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Synopsis of the antlion genus *Deutoleon* Navás, 1927 in China (Neuroptera: Myrmeleontidae)

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Abstract

A synopsis of the genus *Deutoleon* Navás, 1927 (Neuroptera: Myrmeleontidae) is presented. The little known species *Deutoleon turanicus* Navás, 1927 is newly recorded from China. Two species of *Deutoleon* are redescribed and illustrated in detail, including the female of *D. turanicus*. A key to species of *Deutoleon* is provided.

Key words: Myrmeleontidae, Nemoleontini

Introduction

Deutoleon Navás, 1927 is a relatively small genus of antlions (Insecta: Myrmeleontidae) in the Palaearctic region. According to the classification system of Stange (2004), *Deutoleon* belongs to the tribe Nemoleontini Banks, 1911, and is closely related to the genus *Distoleon* Banks, 1910. The key diagnostic character for *Deutoleon* is two presectoral crossveins in the hindwing, compared with *Distoleon* which has only one presectoral crossvein. *Deutoleon* includes two species, *Deutoleon turanicus* Navás, 1927, occurring in Mongolia and Turkey, and *Deutoleon lineatus* (Fabricius), 1798, throughout Europe to northern Asia (Aspöck *et al.* 1980, 2001; Stange 2004). Adults of *D. lineatus* were described in detail by Kis *et al.* (1970). Navás (1927) described the male of *D. turanicus* without discussing the difference between male and female. Papers that have since dealt with this species are those of Hölzel (1970a, b), Krivokhatsky (1996), Ari *et al.* (2007) and Canbulat (2007).

Recently, we examined antlion specimens deposited in the Insect Collection of China Agricultural University. Two *Deutoleon* species were identified: *D. turanicus* and *D. lineatus*. *D. turanicus* is newly recorded from China and the female is described for the first time. Both species are redescribed and illustrated.

Material and methods

Terminology of wing venation follows Wang *et al.* (2003), while genitalia terminology follows Stange (1994). Photographs of partial morphological characteristics are taken by a Canon EOS 500D digital camera connected with Olympus U-CTR30-2 microscope and UV-C (Application Suite) applied software by United Vision Ltd. Photographs of habitus are taken by a Nikon COOLPIX4500 digital camera. And all figures are processed in Adobe Photoshop CS5.

All specimens examined are deposited in the Insect Collections of China Agricultural University (ICCAU), Beijing, China.

Deutoleon Navás, 1927

Deutoleon Navás, 1927: 19. Type species: *Deutoleon turanicus* Navás, 1927, by original designation.

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Diagnosis: Forewing vein CuP originates at or very near basal crossvein, 2A runs close to 1A for short distance, then bends at sharp angle toward 3A, with seven presectoral crossveins. Hindwing with two presectoral crossveins. Hind tibial spurs well developed, at least twice as long as basitarsus. Male ectoproct without postventral lobe. Female without anterior gonapophyses. Male pilula axillaris always absent.

Distribution: Asia, Europe.

Key to species of *Deutoleon*

1. Forewing veins yellow, without black spot at anastomosis of CuA2 and CuP +1A, the black medial stripe with indistinct lateral branch on pronotum ..... ***D. lineatus***
- Forewing veins black and yellow alternating, with one conspicuous spot at anastomosis of CuA2 and CuP +1A**,** the black medial stripe with lateral branch on pronotum ..... ***D. turanicus***

Deutoleon lineatus (Fabricius, 1798)

(Fig. 1A)

Myrmeleon lineatum Fabricius, 1798: 205
Myrmeleon ornatum Olivier, 1811: 8. Synonymized by Hagen, 1858:126.
Myrmeleon sibiricum Waldheim, 1822: 45. Synonymized by Hagen, 1858:123.
Formicaleo lineatus (Fabricius, 1798) Hagen, 1866: 404.
Deutoleon lineatus (Fabricius, 1798) Navás, 1927: 19.
Distoleon lineatus (Fabricius, 1798) Okamoto and Kuwayama, 1932: 1529.

