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# Parasitoids of *Gangara thyrsis* (Fabricius) (Lepidoptera: HesperIIDae) with description of a new species of *Agiommatus* Crawford, 1911 (Hymenoptera: Pteromalidae) from India with notes on biology

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**Abstract** In rearing of *Gangara thyrsis* (Fabricius) (Lepidoptera: HesperIIDae) from Karnataka and Goa, India, six species of parasitoids were observed. One new species of parasitic wasp is described and illustrated: *Agiommatus thyrsisae* n. sp. (Hymenoptera: Pteromalidae), a solitary parasitoid reared from the egg of *G. thyrsis* on the natural host plant *Dypsisis lutescens* (H. Wendl.) Beentje & J. Dransf. Three additional species of parasitic wasps were also reared: *Anastatus ramakrishnai* (Mani, 1935) (Hymenoptera: Eupelmidae), a solitary hyperparasitoid of *A. thyrsisae* n. sp.; *Sympiesis thyrsisae* Gupta, Gawas & Bhambure (Hymenoptera: Eulophidae), a gregarious parasitoid reared from the caterpillar of *G. thyrsis* on the host plant *Cocos nucifera* L., and *Brachymeria lasus* (Walker) reared from pupa of *G. thyrsis* on the host plant *D. lutescens*. Additionally, two species of tachinid flies were also reared from the pupae of *G. thyrsis*: *Exorista sorbillans* (Wiedemann, 1830) and an innominate species close to *Blepharella* spp. *Gangara thyrsis* is a new host record for the genus *Agiommatus* and for *A. ramakrishnai* and *B. lasus*. The

mean percent parasitism in *G. thyrsis* eggs was 26.58% with an incubation period of 6–7 days. Amongst the egg parasitoids, 57.14–73.08% were females and 23.08% were males. Hyperparasitism ranged from 3.85 to 42.86%. *Dypsisis lutescens*, a member of Arecaceae, is a new host plant record for *G. thyrsis*.

## Introduction

The genus *Agiommatus* Crawford, 1911 erected by Crawford with the type species *A. sumatraensis* Crawford, 1911 reared from the eggs of a probable noctuid species. This genus is hitherto known by nine species across the world: *Agiommatus antherinae* Ferrière, 1951 (from Madagascar), *A. attaci* Ferrière, 1930 (from Indonesia and Malaysia), *A. bekiliensis* (Risbec, 1952) (from Ethiopia and Madagascar), *A. erionotus* Huang, 1986 (from China), *A. geethae* Sureshan & Narendran, 1996 (from India), *A. pantanus* Xiao & Huang, 2001 (from China), *A. paria* (Motschulsky, 1863) (from India and Sri Lanka), *A. sumatraensis* Crawford, 1911 (from Indonesia) and *A. viridis* (Girault, 1913) (from Australia) (Noyes, 2015).

The members of this genus are known to parasitise eggs of species of the families HesperIIDae [*Erionota thrax* (L.)]; Lasiocampidae [*Dendrolimus* sp.]; Lymantriidae [*Dasychira axutha* Collenette and *Pantana* sp. (both genera are now placed in the family Erebidae)]; Noctuidae [*Spodoptera litura* (Fab.)];

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Nymphalidae [*Apatura chevana* (Moore) and *Mimathyma chevana* (Moore)]; Saturniidae [*Antherina suraka* (Boisduval), *Opodiphthera astrophel* (Walker) (= *Antherina simplex*) and *Attacus atlas* (L.)]; Sphingidae [*Acherontia styx* (Westwood)] (see Ferrière, 1951; Thompson, 1958; Huang, 1986; Bouček, 1988; Yang, 1992; Sureshan & Narendran, 1996; Xiao & Huang, 2001; Noyes, 2015).

*Gangara thyrasis* (Fabricius) (Lepidoptera: Hesperidae), a minor pest, is distributed in the Oriental region: India (Andaman Islands, Karnataka, Kerala and Maharashtra), Bangladesh, Indonesia, Sri Lanka, Thailand and West Malaysia. Primary hosts are coconut and other ornamental palms. Being polyphagous, many host plants have been reported from southern India: *Cocos nucifera* L., *Licuala grandis* (hort. ex W. Bull) H. Wendl., *Caryota urens* L., *Phoenix acaulis* Roxb., *Phoenix lourierii* Kunth, *Calamus rotang* L. and *Cyperus alternifolius* L. (see Saji et al., 2016).

There are only two parasitoids reported from *G. thyrasis*, *Malaycromia helmuti* Gupta, 1999 and *Xanthopimpla regina* Morley, 1913 (Yu et al., 2012). To the best of our knowledge, the present study unveils the parasitoid complex of this butterfly affecting all life-cycle stages for the first time.

