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## A new species of *Chrysonotomyia* Ashmead (Hymenoptera: Eulophidae: Entedoninae) from Uttarakhand, India

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### Abstract

The new species, *Chrysonotomyia ricini* sp. n. from Uttarakhand, India described in detail with illustrations. All the type specimens were reared from the pupae of *Liriomyza trifolii* (Burgess) (Diptera: Agromyzidae), a leafmining fly attacking castor, *Ricinus communis* L. (Euphorbiaceae). A key for identification of the species of *Chrysonotomyia* in India is also provided. All the specimens are deposited in the Insect Museum, Department of Entomology, G.B. Pant University of Agriculture and Technology, Pantnagar, Uttarakhand, India.

**Keywords:** *Chrysonotomyia ricini* sp. n, Eulophidae, India, *Liriomyza trifolii*, new species

### Introduction

The genus *Chrysonotomyia* was first time proposed in 1904 by Ashmead<sup>[1]</sup> for the species *Eulophus auripunctatus* Ashmead. Boucek<sup>[2]</sup> synonymised *Heterocharis Erdos* with *Neochrysocharis Kurdjumov*, later Boucek and Askew<sup>[3]</sup> synonymised *Halochariessa Erdos* with *Achrysocharis* Girault. *Chrysocharidia Erdos* synonymised with *Achrysocharis* Girault by Boucek<sup>[4]</sup>, he actualized that the character given for *Chrysocharidia* by Erdos, the length of apical fringe in wings, varied intraspecifically. Kamiyo<sup>[5]</sup> and Boucek<sup>[6]</sup> individually exposed that *Achrysocharis* was a synonym under *Chrysonotomyia*, after that Boucek and Graham<sup>[7]</sup> placed *Achrysocharella* Girault as a synonym under *Chrysonotomyia*. Finally, Boucek<sup>[8]</sup> sited *Neochrysocharis* Kurdjumov as synonym with *Chrysonotomyia* based on variation in the characters separating them, but Hansson<sup>[9]</sup> positioned them as two distinct valid genera. He distinguished these genera mainly on two characters: first, the transepimeral suture weakly curved or straight in *Neochrysocharis*, and strongly curved in *Chrysonotomyia*; and the second, the shape of the flagellar sensilla with a rounded apex in *Neochrysocharis*, and with the apex curved in *Chrysonotomyia*.

*Chrysonotomyia* Ashmead currently embodies 171 species (Noyes<sup>[10]</sup>) in world and 12 species from India (Hayat *et al.*<sup>[11]</sup>, Noyes<sup>[10]</sup>). Khaliq Chisti<sup>[12]</sup> and Hayat *et al.*<sup>[11]</sup> followed the classification given by Boucek (1988). Khaliq Chishti<sup>[12]</sup> recorded three new species of this genus from India and provided an identification key to the species from India. Few new combinations and species were recorded from India by Narendran *et al.*<sup>[13]</sup>, Hayat *et al.*<sup>[11]</sup>. The key given by Khaliq Chishti<sup>[12]</sup> and the original descriptions of different species were followed for identification of the new species. In the present investigation, a new species of *Chrysonotomyia* from Uttarakhand, India is described and a taxonomic key based on females also provided.

### Materials and Methods

The infested leaves of castor, *Ricinus communis* L. with leafminer, *Liriomyza trifolii* (Diptera: Agromyzidae) were collected from Crop Research Centre, Pantnagar, Uttarakhand during August, 2015 and brought to the laboratory for rearing. The infested leaves were placed in rearing glass jars covered with muslin cloth. The rearing jars were provided with blotting paper at the base and 2-3 drops of water daily to maintain turgidity of leaves. The jars were kept in environmental chamber maintained at temperature 25±2 °C with relative humidity 75±5%. The emerged adult flies as well as their parasitoids were collected from the rearing jars with the aid of aspirator by observing daily. The miner adults were preserved as dry mount and parasitoids in 70% ethanol for further identification. The specimens were identified by authors under Olympus binocular microscope. A standard procedure given by Noyes<sup>[14]</sup> was

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followed for preparing permanent slides of the parasitoid specimen to examine diminutive, abstruse characters and the drawings made under Olympus trinocular microscope with attached Camera Lucida. The specimens and slide were deposited at the Insect Museum, Department of Entomology, G.B. Pant University of Agriculture and Technology, Pantnagar, Uttarakhand, India.

