

# The Army Ant *Aenictus wroughtonii* (Hymenoptera, Formicidae, Aenictinae) and Related Species in the Oriental Region, with Descriptions of Two New Species

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**Abstract** The *Aenictus wroughtonii* species group is established to include seven species (five named and two new species) occurring in the Oriental and Indo-Australian regions: *A. artipus* WILSON, *A. biroi* FOREL, *A. camposi* WHEELER et CHAPMAN, *A. sagei* FOREL, *A. stenocephalus* JAITRONG et YAMANE, sp. nov., *A. vieti* JAITRONG et YAMANE, sp. nov. and *A. wroughtonii* FOREL. Three species are restricted to western part of the Oriental region, i.e. India and Sri Lanka (*A. biroi*, *A. sagei* and *A. wroughtonii*), and four are mainly distributed in Southeast Asia (*A. artipus*, *A. camposi*, *A. stenocephalus* sp. nov. and *A. vieti* sp. nov.). *A. artipus* is new to Vietnam, and *A. camposi* is new to Sumatra. Among food source of this species group are small ants of the subfamily Formicinae such as *Paratrechina*, *Prenolepis* and *Plagiolepis*.

## Introduction

The genus *Aenictus* SHUCKARD, 1840 is one of the large ant genera in the world, and belongs to the subfamily Aenictinae. The members of the genus are mainly distributed in the Old World tropics and subtropics (GOTWALD, 1995). Currently 89 valid names (species and subspecies) are listed from the Oriental and Indo-Australian regions (WILSON, 1964; TERAYAMA and KUBOTA, 1993; BOLTON, 1995; YAMANE and HASHIMOTO, 1999; ZHOU and CHEN, 1999; ZHOU, 2001; BOLTON *et al.*, 2006).

During our investigation on the Oriental and Indo-Australian species of *Aenictus*, we have recognized a well-defined species group comprising seven Asian species. The members of this group have yellowish and slender bodies, with long legs and antennae. Three of them (*Aenictus biroi* FOREL, *A. sagei* FOREL and *A. wroughtonii* FOREL) are known from India and Sri Lanka, and two (*A. camposi* WHEELER et CHAPMAN and *A. artipus* WILSON) from Southeast Asia. The other two species from Thailand, Vietnam and Taiwan should be new to science. In this paper we define this species group, describe two new species, redescribe the type specimens of the known species, and give some comments on their distribution and biology.

## Materials and Methods

This study is mainly based on the materials deposited in the SKY collection at Kagoshima University (Japan), The Natural History Museum of the National Science Museum (Thailand), and the Ant Museum of Kasetsart University (Thailand). For the five named species syntypes, holotype or paratypes were examined.

The abbreviations used for the measurements and indices are as follows (cf. Shattuck, 2008): TL, total length; HL, maximum head length in full-face view, measured from the anterior clypeal margin to the midpoint of a line drawn across the posterior margin of head; HW, maximum head width in full-face view; SL, scape length excluding the basal of constriction and condylar bulb; ML, mesosomal length measured from the point at which the pronotum meets the cervical shield to the posterior margin of metapleuron in profile; MTL, maximum length of mid tibia, excluding the proximal part of the articulation which is received into the distal end of femur; PL, petiole length; CI (cephalic index),  $HW/HL \times 100$ ; SI (scape index),  $SL/HW \times 100$ .

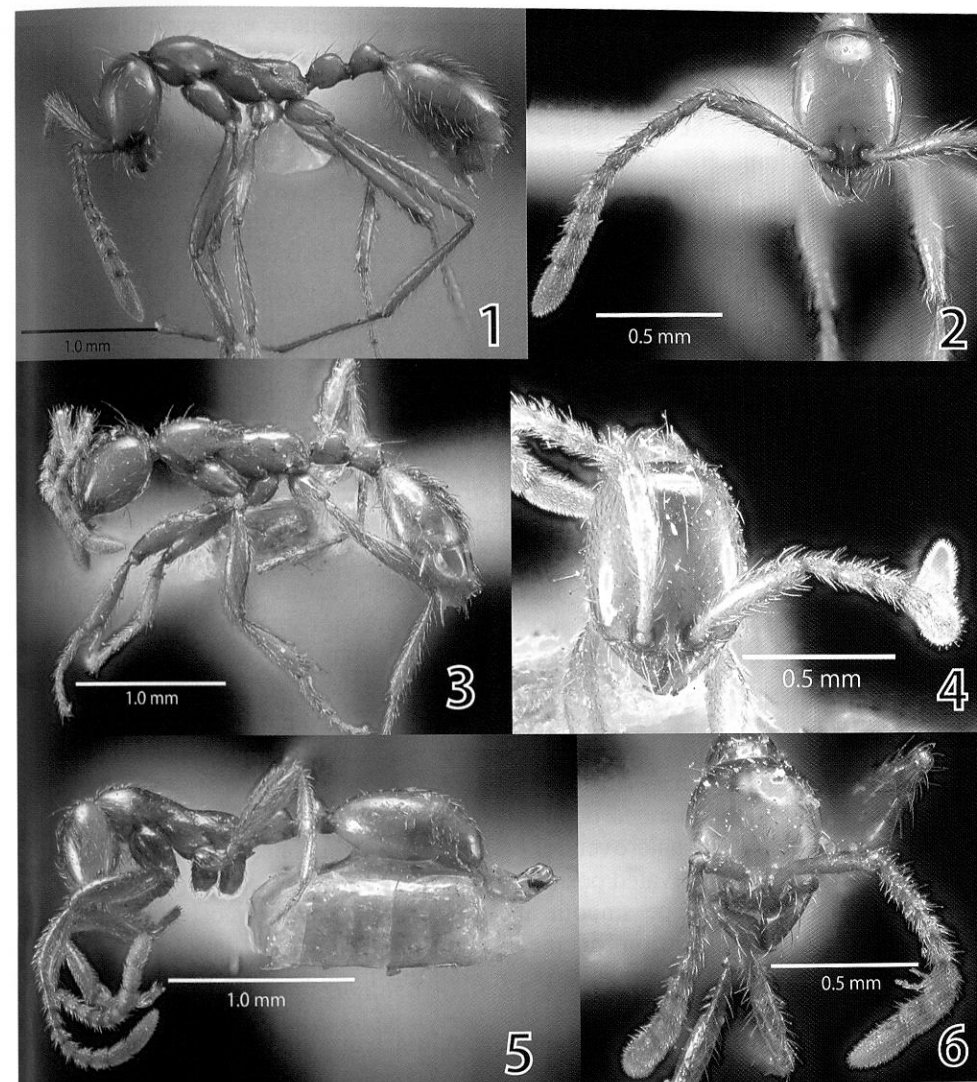
Abbreviations of the type depositories are as follows: AMK, Ant Museum, Faculty of Forestry, Kasetsart University, Thailand; IEBR, the Institute of Ecology and Biological Resources, Vietnam; MCZC, Museum of Comparative Zoology, Cambridge, MA, USA; MHNG, Muséum d'Histoire Naturelle, Geneva, Switzerland; SKYC, SKY Collection at Kagoshima University, Japan; THNHM, Natural History Museum of the National Science Museum, Thailand.

