

Description of a new species of *Antrocephalus* Kirby (Hymenoptera: Chalcididae) from Kaippad paddy field of Kerala, India

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Abstract

A new species of *Antrocephalus* is newly described with illustrations from Kaippad paddy field in Kannur district of Kerala, India. With this new species, the genus is now represented by 16 species from Kerala, 21 from India and 126 valid species worldwide. A short note on Kaippad cultivation of paddy and new host records of genus *Antrocephalus* are provided.

Keywords: *Haltichellinae, new species, taxonomy, India.*

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Introduction

Antrocephalus is one of the most common genera of chalcid wasps one could encounter in any collection method and is distributed all across the inhabited parts of Asia, Europe, Australia and South America (Bouček, 1988). It is one of many confusing genera of chalcid family (Narendran, 1989; Sureshan, 1994) with its limits hard to define as it comes very close to *Hockeria* Walker and rarely to *Kriechbaumerella* Dalla Torre and only with extensive expertise in the taxonomy of these genera, one can authoritatively identify this genus (Narendran & van Achterberg, 2016). As a typical Haltichellinae member, sexual dimorphism is quite evident in the genus than the rest of chalcid counterparts with the flagellum of male thicker. One of the most peculiar diagnostic features of the genus is the long horse-shoe shaped pre-orbital carina running along the compound eye and joining behind the median ocellus along with an extended pronotal carina ending mostly as tubercles medially. Literatures and field observations attribute species of the genus as potential biocontrol agents against lepidopteran pests (Narendran, 1989; Narendran & van Achterberg, 2016). The latest revision of the genus from India was compiled by Narendran (1989). Sureshan (1994) added the latest valid species *viz*,

A. narendrani from Kasargod (Kerala).

Here we describe with illustrations a new species of *Antrocephalus* from Kaippad paddy fields in Kerala, India.

Materials and Methods

The new species was collected from a paddy field following the Kaippad cultivation in Keezhara (12°00'30.4" N, 75°19'21.7" E) in Kannur, Kerala, India by sweeping along the bunds of rice field and two meter inside from edges, swept once at each step in a figure of eight. The collected specimens were transferred to 70% ethyl alcohol, dried, card mounted and examined under LEICA M205 stereozoom microscope. The designated holotype of the new species was imaged using attached LEICA DFC2900 digital camera. Measurements were obtained using Leica LAS (Leica Application Suite V3.80) microsystems by Leica (Heerburgg, Switzerland). Images taken at varying focal planes were stacked using Leica Auto montage Software V3.80 and the final illustrations were post-processed for contrast and brightness using Adobe Photoshop CS5 (Version 12.0 x64) software. Further expeditions to collect additional samples did not materialize, and this description is based on the lone specimen collected and designated as holotype. The

specimen is currently deposited in entomological collections of Systematic Entomology Laboratory, Malabar Christian College and will be deposited in 'National Zoological Collections' of Zoological Survey of India, Western Ghats Regional Centre, Kozhikode (ZSIK).

Terms and abbreviations: Morphological terms used are adapted from Narendran (1989). The nomenclature for cuticular sculpturing follows Harris (1979). The general abbreviations of the terms are as follows unless noted otherwise; fl_x = Flagellum, x being the flagellum number; mv = Marginal vein; **OOL** = Ocello-Ocular line; pmv = Postmarginal vein; **POL** = Post ocellar line; Gt_x = Gastral terga, x being the tergum number.

Results

Genus *Antrocephalus* Kirby, 1883

Antrocephalus Kirby, 1883: 54, 63. Type species: *Halticella fascicornis* Walker; designated by Kirby (1883).

Narendran & van Achterberg (2016: 12) may be referred for complete list of synonymy.

Diagnosis: Head in frontal view with a horse shoe-shaped preorbital carina running beyond the median ocellus joining behind it; scrobe deep enclosing the median ocellus; pronotum with anterior carinae often indicated, forming submedian tubercles in most species; genotemporal margin often with a distinct genotemporal furrow; metasoma usually acuminate with two basal submedian short or long carinae on Gt_1 .

