

## **SINOPODA, A NEW GENUS OF HETEROPODINAE (ARANEAE, SPARASSIDAE) FROM ASIA**

**Peter Jäger:** Institute for Zoology, Johannes Gutenberg-University, Saarstr. 21,  
55099 Mainz, Germany

**ABSTRACT.** *Sinopoda* new genus (Araneae, Sparassidae, Heteropodinae) is described from Asia. It is recognizable only from genital characters. At present, the new genus comprises 25 species from Japan, Korea, China, Thailand, Malaysia and east India. *Heteropoda campanacea*, *H. forcipata*, *H. hamata*, *H. koreana*, *H. licenti*, *H. marsupia* (?), *H. minschana*, *H. serrata*, *H. shennonga*, *H. stellata* and *Panaretidius microphthalmus* are placed in *Sinopoda* new genus. Relationships to other heteropodine genera are discussed.

Jäger (1998a) identified somatic characters, which are useful for distinguishing suprageneric taxa in the Sparassidae. At present, nine heteropodine genera are known from Asia: *Adrastis* Simon 1880, *Heteropoda* Latreille 1804, *Panaretidius* Simon 1906, *Panaretus* Simon 1880, *Pandercetes* L. Koch 1875, *Parhedrus* Simon 1887, *Spariolenus* Simon 1880, *Torania* Simon 1886, *Yiinthi* Davies 1994. Most of the species belonging to *Sinopoda* new genus were formerly described under *Heteropoda*.

### **METHODS**

The following abbreviations are used in the text: AC, anterior width of carapace; AL, abdomen length; ALE, PME, AME, PLE, ME, LE, AE, PE refer to anterior lateral eyes, posterior median eyes, etc.; AW, abdomen width; BL, body length; CH, carapace height; CL, carapace length; CW, carapace width; GL, gnathocoxae length; GW, gnathocoxae width; LL, labium length; LW, labium width; mm, millimeters; n, number of examined specimen; SL, sternum length; SW, sternum width. NHMB, Naturhistorisches Museum Basel, NHMW Naturhistorisches Museum Wien, SMF Senckenberg Museum Frankfurt, ZMB, Zoologisches Museum der Humboldt-Universität Berlin.

Spine notation follows Davies (1994), exceptions are given in brackets. Dissected epigyna were cleared in lactic acid. Measurements are in mm. The variation of measurements is given first, followed by measurements of the lectotype in brackets.

For characterizing the new genus and giving

information of its distribution, 14 undescribed species were examined, which are recognized by the author as species of *Sinopoda* new genus.