Diagnosis: Face yellow with three black spots near scape, vertex yellow, inflated with black pattern (Fig. 1C). Pronotum trapezoid, yellow with two black longitudinal wider medial stripes; Forewing yellow except Sc and R with somewhat black, Rs arises after CuA fork, 7 presectoral crossveins before origin of Rs; anastomosis of CuA2 and Cup +1A without spot; Hindwing with 2 presectoral crossveins before origin of Rs, female with one distinct brownish short stripe in rhegma area.

Redescription: Male: forewing 35–42 mm, hindwing 34–41 mm, body length 25–31 mm. Female: 37–44 mm, hindwing 35–42 mm, body length 27–33 mm.

Head*:** Face yellow with three black spots near scape, antenna clavate. Compound eye dark, vertex yellow, inflated with black pattern like Fig.1- C; labrum yellow with several black setae, maxillary palpus and labial palpus yellow. ***Thorax*:** Pronotum trapezoid, yellow with sparse black setae and two black longitudinal wider medial stripes, lateral margin mostly black. Mesothorax and metathorax black with several yellow stripes. ***Wing (Fig.1- A, B)**:** Hyaline and narrow; forewing yellow except Sc and R with somewhat black. 15–16 crossveins from origin of Rs to hypostigmal cell, Rs arises after CuA fork, 7 presectoral crossveins before origin of Rs; anterior and posterior Banksian lines distinct; anastomosis of CuA2 and CuP +1A without spot. Hindwing yellow except Sc and R somewhat black, 15–16 cross-veins from origin of Rs to hypostigmal cell, 2 presectoral crossveins before origin of Rs, Rs arises before CuA fork, without anterior and posterior Banksian lines. Hindwing of female with one distinct brownish short stripe in rhegma area, but hindwing of male without. ***Legs*:** Long and slender, yellow with several spots and black dense short setae; femur inflated, 5th tarsomere longer than total length from 1th to 4th tarsomere, tibial spur brick red, well developed, reaching to distal of 4th tarsomere, claw developed and brick red. ***Abdomen*:** Shorter than hindwing, black with sparse white setae. ***Male terminalia*** (Fig.2-C): ectoproct nearly triangle with dense setae, sternite 9 trapezoid. ***Male genitalia*** (Fig.2-D, E): gonarcus strongly bended, ossification weak, parameres basal part combined, distal part fork-like in ventral view and hook-like in lateral view, fork-like part longer than basal part. ***Female genitalia:*** (Fig.2-A, B) ectoproct and lateral gonapophyses with dense stout digging setae; without anterior gonapophyses; posterior gonapophyses fingerlike.

Distribution: China: Beijing, Shandong, Hebei, Shanxi, Inner Mongolia, Jilin, Ningxia; Xinjiang, Liaoning (Fig.3). Korea, Russia, Mongolia, Ukraine, Hungary, Kazakhstan, Kyrgyzstan, Caucasus, Romania.

Materials: 1♀, Beijing Xiangshan, 1952.V.31, Mo Wang; 1♂, Beijing Miaofengshan, 1964.VII.6,Qingyin Chen; 1♀, Inner Mongolia Chifeng, 2004.VII.26, Yanling Zhao; 1♂, Liaoning Xingcheng, 1951. VI. 19, Lvhua Li; 1♂, Hebei Zuo county, 1965.VI.21, Xunke Huang; 1♀, Shanxi Hengshan, 1964.VI.5, Yao Zhou; 1♀, Xinjiang Sha-

wan, 1979. VIII.17, Zhibing Liu; 1♂, Jilin Tumen river, 2003. VII.13, Binshan Liu; 1♀, Ningxia Helan mountain, 1980.VII.21, Fashen Li; 1♀, Hebei, Xiaowutai, 2001.VII.7, Yike;

