Revision of the genus Aulacocentrum Brues, 1922 (Hymenoptera: Braconidae: Macrocentrinae) from India with description of two new species and a key to the Indian species

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ORIGINAL ARTICLE

Revision of the genus *Aulacocentrum* Brues, 1922 (Hymenoptera: Braconidae: Macrocentrinae) from India with description of two new species and a key to the Indian species

Ankita Gupta[1] · Cornelis Van Achterberg[2] · Kattigehallimath Ajaykumara[3] · Rohit Pattar[1] · Hemanth Kumar Hosautpathanahalli Mogappa[1] · Satya Nand Sushil[1]

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Abstract

The Indian species of the genus *Aulacocentrum* Brues, 1922 are revised. Two new species, *Aulacocentrum hunliensis* Gupta sp. n. from Arunachal Pradesh (in north eastern region) and *A. parotisae* Gupta sp. n. from Karnataka (in southern region) are illustrated and described. *Aulacocentrum parotisae* sp. n., a solitary endoparasitoid, is reared from the caterpillars of *Parotis* sp. (Lepidoptera: Crambidae) feeding on *Psydrax dicoccos* Gaertn. (Rubiaceae) in Karnataka. Additionally, *A. seticella* van Achterberg and He, 1994 is first time reported from southern India and a key to the Indian species of *Aulacocentrum* is provided.

Keywords New species · *Aulacocentrum* · India

Introduction

The genus *Aulacocentrum* Brues, 1922 (Braconidae: Macrocentrinae) is mainly distributed in the Old World tropics and southern part of the East Palaearctic region. So far, ten species are known from the Oriental, Australasian (Wallacea), Oceanic and East Palaearctic regions (Pham et al. 2024). Three species are known from India which include *Aulacocentrum longitergiae* Sharma, 1978, *A. philippinense* (Ashmead, 1904) and *A. seticella* van Achterberg & He, 1994 out of which the position of *A. longitergiae* Sharma, 1978 is uncertain due to untraceable holotype (Pham et al. 2024).

The species of the genus *Aulacocentrum* have been reported as larval parasitoids of members of the families Pyralidae and Crambidae (Lepidoptera) (Yu et al. 2016; Pham et al. 2024). *Aulacocentrum philippinense* was recorded as an endoparasitoid of the rice leaf roller *Cnaphalocrocis medinalis* (Guenée, 1854) (Crambidae) in Vietnam (Long and Belokobylskij, 2003). However, in China, *A. confusum* He and van Achterberg, 1994 was reported from *Ostrinia furnacalis* (Guenée, 1854) (Crambidae) and *Diaphania pyloalis* (Walker, 1859) (Pyralidae); and *A. seticella* was recorded from *Pachyzancla* sp. (Crambidae) (He and van Achterberg, 1994).

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In the present study, two new species, *Aulacocentrum hunliensis* sp. n**.** collected from Lower Dibang Valley of Arunachal Pradesh in the north-eastern part of India and *A. parotisae* sp. n. collected from Karnataka in the southern part of India are illustrated and described. Additionally, *A. parotisae* sp. n. was reared from *Parotis* sp. (Lepidoptera: Crambidae) caterpillars on the host plant *Psydrax dicoccos* Gaertn. which is listed as vulnerable under criteria A1c (World Conservation Monitoring Centre, 1998).

A key to the Indian species of *Aulacocentrum* is provided.

Material and methods

Two females of *A. hunliensis* sp. n. were collected from the yellow pan traps placed at Hunli in the Lower Dibang Valley of Arunachal Pradesh while multiple specimens of *A. parotisae* sp. n. were reared from the caterpillars of *Parotis* sp. (Lepidoptera: Crambidae) in Chikkabalapur, Karnataka. The following abbreviations are used in the descriptions: POL—Posterior Ocellar Line; OOL—Ocular Ocellar Line; OD—Ocellar Diameter; T1, T2, T3 – first, second and third metasomal tergites, respectively; F1, F2 – first and second flagellomere, respectively. Morphological terminology in general follows van Achterberg (1993a, 1993b). Photos were taken with a Leica M 205 A stereo-zoom microscope with Leica DC 420 inbuilt camera using automontage software (version 3.8). The type specimens are deposited in the National Insect Museum (NIM) of ICAR-National Bureau of Agricultural Insect Resources (ICAR-NBAIR), Bengaluru, India.

Results

Details of all the five species known from India (including description of two new species) along with a key to the Indian species of *Aulacocentrum* are given. The species distribution map of Indian species of *Aulacocentrum* is provided in Fig. 1.

Genus *Aulacocentrum* Brues, 1922

Type species. *Aulacocentrum pedicellatum* Brues, 1922 (examined by CvA).

Key diagnostic characters. First metasomal tergite distinctly transversely striate (in part); first tergite 3–8 × as long as its apical width; vein SR of hind wing moderately to strongly bent and vein SC + R1 abruptly bent; fore femur dorsally moderately long setose and length of inner hind tibial spur 0.3–0.5 × as long as hind basitarsus (He and van Achterberg, 1994).

Aulacocentrum hunliensis Gupta sp. n.

(Figs. 2–4)

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Description. Holotype (Fig. 2), female, body length 11.0 mm; fore wing length 9.2 mm; ovipositor 14.1 mm; ovipositor sheath 11.9 mm.

Head. Antenna with 48 flagellomeres; F1 1.3 × as long as F2; length of F1 and F2 6.4 and 4.7 × their widths, respectively; in frontal view, width of face 1.3 × its length (Fig. 3a); length of maxillary palp 1.4 × height of head; face sparsely punctate; malar space 1.2 × as long as basal width of mandible (Fig. 3a); clypeus less convex than *A. parotisae* sp. n.; straight apically, sparsely, finely punctate; distance between tentorial pits 1.5 × distance from pit to eye margin; in dorsal view, width of head 2.7 × median length; eye 11.5 × as long as temple; OOL: OD: POL = 2.0: 2.0: 3.2 (Fig. 3b); frons, vertex and temple shiny, smooth, setose.

Mesosoma. Length of mesosoma 1.65 × as long as its height (Fig. 3d); propleuron with fine sparse punctures (Fig. 3d); middle lobe of mesoscutum with mid-longitudinal carina, sparsely and finely punctate anteriorly and areolate-rugulose posteriorly between lateral lobes; lateral lobes of mesoscutum sparsely and finely punctate; notauli with faint crenulae at anterior end and almost smooth posteriorly, not fused throughout, reaching apical margin separately (Fig. 3c); scutellar sulcus with nine carinae, scutellum sparsely and finely punctate; mesopleuron and metapleuron distinctly punctate (punctures well separated), metapleuron rugulose on edges (Fig. 3d); propodeum mostly irregularly rugulose and coarsely punctate in basal one-third (Fig. 3e).

Wings. Length of fore wing 3.2 × its maximum width (Fig. 4a); length of pterostigma 5.7 × its width; fore wing vein SR1 2.5 × as long as 3-SR; r: 3-SR: SR1 (relative) = 1.0: 2.5: 6.8; vein 1-CU1 quadrate; cu-a: 2-CU1 (relative) = 0.3: 16.5; 2-SR: 3-SR: r-m (relative) = 1.9: 2.6: 1.0; second submarginal cell of fore wing narrowed distally; hind wing with vein 2-SC + R longitudinal; vein SC + R1 evenly curved (Fig. 4a); cu-a: 1-M: 1r-m = 1.4: 1.4: 1.0; marginal cell sparsely setose.

