Sociobiology 62(4): 506-512 (December, 2015) DOI: 10.13102/sociobiology.v62i4.364

Sociobiology
An international journal on social insects

RESEARCH ARTICLE - ANTS

A New Species and a New Record of the Ant Genus *Stigmatomma* Roger (Hymenoptera: Formicidae) from India

H Bharti, JS Rilta

Punjabi University, Patiala, India

Article History

Edited by
Gilberto M. M. Santos, UEFS, Brazil
Received 07 March 2014
Initial acceptance 08 April 2014
Final acceptance 13 September 2015

Keywords
Amblyoponinae, *Stigmatomma*, New species, Ants, Himalaya.

Corresponding author
Himender Bharti
Department of Zoology and Environmental Sciences, Punjabi University,
Patiala 147002, India
E-Mail: himenderbharti@gmail.com

ABSTRACT
A new species of the ant genus *Stigmatomma* Roger, 1859 collected from North-eastern Himalaya is described: *Stigmatomma xui* **sp. n**. Another species *Stigmatomma awa* (Xu & Chu, 2012) is also reported for the first time from India and is formally transferred from *Ambylopone* to *Stigmatomma*. A key is provided to distinguish the related species.

Introduction

Based on the comparative study of mandible characters in worker caste, Yoshimura and Fisher (2012) revived *Stigmatomma* from synonymy within *Amblyopone.* It is widely distributed and currently represented by 63 living species and 2 fossil species (Bolton, 2015). Noteworthy contributions to this genus include, Brown, 1960; Taylor, 1979; Morisita et al., 1989; Terayama, 1989; Dlussky et al., 1990; Lattke, 1991; Atanasov and Dlussky, 1992; Onoyama, 1999; Xu, 2001; Lacau and Delabie, 2002; Xu, 2006; Arias-Penna, 2008; Terayama, 2009; Heterick, 2009; Bharti and Wachkoo, 2011 and Xu, 2012.

In India, *Stigmatomma* is represented by 4 species (Bharti, 2011; Bolton, 2015), *S. bellii* (Forel, 1990), *S. rothneyi* (Forel, 1990), *S. minutum* Forel, 1913 and *S. boltoni* (Bharti & Wachkoo, 2011) with recent exclusion of *S. pertinax* (Baroni Urbani, 1978) which has been transferred to *Bannapone* (Eguchi et al., 2015). Here, we describe a new species *S. xui* sp. n. and also document a new record *S. awa* (Xu & Chu, 2012) from India, which we redescribe and formally transfer from *Amblyopone* to *Stigmatomma*. An identification key to the known species of *Stigmatomma* having eleven segmented antenna is provided herewith.

Materials and Methods

The specimens were collected through Winkler's extractor. These were preserved in 70% alcohol and later pinned as per standard procedure in ant taxonomy. The taxonomic analysis was conducted on a Nikon SMZ 1500 stereo zoom microscope.For digital images, Evolution MP digital camera was used on the same microscope with Auto-Montage (Syncroscopy, Division of Synoptics, Ltd.) software. Later images were cleaned with Adobe Photoshop CS5 and Helicon Filter 5. Holotype of new species has been deposited in PUAC (Punjabi University Patiala Ant Collection at Department of Zoology and Environmental Sciences, Punjabi University, Patiala, Punjab, India). Measurements were recorded in millimeters on Nikon SMZ 1500 stereo zoom microscope. Standard measurements and indices follow Xu and Chu (2012).

TL-Total Length: The total outstretched length of the individual, from the mandibular apex to the gastral apex.

HL-Head Length: The straight-line length of the head in perfect full-face view, measured from the mid-point of the anterior clypeal margin to the midpoint of the occipital margin. In species where one or both of these margins is concave, the measurement is taken from the mid-point of a transverse line that spans the apices of the projecting portions.

HW-Head Width: The maximum width of the head in full face view, excluding the eyes.

SL-Scape Length: The straight-line length of the antennal scape, excluding the basal constriction or neck.

ML-Mandible Length: The straight-line length of the mandible measured from apex to the lateral base.