## *Aenictus wroughtonii* species group

All the members of this group share the following characteristics in the worker: head narrow; occipital margin lacking collar; antenna long, 10-segmented, with a strikingly long scape attaining or extending beyond posterolateral corner of head; anterior clypeal margin roundly convex with 5–10 denticles; mandible subtriangular, with masticatory margin bearing 8–12 minute inconspicuous teeth in addition to a large apical tooth with a sharp apex; basal margin of mandible lacking tooth; frontal carina short; parafrontal ridge feeble and incomplete; mesosoma narrow and elongate; legs thin and long; subpetiolar process weakly developed or almost absent; head entirely smooth and shiny; gaster shiny; almost entire body clear yellow to yellowish brown; typhlatta spot absent.

## Key to species

1. Propodeal junction rounded. .... 2
- Propodeal junction angulate. .... 4
2. Subpetiolar process almost absent, anteroventrally not angulate. .... *A. wroughtonii*
- Subpetiolar process weakly developed; its anteroventral corner angulate. .... 3
3. Scape short; SI 100 or less; body hairy; the longest pronotal hair 0.23–0.25 mm; subpetiolar process very low, with ventral outline almost straight. .... *A. sagei*
- Scape long; SI 130–140; body with sparse hairs; the longest pronotal hair approximately 0.15–0.18 mm; subpetiolar process with ventral outline slightly convex. .... *A. artipus*
4. Ventral outline of subpetiolar process convex, anteroventrally not angulate. .... 5



Figs. 1–6. Workers of *Aenictus wroughtonii* group. 1, 2, *A. artipus*; 3, 4, *A. sagei*, lectotype; 5, 6, *A. wroughtonii*, lectotype. 1, 3, 5, Habitus in profile; 2, 4, 6, Head in full-face view.

- Ventral outline of subpetiolar process convex or almost straight; its anteroventral corner angulate. .... 6
- 5. Declivity of propodeum narrower, seen from back strongly tapering above; petiole slightly longer than high; body smaller with TL 2.6–2.7 mm; antenna longer with SI 122–135. .... *A. camposi*
- Declivity of propodeum broader, and more rounded above; petiole as long as high; body larger with TL 3.1–3.2 mm; antenna shorter with SI 114–118. .... *A. biroi*
- 6. Ventral outline of subpetiolar process strongly convex in anterior half; mesonotum partly and propodeum almost entirely densely sculptured; pronotum clearly demarcated from mesonotum by a shallow transverse groove. .... *A. vietii* sp. nov.

- Ventral outline of subpetiolar process almost straight; entire mesonotum and propodeum smooth and shiny, at most with superficial sculpture; pronotum only weakly demarcated from mesonotum. .... *A. stenocephalus* sp. nov.

***Aenictus artipus* WILSON**

(Figs. 1, 2, 16)

*Aenictus artipus* WILSON, 1964: 449, fig. 60; BOLTON, 1995: 58; JAITRONG and NABHITABHATA, 2005: 11.

*Types.* Holotype and six paratypes from Chiangmai [Chiang Mai], Siam [Thailand], X-27-20 (MCZC, examined).

*Measurements* (5 non-type workers). TL 3.2–3.3 mm; HL 0.60–0.63 mm; HW 0.50–0.53 mm; SL 0.65–0.70 mm; ML 1.03–1.05 mm; MTL 0.65–0.68 mm; PL 0.25 mm; CI 80–84; SI 130–140.

*Worker description.* Head in full-face view clearly longer than broad, with its sides slightly convex and posterior margin almost straight. Antennal scape long, extending beyond posterolateral corner of head; antennal segments II–X each longer than broad; II as long as III or less; III as long as IV and V combined; VI shorter than II; VII as long as VI; VIII and IX combined as long as the terminal segment (X). Frontal carina short, not reaching level of posterior margin of torulus. Clypeus short, with its anterior margin bearing 7–10 denticles. Mandible with the apical tooth large and curved, followed by 10–12 minute teeth on masticatory margin. Mesosoma narrow and elongate; seen in profile pronotum convex dorsally; promesonotum sloping gradually to metanotal groove; propodeum slightly lower with its dorsal outline almost straight. Propodeal junction rounded; declivity of propodeum slightly convex. Petiole very narrow, seen from above almost parallel-sided, in profile slightly longer than high, rounded dorsally, with rather flat dorsal face; subpetiolar process weakly produced below; its anteroventral corner bluntly angulate; postpetiole slightly shorter than petiole, with its node elevated posteriorly.

Head and antennal scape smooth and shiny. Mesosoma almost entirely smooth and shiny except for upper portion of meso- and metapleura; a groove present between mesopleuron and metapleuron; area between propodeal spiracle and metapleural gland bulla with punctures and rugae.

Body with relatively sparse, obliquely standing hairs mixed with short hairs over the surface; length of the longest pronotal hair 0.13–0.15 mm. Entire body deep yellow to pale brown, with mandible, part of antenna and legs paler.

