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## A new species and additional records of *Aradus* Fabricius, 1803 from China (Heteroptera, Aradidae)

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### A b s t r a c t

In this paper a new species from Yunnan province, *Aradus parayunnanus* n.sp., is described; and *A. signaticornis* R.F.SAHLBERG, *A. aterrimus* FIEBER, and *A. abbas* BERGROTH representing new species records for China are reported. In addition several new distribution data are given for seven already formerly reported species.

**K e y w o r d s:** Heteroptera, Aradidae, *Aradus*, new species, new records, China.

### Z u s a m m e n f a s s u n g

In der vorliegenden Arbeit wird eine neue *Aradus*-Art aus der Provinz Yunnan, *Aradus parayunnanus* n.sp. beschrieben, und *A. signaticornis* R.F.SAHLBERG, *A. aterrimus* FIEBER, und *A. abbas* BERGROTH neu für China gemeldet. Von weiteren 7 Arten werden zusätzliche Funddaten aus China mitgeteilt.

### I n t r o d u c t i o n

Although recent studies (HEISS 2001, 2003a, 2003b, 2007b, 2008) brought several new species to light, the flat bug fauna of the vast and diverse territory of China is still insufficiently known. The present paper deals with several new and some additional species records of the genus *Aradus* and a new species is described from Yunnan province.

The material is housed in the special Aradidae collection of the author (CEHI) unless otherwise stated.

Measurements were taken with a micrometer eyepiece, 20 units = 1mm. When citing the text of the labels on the pin attached to the specimens, / separates the lines and // different labels.

### T a x o n o m y

#### New species records

#### *Aradus signaticornis* R.F.SAHLBERG 1848 (photo 1)

Material examined: 1♂ China, Yunnan province / 26 km N Lijiang 15 VI 2007 / Ganzhaizi pass / 27°07.1 N 100°14.9 E, 3000m / J.Hájek & J.Ružička leg. // Collectio / National Museum / Praha, Czech Republic // *Aradus signaticornis* R.Sahlberg, det.E.Heiss 2009.

This species originally described from Finland shows a holarctic distribution and is recorded from Northern Europe through Siberia to Russian Far East, Korea, and Alaska (HEISS 2007a).

The medium sized (4.9 – 6.3mm) species is the first record from China and can easily be recognised, as it is entirely black except the conspicuous white antennal segment III. The identification of the Chinese specimen was ascertained by comparison of its male genital structures with those of European specimens.

***Aradus aterrimus* FIEBER 1864** (photo 2)

Material examined: 1 ♀, China, Yunnan / Heishui 27°13 N 100°19 E / 35 km N Lijiang / 19 VII 1992 S Bečvar lg. (CEHI).

FIEBER described this species on material from England; however, it is widely distributed in Europe, reaches the Caucasus to the south, and extends eastward to Mongolia and Russian Far East (HEISS 2001, 2007a). A habitus illustration and the male genital structures are figured in HEISS 2007a.

First record from China.

***Aradus abbas* BERGROTH 1889** (photo 3)

Material examined: 1 ♂ from an old collection labelled: Canton, China / inspect. H. / Wash. D.C. / 5-15-33 (CEHI).

Described from Canada, *A. abbas* is now recorded from Alaska through Canada to northern United States (HENRY & FROESCHNER 1988, MAW et al. 2000). This nearctic species is adventive and most probably introduced to Canton (Guangzhou) with timber.

No further specimen has since been reported from mainland China.

A d d i t i o n a l r e c o r d s o f k n o w n s p e c i e s

***Aradus lugubris* FALLEN 1807** (photo 4)

Material examined: 1 ♀ China, Shaanxi prov. / Quinling Shan 1300m / E Xunyangba 23 V – 13 VI 2000 / C.Holzschuh lg. (CEHI).

Widely distributed holarctic species, of which records from Shaanxi and Fujian provinces are published.

***Aradus hieroglyphicus* J.SAHLBERG 1878** (photo 5)

Material examined: 4 ♂♂ 5 ♀♀ 3 L5 China, Beijing Shi / 60 km NW Beijing / Badaling 40°3 N 116°0 E / 28 V 2000 J.Turna lg. (CEHI).

As shown by HEISS (2007b) the species reported from China as *Aradus betulae* (LINNAEUS 1758) by HSIAO 1964 and LIU 1981 was later assigned to and described as *A. chinensis* by VÁSÁRHELYI 1988; but is not specifically different from the East-Palaeartic taxon *Aradus hieroglyphicus*, which is also reported from Kirgisia, Russian Far East to Korea. The records from NE and NW China fit well into this distribution pattern.