Hosts: Pupae of Lepidoptera.

Distribution: Asia, Australia, Europe, and Oceania (New Guinea). Introduced in South America (Bouček, 1988).

Antrocephalus argentoflagellatus Binoy and Santhosh sp. n.

(Figs. 1–10)

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Material examined: Holotype ♀, INDIA: Kerala, Kannur district, Keezhara; Kaippad Paddy Field (12°00'30.4" N & 75°19'21.7" E), 24.vii.2017, Coll. K.M. Rajesh.

Diagnosis: In the key to Oriental species of *Antrocephalus* Kirby (Narendran, 1989), *A. argentoflagellatus* sp. n. keys near *A. japonicus* (Masi) in having Gt_1 more than half as long as abdomen, basal carinae more than 0.25× as Gt_1 , scutellum slightly convex with posteriorly declining propodeum. However, it differs from *A. japonicus* in having 1) scutellum emarginate and bidentate with lateral margins emarginate, carinate (in *A. japonicus*, scutellum with lateral sides rounded, acarinate, apically emarginate); 2) scrobe not reaching the front ocellus and without traverse carina beneath front ocellus (in *A. japonicus*, scrobe reaching the front ocellus with traverse carina beneath front ocellus); 3) pmv 1.2× mv (in *A. japonicus*, pmv as long as mv); 4) metasoma distinctly longer than mesosoma (in *A. japonicus*, metasoma as long as mesosoma).

Description: Holotype ♀ (Figs. 1–10). Length 4.15 mm. Body black with the following parts as follows: eyes black; hind coxa and femur reddish brown, all tarsi testaceous.

