

***Dufourea wuae* – a new name and first description of the female
(Hymenoptera: Halictidae: Rophitinae), with an updated checklist
of the genus *Dufourea* in China**

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ABSTRACT. Two species of the genus *Dufourea* have the same scientific name, *Dufourea longicornis* (WARNCKE, 1979) distributed in the Middle East, and *Dufourea longicornis* WU, 1982 distributed in China. *Dufourea wuae* is a new name for *Dufourea longicornis* WU, 1982. The female of *Dufourea wuae* is described for the first time, and an updated checklist of the Chinese species of *Dufourea* is given; there are 29 species in total. Most species are distributed in southern China. Twenty-five of the Chinese species are endemic; only four are distributed in other areas of the western and eastern Palaearctic.

KEY WORDS: Halictidae, Rophitinae, *Dufourea longicornis*, *Dufourea wuae*, new name, China.

INTRODUCTION

The genus *Dufourea* is a major genus of the subfamily Rophitinae and is widely distributed in the Holarctic region. The genus is represented by 22 species in the north of the Oriental Region, 125 species in North America and Eurasia and 52 in the Palaearctic (PESENKO & ASTAFUROVA 2006). The genus *Halictoides* is transferred to the genus *Dufourea* and is considered a subgenus. Moreover, the subgeneric status of *Dufourea* is not clear, so the genus is treated without subgenera. Most species are oligolectic except for a few that are polylectic (MICHENER 2000, PESENKO & ASTAFUROVA 2006).

Currently, the genus is divided into 7 subgenera, four of them are present in the eastern Palaearctic: *Cephalictoides* (5 species), *Cyprirophites* (1), *Dufourea* (2) and *Halictoides* (5) (PESENKO & ASTAFUROVA 2006).

Different authors have studied the Chinese species of *Dufourea* but the total species number and distribution in China is not clear. 26 species have been identified in China – they are distributed over the southern plateau and mountains of Tibet and the Hengduan Mountains of Yunnan (NIU et al. 2005). In contrast, the total number of species known from the whole eastern Palaearctic Region is 13, including 11 from China. Most species are distributed mainly in northern China and most are endemics (PESENKO & ASTAFUROVA 2006). The genus is well investigated in China and there are many publications with a Chinese key for different species in China (WU 1982, 1983, 1985, 1986, 1987, 1990a, b, 1992, 1996).

A homonym was discovered in the genus *Dufourea*, *Dufourea longicornis* (WARNCKE 1979) being the senior homonym and *Dufourea longicornis* WU, 1982 the junior one. The former species, described by WARNCKE (1979), is known from the Middle East (Iran, Israel and Turkey) and belongs to subgenus *Cyprirophites*. The latter species, described by WU (1982), is known only from China; only the male was known and belongs to the subgenus *Halictoides*. The new name, *Dufourea wuae*, is ascribed to *Dufourea longicornis* (WU, 1982), not to *Dufourea longicornis* (WARNCKE, 1979). The female of *Dufourea wuae* was collected from Inner Mongolia, northern China. Here we describe the female for the first time. The Chinese species checklist is correspondingly updated.

Acknowledgements

We would like to express our deep gratitude to Prof. Wu Yan-ru and Dr Niu Ze-qing, Zoological Institute, Chinese Academy of Sciences, for their help in species identification. We are also grateful to Dr Rui Zhang and Ji Xiaoling, Lab. of Entomology, Yunnan Agriculture University, for their help in translating Chinese papers to English, including the original description of the holotype. This study was supported by the “Postdoctoral Program for African Researchers of China-Africa Science and Technology Partnership Program (CASTEP)”, Chinese postdoc foundation, Beijing, and “National Natural Science Foundation of China (U0936601)”. Our profound thanks go to the editor-in-chief and the two anonymous referees of the journal for their comments.