Legs. Hind coxa densely setose latero-ventrally, punctate dorsally, with few transverse striations apically (Fig. 4c); length of femur, tibia, and basitarsus of hind leg 8.4, 14.9, and 9.64 × their maximum widths, respectively; hind trochantellus with four teeth in one row; length of hind inner and outer tibial spurs 0.48 × and 0.40 × hind basitarsus, respectively; length of hind basitarsus 0.34 × hind tibia and 1.02 × second–fifth tarsal segments combined.

Metasoma. Length of metasoma 1.27 × head and mesosoma combined; laterope large, fused into a groove posteriorly; T1 evenly widened apically, with medio-basal shallow depression (Fig. 3e, f); length of T1 5.7 × its apical width (Fig. 3f); T1 parallel-sided, with curved striation medially, basal one-third largely punctate; T2 1.1 × as long as

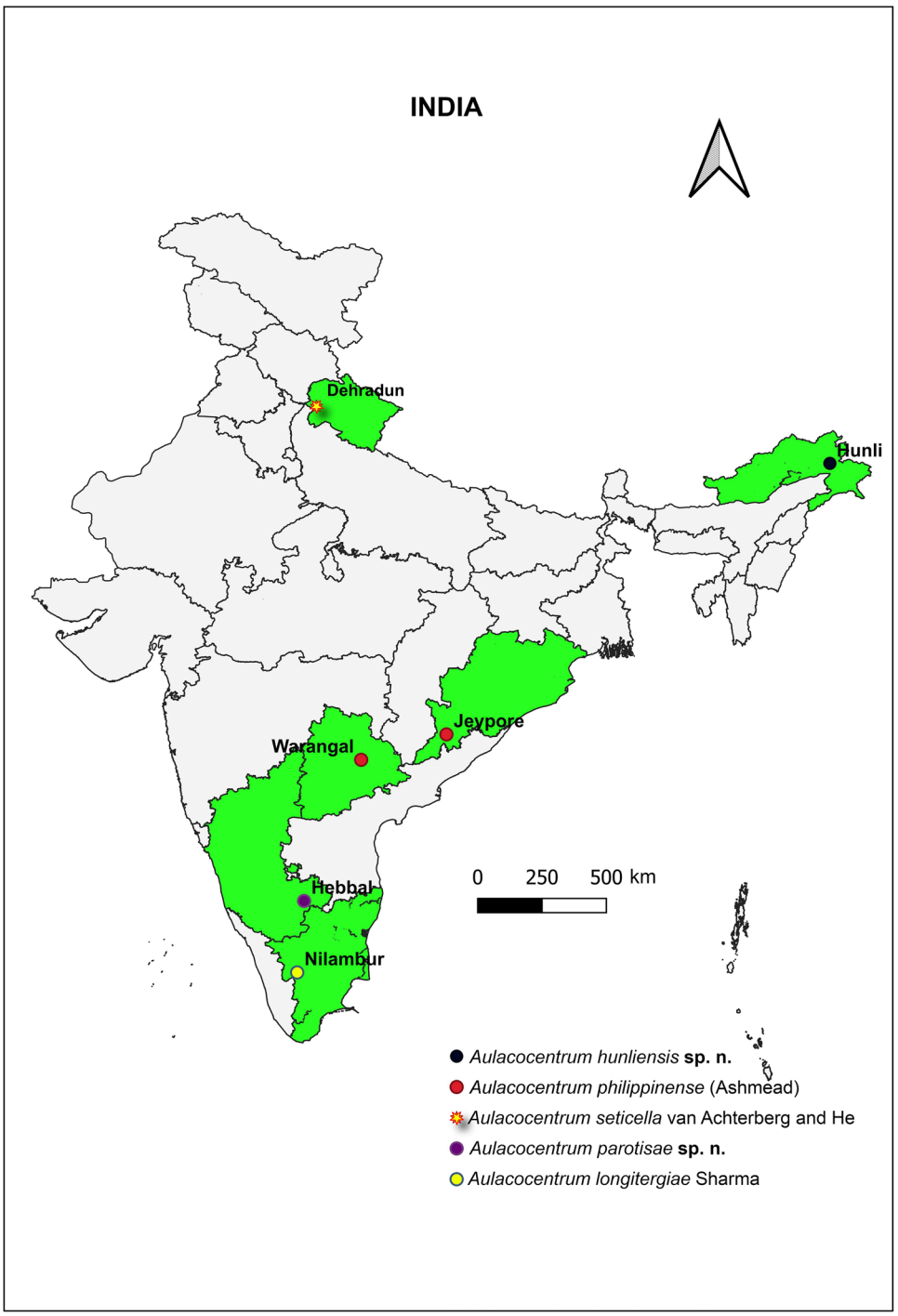

Fig. 1 Species distribution map of the genus *Aulacocentrum* Brues in India

T3 medially; T2 weakly constricted medially, with convergent striae on basal 2/3 of tergite, with parallel striation apically; T3 sparsely punctate, with dorsal micro-striae basally; remaining metasomal tergites coriaceous-punctate; length of ovipositor sheath 1.3 × as long as fore wing and 5.2 × as long as T1.

Colour. Scapus largely yellow ventrally, brown dorsally; ocelli dark brown; mandibles brown except black apical tip; flagellum dark brown, with 9th–19th middle flagellomeres ivory; palpi yellowish white; tegula light brown; fore leg yellow; hind coxa reddish yellow, hind trochanter and trochantellus yellow, hind femur blackish brown to black, reddish yellow at extreme base; apical 1/2 of hind tibia blackish brown, yellow basally; hind tibial spurs and tarsus cream-white; mesonotum black; metapleuron blackish brown; propodeum black; wing veins brown; pterostigma dark brown,

Fig. 2 *Aulacocentrum hunliensis* sp. n. female, holotype. Habitus in lateral aspect

yellow apically; wing membrane hyaline; basal 2/3 of first metasomal tergite pale yellow to ivory, apical 1/3 black; T2 entirely black; basal 2/3 of T3 whitish yellow, black apically; the remainder blackish brown to black; hypopygium brown; ovipositor and ovipositor sheath brown.

Male. Unknown.

Types examined. Holotype: female; India: Arunachal Pradesh: Lower Dibang Valley; 30.vii.2022; yellow pan trap; coll. Ajay Kumara; Code- NIM/NBAIR/Brac/Aula/30722-H. Paratype: one female; same data as holotype; Code- NIM/NBAIR/Brac/Aula/30722-P1.

Etymology. Named after the place of collection.

Biology. Unknown.

Distribution. India (Arunachal Pradesh: Lower Dibang Valley).

