A review of the species of *Asyndetus* from China (Diptera: Dolichopodidae)

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Abstract – The species of the genus *Asyndetus* from China are reviewed. The following two species are described as new to science: *A. beijingensis* n. sp., *A. guangxiensis* n. sp. A key to the known species of *Asyndetus* from China is given.

The genus *Asyndetus* Loew, 1869 belongs to the subfamily Diaphorinae (Dolichopodidae). It is worldwide distributed with about 80 known species. There are 14 species known from the Palaearctic Region (Negrobov 1991) and 11 species from the Oriental Region (Grootaert & Meuffels 2002). Up to now, the following 5 species have been known from China (Becker 1922, Parent 1926, Negrobov 1973): *A. calcara-tus* Becker, 1922; *A. latifrons* (Loew, 1857); *A. longicornis* Negrobov, 1973; *A. mutatus* Becker, 1922; *A. perpulvillatus* Parent, 1926. The males of *Asyndetus* exhibit a number of secondary sexual characters, which are the loss of the claws generally associated with enlarged pulvilli, different shape and colour of the palpi and slight differences in shape of antenna.

In this paper, the species of *Asyndetus* from China are reviewed. Two species are described as new to science. A key to the six known species of the genus *Asyndetus* from China is presented.

The types of the new species are kept in the Insect collection of China Agricultural University (CAU).


**Genus *Asyndetus*** Loew


**Diagnosis** – Small to medium-sized Diaphorinae, body length 1.5-4.5 mm. Eyes in both sexes broadly separated. *acr* present, biseriate or irregularly biseriate; usually 5-6 strong *dc*, although sometimes only four; propis- ternum with 2-3 short setae on lower part and 1-2 on upper part. Pulvilli sometimes enlarged in males. Wing: costa ending at *R*₄₊₅, well before wing apex; vein *M* usually with bend or weakening in distal third of wing, with distal section of *M* either weakly joined to its base, or distinctly displaced anteriad; crossvein m-cu usually present, positioned basally and making *Cu₅/A₅* ratio small, less than 0.25. Male sternum 8 usually with four strong curved setae that projected posteriad; epandrium circular; epandrial lobe usually large and subtriangular; cercus short and lobate.

**Distribution** – Worldwide distributed with about 80 known species.

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Key to species (males) of Asyndetus from China

1. Crossvein m-cu present .......................... 2
   – Crossvein m-cu absent; first flagellomere longer than wide .......................... longicornis Negrobov

2. Tibiae black ........................................ 3
   – Tibiae yellow; mid femur with long ventral bristles ...................................... perpulvillatus Parent

3. Legs wholly black .................................. 4
   – Fore tibia brownish yellow .......................... 5

4. Fore tarsomeres 1-2 with one row of strong pv .............................. beijingensis, n. sp.
   – Fore tarsus without bristles ................ guangxiensis, n. sp.

5. Hind tibia brown to black with basal half brownish red .......................... calcaratus Becker
   – Hind tibia wholly brown to black .......................... latifrons (Loew)

Asyndetus beijingensis n. sp. (figs. 1-3)


Diagnosis – Legs entirely black. Fore tarsomeres 2-3 shortened. Fore tarsomeres 1-2 with one row of strong pv.

Description – Male. Body length 3.6 mm, wing length 2.9 mm.
   Head metallic green with pale gray pollen. Hairs and bristles on head black; middle and lower postocular bristles (including postero-ventral hairs) pale yellow. Antenna (fig. 2) black; first flagellomere 0.83 times as long as wide; arista black, short pubescent, with basal segment very short. Proboscis black, rarely with black hairs; palpus black with four black bristles (three short bristles and one long bristle).

Thorax metallic green with pale gray pollen. Hairs and bristles on thorax black; four uniformly strong long dc, 6-7 paired acr; one long h, one long ih, one long npl, one long av; scutellum with two pairs of bristles (apical pair thick and long, basal pair short and hair-like). Propleuron with one black bristle on lower portion. Legs entirely black. Hairs and bristles on legs black; fore coxa with four strong anterior and apical bristles; mid coxa with one long antero-outer bristle at basal 1/4; hind coxa with one outer bristle at basal 1/4. Fore femur with one row of av and pv; mid femur apically with one row of three longer av and three slightly short pv. Fore tibia with one av, apically with four bristles; mid tibia with two-three ad and four pd, apically with four bristles; hind tibia with two long pd, apically with one long precapical pd, one row of three set closely av and two-three hair-like v curved apically. Fore tarsomeres 1-2 with one row of strong pv. Legs without claws; elongated pulvillus of fore leg as long as tarsomere 5. Relative lengths of tibia and 5 tarsomeres LI 1.0 : 0.55 : 0.1 : 0.07 : 0.05 : 0.1; LII 1.4 : 0.65 : 0.3 : 0.2 : 0.1 : 0.1; LIII 1.6 : 0.4 : 0.4 : 0.2 : 0.1 : 0.1. Wing (fig. 1) tinged with grayish; veins black, R4, 5 and M divergent apically. CuAx ratio 0.17. Squama yellowish with pale hairs. Halter pale yellow.

