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## Description of new species of the genera *Zolotarewskyia* Risbec and *Cleonymus* Latreille and first record of the male of *Dipara hayati* Sureshan from India (Hymenoptera: Pteromalidae)

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**Received:**

19 December, 2018

**Accepted:**

19 January, 2019

**Published:**

26 January, 2019

**Subject Editor:**

Hossein Lotfalizadeh

**ABSTRACT.** The pteromalid genus *Zolotarewskyia* Risbec (Pteromalidae: Cleonyminae) is reported from India after a gap of 45 years with the description of a new species and one new species of *Cleonymus* Latreille are described from Southern Western Ghats, Kerala, India. Affinities of the new species with closely related species are discussed and a key to the oriental species of *Cleonymus* is also provided. Male of *Dipara hayati* Sureshan is also described for the first time.

**Key words:** Pteromalidae, *Zolotarewskyia*, *Cleonymus*, new species, new record, India

**Citation:** Sureshan, P.M., Ranjith, A.P. & Rajan, T. (2018) Description of new species of the genera *Zolotarewskyia* Risbec and *Cleonymus* Latreille and first record of the male of *Dipara hayati* Sureshan from India (Hymenoptera: Pteromalidae). *Journal of Insect Biodiversity and Systematics*, 4 (4), 281–292.

### Introduction

*Zolotarewskyia* Risbec, a rare genus of subfamily Cleonyminae was described from Madagascar with *Z. seyrigi* Risbec as type species (Risbec, 1955). The genus is currently known by eight described species and a few undescribed species worldwide, out of which two are reported from the Oriental region viz. *Z. indica* (Mani & Kaul) from India and *Z. lyra* (Girault) from Singapore (Gibson, 2003). Bouček (1976) synonymized *Zolotarewskyia* under *Systolomorphella* Girault. The genus is very close to *Cleonymus* Latreille and is believed to have an Old World origin (probably in Africa and later spread into south-east Asia

to Australia) except for an undescribed species reported from Hawaii (Gibson, 2003). Mani et al. (1973) reported the genus from India describing a new species with the name *Chalcedectus indicus* based on male and female types collected from Dehradun. Bouček et al. (1979) synonymized this species under *Zolotarewskyia* and also reestablished the validity of the genus. *Zolotarewskyia* is reported here from India after a gap of 45 years by describing a new species from a specimen collected from the southern Western Ghats. The discovery of the genus from southern Western Ghats is interesting, since the

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type locality of the first Indian species was Dehradun, a locality at Himalayan region.

*Cleonymus* Latreille is worldwide in distribution currently known by 42 described species out of which six are known from the Oriental region and three are known from India (Noyes, 2018). A new species of *Cleonymus* is described here from the southern Western Ghats based on a female specimen collected from the same locality mentioned above. Both the new species described here are based on single specimen which possess unique morphological features separating them from other related species and all efforts to collect further specimens did not yield any additional material due to the rarity of these genera. The Indian species of *Dipara hayati* Sureshan (Pteromalidae: Diparinae) was described based on the female type specimen collected from Kerala (Sureshan, 2013). *Dipara* males show remarkable sexual dimorphism and mostly difficult to identify unless reared from the host or collected together with the females from the field. At the time of description of *D. hayati*, male specimens were not available or rather not identifiable to the author. In the present study one female and one male specimens were collected together in a yellow pan trap from the same locality and the female specimen exactly tallied with the holotype in external morphology. Male of *D. hayati* Sureshan is described here for the first time.

### Material and methods

The specimens of the present study were collected using sweep net and yellow pan traps from a moist deciduous forest patch lying adjacent to an agroecosystem of mixed crops. The area is located at Kakkadampoyil of Calicut district (11.33618°N & 76.11025°E) which lies in the foot hills of south Western Ghats, Kerala. The specimens were preserved in 70% ethyl

alcohol and card mounted for microscopic observation. They were studied under stereoscopic binocular microscope model LEICA M 205A and photographs were taken with LEICA DFC 500 camera. The type specimens are deposited in the National Zoological Collections of Western Ghat Regional Centre, Zoological Survey of India, Kozhikode (ZSIK).