## Materials and methods

In this study eggs, caterpillars and pupae were field-collected from Karnataka and Goa, India. Unparasitised hosts were reared to adulthood for host confirmation. Mass-rearing was conducted at  $25 \pm 2^\circ\text{C}$  and  $50 \pm 10\%$  relative humidity and caterpillars were fed with the natural host plant from which they were collected. Identification was undertaken consulting Ferrière (1951), Sureshan & Narendran (1996), Xiao & Huang (2001) and Sureshan (2003). Most of the images of the hosts were taken with Nikon D7000 with Nikkor 105 mm macro lens. The wasp images were taken using Leica M 205 A Stereozoom microscope with Leica DC 420 inbuilt camera using automontage software (version 3.8). All specimens of the present study are housed in the Indian Council of Agricultural Research (ICAR), National Bureau of Agricultural Insect Resources (NBAIR), Bangalore, India. The terminology and abbreviations used for wasps are as follows: OOL, ocular-ocellar line; POL,

post-ocellar line; OD, median ocellus diameter; F1–F5, funicular segments 1–5; T1–T4, metasomal/abdominal tergites; fore wing veins: CC, costal cell, SMV, submarginal vein, MV, marginal vein, STV, stigmal vein; PMV, postmarginal vein; ICAR–NBAIR, Indian Council of Agricultural Research, National Bureau of Agricultural Insect Resources.

## Order Hymenoptera Linnaeus, 1758

### Family Pteromalidae Dalman, 1820

#### *Agiommatius thyrasisae* n. sp.

**Type-host:** Egg of *Gangara thyrasis* (Fabricius) (Lepidoptera: Hesperidae) (Supplementary file, Fig. S1) on the host plant *Dypsis lutescens* (H.Wendl.) Beentje & J. Dransf (Supplementary file, Fig. S2).

**Type-locality:** Karnataka, Bangalore, Hebbal, (13.04°N, 77.59°E), India.

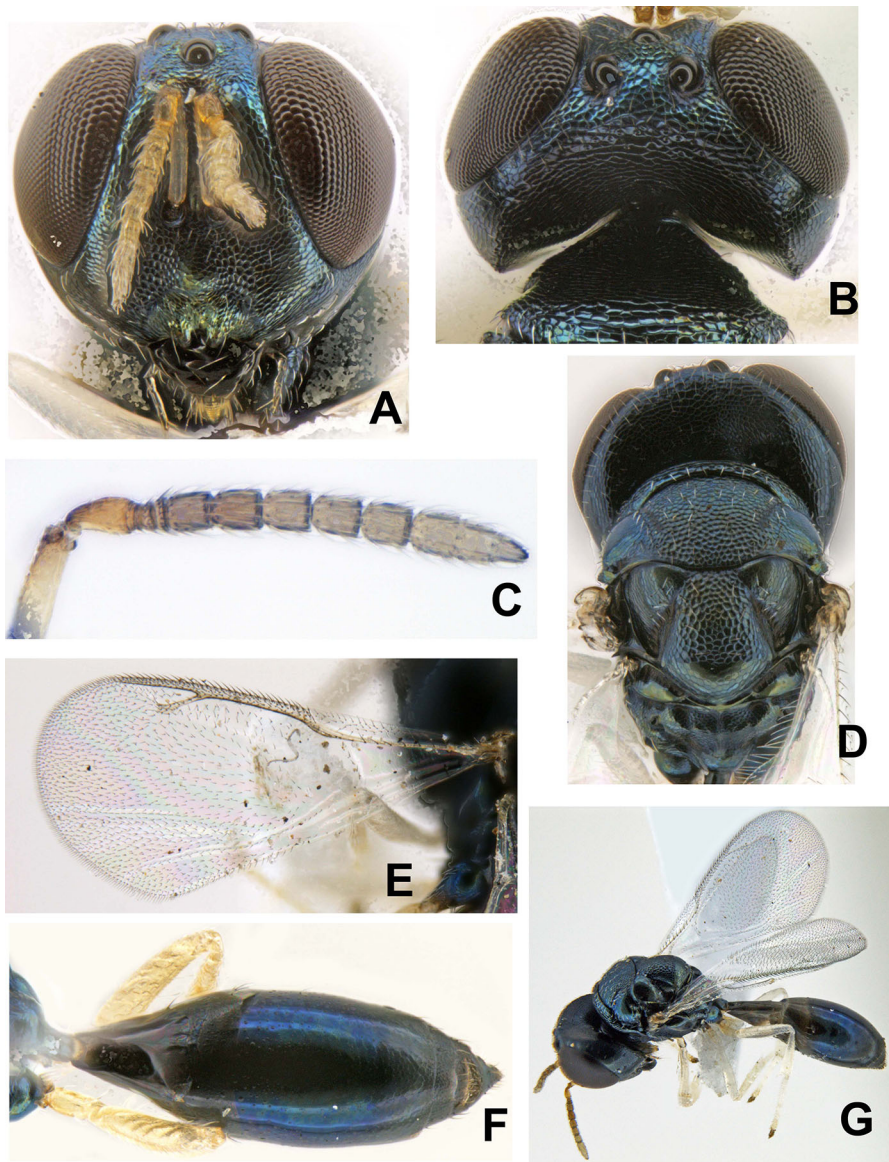
**Type-material:** Holotype, one female on card, 02.xi.2015, coll. Sandesh M. Gawas. Deposited in the ICAR–NBAIR, Bangalore under accession number NBAIR/Ptero/Agio/21115-H. Paratypes, four females and two males on card, with same data as for the holotype (NBAIR/Ptero/Agio/21115-P).