MATERIAL AND METHODS

Study material and identification

This study is based on material collected by the Yunnan Agriculture University. The specimens were collected from Helan Gulaben Mountain, Da Yang Valley, Huangtu

Tiag Liangzi Mountain and Huangtu Liangzi Mountain, Inner Mongolia Province (North China). The specimens were collected using a yellow trap with water and a sweep net. The specimens were identified on the basis of the keys of *Dufourea* published by WU (1987) and PESENKO & ASTAFUROVA (2006). Both sexes were sent to the Institute of Zoology, Chinese Academy of Sciences, Beijing, for accurate identification.

External structures

Specimens were examined and described using a stereoscopic microscope (OLYMPUS SZ.ST). Photos of specimens were taken by using Canon G10 58 mm Digital Camera, and illustrated by using ADOBE PHOTOSHOP software. Examinations of male genitalia were carried out. Male terminalia were macerated with 10% KOH (potassium hydroxide) for at least half a day, and transferred to distilled water for dissection.

Terminology and abbreviation

The morphological terminology in the description follows NIU et al. (2005) and PESENKO & ASTAFUROVA (2006).

The terms and abbreviations used are as follows: Fn = nth flagellar segment; Tn, Sn = nth metasomal tergum and sternum, respectively; PP = punctures; IS = inter-space of punctures.

Measurements

Body length is measured from the base of the antennal fossa to the apex of the pygidial plate. Wing length is measured as a straight line from the base of the tegula to the tip of the forewing.

SYSTEMATICS

Dufourea wuae nom. n.

Dufourea longicornis WU, 1982

Description

Female (Fig. 1). Body length 7.8-8.3 mm, wing length 6.1-6.3 mm. Body black without metallic reflection except as follows: antenna beneath brownish; triangular above clypeus in middle face brownish; mandibles the apical half reddish brown; glossa yellow; galea and maxillary palps brownish; tegula brownish; posterior margins of metasomal terga brownish semi-transparent; wings nearly subhyaline (small markings); veins and pterostigma brown; tibial spurs pale brownish.

Pilosity. Hairs on head finely branched, moderately, blackish mixed with brownish; those on vertex dense, long 400-700 μ m, those on front dense, slightly long 250-400 μ m,

those on clypeus dense, long 400-500 μm , those on gena dense, long 300-500 μm . Hairs on mesosoma with dense hairs laterally, bare medially; black mixed with brownish hairs long 300-500 μm ; propodeum with whitish, dense, long hairs 300-400 μm . Hind trochanter and femur with simple hairs, tibial scopa with simple, dense, whitish hair. Hairs on lateral and anterior portions of T1-2 with simple, slightly dense, whitish, short 100-250 hairs, medially with tiny suberect, whitish hairs; T3 has weak basal, whitish hairs, medially with tiny suberect, whitish hairs; T4-5 with dense, brownish, slightly long hairs; basal hair bands absent on T2-4; caudal fimbria brownish.

Structure. Head wider than long; head length/width 1.9 mm/2.2 mm; not as wide as mesosoma, HW:MsW:MtW:2.2:2.4:2.5. Vertex rounded, wide, densely punctate, with fine, shallow PP (25-30 μm), IS: 0.5; distance between lateral ocelli smaller than the distance between lateral ocellus and compound eye; frons and paraocular area densely punctate, with deep, dense, rounded PP (30-50 μm), IS: 0.5; frons with longitudinal ridge medially extending as long as antennal sockets, frontal carina present, triangular, down the antennal sockets and above clypeus in middle face. Antennal sockets placed on lower half of face, separated from clypeal margin by distance equal to diameter of sockets; upper end of subantennal suture directed towards lower margin of antennal socket. Supraclypeal area flattened, shiny, with fine, dense PP (20-30 μm), IS: 0.5. Clypeal length 0.5 mm; broad, clypeus nearly convex with anterior margins strongly obtuse, shiny, with dense, large, rounded, dense PP (40-60 μm), IS: 1. Genal area as broad as eye, shiny, densely punctate, with fine, dense PP (20-35 μm), IS: 0.5. Apex of labrum rounded, process of labrum absent. Mandibles tridentate, with three apical teeth, the third tooth some distance away from the second one. Scape long, length about 0.7 mm; pedicel rounded, as long as wide, F1 length longer than F2, about 3 times F2; F1 as long as F2+F3, F3 longer than F2, F4 to F9 as long as wide, F9 elongate apically.

