Studies on the Genus Onesia (Diptera: Calliphoridae) from China, with the Descriptions of Two New Species

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STUDIES ON THE GENUS ONESIA (DIPTERA: CALLIPHORIDAE) FROM CHINA, WITH THE DESCRIPTIONS OF TWO NEW SPECIES

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ABSTRACT

The genus Onesia (Diptera: Calliphoridae) is essentially Australasian/Oceanian and Palaeartic Regions in distribution. Two new species of the genus from China are described, viz. Onesia dynatophallus Xue & Bai sp. nov and Onesia franzaosternita Xue & Dong sp. nov. A key to Onesia species in China and a map of their distribution are given. The type specimens are deposited in the Institute of Entomology, Shenyang Normal University.

Key Words: China, Calliphoridae, Onesia, insect key, new species, fauna

RESUMEN

El genero Onesia (Diptera: Calliphoridae) es esencialmente de las regiones de Australasia/Oceania y Palaeártica en distribución. Se describen dos nuevas especies de este genero de China, viz. Onesia dynatophallus Xue & Bai sp. nov y Onesia franzaosternita Xue & Dong sp. nov. Se provee una clave para las especies de Onesia en China y un mapa de su distribución. Los especimenes de los tipos están depositados en El Instituto de Entomología, Universidad Normal de Shenyang.

Onesia is a genus of Calliphoridae (Diptera) and most of Onesia species are distributed in the Australasian/Oceanian and Palaearctic Regions. According to current data, there are 61 species of Onesia in the world, including 28 Palaearctic, 23 Australasian/Oceanian species, and 7 Oriental. In addition 2 species are common to the Palaearctic and Oriental regions, and one to the Oriental and Australasian/Oceanian regions (Rognes 1991, 1997, 1998; Schumann 1964, 1974, 1986; Verves 2004, 2005; Verves & Khrokalo 2006). Most Australasian/Oceanian species were listed by Kurahashi (1989), and most East Palaearctic and oriental species have been reported by Kano & Shinonaga (1968), Kurahashi (1986, 1989); Kurahashi & Jayasekera (1989); Fan (1992, 1997); Xue (2005); Xue & Chao (1998); and Xue & Wang (2006).

A faunistic analysis of the Onesia species from China is reported herein for the first time. The majority of the Chinese species are found in the Hengduan Mountains which are located between 27°-35°N and 99°-105°E (Fig. 23).

METHODS AND MATERIALS

Absolute measurements in millimeters (mm) are used for body length. Abbreviations have the following meaning: acr = acrostichal setae; dc = dorsocentral setae; ial = intra-alar setae; pra = prealar setae; p = posterior setae; v = ventral setae; ad = anterodorsal setae; pd = posteroventral setae; av = anteroventral setae; pv = posterovelar setae. The distribution map was made with the software of ArcView GIS 3.2.

General Characteristics of Genus Onesia and Key to Chinese Species

Onesia Robineau-Desvoidy, 1830: 365. Type species: Onesia floralis Robineau-Desvoidy, 1830, by subsequent designation (Townsend, 1916: 8).

Macrophallus Mueller, 1922: 62. Type species: Onesia austriaca Villeneuve, 1920, by subsequent designation (Townsend, 1935: 170). Synonymized by Schumann, 1964: 915.

Macronesia Villeneuve, 1926: 130. Type species: Onesia hendeli Villeneuve, 1926 [= Onesia kowarzi Villeneuve, 1920], by subsequent designation (Townsend, 1935: 170). Synonymized by Schumann, 1964: 915.

Onesioides Schumann, 1973: 338. Type species: Melinda hokkaidensis Baranov, 1939, by original designation. Synonymized by Rognes, 1991: 97.

Pellonesia Lu & Fan, 1981 in: Wang et al. (1981): 255, 256, 258. Type species: Onesia pterygoidea Lu & Fan, 1981, by monotypy. Synonymized by Rognes, 1991: 97.