PW-Pronotal Width: The maximum width of the pronotum measured in dorsal view.

WL-Weber's Length: The diagonal length of the mesosoma in profile view, measured from the point at which the pronotum meets the cervical shield to the posterior basal angle of the metapleuron.

PL-Petiole Length: The length of the petiole measured in profile from the anterior process to the posterior most point of the tergite, where it surrounds the gastral articulation.

PH-Petiole Height: The height of the petiole measured in profile from the apex of the ventral (subpetiolar) process vertically to a line intersecting the dorsal most point of the node.

DPW-Dorsal Petiole Width: The maximum width of the petiole in dorsal view.

GL: Gaster Length: The length of gaster in lateral view from the anterior most point of first gasteral segment to the posterior most point (excluding sting).

CI-Cephalic Index = HW×100 / HL.

SI-Scape Index = SL×100 / HW.

LPI-Lateral Petiole Index = PH×100/PL.

DPI-Dorsal Petiole Index = DPW×100/PL.

Acronym of depository

PUAC: Punjabi University Patiala, Ant Collection at Department of Zoology and Environmental Sciences, Punjabi University, Patiala, Punjab, India.

Results

Genus Diagnosis: Head without mandible rectangular or trapezoidal mesosoma and gaster more or less cylindrical in form; mandibles elongate narrow, pointed and slightly curved at apex, middle to basal part of inner margin of mandible with triangular teeth arranged in two rows, or with more or less bifid teeth arranged in a single row, eye moderate to minute to vestigial, placed at the sides on above or below the mid length of head; antennae 11-12 segmented, filiform, the apex only slightly incrassate. Mesosoma narrower than head, promesonotal suture distinct, mesosoma strongly constricted at promesonotal suture and divided in to almost two equal halaves; meso-metanotal sutue effaced; metanotum obliquely truncate posteriorly, basal portion passing into the apical portion by a more or less rounded curve, apical face of metanotum broadened , sides submargined; legs short, robust, tibiae of the posterior legs with two calcaria. Petiole cubical, broadly attached to ABIII, gaster narrow, not wider than the mesosoma, constriction between the basal two segments deep, giving the basal segment a nodiform appearance; sting exserted.

Description of new species

Stigmatomma xui sp. n.