*Non-type materials examined.* Vietnam: Ba Vi N.P. (ca. 450 m alt.), 21°N, 105°E, Ha Tai, N. Vietnam, 11 XI 2001, Sk. YAMANE leg., VN01-SKY-72 (SKYC, THNHM). Thailand: Doi Suthep-Pui N.P., ca. 800–900 m alt., Chiang Mai Prov., N. Thailand, 7 VI 2001, K. EGUCHI leg., Eg01-TH-073 (SKYC, THNHM); Doi Suthep-Pui N.P., Chiang Mai Prov., N. Thailand, VII 2008, S. SONTICHI leg., WJT08-TP03 (AMK, SKYC, THNHM); Doi Suthep-Pui N.P., Chiang Mai Prov., N. Thailand, II 2008, S. SONTICHI leg., WJT08-PT01 (AMK, SKYC, THNHM); Doi Ang Khang, Chiang Mai Prov., N. Thailand, 12 VII 2000, W. JAITRONG leg., WJT00-AK01 (AMK, SKYC, THNHM); Doi Ang Khang, Chiang Mai Prov., N. Thailand, 13 VII 2000, W. JAITRONG leg., WJT00-TH50 (AMK, SKYC, THNHM); Doi Chiang Dao W.S. (500–600 m alt.), nr Chiang Mai, N. Thailand, 2 IV 2005, Sk. YAMANE leg., TH05-SKY-19 (SKYC, THNHM); Umpang W.S., Tak Prov., N. Thailand, 15 VII 2005, W. JAITRONG leg., WJT05-N17 (SKYC, THNHM); Phu Luang W.S., 800 msl., Loei Prov., S. HASIN leg., HS07-73; Savanna forest, Phu Khieo, Chaiyaphum

Prov., NE. Thailand, 5 VII 1998, D. WIWATWITAYA leg. (AMK, SKYC, THNHM); Sakhaerat ERS., Nakhon Ratchasima Prov., NE. Thailand, 19 X 2005, W. JAITRONG leg., THNHM-I05-3427 (AMK, SKYC, THNHM); Dry evergreen forest, Sakhaerat ERS., Nakhon Ratchasima Prov., NE. Thailand, 16 IX 2001, W. JAITRONG leg., WJT01-TH19 (AMK, SKYC, THNHM); Hill evergreen forest, Khao Yai N.P., Prachinburi Prov., 25 III 2000, W. JAITRONG leg.

*Distribution.* Vietnam (new record) and Thailand (Fig. 16).

*Bionomics.* Little is known about the bionomics of *A. artipus*. Nothing is mentioned by WILSON (1964) on it. However, judging from the specimens examined this species mainly inhabits forests located in continental Southeast Asia. This species has been collected in various habitats such as hill evergreen forest, savanna forest, evergreen forest, disturbed forest and agricultural area located near natural seasonal forest. JAITRONG and WIWATWITAYA (2006) found *A. artipus* (mentioned as *Aenictus* sp. C) only in the highland (more than 800 m alt.), while our data show that it is occasionally collected also in the lowland (200–500 m alt.). Most colonies of this ant were collected from foraging columns on the forest floor. The single exception was the colony that was collected from a bivouac found under a stone in a dry evergreen forest in the Sakhaerat Ecological Research Station (NE. Thailand) in October (winter). The colony contained larvae but no pupa. So far we have no information about the prey.

*Remarks.* This species is closely related to *A. sagei* and *A. wroughtonii*, all sharing the rounded propodeal junction and smooth and shiny body. *A. artipus*, however, is distinguished from the latter two by the subpetiolar process with clearly angulate anteroventral corner and denser punctuation in the upper portion of meso- and metapleura.

***Aenictus biroi* FOREL**

(Figs. 9, 10, 15)

*Aenictus biroi* FOREL, 1907: 10; WILSON, 1964: 451, fig. 75; BOLTON, 1995: 59.

*Types.* Four syntype workers (one on a pin, three on another) from Pattipola (2,000 m), Ceylon [Sri Lanka] (MHNG, examined). The single specimen mounted on one pin is selected as the lectotype, the others as paralectotypes.

*Measurements.* Worker lectotype and paralectotypes (n = 4): TL 3.1–3.2 mm; HL 0.60–0.65 mm; HW 0.50 mm; SL 0.63–0.65 mm; ML 1.08 mm; MTL 0.63–0.65 mm; PL 0.23–0.25 mm; CI 85; SI 114–118.

*Worker description* (lectotype and paralectotypes). Head in full-face view slightly longer than broad, with its sides and posterior margin roundly convex; posterolateral corner round. Antennal scape long, almost as long as head length; antennal segment II nearly as long as III; IV–VI almost the same in length, and each slightly shorter than III; VII–IX each slightly longer and broader than VI; the last (X) almost as long as VIII and IX combined. Frontal carina well developed, thin and extending posteriorly beyond the level of posterior margin of torulus; seen in profile its dorsal outline concave in the middle. Clypeus short, slightly protruding anteriorly, with its anterior margin almost straight, bearing 6–8 denticles. Mandible with the apical tooth large and curved, followed by a series of 8–10 minute teeth on masticatory margin. Mesosoma relatively thick, seen from above broader ventrally and constricted at mesothorax; in profile pronotum convex dorsally and sloping gradually to metanotal groove; mesopleuron clearly demarcated from metapleuron by a ridge; upper portion of mesopleuron slightly impressed. Propodeum in profile lower than promesonotum,



with nearly straight dorsal outline that slopes down posteriad; area below spiracle impressed; propodeal junction angulate; declivity of propodeum widely and shallowly concave, encircled with a thin rim. Petiole slightly longer than high, elevated posteriorly; subpetiolar process present; its ventral outline strongly convex, without angle or tooth; postpetiolar node short, almost as long as broad.

Head and antennal scape smooth and shiny. Pronotum smooth and shiny, with its anteriormost portion punctate; mesothorax and propodeum with dense punctures; propodeal dorsum with short longitudinal rugae along the angle. Petiole extensively smooth and shiny, with its anteriormost part sparsely punctate; postpetiole almost smooth and shiny. Gaster, femora and tibiae smooth and shiny.

Body with relatively sparse standing hairs mixed with sparse short hairs over the surface; length of the longest pronotal hair 0.18–0.20 mm. Head, waist, gaster, antenna and legs yellow; mesosoma pale brown.

*Distribution.* Sri Lanka (Fig. 15).