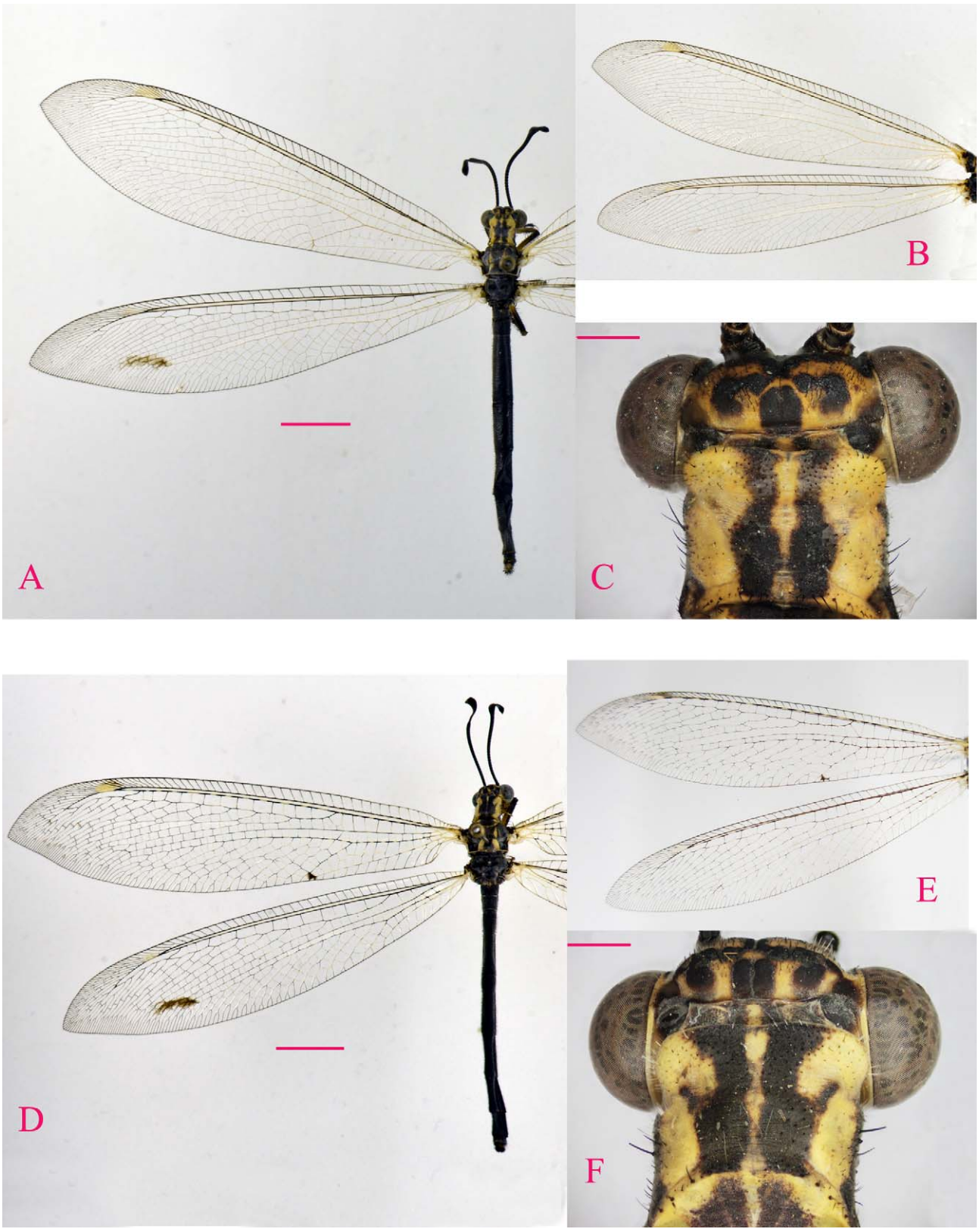

FIGURE 1. A–C: *Deutoleon lineatus*. A. wings of female; B. wings of male; C. head and pronotum, dorsal; D–F: *Deutoleon turanicus*. D. wings of female; E. wings of male; F. head and pronotum, dorsal. Scale bar: A, D-5mm; C, F-0.5mm.