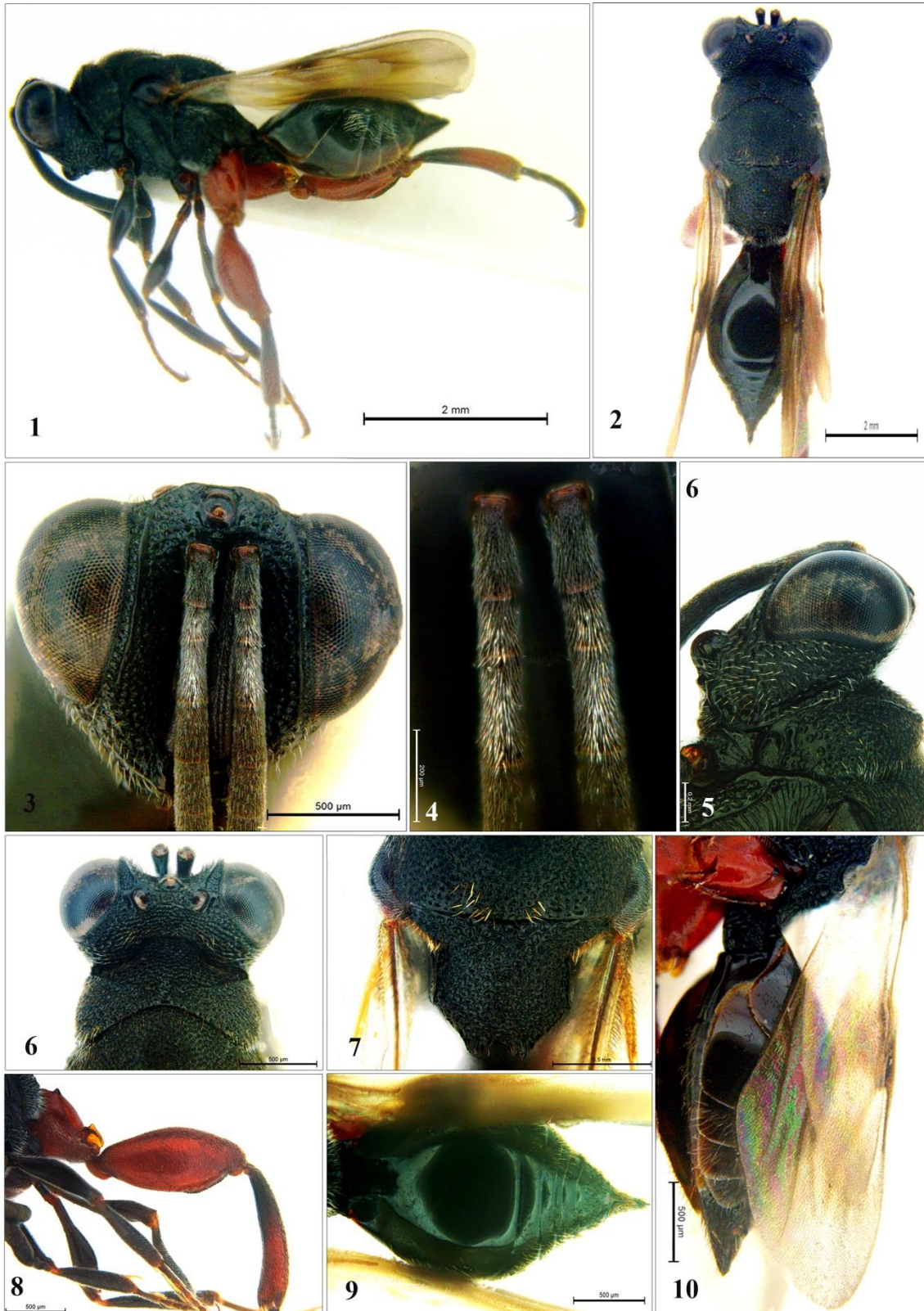
Head: Head densely punctate, width in frontal view 1.3× its height (up to anterior clypeal margin) (Fig. 3); POL 1.3× OOL, with coarse setigerous punctae (Fig. 6); eyes glabrous, 1.9× as wide as long; strong horse-shoe shaped pre-orbital carina joining behind the median ocellus; genotemporal furrow distinct, deep; post orbital carina absent (Fig. 5); scape 7.0× as long as wide; fl_1 subquadrate, fl_2 2.0× as long as wide, fl_2 and fl_3 with characteristic silver pubescence on the surface (Fig. 4).

Mesosoma: Pronotum dorsally with close pits and narrow interstices, anterior pronotal carina joining sub-medially forming weak tubercles (Fig. 6); axilla with yellowish brown patch of setae posteriorly; pits on mesoscutum and scutellum coarsely rugose punctate, with narrow interstices; scutellum 1.1× as long as wide, apically bidentate with lateral margins emarginate, deeply carinate (Fig. 7); lateral propodeal tooth distinct.

Wings: Fore wing infumated with dark infuscation joining mv and a faint one post pmv , veins deep brown, pubescence brown on lamina; pmv 1.2× mv (Fig. 10).

Legs: Hind coxa reddish brown with a prominent black tubercle dorsobasally; hind femur without inner ventro-basal tooth, 3.0× as long as wide, fairly pubescent on outer disc with short comb of serrulation restricted to

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Figures 1–10. *Antrocephalus argentoflagellatus* Binoy and Santhosh **sp. n.** Holotype ♀ : **1.** Habitus, lateral view; **2.** Habitus, dorsal view; **3.** Head, frontal view; **4.** Flagellum 1–3, dorsal view; **5.** Head and pronotum, lateral view; **6.** Head and pronotum, dorsal view; **7.** Mesoscutum and scutellum, dorsal view; **8.** Hind leg; **9.** Metasoma, dorsal view; **10.** Fore wing and metasoma, lateral view.

apical third; hind tibia reddish brown with basal third brownish black (Fig. 8).

Metasoma: Metasoma longer than combined length of mesosoma; a short petiole visible laterally, dorsally inconspicuous; Gt_1 0.6× as long as metasoma, Gt_1 with basal carina more than 0.3× as long as Gt_1 (Fig. 9); Gt_6 rugose punctate with dense pubescence, syntergum with longitudinal carina (Fig. 10).

