

TWO NEW SPECIES OF *DELIA*, WITH A KEY TO THE MALES OF THE WORLD SPECIES OF THE *INTERFLUA* GROUP (DIPTERA: ANTHOMYIIDAE)¹

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ABSTRACT: Two new species of the *Delia interflua* group are described, *Delia absidata* Xue and Du, sp. nov., and *Delia subinterflua* Xue and Du, sp. nov. The group is briefly discussed and a key to all the known species is presented.

KEY WORDS: Diptera, Anthomyiidae, *Delia*, *interflua* group, new species

The genus *Delia* was established by Robineau-Desvoidy (1830) (as a subgenus of *Hylemyia*) and *Delia floricola* was designated as type species by Coquillett (1910). It is essentially Holarctic in distribution. The Nearctic species have been listed by Griffiths (1991) and the Palaearctic species by Dely-Draskovits Á. (1993). Since then, many species have been described from China, which have been summarized by Xue (in Xue and Chao, 1996).

Delia is one of the largest genera of Anthomyiidae. Since the primary subdivision of *Delia* is still unclear, it seems premature and unwise to formally recognize the subgenera. Griffiths (1991) recognized a series of eight sections occurring in the Nearctic Region, including the *D. interflua* section. Eleven of the twelve previously described species are Palaearctic, viz. *D. interflua* (Pandellé), *D. kullensis* (Ringdahl), *D. kumatai* Suwa, *D. pansibirta* Jin and Fan, *D. fulviposticus* Li and Deng, *D. spicularis* Fan, *D. brevipalpis* Xue and Zhang, *D. nemostylata* Deng and Li, *D. duplicipectina* Fan, *D. conjugata* Deng and Li, *D. stenostyla* Deng and Li. In addition, the descriptions of two new Palaearctic species of this section are given, viz. *D. absidata* Xue and Du, sp. nov., *D. subinterflua* Xue and Du, sp. nov. A single Nearctic member of this section is *D. abstracta*. The biology of *D. kullensis* is different from *D. abstracta*. The paper is well characterized by constitutive modification of some abdominal and postabdominal structures: the apices of the processes of the 5th sternite widen and rounded, cercal plate with long setae, surstyli elongated except for *D. kullensis*, and mostly the acrophallus (more or less longitudinally directed) is supported by a sclerotized bridge between the bases of the free paraphallic processes, the sclerotized bridge is prolonged downwards, forming a membranous process.

The species of the *D. interflua* group are essentially Palaearctic in distribution. They are found in bright and dry weather, but also adapt to low temperature conditions. All Chinese species were collected on the Tibetan Plateau which is located

¹ Received on June 3, 2007. Accepted on September 12, 2007.

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between 26°12'41" and 39°46'50"N, 73°18'52" and 104°46'59"E. With an average elevation of 4900 m above sea level the Tibetan Plateau is the highest region on earth and on the basis of the special features of its natural conditions, it was termed as "the third pole of the world" (Xue et al., 2007). The species of the group in China may fully reflect the unique geological, geographical and biological features of the Tibetan Plateau. The species in other regions are distributed in the similar natural condition.

METHODS

The morphological terminology is given according to McAlpine (1981). Abbreviations for morphological terms used in this study are: *acr*, acrostichal setae; *ad*, anterodorsal setae; *av*, anteroventral setae; *dc*, dorsocentral setae; *ial*, intra-alar setae; *p*, posterior setae; *pd*, posterodorsal setae; *post acr*, postsutural acrostichal setae; *post dc*, postsutural dorsocentral setae; *pra*, prealar setae; *prst acr*, presutural acrostichal setae; *prst dc*, presutural dorsocentral setae; *pv*, posteroventral setae; and *R₄₊₅*, branch of Radius. Other abbreviations used are: *fig.*, figure; and *mt.*, mountain.

The type specimens of the two new species described herein were deposited in the dipterological collection of Institute of Entomology, Shenyang Normal University, China. (IESNU).