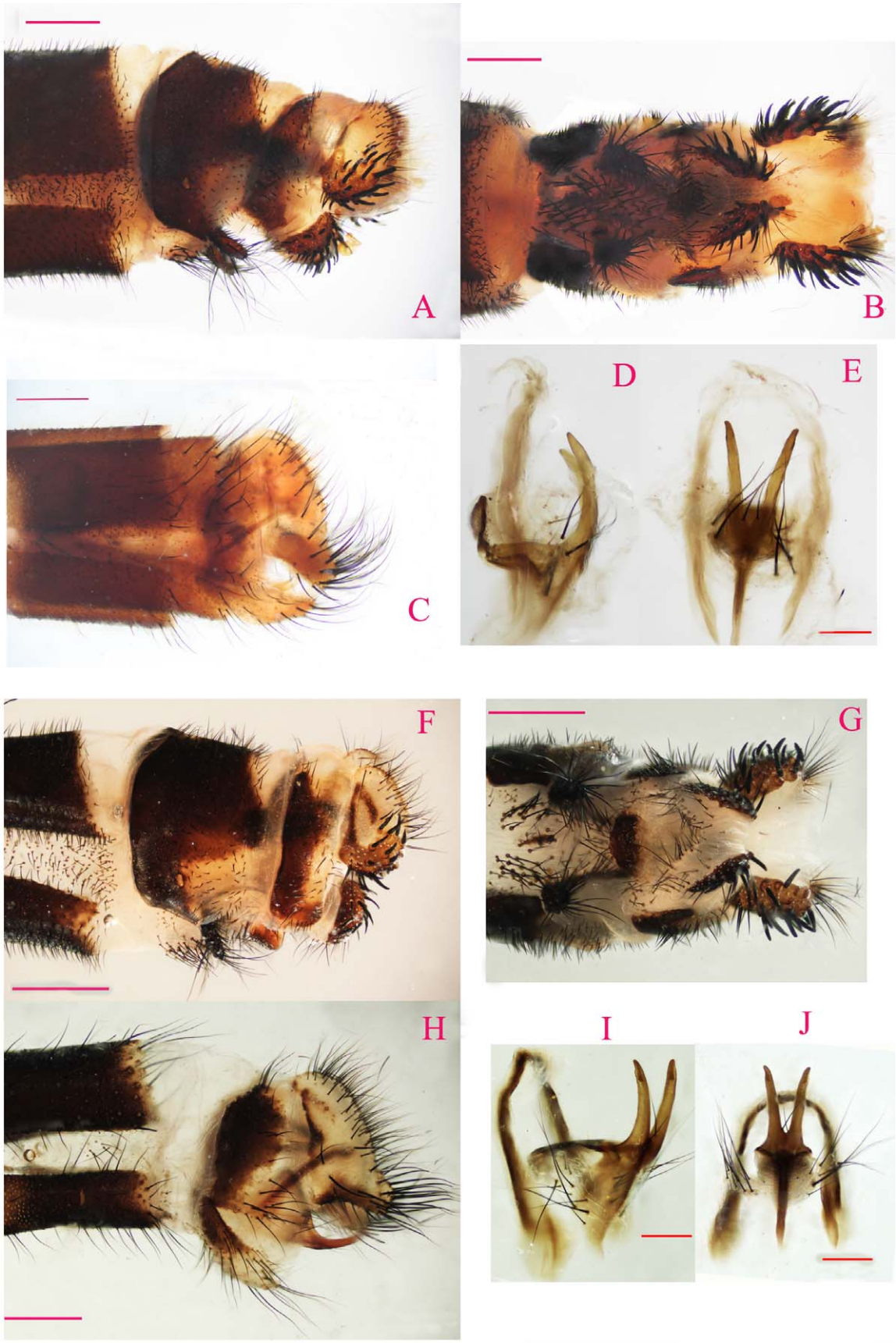

FIGURE 2. A–E: *Deutoleon lineatus*. A. female terminalia, lateral; B. female terminalia, ventral; C. male terminalia, lateral; D. gonarcus-paramere complex, lateral; E. gonarcus-paramere complex, ventral. F–J: *Deutoleon turanicus*. F. female terminalia, lateral; G. female terminalia, ventral; H. male terminalia, lateral; I. gonarcus-paramere complex, lateral; J. gonarcus-paramere complex, ventral. Scale bar: A–C, F–H, 0.5mm; D–E, H–I, 0.2mm.

***Deutoleon turanicus* Navás, 1927** (Fig. 1-D, 4-A)

Deutoleon turanicus Navás, 1927: 18

Diagnosis: This species is very similar to *Deutoleon lineatus*, from which it can be easily separated by the following characters: Wing veins yellow and black alternating, forewing with one conspicuous spot at anastomosis of CuA2 and CuP +1A. The medial black stripes with short black lateral branch on pronotum.

Redescription: Male: forewing 33–45 mm, hind wing 32–43 mm, body length 25–31 mm. Female: 36–45 mm, hind wing 34–44 mm, body length 26–34 mm.