*Bionomics.* So far this species is known only from the type colony that was found in hard clay soil in a bare area (WILSON, 1964 after FOREL, 1907).

*Remarks.* This species is similar to *A. camposi* in the angulate propodeal junction, dense punctation on mesothorax and propodeum, and unarmed subpetiolar process. In *A. biroi*, however, the body is slightly larger than in *A. camposi*, and the head is almost as long as broad (in the latter the head is clearly longer than broad), and the declivity of the propodeum is broader and widely rounded above (in the latter it is narrow and distinctly tapers above).

***Aenictus camposi* WHEELER et CHAPMAN**  
(Figs. 7, 8, 16)

*Aenictus camposi* WHEELER et CHAPMAN, 1925: 48, pl. 1, figs. 3–4; WILSON, 1964: 452, fig. 63; BOLTON, 1995: 58; JAITRONG and NABHITABHATA, 2005: 11.

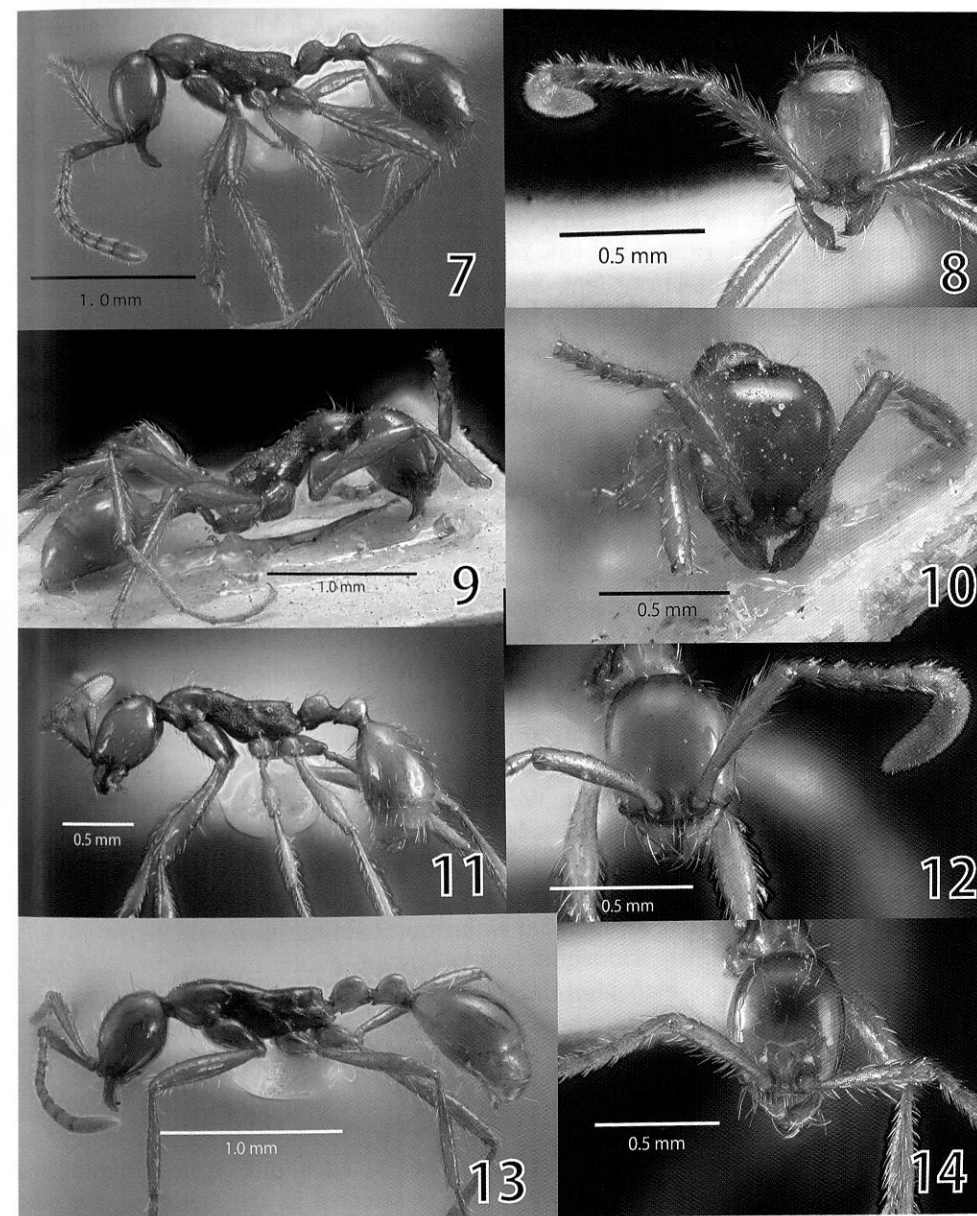
*Types.* Six syntypes on three pins (one on a pin, two on another, three on the other) from Horns of Negros, 1,200 m alt., Dumaguete, Oriental Negros Province, Philippines (MCZC, examined). The single specimen mounted on one pin is selected as the lectotype, the others as paralectotypes.

*Measurements.* Worker (10 non-type workers): TL 2.6–2.7 mm; HL 0.55–0.58 mm; HW 0.43–0.45 mm; SL 0.55–0.58 mm; ML 0.85–0.88 mm; MTL 0.55–0.58 mm; PL 0.25–0.28 mm; CI 74–82; SI 122–135.

*Worker description.* Head in full-face view clearly longer than broad, with its sides and posterior margin slightly convex. Antennal scape long, extending beyond posterior corner of head; antennal segment II slightly shorter than III, but longer than each of IV–VI; the last (X) almost as long as VIII and IX combined and as long as II and III combined. Frontal carina short, thin and not extending beyond the level of posterior margin of torulus. Clypeus short, with its anterior margin bearing 5–7 denticles. Mandible with the apical tooth large and curved, followed by 10–12 minute teeth on masticatory margin. Mesosoma in profile with pronotum convex dorsally and sloping gradually to metanotal groove. Propodeum in profile lower than promesonotum, with nearly straight dorsal outline; propodeal junction angulate; declivity of propodeum seen from back distinctly tapering above, shallowly concave, and encircled with a thin rim. Petiole in profile slightly longer than high, with the dorsal outline rather flat, seen from above relatively narrow, almost parallel-sided; subpetiolar process

present with its ventral outline convex, without angle or tooth; postpetiole slightly smaller than petiole; its node short, almost as long as broad, in profile elevated posteriorly.

