of the same specimens of *P. pratensis* may vary considerably in colour depending on the conditions of light. The legs were brownish under photographic light conditions and almost yellow using a different light source and high light intensity. *Phaonia maculipennis* is notable (Figure 17) for having a distinctly smaller but broad eye, a gena below the lowest margin of eye nearly one-third as high as the maximum eye height, the postpedicel is conspicuously four times as long as it is deep, and the frons at midlength (Figure 11) is about three times as wide as the depth of the postpedicel. In the other taxa, these conspicuous features are less pronounced as is summarized in Table 1. But using the hitherto available identification keys, the differences could not be detected. *Phaonia parnia* differs from the other species by a mouth margin weakly but clearly protruding with regard to the profrons (Figure 18), and a fixated abdominal pattern without shifting dark patches when the viewing angle changes. *Phaonia pratensis* is marked by only one species-specific feature, the fore tibiae have usually at least one posterior median seta (Table 1), however the species is also characterized by several specific combinations, for example the eyes are at least twice as high as they are wide, however, the eyes in *Phaonia acponti* sp. n. are equally large and in *P. parnia* they are moderately shorter, but *P. pratensis* has no hairs on the proepisternal depression and usually no striking long hairs on mid femur like *P. acponti* sp. n. and, unlike *P. parnia*, the mouth margin lies somewhat behind the profrons and the abdomen is marked with large lateral shifting patches.

Hennig's statement that the meron in *P. pratensis* is naked could not be confirmed. The meron was hairy in all *P. pratensis* specimens

investigated and also in all specimens of the newly added species. After initially no hairs were found on the meron of a male of *Phaonia acponti* sp. n., the hairs were clearly visible when a different light source was used. Thus, Collin's statement (1951) that both species (*P. laeta* and *P. pratensis*), have a hairy meron was confirmed and can probably be extended to the entire species complex. It cannot be excluded that Hennig overlooked the small, sometimes difficult to detect, fine, short hairs. The eyes of all males examined were also clearly and relatively long-haired. On the other hand, the presence or absence of the median posterior seta of the fore tibia does not seem to be absolutely uniform within the same species. One of the six *P. pratensis* males had no posterior seta on the fore tibiae, and one of the four *P. laeta* males had one clear posterior seta each on the fore tibia. Neither posterior setae were found on the fore tibia in the male syntypes of *P. laetabilis*, nor in the other added species examined. The two males with the atypically armed fore tibiae did not show any other characteristic that indicated a possible affiliation to another species. There is obviously an intra-specific variability in this taxonomic characteristic for both *P. laeta* and *P. pratensis*, as Hennig has already mentioned it for *P. pratensis*. Assigning a specimen to one of these two species primarily based on this criterion alone could thus lead to a misidentification. It also cannot be ruled out that other specimens of *P. laeta* and *P. pratensis* have not been correctly recognized in the past and therefore probably have been wrongly assigned. Hennig (1964) has already pointed out that the species identification may have been inadequate for a large number of previously identified specimens of the *P. laeta-pratensis* complex due to a lack of clear identification criteria. Further investigations may also show that there are even more *Phaonia* specimens that are similar and different as well to *P. laeta* and *P. pratensis*. They may even be marked by different combinations of the taxonomic features mentioned above, thus, possibly also belong to another hitherto unknown species.

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## References

- Collin, J.E. 1951. *Phaonia laetabilis* sp. n. with notes on some other related Anthomyiidae (Diptera). *The Entomologist's Record and Journal of variation* 63, 1–5.
- D'Assis Fonseca, E.C.M. 1968. Diptera Cyclorrhapha Calyptrata. Section (b) Muscidae. – *Handbooks for the Identification of British Insects*. Royal Entomological Society, London. 10 (4) (b), 1–119.
- Fallén, C.F. 1823. Monographia Muscidum Sveciae, Part IV, 49–56. – Lundae
- Gregor, F., Rozkošný, R., Barták, M. & Vaňhara, J. 2002. The Muscidae (Diptera) of Central Europe. *Folia Facultatis Scientiarum Naturalium Universitatis Masarykianae Brunensis, Biologia* 107, 280 pp.
- Gregor, F., Rozkošný, R., Barták, M. & Vaňhara, J. 2016. Manual of Central European Muscidae (Diptera). *Zoologica* 162, 1–220.
- Hennig, W. 1964. *Muscidae*. Pp. 1–1110 in Lindner, E. (ed.), *Die Fliegen der palaearktischen Region*. 63 b, E. Schweizerbart'sche Verlagsbuchhandlung, Stuttgart.
- McAlpine J.F. 1981. Morphology and terminology – adults. In: McAlpine, J.F., Peterson, B.V., Shewell, G.E., Teskey, H.J., Vockeroth, J.R. & Wood, D.M. (eds). *Manual of Nearctic Diptera*. Volume 1. *Agriculture Canada Monograph* 27, 9–63.
- Pont, A.C. 1984. A revision of Fanniidae and Muscidae described by Fallén. *Entomologica scandinavica* 15, 277–297.
- Ringdahl, O. 1944. Revision av Vilhelm Storms Diptersamling 2. Familjen Muscidae. *Det Kongelige Norske Videnskabers Selskab Forhandlingene* 17(20), 82–85.



- Rognes, K. 1986. A check-list of Norwegian Muscidae (Diptera). *Fauna norwegica Ser. B.* 33, 77–85.
- Storm, V. 1896. Dipterologiske undersøgelser. *Kongelige norske Videnskabers. Selskab Skr.* 1895, 225–241.
- Stuckenberg, B.R. 1999. Antennal evolution in the Brachycera (Diptera), with a reassessment of terminology relating to the flagellum. *Studia Dipterologica* 6, 33–48.
- Zielke, E. 2018. Some records of Muscidae (Diptera) from Greece with a description of a new *Phaonia* species and a list of the known muscids from the country. *Acta Musei Moraviae, Scientiae biologicae* 103(2), 269–280.

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