For description of parasitoids conventional terminology and abbreviations as per Gibson [15] has been adopted. Abbreviations are: POL, postocellar length; OOL, ocellar-ocular length; F1, funicular segment 1; F2, funicular segment 2; SMV, submarginal vein; MV, marginal vein; PMV, postmarginal vein; STV, stigmal vein. All measurements in millimeters (mm) were used.

## Results and Discussion

### Genus *Chrysonotomyia* Ashmead

#### (Type species *Eulophus auripunctatus* Ashmead)

*Chrysonotomyia* Ashmead, 1904a: 344. Type species *Eulophus auripunctatus* Ashmead, 1894: 166, by monotypy and original designation.

*Achrysocharella* Girault, 1913a: 171. Type species *Achrysocharella dubia* Girault, by original designation.

*Achrysocharis* Girault 1913b: 104. Type species *Achrysocharis bifasciatus* Girault, by monotypy.

*Wolffiella* Krause, 1917: 26-35. Type species *Wolffiella ruforum* Krause, by monotypy.

*Halocharis* Erdos, 1951: 209. Type species *Halocharis transsylvanica* Erdos, by monotypy and original designation.

*Halochariessa* Erdos, 1956a: 334. Type species *Halocharis transsylvanica* Erdos, 1951: 209, by original designation.

*Chrysocharidia* Erdos, 1956b: 389. Type species *Chrysocharidia fimbriata* Erdos, by original designation.

*Cecidiophaga* Erdos, 1966: 414. Type species *Halochariessa germanica* Erdos, 1956a: 335, by monotypy and original designation.

### Diagnosis

Body weakly sclerotized, often some parts including legs yellowish; clypeus delimited; subtorular grooves present as short sutures not reaching clypeal sutures; scrobal grooves traced by sutures, long, meeting frontal sulcus at a point much closer to anterior ocellus than to torulus; frontal sulcus short, straight transverse and with overhanging ridge; antennae inserted below lower level of eyes, scape cylindrical, pedicel as long as or longer than first funicle segment, funicle 2-segmented, club 3-segmented; mesoscutum with parapsidal furrows distinct anteriorly; fore wings rounded apically radial cell with or without setae; venation interrupted between submarginal vein and premarginal vein, marginal vein long, post-marginal and stigmal veins well developed; abdomen sessile, as long as or longer than thorax.

*Chrysonotomyia* was closely related with *Closterocerus*, especially if the wings show only a simple infuscation at the stigma and the legs are pale coloured. In such cases the form of the antennae seems to be decisive, always black with the scape compressed and subtriangular, expanded in the distal one third; and the flagellum also compressed, with short broad segments and the club with a long spicule in *Closterocerus*, but not found in *Chrysonotomyia* [16].

### Biology/host

Species of this genus develop as endoparasitoids in immature stages of various phytophagous insects. The host range of the genus is wide, including leaf-miners, gall-midges (Diptera:

Cecidomyiidae) [17, 18, 19, 20], gall-wasps (Hymenoptera: Cynipidae) [5], jumping plant lice (Hemiptera: Psyllidae) [21], armored scale insects (Hemiptera: Diaspididae), leaf beetles (Coleoptera: Chrysomelidae) [22] and eggs of sawflies (Hymenoptera: Diprionidae) [23].

### Distribution

Representatives for this genus have been found in all zoogeographical regions.

### Key to Indian species of *Chrysonotomyia* Ashmead (based on females)

(Modified from Khaliq Chishti, 1989)