Head, antennal scape, pronotum, petiole, postpetiole, gaster, femora and tibiae of legs entirely or extensively smooth and shiny. Antennal flagellum densely punctate. The anteriormost portion of pronotum punctate; mesothorax and propodeum with dense punctures; metapleuron partly or extensively smooth; propodeal dorsum with short longitudinal rugae along the angle.



Figs. 7–14. Workers of *Aenictus wroughtonii* group. 7, 8, *A. camposi*; 9, 10, *A. biroi*, lectotype; 11, 12, *A. vietii* sp. nov., holotype; 13, 14, *A. stenocephalus* sp. nov. holotype. 9, 11, 13, Habitus in profile; 10, 12, 14, Head in full-face view.

Body with relatively sparse standing hairs mixed with sparse short hairs over the surface; length of the longest pronotal hair 0.10–0.13 mm. Head, waist, gaster, antenna and legs yellow; mesosoma pale brown.

*Non-type material examined.* Thailand: Khao Soi Dao W.S., Chanthaburi Prov. E. Thailand, 20 VII 1997, Sk., YAMANE leg., TA970720–3 (SKYC, THNHM); near head quarter, Evergreen Forest., Khao Soi Dao W.S., Soi Dao district, Chanthaburi Prov., 18 I 2008, W. JAITRONG leg., WJT08–TH36 (THNHM); Khao Soi Dao W.S., Chanthaburi Prov. E. Thailand, 20 VII 1997, H. OKIDO leg., TH97–HO–019 (SKYC, THNHM); Evergreen forest, Pala-U Waterfall, Khang Krachan N.P., Prachuap Kirikhan Prov., 25 III 2007, W. JAITRONG leg., WJT07–TH369 (=THNHM–I2007–1803) (AMK, SKYC, THNHM). Malaysia: Niah N.P., Sarawak [Borneo], 28 I 1993, Sk. YAMANE leg., (SKYC, THNHM); Tower Region, Lambir N.P., Miri, Sarawak [Borneo], 19 IV 1993 (SKYC, THNHM); Old Tower Reg. Lambir N.P., Sarawak [Borneo], 30 IV 2004, Sk. YAMANE, SR04–SKY–22 (SKYC, THNHM); Tawau Hills N.P., Sabah, Borneo, E. Malaysia, 8 VII 1996, Sk. YAMANE leg., SB96–SKY–12 (SKYC, THNHM); Gunong Rara Tawau, Sabah, Malaysia, 23 II 1997, K. EGUCHI leg., Eg97–BOR–573 (SKYC, THNHM); Danum Valley, Sabah, Borneo, Malaysia, 4 XI 1996, K. EGUCHI leg., Eg96–BOR–154 (SKYC, THNHM). Brunei: Tasek Merimbun, Brunei, 16 II 1999, Tuah ATAR leg., Eg99–BOR–122 (SKYC, THNHM). Indonesia: Ulu Gadut near Padang, W. Sumatra, Indonesia, 18 II 2007, Sk. YAMANE leg., SU07–SKY–023 (SKYC, THNHM).

*Distribution.* Thailand, Borneo (Sabah, Sarawak, Brunei), W. Sumatra (new record), Philippines (Negros, Luzon) (Fig. 16).

*Bionomics.* *Aenictus camposi* ranges from the Philippines through Sundaland to southern part of continental Southeast Asia. This species is found from lowland to highland and in natural and disturbed forests. ROŚCISZEWSKI and MASCHWITZ (1994) reported that *A. camposi* fed on other small ant species such as five species of *Paratrechina* and *Prenolepis naoroji* in Pasoh Forest Reserve, Malay Peninsula.

*Remarks.* *Aenictus camposi* is most similar to *A. biroii* (see under *A. biroii*) and *A. vieti*. It is easily distinguished from *A. vieti* as follows: the declivity of propodeum is broader with more rounded apex in *A. vieti* (narrower and distinctly tapering above in *A. camposi*); subpetiolar process with anteroventral corner acutely angulate in *A. vieti* (unarmed in *A. camposi*).

In the single colony from Padang, West Sumatra, Indonesia, the workers have smooth and shiny mesosomal dorsum, and the sides of propodeum are almost smooth with sparse punctuation. In other respects they agree well with the type specimens of *A. camposi*.

ZHOU (2001) recorded this species from Guangxi and some other provinces in China. However, according to his figs. 82 and 83 it is most probably *A. vieti*.

### *Aenictus sagei* FOREL

(Figs. 3, 4, 15)

*Aenictus wroughtonii* var. *sagei* FOREL, 1901: 469.

*Aenictus sagei*: WILSON, 1964: 477; BOLTON, 1995: 60.

*Types.* Six syntype workers (two pins, three on each pin) from Dharmasala, India (MHNG, examined). One worker (top on a pin) is selected as the lectotype, the others as paralectotypes.

*Measurements.* Worker lectotype and paralectotypes ( $n = 6$ ): TL 3.1–3.2 mm; HL 0.63–0.65 mm; HW 0.50–0.53 mm; SL 0.50–0.53 mm; ML 1.0–1.1 mm; MTL 0.55–0.58 mm; PL 0.25 mm; CI 80–81; SI 100.

*Worker description* (lectotype and paralectotypes). Head in full-face view subrectangular, distinctly longer than broad, with feebly convex sides and almost straight posterior margin; anterior portion slightly broader than posterior portion. Antennal scape short (shorter than head length; SI 100), not extending beyond the posterior margin of head; antennal segment II as long as III or less; II and III each clearly longer than each of IV–VII; VIII and IX combined as long as the last antennal segment (X). Frontal carina longer than in the other species of this group, extending posteriad beyond the posterior margin of antennal torulus. Clypeus short, with its anterior margin bearing 9–10 denticles. Mandible with the apical tooth large and curved, followed by 10–11 minute teeth on masticatory margin. Mesosoma elongate; in profile pronotum strongly convex dorsally; promesonotum sloping gradually to metanotal groove. Propodeum slightly lower than promesonotum; its dorsal outline almost straight; propodeal junction rounded; declivity of propodeum flattened, laterally margined with a weak ridge. Petiole small, in profile rounded dorsally; subpetiolar process weakly developed, with its ventral outline nearly straight; its anteroventral corner obtusely angulate; postpetiole slightly smaller than petiole, with its node rounded and scarcely longer than broad.