Comments. *Aulacocentrum hunliensis* sp. n. can be separated from *A. philippinense*, the very similar Oriental species according to Pham et al. (2024), in the following characters: Notauli smooth, wide apart, not fused posteriorly (*vs* notauli sparsely crenulate anteriorly, narrowly fused posteriorly in *A. philippinense*); metapleuron and propodeum completely black (*vs* metapleuron whitish yellow and propodeum medio-posteriorly black, pale yellow basally and ventrally in *A. philippinense*); vein 1-CU1 quadrate (*vs* longitudinal in *A. philippinense*); basal 2/3 of first metasomal tergite pale yellow to ivory, apical 1/3

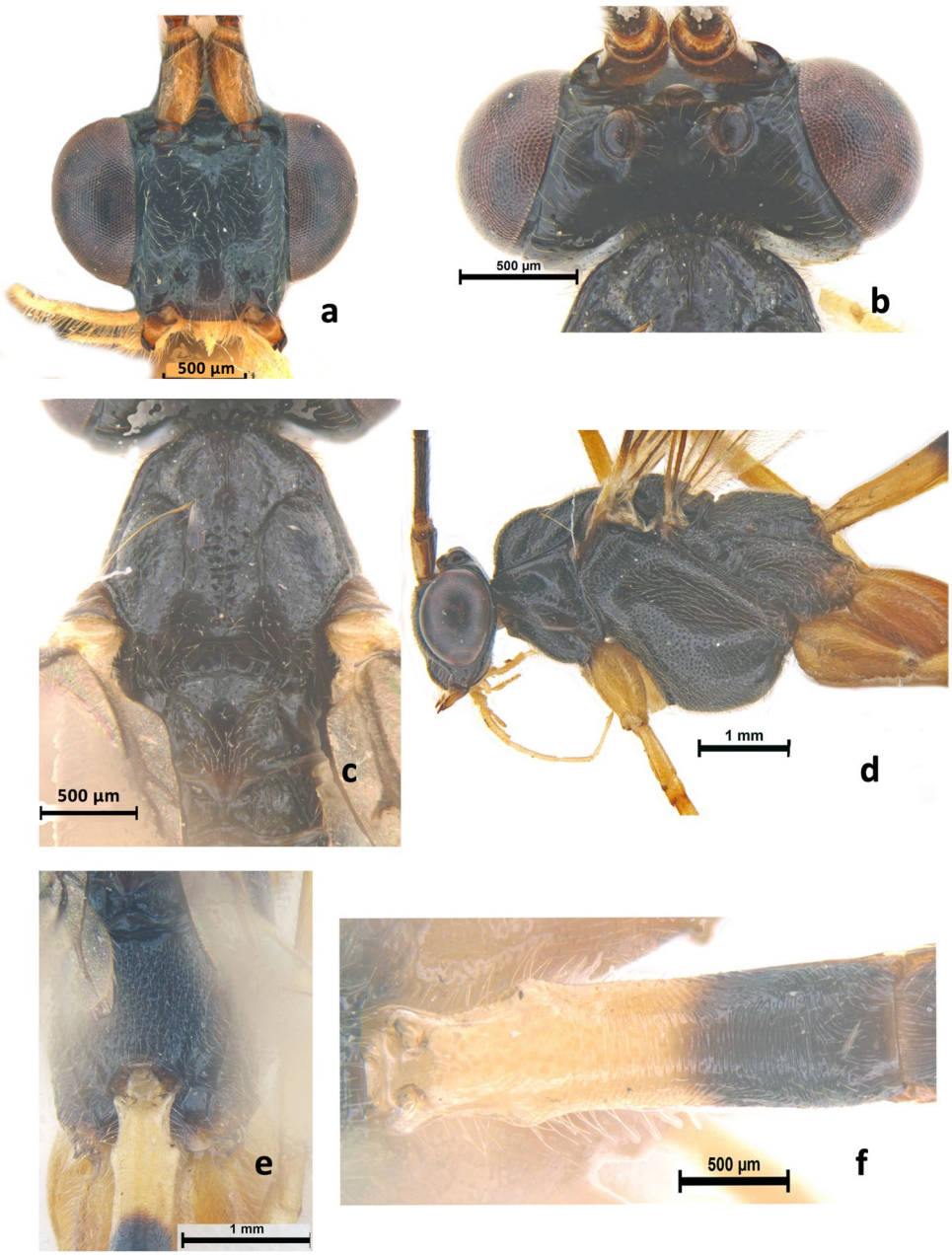

Fig. 3 *Aulacocentrum hunliensis* sp. n. female, holotype. **a** Head in anterior aspect; **b** vertex; **c** mesosoma (dorsal); **d** head and mesosoma (lateral); **e** propodeum (dorsal); **f** first tergite

black (*vs* basal 1/3 of first metasomal tergite pale yellow, apical 2/3 black in *A. philippinense*); length of T1 of female 5.7 × its apical width (*vs* 3.8–4.3 × in *A. philippinense*); T2 slightly constricted medio-laterally (*vs* distinctly constricted in *A. philippinense*).

This new species can be differentiated from the similar looking species from Vietnam—*A. intermedium* Long and van Achterberg, 2024 (in Pham et al. 2024) in having notauli non-crenulated, deep, not fused posteriorly (*vs* narrow, sparsely crenulate anteriorly, narrowly fused posteriorly with median rugosity in *A. intermedium*); propodeum completely black (*vs* black medio-posteriorly, basally and laterally pale yellow in *A. intermedium*); metapleuron blackish brown to black (*vs* yellow in *A. intermedium*); length of hind femur 8.4 × its maximum width (*vs* 9.8 ×).

Note. For comparison with other closely allied Oriental species see Table 1.

***Aulacocentrum parotisae* Gupta sp. n.**

(Figs. 5–7)

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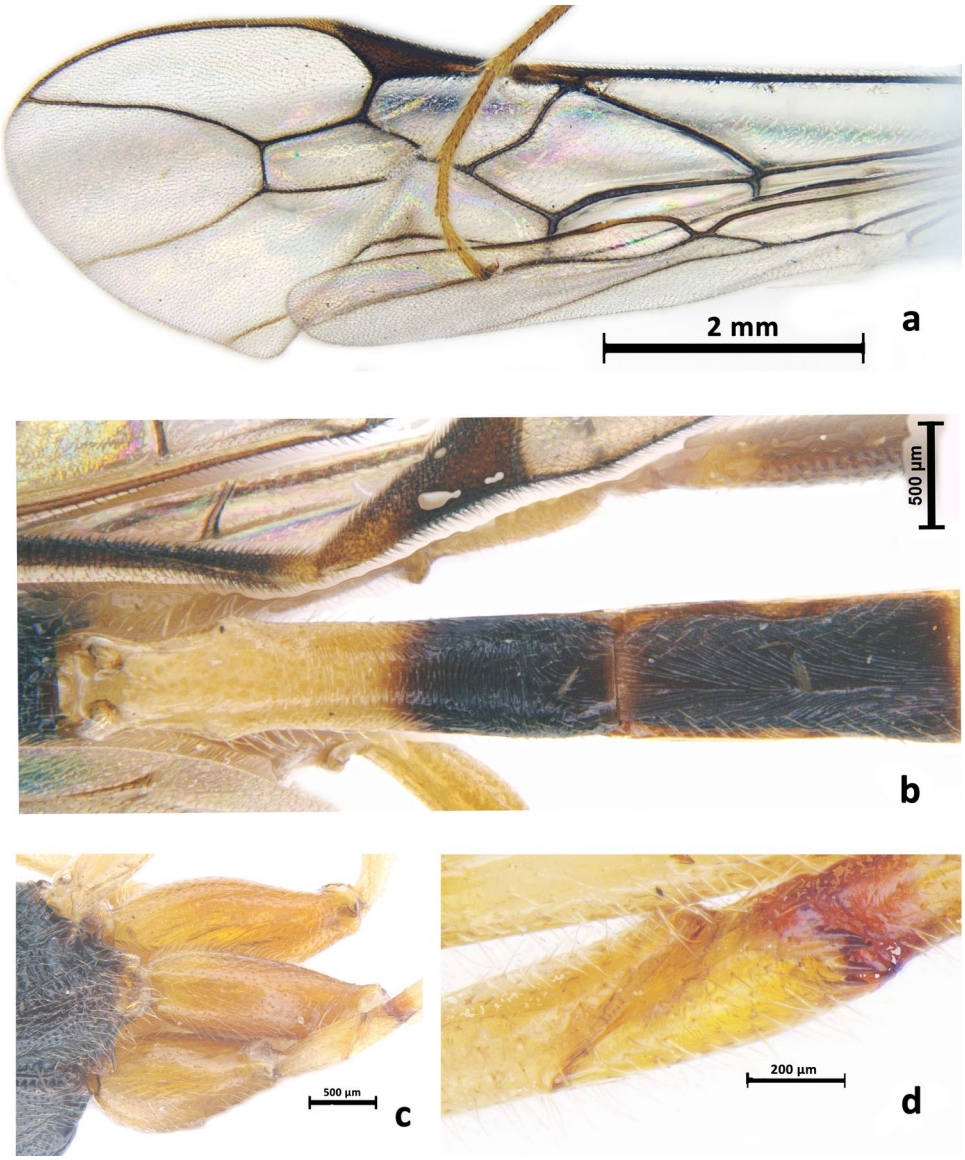