1. Fore wings with discal setae transparent ..... 2
  - Fore wings with discal setae black.....3
2. Antennae with first funicle segment shorter than second, second segment longer than wide; scape five times as long as wide; marginal vein of fore wing with 16 setae .....*hyalinipennis* (Khan and Shafee)
  - Antennae with first funicle segment as long as second, second segment as long as wide; scape four times as long as wide; marginal vein of fore wing with 9 setae .....*metallious* (Khan and Shafee)
3. Fore wings with distinct row of hairs extending from distad of stigmal vein, space between row and front margin of wing bare or nearly so.....4
  - Fore wings without row of hairs from distad of stigmal vein.....6
4. Fore wings broad, less than twice as long as wide..... 5
  - Fore wings narrow, more than twice as long as wide. *postmarginaloides* (Saraswat)
5. Head without variolate obscurely sculpture; fore wings with infuscated patch beneath stigmal vein; stigmal vein arising more or less vertically from marginal vein, not dilated apically; antennal pedicel longer than funicle, club longer than pedicel and funicle combined..... *obesula* Boucek
  - Head with variolate obscurely sculpture; fore wings without infuscated patch beneath stigmal vein; stigmal vein arising obliquely from marginal vein, dilated apically; pronotum dome shaped and posterolateral margins with projected corners; antennal pedicel shorter than funicle, club shorter than pedicel and funicle combined..... *ricini* sp. n.

### *Chrysonotomyia ricini* sp. n. [Plate: I Figs. 1-10]

#### Material Examined

Holotype 1♀, Paratypes 5♀, 2♂. India: Uttarakhand, CRC, Pantnagar, (29.0210° N, 79.4897° E); Host: *Liriomyza trifolii* (Diptera: Agromyzidae); Host plant: castor, *Ricinus communis* L. (Euphorbiaceae); 19.VIII.2015, Hym. Eulo. Nr. EE 88, coll. Sandip More.

### Description

**Female:** Body length about 1.13 mm; body colour metallic green, gaster brown to dark with metallic green tinge. Head metallic green, eyes red, antennae brown except 3/4<sup>th</sup> part of scape; coxae concolourous with body and remaining segments of all the three legs are white.

**Head (Fig. 1):** Slightly wider than long in frontal view (0.33:0.28); head with frontal grooves 'Y' or 'X' shaped apart from anterior ocellus and not meeting medially; frontovertex wider than long (0.12:0.10), about 0.36x as wide as the total head width (0.12:0.33). A median fold from occipital margin to foramen magnum present. Ocelli arranged in acute angled triangle; POL 1.2x as long as OOL; compound eyes large

covering almost complete head, occular line concave, antennal toruli situated above the lower level of eye margin; malar sulcus absent; malar space much shorter than eye length (0.04:0.22); mandibles bidentate.

**Antennae (Fig. 2):** 7 segmented, apical tip of antenna with spicule, antennal formula 1123; scape bulged medially about 4.1x as long as wide (0.50:0.12), scape apex not reaching to anterior ocelli; pedicel about 1.2x as long as wide (0.16:0.13) and shorter than the length of the F1 as well as F2; funicle 2 segmented, F1 shorter than F2 (0.17:0.18); F1 about 1.4x as long as wide (0.17:0.12) and F2 about 1.5x as long as wide (0.18:0.12); club 3 segmented about 5.3x as long as wide (0.59:0.11), longer than pedicel and funicle combined.

**Mesosoma (Fig. 3):** Pronotum dome shaped anteriorly, posterolateral margins with projected corners. Mesoscutum coarsely strongly reticulate with notauli complete reaching to scutoscutellar suture, about 1.58x as wide as long (0.27:0.17); having 2 pairs of setae, axilla slightly advanced; scutellum as long as broad and slightly shorter than the mesoscutum, one pair of setae on scutellum and without longitudinal grooves; dorsellum small, more than half the length of propodeum; propodeum smooth, without median carina; propodeal spiracles small and separated from the anterior margin of propodeum; petiole present and as long as propodeum.

**Fore wings (Fig. 4):** About 1.85 times longer than wide (0.74:0.40); more than 1.15x longer than hind wing length; SMV with 2 setae directed upwards, shorter than MV (0.14:0.29); MV bearing small, tough setae on front edge; PMV shorter than STV (0.05:0.07), setal line from STV directed backward with bare area; marginal fringe short; basal vein present; cubital vein present, speculum closed from behind.

**Hind wings (Fig. 5):** About 6.4x as long as wide (0.64:0.10) with somewhat pointed apex; vein length about half the length of wing (0.34:0.64).

**Fore Legs (Fig. 6):** Coxae dark brown while remaining segments of leg white, tibial spur short.

**Mid legs (Fig. 7):** Coxae dark brown while remaining segments of leg white, tibial spur short.

**Hind legs (Fig. 8):** Coxae, middle part of femur and basal 1/4<sup>th</sup> part of tibia brown; remaining parts and segments of leg white.