### **SYSTEMATICS**

#### ***Sinopoda* new genus**

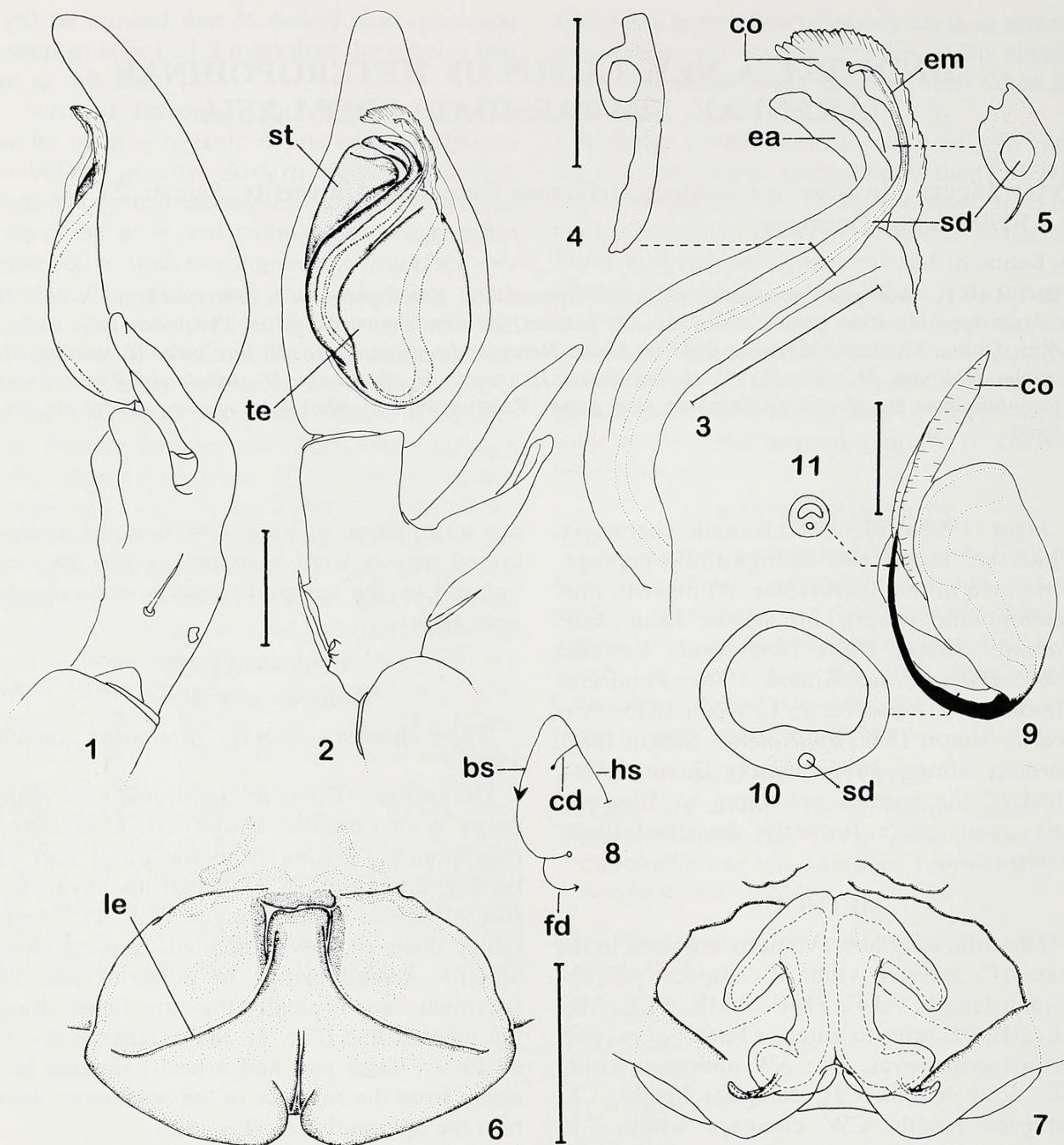
**Type species.**—*Sarotes forcipatus* Karsch 1881.

**Diagnosis.**—Close to *Heteropoda* but male palps with embolic apophysis. Conductor membranous, arising from the distal part of the tegulum (Figs. 2, 3). Tibial apophysis bifurcate, dorsal branch longest (Fig. 1). Copulatory ducts of vulva uncoiled, running from anterior genital orifice to posterior part of spermathecae. Typically they are fused along the median line (Fig. 7). Spermathecae divided into a basal part and a head, situated laterally from the entrance of the copulatory duct into the spermathecae (Fig. 8).

**Etymology.**—The name is an acronym of the prefix *sino-* (belonging to China) and *Heteropoda*. The gender is feminine.

**Characters of checked *Sinopoda*-species.**—Small to large spiders (3–25 mm) with laterigrade legs. *Carapace*: widest above coxa II to III; CL/CW 1.0 to 1.3; CW/AC in ♂ 1.8–2.3, in ♀ 1.4–1.8; fovea and highest point of carapace mostly above coxa III; CL/CH 2.7–6.2. Sternum broadest between coxa II; SL/SW 0.9–1.1 (0.9 = BL < 6mm). LW/LL 0.9–1.3 (BL > 8mm), 1.3–1.7 (BL < 6mm). GL/GW 1.5–2.4. *Abdomen*: oval, AL/AW 1.2–3.3 (mean 1.7; n = 24). *Eyes*: in two rows, viewed from above both rows recurved. *Chelicerae*: with 3 anterior and 4





Figures 1–11.—1–8. Genital characters of paralectotypes of *Sinopoda forcipata* NEW COMBINATION from Japan. 1. Lateral aspect of left palp; 2. Ventral aspect of left palp; 3. Ventral aspect of embolus and conductor; 4, 5. Cross sections of embolus; 6. Ventral aspect of epigynum; 7. Dorsal aspect of vulva; 8. Schematic course of right spermatheca; 9–11. Male genital characters of *Heteropoda venatoria* Linnaeus: 9. Ventral aspect of tegulum; 10, 11. Cross sections of embolus. Abbreviations: Bs, Basal part of spermathecae; cd, copulatory duct; co, conductor; ea, embolic apophysis; em, embolus; fd, fertilization duct; hs, head of spermathecae; le, ledges of epigynum; sd, sperm duct; st, subtegulum; te, tegulum. Scales for Figs. 1–3, 6, 9 = 1.0 mm; Figs. 4, 5, 10, 11 = 0.1 mm.