Fig. 4 *Aulacocentrum hunliensis* sp. n. female, holotype. **a** Wings; **b** first and second tergites (dorsal); **c** mid and hind coxae; **d** teeth on hind trochantellus

Description. Holotype, female, body length 11.7 mm, fore wing length 8.8 mm, ovipositor sheath 12.2 mm (Fig. 5a).

Head. Antenna 46 flagellomeres; first flagellomere 1.3 × second flagellomere; length of first and second flagellomeres 5.3 and 4.5 × their widths, respectively; in frontal view width of face 1.2 × its length (Fig. 6a); length of maxillary palp 1.4 × height of head; face densely punctate medially, sparsely punctate laterally (Fig. 6a); malar space 1.3 × as long as basal width of mandible; clypeus straight apically, punctate as in face; distance between tentorial pits 1.6 × distance from pit to eye margin; in dorsal view, width of head 2.5 × median length (Fig. 6b); eye 15 × as long as temple; ocelli large, OOL: OD: POL = 1.6: 2.6: 2.7, OOL 0.6 × OD (Fig. 6b); frons, vertex and temple smooth.

Mesosoma. Length of mesosoma 1.5 × its height (Fig. 7a); middle lobe of mesoscutum finely punctate; notauli distinctly crenulate throughout, narrowly fused posteriorly with median rugosity (Fig. 6c); scutellar sulcus with seven carinae, scutellum densely punctate and densely setose in apical half; propleuron smooth anteriorly and punctate posteriorly (Fig. 7a); mesopleuron densely punctate; metapleuron largely rugose-punctate (Fig. 7a); propodeum mostly areolate-rugose (Fig. 6d).

Wings. Length of fore wing 3.1 × its maximum width (Fig. 6e); length of pterostigma 3.8 × its width; vein SR1 of fore wing 2.3 × as long as vein 3-SR; r: 3-SR: SR1 (relative) = 1.0: 2.4: 5.5; vein 1-SR + M of fore wing bent medially (Fig. 6e); cu-a: 1-CU1: 2-CU1 (relative) = 2.1: 1.0: 9.9; 2-SR: 3-SR: r-m (relative) = 1.9: 2.8: 1.0; second

Table 1 Comparative characters of closely allied Oriental species of *Aulacocentrum*

Characters	*A. hunliensis* sp. n.	*A. intermedium* (measurements taken from Pham et al. 2024)	*A. philippinense* (measurements taken from Pham et al. 2024)	*A. parotisae* sp. n.	*A. glabrum* (measurements taken from Pham et al. 2024)
Fore wing 2-CU1 : 1-CU1	1-Cu1quadrate	5.5 ×	9.4 ×	9.9 ×	1-Cu1 quadrate
Hind wing 2-SC+R	Longitudinal	Longitudinal	Longitudinal	Longitudinal	Thick, nearly quadrate
Notauli	Faintly crenulated at anterior end, mostly smooth, well separated and not fused posteriorly	Narrow, sparsely crenulate anteriorly, narrowly fused posteriorly with median rugosity	Sparsely crenulate anteriorly, narrowly fused posteriorly with median rugosity	Crenulated, strongly converging posteriorly in a sharp V-shaped depression, divided by mid-longitudinal rugosity	Crenulated anteriorly, strongly converging posteriorly in a sharp V-shaped depression, divided by mid-longitudinal rugosity
Mesoscutum	Middle lobe of mesoscutum sparsely and finely punctate anteriorly and areolate-rugulose posteriorly	Middle lobe of mesoscutum densely punc tate; lateral lobes of mesoscutum sparsely punctate	Middle lobe of mesoscutum rugulose dorsally	Middle lobe of mesoscutum finely and sparsely punctate	Middle and lateral lobes of mesoscutum mostly coriaceous, with sparse fine punctures
Scutellum	Sparsely punctate	Densely punctate	Densely punctate	Densely punctate	Rugose-punctate
Metapleuron	Blackish-brown to black	Yellow	Whitish yellow	Yellow	Yellow medially and posteriorly
Propodeum	Completely black	Black medio-posteriorly, basally and laterally pale yellow	Black medio-posteriorly, pale yellow basally and ventrally	Black medio-posteriorly, pale yellow basally and ventrally	Completely black
T1 colour	Basal 2/3 pale yellow to ivory, apical 1/3 black	Basal 2/3 pale yellow, apical 1/3 black	Basal 1/3 pale yellow, apical 2/3 black	Basal 1/2 of first tergite pale yellow remaining 1/2 blackish brown	Basal 1/2 of first tergite pale yellow remaining 1/2 blackish brown
Ratio of length of first tergite to its apical width	5.7 ×	4.1 ×	3.8 ×	4.5 ×	3.6 ×
Basal depression of T1	Not distinct	Distinct	Flat	Distinct	Distinct
Medio-lateral constriction of T2	Weak	Weak	Distinct	Distinct	Distinct
Ratio of length of hind femur to its maximum width	8.4 ×	9.8 ×	8.2 ×	7.9 ×	9.1 ×

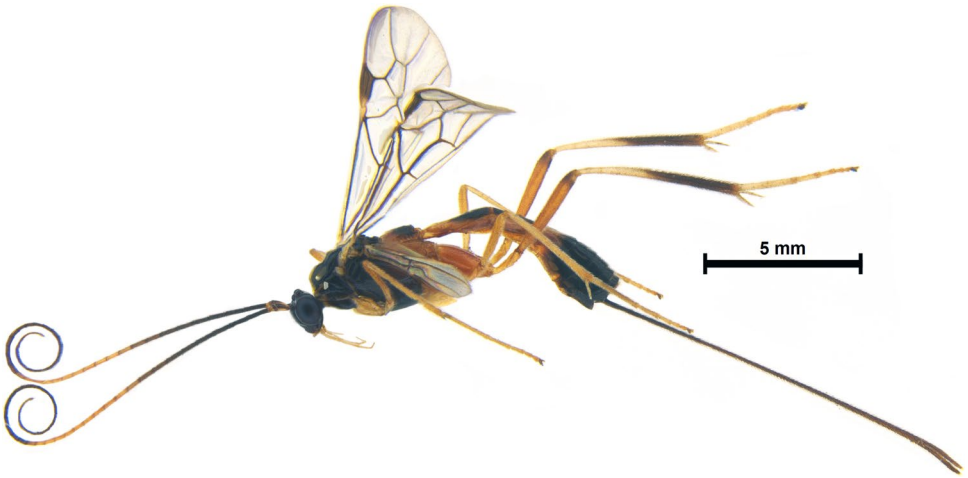

Fig. 5 **a** *Aulacocentrum parotisae* sp. n. female, holotype, habitus in lateral aspect. **b** Male, paratype, habitus in dorsal aspect

submarginal cell of fore wing narrowed distally; hind wing with vein 2-SC + R longitudinal (Fig. 6e); vein of hind wing cu-a: 1-M: 1r-m (relative) = 1.3: 1.6: 1.0; marginal cell basally sparsely setose on edges and glabrous within, parallel sided medially and slightly widened apically; basal cell glabrous apically.

