

A review of the ant genus *Harpegnathos* Jerdon, 1851 (Hymenoptera: Formicidae) in the Philippines, with the description of two new species

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Abstract

Harpegnathos honestoi and *H. alperti* are described from Mt. Isarog, Luzon Island, Philippines. They are the fourth and fifth worker-based species of the genus from the Philippines. *Harpegnathos honestoi* is the first species known to be at least sub-arboreal. A key to the Philippine species is provided.

Keywords: *Harpegnathos honestoi*, *Harpegnathos alperti*, Philippines, dichotomous key, Formicidae, Mt. Isarog, new species.

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Introduction

Harpegnathos Jerdon, 1851 is a genus of unmistakably distinctive ponerine ants. These large ants bear long curved forceps-like mandibles endowed with more than 50 sharp teeth, huge ovate eyes at the anterolateral corners of the head, a long tubular mesosoma, and long spindly legs that they use effectively to jump. They range from India and Sri Lanka to Southeast Asia.

Three nominal worker-based species and subspecies and one male-based species are known from the Philippines (General and Alpert, 2012). None of these are known to be sympatrically associated, each worker-based species having been found on different islands (see Figure 9): *H. venator chapmani* Donisthorpe, 1937 on Luzon Island, *H. macgregori* Wheeler & Chapman, 1925 on Biliran Island, and *H. empesoi* Chapmani, 1963 on Mindanao Island (Chapman, 1963; Donisthorpe, 1937; Wheeler and Chapman, 1925). Despite the fact that these species are allopatric, I consider them good species because of their clear morphological differences. These morphological differences are summarized in the identification key (see below). The male-based species, *H. medioniger* Donisthorpe, 1942 is known from

Luzon Island (Donisthorpe, 1942). Despite the high species diversity, these ants are rarely encountered in the Philippines. All four species are known only from the holotypes (Chapmani, 1963; Donisthorpe, 1937; Wheeler and Chapman, 1925). With the possible exception of *H. venator chapmani*, none have been encountered again since the original collection for lack of attention (DEMG, unpublished notes).

Materials and Abbreviations

Specimens were examined and measured using a Wild M-5A stereomicroscope with ocular micrometer. Images were created using a Canon 7D digital camera attached to a Leica MZ16 stereomicroscope. Montage images were rendered using Helicon Focus 6. Images were edited with Adobe Photoshop CS6 Extended. Coordinates for historical collections were obtained from the Philippine Gazetteer (DIVA-GIS 2014). Coordinates for the present specimens refer to the base camp to discourage poachers.

The following measurements and indices are reported.

Measurements (in millimeters)

EL	Eye length along the maximum diameter.	PW	margin of petiolar denticle to posterior face of petiole Maximum width of pronotum in dorsal view.
EW	Maximum width of compound eye.	SL	Length of scape, excluding the basal neck and condyle.
HFL	Maximum length of hind femur in anterior view.	TL	The total outstretched length of the ant from the mandibular apex to the gastral apex; when measured in profile the sum of mandibular length + head length + mesosomal length + lengths of waist segments + length of gaster
HL	Maximum head length in full face (dorsal) view, measured from the anterior-most point of the clypeal margin to the posterior-most point of head capsule.		
HW	Maximum head width in full face (dorsal) view, measured behind the eyes.		
MandL	Mandible length, the straight line length of the mandible at full closure, measured in the same plane for which the HL measurement is taken (i.e. full face view), from the mandibular apex to the anterior edge of the frontal lobe, or to the transverse line connecting the anterior-most points in those taxa where the margin is concave medially.		
ML	Mesosomal length measured from the anterior edge of the pronotum (excluding the collar) to the posterior edge of the propodeal lobe.		
MLO	Mandibular outside length, maximum absolute chord length of left mandible measured from lateral insertion to apex, in oblique lateral view so that the entire mandible is in focus		
MOW	Median ocellus width, maximum width of median ocellus		
MtL	Maximum length of gaster, from base of abdominal tergite IV to apex of abdominal tergite VII, measured in lateral view.		
PetH	Petiolar height, petiolar height in lateral profile measured as the perpendicular distance from the ventral margin to the highest point of posterolateral tubercles; if ventral margin is concave upward then measured from a line tangent to the uppermost portion of the curve and oriented as close as possible to the long axis of petiole.		
PetL	Petiolar length, straight line length, in lateral view, from anterior		