**Etymology:** The specific name ‘*thyrasisae*’ is derived from the host species.

#### Description (Fig. 1A–G)

**Female** [Measurements based on the holotype.] Body length 2.53 mm (Fig. 1G); paratypes 2.11–2.38 mm. Colour (Fig. 1A–G). Head and mesosoma metallic dark green, eyes and ocelli brown. Antenna with scape, pedicel and anelli yellow testaceous; funicular segments yellowish brown, fading towards clava; clava pale yellow with extreme apex dark brown. Gaster metallic green except T1 and T2 dark brown (T2 in some specimens light brown apically); coxa concolourous with mesosoma except pale apex; legs pale testaceous except extreme apices. Wings hyaline with veins and pilosity light brown.

**Head** (Fig. 1A). Head large, reticulate; ocellar triangle reticulate. Head in frontal view without distinct median carina on upper face but with longitudinal median depression to rest antenna. Vertex with occipital carina. Antenna inserted slightly below middle of face. Scrobal area reticulate. Torulus placed



**Fig. 1** *Agiommatius thyrsisae* n. sp. Female. A, Head in frontal view; B, Vertex in dorsal view; C, Antenna; D, Mesosoma; E, Fore wing; F, Metasoma; G, Habitus

above level of ventral margin of eye. Head in lateral view with malar space about  $0.29\times$  eye height; malar sulcus absent. Clypeal margin deeply emarginated in the middle, distance between 2 teeth almost subequal to tooth length. Mandibles bi-dentate. Antenna (Fig. 1C) with 5 funicular segments and 3 anelli.

Relative measurements. Head  $1.25\times$  wider than high (0.80: 0.64); eye height  $3.46\times$  malar space (0.45: 0.13). In dorsal view, eye height  $1.86\times$  temple length (0.39: 0.21). Antenna short,  $0.93\times$  head width (0.74:

0.80). All funicular segments slightly longer than wide. Scape not reaching front ocellus. Pedicel  $1.8\times$  longer than wide. Scape length  $0.56\times$  eye height (0.25: 0.45). Pedicel  $1.46\times$  F1; funicle with F1–F5 about  $1.18$ – $1.33\times$  as long as wide and clava  $2.92\times$  longer than wide. Clava  $1.2\times$  as long as the combined length of F4 and F5. POL: OOL: OD (0.10: 0.03: 0.07); POL  $3.3\times$  OOL; OOL  $0.43\times$  OD. Measurements (ratio of length/width of each funicular segment): F1, 1.19; F2, 1.22; F3, 1.18; F4, 1.33; F5, 1.20; clava, 2.92.

Mesosoma (Fig. 1D). Mesosoma convex with incomplete notauli,  $0.78\times$  as long as gaster. Pronotum with shallow, inconspicuous margin differentiating neck and collar (Fig. 1B); collar length medially about  $0.18\times$  mesoscutum length ( $0.06:0.33$ ) in dorsal view; mid-lobe and frontal part of scutellum distinctly engraved reticulate; scapula, axilla and frenal area superficially and faintly reticulate. Scutellum more obscurely sculptured than mesoscutum and with frenum indistinctly delineated by faint reticulations. Scutellum length  $1.18\times$  mesoscutum ( $0.39:0.33$ ),  $1.63\times$  propodeum length ( $0.24$ ); propodeum with median carina, plica and nucha. Petiole bare,  $1.33\times$  longer than wide. Fore wing (Fig. 1E). Hyaline, upper surface of costal cell (CC) with setae, basal cell bare, basal line with 3–5 hairs. Marginal vein  $1.5\times$  postmarginal vein;  $2.4\times$  stigmal vein.

Metasoma (Fig. 1F). Gaster with a short petiole, smooth and shiny. T3 largest followed by T1 and T2, respectively. T1 narrow in few specimens. Gaster length  $3.89\times$  its width. Gaster petiole  $1.8\times$  as long as wide. Ovipositor not protruding.

