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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 Palaearctic 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 Palaearctica 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* = posterodorsal setae; *av* = anteroventral setae; *pv* = posteroventral 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.

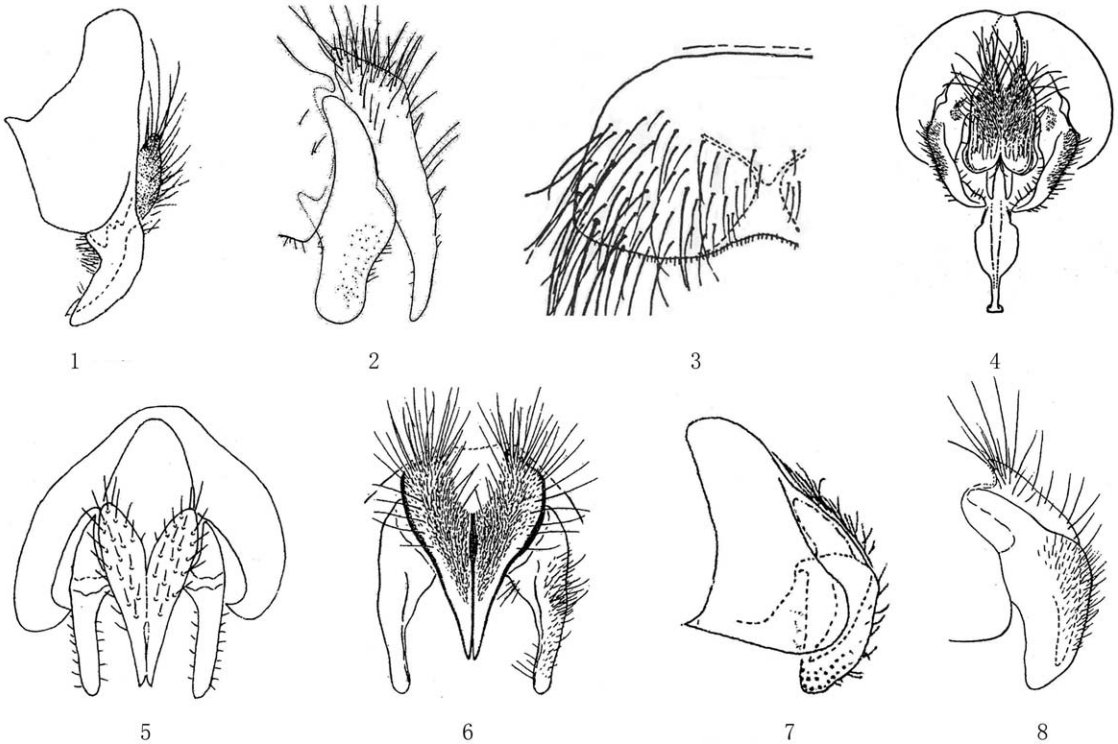
Macronesia Villeneuve, 1926: 130. Type species: *Onesia hendeli* Villeneuve, 1926 [= *Onesia kowarzi* Villeneuve, 1920], by subsequent designation (Townsend, 1935: 170). Synonymized by Schumann, 1964: 915.

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 pterygoides* 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



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;

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 seta, *acr* (1-2) + (2-4), *dc* (2-3) + (3-4), *ial* (0-1) + (3-4) (expect *O. dynatophallus* **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; m_{1+2} vein with angulated bend, lower calypter with sparse dark ciliae, halter yellow-brown; legs black; abdomen with light pruinosity, only tergite 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 proclinate distinctly in profile (Fig. 16)..... *O. franzaosternita* Xue & Dong **sp. nov.**
- 3a. Sternite 5 without fringe, apical half of cercus at most proclinate 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