Abdomen metallic green with pale gray pollen. Hairs and bristles on abdomen black.

Male genitalia (fig. 3). Lateral lobe on epandrium triangular with one short apical bristle; surstylus long and curved, narrow medially and rounded apically; cercus bilobate with moderately long bristles; aedeagus slender.

Female. Unknown.

Distribution – China (Beijing).

Remarks – The new species is somewhat similar to Asyndetus latifrons Loew (Negrobov 1973), but may be easily separated from the latter by the different shape of the surstylus on the epandrium. In latifrons, the surstylus on the epandrium is rather wide and thick.

Etymology – The specific name refers to the type locality Beijing.

Asyndetus calcaratus Becker

Asyndetus calcaratus Becker, 1922: 84. Type locality: Anping, Formosa.

Distribution – China (Taiwan).
Asyndetus from China

Remarks – The species is easily identified by the hind tibia swollen at tip with one strong bent ventral bristle at basal 1/4.

Asyndetus guangxiensis n. sp.
(figs. 4-7)

Type material – Holotype male, Guangxi: Tiane, Gaoniang-Longli (300 m), 9-VIII-2002, D. Yang. Paratype, one female, same data as holotype.

Diagnosis – Legs entirely black. Hind femur with one row of *ad*, *pd* and *av*.

Description – Male. Body length 3.3 mm, wing length 2.9 mm.

Head metallic green with pale gray pollen. Hairs and bristles on thorax black; four uniformly strong *dc*, 5-6 irregular paired *acr* short and hair-like; scutellum with two pairs of bristles (apical pair thick and long, basal pair short and hair-like). Propodeon with one black bristle on upper portion and one black bristle on lower portion. Legs entirely black. Hairs and bristles on legs black; fore coxa with four anterior and apical bristles; mid coxa with two anterior outer bristle; hind coxa with one outer bristle near base. Fore femur with closely set three *pd* at middle and one rows of *av* and *pv*; mid femur with one row of *av*; hind femur with one row of *ad*, *pd* and *av*. Fore tibia apically with two bristles; mid tibia with one *ad* and one *pd*, apically with three bristles; hind tibia with two *ad* and two *pd*, apically with four bristles. Legs without claws; elongated pulvilli of fore leg longer than tarsomere 5. Relative lengths of tibia and 5 tarsomeres LI 1.15 : 0.65 : 0.4 : 0.25 : 0.1 : 0.13; LII 1.4 : 0.65 : 0.4 : 0.25 : 0.1 : 0.13; LIII 1.65 : 0.5 : 0.5 : 0.3 : 0.2 : 0.15. Wing (fig. 4) hyaline; veins brown, *R_{4+5}* and *M* divergent apically. *CuAx* ratio 0.18. Squama pale yellow with pale hairs. Halter pale yellow.

Abdomen dark metallic green with pale gray pollen. Hairs and bristles on abdomen black. Sternite 4 with one pair of strong posterior bristles; sternite 8 with four strong bristles.

Male genitalia (fig. 6). Lateral lobe on epandrium distinct, with one long apical bristle on finger-like process and a shorter subapical bristle; surstylus straight and somewhat tapering toward apex with a short and thick process basally; cercus nearly semicircular with moderately long bristles; hypandrium (fig. 7) long and oblique acute apically in ventral view; aedeagus slender.

Female. Body length 4.0 mm, wing length 3.2 mm.

Distribution – China (Guangxi).

Remarks – The new species is somewhat similar to Asyndetus obscurus Meuffels & Grootaert, but may be separated from the latter by the subquadrate lateral lobe and the strongly bristled legs. In obscurus, the lateral lobe is long with three apical bristles, and the legs are weakly bristled (Meuffels & Grootaert 1993).

Etymology – The specific name refers to the type locality Guangxi.

Asyndetus latifrons (Loew)
Diaphorus latifrons Loew, 1857: 46. Type locality: Silesia.