posterior teeth and several denticles in between them; as in all other heteropodine species majority of denticles near the anterior teeth (Jäger 1998a). *Legs*: length in most cases 2143 ( $n = 24$ ), also 2413 ( $n = 7$ ), 2431 ( $n = 3$ ), 2134 ( $n = 2$ ). In cavernicolous spe-

cies and in all males legs, especially tibiae and metatarsi, elongated relative to body length. Scopulae on tarsi and distal part of metatarsi, sparse in some species. Palpal claw in females present, with 5 to 11 long teeth. *Color*: variable, pale brown and pale yellow



in cavernicolous species to dark brown, with or without pattern.

**Male palp:** Part of subtegulum visible in ventral view. Tegulum oval in general shape. Embolus more or less s-shaped, arising from prolateral part of tegulum in a 6 to 8 o'clock position, basally embedded in a tegular flange (Fig. 2). Tip of embolus near membranous and flattened conductor (Fig. 3). Embolus broadened, containing just one cavity (sperm duct) as in *Sinopoda forcipata* NEW COMBINATION (Figs. 4, 5), some species with tooth in subdistal position. Embolic apophysis arising prolaterally from the basal half of the embolus, embedded distally in a subtegular furrow. By comparison, embolus of *Heteropoda* filiform, not s-shaped (Fig. 9) and with two tubuliform cavities, a narrow sperm duct and a large one, which is connected with the tegular cavity (Figs. 10, 11). Conductor thicker, sheath-like, tapering and arising on a prolateral position of tegulum (Fig. 9).

**Epigynum:** Characterized by copulatory orifices covered by two ledges running from a medio-anterior to latero-posterior position. Two posterior lobes in some species divided in the median line. The darkened field of epigynum sometimes extended in two anterior elongated bands, these sometimes separated from epigyneal field (Fig. 6). In *Heteropoda* rims aligned in direction of body axis, in most cases short. Copulatory ducts coiled, if touching each other then only at their origin.

**Distribution.**—Japan, Korea, China, Thailand, Malaysia (Selangor, Sarawak), east India (Assam).

**Natural history.**—Little is known about the representatives of this genus. Deeleman (1998) collected specimens in Borneo (W-Sarawak, Matang reserve) from tree bark and grass. The author observed individuals in China (Shaanxi, Taibai Shan) in leaf litter, running like lycosids during the day. Another species there inhabited natural rock fissures and man-made walls. This species came out at a certain time in the evening to ambush for prey always near the same spot (Jäger 1998b). Other species are reported from caves, though not all of them appear to be restricted to caves.

**Other species included in *Sinopoda*.**—*Sinopoda campanacea* (Wang 1990) NEW COMBINATION, *S. hamata* (Fox 1937) NEW COMBINATION, *S. koreana* (Paik 1968) NEW COMBINATION, *S. licenti*

(Schenkel 1953) NEW COMBINATION, *S. marsupia* (Wang 1991)(?) NEW COMBINATION, *S. minschana* (Schenkel 1936) NEW COMBINATION, *S. serrata* (Wang 1990) NEW COMBINATION, *S. shennonga* (Peng, Yin & Kim 1996) NEW COMBINATION, *S. stellata* (Schenkel 1963) NEW COMBINATION, *S. microphthalma* (Fage 1929) NEW COMBINATION.

### *Sinopoda forcipata* (Karsch 1881) NEW COMBINATION

(Figs. 1–8)

*Sarotes forcipatus* Karsch 1881:38. (Syntypes: 3♂ (ZMB 2696, 2698/2), 2♀ (ZMB 2694, 2695), 1♀ with epigynum region dissected (epigynum is missing) and a subadult ♂ (both ZMB 2696) - labeled: Japan, leg. Hilgendorf, det. Karsch -, examined. 1♂ (ZMB 2698, both palps and legs entire, PJ 921) hereby designated as lectotype, others as paralectotypes)

*Heteropoda forcipata*: Bösenberg & Strand 1906: 276; Järvi 1912:82, 113; 1914:209; Fox 1936: 127; 1937:7; Suzuki 1952:3, 14; Roewer 1954: 714; Bonnet 1957:2189; Yaginuma 1960:113; 1962a:52; 1962b:75; 1962c:130; 1963:51; 1971: 113; 1975:190, 1986:199; Chikuni 1989:130; Yaginuma 1990:270; Ono et al. 1995:128.