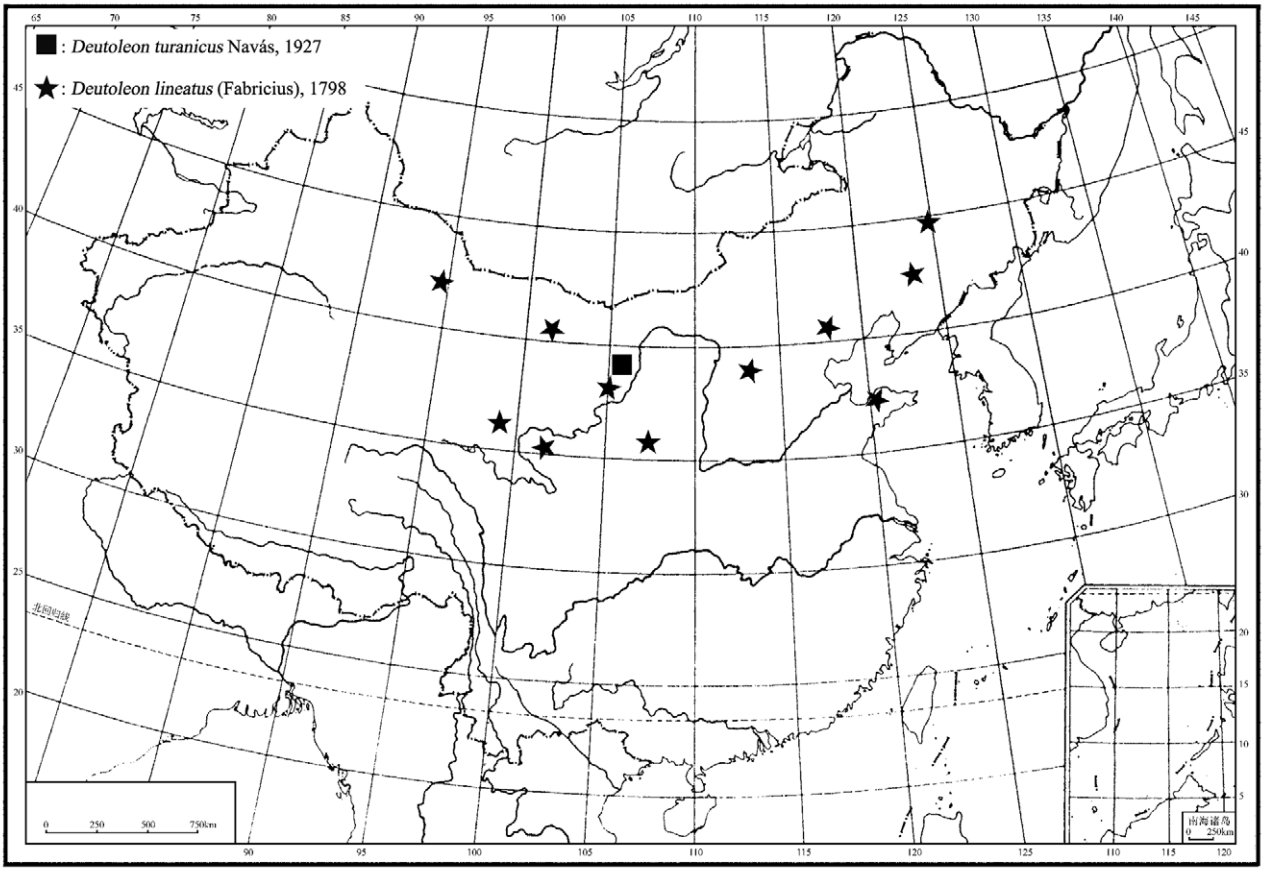

FIGURE 3. The distribution map of the genus *Deutoleon* in China

Head*:** Face yellow with three black spots near scape, antenna clavate; compound eye dark with several black spots, vertex inflated, yellow with black pattern like Fig. 1-F; labrum yellow with sparse black setae, maxillary palpus and labial palpus yellow. ***Thorax*:** Pronotum trapezoid, shorter than broad, yellow with several black setae, two black longitudinal medial stripes of pronotum with black lateral branch. Mesothorax and metathorax black with several yellow stripes. ***Wing (Fig.1-D, E)**:** Hyaline and narrow; forewing Sc and R black, other veins yellow and black alternating, stigma yellow. 14–17 cross-veins from origin of Rs to hypostigmal cell, Rs arises after CuA fork, 7 presectoral crossveins before origin of Rs. Anterior and posterior Banksian lines distinct; anastomosis of CuA2 and Cup +1A with one conspicuous spot. Hindwing black, 15–16 cross-veins from origin of Rs to hypostigmal cell, 2 presectoral crossveins before Rs fork, Rs arises before CuA fork; without anterior and posterior Banksian lines. Hindwing of female with distinct brownish short stripe in rhegma area, but hindwing of male without. ***Legs*:** Long and slender, yellow with several spots and black dense short setae; femur inflated 5th tarsomere longer than total length from 1th to 4th tarsomere. Tibial spur brick red, well developed, reaching to distal of 4th tarsomere. Claw