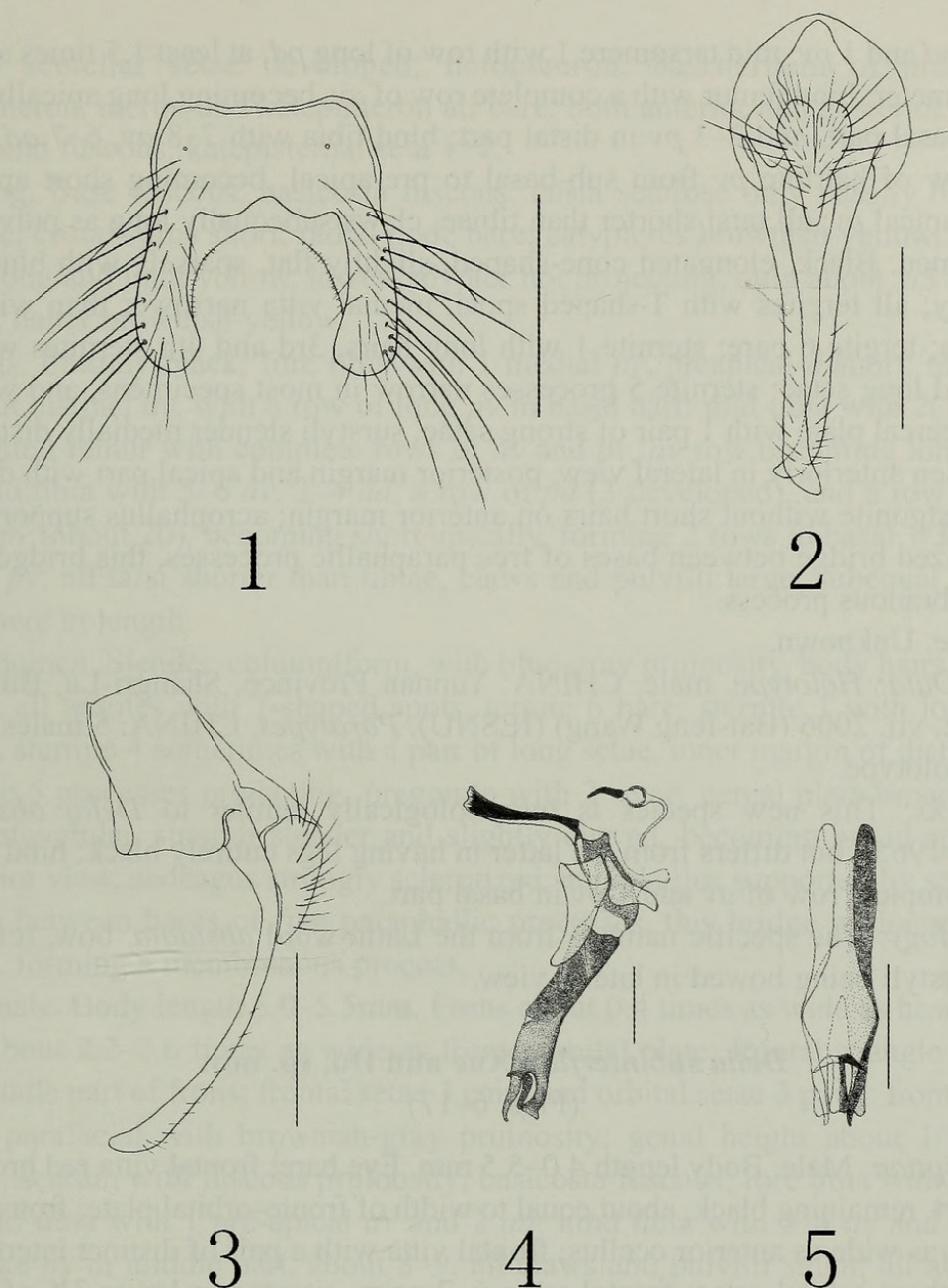
SYSTEMATIC ENTOMOLOGY

Delia absidata Xue and Du, sp. nov.