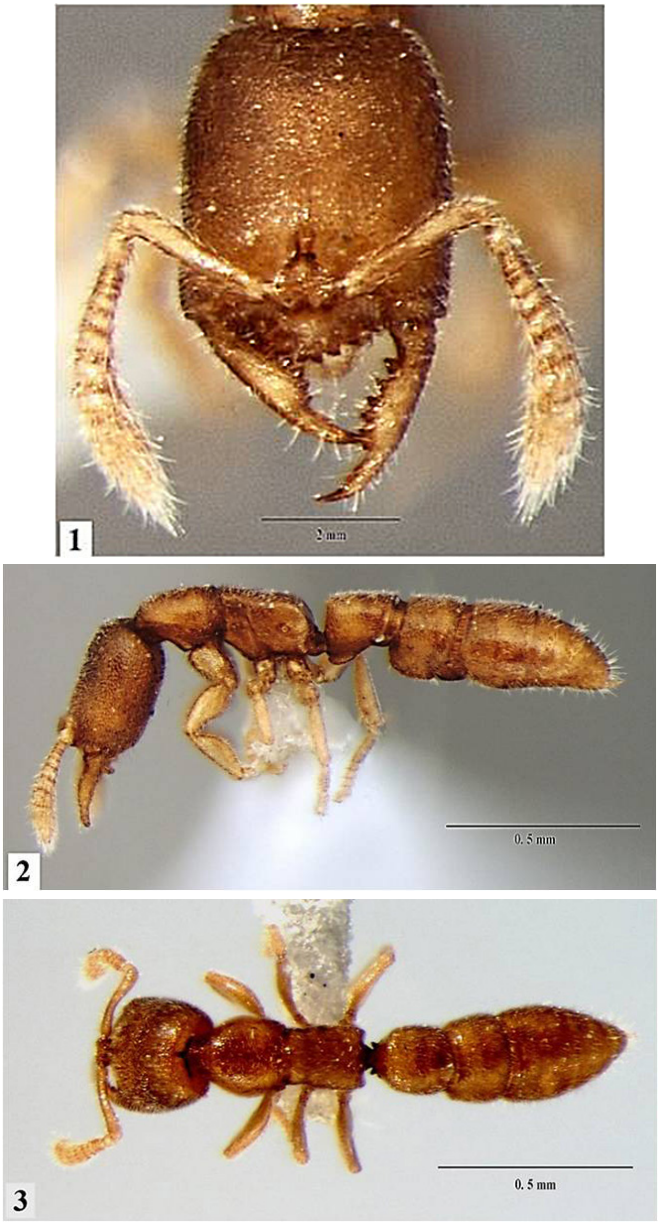


Fig 1-3. *Stigmatomma xui* sp. n.(worker):**1**. Head in full face-veiw; **2.** Body in profile veiw; **3.** Body in dorsal veiw.

Type material: Holotype (worker): India, East Sikkim, Rorathang, 27°11'49.91"N, 88°36' 12.44"E, 587m,12.vi.2012, Winkler (coll. Joginder Singh Rilta). Paratype worker with same data as of holotype [PUAC].

Holotype measurements: TL: 1.87; HL: 0.43; HW: 0.34; SL: 0.22; ML: 0.29; PW: 0.21; WL: 0.46; PL: 0.18; PH: 0.19; DPW: 0.20; GL: 0.57; CI: 79; SI: 64; LPI: 106; DPI: 112.

Paratype measurements: TL: 1.94; HL: 0.44; HW: 0.33; SL: 0.21; ML: 0.30; PW: 0.21; WL: 0.49; PL: 0.17; PH: 0.20; DPW: 0.21; GL: 0.54; CI: 75; SI: 63; LPI: 117; DPI: 123.

Head: In full face view, head rectangular (CI:79); Occipital margin weakly concave, occipital corners rounded; mandibles narrow and slender, outer margins almost straight except at the apical part with 8 teeth (2 apical and 2 basal teeth are simple; middle 4 are paired arranged in two rows); anterior margin of clypeus convex, with 6 dentiform setae which arise from flat cuticle; median setae fused at base; posttorular flange close to each other, covering antennal insertion; antennae 11 segmented; scape short, not reaching to posterior corner of head (SI: 64); antennal segments 3-10 broader than long; segment 11 longer than broad; eyes absent (as seen under stereozoom optical microscope).

Mesosoma and Petiole: In lateral view, mesosoma weakly convex; promesonotal suture distinct; meso-metanotal suture effaced. propodeal dorsum straight, posterolateral corner of propodeum rounded; petiole broadly attached to ABIII, petiole quadrate in lateral view with anterior border almost straight, dorsal margin straight; subpetiolar process narrow, oblique with rounded anteroventral corner.

In dorsal view, mesonotum constricted, propodeum slightly widened backward, propodeal declivity concave, petiole broader than long (DPI: 112), anterodorsal corner rounded.

Gaster: First gastral segment broader than long, broader than dorsal petiolar width, second gastral segment broader than the first gastral segment.

Sculpture: Mandibles punctuated with rugosity. Head densely punctuated, interfaces appear as micro-reticulation and opaque; dorsal surface of pronotum and mesonotum densely punctured. Dorsum of propodeum sparsely punctured. Lateral sides of mesonotum and metanotum superficially striated. Petiole and gaster sparsely punctuated.

Pilosity and pubescence, Pilosity sparse few erect or suberect hairs on mandibles, apical antennal segments and apex of gaster; dorsal surfaces of head and body with dense decumbent pubescence. tibiae with dense decumbent pubescence, but without suberect hairs.

Color**:** reddish brown; antennae, mandibles, legs and tip of gaster yellow.

Ecology: This species was collected by Winkler's extractor from an undisturbed dense forest. The thickness of leaf litter was about 4 inches. The floor of the forest receives limited sun light. The maximum recorded temperature of the area is 28°C with minimum -1°C and the region receives 325cm of rainfall per annum.