**Metasoma (Fig. 9):** Ovate, about 1.67x as long as broad (0.47:0.28), and longer than mesosoma (0.47:0.45); gaster surface smooth, all gasteral segments nearly equal; ovipositor (Fig. 10) sheaths slightly exerted; first valvifer triangular; second valvifer nearly uniform in width, about 6.1x as long as third valvulae (0.34:0.055); outer plates of ovipositor narrow at base and broadened at apex, with a ridge in the middle.

**Male:** Similar to female

**Host:** *Liriomyza trifolii* on castor

**Etymology:** Named after the name of host plant of *Liriomyza trifolii*.

**Remarks:** The species *Chrysotomyia ricini* sp. n. comes near to *C. obesula* but differs in following characters: pedicel shorter than F1 as well as F2 (pedicel longer than funicle *C.*

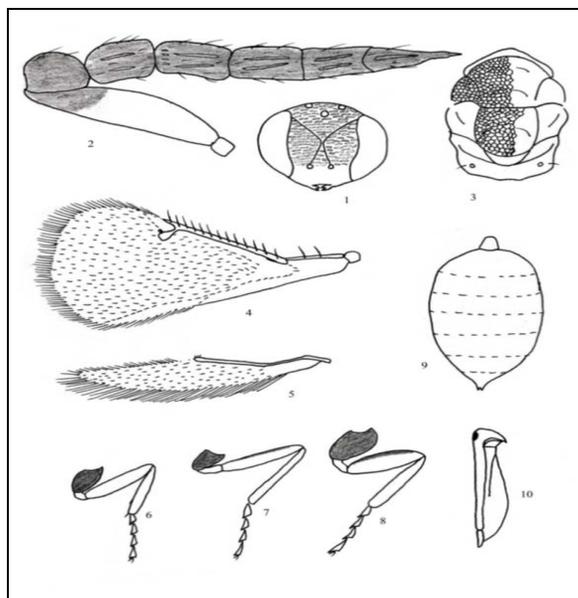
*obesula*); thorax about 1.55x as long as broad (slightly longer than broad in *C. obesula*); pronotum clearly visible dorsally and dome shaped (hardly visible in *C. obesula*); mesoscutum about 1.58x as broad as long (twice as broad as long in *C. obesula*); mesoscutum with 2 pairs of setae (1 pair of setae in *C. obesula*); notauli complete (notauli incomplete in *C. obesula*); scutellum as long as broad (scutellum transverse in *C. obesula*); propodeum 1.6x as long as dorsellum and smooth (twice and rugose reticulate *C. obesula*); gaster longer than thorax (equal in *C. obesula*); stigmal vein arising obliquely from marginal vein and dilated apically (STV arising more or less vertically from MV and not dilated apically in *C. obesula*).

### Conclusion

The present study provides a new species, *Chrysotomyia ricini* sp. n. to the science of entomology on serpentine leafminer, *Liriomyza trifolii*, as biological control agent and have immense potential in managing the population of pest species.

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**Plate 1:** Figs. 1-10: *Chrysotomyia ricini* sp. n.

1. Head in frontal aspect, 2. Antennae; 3. Mesosoma; 4. Fore wing; 5. Hind wing; 6. Fore leg; 7. Middle leg; 8. Hind leg; 9. Gaster; 10. Female genitalia

### References

- Ashmead WH, Smith HH. Classification of the chalcid flies of the superfamily Chalcidoidea, with descriptions of new species in the Carnegie Museum, collected in South America by Herbert H. Smith. Memoirs of the Carnegie Museum. 1904; 1:225-551.
- Boucek Z. Chalcidoidea. Pp. 204-288 in: Klic Zvířeny CSR. II. Praha. 1957, 746.
- Boucek Z, Askew RR. Palearctic Eulophidae (excl. Tetrastichinae). Index of entomophagous insects. Paris. 1968; 3:254.
- Boucek Z. Descriptive and taxonomic notes on ten,