- 4a. Apical part of first flagellomere and pedicel mostly red-brown, parafacial about 3.0 times of first flagellomere in width; *acr* 3+3, *dc* 2+3, posthumeral setae 1+0, katapisternal setae 2+1; in profile view cercus clearly visible, not hidden by surstylus (Fig. 2) *O. hokkaidensis* (Baranov 1939)
5. 5th abdominal sternite about 2.0 times as broad as long, with a membranous connexion between the apical parts of lateral lobes (Fig. 3); basal part of surstylus with large aliform processes, projecting over tips of cerci (Fig. 4). *O. pterygoides* 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 of lateral lobes (Fig. 9); basal parts of surstylus without aliform process 6
6. Basicosta mostly black or blackish brown 7
- 6a. Basicosta yellow or brown yellow 15
7. *acr* 1+2 *O. abaensis* Chen et Fan in Chen et al. (1992)
- 7a. *acr* 2+3 8
8. Fore tibia with 1 *v* *O. batangensis* Chen et Fan in Chen et al. (1992)
- 8a. Fore tibia without *v* 9
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* 10
10. Mid tibia with *pv* 11
- 10a. Mid tibia without *pv* 13
11. Surstylus about 3.0 times as broad as cercus. *O. curviloba* (Liang et Gan 1986)
- 11a. Surstylus subequals with cercus in width 12
12. Mid tibia with 2 *pv*, anterior spiracle dark, first flagellomere mostly black, only the area adjacent with pedicel red, the former 3.0 times as long as the latter. *O. jiuzhaigouensis* Chen et Fan in Chen 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. sinnensis* Villeneuve 1936
13. Mid tibia with 1 *ad*. *O. chuanxiensis* Chen et Fan in Chen et al. (1992)
- 13a. Mid tibia with 2 *ad* at least 14
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 in Chen 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 in Chen et al. (1992)
15. Cercus distinctly longer than surstylus *O. ganzeensis* Chen et Fan in Chen et al. (1992)
- 15a. Cercus equals in length or shorter than surstylus 16
16. Cercus subequals with surstylus in length (Fig. 5) 17
- 16a. Cercus distinctly shorter than surstylus in length (Fig. 6) 18
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 in Chen 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, gena black, with grey pruinosity, gena about 3/5 of eye in height, genal hairs black, and postgena setae light-yellow, prementum without pruinosity, slightly shining, about 2.5 times as long as broad, palpi brown yellow, longer than prementum distinctly.

Thorax. Ground color dark black and slightly dark green, with grey pruinosity, presutural area of scutum with 4 black vittae, postsutural area of scutum with 5 black vittae, and the median vitta reaching scutoscutellar suture; *acr* 2+3, *dc* 3+3, *ial* 0+2, posthumeral setae 1+1, *pra* about 1.2 times as long as posterior notopleural setae; notopleuron and lateral and ventral margins of scutellum with black hairs, prosternum, propleuron and anepimeron all with hairs, katapimeron bare, meron with row of setae; anterior and posterior spiracles dark brown, katapisternal setae 2+1.

Wing. Base 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 paracalyptal tuft, but without posterior paracalyptal tuft; halteres brownish-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 *p*; hind femur with a complete *av* row, and a row of strong *pv* in basal 3/5; hind tibia with 1 *av*, 2 *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 jiuzaigouensis* 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* 0+2, posthumeral setae 1+1, mid tibia without *pd*, hind tibia with 1 *av*; surstylus triangle-shaped in profile, middle section of paraphallus broad and large, distal part of it with hamulus.

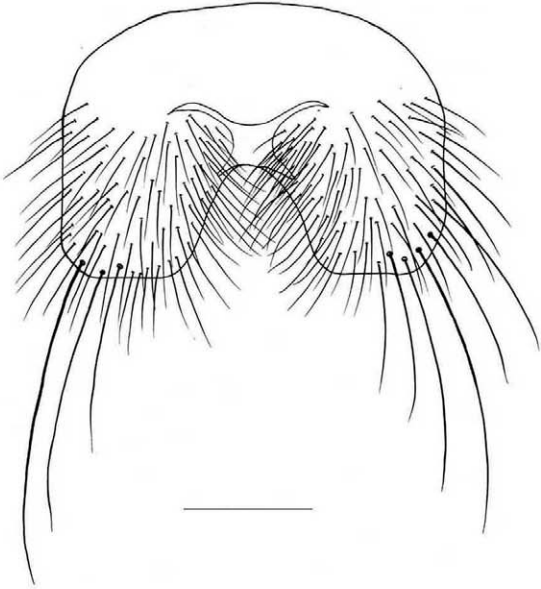
Distribution—Kangding, Sichuan, China.

Onesia franzaosternita Xue & Dong **Sp. Nov**
(Figs. 14-22)

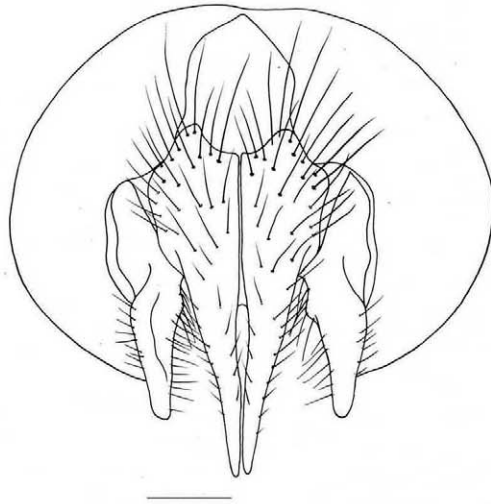
Male: Body length 5.5-8.2 mm.