(Figs. 1–5)

Description: Male. Body length 7.5 mm. Eye bare; frontal vitta black, obliterated in upper half; frons about equal or shorter than width of anterior ocellus; frontal vitta with a pair of interfrontal setae; without orbital setae; frontal setae 6 pairs; fronto-orbital plate and parafacial with silver white pruinosity, parafacial wider than postpedicel; antenna black, postpedicel about twice as long as broad; arista short ciliated, the longest aristal hairs equal to its basal diameter; facial ridge low and flat, lower facial margin not projecting, vibrissal angle placed behind frontal angle in profile; gena with light gray pruinosity, genal height about 2/9 of eye height; anterior margin of gena with 2 rows of upcurved subvibrissal setulae; post-ocular setae extending to ventral surface, epicephalon haired; palpus slender and black, about 3/5 length of prementum, prementum black and shiny, at most with fine pruinosity, about 4.0 times as long as broad.

Thorax. Black in ground color, with brownish-gray pruinosity; scutum with 3 distinct black vittae; *prst acr* 1(2) distinct, only 1 pair of *post acr* developed which are placed in front of scutellum, *dc* 2+3, *ial* 0+2, with 1 pair of weak outer posthumeral setae; *pra* developed, about 1.5 times as long as posterior notopleural seta; scutellum without spots, ventral margins with some long pale hairs apically; anterior anepisternal setae absent; notopleuron, basisternum of prosternum, anepime-



Figs. 1–5. *Delia absidata* Xue and Du, sp. nov. (male). 1. Sternite 5 in ventral view, scale bar = 0.5 mm. 2. Terminalia in posterior view, scale bar = 0.5 mm. 3. Terminalia in profile, scale bar = 0.5 mm. 4. Aedeagus in profile, scale bar = 0.2 mm. 5. Distal part of aedeagus in anterior view, scale bar = 0.2 mm.

ron, meron and katepimeron all bare; anterior and posterior spiracles fuscous, posterior spiracle short; katepisternal seta 1+2.

Wing. Base and basicosta brown, vein fuscous; Costa setulose only basally on ventral surface; costal spine shorter than length of crossvein r-m; radial node bare, calypteres brownish-yellow, lower calypter not projecting, equal or smaller than upper; halter yellow.

Legs. Entirely black; fore tibia with 1 medial *pv*, without distinct *ad*; mid femur without *av* row, a row of *pv* in basal half, 2–3 pre-apical *pd*; mid tibia without *av*

or *ad*, 2 *pd* and 1 *pv*; mid tarsomere 1 with row of long *pd*, at least 1.5 times as long as its diameter; hind femur with a complete row of *av*, becoming long apically, with 1 *pv* in basal part, and 2–3 *pv* in distal part; hind tibia with 7–8 *av*, 6–7 *ad*, 4 *pd*, and a row of hairlike *pv* from sub-basal to pre-apical, becoming short apically, without apical *pv*; all tarsi shorter than tibiae, claws subequally long as pulvilli.

Abdomen. Black, elongated cone-shaped, slightly flat, sparsely with blue gray pruinosity; all tergites with T-shaped spots, medial vitta narrower than width of hind tibia; tergite 6 bare; sternite 1 with long hairs, 3rd and 4th sternites without dense and long setae; sternite 5 processes narrow in most specimens, and wide in several; cercal plate with 1 pair of strong setae, surstyli slender medially distal part not swollen anteriorly in lateral view, posterior margin and apical part with distinct setae, postgonite without short hairs on anterior margin; acrophallus supported by a sclerotized bridge between bases of free paraphallic processes, this bridge without membranous process.

Female. Unknown.

Type Data: *Holotype*, male, CHINA: Yunnan Province, Shangri-La, Bita Sea, 3700m, 2. vii. 2006 (Bai-feng Wang) (IESNU). *Paratypes*, CHINA: 5 males, same data as holotype.

Remarks: This new species is morphologically similar to *Delia abstracta* (Huckett 1965), but differs from the latter in having legs entirely black; hind femur with a complete row of *av* and 1 *pv* in basal part.

Etymology: The specific name is from the Latin word *absidata*, bow, referring to the surstyli being bowed in lateral view.