Etymology: The species is named in honor of Prof. Zhenghui Xu.

Remarks: This new species most resembles *S. sakaii* (Terayama, 1989), but can be distinguished from the latter by the presence of 6 dentiform setae which arise from flat cuticle; oblique subpetiolar process and rounded posterolateral corner of propodeum and anterodorsal corner of petiole, whilst *S. sakaii* is characterized by anterior clypeal margin with 8 dentiform setae which arise from tubercle-like cuticular projection; trapezoidal subpetiolar process; bluntly angled posterolateral corner of propodeum and anterodorsal corner of petiole.

New record from India

Stigmatomma awa (Xu & Chu, 2012) new combination
Amblyopone awa Xu & Chu, 2012: 1192, figs. 51-56 (w. q.) CHINA.

Fig 4-6. *Stigmatomma awa* (worker): **4.** Head in full face- veiw; **5.** Body in profile veiw; **6.** Body in dorsal veiw.

Material Examined: 7 workers: India: Arunachal Pradesh, Lumla, 27°32'49.68"N, 91°43' 56.99"E, 2800 m, 8.x.2013 Winkler method (coll. Joginder Singh Rilta).

1 worker India: Arunachal Pradesh, Lumla, 27°32'49.68"N, 91°43' 56.99"E, 2800 m, 13.x.2015 Winkler method (coll. Joginder Singh Rilta).

TL: 6.37-6.71; HL: 0.79 - 0.86; HW: 0.67- 0.74; SL: 0.41- 0.46; ML: 0.55 - 0.62; PW: 0.38 - 0.41; WL: 0.98 - 1.13; PL: 0.36 - 0.38; PH: 0.40- 0.43; DPW: 0.43 - 0.46; GL: 1.10 - 1.22; CI: 84.34 - 86.04; SI: 61.19- 62.16; LPI: 111.12 - 113.15; DPI: 104.87- 121.05 (workers measured).

Head: In full-face view, head roughly trapezoidal, widened forward and longer than broad (CI:86.04); Occipital margin weakly concave, occipital corners bluntly angled; lateral sides weakly convex, anterolateral corners acutely toothed; mandibles elongate, masticatory margin with a long apical tooth, a short subapical tooth; anterior clypeal margin with 8 dentiform setae, arranged in pairs; antennae short, 12-segmented, apices of scape reach to about 2/3rd of the distance from antennal socket to occipital corners (SI:62.16), funiculi incrassate toward apex; eyes small with 3 facets, located behind the midpoint of the lateral sides of head.

Mesonotum and Petiole: In lateral view, pronotum weakly convex, promesonotal suture distinctly notched, mesosoma short and convex, metanotal groove absent, propodeal dorsum straight about 2 times as long as declivity, posterodorsal corner rounded, declivity weakly convex; petiole trapezoidal, dorsal and anterior faces nearly straight, subpetiolar process roughly rectangular, with a large elliptical sub-transparent fenestra, ventral face straight, posteroventral corner rightly angled.

In dorsal view, mesonotum constricted, propodeum slightly widened backward, propodeal declivity longitudinally concave; petiole broader than long, (DPI: 121.05) anterior and lateral sides weakly convex.

Gaster: First gastral segment broader than long, broader than dorsal petiolar width, second gastral segment broader than the first gastral segment.

Sculpture: Mandible longitudinally striate, head densely punctured, interfaces appear as micro-reticulation; pronotum densely punctured, the narrow longitudinal middle strip without punctures, dorsum of mesonotum and propodeum densely punctured; lateral sides of mesonotum and metanotum finely longitudinally striate; petiole and gaster finely sparsely punctured.

Pilosity and pubescence: dorsal surface of head and body with sparse suberect short hairs, except two pairs of long hairs on anterior clypeal margin and dense decumbent pubescence; tibiae with dense decumbent pubescence, but without suberect hairs.

Colour: reddish brown, eyes black, antennae and legs yellowish brown.

Global distribution: Palearctic Region: China, Tibet and India.