Legs. Hind coxa densely setose latero-ventrally, densely punctate dorsally, with oblique striations apically (Fig. 7c); length of femur, tibia, and basitarsus of hind leg 7.9, 15.8, and 10.7 × their maximum widths, respectively; left hind trochantellus with three teeth apically; length of hind inner and outer tibial spurs 0.4 × and 0.24 × hind basitarsus, respectively; length of hind basitarsus 0.4 × hind tibia and 1.0 × second–fifth tarsal segments combined.

Metasoma. Length of metasoma 1.43 × as long as head and mesosoma combined; T1 with strong depression medio-basally (Fig. 7c); length of T1 4.5 × its apical width; laterope large (Fig. 7c); T1 mostly transversely striate basally, transverse-obliquely striate medio-subapically and with longitudinal-oblique striations apically; T2 1.1 × longer than T3 medially; T2 strongly constricted medio-laterally, with convergent striae on basal 2/3 of tergite leading to parallel striations in apical 1/3 (Fig. 7d); T3 finely parallel striate on basal 1/3 of tergite; remaining metasomal tergites coriaceous, with dense setae; length of ovipositor sheath 1.4 × as long as fore wing and 5.05 × as long as T1.

Colour. Head and mesoscutum black; scapus yellow basally, brown apically, flagellomeres dark brown except 10th –19th yellowish brown; palpi pale yellow; fore and mid leg yellow, except tarsi brown; hind coxa brownish yellow, trochanter and trochantellus yellow; hind femur yellowish brown, dark brown at apex; hind tibia blackish brown apically, cream-white in basal 1/2; hind tibial spurs and tarsus pale yellow; tegula cream-white; wing veins brown; parastigma yellow; pterostigma brown, yellow basally and apically; wing membrane hyaline; basal 1/2 of T1 yellow, apical 1/2 of T1 black; T2 black; basal 2/3 of T3 yellowish, apical 1/3 black; first–third sternites pale yellow and remainder black; ovipositor sheath dark brown.

Types examined. Holotype: female on card; India: Karnataka: Yelahanka; 20.viii.2013; ex larva of *Parotis* sp.; coll. Ankita Gupta; Code- NIM/NBAIR/Brac/Aula/20813-H. Paratype: three females, two males; same data as holotype; Code- NIM/NBAIR/Brac/Aula/20813P1–P5. One female; Karnataka: Kunigal; 27.x.2011; ex larva of *Parotis* sp.; coll. Ankita Gupta; Code- NIM/NBAIR/Brac/Aula/271011-P6. One female; Karnataka; 23.viii.2024; ex larva of *Parotis* sp.; feeding on *Psydrax dicoccos* Gaertn.; coll. Hemanth Kumar; Code- NIM/NBAIR/Brac/Aula/23824-P7. One female; Karnataka: Devarayanadurga; 17.xi.2015; ex indet. larva; coll. Ankita Gupta; Code- NIM/NBAIR/Brac/Aula/271115-P8.

Etymology. Named after its host genus '*Parotis*'.

Biology. Solitary larval endoparasitoid of *Parotis* sp. (Fig. 8c, d) feeding on *Psydrax dicoccos* Gaertn. (Rubiaceae) (Fig. 9a, b). *Psydrax dicoccos* is listed as vulnerable under criteria A1c (World Conservation Monitoring Centre, 1998).

Comments. This new species shows resemblance to *A. glabrum* Long from Vietnam in Pham et al. (2024) in having basal cell glabrous apically and first metasomal tergite with longitudinal-oblique striations apically, however can be differentiated from *A. glabrum* in having marginal cell less wider basally (*vs* distinctly wider, 'U' shaped in *A. glabrum*); first flagellomere 5.3 × its width (*vs* 3.8 ×); hind femur largely yellowish brown, but dark brown at apical tip (*vs* blackish brown, yellow at basal end in *A. glabrum*); vein 2-SC + R of hind wing longitudinal (*vs* nearly quadrate in *A. glabrum*); T2 strongly constricted medio-laterally (*vs* weakly in *A. glabrum*); length of T1 4.5 × its apical width (*vs* 3.6 × in *A. glabrum*); vein 1-CU1 of fore wing longitudinal (*vs* quadrate in *A. glabrum*).

Note. For comparison with other closely allied Oriental species see Table 1.

Male. Paratype, male, body length 10.4 mm, fore wing length 8.8 mm. OOL: OD: POL = 1.7: 2.7: 2.6, OOL 0.6 × OD. Hind femur: tibia: tarsus- 3.29: 4.83: 3.86. Hind tibial spur