**Diagnosis.**—Male with distal part of embolic apophysis bent at a right angle (Figs. 2, 3); dorsal branch of tibial apophysis broad and tapering (Fig. 1). ♀ posterior lobes of epigynum point towards the median line, closest distance between ledges about  $\frac{1}{9}$  of total width of epigynum (Fig. 6); head of spermathecae two times as long as broad, nearly constant in width (Fig. 7).

**Redescription of male.**—CL 7.3–9.8 (9.1), CW 6.4–8.8 (7.9), AC 3.4–3.9 (3.7), CH 1.5–2.4 (1.9), AL 8.0–11.0 (10.2), AW 4.7–6.3 (5.5). **Color:** Pale yellowish-brown, without distinct pattern. **Eyes:** Diameters AME 0.30–0.44, ALE 0.41–0.53, PME 0.34–0.41, PLE 0.45–0.53, interdistances AME-AME 0.22–0.27, AME-ALE 0.07–0.12, PME-PME 0.33–0.47, PME-PLE 0.52–0.58, AME-PME 0.44–0.49, ALE-PLE 0.36–0.47, clypeus AME 0.41–0.55, clypeus ALE 0.40–0.62; both rows recurved in dorsal view. **Legs and palps:** 2143 (measurements see Table 1). **Spination:** Palps 131, 101, 211(small/0)1. Femora I-II 323, III 333, IV 331. Patellae 101. Tibiae 2326. Metatarsi I 102(1)4, II 1(2)01(2)4, III 2026, IV 3036.



Table 1.—Leg and palp measurements in males (*n* = 8) of *Sinopoda forcipata* NEW COMBINATION.

| Leg segment | Palp      | I         | II        | III       | IV        |
|-------------|-----------|-----------|-----------|-----------|-----------|
| Femur       | 4.3–5.1   | 10.1–12.0 | 11.0–13.6 | 9.1–11.1  | 9.6–11.8  |
| Patella     | 1.5–2.4   | 3.5–5.0   | 3.8–5.0   | 2.7–4.3   | 3.1–4.1   |
| Tibia       | 2.4–2.9   | 11.0–13.0 | 12.1–14.2 | 8.8–10.7  | 9.7–11.5  |
| Metatarsus  | —         | 10.8–13.8 | 12.5–15.4 | 8.8–10.8  | 10.6–12.7 |
| Tarsus      | 3.6–4.3   | 3.5–4.0   | 3.9–4.5   | 2.7–3.5   | 3.4–3.6   |
| Total       | 11.8–14.7 | 39.0–47.1 | 53.3–52.4 | 32.6–39.1 | 36.7–43.1 |

**Female.**—CL 9.7–10.2, CW 8.2–8.8, AC 4.9–5.3, CH 2.4–2.6, AL 10.6–13.9, AW 6.0–8.3. *Color:* As in male. *Eyes:* Diameters AME 0.29–0.44, ALE 0.48–0.55, PME 0.37–0.42, PLE 0.51–0.58, interdistances AME–AME 0.28–0.42, AME–ALE 0.10–0.22, PME–PME 0.48–0.55, PME–PLE 0.63–0.77, AME–PME 0.54–0.67, ALE–PLE 0.58–0.63, clypeus AME 0.63–0.74, clypeus ALE 0.56–0.69. *Legs and palps:* 2143 (measurements see Table 2). *Spination:* Palps 131, 1(0)01, 2121, 1014. Femora I–III 3(4)2(3)3(2/4), IV 33(2)1(2). Patellae 101. Tibiae I–II 22(0/1)26, III–IV 23(1/2)26. Metatarsi I–II 1014, III 2014(2016/2026), IV 3036. Palpal claw with 7–8 teeth.