Body extensively smooth and shiny. Anteriormost portion of pronotum minutely punctate; upper portion of mesopleuron with fine rugae.

Body with a few long standing hairs mixed with short decumbent hairs over the surface; length of the longest pronotal hair 0.20–0.25 mm. Head, mesosoma, waist and gaster deep yellow to pale brown; mandible pale yellow; antenna and legs extensively yellow.

*Distribution.* North-central India (Fig. 15).

*Bionomics.* *Aenictus sagei* is known from the type series from Dharmasala (Forel, 1901), and additional material collected in Solon [?Solon] (1,380–1,400 m alt.), north-central India by L. WEATHERILL, who observed workers preying on other small ants such as *Paratrechina* and *Plagiolepis* (WILSON, 1964). These prey ants are in size almost the same as the prey of *A. camposi* observed in Malay Peninsula reported by ROŚCISZEWSKI and MASCHWITZ (1994).

*Remarks.* This hairy species is closely related to *Aenictus wroughtonii*, but is slightly larger than the latter. The pronotal hairs are longer in *A. sagei* (0.20–0.25 mm) than in *A. wroughtonii* (0.10–0.13 mm). The antennal scape is short, shorter than head length with SI 100 in the former, while it reaches posterior margin of head with SI 111–122 in the latter. The subpetiolar process is weakly developed, with its anteroventral corner obtusely angulate in the former, while it is almost absent and unarmed in the latter. *Aenictus sagei* is also similar to *A. artipus*, in which, however, the subpetiolar process is recognizable, with its anteroventral corner more clearly angulated. The antennal scape is longer in *A. artipus* (extending beyond posterolateral corner of head), while it does not exceed the posterior corner in *A. sagei*.

### *Aenictus stenocephalus* JAITRONG et YAMANE, sp. nov.

(Figs. 13–15)

*Types.* Holotype worker from agricultural area, near Phu Kheao W.S., Chaiyaphum Prov., NE. Thailand, 30 I 1999, W. JAITRONG leg., WJT99–AG20. Three paratype workers, same data as holotype.



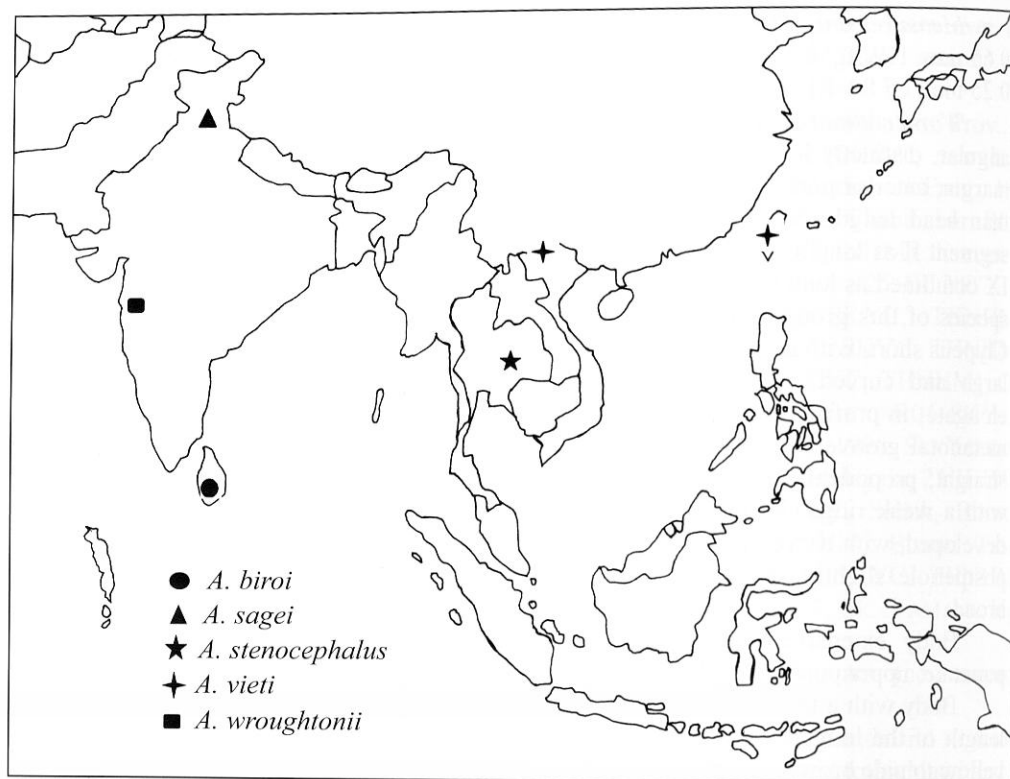


Fig. 15. Distribution of *Aenictus biroi*, *A. sagei*, *A. stenocephalus*, *A. vieti* and *A. wroughtonii*.

*Type depository.* Holotype and one paratype is deposited in THNHM, one paratype in SKYC, and the other in AMK.

*Measurements.* Holotype, three paratype, and one non-type workers ( $n = 5$ ): TL 3.0–3.1 mm; HL 0.55–0.58 mm; HW 0.48 mm; SL 0.63–0.65 mm; ML 1.00–1.03 mm; MTL 0.65–0.68 mm; PL 0.23–0.25 mm; CI 83–86; SI 132–137.