***Delia subinterflua* Xue and Du, sp. nov.**

(Figs. 6–17)

Description: Male. Body length 4.0–5.5 mm. Eye bare; frontal vitta red brown in lower part, remaining black, about equal to width of fronto-orbital plate; frons about 1.5 times as wide as anterior ocellus; frontal vitta with a pair of distinct interfrontal setae; without orbital setae; frontal setae 6–7 pairs, situated in lower 3/5 of frons; fronto-orbital plate, parafacial with fuscous pruinosity, parafacial about 1.5 times as wide as postpedicel; antenna black, postpedicel about 1.7–2.0 as long as broad; arista short ciliated, the longest aristal hairs shorter than its basal diameter; facial ridge low and flat, lower facial margin not projecting, vibrissal angle placed behind frontal angle in profile; gena with gray pruinosity, genal height about 1/4 of eye height; anterior margin of gena with 1 row of upcurved subvibrissal setulae; post-ocular setae extending to ventral surface, epicephalon haired; para-occipital and postgenal hairs black; palpus fuscous, about 1/2–3/4 length of prementum, prementum shining, about 5.0 times as long as broad.

Thorax. Black in ground color, scutum black, only postpronotal lobe with gray pruinosity, scutum distinctly with 3 black vittae; 2 rows of hairlike *prst* *acr*, *dc* 2+3, *ial* 0+2, *pra* about 1.4 times as long as posterior notopleural seta; scutellum without spots, ventral margins with some brown hairs apically, basal scutellar setae and

apical scutellar setae developed; notopleuron, basisternum of prosternum, anepimeron, meron and katepimeron all bare; both anterior and posterior spiracles small and fuscous; katepisternal seta 1+2.

Wing. Base fuscous, basicosta fuscous; costa setulose only basally on ventral surface; costal spine short; radial node bare; calypteres brownish-yellow, marginal hairs long and light yellow, lower calypter not projecting, only about 1/3 length of upper; halter brownish-yellow.

Legs. Entirely black; fore tibia with 1 medial *pv*, preapical *d* short; mid femur without distinct *av*, with a row of long *pv* in basal half; mid tibia with 2(1) *pd* and 2 *pv*; hind femur with complete rows of *av* and *pv*, *av* row becoming long apically; hind tibia with 5–6 *av*, 3–4 *ad*, a row of *pd* (3 developed), and a row of pectinated *pv* (about 20), becoming short apically, forming 2 rows in basal 1/3, without apical *pv*; all tarsi shorter than tibiae, claws and pulvilli large, subequal to of 5th tarsomere in length.

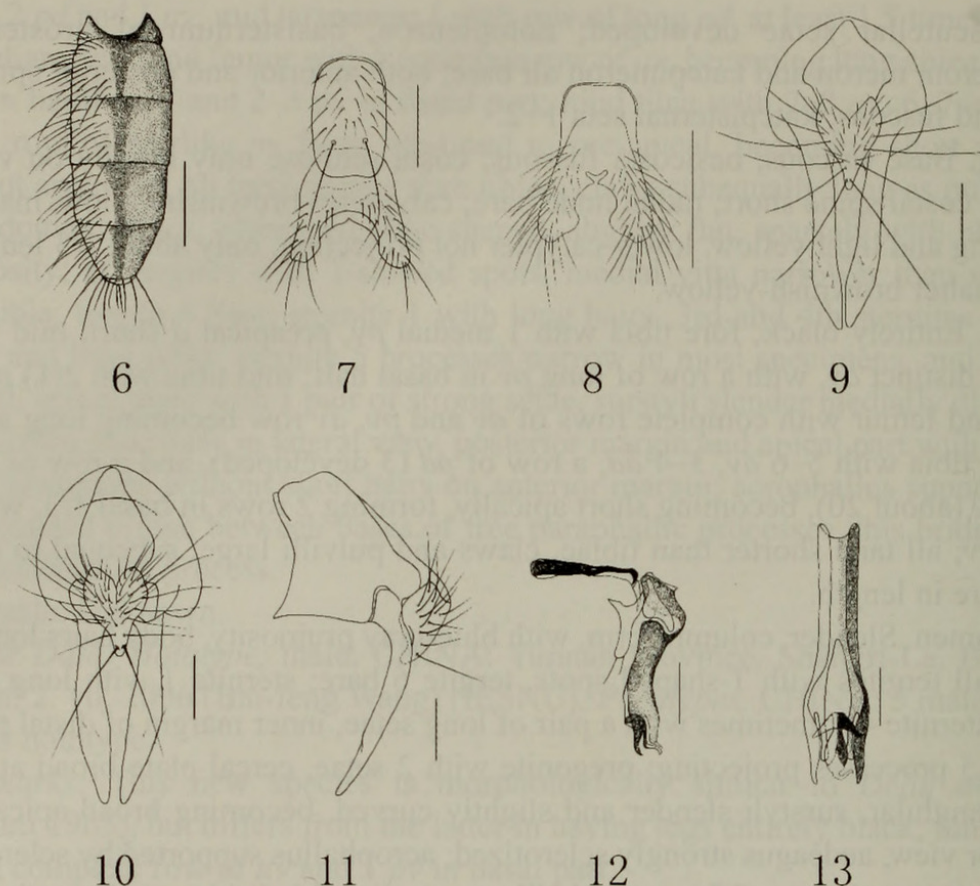
Abdomen. Slender, columniform, with blue-gray pruinosity, body hairs long and dense; all tergites with T-shaped spots, tergite 6 bare; sternite 1 with long dense fringe, sternite 4 sometimes with a pair of long setae, inner margin of distal part of sternite 5 processes projecting; pregonite with 2 setae, cercal plate broad at basal half, triangular, surstyli slender and slightly curved, becoming broad apically in posterior view, aedeagus strongly sclerotized; acrophallus supported by sclerotized bridge between bases of free paraphallic processes, this bridge prolonged downwards, forming a membranous process.