Terminology generally follows that of Gibson (2003). The following abbreviations are used in the text, fu<sub>1</sub>-fu<sub>7</sub>: funicular segments 1-7; MV: marginal vein; OD: ocellar diameter; OOL: ocello-ocular distance; PMV: post marginal vein; POL: post-ocellar distance; SMV: submarginal vein; STV: stigmal vein, Gt<sub>1</sub>-Gt<sub>7</sub>: tergites 1-7 of gaster.

### Results

#### Genus *Zolotarewskyia* Risbec, 1955

*Zolotarewskyia* Risbec, 1955: 180. Type species *Zolotarewskyia seyrigi* Risbec by original designation. Synonymy with *Systolomorphella* Giralutl by Bouček (1976: 10); reestablished as valid by Bouček et al. (1979: 460).

*Pseudocleonymus* Hedqvist, 1976: 184. Type species: *Pseudocleonymus spinifer* Hedqvist by original designation. Synonymy by Bouček et al. (1979: 460).

**Diagnosis:** The genus closely resembles *Cleonymus* Latreille in general morphology except for the arrangement of teeth on hind metafemur. In *Zolotarewskyia* the basal-most tooth is located between about the middle and apical third of the metafemur and if near the apical third then it is not the longest tooth and there is small but distinct tooth or denticle basal to the longest tooth. In *Cleonymus* basal-most tooth of metafemur more apical within about the apical quarter and the basal most tooth is the longest. The branched antennae of *Zolotarewskyia* males also separate it from *Cleonymus* (Bouček, 1988).

**Hosts:** *Zolotarewskyia* species are not yet reared from a definitive host but Yang (1996) collected specimens on branches and twigs infested with wood boring beetles of families Anobiidae, Buprestidae, Curculionidae and Scolytidae. Biology of species probably similar to that of *Cleonymus*, primary parasitoids of wood-boring beetles (Gibson, 2003).

**Distribution:** Oriental, African and Australian regions and Hawaii (Gibson, 2003).

***Zolotarewskyia longianella* sp.nov. (Figs 1-6)**  
<http://zoobank.org/NomenclaturalActs/27FAEB2D-9BF9-4AAE-A241-4673211EF1AB>

**Material Examined.** Holotype: Female, INDIA: Kerala, Kozhikode District, Kakkadompoyil: Kozhipara (11.3362° N, 76.1102°E), 7.xii.2017, Coll. Renjith. Reg. no. ZSI/WGRC/IR/ INV/ 11703.

**Description:** Holotype Female (Fig. 1): Length 6.6 mm. Body shiny black, head with slight bluish reflection, area below toruli with golden reflection, eyes cupreous, ocelli reddish brown, pubescence silvery. All coxae concolorous with mesosoma. Fore and mid legs uniformly and hind legs except coxa and femora testaceous, femora darker, antennae testaceous except distal funicular segments and clava black, mandibles brownish black.