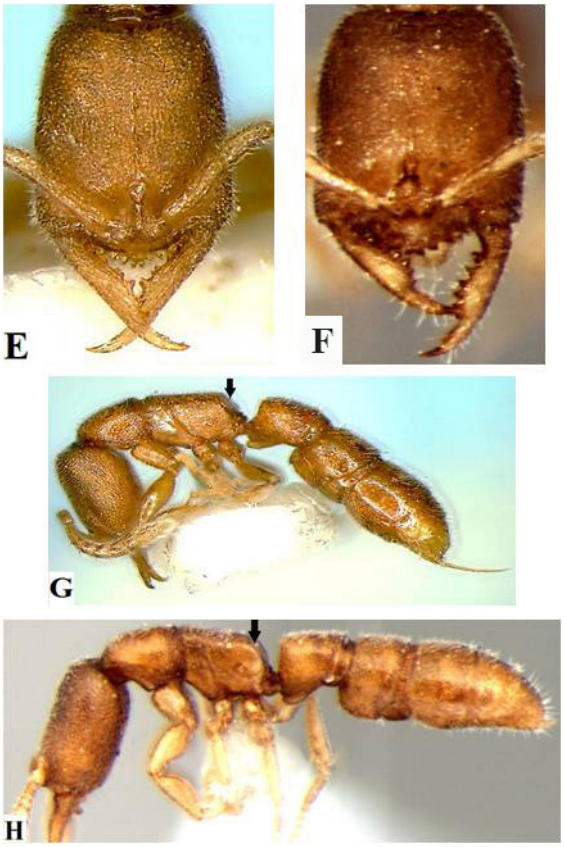
Remarks: *Stigmatomma awa* (Xu & Chu, 2012) is reported here for the first time from India, earlier known from China and Tibet**.** This species is remarkably different from the other known Indian species with following combination of characters: mandibles with 7 teeth; anterior clypeal margin with 8 dentiform setae; eyes small, each with 3 facets; subpetiolar process with elliptical sub-transparent fenestra. This species was originally described in *Ambylopone* and we formally place it in *Stigmatomma* based on the diagnosis provided by Yoshimura and Fisher (2012).

Key to the known species of ***Stigmatomma*** *with eleven segmented antenna*

1. Anterolateral corners of head acutely toothed/Genal teeth present (Fig A), mesosoma smooth and shiny (Fig C) (Neotropical Region: Dominican Republic, Greater Antilles, Lesser Antilles, **Type locality-Puerto Rico**)..... ..... *S. falcatum* (Lattke, 1991).

– Anterolateral corners of head not toothed/Genal teeth absent (Fig B), mesosoma variously sculptured from sparsely to densely punctuate (Fig D).....2

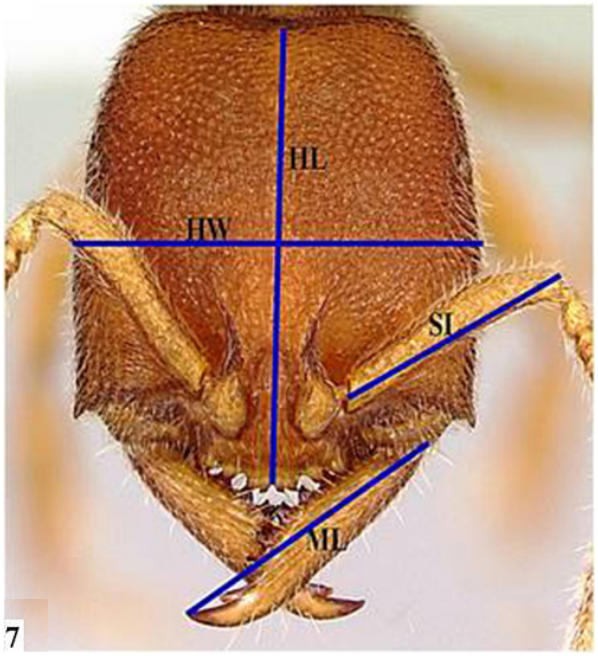
Figs A-D. *S. falcatum* (Lattke, 1991). A. Anterolateral corners of head acutely toothed; B. Anterolateral corners of head not toothed; C. Mesosoma smooth and shiny; D. Mesosoma variously sculptured from sparsely to densely punctuate.