**Male** [Measurements based on the paratypes.] Body length 1.725 and 1.89 mm (Fig. 2C). Antenna with last 2 claval segments dark brown remaining yellow. Apical one third of T1 and complete T2 yellow, remaining dark brown. Fore and mid coxa yellow. Hind coxa yellow with anterio-dorsal metallic green, pre-apical distinct row of 5 setae. Clypeal margin deeply emarginated in the middle with two sharp teeth. Head width  $0.91\text{--}0.96\times$  antenna length (Fig. 2A); antenna longer than that of female,  $1.04\text{--}1.11\times$  head width. Metasoma (ratio of length and width)  $2.47\text{--}3.18$  (Fig. 2B); median length of metasoma  $0.88\text{--}0.91\times$  that of mesosoma. Scape  $0.54\times$  eye height.

## Biology and variation

Reared from the eggs of *Gangara thyraxis* (Fabricius) (Lepidoptera: Hesperidae) (Fig. 3A) on the host plant *D. lutescens*, a commonly grown ornamental plant.

T1 appears to be extended in few specimens, usually  $1.42\text{--}2.6\times$  T2. This difference is due to the differential extension of T1 at the time of mortality. Relative measurements of various body parts of females (holotype and paratypes) are given in Table 1. Rearing details of *Gangara thyraxis* eggs under laboratory conditions are given in Table 2.

## Remarks

The original descriptions of *A. attaci* Ferrière, 1930, *A. erionotus* Huang, 1986, *A. geethae* Sureshan & Narendran, 1996, *A. pantanus* Xiao & Huang, 2001, *A. paria* (Motschulsky, 1863) and *A. sumatraensis* Crawford, 1911 were consulted for species comparisons (Motschulsky, 1863; Crawford, 1911; Ferrière, 1930; Huang, 1986; Sureshan & Narendran, 1996; Xiao & Huang, 2001). *Agiommatus thyraxisae* n. sp. closely resembles the Indian species *A. geethae* but differs mainly in (i) being a solitary parasitoid, reared from egg of *Gangara thyraxis* (vs gregarious parasitoid, reared from egg-mass of *Spodoptera litura*); (ii) body length 2.11–2.53 mm (vs 1.8–1.9 mm); (iii) all coxae concolorous with mesosoma except pale apices (vs fore and hind coxae almost brown, mid coxae pale brownish yellow); (iv) temple length  $0.47\text{--}0.57\times$  eye length (vs  $0.4\times$ ); (v) scape length  $0.40\text{--}0.56\times$  eye height (vs  $0.6\times$ ) mesoscutum width  $2.42\text{--}2.95\times$  its length (vs  $2.1\times$ ).

*Agiommatus thyraxisae* n. sp. is unique and different from the remaining Oriental species of this genus (based on comparison with original descriptions) in the following combination of characters: (i) legs with all coxae metallic dark green and concolorous with the body (vs whitish yellow in *A. sumatraensis*); (ii) F1  $1\text{--}1.19\times$  as long as wide (vs  $2\times$  in *A. attaci*); (iii) T3 largest followed by T1 and T2 respectively, T3  $9\times$  as long as T4 medially (vs T4 large,  $2.5\times$  as long as T3 medially in *A. paria*); (iv) antenna  $0.84\text{--}0.93\times$  head width (vs  $0.57\times$  in *A. pantanus*); (v) MV  $2.25\text{--}2.78\times$  STV (vs  $3\times$  in *A. erionotus*); and (vi) female gaster without yellowish cross bands (vs two yellowish transverse bands in *A. paria*).