Diagnosis (Figs. 1-8)

Medium-sized flies (5.0-12.0 mm). Male frons narrow, frontal vitta brown to black, with longitudinal crinkle, fronto-orbital plate and parafacial with gleamy yellowish-white and silver pruinosity, all with small hairs, fronto-orbital plate with transverse strip, parafacial and gena broad, frontal angle and vibrissa angle all projecting, gena about 1/2 of eye in height, antenna scape and pedicel red-brown to black, most of
first flagellomere red-brown, first flagellomere at least 2.0 times as long as pedicel, the longest hair shorter than width of first flagellomere, palpus yellow-brown, without facial carina; thorax black and green, with white pruinosity, with outer posthumeral setae, acr (1-2) + (2-4), dc (2-3) + (3-4), ial (0-1) + (3-4) (except O. dynatophalus sp. nov, O. franzaosternita sp. nov and O. occidentalis Feng, 2003, with 2 post intra-alar setae), distance between acr rows narrow, scutum usually with 3 indistinct vittae, katepisternum 2+1; m1+2 vein with angulated bend, lower calypter with sparse dark ciliae, halter yellow-brown; legs black; abdomen with light pruinosity, onlytergite 5 with many discal setae, epandrium and basal parts of surstyli red-brown, paraphallus short, distiphallus long. Female oviscapt short.

**KEY TO CHINESE SPECIES OF THE GENUS **ONESIA **(MALES)**

1. Abdomen with shifting patches distinctly ................................................................. 2
1a. Abdomen without or with shifting patches indistinctly ........................................... 5

2. In profile, cercus very broad, about 6.0 times of surstylus in width .................... O. megaloba (Feng 1998)
2a. In profile, cercus at most about 3.0 times of surstylus in width ............................. 3

3. Inner margin of lateral lobe of sternite 5 with thin fringe (Fig. 14), apical half of cercus procline distinctly in profile (Fig. 16). ............................................................. O. franzaosternita Xue & Dong sp. nov
3a. Sternite 5 without fringe, apical half of cercus at most procline indistinctly in profile (Fig. 1) .............................................................. 4

4. Antennae black, parafacial about 2.0 times of first flagellomere in width; acr 2+3, dc 3+3, posthumeral setae 2+1, katepisternal setae 3+1; in profile view the whole length of cercus mostly hidden by the surstylus (Fig. 1). .................................................................................. O. erlangshanensis Feng 1998