Indices

CI	Cephalic Index: $HW/HL \times 100$.
EI	Eye Index: $EL/HW \times 100$.
MI	Mandibulo-cephalic Index: $MandL * 100/HL$
SI	Scape index: $SL/HW \times 100$

Repositories

AMNH	American Museum of Natural History, New York, NY, USA.
BMNH	Natural History Museum, London, UK.
MCZC	Museum of Comparative Zoology, Harvard University, Cambridge, MA, USA.
PNM	National Museum of the Philippines, Manila, Philippines.
USNM	United States National Museum of Natural History, Washington, D.C., USA.

List of species of *Harpegnathos* known from the Philippines

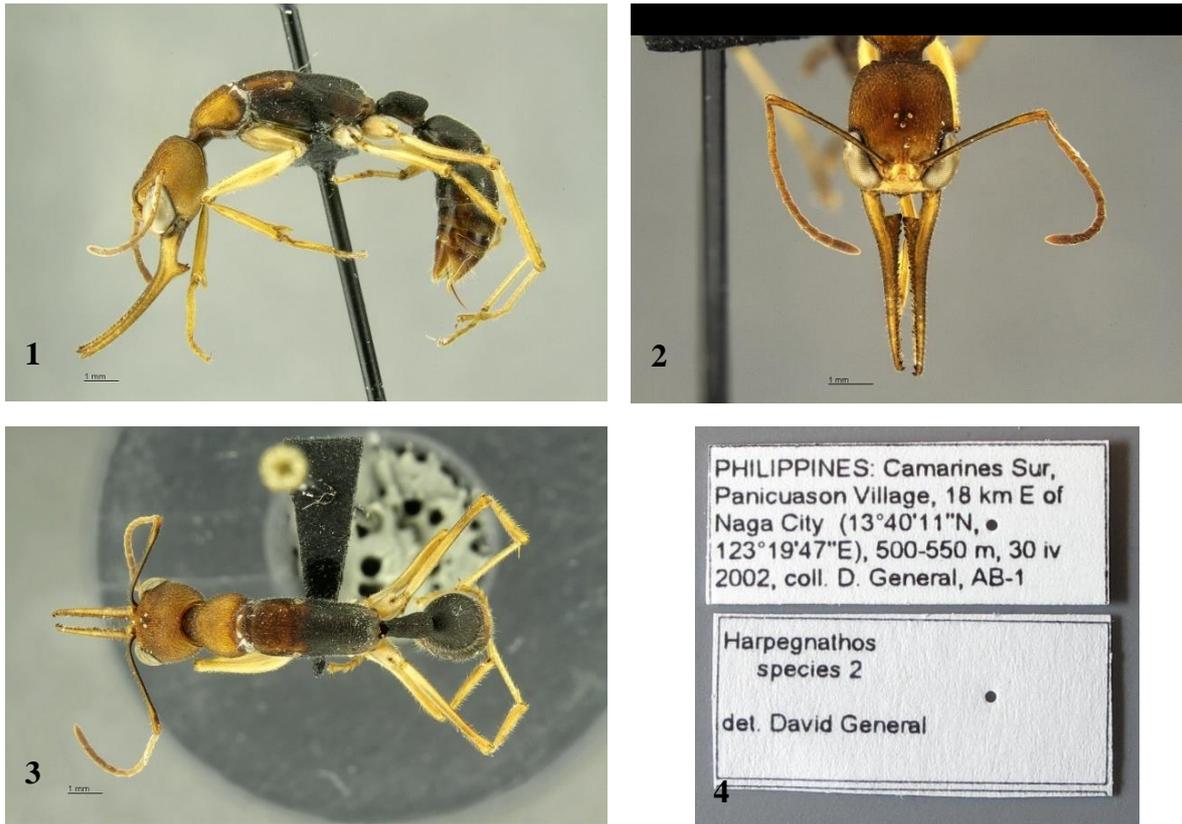
<i>H. alperti</i>	sp. n.
<i>H. empesoi</i>	Chapman 1963 (examined)
<i>H. honestoi</i>	sp. n.
<i>H. macgregori</i>	Wheeler & Chapman, 1925 (examined)
<i>H. medioniger</i>	Donisthorpe, 1942 (based on the male; not seen)
<i>H. venator chapmani</i>	Donisthorpe, 1937 (not seen)