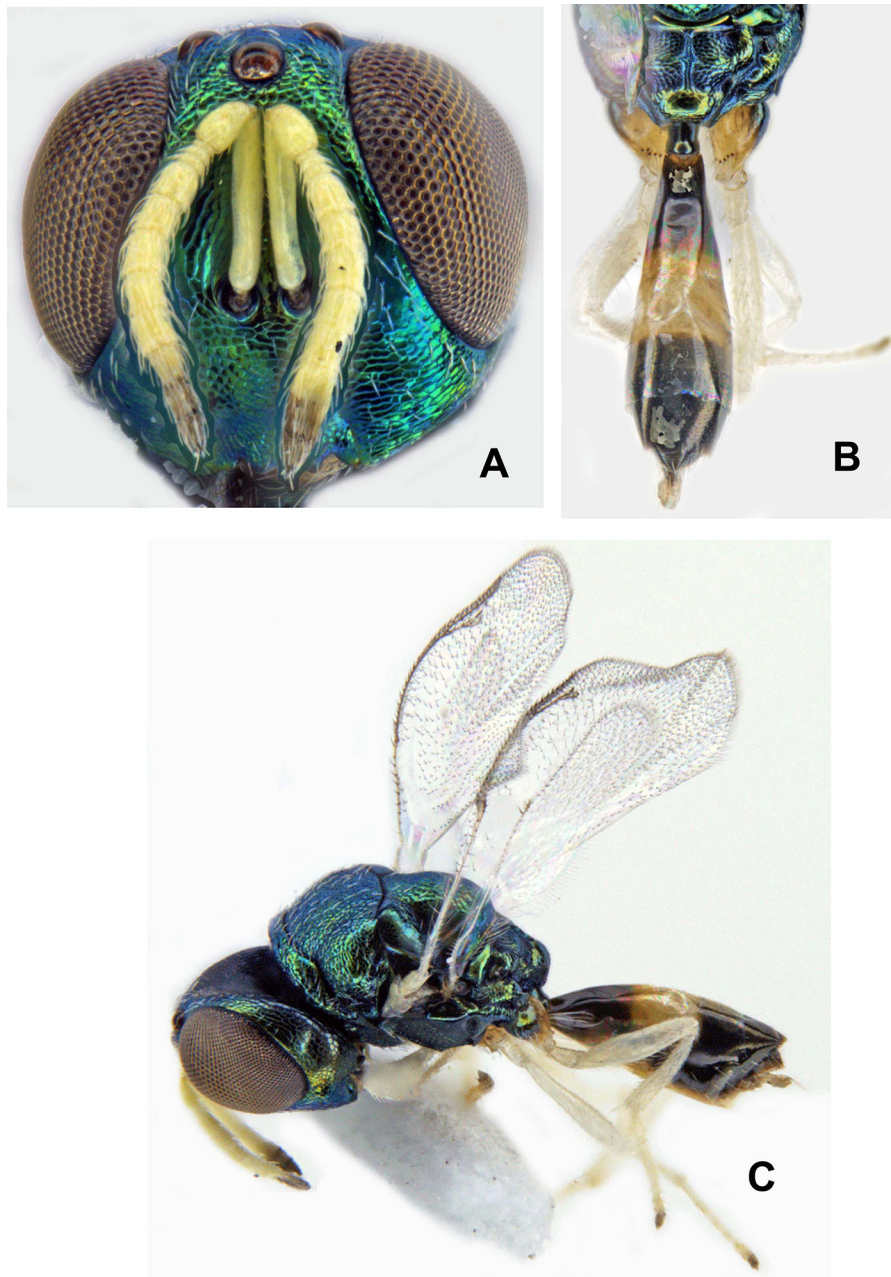
## Family Eupelmidae Walker, 1833

### *Anastatus ramakrishnai* (Mani)

**Host:** Egg of *Gangara thyraxis* (Fabricius) (Lepidoptera: Hesperidae) on the host plant *D. lutescens*.

**Locality:** Karnataka, Bangalore, Hebbal, ( $13.04^{\circ}\text{N}$ ,  $77.59^{\circ}\text{E}$ ), India.

**Voucher material:** Three females on card, 02.xi.2015, coll. Sandesh M. Gawas. Deposited in the ICAR–NBAIR, Bangalore (NBAIR/Eupel/Anas/21115-HP).