Fore wings with two submarginal cells, 1st medial cell short, only twice as long as wide. Scutum shiny, densely punctate, with fine, rounded PP (20-25 μm), IS: 0.5. Scutellum shiny, densely punctate, with fine, rounded PP (20-30 μm), IS: 0.5; over the surface. Metanotum rugulose. Episternal groove absent. Mesepisternum tessellate. Metepisternum with fine, PP. Propodeum lustrous. Propodeal dorsum as long as scutellum, and longer than metanotum. Propodeal dorsum with coarse sinuate ridges; transverse carina distinct dorsoapically and dorsolaterally. Oblique carinae not connected with transverse carina at upper ends. Propodeal side densely punctate, with fine, dense, rounded PP. Msitibial plate present, hind and middle femur and tibia distinctly concave in outer surface. Metasomal terga shiny; marginal zones depressed, T1-5 densely punctate, with fine, dense, rounded PP \leq 15 μm , T1-5 marginal zones nearly impunctate, finely shagreened.

Male (Fig. 2). Body length 8.1-8.9 mm, wing length 5.8-6.1 mm. Body black, shiny except as follows: antenna beneath brownish; mandibles the apical half reddish brown;

galea and maxillary palps brownish; tegula brownish; posterior margins of metasomal terga brownish semi-transparent; wings nearly subhyaline (small marking); veins and pterostigma brown; tibial spurs pale brownish.