Head. eye bare; width of frons equal to or larger 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.

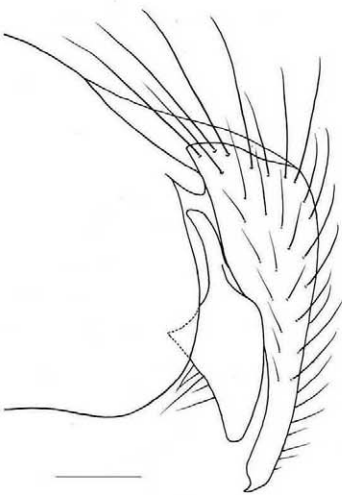
Thorax. Ground color black, with light grey pruinosity, scutum with 4 black vittae, *acr* 1+3, *dc* 3+3, *ial* 0+2, posthumeral setae 1+1, *pra* about 1.3 times as long as posterior notopleural seta; notopleuron and lateral and ventral margins of scutellum with black hairs, ventral surface of distal part bare, prosternum, propleuron and anepimeron all with hairs, katapimeron bare, meron with row of setae; anterior and posterior spiracles dark brown, katapisternal setae 1+1.



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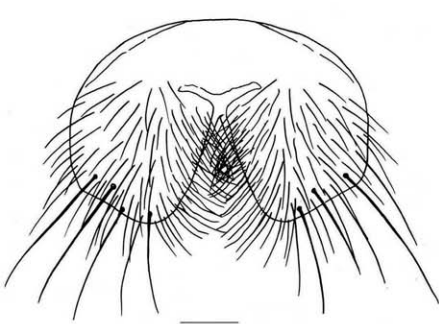


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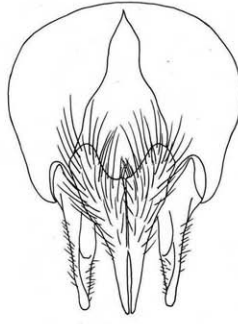


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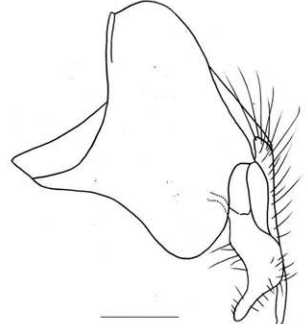
Figs. 9-13. *Onesia dynatophallus* Xue & Bai **sp.nov.** (male holotype). 9. Sternite 5 in ventral view, scale bar = 1 mm; 10. Terminalia in posterior view, scale bar = 0.2 mm; 11. Terminalia in profile, scale bar = 0.2 mm; 12. Aedeagus and gonites in profile, scale bar = 0.2 mm; 13. Distiphallus in posterior view, scale bar = 0.2 mm;