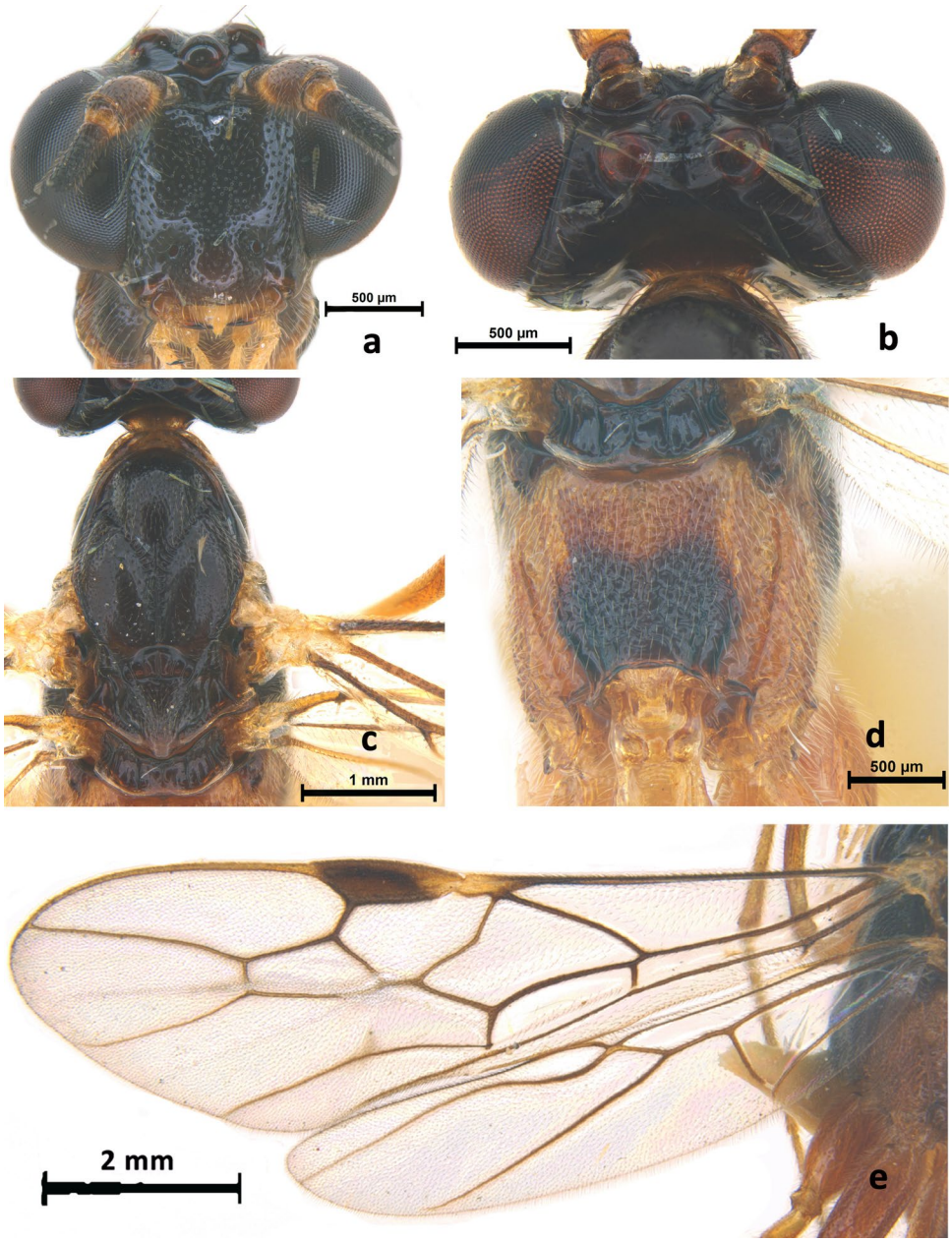

Fig. 6 *Aulacocentrum parotisae* sp. n. female, holotype. **a** Head in anterior aspect; **b** vertex; **c** mesosoma (dorsal); **d** propodeum (dorsal); **e** wings

length 0.83 and 0.55, respectively. Length of T1 4.5 × its apical width. Coloration and sculpture similar to female.

Aulacocentrum longitergiae Sharma, 1978

Description. Sharma (1978) described this species based on a single male. The following are the main diagnostic characters: antennal flagellum unicoloured, without median pale flagellomeres; head and hind tibia reddish brown; length of T1 6.0 × its apical width [marginal cell of hind wing strongly constricted subbasally; 2-SC + R of hind wing transverse.

Additionally the species can be identified by head distinctly triangular in shape, wider than long, 1.5 × as wide as long; POL nearly 2 × OOL; occiput without occipital carinae; frons slightly depressed; face minutely punctate with extremely shallow punctures; clypeus highly convex, not separated from face; mesoscutum with extremely shallow punctures; mesosternum and mesopleuron moderately punctate with extremely shallow punctures; disc of scutellum minutely punctate with shallow punctures; propodeum longer than wide, 2.3 × as wide as its apical width, spiracle located very close to the pleural suture in the middle, propodeum strongly punctate with broad coalescent punctures, transversely striated apically; fore wing more than 4 × as long as wide; hind wing 5 × as long as wide; T1 6 × as long as wide apically, shiny with

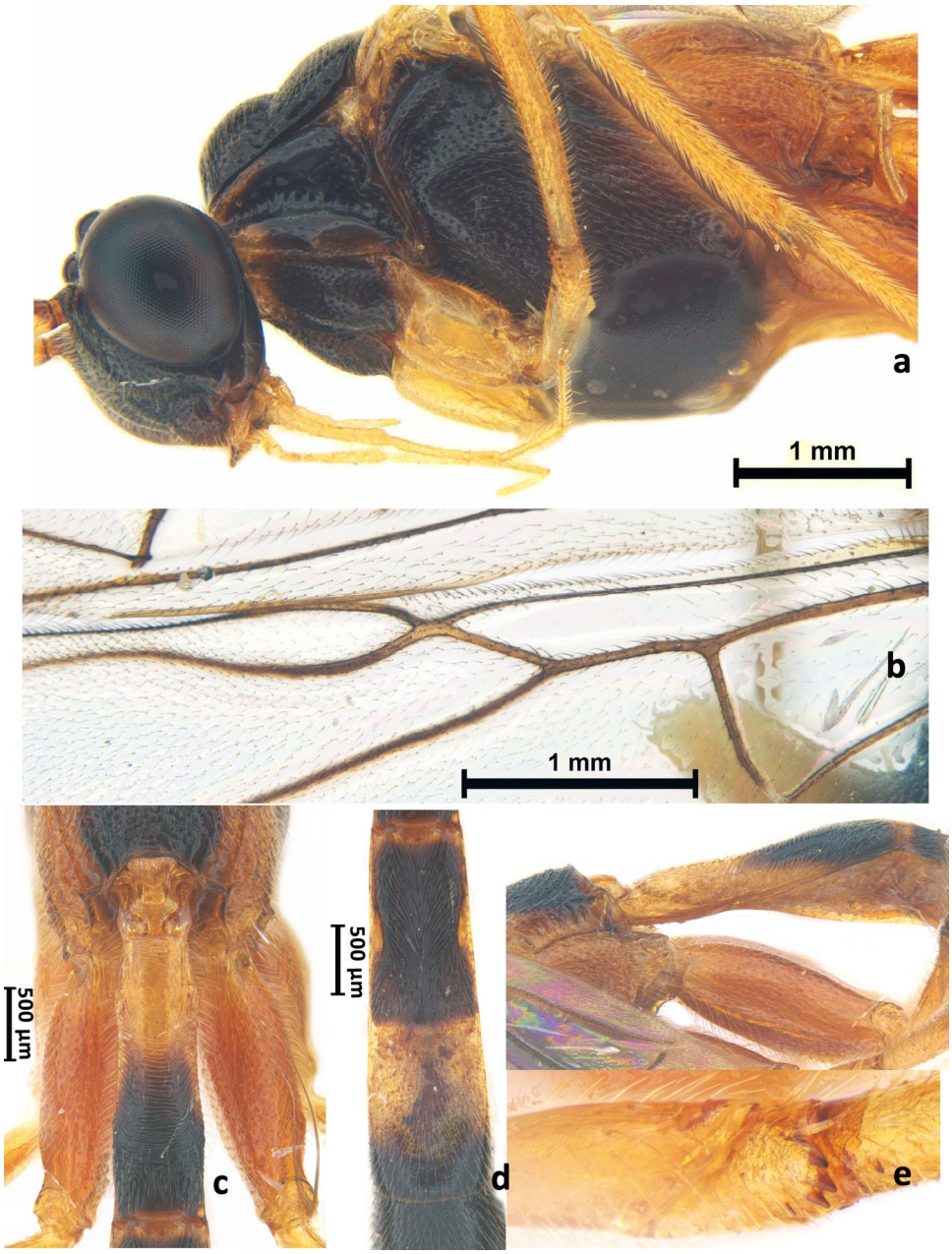

Fig. 7 *Aulacocentrum parotisae* sp. n. female, holotype. **a** Head and mesosoma (lateral); **b** hind wing (in part); **c** first tergite; **d** second and third tergites; **e** teeth on hind trochantellus

transverse striations all over except basal one third, spiracles are located on lateral tubercles; T2 with dense aciculations all over; T3 slightly shorter than T2, partly aciculate (Sharma, 1978).