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Figs. 1-8. After Feng (1998) (male). 1. O. erlangshanensis Feng 1998, terminalia in profile; 2. O. hokkaidensis (Baranov 1939), terminalia in profile; 3. O. pterygoides Lu et Fan in Wang et al. (1981), sternite 5 in ventral view; 4. O. pterygoides Lu et Fan in Wang et al. (1981), terminalia in posterior view; 5. O. occidentalis Feng, 2003, terminalia in posterior view; 6. O. wolongiensis Chen et Fan in Chen et al. (1992), terminalia in posterior view; 7. O. flora Feng 1998, terminalia in profile; 8. O. wolongiensis Chen et Fan in Chen et al (1992), terminalia in profile;
| Step | Description | Reference |
|------|-------------|-----------|
| 4a   | Apical part of first flagellomere and pedicel mostly red-brown, parafacial about 3.0 times of first flagellomere | O. hokkaidensis (Baranov 1939) |
| 5   | 5th abdominal sternite about 2.0 times as broad as long, with a membranous connexion between the apical parts | O. pterygoide Lu et Fan in Wang et al. (1981) |
| 5a  | 5th abdominal sternite about 1.5 times as broad as long, without a membranous connexion between the apical parts |  |
| 6   | Basicosta mostly black or blackish brown | O. abans Chen et Fan et al. (1992) |
| 6a  | Basicosta yellow or brown yellow | O. abaensis Chen et Fan et al. (1992) |
| 7   | acr 1+2 | O. curvoloba (Liang et Gan 1986) |
| 7a  | acr 2+3 | O. curvoloba (Liang et Gan 1986) |
| 8   | Fore tibia with 1 | O. batangensis Chen et Fan et al. (1992) |
| 8a  | Fore tibia without | O. batangensis Chen et Fan et al. (1992) |
| 9   | Hind tibia with 1 pv, mid tibia without pd | O. dynatophallus Xue & Bai, sp. nov |
| 9a  | Hind tibia without pv, mid tibia with pd | O. dynatophallus Xue & Bai, sp. nov |
| 10  | Mid tibia with | O. jiuhaigouensis Chen et Fan et al. (1992) |
| 10a | Mid tibia without pv | O. jiuhaigouensis Chen et Fan et al. (1992) |
| 11  | Surstylus about 3.0 times as broad as cercus | O. curvoloba (Liang et Gan 1986) |
| 11a | Surstylus subequals with cercus in width | O. curvoloba (Liang et Gan 1986) |
| 12  | Mid tibia with 2 pv, anterior spiracle dark, first flagellomere mostly black, only the area adjacent with pedicel | O. jiuhaigouensis Chen et Fan et al. (1992) |
| 12a | Mid tibia with 3 pv, anterior spiracle brown, apical part of first flagellomere entirely black, the former 2.5 times as long as pedicel | O. sinnense Villeneuve 1936 |
| 13  | Mid tibia with 1 ad. | O. chuanxiensis Chen et Fan et al. (1992) |
| 13a | Mid tibia with 2 ad at least | O. chuanxiensis Chen et Fan et al. (1992) |
| 14  | Mid tibia with 1 pd, hind tibia with 4 ad; frons about 2.0 times as wide as anterior ocellus | O. songpanensis Chen et Fan et al. (1992) |
| 14a | Mid tibia with 2 pd, hind tibia with 3 ad; the width of frons equals to the width of anterior ocellus | O. hongyuanensis Chen et Fan et al. (1992) |
| 15  | Cercus distinctly longer than surstylus | O. ganzeensis Chen et Fan et al. (1992) |
| 15a | Cercus equals in length or shorter than surstylus | O. ganzeensis Chen et Fan et al. (1992) |
| 16  | Cercus subequals with surstylus in length (Fig. 5) | O. hongyuanensis Chen et Fan et al. (1992) |
| 16a | Cercus distinctly shorter than surstylus in length (Fig. 6) | O. hongyuanensis Chen et Fan et al. (1992) |
| 17  | dc 2+3, ial 0+2; only tergite 6 with posterior marginal setae | O. occidentalis Feng 2003 |
| 17a | dc 3+3, ial 0+3; tergite 3-6 with posterior marginal setae | O. huaxiae Feng et Xue 2000 |
| 18  | 15 pairs of frontal setae, first flagellomere about 3.0 times as long as pedicel; epandrium extending backwards, a large part of surstylus hidden by epandrium in profile (Fig. 7) | O. flora Feng 1998 |
| 18a | 8-9 pairs of frontal setae, first flagellomere about 3.5 times as long as pedicel; epandrium not extending backwards (Fig. 8) | O. wolongiensis Chen et Fan et al. (1992) |
Onesia dynatophallus Xue & Bai **Sp. Nov**

(Figs. 9-13)

Male: Body length 9.0-9.5 mm.

Head. Eye bare; width of frons equals in width or broader than the distance between outer margins of posterior ocelli, frontal vitta black, slightly narrower than fronto-orbital plate, at its narrowest point, 14-15 pairs of frontal setae, without orbital setae; fronto-orbital plate and parafacial with cuprum-grey pruinosity, parafacial about 2.5 times as wide as first flagellomere, more than 1/2 length of one eye, antennae black, first flagellomere about 2.5 times as long as pedicel, basal 1/4 of arista becoming thick, basal 3/4 of arista plumose, most of arista hairs about 1.2-1.3 times as wide as first flagellomere, without facial carina, lower 1/3 of facial ridge with small setae, lower parafacial brown, epistoma distinctly situated behind frontal angle in profile, genna black, with grey pruinosity, gena about 3/5 of eye height, genal hairs black, and postgena setae light-yellow, pimeron all with hairs, katepimeron bare, metepimeron with row of setae, anterior and posterior spiracles dark brown, katepisternal setae 2+1.

Wing. Basal section slightly brown, basicosta black, without costal spine, both surfaces of radial node with setae, m-m crossvein S-shaped, calypteres dark brown, lower calypter with small lobule, inside it with few setae in the middle; with anterior paracalyptral tuft, but without posterior paracalyptral tuft; halteres brown-yellow.

Legs. Entirely black; ventral surface of fore tarsus without tenant hairs, fore tibia with 5-6 ad, 1 ad distinct, 1 pv; mid femur av distinct, becoming short apically, with a complete pv row, strong; mid tibia with 1 v, 1 ad, 2 pv; hind femur with a complete av row, and a row of strong pv in basal 3/5; hind tibia with 1 pv, 2 av, 3 ad, 3 pd, 1 short preapical pv.