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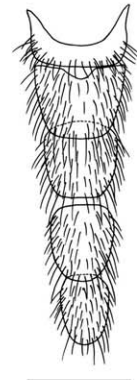
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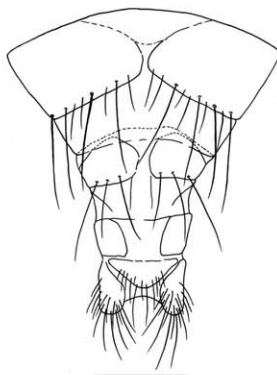
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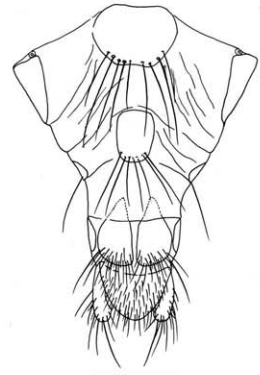
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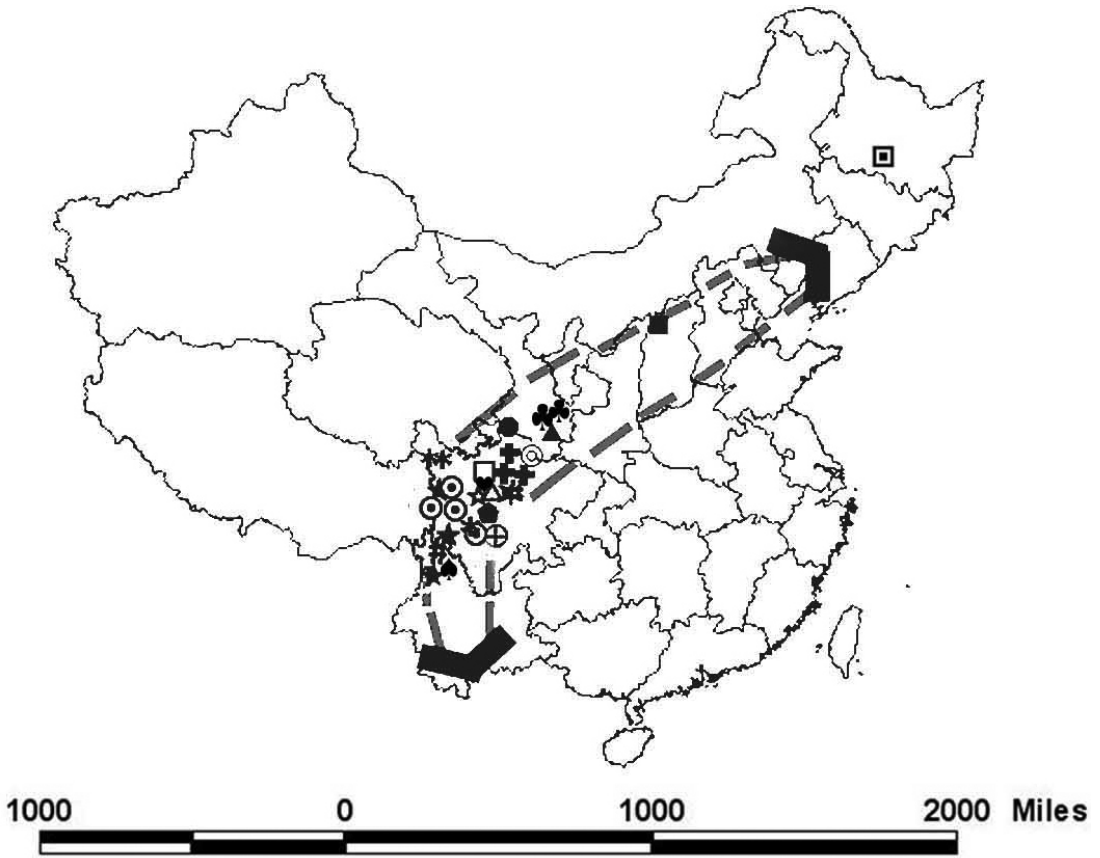


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Figs. 14-22. *Onesia franzaosternita* Xue & Dong **sp. nov** (Figs.14-18 male holotype): 14. Sternite 5 in ventral view, scale bar = 0.2 mm; 15. Terminalia in posterior view, scale bar = 0.2 mm; 16. Terminalia in profile, scale bar = 0.2 mm; 17. Aedeagus 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;



- *O. abaensis* Chen et Fan in Chen, Fan & Fang (1992)
- ★ *O. batangensis* Chen et Fan in Chen, Fan & Fang (1992)
- ♠ *O. curviloba* (Liang et Gan, 1985)
- ⊙ *O. chuanxiensis* Chen et Fan in Chen, Fan & Fang (1992)
- ☆ *O. dynatophallus* sp. nov.
- △ *O. erlangshanensis* Feng, 1998
- ⊕ *O. flora* Feng, 1998
- ♣ *O. franzaosternita* sp. nov.
- * *O. ganziensis* Chen et Fan in Chen, Fan & Fang (1992)
- ▣ *O. hokkaidensis* (Baranov, 1939)
- *O. hongyuanensis* Chen et Fan in Chen, Fan & Fang (1992)
- ☾ *O. huaxiaae* Feng et Xue, 2000
- ⊗ *O. jiuzhaigouensis* Chen et Fan in Chen, Fan & Fang (1992)
- ♥ *O. megaloba* (Feng, 1998)
- ♠ *O. occidentalis* Feng, 2003
- *O. pterygoides* Lu et Fan in Wang, Lu, Chen & Fan (1981)
- ▲ *O. sinensis* Villeneuve, 1936
- ⊕ *O. songpanensis* Chen et Fan in Chen, Fan & Fang (1992)
- # *O. wolongensis* Chen et Fan in Chen, Fan & Fang (1992)

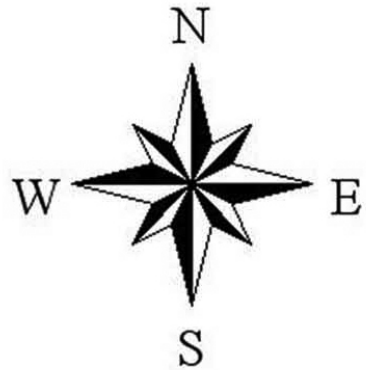


Fig. 23. Distributional map of the species of *Onesia* in China.

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, calypteres light brown, lower calypter with small lobule, inside it with 3-4 setulae in the middle; with anterior paracalyptal tuft, but without posterior paracalyptal 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, fringe-like, 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 seta, 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, basal 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: Qiuqianjia 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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