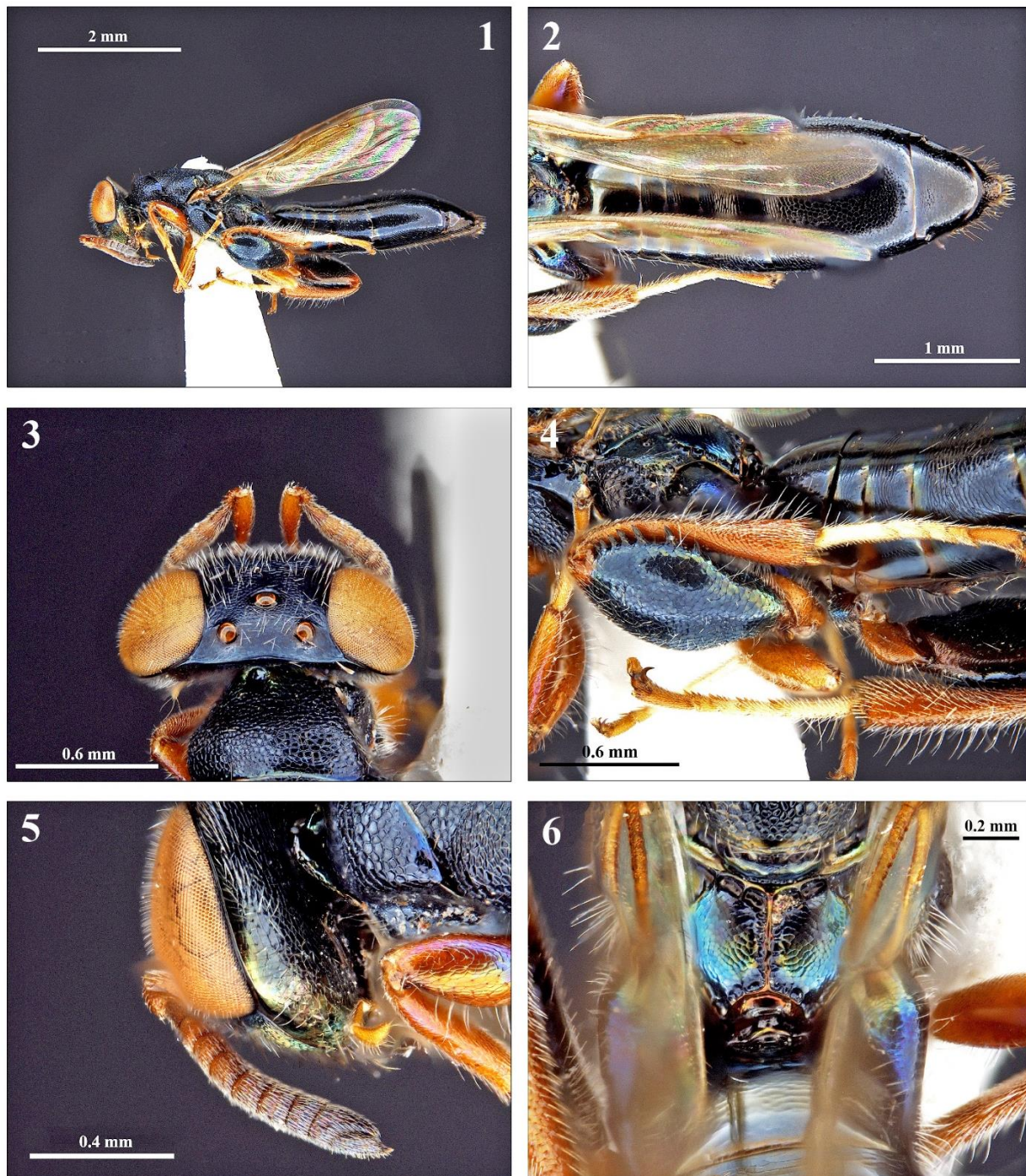
**Head:** (Figs 3, 5) width in dorsal view 2.5x length, in front view width 1.3x height, upper half of face, vertex and occipital area finely reticulate, lower half of face distinctly reticulate, reticulation transverse in the upper half, a broad shiny band below malar sulcus, gena finely reticulate, pubescence sparse on the upper face; eyes pubescent, clypeus minutely reticulate, anterior margin slightly truncate, lower margin of mouth emarginate, vertex sharply edged, occiput declivitous, temples narrow, POL 2.7x OOL, malar space length 0.5x eye height; eyes separated 0.64x their length at level of front ocellus. Antenna (Fig. 5)

slightly clavate, inserted little below lower ocular line, toruli widely separated, inner antennal area little raised, scrobe not indicated, scape short, as long as eye, slightly thickened at upper half, anellus long slightly longer than pedicel, fu<sub>1</sub> longer than broad, fu<sub>2</sub> and fu<sub>3</sub> quadrate, fu<sub>4</sub>-fu<sub>7</sub> transverse, all funicular segments with two rows of sensilla, spiny projection of pre-claval segment reaching  $\frac{3}{4}$  length of clava, pubescence small.

**Mesosoma:** 1.8x as long as wide dorsally, little compressed dorsally, uniformly and moderately reticulate, sculpture not raised, with slight metallic reflection except on propodeum with strong blue metallic reflection medially. Pronotum dorsally 1.7x as wide as long. Mesoscutum width 1.62x length, notauli fine and complete. Scutellum convex, dorsellum convex, finely reticulate. Propodeum (Fig. 6) medially 0.72x as long as scutellum, median carina strong, complete interrupted with foveolae on either side, deep foveolae medially on anterior margin, median area uniformly reticulate in somewhat circular pattern, plicae absent, plical area indicated by deep foveolae, spiracles large, oval, almost touching hind margin of metanotum, callus finely reticulate with long dense hairs. Mesopleuron distinctly reticulate except on upper mesepimeron shiny, metapleuron with broad and distinct reticulation and hairy. Hind coxa (Fig. 4) finely reticulate, femur swollen, finely reticulate with a row of 7 strong teeth on the ventral margin, first one small and located in the middle, femur with long white hairs with two strong unequal spurs, fore femur moderately swollen. Forewing 3.1x as long as broad, smoky in the upper half, no infumation, marginal fringe absent, pubescence almost entire except on basal area sparse, speculum absent, basal cell hairy, costal cell hairy at base and with a median line of hairs in the upper portion. Relative lengths of SMV: MV: PMV: STV as 59: 29: 21: 8.