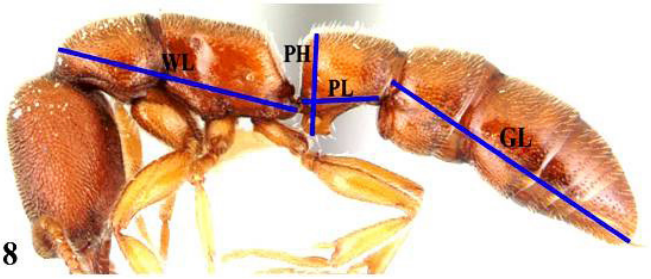


Figs E & G. *S. sakaii* (Terayama, 1989): E. Head in full-face view; G. Body in profile view. **Figs F & H**. *S. xui* sp. n.: F. Head in full-face view; H. Body in profile view.

2. In full face view, head trapezoidal in shape, masticatory margin of mandible with 5 set of paired teeth; in profile view (Fig E), posterolateral corner of propodeum angulate, and anterodorsal corner of petiolar node bluntly angled; subpetiolar process trapezoidal (Fig G) (Palearctic Region: Japan; Oriental Region: China, **Type Locality-Taiwan**)..... *S. sakaii* (Terayama, 1989).

– In full face view, head rectangular in shape, masticatory margin of mandible with 4 set of paired teeth; in profile view (Fig F), posterolateral corner of propodeum and anterodorsal corner of petiolar node rounded; subpetiolar process oblique (Fig H) (Oriental Region: India)..... *S. xui* sp. n.





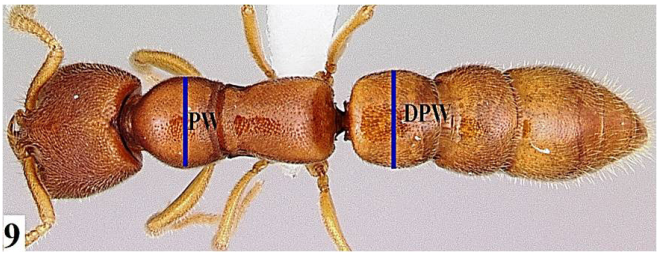


Fig 7-9. Images illustrating the measurements used.**7.** head in full-face view with measuring lines for HL, HW, SL and ML. **8**. body in lateral view with measuring lines for WL, PH, PL and GL. **9**. body in dorsal view with measuring lines for PW and DPW.

Fig 10-13. *Stigmatomma sakaii* (worker-image from antwiki):**10**. Head in full face-veiw; **11.** Body in profile veiw; **12.** Body in dorsal veiw; **13.** Label.

Fig 14-17. *Stigmatomma falcatum* (worker-image from antwiki):**14**. Head in full face-veiw; **15.** Body in profile veiw; **16.** Body in dorsal veiw; **17.** 17. Label of Stigmatomma falcatum.

Acknowledgments

Sincere gratitude is due to Prof. Zhenghui Xu, College of Forestry, Southwest Forestry University, Yunnan Province, China for his valuable suggestions. Financial assistance rendered by Ministry of Environment and Forests (Grant No. 14/35/2011-ERS/RE; 22018/41/2010-CS (Tax)), Govt. of India, New Delhi is gratefully acknowledged. We also acknowledge Govt. of Arunachal Pradesh and Govt. of Sikkim, Department of Forest, Environment and Wildlife Management for granting permission to collect the material, and for other assistance supporting this research. Finally, the authors wish to thank the team of antwiki for images of *Stigmatomma sakaii* and *falcatum*.

References

Arias-Penna, T.M. (2008). Subfamilia Amblyoponinae. In: Sistematica, biogeografia y conservation de las hormigas cazadoras de Colombia (E., Jiminez, F. Fernandez, T. M. Arias & F.H. Lozano-Zambrano, Eds.), Instituto Alexander von Humboldt, 41: 51. Bogota.