Distribution – China (Henan, Taiwan), Central Europe, Banglandesh, India, Thailand, Philippines.

Remarks – For the diagnosis and illustration of this species, see Grootaert & Meuffels (2002).
Asyndetus longicornis Negrobov


**Distribution** – Europe; Asia (Mongolia, China).

**Remarks** – The species is easily identified by the crossvein m-cu absent and first flagellomere longer than wide.

Asyndetus mutatus Becker

Asyndetus mutatus Becker, 1922: 84. Type locality: Tainan, Formosa.

**Distribution** – China (Taiwan).

**Remarks** – The species was established based on a single female holotype. Its male is still unknown.

Asyndetus perpulvillatus Parent

(figs. 8-11)

Asyndetus perpulvillatus Parent, 1926: 126. Type locality: China.


**Diagnosis** – First flagellomere nearly as long as wide. Tibiae and tarsi yellow except hind tibia with brown apex.

**Description** – Male. Body length 3.1-3.3 mm, wing length 2.9-3.3 mm.

**Head** metallic green with pale gray pollen. Hairs and bristles black; ocellar tubercle distinct with two strong oc and two posterior hairs; middle and lower postocular bristles (including postero-ventral hairs) pale yellow. Antenna (fig. 9) black; first flagellomere nearly as long as wide; arista black, short pubescent, with very short basal segment. Proboscis dark brown with blackish hairs; palpus dark brown with black hairs and two black apical bristles.

**Thorax** dark metallic green with pale gray pollen. Hairs and bristles on thorax black; four uniformly strong dc, 6-7 paired acr short and hair-like; one long hb, one long ih, one long npl, one long sa; scutellum with two pairs of bristles (basal pair weak and hair-like, apical pair long and strong). Propleuron with two black bristles on lower portion. Legs black; all coxae black; femora with yellow tips; tibiae and tarsi yellow except hind tibia with brown apex; fore and mid tarsi from tip of tarsomere one onward dark brown, hind tibia with brown apex, hind tarsomere one dark brown. Hairs and bristles on legs black; fore coxa with four anterior and apical bristles; mid coxa with two anterior outer bristles at basal 1/4; hind coxa with one outer bristle at basal 1/4. Fore femur with one row of av and pv; mid femur with one row of 5-6 av and 6 pv (inner three very long); hind femur with one row of av and pv. Fore tibia with one ad and one pd, apically with two bristles; mid tibia with two ad and two pd, apically with three bristles; hind tibia with two ad and 3-4 pd, apically with three bristles. Legs without claws, elongated pulvilli longer than tarsomere 5. Relative lengths of tibia and 5 tarsomeres LI 1.4 : 0.6 : 0.2 : 0.13 : 0.1 : 0.15; LII 1.5 : 0.85 : 0.3 : 0.2 : 0.1 : 0.15; LIII 1.8 : 0.5 : 0.45 : 0.3 : 0.1 : 0.15. Wing (fig. 8) slightly tinged with grayish; veins brown, R4+5 and M little divergent apically. CuAx ratio 0.18. Squama pale yellow with pale hairs. Halter pale yellow.

**Abdomen** dark metallic green with pale gray pollen. Hairs and bristles on abdomen black. Sternum 4 with two bundles of two strong posterior bristles; sternum 8 with two strong bristles.

**Male genitalia** (figs. 10). Lateral lobe on epandrium indistinct with one long finger-like process bearing one bristle; surstylius wide, with one thick finger-like process basally; cercus nearly oval with long bristles; hypandrium (fig. 11) with acute apex in ventral view; aedeagus long.

**Female**. Body length 3.0-3.6 mm, wing length 2.9-3.6 mm.
**Distribution** – China (Beijing, Fujian).

**Remarks** – This species can be easily separated from other species by the indistinct lateral lobe with a long finger-like process bearing one long bristle.

**Discussion**

Seven species of *Asyndetus* are known to China. Among them two species occur in the Palaearctic and Oriental Realms: *A. latifrons* Loew in South China Region (Taiwan Subregion) and North China Region (Huang-huai plains Subregion, Henan); *A. perpulvillatus* Parent in South China Region (Taiwan subregion and Min-Guang Subregion, Fujian) and North China Region (Huang-huai plains Subregion, Beijing). Three species (*A. calcaratus*, *A. mutatus* and *A. guangxiensis*) are scattered only in South China Region: Taiwan Subregion and Min-Guang Subregion (Guangxi), which both belong to the Oriental Realm. *A. longicornis* Negrobov occurs in Neimeng-xinjiang Region, which belongs to the Palaearctic Realm.

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