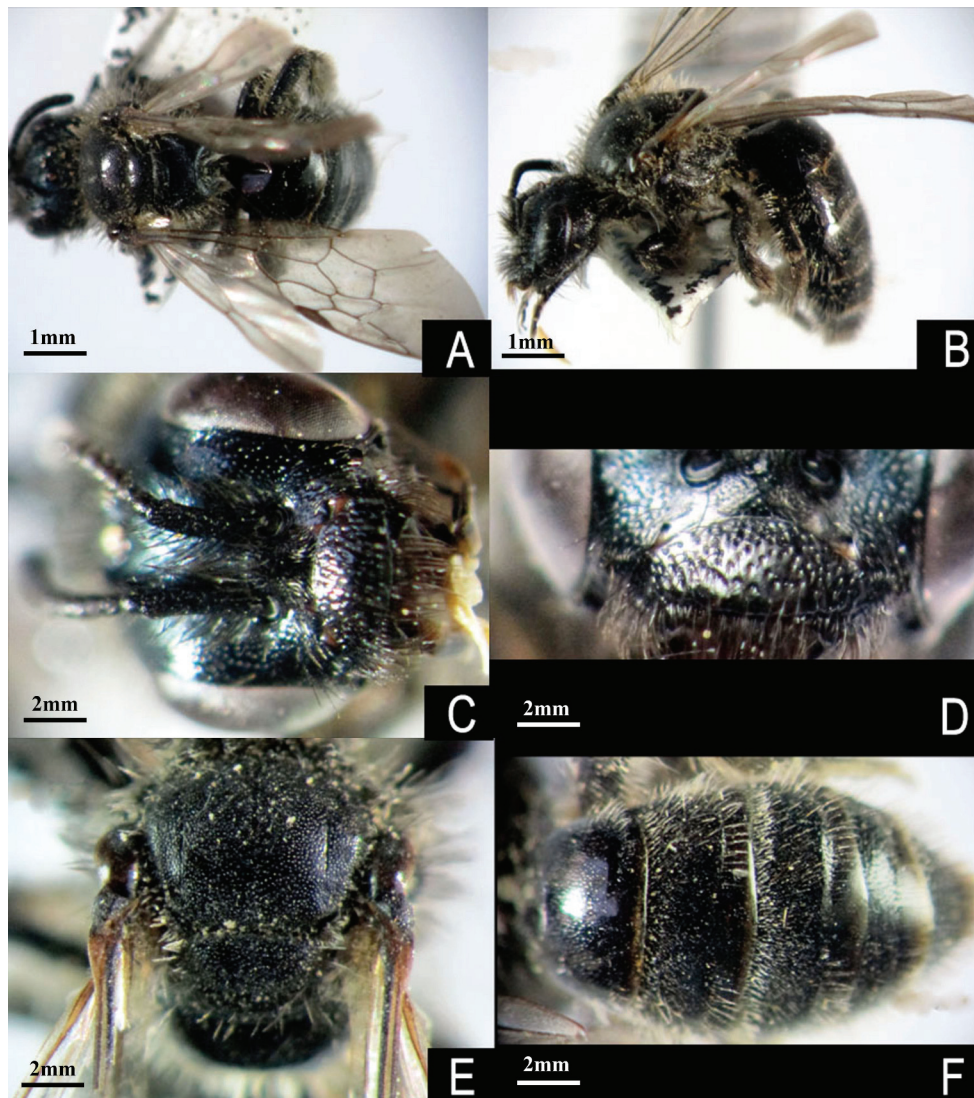


Fig. 1. *Dufourea wuae*, female: A – general habitus in dorsal view, B – the same in lateral view, C – head in frontal view, D – clypeus with brownish triangle, E – mesoscutum, F – metasomal terga.

Pilosity. Hairs on head finely branched, moderately, blackish mixed with whitish; those on vertex sparse, slightly long 400-450 μm , those on front sparse, short, those on supraclypeal area dense, whitish, those on clypeus dense, long 700-1000 μm , those on gena dense, long 400-500 μm . Hairs on mesosoma with dense hairs laterally, bare medially; whitish mixed with brownish hairs, 250-600 μm ; propodeum with whitish, dense, slightly long hairs 250-400 μm . Hind trochanter and femur with simple, whitish hairs. Hairs on metasoma with tiny suberect, whitish hairs; T4-6 with dense, brownish, slightly long hairs; basal hair bands absent on T2-4; caudal fimbria brownish.

Structure. Head as long as wide; head length/width 2.2 mm/2.2 mm; as wide as mesosoma, wider than metasoma, HW:MsW:MtW:2.2:2.2:2.0. Vertex rounded, wide, densely punctate, with fine, shallow PP (20-40 μm), IS: 0.5-1; distance between lateral ocelli smaller the distance between lateral ocellus and compound eye; frons and paracocular area densely punctate, with deep, dense, rounded PP (20-50 μm), IS: 0.5-1; frons with longitudinal ridge medially extending as long as antennal sockets, frontal carina present, triangular, down the antennal sockets and above clypeus in middle face. Antennal sockets placed on lower half of face, separated from clypeal margin by distance equal to diameter of sockets; upper end of subantennal suture directed towards lower margin of antennal socket. Supraclypeal area flattened, shiny, with fine, dense PP (≤ 20 μm), IS: 1; clypeal length 0.5 mm; broad, clypeus nearly convex with anterior margins strongly obtuse, shiny, with dense, large, rounded, dense PP (30-40 μm), IS: 1. Genal area broader than eye, shiny, densely punctate, with fine, dense PP (30-40 μm), IS: 0.5-1. Apex of labrum rounded, process of labrum absent. Mandibles tridentate, with three apical teeth, the third tooth some distance away from the second one. Scape long, length about 0.5 mm; pedicel rounded, as long as wide, F1 length shorter than F2; F2+F3 longer than F1, F3 as long as F2, F4 to F9 longer than wide, F9 elongate apically. Fore wings with two submarginal cells, 1st medial cell short, only twice as long as wide. Scutum shiny, densely punctate, with fine, rounded PP (20-30 μm), IS: 0.5-1. Scutellum shiny, densely punctate, with fine, rounded PP (20-30 μm), IS: 0.5 over the surface. Metanotum rugulose. Episternal groove absent. Mesepisternum tessellate. Metepisternum with fine, shallow PP. Propodeum lustrous. Propodeal dorsum as long as scutellum, longer than metanotum. Propodeal dorsum with coarse sinuate ridges, transverse carina distinct dorsoapically and dorsolaterally. Oblique carinae not connected with transverse carina at upper ends. Propodeal side densely punctate, with fine, dense, rounded PP, misitibial plate present, hind and middle femur and tibia distinctly concave in outer surface. Metasomal terga shiny; marginal zones depressed, T1-5 densely punctate, with fine, dense, rounded PP ≤ 15 μm , T1-5 marginal zones nearly impunctate, finely shagreened.