- mainly new, species of West Palaearctic Eulophidae (Hymenoptera). *Acta Entomologica Musei Nationalis Pragae*. 1969; 38:525-543.
5. Kamijo K. Notes on Ashmead's and Crawford's types of Eulophidae (Hymenoptera, Chalcidoidea) from Japan. *Kontyu*. 1976; 44(4):482-495.
  6. Boucek Z. Descriptions of two new species of Neotropical Eulophidae (Hymenoptera) of economic interest, with taxonomic notes on related species and genera. *Bulletin of Entomological Research*. 1977; 67(01):1-5.
  7. Boucek Z, Graham MWR de V. In: Fitton, Graham, Boucek, Fergusson, Huddleston, Quintan and Richards: A checklist of British insects. *Handbk Ident. Br. Insects*. 1978; 11(4):1-159.
  8. Boucek Z. Australasian Chalcidoidea (Hymenoptera): a biosystematic revision of genera of fourteen families, with a reclassification of species. Wallingford, U.K. 1988, 838.
  9. Hansson C. A taxonomic study on the Palearctic species of *Chrysonotomyia* Ashmead and *Neochrysocharis* Kurdjumov (Hymenoptera: Eulophidae). *Entomology Scandinavian*. 1990; 21(1):29-52.
  10. Noyes JS. Universal Chalcidoidea Database. World Wide Web electronic publication <http://www.nhm.ac.uk/chalcidoids> 2016. Retrieved on March 2017.
  11. Hayat M, Aftab H, Perveen S. Taxonomic notes on Indian Eulophidae (Hymenoptera: Chalcidoidea)-2. On the types of some Eulophinae, Entedoninae and Euderinae. *Oriental Insects*. 2005; 39(1):1-14.
  12. Khaliq Chishti MSA. Studies on the taxonomy of the family Eulophidae (Hymenoptera: Chalcidoidea). Ph.D. Thesis. Aligarh Muslim University, Aligarh, Uttar Pradesh, India. 1989, 1-240.
  13. Narendran TC, Galande SM, Mote UN. Two new species of Eulophidae (Hymenoptera: Chalcidoidea) from Maharashtra, India. *Uttar Pradesh Journal of Zoology*. 2001; 21(2):153-7.
  14. Noyes JS. Universal Chalcidoidea Database. World Wide Web electronic publication, 2004.
  15. Gibson GAP. Morphology and Terminology. Annotated keys to the genera of nearctic chalcidoidea (Hymenoptera), NRC Research Press, Canada. 1997, 794.
  16. Hansson C. Re-evaluation of the genus *Closterocerus* Westwood (Hymenoptera: Eulophidae), with a revision of the Nearctic species. *Insect Systematics & Evolution*. 1994; 25(1):1-25.
  17. Saraswat GG. On some *Tetrastichus* (Hymenoptera: Chalcidoidea) from India. *Mem. School Ent, St. John's College, Agra*. 1975; 4:1-34.
  18. Boucek Z. A faunistic review of the Yugoslavian Chalcidoidea (parasitic Hymenoptera). *Acta Entomologica Jugoslavica*. 1977; 13 (suppl.):1-145.
  19. Boucek Z. Taxonomic study of chalcidoid wasps (Hymenoptera) associated with gall midges (Diptera: Cecidomyiidae) on mango trees. *Bulletin of entomological research*. 1986; 76(03):393-407.
  20. Hansson C. The classification of *Chrysonotomyia* Ashmead and *Teleopterus* Silvestri (Hymenoptera: Eulophidae), with a review of the species in the Nearctic region. *Proceedings Entomological Society of Washington*. 1994; 96:665-673.
  21. Moser JC. The interrelationships of three gall makers and their natural enemies, on hackberry (*Celtis occidentalis* L.). *Bulletin New York State Museum and Science Services*. 1965; 402:1-95.
  22. Yoshimoto CM. Synopsis of *Chrysonotomyia* Ashmead s. str. of America North of Mexico (Hymenoptera: Chalcidoidea, Eulophidae). *The Canadian Entomologist*. 1980; 112(10):1039-1048.
  23. Krausse A. *Wolffiella ruforum* m. nov. Gen. nov. spec., ein neuer Chalcidier aus den Eiern von *Lophyrus rufus*. *Z. Forst. Jagdw.* 1917; 49:26-35.