***Aradus zhengi* HEISS 2001** (photo 6)

Material examined: 1 ♀ China, W Henan 6-7 VI 2006 / Funiu Shan 33°31 N 111°54 E / Baotiaman 1500 – 1750m ( J.Turna lg. (CEHI); 3 ♂♂ 1 ♀ China, Shaanxi / Quinling mts.,

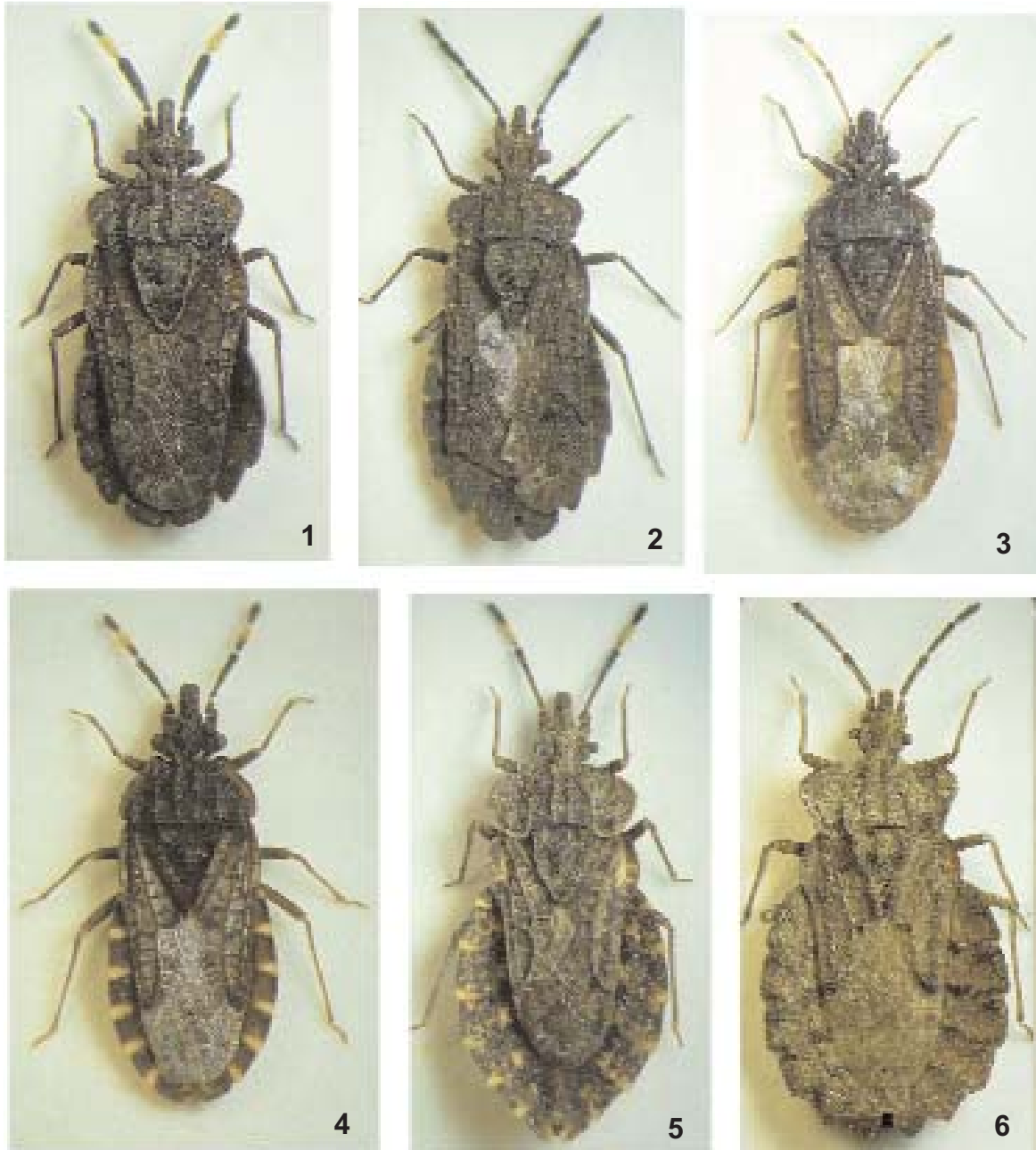


Photo 1-6: Aradus-species. 1 – *A.signaticornis* ♀; 2 – *A. aterrimus* ♀; 3 – *A.abbas* ♂; 4 – *A.lugubris* ♀; 5 – *A.hieroglyphicus* ♀; 6 – *A.zhengi* ♀.

road / Baoji – Taibai vill. / pass 35 km S of Baoji / 22 V 98 M. Tryzna lg. (CEHI); 1 ♂ 1 ♀ 1 L5 China, Shaanxi prov. / Quinling Mts. 1200m / Yunyangba env. / 20 V – 10 VI 2000 C. Holzschuh lg. (CEHI); 1 ♀ China, Gansu province / Lazikon valley 2150m / 34°08.0 N 103°54.5 E / 27 VI 2005 / J. Hájek, D. Král, J. Ručička lg. // Collectio / National Museum / Praha, Czech Republic.