**Metasoma:** Petiole transverse (Fig. 2), gaster in dorsal view length 2.3 x width, in lateral view 1.2x length of head plus mesosoma combined, Gt<sub>1</sub> shiny, except finely reticulate on median area, Gt<sub>2</sub> and Gt<sub>3</sub> finely and transversely reticulate in the basal half; Gt<sub>4</sub> transversely reticulate on basal  $\frac{3}{4}$  portion, Gt<sub>5</sub> largest, almost

completely reticulate except on distal area shiny, reticulation transverse in the basal part. Gt<sub>6</sub> almost completely finely reticulate, epipygium minutely reticulate, gaster completely and finely reticulate laterally, pubescence sparse, hypopygium reaching hind margin of Gt<sub>3</sub>, ovipositor not exerted.



**Figures 1-6.** *Zolotarewskyia longianella* sp. nov. Holotype female, 1: Body profile, 2: Gaster dorsal view, 3: Head and pronotum dorsal view, 4: Hind leg, 5: Head profile view, 6: Propodeum dorsal view.

**Male:** Unknown

**Host:** Unknown.

**Etymology:** The species name derived from anellus (ring segment) which is very distinct and elongate in the species.

**Remarks:** The species is unique and differs from the other species under the genus in having antenna with a long anellus and wings without any bands. The number of teeth in the lower margin of hind femur is 6, also variable in other species which is either lower or higher numbers. The species distinctly differs from the Indian species *Z. indica* (Mani & Kaul) in having antenna with long anellus which is slightly longer than pedicel, forewing smoky on the upper half and without bands, hind femur with 6 teeth on the lower margin, gaster long, 1.13x longer than half of the body and body length 6.6 mm. (In *Z. indica* antenna with anellus almost as long as broad, forewing hyaline with 3 faint and obscure spots, hind femora with 9 teeth and gaster shorter, length only little less than half of the body and small body size 4mm. It also differs from *Z. indica* in the different color combination of body parts especially antenna and legs).

#### **Genus *Cleonymus* Latreille, 1809**

*Cleonymus* Latreille, 1809: 29. Type species *Diplolepis depressa* Fabricius; subsequently designated by Latreille (1810: 436. (For further synonyms see Gibson, 2003).

**Diagnosis:** Metafemur ventrally often finely denticulate, serrate or with subapical lobe or angulation, but if with strong tooth within about apical quarter then also with more apical, much smaller, closely approximated teeth or denticles. Male antenna is always simple with almost symmetrical segments covered by regular dense pilosity (Gibson, 2003).

**Hosts:** Primary parasitoids of wood-boring beetles of the families Anobiidae, Anthribidae, Bostrichidae, Buprestidae, Cerambycidae, Curculionidae and Scolytidae (Gibson, 2003).

**Distribution:** Cosmopolitan

***Cleonymus calicutensis* sp.nov. (Figs 7–12)**

<http://zoobank.org/NomenclaturalActs/17DD2131-CF77-4D00-9E05-44EF9EB9E5FA>

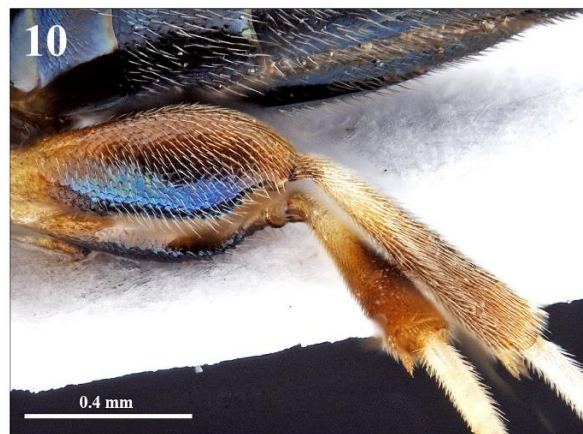
**Material Examined:** Holotype, Female: INDIA: Kerala, Kozhikode District, Kakkadompoyil, Kozhipara, (11.3362°N, 76.1102°E), 7.xii. 2017, coll. Renjith, Reg. no. ZSI/WGRC/IR/INV/ 11700.