Female. Body length 5.0–5.5mm. Frons about 0.4 times as wide as head; frontal vitta about 2.2–2.6 times as wide as fronto-orbital plate; frontal triangle reaching the middle part of frons; frontal setae 3 pairs and orbital setae 3 pairs; fronto-orbital plate, parafacial with brownish-gray pruinosity; genal height about 1/3 of eye height; scutum with fuscous pruinosity; basicosta fuscous; fore tibia with 1 medial *ad*; mid tibia with 1 pre-apical *av* and 2 *ad*; hind tibia with 3–4 *av* and a row of seta-like *pv* in middle part, about 8–9; all claws and pulvilli small; all abdominal tergites with badly developed medial vittae. The other characters are the same as in male.

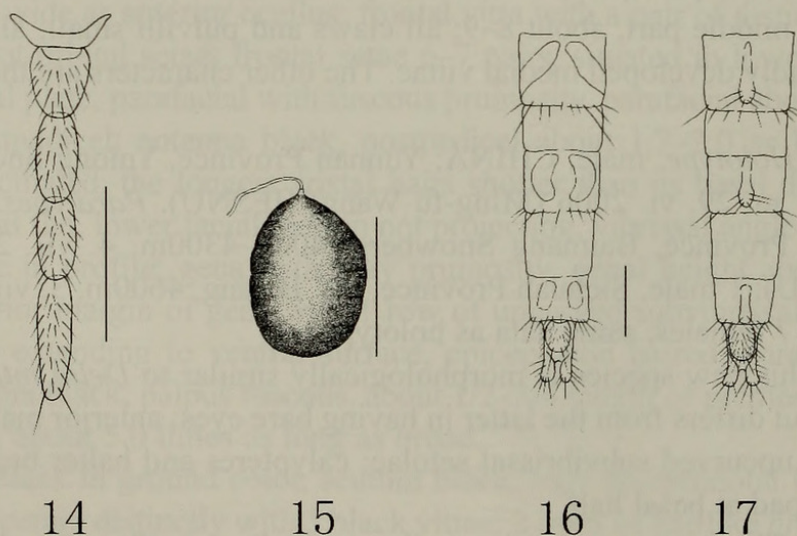
Type Data: *Holotype*, male, CHINA: Yunnan Province, Yulong Snowberg, Big ropeway, 4571 m, 29. vi. 2006 (Ming-fu Wang) (IESNU). *Paratypes*, CHINA: 2 male, Yunnan Province, Baimang Snowberg, 4000–4300m, 4. vii. 2006 (Liang Chang) (IESNU); 1 male, Sichuan Province, Mt. Balang, 4600m, 3. viii. 2005 (Hu Ao) (IESNU); 7 females, same data as holotype.