Results

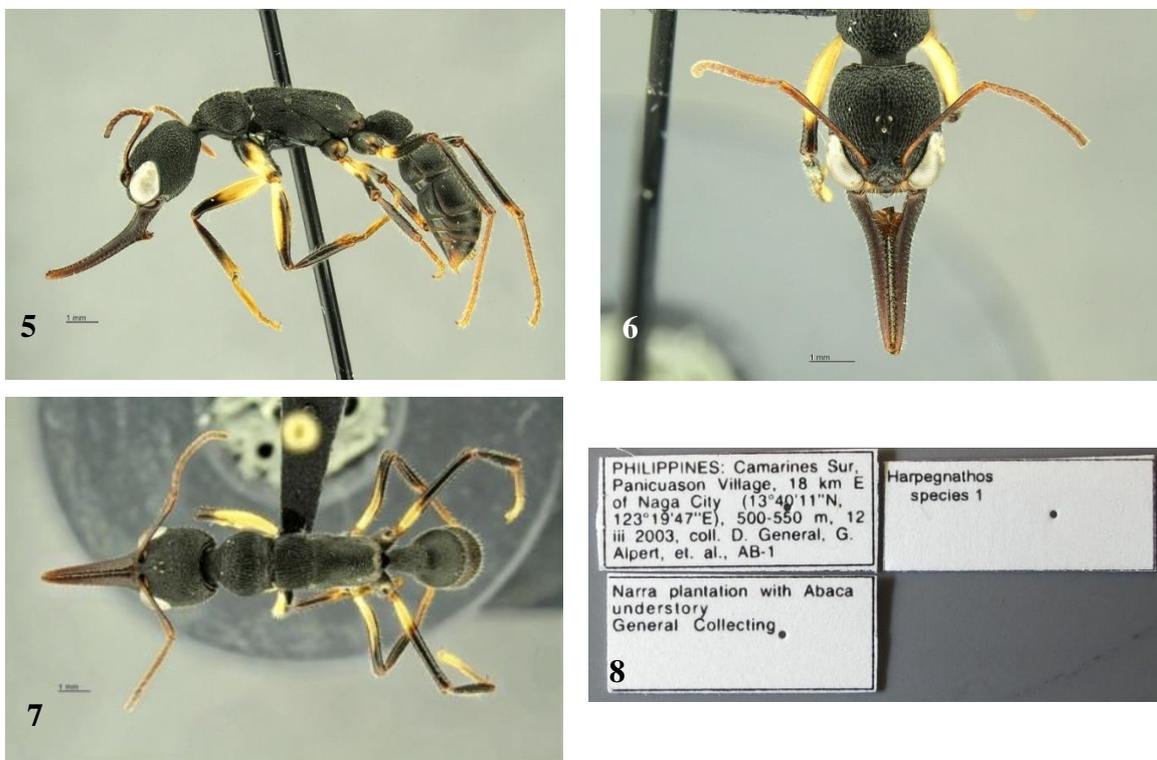
***Harpegnathos honestoi* General sp. n.**

[urn:lsid:zoobank.org:act:DC10CBBE-79B9-4B68-8D14-1EC4952FED20](https://zoobank.org/act:DC10CBBE-79B9-4B68-8D14-1EC4952FED20)

Holotype. PHILIPPINES: Luzon Island, Camarines Sur, Naga City, Panicuason



Figures 1-4. *Harpegnathos honestoi* sp. n., holotype. 1. lateral view, 2. frontal head view, 3. dorsal view, 4. labels.



Figures 5-8. *Harpegnathos alperti* sp. n., holotype. 5. lateral view, 6. frontal head view, 7. dorsal view, 8. labels.

Village, Mt. Isarog, 500-550 m \pm 500 m, 13°40'11" N, 123°19'47" E \pm 4 km, 30.iv.2002, leg. D.E.M. General, (PNM 9021, deposited in PNM).