**Description:** Holotype, Female (Fig. 7): Length 4.25 mm (without ovipositor), extended part of ovipositor 0.37 mm. Body bluish black with violaceous reflection on  $Gt_1$  and basal part of hind coxa dorsally, brilliant dark blue reflection on propodeum dorsally. Head almost black. Antennae with scape, pedicel, anelli,  $fu_1$ ,  $fu_2$  &  $fu_3$  (partly) blackish brown, clava black, remaining segments testaceous. Legs brown except hind coxae concolorous with mesosoma, hind femora black laterally in the lower half, tibia in the basal half and basal segments of tarsi whitish yellow. Eyes cupreous. Front ocellus silvery, lateral ocelli black. Tegulae dark brown, Forewing with two infumate band, one below parastigma and one below PMV, both interconnected, the latter broken in the middle, veins and pubescence brown

**Head:** (Fig. 9) In dorsal view about 2.43x as broad as long, POL.1.75x OOL, OOL 0.93x OD. Head distinctly and closely reticulate, punctuate, occipital area rather transversely reticulate pubescence long and dense on lower face, clypeus finely reticulate, anterior margin almost straight; malar space 0.52x eye height; eyes separated by 0.78 x their height, length 1.4 x width. Scrobe as deep depression above toruli with inter antennal region little raised, parascrobal area little raised near toruli in the form of an edge. Eyes pubescent. Temple visible in dorsal view, narrow 0.12x as long as eye. Antennae (Fig. 11) inserted level with lower margin of eyes, formula 11171, scape 0.61x eye length, pedicel plus

flagellum 0.8x head width, pedicel length 2.25x width, anellus transverse, 0.3x as long as pedicel, all funicular segments except first with two rows of sensillae, first with one row; funicular segments quadrate, except  $fu_4$  transverse, preclava with long

process on side of clava, clava narrow, sharply acuminate, indistinctly segmented, exposed part 2.8x as long as broad and slightly longer than 2.5 preceding segments combined.



**Figures 7-12.** *Cleonymus calicutensis* sp.nov. Holotype female, 7: Body profile, 8: Gaster dorsal view, 9: Head and pronotum dorsal view, 10: Hind leg (part), 11: Antenna, 12: Scutellum and Propodeum dorsal view.

**Mesosoma:** 1.64x as long as broad, reticulate punctate and hairy, pronotum 0.6x as long as broad, medially 0.82x as long as mesoscutum; mesoscutum medially 1.82x as broad as long, notauli incomplete. Scutellum convex, as long as mesoscutum medially. Dorsellum smooth and shiny; propodeum (Fig. 12) completely shiny, medially 0.6x as long as scutellum, median carina distinct, complete, connected to the strong transverse adpetiolar carina, plicae absent, nucha indistinct, anterior margin of propodeum with deep foveolae, callus densely hairy, spiracles large, oval, separated from hind margin of metanotum by a distance slightly less than their diameter. Mesopleuron moderately reticulate except upper mesepimeron shiny; metapleuron densely hairy, deeply punctate; prepectus broad, triangular, uniformly hairy and punctate, longer than tegula. Forewing entirely hairy, speculum absent, upper surface of costal cell hairy, length 2.5x width, marginal fringe small, STV long and branching at an acute angle. Relative lengths of SMV: MV: PMV: STV as 28:15:14.5:7.5. Hind coxa moderately reticulate, densely hairy on dorsal and ventral parts, hind femur (Fig. 10) with row of small teeth on the ventral margin, hind tibia with two strong and unequal spurs.

**Metasoma:** Gaster (Fig. 8) sessile, 1.41x as long as mesosoma, 2.13x as long as broad in dorsal view; Gt<sub>1</sub> and Gt<sub>2</sub> smooth dorsally, Gt<sub>3</sub> with weak transverse reticulation basally, Gt<sub>4</sub> moderately and transversely reticulate in the basal half, Gt<sub>5</sub> largest, Gt<sub>5</sub> and Gt<sub>6</sub> almost completely reticulate except on smooth band posteriorly; gaster laterally hairy except on the basal tergites; ovipositor strongly protruded out; hypopygium ending slightly before middle of gaster.