Remarks: This new species is morphologically similar to *Delia interflua* (Pandellé, 1900), but differs from the latter in having bare eyes; anterior margin of gena with 1 row of upcurved subvibrissal setulae; calypteres and halter brown-yellow; cercal plate broad at basal half.

Etymology: This new species is similar to *Delia interflua* (Pandellé, 1900). Hence, its epithet is derived to reflect this relationship.



Figs. 6–13. *Delia subinterflua* Xue and Du, sp. nov. Male: 6. Abdomen in dorsal view, scale bar = 1 mm. 7. 4th and 5th sternites in ventral view (species in Sichuan Province), scale bar = 0.5 mm. 8. 5th sternite in ventral view (species in Yunnan Province), scale bar = 0.5 mm. 9. Terminalia in posterior view (species in Yunnan Province), scale bar = 0.2 mm. 10. Terminalia in posterior view (species in Sichuan Province), scale bar = 0.2 mm. 11. Terminalia in profile, scale bar = 0.2 mm. 12. Aedeagus in profile, scale bar = 0.2 mm. 13. Distal part of aedeagus in anterior view, scale bar = 0.1 mm.



Figs. 14–17. *Delia subinterflua* Xue and Du, sp. nov. Female: 14. Sternites 1 to 5, scale bar = 1 mm. 15. Spermatheca, scale bar = 0.1 mm. 16. Ovipositor in dorsal view, scale bar = 0.5 mm. 17. Ovipositor in ventral view, scale bar = 0.5 mm.

***Delia fulviposticrus* Li and Deng, 1981**
Supplemental Description
(Figs. 18–24)

Description. Male. Body length 8–9 mm. Eye bare; frontal vitta red brown, obliterated at middle part; frons narrower than anterior ocellus; frontal vitta with a pair of interfrontal setae; without orbital setae; frontal setae 6–7 pairs, situated on lower half; fronto-orbital plate and parafacial brown in ground color, with silver gray pruinosity, parafacial slightly wider than postpedicel; antenna black, postpedicel about 1.5–2.0 times as long as broad; arista pubescent, the longest arisal hairs shorter than its basal diameter; in profile vibrissal angle slightly placed behind frontal angle; gena with gray pruinosity, genal height about 1/5 of eye height; anterior margin of gena with a row of upcurved subvibrissal setulae; postocular setae extending to ventral surface, epicephalon haired; prementum shiny, about 3.5 times as long as broad, palpus slender and black, about 2/3 length of prementum.