Type locality: Philippines: Camarines Sur, Naga City, Panicuason Village, Mt. Isarog.

Description of worker (Figs. 1-4)

Holotype measurements: TL 20.44, HL 2.81, HW 2.39, CI 85, SL 2.96, SI 124, MandL 4.11, MI 146, MLO 4.16, PW 1.98, ML 5.15, PetL 1.40, PetH 0.88, HFL 3.64, MtL 4.58, EL 1.35, EW 0.94, EI 57, MOW 0.11.

In full face view, posterior margin of head straight; scape exceeding posterior margin of head by at least width of scape; ocelli present; frontal lobes broad, covering antennal sockets; frontal carinae short, as long as about twice width of scape, diverging; clypeus narrowly inserted between frontal lobes; triangular labral lobe present; eyes extremely large, ovate, occupying anterior lateral margin of head; mandibles converging gradually from attachments; head coarsely striate; antennal scape with sparse, short erect and suberect hairs.

In lateral view, mesosoma long and cylindrical; front coxa well separated from mid- and hindcoxae; front coxa long but distal end not reaching midcoxa; promesonotal suture deeply impressed; metanotal groove obsolete; dorsal face of propodeum very long; propodeal declivity not bounded by lateral carinae; metapleural gland orifice opening laterally, not protected by guard hairs; petiole longer than tall; anterior subpetiolar process triangular; gaster long; sting present and functional; tarsal claws with median tooth.

In dorsal view, irregular striae subparallel on pronotum and mesonotum; propodeum transversely striate; petiole longer than broad; petiole reticulate dorsally and laterally; first and second gastral tergite coarsely punctate over underlying punctulation.

Sparse short hairs on body. Head, mandibles, antennae and pronotum orange; rest of body brownish black; legs yellow.

Known only from the holotype.

Queen and male unknown.

Bionomics: Collected live from web of a theridiid spider, about 1 m from ground in low

vegetation. I collected both the spider and its prey as the spider was struggling to wrap the ant in silk (DEMG, unpublished notes).

Etymology: The name of the new species is a patronym lovingly dedicated to my father, Honesto C. General, who recently celebrated his 90th birthday.

***Harpegnathos alperti* General sp. n.**

[urn:lsid:zoobank.org:act:6B58C862-57D7-4EFA-BF6A-B5D216BA99A3](https://doi.org/10.3896/urn:lsid:zoobank.org:act:6B58C862-57D7-4EFA-BF6A-B5D216BA99A3)

Holotype. PHILIPPINES: Luzon Island, Camarines Sur, Naga City, Panicuason Village, 500-550 m \pm 500 m, 13°40'11" N, 123°19'47" E \pm 4 km, 12.iii.2003, coll. D.E.M. General, G.D. Alpert, *et al.* (PNM 13015, deposited in PNM).

Description of worker (Figs. 5-8)

Measurements: TL 19.45, HL 2.81, HW 2.55, CI 91, SL 2.60, SI 102, MandL 3.54, MI 126, MLO 3.64, PW 2.03, ML 5.04, PetL 1.35, PetH 0.88, HFL 3.22, MtL 4.16, EL 1.40, EW 0.94, EI 55, MOW 0.11 (n=1).

In full face view, posterior margin of head straight; scape exceeds posterior margin of head by at least width of scape; ocelli present; frontal lobes broad, covering antennal sockets; frontal carinae short, as long as about twice width of scape, diverging; clypeus narrowly inserted between frontal lobes; triangular labral lobe present; eyes extremely large, ovate, occupying the anterior lateral margin of head; mandibles converging rather abruptly from attachments; head irregularly reticulo-punctate; antennal scape with sparse, short erect and suberect hairs.

In lateral view, mesosoma long and cylindrical; front coxa well separated from mid- and hindcoxae; front coxa long but distal end not reaching midcoxa; promesonotal suture deeply impressed; metanotal groove obsolete; dorsal face of propodeum very long; propodeal declivity not bounded by lateral carinae; metapleural gland orifice opening laterally, not protected by guard hairs; petiole longer than tall; anterior subpetiolar process triangular; gaster long; sting present and functional; tarsal claws with median tooth.