**Male:** Unknown

**Distribution:** India: Kerala

**Etymology:** The species name is derived from the name of Calicut district, Kerala, India where the specimen was collected.

**Remarks:** The species runs to the couplet 5 of the key to the Oriental species of *Cleonymus* by Sureshan & Farsana (2015) and closely resembles *C. grandiceps* Xiao & Huang in general morphology and body measurements, but differs from it in having: colour of antenna dark brown except fu<sub>3</sub> (partly) fu<sub>7</sub> testaceous, pedicel shorter than anellus and fu<sub>1</sub> combined, pedicel plus flagellum combined distinctly shorter than head width, temple narrow, but distinctly visible in dorsal view, pronotum more than half of scutellum in dorsal view, Gt<sub>3</sub> only finely reticulate in basal half, forewing with MV almost as long as PMV and body size 4.25 mm (in *C. grandiceps* antennae brown except clava dark brown, pedicel longer than anellus and fu<sub>1</sub> combined, pedicel plus flagellum distinctly longer than head width, temple almost invisible in dorsal view, pronotum about half of scutellum in dorsal view, Gt<sub>3</sub> uniformly and strongly reticulate, MV 1.2x PMV and body size 3mm).

**Key to the Oriental species of *Cleonymus* (females) (modified from Sureshan & Farsana, 2015).**

1. Antennae with fu<sub>1</sub> distinctly longer than broad. ....2
- Antenna with fu<sub>1</sub> transverse to quadrate. ..4
2. Forewing hyaline with three brown infumations, one broad, below STV, one below parastigma and one below SMV; scrobal area flat (India). ....*C. indicus* Sureshan
- Forewing with two pale brown infumations, one below parastigma and the other below STV; scrobe in the form of deep depression above toruli. ....3
3. Gaster about 2.2x as long as mesosoma (Kamijo, 1996: Figs 13, 14); anellus transverse (Taiwan & Japan). ....*C. angustatus* (Masi)

- Gaster 1.4x as long as mesosoma, anellus longer than wide (Sureshan & Balan, 2013: Figs 1, 2) (India). .....  
..... ***C. kamijoi* Sureshan & Balan**
- 4. Forewing with fuscous patches below parastigma and STV separated by a hyaline patch which extends to the posterior margin of wing (Narendran & Rajmohana, 2008: Fig. 5) (India). .....  
..... ***C. keralicus* Narendran & Rajmohana**
- Forewing with fuscous patches below parastigma and STV, joined in the middle. ....5
- 5. Gt<sub>4</sub> longest, fu<sub>1</sub> distinctly transverse, rest of the funicular segments quadrate (Narendran & Mini, 1997: Figs 1, 2) (Malaysia). .....  
..... ***C. malaicus* Narendran & Mini**
- Gt<sub>5</sub> longest; all funicular segments quadrate or distal segments transverse. ..6
- 6. Antennae (Fig. 11) dark brown except fu<sub>3</sub> (partly) fu<sub>7</sub> testaceous, head and mesosoma bluish black, pedicel shorter than anellus and fu<sub>1</sub> combined, pedicel plus flagellum distinctly shorter than head width; temple distinct, visible dorsally; pronotum more than half of scutellum in dorsal view, size 4.25mm (India). ..... ***C. calicutensis* sp.nov.**
- Antennae brown except clava dark brown, head and mesosoma dark green, pedicel longer than anellus and fu<sub>1</sub> combined, pedicel plus flagellum distinctly longer than head width; temple almost invisible dorsally; pronotum about half of scutellum in dorsal view, size 3mm (India & China). .....  
..... ***C. grandiceps* Xiao & Huang**