Published records from China are from Shaanxi and Gansu provinces (HSIAO 1964, HEISS 2001).

***Aradus compar* KIRITSHENKO 1913** (photo 7)

Material examined: ♂♂ ♀♀ China, W Henan 2-3 VI 2005 / Funiu Shan 33°5 N 111°9 E / S Baotianman / J.Turna lg. (CEHI); 1♂2♀♀ China, Shaanxi, Taibai / Shan Mts., Houzhenzi vill. / 33°52 N 107°44 E / 10-30 V 2000 / A.Plutenko lg. (CEHI); 2♀ China, Shaanxi / Daba Shan 1800m / 15 km S Shou-Man 26°24 N 107°54 E / 25 III 2000 A.Plutenko lg. (CEHI); 1♂ China, border Hebei – Nei Mongol, pass 1600m / road Chengde – Chifeng / 1-2 VI 2000 41°6 N 118°2 E J.Turna lg. (CEHI); 3♂♂2♀♀ China, Gansu province / Lazikon valley 2150m / 34°08.0 N 103°54.5 E / 27 VI 2005 / J.Hájek, D.Král, J.Ručička lg. // Collectio / National Museum / Praha, Czech Republic.

*A. compar* is so far recorded from Hubei, Gansu, Shaanxi, and Sichuan provinces of China

(HEISS 2003a).

***Aradus bergrothianus* KIRITSHENKO 1913** (photo 8)

Material examined: ♂♂ ♀♀ China, Shaanxi prov. / Quinling mts. 1200m / Xunyangba env. / 29 V – 10 VI 2000 C.Holzschuh lg. (CEHI); 3♀♀ China, N Henan / Wanxianshan 840m / 35°42 N 113°36 E 15 V 2006 J.Turna lg. (CEHI).

East Palaearctic species known from Russian Far East, Korea, and China (Hebei, Sichuan).

***Aradus holzschuhi* HEISS 2003** (photo 9)

Material examined: 3♀♀ China, Yunnan prov., pass / 15 km S of Liziping, 20-21 V 2005 / O.Nakladal lg. (CEHI); 1♂2♀♀ China, Yunnan prov., pass / 50 km W of Judian, 11-13 VI 2005 / O.Nakladal lg. (CEHI); 1♂ China, W Sichuan / W of Zhier 2866m 28°22.293 N 101°32.701 E / 2-5 VI 2006 R.Sehnal & M Tryzna lg. (CEHI); 1♂ China, Yunnan / Haba Shan 1-6 VII 2005 E.Kučera lg. (CEHI); 1♂ China, Yunnan province / 2.5 km SW Haba, 19 VI 2007 / Haba Xueshan Mts. / 27°22.4 N 100°06.7 E 3100m / J.Hájek, D.Král, J.Ručička lg. // Collectio / National Museum / Praha, Czech Republic.

This species of the East Palaearctic *orientalis-compar*-group may be confounded with closely related taxa, and for a correct identification examination of the male genitalic structures is necessary. Single females might not be assigned with certainty.

***Aradus spinicollis* Jakovlev 1880**

Material examined: ♂♂ ♀♀ China, Shaanxi Province / Quinling Shan 1300m / E Xunyangba 23 V-13 VI 2000 / C.Holzschuh lg. (CEHI); 1♂1♀ China, Shaanxi Prov. / Dabashan, 21 km NW Zhenping / 1800m 29 V 2002 Stary lg. (CEHI); 1♂ China, W Hubei / Dalaoshan Forest park / 31°05 N 110°95 E 7 9-10 VI 2004 J.Turna lg. (CEHI); 1♀ China, W Jiangxi / Jinggong Shan / env. Ciping 2-14 VI 94 lg. ignotus (CEHI).