In dorsal view, irregular striae subparallel, but diverging posterior fourth of pronotum; irregular striae subparallel on mesonotum; propodeum coarsely punctate;

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petiole longer than broad; petiole coarsely punctate dorsally and laterally; first and second gastral tergite coarsely punctate over underlying punctulation.

Sparse short hairs on body. Body black; mandibles and antennae chocolate-brown; legs yellowish chocolate-brown.

Comparative Note: This specimen is superficially similar to *H. venator chapmani* Donisthorpe, 1937 which Donisthorpe (1937) considered a black variety of *H. venator* F. Smith, 1858, albeit with sculpturation similar to *H. v. rugosus* Mayr, 1862. The key (see below) summarizes the morphological

differences with a non-type specimen of *H. v. rugosus*. Unfortunately, the holotype of *H. v. chapmani* cannot be located at the MCZC, AMNH, USNM, or BMNH, precluding a direct comparison and a confident determination (DEMG, personal observation; Natural History Museum Data Portal. 2016).

Etymology: This species is named after my mentor and colleague, Dr. Gary D. Alpert, a true friend who hosted all my visits to Cambridge, MA, USA. Gary's fortuitous visit to Naga City and Mt. Isarog firmly redirected my research interest from spiders to ants.

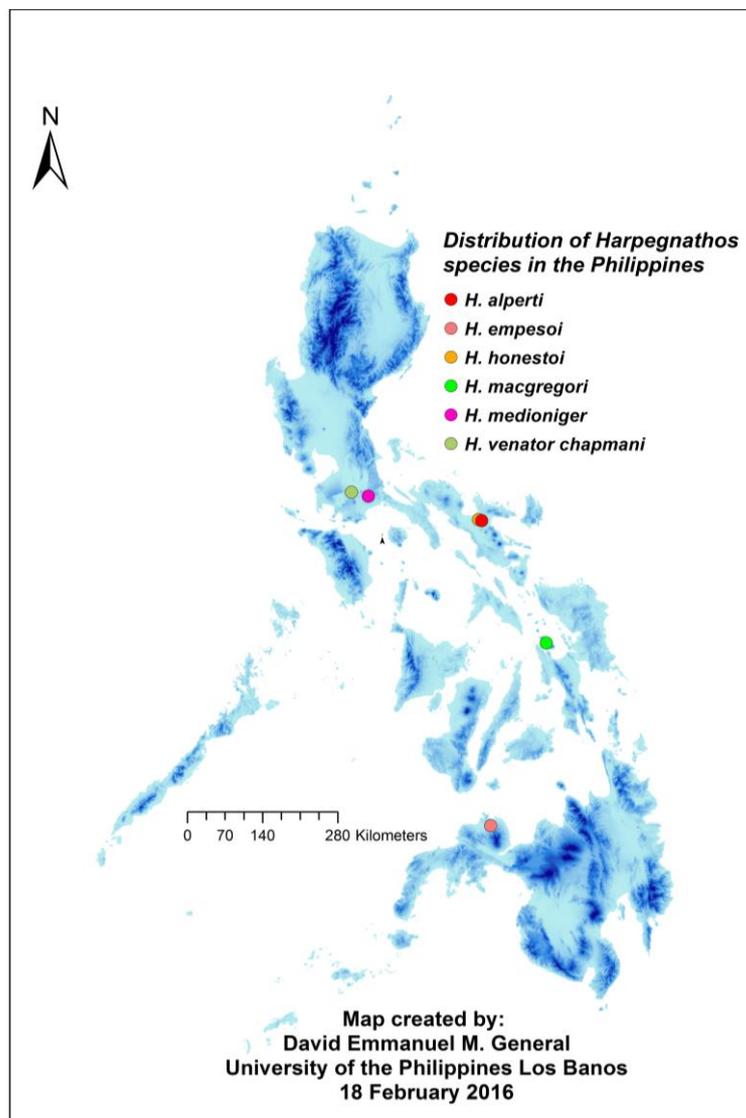


Figure 9. Distribution map of *Harpegnathos* species in the Philippines. Each valid species is known only from its type locality. Darker regions denote areas of higher elevation.