Abdomen. Olive green, ovum-shaped, with few grey pruinosity, without distinct shifting patches, tergites 3-5 with distinct black median vittae, posterior marginal setae of tergite 3-6 complete; sternite 1 with hairs, sternite 5 trapezia-shaped, and its lateral lobe with 2-3 long setae.

Female: Unknown.

**Holotype:** Male, P.R. China: Sichuan Province: Kangding: Mt. Zheduo, 4200 m altitude, 7-VI-2006, collected by Chun-tian Zhang. **Paratype:** 1 male, same data as holotype.

**Etymology:** The species name is from the Greek words *dynat* meaning muscular and *phall* meaning aedeagus, referring to the thick and strong aedeagus of the species. (Figs. 12-13)

**Remarks:** This new species resembles *Onesia jiuzhaigouensis* Chen et Fan in Chen et al. (1992), but it differs from the latter in male body length 9.0-9.5 mm, frons equals in width or broader than the distance between outer margins of posterior ocelli, fronto-orbital plate and parafacial with cuprum-grey pruinosity, parafacial about 2.5 times as wide as first flagellomere, excess 1/2 the length of one eye, lower 1/3 of facial ridge with small setae, genal height about 3/5 of eye height, *ial* O+2, posthumeral setae 1+1, mid tibia without *pd*, hind tibia with 1 av; surstylist triangle-shaped in profile, middle section of paraphallus broad and large, distal part of it with hamulus.

**Distribution—**Kangding, Sichuan, China.

*Onesia franzaosternita* Xue & Dong **Sp. Nov**

(Figs. 14-22)

Male: Body length 5.5-8.2 mm.

Head. Eye bare; width of frons equal to or longer than the distance between outer margins of posterior ocelli, frontal vitta black, its narrowest point about 1/3 as wide as one fronto-orbital plate, 11-12 pairs of frontal setae, without orbital setae; ocellar seta subequal to inner vertical seta and frontal setae, fronto-orbital plate and parafacial with light-grey pruinosity, parafacial about 1.8-2.0 times as wide as first flagellomere, about 1/3 eye in length, on basal half of parafacial with 4-5 rows short hairs, antennae black-brown mostly, apical part of pedicel and basal part of first flagellomere red-brown, first flagellomere about 2.2 times as long as pedicel, the basal 1/4 of arista becoming thick, the basal 3/4 of arista plumose, the longest hairs subequal to first flagellomere in width, facial carina lower and narrow, lower 1/3 of facial ridge with small setae, lower of parafacial brown, epistoma distinctly situated behind frontal angle in profile, gena black, with grey pruinosity, genal height about 1/3 of eye height, genal hairs black, and postgena with sparse light-yellow hairs, occiput lateral area with hairs, prementum without pruinosity, shining, about 2.5 times as long as broad, palpi brown yellow, and equal to or longer than prementum.

Thorax. Ground color black, with light grey pruinosity, scutum with 4 black vittae, *acr* 1+3, *dc* 3+3, *ial* O+2, posthumeral setae 1+1, *pra* about 1.3 times as long as posterior notopleural seta; notopleuron and lateral and ventral margins of scutellum with black hairs, ventral surface of distal part bare, prosternum, propleuron and anepimeron all with hairs, katepimeron bare, meron with row of setae; anterior and posterior spiracles dark brown, katepisternal setae 2+1.
Figs. 9-13. *Onesia dynatophallus* Xue & Bai *sp.nov.* (male holotype). 9. Sternite 5 in ventral view, scale bar = 1 mm; 10. Terminalia in posterior view, scale bar = 0.2 mm; 11. Terminalia in profile, scale bar = 0.2 mm; 12. Aedeagus and gonites in profile, scale bar = 0.2 mm; 13. Distiphallus in posterior view, scale bar = 0.2 mm;
Figs. 14-22. *Onesia franzaosternita* Xue & Dong sp. nov (Figs. 14-18 male holotype): 14. Sternite 5 in ventral view, scale bar = 0.2 mm; 15. Terminalia in posterior view, scale bar = 0.2 mm; 16. Terminalia in profile, scale bar = 0.2 mm; 17. Aedeagus and gonites in profile, scale bar = 0.2 mm; 18. Distiphallus in anterior view, scale bar = 0.1 mm; (Figs. 19-22 female holotype): 19. Sternite 1 to 5 in ventral view, scale bar = 0.2 mm; 20. Spermatheca, scale bar = 0.1 mm; 21. Ovipositor in dorsal view, scale bar = 0.2 mm; 22. Ovipositor in ventral view, scale bar = 0.2 mm;
Fig. 23. Distributional map of the species of Onesia in China.
Wing. Wing base light brown, vein brownish, basicosta dark brown, costal spine short and small, both surfaces of radial node with setulae, m-m cross vein lightly S-shaped, calypteris light brown, lower calypter with small lobule, inside it with 3-4 setulae in the middle; with anterior paracalyptral tuft, but without posterior paracalyptral tuft; halteres light brown.