Male genitalia (Figs 3, 4). Gonobases and gonocoxites developed, gonostyli long, penis valves long with inner basal tooth.

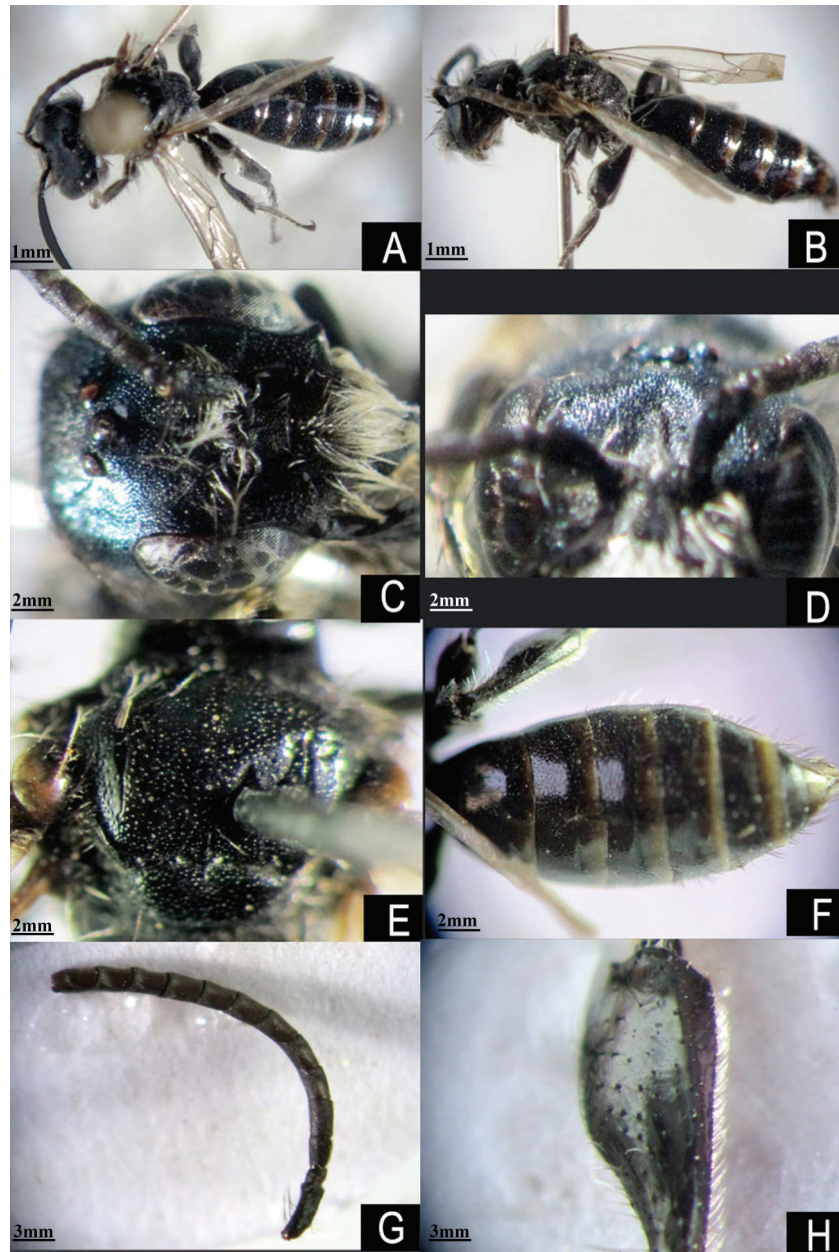


Fig. 2. *Dufourea wuae*, male: A – general habitus in dorsal view, B – the same in lateral view, C – head in frontal view, D – longitudinal ridge in the frons, E – mesoscutum, F – metasomal terga, G – antenna, H – hind tibia.