Other material examined.—3♂2♀ (NHMB 551, labeled: Clubionidae, *Heteropoda aulica* (L. K.), Japan, Yokohama, G.v.R. Merian), 1♀ (ZMB 2396, labeled: *Sarotes aulicus* L. Koch. Nagasaki Westrh.), 1♂ (SMF 4578, labeled: *Heteropoda invicta* (L. Koch), 1♂, Japan: Saga, W. Dönitz S.), 1♂ (SMF 4595, labeled: Eusparassid No. 41, *Heteropoda forcipata* (Ka.), 1♂, China, Roewer det. 1933), 1♂ (NHMW 1879.II.20, labeled: holotype of *Heteropoda invicta*, Inv.-No. 17.863, Coll. Musei Vindobonensis, *Sarotes invictus*, Erber Tausch).

**Note.**—In Japan two species exist, *Sinopoda forcipata* NEW COMBINATION and *S. stellata* NEW COMBINATION. The descrip-

tions by L. Koch (1878) of *Heteropoda aulica* and *H. invicta* have caused some problems. Individuals of *S. forcipata* NEW COMBINATION have been examined by the author, which were determined as *H. aulica* or *H. invicta*. *H. aulica* clearly does not belong to *Sinopoda* new genus. *H. invicta* cannot clearly be recognized from the original description. There are two specimens deposited in NHMW in one vial, which are labeled as 'holotype', one male and one female. Koch described only one female. The female belongs to *Heteropoda venatoria* Linnaeus 1767, the male to *Sinopoda* sp. The original drawing No. 32 by Koch does not permit a clear association with this genus. If the species belongs to *Sinopoda* new genus, the epigynum is turned upside down.

**Color variation.**—In most other specimens examined color dark yellow to brown.

**Distribution.**—Japan, China.

DISCUSSION

Autapomorphic characters of the new genus are: embolic apophysis, bifurcate tibial apophysis, and course of epigyneal rims. The shape of the conductor resembles that of *Barylestis* (Africa), *Pandercetes* (Asia, Australia), *Spatriolenus* (Asia) and two undescribed genera from Asia. In contrast to them, *Heteropoda*

Table 2.—Leg and palp measurements in female (*n* = 5) of *Sinopoda forcipata* NEW COMBINATION.

| Leg segment | Palp      | I         | II        | III       | IV        |
|-------------|-----------|-----------|-----------|-----------|-----------|
| Femur       | 4.0–4.6   | 9.5–10.4  | 10.6–11.5 | 9.1–10.3  | 9.7–10.8  |
| Patella     | 2.1–2.3   | 4.4–4.9   | 4.6–4.9   | 3.8–4.2   | 3.7–3.9   |
| Tibia       | 2.8–3.3   | 10.0–10.6 | 10.2–11.2 | 8.1–9.3   | 8.8–9.7   |
| Metatarsus  | —         | 9.0–9.5   | 9.1–10.0  | 7.3–8.4   | 9.0–9.8   |
| Tarsus      | 4.1–4.5   | 2.8–3.1   | 2.8–3.0   | 2.1–2.9   | 2.2–3.1   |
| Total       | 13.0–14.4 | 36.9–38.4 | 36.8–40.5 | 30.9–34.8 | 34.2–37.3 |



(all continents) and *Parhedrus* (Asia) possess sheath-like conductors. Järvi (1912, 1914) recognized the female genital organs of *S. forcipata* NEW COMBINATION as an extreme specialization and stated that in a hypothetical ancestral epigynum the lateral lobes and the ducts were medially fused. This conclusion can be confirmed, as in several species a median furrow is present. Furthermore, he homologized the head of spermathecae of *Sinopoda forcipata* NEW COMBINATION with the coils in *Heteropoda* spp., which is here rejected. In *Heteropoda* spp. the head of the spermathecae is absent. As *S. forcipata* has uncoiled ducts with a simple cavity, it is supposed that this type of vulvae has been divided from *Heteropoda* s. str. and other heteropodine genera a relatively long time ago. The most primitive species of *Sinopoda* new genus is known from W-Sarawak (Borneo). The typical epigyneal ledges of *Sinopoda* spp. are homologous with those of *Heteropoda* spp., but in the latter genus they either are covered by the lateral lobes or are situated in the anterior part of the epigynum. For these reasons, I consider *Sinopoda* new genus a monophyletic group, whose exact placement within the Heteropodinae is not yet clear. To elucidate intergeneric relationships more taxa need to be examined.

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