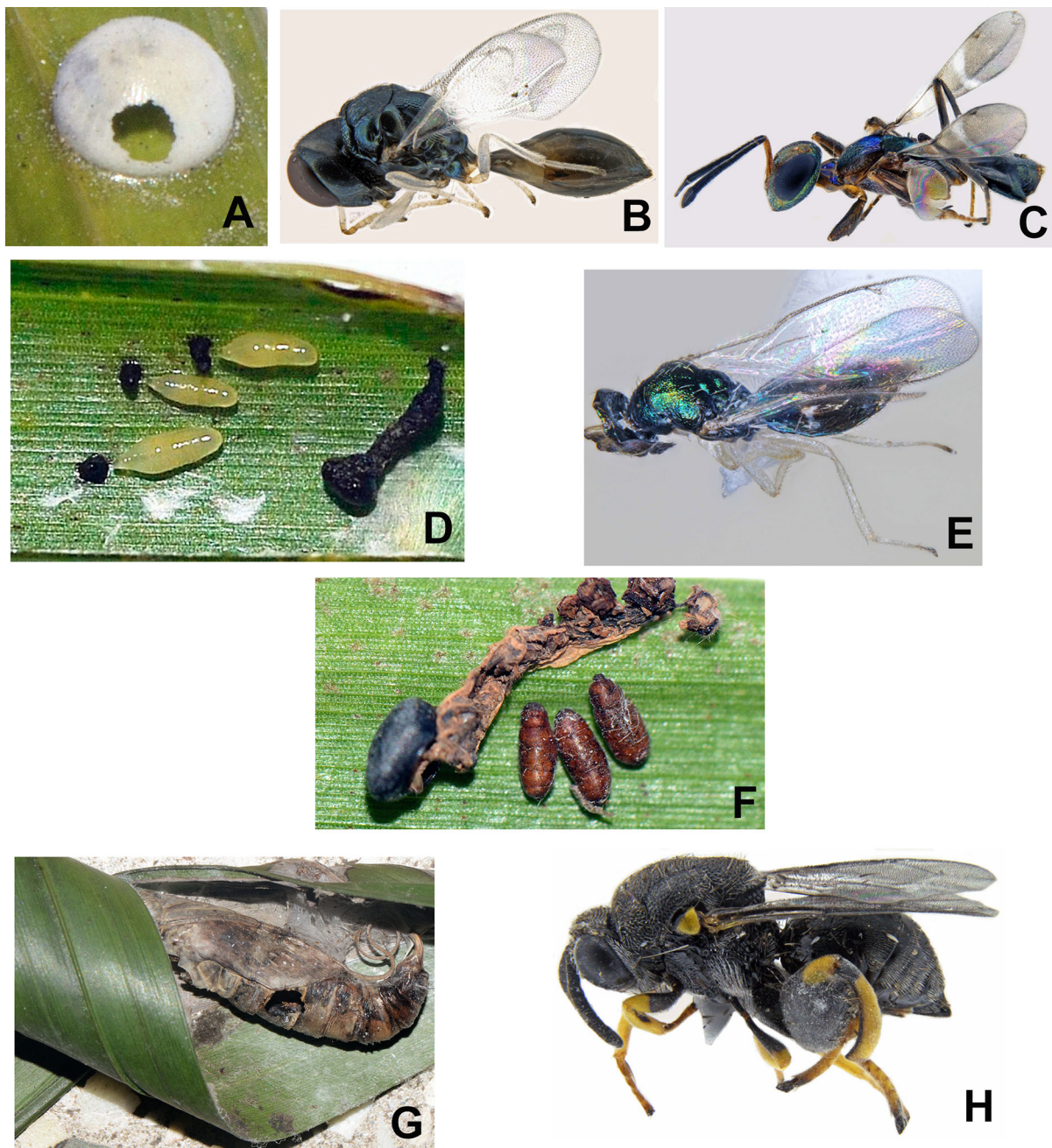


**Fig. 2** *Agiommatius thyrsisae* n. sp. Male. A, Head in frontal view; B, Metasoma with propodeum; C, Habitus

#### Brief diagnosis (Fig. 3C)

Body length 2.5–3.00 mm. Body dark brown to black, in part metallic. F1 shorter than clava; scape 2× as long as clava. Fore wing longer than metasoma and

exceeding apex of metasoma. Fore wing infuscate with hyaline cross band; hyaline band with distal margin curved. Fore femur with a denticle at distal third on ventral margin.



**Fig. 3** Parasitised life-cycle stages of *Gangara thyrsis* and their parasitoids. A, Parasitised egg; B, Female of *Agiommatius thyrsisae* n. sp.; C, Female of *Anastatus ramakrishnai*; D, Parasitised caterpillar with *Sympiesis thyrsisae* cocoons; E, Female of *Sympiesis thyrsisae*; F, Parasitised caterpillar with dipteran puparia; G, Parasitised pupa; H, Female of *Brachymeria lasus*

**Table 1** Relative measurements of various body parts of females of *Agiommatus thyrsisae* n. sp. (holotype and paratypes)