Remarks

This species is close to *D. sinensis* WU, 1982 but differs in having long antenna, the shape of genital sternite 7 (wider in the median part), the shape of sternite 8 (apical and basal parts wider). Female with obvious brownish triangle above clypeus in middle face, frontal carina present, hind and middle femur and tibia distinctly concave on outer surface.

Distribution

China (Xizang, Inner Mongolia).

Specimens examined

1 female, China, Halawu-Shatangzi, Helan Mountain, Inner Mongolia, 5 VIII 2010, leg. Guo Rui.; 1 female, China, Gulaben-Dayanggou, Helan Mountain, Inner Mongolia, 23 VII 2010, leg. Guo Rui.; 1 male, China, Gulaben-Dayanggou, Helan Mountain, Inner Mongolia, 27 VII 2010, leg. Guo Rui.; 1 male, China, Halawu Beigouhuangtuliangzi, Helan Mountain, Inner Mongolia, 9 VII 2010, leg. Zhang Dingjie.

Etymology

Wu Yan-Ru is a prominent taxonomist of Chinese bees. She has published a lot of books and papers dealing with different bee groups in China. She is a knowledgeable taxonomist with a great achievements, discoveries and descriptions of many new species of bees.

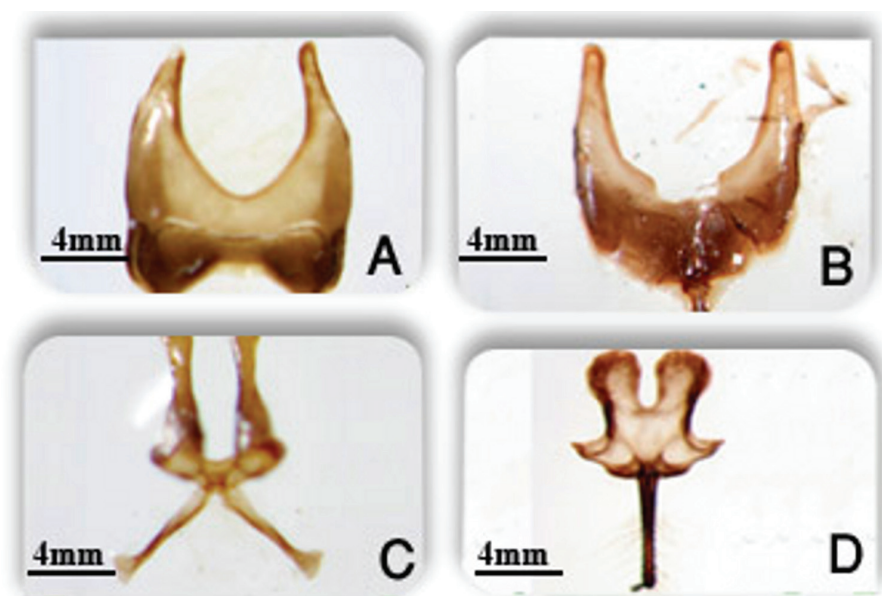


Fig. 3. *Dufourea wuae*, male subgenital sterna: A – metasomal sternum 5, B – metasomal sternum 6, C – metasomal sternum 7, D – metasomal sternum 8.