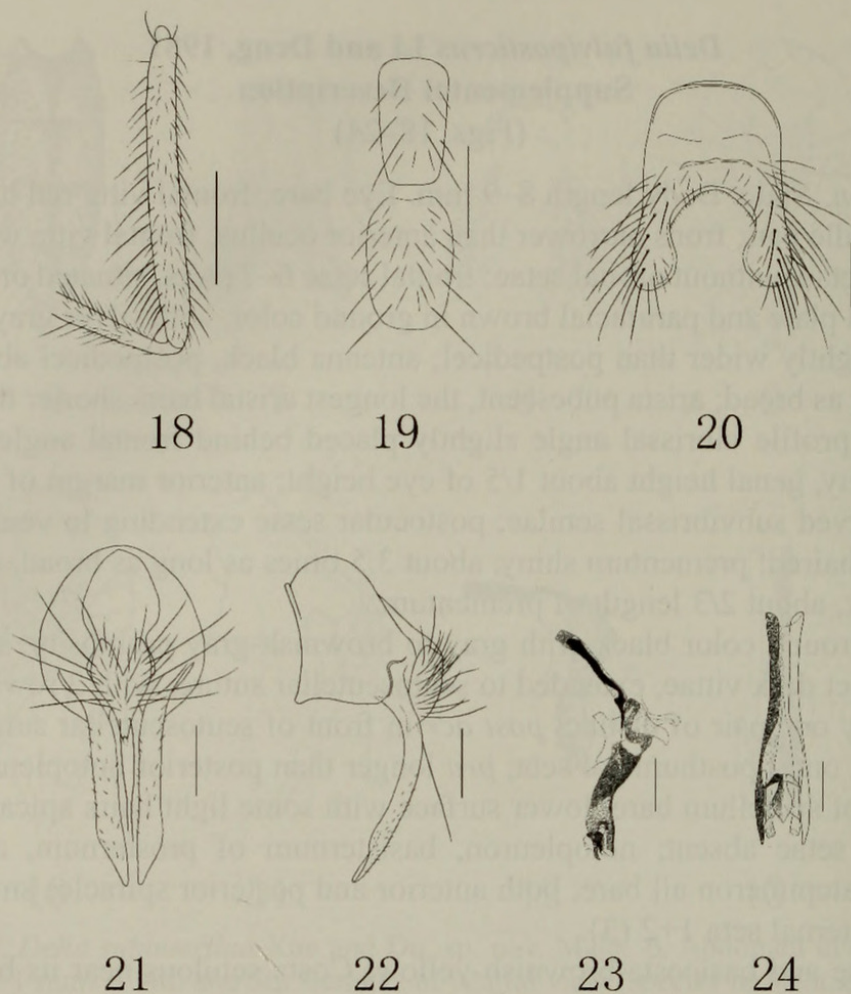
Thorax. Ground color black with gray to brownish-gray pruinosity; scutum with three indistinct dark vittae, extended to scutoscutellar suture; with 2 rows of hairlike *prst acr*, only one pair of distinct *post acr* in front of scutoscutellar suture, *dc* 2+3, *ial* 0+2; with outer posthumeral seta; *pra* longer than posterior notopleural seta; lateral surface of scutellum bare, lower surface with some light hairs apically; anterior anepisternal setae absent; notopleuron, basisternum of prosternum, anepimeron, meron and katepimeron all bare; both anterior and posterior spiracles small and fuscous; katepisternal seta 1+2 (3).

Wing. Base and basicosta brownish-yellow; Costa setulose near its base on ventral surface only; costal spine short; radial node bare; calypteres brownish-yellow, lower calypter not projecting, about 2/3 length of upper; haltere yellow.

Legs. All coxae, tarsi and femora mostly black, mid and hind femoral base brown, trochanter and fore tibia fuscous, mid tibia brown, hind tibia yellow; fore tibia with 1 median *p_v*; mid femur with seta-like *av* row, 2–3 *p_v* in basal part, the longest setae about 1.3–1.4 times as long as its diameter, 2 pre-apical *p_d*; mid tibia with 2 *p_d* and 2 *p_v*; hind femur with a complete row of *av*, becoming longer toward apex, *p_v* row discontinuous in the middle part, seta-like in basal half (distinctly shorter than its diameter) and long in distal 1/4 (equal to or slightly longer than its diameter); hind tibia with a row of *av* (about 8–9), a row of about 7–8 *ad* (2 strong), a row of *p_d*, 3 long, becoming shorter toward apex, *p_v* row complete, becoming 2 irregular rows in basal part, without apical *p_v*; fore tarsus longer than tibiae, all claws and pulvilli large, longer than 5th tarsomere.

Abdomen. Black, long cone-shaped, slightly flattened; with blue gray pruinosity, anterior margin stripes of all tergites narrow, the medial black vittae distinct, tergite 6 bare, sternite 1 with dense and long hairs, 3rd and 4th sternites without dense and long setae; lateral process of sternite 5 obtuse basally; cercal plate with long setae, apex narrow and slightly branch off, with 1 hair on branch base, surstyli slightly straight; acrophallus supported by sclerotized bridge between bases of free paraphallic processes, sclerotized bridge prolonged downwards, forming a spindly sclerotized process.

Material Examined: 2 males, CHINA: Sichuan Province, Mt. Huanglong, 3850m, 30. v. 2006 (Dandan Wang) (IESNU).



Figs. 18–24. *Delia fulviposticus* Li and Deng, 1981 (male). 18. Hind femur in posterior view, scale bar = 1 mm. 19. 3rd and 4th sternites in ventral view, scale bar = 0.5 mm. 20. Sternite 5 in ventral view, scale bar = 0.2 mm. 21. Terminalia in posterior view, scale bar = 0.2 mm. 22. Terminalia in profile, scale bar = 0.2 mm. 23. Aedeagus in profile, scale bar = 0.2 mm. 24. Distal part of aedeagus in anterior view, scale bar = 0.1 mm.