| Characters                               | Holotype            | Paratype P1         | Paratype P2         | Paratype P3         | Paratype P4         |
|------------------------------------------|---------------------|---------------------|---------------------|---------------------|---------------------|
| Body length (mm)                         | 2.53                | 2.38                | 2.21                | 2.33                | 2.11                |
| Head width: head height                  | 1.25<br>(0.80:0.64) | 1.18<br>(0.86:0.73) | 1.16<br>(0.79:0.68) | 1.14<br>(0.79:0.69) | 1.17<br>(0.74:0.63) |
| Antenna length (mm)                      | 0.74                | 0.73                | 0.68                | 0.69                | 0.69                |
| Ratio of antenna length: head width      | 0.92                | 0.85                | 0.86                | 0.87                | 0.93                |
| Eye height in dorsal view: temple length | 0.39:0.21           | 0.39:0.21           | 0.44:0.23           | 0.44:0.25           | 0.38:0.18           |
| Malar space: eye height in frontal view  | 0.13:0.45           | 0.13:0.53           | 0.13:0.46           | 0.13:0.48           | 0.13:0.45           |
| Scape length: eye height in frontal view | 0.25:0.45           | 0.22:0.53           | 0.23:0.48           | 0.22:0.48           | 0.18:0.45           |
| Collar length: mesoscutum length         | 0.06:0.33           | 0.04:0.26           | 0.06:0.29           | 0.06:0.30           | 0.05:0.29           |
| Scutellum length (mm)                    | 0.39                | 0.33                | 0.38                | 0.33                | 0.32                |
| Mesosutum: propodeum                     | 0.33:0.24           | 0.26:0.19           | 0.29:0.19           | 0.30:0.17           | 0.29:0.18           |
| Length (mesosoma: metasoma: propodeum)   | 0.95:1.22:0.24      | 0.86:1.07:0.19      | 0.87:1.00:0.19      | 0.87:0.83:0.17      | 0.82:0.93:0.17      |
| Petiole (length: width)                  | 0.08:0.06           | 0.07:0.06           | 0.08:0.06           | 0.07:0.06           | 0.09:0.07           |
| Gaster (length: width)                   | 1.36:0.35           | 1.07:0.31           | 1.00:0.34           | 0.86:0.32           | 0.94:0.34           |
| Median length (T1:T2:T3)                 | 0.39:0.15:0.52      | 0.39:0.17:0.59      | 0.26:0.16:0.47      | 0.32:0.19:0.36      | 0.27:0.19:0.45      |
| T2 (width: median length)                | 0.33:0.15           | 0.32:0.17           | 0.31:0.16           | 0.31:0.19           | 0.32:0.19           |
| T3 (median length: width)                | 0.52:0.35           | 0.59:0.32           | 0.47:0.33           | 0.36:0.30           | 0.44:0.33           |
| Pedicel (length: width)                  | 0.09:0.05           | 0.09:0.05           | 0.08:0.06           | 0.08:0.05           | 0.06:0.04           |
| F1 (length: width)                       | 1.19                | 1.00                | 1.01                | 1.02                | 1.07                |
| F2 (length: width)                       | 1.22                | 1.00                | 1.01                | 1.16                | 1.12                |
| F3 (length: width)                       | 1.18                | 1.04                | 1.02                | 1.04                | 1.15                |
| F4 (length: width)                       | 1.33                | 1.18                | 1.08                | 1.03                | 1.07                |
| F5 (length: width)                       | 1.20                | 1.08                | 1.15                | 1.05                | 1.10                |
| Clava (length: width)                    | 2.92                | 2.95                | 2.28                | 2.17                | 2.16                |
| POL:OOL:OD                               | 0.10:0.03:0.07      | 0.09:0.03:0.07      | 0.10:0.03:0.06      | 0.09:0.03:0.06      | 0.08:0.02:0.07      |
| MV:PMV:STV                               | 0.36:0.24:0.15      | 0.36:0.28:0.16      | 0.39:0.26:0.14      | 0.35:0.27:0.15      | 0.32:0.22:0.13      |

**Table 2** Rearing details of *Gangara thyrsis* (Fabricius) eggs in the laboratory

| Date of collection | Total no. of eggs collected | No. of hosts emerged<br>(% emergence) | No. of parasitoids emerged<br>(% parasitism) | No. of unhatched eggs<br>(% unhatched) |
|--------------------|-----------------------------|---------------------------------------|----------------------------------------------|----------------------------------------|
| 07.xi.15           | 85                          | 38<br>(44.71%)                        | 26: M–6; F–19; HP–1<br>(30.59%)              | 21<br>(24.71%)                         |
| 15.xii.15          | 31                          | 16<br>(51.61%)                        | 7: M–0; F–4; HP–3<br>(22.58%)                | 8<br>(25.81%)                          |
| Mean               |                             | 48.16%                                | 26.58%                                       | 25.26%                                 |

*Abbreviations:* F, female wasp; M, male wasp; HP, hyperparasitoid

## Family Chalcididae Latreille, 1817

### *Brachymeria lasus* (Walker)

**Host:** Pupa of *Gangara thyraxis* (Fabricius) (Lepidoptera: Hesperidae) (Fig. 3G) on the host plant *D. lutescens*.

**Locality:** Karnataka, Bangalore, Hebbal, (13.04°N, 77.59°E), India.

**Voucher material:** One female on card, 02.xi.2015, coll. Sandesh M. Gawas. Deposited in the ICAR–NBAIR, Bangalore (NBAIR/Chal/Brach/21115-B).

Brief diagnosis (Fig. 3H)

Body length 7 mm. Body colour black, tegula pale yellow, base reddish brown. Coxa and trochanters black, femur shiny black with apical region yellow, fore and mid tibia yellow, hind tibia yellow with base black. Pubescence silvery white. Lateral ridges of scrobe produced in front of the antennal toruli. A smooth median area below the scrobe. First tergite smooth, second tergite punctured.