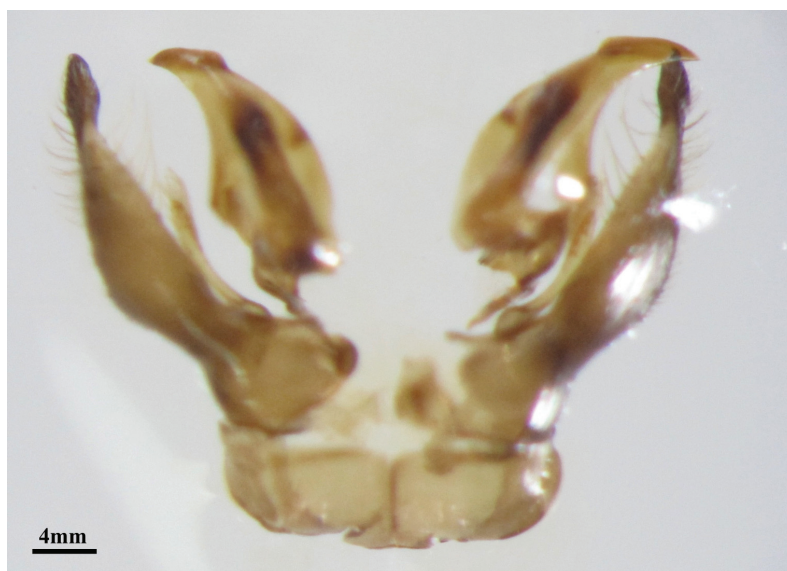


Fig. 4. Dorsal view of genital capsule of *Dufourea wuae*.

List of Chinese species and their distribution

Different total numbers of *Dufourea* species known from China are given by different authors (NIU et al. 2005, PESENKO & ASTAFUROVA 2006). The total number of species present in China is 29; these species are distributed throughout China from north to south and from east to west. Most of the species are distributed in southern China. The total number of species distributed in China is as follows: 19 species in the south, 11 in the north, 2 in the west and 3 in the east. Most Chinese species have a limited distribution as most of them considered montane species (PESENKO & ASTAFUROVA 2006, NIU et al. 2005). Therefore, most species are endemics; only four of the 29 species are present in other regions of the Palearctic Region. Table lists the Chinese species with their distribution in China and in the world.

Table. Checklist of Chinese species of *Dufourea* with their distribution.

Species	Distribution	
	China	Other regions
<i>Dufourea armata</i> POPOV, 1959	north	
<i>D. atrocoeruleus</i> (MORAWITZ, 1876)	northwest	
<i>D. calcarata</i> (MORAWITZ, 1886)	north and west	

<i>D. carinata</i> (Popov, 1959)	east	Russia
<i>D. carbopilus</i> (WU, 1986)	south	
<i>D. cholra</i> WU, 1990	south	
<i>D. clavicra</i> (MORAWITZ, 1889)	north, west and south	
<i>D. clypeata</i> (WU, 1983)	south	
<i>D. dentiventris</i> (NYLANDER, 1848)	north	Europe, Siberia, Korea
<i>D. flavozonata</i> (WU, 1990)	north	
<i>D. glaboabdominalis</i> (WU, 1986)	south	
<i>D. inermis</i> (NYLANDER, 1848)	north and east	Russia
<i>D. latifemurinis</i> (WU, 1982)	south	
<i>D. lijiangensis</i> WU, 1990	south	
<i>D. longispinis</i> (WU, 1987)	south	
<i>D. mandibularis</i> (POPOV, 1959)	south and east	
<i>D. megamandibularis</i> (WU, 1983)	south	
<i>D. metallica</i> MORAWITZ, 1890	south	
<i>D. minuta</i> LEPELETIER, 1841	north	Europe
<i>D. pilotibialis</i> (WU, 1987)	south	
<i>D. pseudometallica</i> WU, 1990	south	
<i>D. sinensis</i> (WU, 1982)	south	
<i>D. spiniventris</i> (POPOV, 1959)	north	
<i>D. subclavicra</i> (WU, 1982)	south	
<i>D. tibetensis</i> WU, 1990	south	
<i>D. tridentatus</i> (WU, 1987)	south	
<i>D. versicolor</i> ALFKEN, 1936	north	
<i>D. wuae</i> nom. n.	south, north	
<i>D. yunnanensis</i> WU, 1990	south	
Total	29 species	4 species

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Received: April 19, 2013

Accepted: May 22, 2013