Distribution. Oriental (India: Tamil Nadu: Nilambur) (Sharma 1978).

Comments. This species could not be collected in our surveys. All the characters are taken from the original description provided by Sharma (1978) which are based on a single male specimen. Pham et al. (2024) mentioned that the position of *A. longitergiae* Sharma, 1978 is uncertain because the holotype is unavailable for study. The holotype was lost during handling (Sharma pers. comm. to CvA in July 1985) as stated in Pham et al. (2024).

Aulacocentrum philippinense (Ashmead, 1904)

Description. As per van Achterberg (1993b) and Pham et al. (2024), this species can be identified with the following combination of characters: body length 7.5–9.0 mm; clypeus more convex; malar space longer; vein 1-SR + M of fore wing evenly curved medially; vein 1r-m of hind wing 0.9 × 1-M; vein 2-SC + R longitudinal. Vein SR of hind wing curved to moderately bent basally, remaining

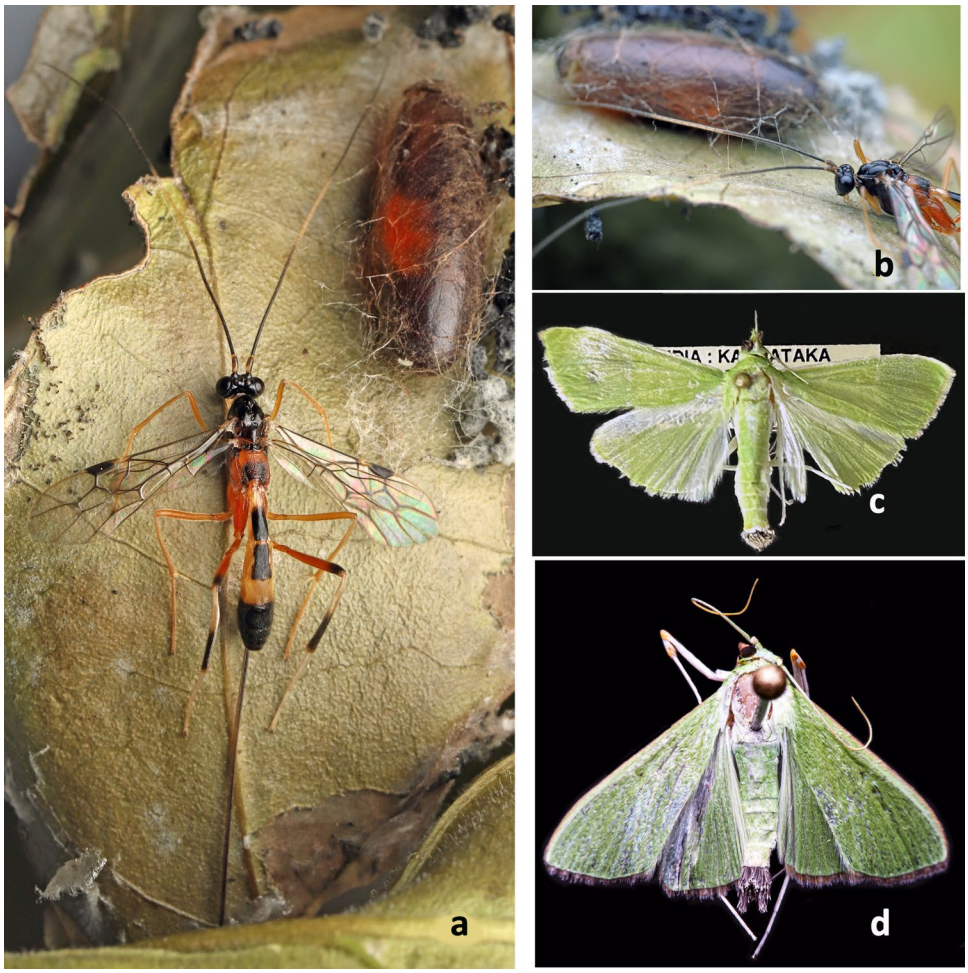

Fig. 8 **a, b** Emerged female of *Aulacocentrum parotisae* sp. n. along with its cocoon; **c, d** adult moths of *Parotis* sp. – host of *A. parotisae* sp. n.

Fig. 9 a, b. *Psydrax dicoccos* Gaertn. Host plant of *Parotis* sp.

Fig. 10 *Aulacocentrum seticella* van Achterberg and He, 1994. Female, body in lateral aspect

distinctly removed from anterior wing margin. T1 with shallow medio-basal depression (basally flat or near so) (see Fig. 5 in van Achterberg 1993b) and gradually widened posteriorly; T1 3.8 × its apical width; laterope more or less differentiated from glymma; T2 distinctly constricted medio-laterally; hind coxa with some fine transverse striae apically; hind femur mostly yellowish brown apically and yellow basally.

Distribution. Australasian (Indonesia-South Moluccas); Eastern Palaearctic (China, Japan and Korea); Oriental (India, Indonesia, Malaysia, Philippines and Vietnam) (Pham et al. 2024). From India: Warangal (Andhra Pradesh now in Telangana State) and Jeypore (Orissa) (van Achterberg 1993b).

Comments. This species could not be collected in our surveys. All the characters are taken from the detailed redescription provided by van Achterberg (1993b).

***Aulacocentrum seticella* van Achterberg and He, 1994**
(Figs. 10, 11)

Description. Based on specimen collected from India, female, body length 13.4 mm; head black; antenna with 49 antennomeres, with nine middle flagellomeres ivory (Fig. 10); ovipositor 9.6 mm; length of maxillary palp 1.6 × height of head; ratio of length of fore wing veins r: 3-SR: SR1 = 1.0: 2.2: 4.3, and 2-SR: 3-SR: r-m = 2.0: 3.3: 1.0; notauli converging posteriorly in distinct V-shaped depression (Fig. 11c); mesopleuron widely depressed