## Order Diptera Linnaeus, 1758

### Family Tachinidae Bigot, 1853

Two species of tachinid flies were also reared from the pupae of *G. thyraxis*: *Exorista sorbillans* (Wiedemann, 1830) Supplementary file, Fig. S3) and an innominate species close to *Blepharella* spp. (Supplementary file, Fig. S4).

### *Exorista sorbillans* (Wiedemann, 1830)

**Host:** Pupa of *Gangara thyraxis* (Fabricius) (Lepidoptera: Hesperidae) on the host plant *D. lutescens*.

**Locality:** Karnataka, Bangalore, Hebbal, (13.04°N, 77.59°E), India.

**Voucher material:** Two males on card, 11.i.2016, coll. Sandesh M. Gawas. Deposited in the ICAR–NBAIR, Bangalore (NBAIR/Dipt/Tachy/11116-A).

### Innominate species close to *Blepharella* spp.

**Host:** Pupa of *Gangara thyraxis* (Fabricius) (Lepidoptera: Hesperidae) on the host plant *D. lutescens*.

**Locality:** Karnataka, Bangalore, Hebbal, (13.04°N, 77.59°E), India.

**Voucher material:** Two females on card, 11.i.2016, coll. Sandesh M. Gawas. Deposited in the ICAR–NBAIR, Bangalore (NBAIR/Dipt/Tachy/11116-B).

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### Compliance with ethical standards

**Conflict of interest** The authors declare that they have no conflict of interest.

**Ethical approval** All applicable institutional, national and international guidelines for the care and use of animals were followed.

## References

- Bouček, Z. (1988). Australasian Chalcidoidea (Hymenoptera). A biosystematic revision of genera of fourteen families, with a reclassification of species. Wallingford, UK: CAB International, 458 pp.
- Crawford, J. C. (1911). Descriptions of new Hymenoptera. No. 3. *Proceedings of the United States National Museum*, 41, 267–282.
- Ferrière, C. (1930). Notes on Asiatic Chalcidoidea. *Bulletin of Entomological Research*, 21, 355.
- Ferrière, C. (1951). Parasites des oeufs d'un saturnide a Madagascar. *Mémoires de l'Institut Scientifique de Madagascar (A)*, 5, 263.
- Huang, D.-W. (1986). *Agiommatus erionotus* a new species of Miscogasterinae (Hymenoptera: Chalcidoidea, Pteromalidae). *Wuyi Science Journal*, 6, 103–110.
- Motschulsky, V. de (1863). Essai d'un catalogue des insectes de l'île Ceylon (Suite). *Byulleten' Moskovskogo Obshchestva Ispytateley Prirody (Otdel Biologicheskii)*, 36, 1–153.
- Noyes, J. S. (2015). Universal Chalcidoidea Database. World Wide Web electronic publication. <http://www.nhm.ac.uk/chalcidoidea> (Accessed on 28/12/2015).
- Saji, K., Kunte, K., Shyamal, L., & Manoj, P. (2016). *Gangara thyraxis* Fabricius, 1775 - Giant Redeye. In: Kunte, K., Roy, P., Kalesh, S. & Kodandaramaiah, U. (Eds), *Butterflies of India*, v. 2.21. Bangalore: Indian Foundation for Butterflies. <http://www.ifoundbutterflies.org/sp/588/Gangara-thyraxis>.
- Sureshan, P. M. (2003). Pteromalinae (Pteromalidae: Chalcidoidea: Hymenoptera) of Indian subcontinent. *Records of*

- the Zoological Survey of India*, Occasional Paper No 205, Kolkata: Zoological Survey of India, 170 pp.
- Sureshan, P. M., & Narendran, T. C. (1996). A new species of *Agiommatus* Crawford (Hymenoptera: Pteromalidae)—an egg parasite of a cutworm on mulberry in Bangalore (Karnataka). *Journal of the Bombay Natural History Society*, 93, 59–61.
- Thompson, W. R. (1958). *A catalogue of the parasites and predators of insect pests. Section 2. Host parasite catalogue, Part 5*. Ottawa, Canada: Commonwealth Agricultural Bureaux, Commonwealth Institute of Biological Control, 583 pp.
- Xiao, H., & Huang, D. W. (2001). A study on genus *Agiommatus* (Hymenoptera: Pteromalidae) from China, with description of one new species. *Entomological News*, 112, 139–140.
- Yang, Z. Q. (1992). Discovery of the genus *Agiommatus* (Hymenoptera: Chalcidoidea, Pteromalidae) from south China with description on a new species. *Entomotaxonomia*, 14, 72–76.
- Yu, D. S. K., van Achterberg, C., & Horstmann, K. (2012). Taxapad 2012, Ichneumonoidea 2011. Database on flash-drive. [www.taxapad.com](http://www.taxapad.com), Ottawa, ON.