*Worker description* (holotype and paratypes). Head in full-face view narrow, elliptical, distinctly longer than broad, with slightly convex sides and posterior margin of head. Antennal scape long, extending beyond the posterior margin of head (SI 132–137); antennal segment II slightly shorter than III and as long as IV or more; V–VII combined as long as VIII and IX combined and almost as long as the last segment (X). Frontal carina short and thin, not extending beyond the level of posterior margin of torulus. Clypeus short, with very slightly convex anterior margin that bears 8–10 teeth. Mandible with the apical tooth large and curved, followed by 10–12 minute teeth on masticatory margin. Mesosoma elongate; in profile pronotum weakly convex dorsally; promesonotum sloping gradually to metanotal groove. Propodeum slightly lower than promesonotum with its dorsal outline almost straight in profile; propodeal junction angulate; declivity of propodeum widely and shallowly concave, encircled with a thin rim. Petiole large, seen in profile subrectangular, slightly longer than high and almost straight dorsally; subpetiolar process weakly developed, with its ventral outline feebly convex, and anteroventral corner acutely angulate; postpetiole slightly smaller than petiole, with its node rounded above and scarcely longer than broad.

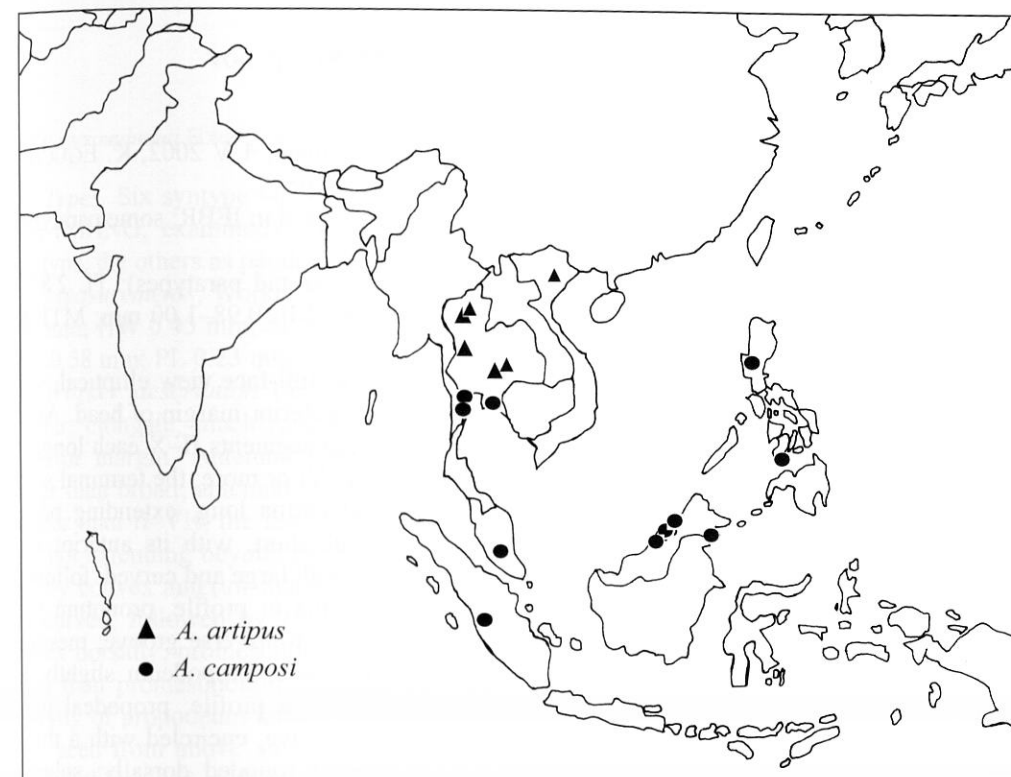


Fig. 16. Distribution of *Aenictus artipus* and *A. camposi*.

Head and antennal scape smooth and shiny. Pronotum smooth and shiny, with its anteriormost portion punctate; mesothorax and metapleuron with dense microreticulae; propodeum extensively smooth and shiny; propodeal declivity entirely sculptured; in the area in front of the angle with fine sculpture. Petiole smooth and shiny, with its anteriormost part sparsely punctate; postpetiole also extensively smooth and shiny. Gaster, and femora and tibiae of legs smooth and shiny.

Body with relatively sparse standing hairs mixed with sparse short hairs over the surface; length of the longest pronotal hair 0.15–0.18 mm. Head, waist, gaster, antenna and legs yellow or pale brown; mesosoma dark brown.

*Non-type material examined.* Thailand: Dry evergreen forest, Phu Kheao W.S., Chaiphaphum Prov., NE. Thailand, 11 VII 1998, W. JAITRONG leg; Savanna forest, Phu Khieo [Kheao] W.S., Chaiphaphum Prov., NE. Thailand, 5 VII 1998, D. WIWATWITAYA leg.

*Etymology.* The specific epithet “*stenocephalus*” is a Latin meaning “narrow headed”.

*Distribution.* Thailand (Fig. 15).

*Bionomics.* The type specimens were collected with pitfall traps in a natural forest (dry evergreen forest and grassland), and non-type specimens from an agricultural area near a natural forest in northeastern Thailand.

*Remarks.* This species is easily distinguished from other species of the group by the almost entirely smooth and shiny body together with angulate propodeal junction. The other important characteristics are the exceptionally narrow head with long antennal scape, subrectangular petiole, only weakly convex pronotum, and almost rudimentary subpetiolar process (but with an acutely angulate anteroventral corner).

*Aenictus vieti* JAITRONG et YAMANE, sp. nov.

(Figs. 11, 12, 15)

*Types.* Holotype worker from Sa Pa, Lao Cai, N. Vietnam, 4 V 2002, K. EGUCHI leg., Eg02-VN-272. Seven paratype workers, same data as holotype.

*Type depository.* Holotype and two paratypes are deposited in IEBR; some paratypes are in SKYC and THNHM.

*Measurements.* Worker (n = 11 including the holotype and paratypes): TL 2.85–2.95 mm; HL 0.58–0.60 mm; HW 0.45–0.48 mm; SL 0.58 mm; ML 0.98–1.00 mm; MTL 0.58–0.60 mm; PL 0.23 mm; CI 78–79; SI 121–128.