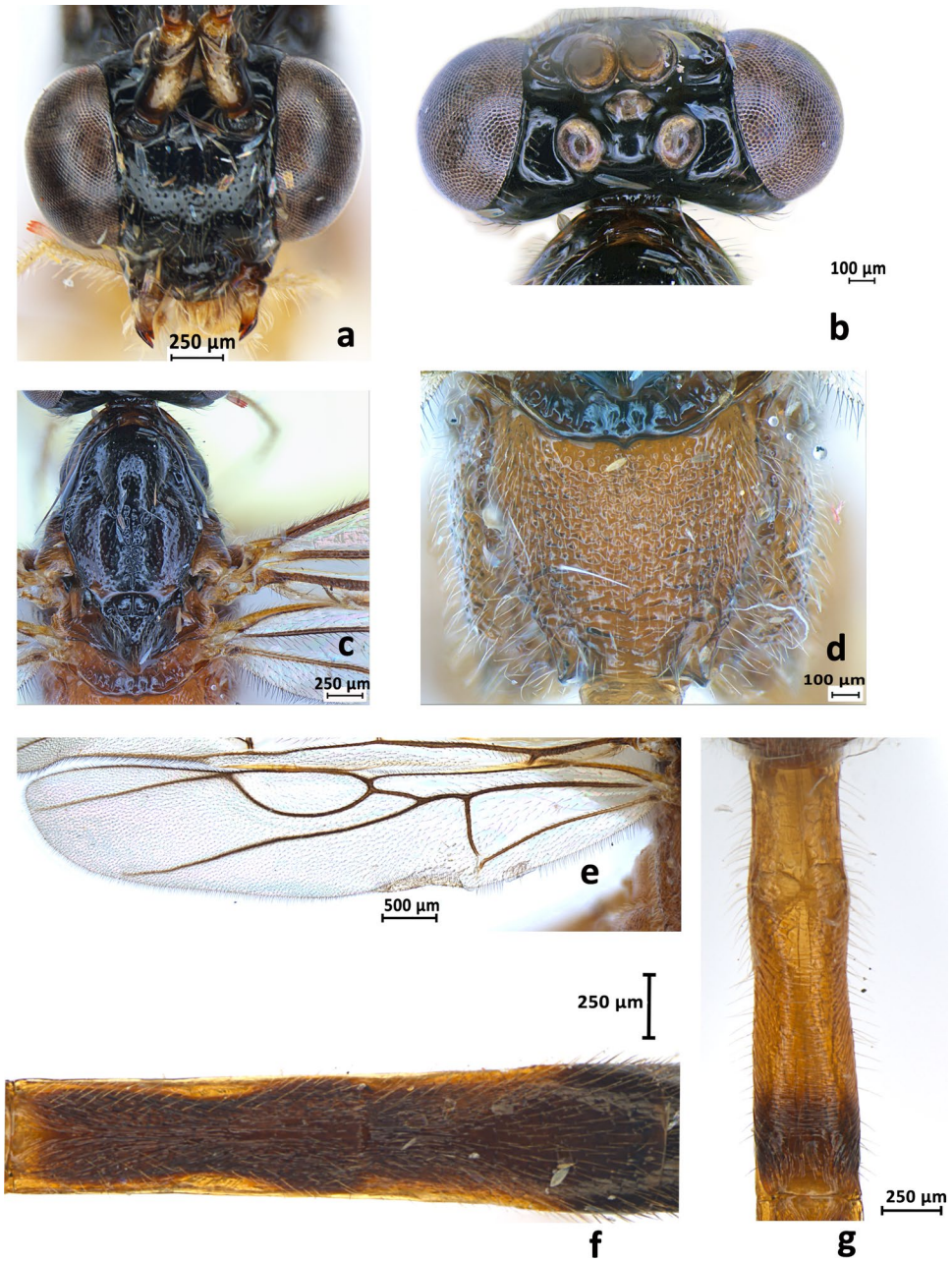

Fig. 11 *Aulacocentrum seticella* van Achterberg and He, 1994. Female. **a** Head in anterior aspect; **b** vertex; **c** mesoscutum (dorsal); **d** propodeum (dorsal); **e** hind wing; **f** second and third tergites; **g** first tergite

medio-posteriorly; hind wing with vein 2-SC + R vertical (Fig. 11e); vein 1-M curved basally; marginal cell of hind wing strongly widened basally (Fig. 11e); vein SR mostly touching anterior margin of the wing (Fig. 11e); metasoma 1.4 × as long as head and mesosoma combined; T1 nearly parallel-sided (Fig. 11g); length of T1 5.5 × its apical width; T2 distinctly constricted medially, with convergent striation (Fig. 11f); more than basal half of T3 finely, longitudinally striate; the remainder coriaceous (Fig. 11f), densely setose; ovipositor 1.77 × metasoma in lateral view.

Distribution. Eastern Palaearctic (China, Japan and Korea); Oriental (China, India, Indonesia, Malaysia, Singapore and Vietnam) (Pham et al. 2024). From India: Uttarakhand (earlier referred as Uttar Pradesh): Dehradun (He and van Achterberg, 1994). For the first time this species is reported from southern India.

Material examined. One female and one male on card; India: Karnataka: Balehonnur; 21.xi.2024; light trap; coll. R. Pattar; Code- NIM/NBAIR/Brac/Aula/211024-A; NIM/NBAIR/Brac/Aula/211024-B.

Key to India species of the genus *Aulacocentrum* Brues, 1922

(Modified from Pham et al. (2024))

1 Female ……..…… 2
– Male …… 5
2 Vein SR of hind wing strongly bent basally, and near to or almost touching anterior wing margin at constriction; first metasomal tergite flat basally and largely yellow in colour…….....…… ***A. seticella*** van Achterberg and He, 1994
– Vein SR of hind wing curved to moderately bent basally, remaining distinctly removed from anterior wing margin; first metasomal tergite with basal depression, rarely with shallow depression basally (***A. philippinense***) and bicoloured …… 3
3 Ocelli large, OOL = 0.5–0.6 × OD (Fig. 6b); first metasomal tergite with deep medio-basal depression (Fig. 7c) …….. ***A. parotisae*** **sp. n.**
– Ocelli small to medium-sized, OOL = 1.0–1.1 × OD (Fig. 3b); first metasomal tergite flat or with shallow medio-basal depression (Figs. 3e, f) ……..…… 4
4 Notauli sparsely crenulate anteriorly, narrowly fused posteriorly; metapleuron whitish yellow; propodeum black, pale yellow basally and ventrally; basal 1/3 of first metasomal tergite pale yellow, apical 2/3 black; length of first tergite 3.8 × its apical width; second tergite distinctly constricted medio-laterally .....….. ***A. philippinense*** (Ashmead, 1904)
– Notauli smooth, wide apart, not fused posteriorly (Fig. 3c); metapleuron and propodeum completely black (Fig. 3d); basal 2/3 of first metasomal tergite pale yellow to ivory, apical 1/3 black (Fig. 3e, f); length of first tergite 5.4–5.7 × its apical width; second tergite slightly constricted medio-laterally (Fig. 4b) …… ***A. hunliensis*** **sp. n.**
5 Antennal flagellum unicoloured, without median pale flagellomeres; head and hind tibia reddish brown; length of first tergite 6.0 × its apical width [marginal cell of hind wing strongly constricted subbasally; vein 2-SC + R of hind wing transverse (see Fig. 14 in Sharma, 1978) …….. ***A. longitergiae*** Sharma, 1978
– Antennal flagellum bicoloured, with median pale flagellomeres; head entirely black; hind tibia mostly blackish brown to black; length of first tergite < 6.0 (3.8–4.5) × its apical width; vein 2-SC + R horizontal (= longitudinal) …… 6
6. OOL 1.0 × OD; length of first tergite 3.8 × its apical width; first metasomal tergite with shallow medio-basal depression to nearly flat ……. ***A. philippinense*** (Ashmead 1904)
- OOL = 0.6 × OD; length of first tergite 4.5 × its apical width; first metasomal tergite with deep medio-basal depression …….. ***A. parotisae*** **sp. n.**

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Author contribution AG conceptualization, investigation, project administration, supervision, undertook surveys, specimen/data collection, rearing, writing species description, key preparation, imaging, figure plates preparation, comparing with other species and writing manuscript; CVA comparing with other species, reviewing & editing manuscript; KA specimen collection, curation and providing specimen data; RP specimen curation, preliminary identification and comparing with other species; HKHM specimen collection, rearing and imaging; SNS—facilitating insect surveys and arranging funds. All authors reviewed the manuscript.

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Data availability No extra datasets other than the existing data mentioned in the manuscript were generated or analysed during the current study.

Declarations

Ethical approval N/A.

Informed consent N/A

Conflict of interest NONE. The authors declare no competing interests.

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