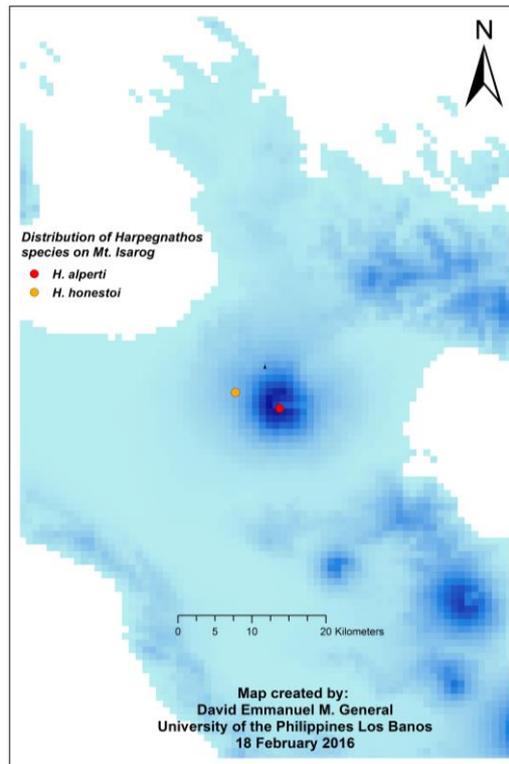


Figure 10. Inset map showing distribution of two *Harpegnathos* species on Mt. Isarog. The coordinates for *Harpegnathos alperti* are representative coordinates for Mt. Isarog Natural Park from the Philippine Gazetteer (DIVA-GIS 2014) and do not indicate the actual collection site for the species.

Key to the Philippine species of *Harpegnathos*, based on the worker

1. Dorsum of head reticulo-punctate; mandibles converging rather abruptly from attachments.....2
 - Dorsum of head striate; mandibles converging gradually from attachments.....3
2. Sculpture on dorsa of pronotum, mesonotum, propodeum and petiole reticulo-punctate; pilosity on body moderately abundant.....*H. venator rugosus* Mayr
 - Sculpture on dorsum of pronotum with irregular striae diverging posteriorly; dorsum of mesonotum with irregular but subparallel striae; dorsum of propodeum coarsely punctuate; petiole with dorsal and lateral coarse punctation; pilosity on body sparse*H. alperti* sp. n.
3. First and second gastral tergite with coarse punctation over underlying punctulation; in full-face view, posterior margin of head straight; mandibles orange with infuscated base*H. honestoi* sp. n.

- First and second gastral tergite with punctulation only; in full-face view, posterior margin of head shallowly emarginated; mandibles concolorous yellow.....4
- 4. Antennal scape barely exceeds posterior margin of head by about the width of scape; propodeal declivity bounded by lateral carinae; pilosity on body sparse.....*H. empesoi* Chapman
 - Antennal scape exceeds posterior margin of head by almost 1/3 length of scape; propodeal declivity not bounded by lateral carinae; pilosity on body moderately abundant.....*H. macgregori* Wheeler & Chapman

Discussion

Harpegnathos honestoi is sympatrically distributed with *H. alperti*, both having been collected in sites less than 5 km apart on Mt. Isarog, Luzon Island, Philippines (Figure 10). This may be the only instance of two *Harpegnathos* species from a single location. Bharti *et al.* (2016) reported the presence of *H. saltator* Jerdon, 1851 and *H.*

saltator cruentatus (F. Smith, 1858) in the Indian states of Karnataka, Kerala, Maharashtra, and of *H. saltator* and *H. venator* (F. Smith, 1858) in the Indian states of Punjab, Tamil Nadu, and West Bengal. It is not clear how closely sympatric their distributions are within the confines of each State.

The presence of at least two species of *Harpegnathos* in close proximity on Mt. Isarog suggests the conservation importance of the forest of that single mountain. There is much to discover on Mt. Isarog. Because the natural history and interaction of these two species is unknown, it is imperative that the remaining forest of Mt. Isarog be conserved for future field research.

More field work is needed at both Mt. Makiling (the type locality of *Harpegnathos venator chapmani*) and Mt. Isarog to elucidate the taxonomic status of *H. v. chapmani*. The natural history of the Philippine species of *Harpegnathos* also needs to be studied.

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