New species

***Aradus parayunnanus* n.sp.** (fig.1-5, photo10,11)

Material examined: Holotype male, China, Yunnan / Habashan, Habashan Mts. / 6-11 VI 2002 alt. 3150 – 3500m / WGS 84: 27°19 N 100°08 E / lgt. Bečvar S. & Fouquè R.+H. (CEHI); Paratypes: 1♀ China, N Sechuan / Shangliang / 24-29 V 2002 / lgt. E.Kučera (CEHI); 1♀ China, SE Sechuan / Jintiang (Tcho-nin) / 15-20 VI 2002 / lgt. E.Kučera (CEHI); 1♀

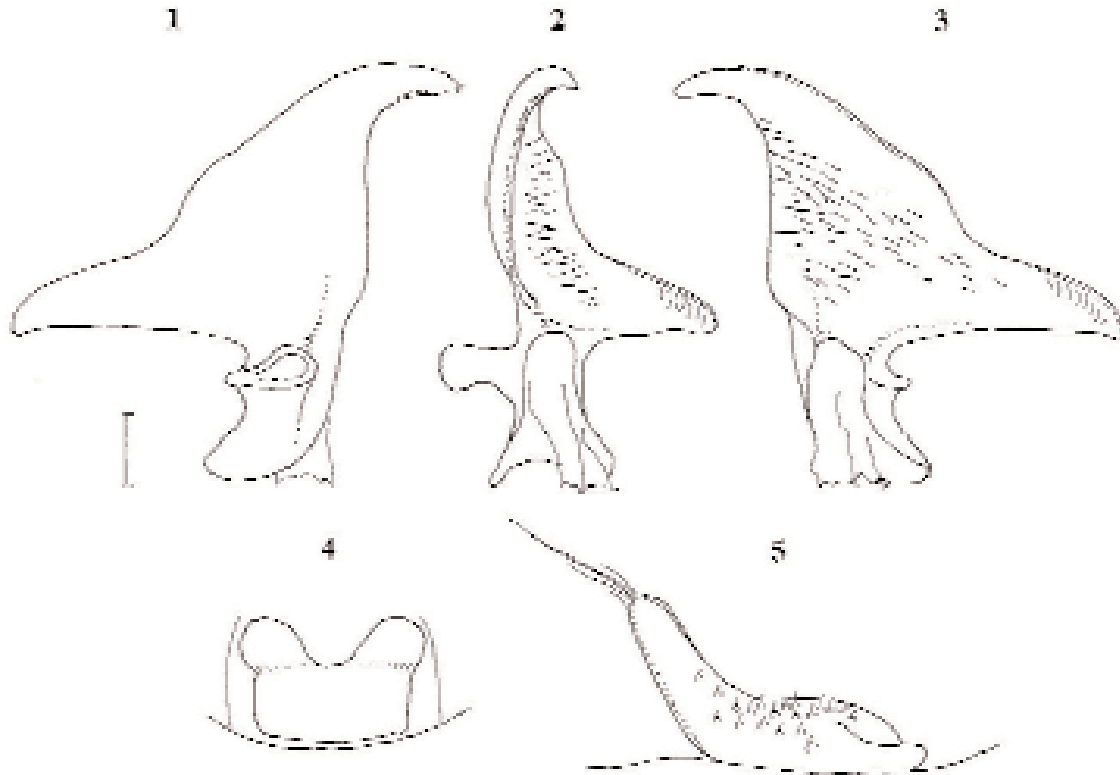


Fig. 1-5: *Aradus parayunnanensis* n.sp. 1 – 3 left paramere in different positions; 4 - tergite IX; 5 – parandrium. Scale 0.1 mm.

China, Yunnan, Zhaotong / Xiaocaoba 1715m / N 27°50.059 E 104°17.554 / 2009 V 28 Yang & Bai / Ent.Mus. CAU, Beijing; 1 ♀ China, Yunnan, Zhaotong / Fengdingshan 716m / N 28°35.404 E 101°14.290 / 2009 V 30 Yang & Bai / Ent.Mus. CAU, Beijing.

#### D i a g n o s i s

*Aradus parayunnanensis* n.sp. belongs to the *oriental – compar* group of East-Palaeartic flat bugs and is closest related to *A. sinensis* KORMILEV 1955 and *A. yunnanensis* HEISS 2003. It is distinguished from *yunnanensis* by the pronotum wider than corium (narrower in *yunnanensis*) and different genitalic structures of the male; from *sinensis* by less laterally expanded pronotum (length / width 2.4-2.7 – 2.85 in *sinensis* ♀), by shorter antennae (length of antennae / width of head = 2.1-2.3 – 2.5 in *sinensis*) and from both species by the entirely black antennal segment II which is lacking the whitish ring. No male specimen of *sinensis* is known to date.