*Worker description* (holotype and paratypes). Head in full-face view elliptical, slightly longer than broad, with convex sides and almost straight posterior margin of head. Antennal scape long, reaching posterolateral corner of head; antennal segments II–X each longer than broad; II slightly shorter than III, but as long as each of IV–VI or more; the terminal segment (X) slightly longer than VIII and IX combined. Frontal carina long, extending posteriad beyond the posterior margin of antennal torulus. Clypeus short, with its anterior margin convex, bearing 8–10 denticles. Mandible with the apical tooth large and curved, followed by 10–12 minute teeth on masticatory margin. With mesosoma in profile, pronotum weakly convex dorsally, demarcated from mesonotum by a shallow transverse groove; mesonotum convex, promesonotum sloping gradually to metanotal groove. Propodeum slightly lower than promesonotum with its dorsal outline almost straight in profile; propodeal junction angulate; declivity of propodeum widely and shallowly concave, encircled with a thin rim. Petiole in profile slightly longer than high and somewhat rounded dorsally; subpetiolar process developed, with its ventral margin convex anteriorly and bearing a thin rim below, with the anteroventral corner acutely angulate; postpetiole slightly smaller than petiole; its node rounded dorsally and scarcely longer than broad.

Head smooth and shiny; antennal scape sparsely punctate. Pronotum smooth and shiny, with its anteriormost portion punctate; mesothorax, metapleuron and propodeum with dense microreticulae and several rugae; dorsum and sides of propodeum with short longitudinal rugae along the angle. Dorsum of petiole and entire postpetiole smooth and shiny. Gaster, femora and tibiae smooth and shiny.

Body with relatively sparse standing hairs mixed with sparse short hairs over the surface; length of the longest pronotal hair 0.10–0.13 mm. Head, waist, gaster, mandible, antenna and legs yellow or pale brown; mesosoma brown.

*Etymology.* The specific epithet is dedicated to Dr. Tuan Viet BUI of the Institute of Ecology and Biological Resources, Vietnam.

*Non-type material examined.* Taiwan: Fenchihu, Taiwan, 8 VIII 1969, M. KUBOTA leg. (MCZC). Vietnam: Xeo Mi Ti, 1,680 m., Sa Pa, Lao Cai, N. Vietnam, 27–30 VII 1998, T. V. BUI leg.

*Distribution.* Vietnam and Taiwan (Fig. 15).

*Bionomics.* The type specimens were collected from the highland of the northernmost part of Vietnam.

*Remarks.* *Aenictus vieti* is closely related to *A. camposi*, but is slightly larger than the latter in body length. It is easily distinguished from *A. camposi* as follows: the subpetiolar process anteroventrally is clearly acutely angulate in *A. vieti* (unarmed in *A. camposi*) and the pronotum is demarcated from mesonotum by a shallow transverse groove in *A. vieti* (groove indistinct in *A. camposi*).

*Aenictus wroughtonii* FOREL

(Figs. 5, 6, 15)

*Aenictus wroughtonii* FOREL, 1890: 103; WILSON, 1964: 480, figs. 58–59; BOLTON, 1995: 61.

*Types.* Six syntype workers on two pins (three on each pin) from Thana, near Poona, India (MHNG, examined). The middle specimen mounted on one pin is selected as the lectotype, the others as paralectotypes.

*Measurements.* Worker lectotype and paralectotypes (n = 6): TL 2.5–2.7 mm; HL 0.58–0.60 mm; HW 0.45 mm; SL 0.50–0.55 mm; ML 0.90–0.93 mm; PNW 0.28–0.30 mm; MTL 0.53–0.58 mm; PL 0.23 mm; CI 75–78; SI 111–122.

*Worker description* (lectotype and paralectotypes). Head in full-face view subrectangular, elongate, much longer than broad, with weakly convex sides and feebly convex posterior margin. Antennal scape reaching posterior margin of head; funicular segments longer than broad; antennal segment II as long as III; IV–VII each shorter than III; VIII–IX broader than II–VII; the last (X) as long as VIII and IX combined. Frontal carina short and thin, not extending beyond the level of posterior margin of torulus. Clypeus short, with very slightly convex anterior margin that bears 8–10 teeth. Mandible with the apical tooth large and curved, followed by 10–12 minute teeth on masticatory margin. Pronotum in profile convex dorsally; promesonotum sloping gradually to metanotal groove. Propodeum slightly lower than promesonotum; its dorsal outline slightly convex; propodeal junction rounded; declivity of propodeum laterally margined with weak ridges. Petiole compressed, as long as high, seen from above almost parallel-sided, seen in profile rounded dorsally and slightly higher behind than in front; subpetiolar process undeveloped, with its ventral outline feebly convex and without anterior angle; postpetiole slightly smaller than petiole with its node rounded dorsally, scarcely longer than broad.

Head including mandible and antennal scape smooth and shiny. Entire mesosoma smooth and very shiny, except upper part of mesopleuron and metapleuron which is finely sculptured. Gaster, femora and tibiae smooth and shining.

Body with relatively sparse obliquely standing hairs mixed with short hairs over the surface; length of the longest pronotal hair 0.10–0.13 mm. Entire body deep yellow to pale brown, with mandible and posterior portion of gaster often paler.

*Distribution.* Western India (Fig. 15).

*Bionomics.* No biological information is available for *A. wroughtonii*. However, judging from the type locality the species probably inhabits lowland.

*Remarks.* *A. wroughtonii* is the smallest species in the *A. wroughtonii* group and closely related to *A. sagei* and *A. artipus*. See 'Remarks' for *A. sagei* and *A. artipus* to separate these species.

**Acknowledgments**

We would like to express our deep gratitude to Dr. Bernhard MERZ (Muséum d'Histoire Naturelle Geneva, Switzerland) who loaned us the type materials of *Aenictus biroi*, *Aenictus sagei* and *Aenictus wroughtonii*. Drs. Edward O. WILSON and Stefan P. COVER (Museum of Comparative Zoology, Harvard University) kindly allowed Sk. YAMANE to examine the type materials of *Aenictus artipus* and *Aenictus camposi*. We are grateful to Dr. Saowapa SONTICHAI (Chiangmai University), Dr. Katsuyuki EGUCHI (Nagasaki University), Prof.

Fuminori ITO (Kagawa University), Dr. Tuan Viet BUI (Institute of Ecology and Biological Resources), Mr. Tuah Bin ATAR (Brunei Museum), and Ms. Wara ASFIYA (Museum Zoologicum Bogoriense) for their help in collecting material.

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[Received January 7, 2010; accepted April 19, 2010]