Atanassov, N. & Dlussky, G.M. (1992). Fauna of Bulgaria. Hymenoptera, Formicidae. Fauna Bulgarica, 22: 1-310.

Bharti, H. (2011). List of Indian Ants (Hymenoptera: Formicidae). Halteres, 3: 79-87.

Bharti, H. & Wachkoo, A.A. (2011). *Amblyopone boltoni*, a new ant species. (Hymenoptera, Formicidae) from India. Sociobiology, 58: 585-591.

Bolton, B. (2015). An online catalogue of the ants of the world. http://antcat.org. (accessed date: 7 October 2015)

Brown, W.L. (1960). Contributions toward a reclassification of the Formicidae. III. Tribe Amblyoponini (Hymenoptera). Bulletin of the Museum of Comparative Zoology, 122: 145-230.

Dlussky, G.M., Soyunov, O.S. & Zabelin, S.I. (1990). The ants of Turkmenistan. Ashkhabad: Ylym Press, 273 pp.

Eguchi, K., Viet, B.T., Yamane, S. & Terayama, M. (2015). Redefinition of the genus *Bannapone* and description of *B. cryptica* sp. nov. (Hymenoptera: Formicidae: Amblyoponinae) Zootaxa, 4013: 077-086.

Heterick, B.E. (2009). A guide to the ants of South-western Austalia. Records of the Western Australian Museum, Supplement, 76: 1-206.

Keller, R.A. (2011). A Phylogenetic Analysis of Ant Morphology (Hymenoptera: Formicidae) With Special Reference to the Poneromorph Subfamilies. American Museum of Natural History, 355: 1-90.

Lacau, S. & Delabie, J.H.C. (2002). Description de trois nouvelles espèces d'*Amblyopone* avec quelques notes

biogéographiques sur le genre au Brésil (Formicidae: Ponerinae). Bulletin de la Societe Entomologique de France, 107: 33-41.

Lattke, J.E. (1991). Studies of Neotropical *Amblyopone* Erichson (Hymenoptera: Formicidae). Contributions in Science, 428: 1-7.

Morisita, M., Kubota, M., Onoyama, K., Ogata, K., Terayama, M, Kondoh, M. & Imai, H.T. (1989). A guide for the identification of Japanese ants. 1. Ponerinae, Cerapachyinae, Pseudomyrmecinae, Dorylinae and Leptanillinae. Myrmecological Society of Japan, Tokyo, 42 pp.

Onoyama, K. (1999). A new and a newly recorded species of the ant genus *Amblyopone* (Hymenopetra: Formicidae) from Japan. Entomological Science, 2: 157-161.

Taylor, R.W. (1979). Melanesian ants of the genus *Amblyopon*e. Australian Journal of Zoology, 26: 823-839.

Terayama, M. (1989). The ant tribe Amblyoponini (Hymenopetera, Formicidae) of Taiwan, with description of a new species. Japanese Journal of Entomology, 57: 343-346.

Terayama, M. (2009). A synopsis of the family Formicidae of Taiwan (Insecta: Hymenoptera). Research Bulletin of Kanto Gakuen University, 17: 81-266.

Xu, Z. (2001). A systematic study on the ant genus *Amblyopone* Erichson from China. Acta Zootaxonomica Sinica, 26: 551-556.

Xu, Z. (2006). Three new species of the ant genera *Amblyopone* Erichson, 1842 and *Proceratium* Roger, 1863 from Yunnan, China. Myrmecologische Nachrichten, 8: 151-155.

Xu, Z. & Chu, J. (2012). Four new species of the Amblyoponine ant genus *Amblyopone* (Hymenopetra: Formicidae) from Southwestern China with a key to the known Asian species. Sociobiology, 59: 1175-1196.

Yoshimura, M & Fisher, B.L. (2012). A Revision of Male Ants of the Malagasy Amblyoponinae (Hymenoptera: Formicidae) with Resurrections of the Genera *Stigmatomma* and *Xymmer*. PLoS ONE 7(3): e33325. doi:10.1371/journal.pone.0033325