***Dipara hayati* Sureshan, 2013 (Figs 13–17)**

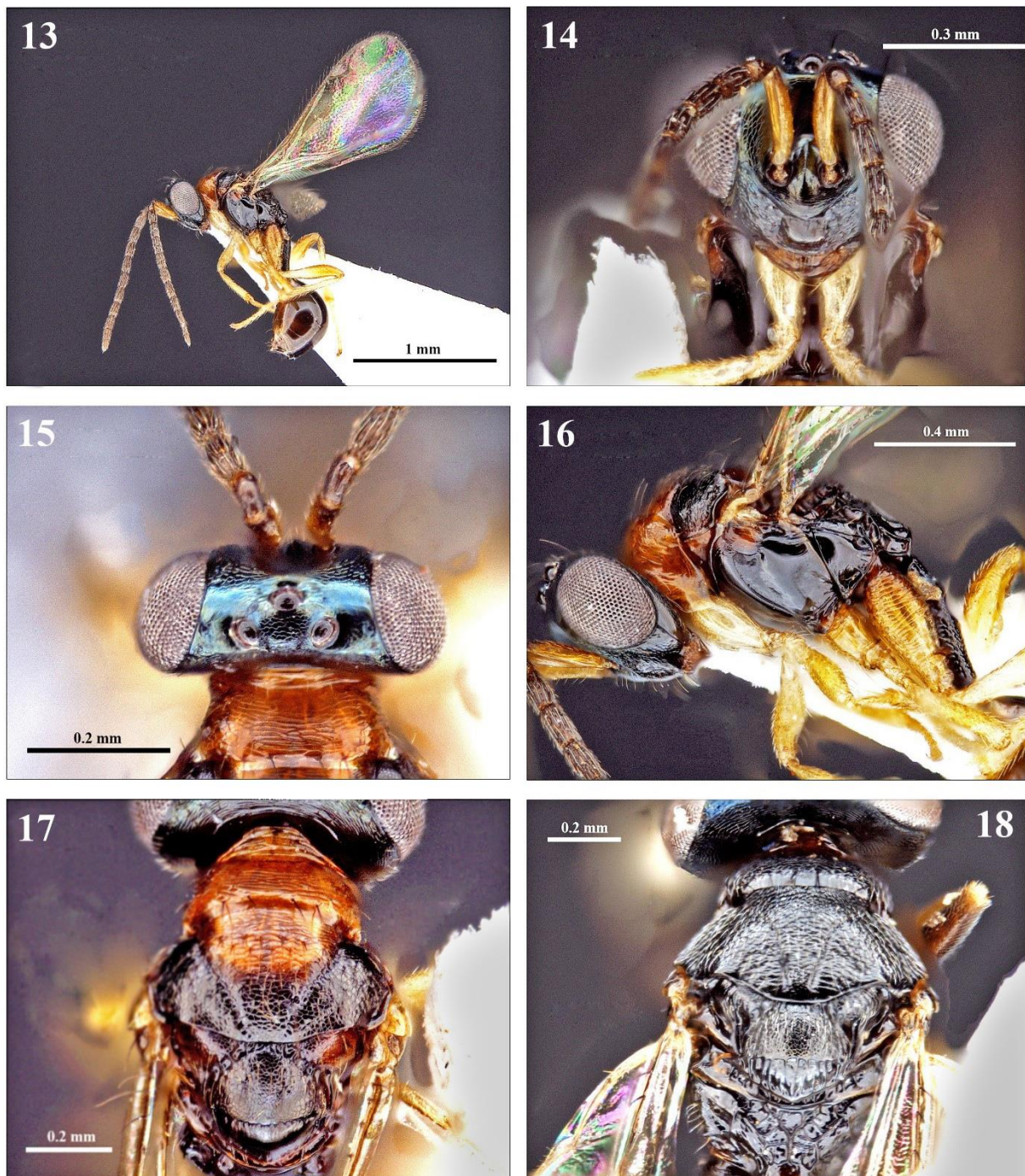
2013. *Dipara hayati* Sureshan, *Rec. Zool. Surv. India*, 113 (1), 81-82. Holotype female, INDIA, Kerala, Chittur by original designation (ZSIK) (examined).

**Material examined:** 1 Male, INDIA: Kerala, Kozhikode district, Kakadampoyil, Kozhipara, (11.3362° N, 76.1102°E), 7.xii.2017, coll. Renjith, Reg. no. ZSI/WGRC/IR/INV/11702; 1 Female, same data as male except Reg. no. ZSI/WGRC/IR/INV/11701 (yellow pan trap collection).