#### D e s c r i p t i o n

Holotype male. Colour dark brown to black; whitish are the apical 2/5 of antennal segment III, the anterolateral margins of pronotum, a basolateral spot on corium, the posterolateral margin of dorsal external laterotergites (deltg) II-VII, a band along inner margin of paratergites VIII, a basal and a preapical ring on femora and tibiae; surface of body covered with small scale-like flat tubercles intermixed with larger round ones, antennae and legs finely granulate.

**H e a d:** About as long as wide (25/24); antenniferous lobes slightly diverging anteriorly, apex acute; antennae 2.29 x as long as width of head, antennal segment I longer than clypeus, II + III constricted at middle, IV cylindrical; length of antennal segments I/II/III/IV = 10/14/16/15; eyes globose protruding laterally; preocular tubercle distinct, directed upward; vertex granulate, flanked by deep longitudinal furrows laterally; postocular lobes rounded; rostrum reaching anterior margin of mesosternum.

**P r o n o t u m:** 2.5x as wide as long (60/24), paranota reflexed with dentate margins, anterolateral angles notched with two larger and several smaller tubercles; humeri rounded, their margins beset with granules; disk with 4 longitudinal carinae, inner ones reaching from anterior to posterior margin, preapically with a crestlike elevation, lateral carinae are shorter.

**S c u t e l l u m:** much longer than wide (32/21), lateral margins carinate, thickened and subparallel at basal 1/3, then converging posteriorly to rounded and reflexed apex; disk raised at basal 1/3, depressed posteriorly.

**A b d o m e n:** Corium expanded and reflexed anterolaterally, veins carinate and densely granulate; lateral margins of deltg III-VI convex, of VII straight, posteroexterior angles of deltg II-VI increasingly protruding, of VII truncate; paratergites VIII with convex inner margins, its lateral margins with a distinct tooth; spiracles II-VII ventral, VIII lateral but hardly visible from above.

**L e g s:** Slender, femora and tibiae straight.

**M a l e g e n i t a l i c s t r u c t u r e s:** parameres with elongate basal and apical projections as fig. 1-3, parandria narrow and elongate with a long seta on apex as fig. 5; tergite IX bilobate apically, fused posteriorly as fig. 4.

**F e m a l e:** Generally as male but of larger size and wider abdomen.

**M e a s u r e m e n t s:** Holotype ♂. Length 7.9mm; width of corium 55; width of abdomen across tergite IV = 73; ratio antennal segment III/II = 1.14. Paratypes ♀♀. Length 8.4 / 8.5mm; width of pronotum 66 / 67; width of abdomen 85 / 76.

**E t y m o l o g y:** para = Greek “next to” and *yunnanus*, the related species.

**D i s c u s s i o n:** After dissection of the male genitalia of the specimen previously reported as the paratype of *Aradus yunnanus* (HEISS 2003), the conspicuous differences then observed led to the opinion, that it represents an unknown taxon. The key given there to the *orientalis-compar* group of *Aradus* leads to the species with antennal segment I longer than clypeus: *discompar* HSIAO 1964, *sinensis* KORMILEV 1955, and *yunnanus* HEISS 2003. However, the new species lacks the whitish ring on the antennal segment II present in all three species, and the male genitalic structures are different from those of *yunnanus*. The male genitalic structures are not yet known for *discompar* and *sinensis*. *Parayunnanus* n.sp. differs from *discompar* by the antennal segment II being shorter than III (longer in *discompar*) and from *sinensis* (according to the description of the only known female holotype) by the more narrow pronotum (2.68x in ♀ n.sp.- 2.85x in *sinensis*) and relatively shorter antennae (ratio length of antennae / width of head 2.1-2.3 in ♀ n.sp – 2.5 in *sinensis*).

Due to the efforts of my friend Dr. Shen Horn Yen the holotype of *sinensis* was recently rediscovered in the collection of the National Chung Hsing University in Taichung, Taiwan. The photo of the holotype submitted to the author shows a pinned specimen which regrettably lacks head and pronotum (although figured in the description) which could not be detected and are obviously lost (photo 12). This abdomen shows no diffe-





Photo 7-12: Aradus-species. 7 – *A.compar* ♂; 8 – *A.bergrothianus* ♂; 9 – *A.holzschuhi* ♂; 10 – *A.parayunnanus* n.sp. holotype ♂; 11 – ditto paratype ♀; 12 – *A.sinensis* abdomen of damaged holotype ♀ and its original labels.

rences to that of related species, therefore new material of this taxon is necessary to ascertain its taxonomic position.

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