Key to species of the males of the *Delia interflua* group

1. Legs wholly black4
- Legs at least partly yellow or brownish-yellow2
2. Frontal setae 11–12 pairs; katepisternal setae 2+2; posthumeral setae 1+0
.....*D. spicularis* Fan in Fan et al., 1984
- Frontal setae not exceeding 8 pairs; katepisternal setae 1+2(3); posthumeral setae 1+2.....3
3. Legs more or less uniformly dark orange-brown to dark brown; mid femur without *av*; mid tibia with 1–2 *ad**D. abstracta* (Huckett, 1965)
- All coxae, tarsi and femora mostly black, base of mid and hind femora brown, trochanter and fore tibia fuscous, mid tibia brown, hind tibia yellow; mid femur with a row of *av* in basal 1/3; mid tibia without *ad*.....
.....*D. fulviposticus* Li and Deng, 1981

4. Frontal setae 17–18 pairs*D. panshirta* Jin and Fan in Jin et al., 1981
— Frontal setae not more than 10 pairs5
5. Mid tibia without *av*8
— Mid tibia with *av*6
6. Mid tibia with 2–3 *av**D. kumatai* Suwa, 1977
— Mid tibia with 1 *av*7
7. Parafacial about twice as wide as postpedicel; mid tibia with 1 *ad*, 2 *pd*; hind tibia with 2–3 *av*, 5 *ad*, 5–7 *pd*.....*D. nemostylata* Deng and Li, 1984
— Parafacial about 1.25 times as wide as postpedicel; mid tibia with 3 *ad*, 3 *pd*; hind tibia with 4 *av*, 6 *ad*, 3 *pd*
.....*D. duplicipectina* Fan in Fan and Zheng, 1993
8. Mid tarsomere 1 without row of long *pd*10
— Mid tarsomere 1 with a row of long *pd*9
9. Hind tibia without *pv**D. brevipalpis* Xue and Zhang, 1996
— Hind tibia with *pv**D. absidata* Xue and Du, sp. nov.
10. Hind femur with a row of *pv*12
— Hind femur without *pv*11
11. Fore tibia with 2 *pv**D. conjugata* Deng and Li, 1994
— Fore tibia with 1 *pv**D. stenostyla* Deng and Li, 1994
12. Hind tibia only with 1–3 *pv**D. kullensis* (Ringdahl, 1933)
— Hind tibia with a row of *pv*13
13. Eyes with hairs; anterior margin of gena with 2 rows of upcurved subvibrissal setulae; calypteres and halter yellow; cercal plate narrow at distal half
.....*D. interflua* (Pandellé, 1900)
— Eyes bare; anterior margin of gena with 1 row of upcurved subvibrissal setulae; calypteres and halter brownish-yellow; cercal plate broad at distal half.....
.....*D. subinterflua* Xue and Du, sp. nov.

ACKNOWLEDGMENTS

This study was supported by the National Nature Science Foundation of China (No. 30270166), The Ministry of Science and Technology of the People's Republic of China (MOST grant no. 2006FY 110500) and the Foundation of Experimental Centre of Shenyang Normal University (No. SY200609). We are very grateful to Mr D. M. Ackland, Oxford University Museum of Natural History, Parks Road, Oxford OX1 3PW, UK, for his reading of this manuscript and valuable suggestions; to Dr. A. C. Pont, of the same museum for his invaluable help over many years; to Dr. J. E. O'Hara, Invertebrate Biodiversity, Agriculture and Agri-Food Canada, for his reading of this manuscript and valuable suggestions; and to Ming-fu Wang, Bai-feng Wang, Hu Ao, Dandan Wang, and Liang Chang for providing the type specimens.

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2008. "Two new species of *Delia*, with a key to the males of the world species of the interflua group (Diptera: Anthomyiidae)." *Entomological news* 119, 113–122. [https://doi.org/10.3157/0013-872X\(2008\)119\[113:TNSODW\]2.0.CO;2](https://doi.org/10.3157/0013-872X(2008)119[113:TNSODW]2.0.CO;2).

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