**Description:** Male: (Fig. 13) Length 1.5 mm. Colour similar to female but generally lighter especially on pronotum and mid lobe of mesoscutum dorsally on the basal half testaceous. Male also differs from female in smaller body size and in other morphological features such as: antennal formula 11173 with long funicular segments (Fig. 14), colour uniformly dark brown, lighter on scape, funicular segments with 2-3 irregular rows of sensillae. Body sculpture finer than in female especially on frenal area of scutellum, medially shiny (Fig. 17), rugae not distinct and centrally there are no complete rugae as in female. Propodeum (Fig. 18) almost similar as in female with an anterior triangular area formed by two distinct carinae which is connected to the median carina at the posterior point of triangular area, median carina complete and connected with the adpetiolar carina, from the posterior point of triangle, two transverse carinae run back and join with plicae. Unlike in female the gaster is short with most of the tergites except Gt<sub>1</sub> retracted and petiole very long and uniformly reticulate. Fore wing similar as in female but with long marginal fringe. Mesoscutum (Fig. 17) with notauli not connected posteriorly rather wide apart than in female.

**Remarks:** This is the first record and description of male of *Dipara hayati* Sureshan.





**Figs 13–18.** *Dipara hayati* Sureshan. Male, **13**: Body profile, **14**: Head front view, **15**: Head and pronotum dorsal view, **16**: Head and mesonotum profile view, **17**: Head and mesonotum dorsal view, **18**: Female mesosoma dorsal view.

### Discussion

Western Ghats is one of the hottest hot spots of global biodiversity and also one of the world natural heritage sites recognized by UNESCO. The area is also represented

by the uninterrupted evergreen forest ecosystems in the world at least in part which harbors unique flora and fauna. Many of the original Gondwana relicts, the

autochthonous fauna of peninsular India, and the trans-migrants from the Palearctic, Indo-Chinese and Malayan region have found refugium in the forested tracts of Western Ghats. When compared to the northern part, the southern Western Ghats is richer both floristically and faunistically and the invertebrate fauna of the region is still largely unknown. The present discovery of the rare Pteromalid genus *Zolotarewskyia* Risbec (probably of African origin) from the southern Western Ghats of Kerala further indicates the occurrence of Gondwana relicts in the Western Ghats and Peninsular India. Recently [Raseena Farsana et al. \(2017\)](#) also reported another African Pteromalid genus *Pycnetron* Gahan from the same locality with the description of a new species *P. keralaensis* Raseena, Sureshan and Nikhil which also proves the biodiversity richness of the Western Ghats. The other faunal discoveries in this paper from the locality Kakadampoyil of Kerala Western Ghats is also noteworthy since lot of ecological damage has been occurred recently in the area due to granite mining, eco-tourism, developmental activities and monoculture farming.

### Acknowledgments

The authors are grateful to Dr. Kailash Chandra, Director, Zoological Survey of India, Kolkata for providing facilities and encouragements. APR is grateful to authorities of University of Calicut and KSCSTE, Govt. of Kerala for awarding Fellowship to pursue Ph.D. PMS is also grateful to the Ministry of Environment Forests and climate change, Government of India for funding the research on Indian Pteromalidae through the AICOPTAX project.

### Conflict of Interests

The authors declare that there is no conflict of interest regarding the publication of this paper.

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توصیف گونه جدید از جنس‌های *Zolotarewskyia* Risbec و *Cleonymus* Latreille و اولین گزارش جنس نر گونه‌ی *Dipara hayati* Sureshan از هند (Hymenoptera: Pteromalidae)

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تاریخ دریافت: ۲۸ آذر ۱۳۹۷، تاریخ پذیرش: ۲۹ دی ۱۳۹۷، تاریخ انتشار: ۰۶ بهمن ۱۳۹۷

**چکیده:** جنس *Zolotarewskyia* Risbec (Pteromalidae : Cleonyminae) پس از ۴۵ سال با توصیف یک گونه جدید از هند گزارش شد و یک گونه از جنس *Cleonymus* Latreille از جنوب غربی رشته کوه‌های گاتس ایالت کرالا، هند، توصیف گردید. قرابت گونه‌های جدید با گونه‌های مجاور مورد بحث قرار گرفته و کلیدی برای شناسایی گونه‌های جنس *Cleonymus* در منطقه‌ی اورینتال تهیه شد. همچنین جنس نر گونه *Dipara hayati* Sureshan برای اولین بار توصیف گردید.

**واژگان کلیدی:** Pteromalidae, *Zolotarewskyia*, *Cleonymus*, گونه جدید،

گزارش جدید، هند