developed. ***Abdomen*:** shorter than wing, black without spots, with sparse white setae. ***Male terminalia*** (Fig.2-H): ectoproct nearly triangle with dense setae, sternite 9 trapezoid. ***Male genitalia*:** (Fig.2-I, J) gonarcus strongly bended, ossification strong, parameres basal part combined, distal part fork-like and hook-like at lateral view, fork-

like part as long as basal part. ***Female genitalia*:** (Fig.2–A, B) ectoproct and lateral gonapophyses with dense stout digging setae. Without anterior gonapophyses; posterior gonapophyses fingerlike.

Distribution: China (Inner Mongolia) (Fig.3), Turkey, Mongolia.

Materials: More than 100 specimens collected from Helan Mountain by Qingbin Zhan in 7.23–8.20, 2010.

Remarks: *Deutoleon turanicus* is similar to *Deutoleon lineatus*, but the latter can be distinguished from the former by forewing veins yellow, without black spot at anastomosis of CuA2 and CuP +1A, the black medial stripe with indistinct lateral branch on pronotum, gonarcus-paramere complex fork-like part longer than basal part.

The species were principally collected at about 2000 meters above sea level of Helan Mountain which is arid and semi-arid climate and locate at 106°E 38.8°N. *D. turanicus* is a typical Palearctic species, their habitat as Fig.4-B. It likes to rest on *Achnatherum splendens* during day time.

FIGURE 4. *Deutoleon turanicus.* A. adult ♀; B. habitat of adult.

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