Legs. Entirely black; ventral surface of fore with few tenant hairs, fore tibia with 2-3 medial ad, slightly longer than body hairs, 1-2 medial pv; mid femur av rows short and thin, hairs-like, with a complete pv row, mid tibia with 1 submedial ad, strong, 2 medial v, 1 submedial p; hind femur with a complete but sparse av row, and a row of strong pv in basal half, ventral surface of basal part with setae, fringelike, hind tibia with 1 av, 2-3 ad, 2-3 pd; tarsi slightly shorter than tibiae, claw and pulvilli developed, subequal to the length of 5th tarsomere.

Abdomen. Black, ovum-shaped, with dense light grey pruinosity, each tergite with narrow median stripe, 2 sides with shifting patches, sternite 1 with hairs, distal part and lateral of abdomen with slightly long setae.

Female: Body length 7.8-8.2 mm. Frons about 0.36 times as wide as head, frontal vitta about 1.7 times as wide as 1 fronto-orbital plate, frontal triangle reach to 1/3 of upper half of frons, without distinct interfrontal setae, but with 2-3 pairs of small setae, 7-8 pairs of intilted frontal setae, reach to 2 sides of anterior ocellus, 2 pairs of proclinate orbital setae, 1 pair of upper orbital setae, inner vertical seta about 2 times as long as ocellae seta, ocellae seta subequal to frontal setae in length, lower half of fronto-orbital plate and upper half of parafacial with many small hairs, parafacial about 2.5 times as wide as first flagellomere, genal height about 1/2 of eye height; ventral surface of front legs without tenant hairs, basalar part of hind femur with 2-3 fringes, claw and pulvilli slightly short, about 2/3 of fifth tarsomere in length; others characteristic the same as male’s.

Holotype: Male, P.R. China: Ningxia Autonomous Region: Jingyuan: Lvyuan Forestry centre, 1700-1800 m altitude, 30-VI-2008, collected by Jia-yu Liu. Paratype: 2 females, same data as holotype; 1 male, Jingyuan: Hongxia Forestry centre, 2100 m altitude, 14-VII-2008, collected by Zhi-yuan Yao; 1 male, Jingyuan: Heshangpu Forestry centre, 2100-2300 m altitude, 26-VI-2008, collected by Jia-yu Liu; 1 female, Jingyuan: Quqianjia Forestry centre, 1800 m altitude, 3-VII-2008, collected by Jia-yu Liu; 2 males, Longde: Sutai Forestry centre, 2140-2200 m altitude, 25-VI-2008, Jia-yu Liu, 1 male, collected by Zhi-yuan Yao.

Etymology: The species name is from the Greek words franza meaning fringe and sternita meaning sternite, referring to inner margin of lateral lobe of sternite 5 with thin fringe.

Remarks: The male genitalia of this new species resembles Onesia huaxiae Feng et Xue 2000, but it differs from the latter in inner margin of lateral lobe of sternite 5 with thin fringe, in profile, surstyli bend distinctly; distal part of cerci slightly flat, in dorsal view, surstyli becoming thin.

Distribution—Jingyuan and Longde, Ningxia Autonomous Region, China.

The Faunistic Analysis of Onesia From China

The majority of the species of Onesia in China are distributed in the Hengduan Mountains Region (Fig. 23), an area between the Oriental and Palaearctic regions, with some species distributed in the north regions of China, Far Eastern region of Russia, the Korea peninsula, and Japan. Species are known from south China, Malaysia, Philippines and Sri Lanka of the Oriental region.

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