Male: Unknown.

Host: Unknown.

Distribution: India: Kerala.

Etymology: The species epithet in neuter gender is derived from the characteristic silver pubescence on flagellum 2-3.

Notes: Kaippad cultivation is an indigenous type of paddy cultivation followed in northern parts of Kerala wherein the medium for cultivation is saline in nature. Kaippad lands are specialized rice tracts traditionally developed from the wetland ecosystem of the areas which are swampy and waterlogged. They experience floods during the monsoons and salinity during summer owing to nearness to rivers that merge to the sea. The tidal currents from the nearby sea move through the river and enter Kaippad fields during the high tide and flow out during low tide. The river water is saline except during monsoon. Salt water from the sea enters the river during summer when the flow is low. When the water level in the river rises either due to tides or rain, the river water flows in to the paddy (Chandramohan, 2013). Even with this unique irrigation and variable nutrients available for development, paddy is susceptible to many pest species (Rajesh *et al.*, 2021). Many chalcid parasitoids are encountered in these fields and a better understanding of the taxonomic position of each of the parasitoid, will deem helpful in the natural control of the pest species, if the same goes above the economic threshold level of attack on paddy.

Members of *Antrocephalus* have been reported to attack a variety of lepidopteran hosts (Bouček, 1988) and lately two new host records are newly discovered. *Antrocephalus lugubris* (Masi, 1932) is newly recorded from the pupa of an unidentified *Lymantria* sp.

(Lymantriidae) and *A. sepyra* (Walker, 1846) is reported to attack the pupal stage of *Tagiades litigiosa* Möschler (Hesperiidae) from Kerala, India. The host-parasitoid status of the new species is presently unknown, but once established the same can be used to initiate biocontrol mechanisms of the pest species that it parasitizes on.

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References

- Bouček, Z. 1988. Australasian Chalcidoidea (Hymenoptera) – A biosystematic revision of genera of fourteen families, with a reclassification of species. Wallingford: CAB International. 832 pp.
- Chandramohan, K.T. 2013. Studies on *Kaippad* rice farming in North Kerala with special reference to the varieties used. Ph.D. Thesis. Department of Botany, University of Calicut. 248 pp.
- Harris, R.A. 1979. A glossary of surface sculpturing. Occasional Papers in Entomology 28: 1–31.
- Kirby, W.F. 1883. Remarks on the genera of the subfamily Chalcidinae, with synonymic notes and descriptions of new species of Leucospidinae and Chalcidinae. Journal of the Linnean Society (Zoology) 17: 53–78. doi: 10.1111/j.1096-3642.1883.tb00236.x
- Narendran, T.C. 1989. Oriental Chalcididae (Hymenoptera: Chalcidoidea). Zoological Monograph. Department of Zoology, University of Calicut, Kerala. 441 pp.
- Narendran, T.C. and van Achterberg, C. 2016. Revision of the family Chalcididae (Hymenoptera: Chalcidoidea) from Vietnam, with the description of 13 new species. Zookeys 576: 1–202. doi: 10.3897/zookeys.576.8177

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- Noyes, J.S. 2019. Universal Chalcidoidea Database. World Wide Web electronic publication <http://www.nhm.ac.uk/chalcidoids>. Last updated March, 2019. [Date of Access 10.12.2021].
- Rajesh, K.M., Sinu, P.A. and Nasser, M. 2021. *Eleocharis dulcis* (Burm.f) as a promising trap plant for the biocontrol of rice white stem borer, *Scirpophaga innotata* (Walker). Biological Control 160: 104676. <https://doi.org/https://doi.org/10.1016/j.biocontrol.2021.104676>
- Sureshan, P.M. 1994. A new species of *Antrocephalus* Kirby (Hymenoptera: Chalcidoidea: Chalcididae) from India. Journal of Zoological Society 4 (1&2): 53–55.