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## DESCRIPTION OF A NEW SPECIES OF *NEOCLADIA* PERKINS AND FEMALE OF *NEOCLADIA NARENDRANI* HAYAT (HYMENOPTERA: CHALCIDOIDEA: ENCYRTIDAE) FROM INDIA

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**Abstract:** A new species, *Neocladia noyesi* is described and the female of *Neocladia narendrani* Hayat is first reported and described from Tamil Nadu.

**Keywords:** Description, Encyrtidae, female, *Neocladia narendrani*, new species.

The members of the genus *Neocladia* Perkins are internal, nymphal parasitoids of Cicadellidae (Hemiptera) (Noyes 2012) containing 34 species worldwide after the recent synonymy of *Anagyrodes* Girault, *Carabunia* Waterston, *Elijahia* Girault, *Paracladella* Girault and *Schillerana* Girault with *Neocladia* by Trjapitzin & Triapitsyn (2010). The new species described comes under *Paracladella*, but is placed in *Neocladia* following Trjapitzin & Triapitsyn (2010). Hayat (2003) described *Neocladia narendrani* from a male, and noted that this species differed from males of *Neocladia* in the fore wing venation and the larger costal cell and predicted that this might belong to an undescribed genus for which females are needed. We recently collected two females presumably of this species and thought of describing this as a new genus but, taking into account the synonymies proposed by Trjapitzin & Triapitsyn (2010), we retain

*narendrani* in *Neocladia*, and describe the female for the first time from Tamil Nadu.

### Material and Methods

Encyrtid parasitoids collected from various ecosystems using different collection methods from Tamil Nadu were processed as per the standard procedure suggested by Noyes (1982).

**Terminologies used:** frontovertex width—measurement taken at the narrowest frontovertex; malar space—the minimum distance between eye and mouth margin; parastigma—a very slight to strong swelling of the apical one-third of the submarginal vein; mesosoma—thorax and propodeum; notaular lines—superficial lines on the mesoscutum running from the antero-lateral margin of the mesoscutum to the centre of its posterior margin; linea calva—an oblique hairless line extending from the stigmal vein to the posterior margin of the fore

**Abbreviations:** F1-6 - funicle segments 1-6; POL - minimum distance between the posterior ocelli; OOL - minimum distance between a posterior ocellus and eye margin; OCL - minimum distance between a posterior ocellus and occipital margin; AOL - minimum distance between a posterior ocellus and the anterior ocellus.

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Competing Interest: None.

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wing; metasoma—abdomen excluding the propodeum, but including petiole; hypopygium—the last sternite of the gaster, also called subgenital plate.

Measurements are directly taken using the divisions of a linear scale.

All images were taken using either Leica DM750 phase contrast microscope or Leica S8APO stereo zoom microscope with montage software. Specimens were deposited with the Entomology Department, Annamalai University, Parasitoid Taxonomy and Biocontrol Laboratory, Faculty of Agriculture, Chidambaram, Tamil Nadu (EDAU).

***Neocladia noyesi* sp.nov.**

(Images 1–6)

urn:lsid:zoobank.org:act:BD635A71-3849-4DD4-847D-18A2F6636D9F

**Material Examined**

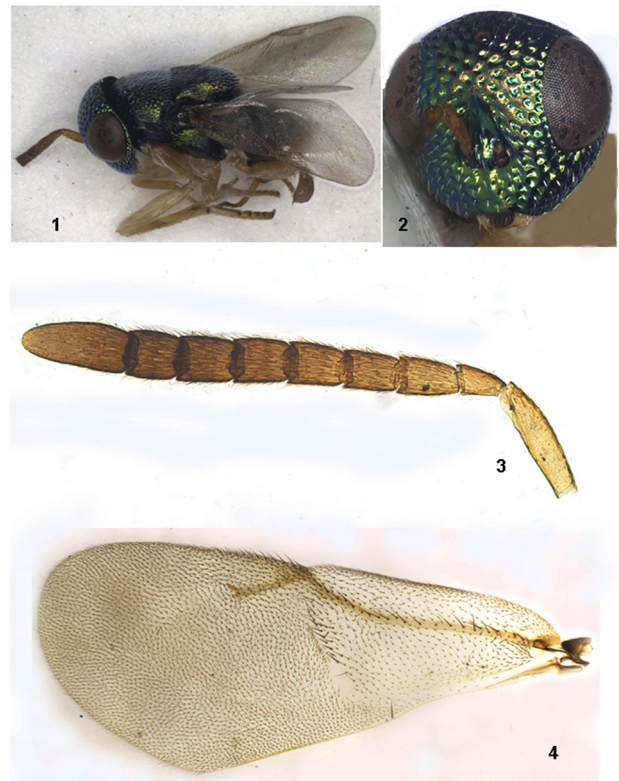
**Holotype:** EDAU/Enc2/2012, 17.iii.2011, Female (EDAU) on card, labelled “*Neocladia noyesi* Manickavasagam & Rameshkumar”, reared from unidentified nymphs of cicadellid on *Cassia* sp., Perumalpalayam, Thuraiyur, Tiruchirappalli, Tamil Nadu, India, coll. Manickavasagam & Rameshkumar.

**Paratype:** 1 male on card with same data as in Holotype (EDAU/Enc2P1/2012).

**Female:** Holotype (Image 1). Length 2.05mm.

**Color:** Body dark with predominantly metallic green luster; frontovertex metallic green; labrum dark brown. Antenna with scape yellowish-brown; pedicel slightly darker than scape; flagellum brown. Pronotum, mesoscutum, tegulae, scutellum and propodeum (except pale greenish-brown median depression) metallic green; setae on dorsum of mesosoma whitish. Wings subhyaline with dark brown setae. Legs including coxae pale yellow except base and apex of hind tibia brown more pronounced on inner side, and apex of hind femur brown; tip of mid tibial spur dark brown.

**Head:** (Image 2) Head a little wider than high (76:73); occipital margin slightly concave and sharp and continues up to mouth margin; posterior margins of eyes nearly reaching occipital margin; frontovertex width at narrowest 0.56× head width (43:76); frontovertex with large thimble-like setigerous punctures extending up to mouth margin, punctures separated by less than their own diameters; each thimble with single white seta; antennal scrobes meeting dorsally; antennal toruli situated lower on head and separated from each other by less than their own width, their lower margins below lower level of eye margins and separated from mouth margin by a distance 2.8× of torulus height; eye height



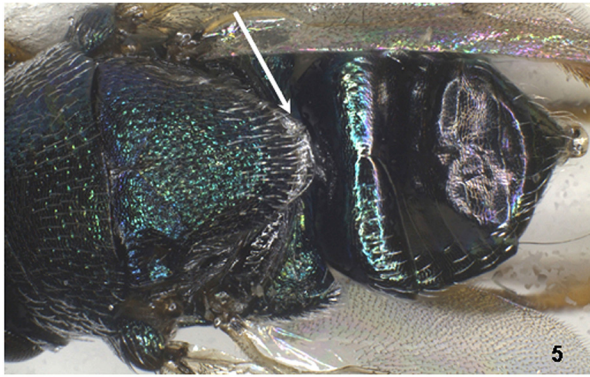
Images 1–4. *Neocladia noyesi* sp. nov.

1 - female; 2 - head frontal view; 3 - antenna; 4 - fore wing

1.36× as long as malar space (38:28). Antennal scape 3.75× as long as wide; pedicel longer than broad and smaller than F1; all funicle segments longer than wide; F2 and F3 and F4 and F5 subequal in length; clava solid and as long as preceding two segments combined (Image 3).

**Relative measurements:** head width, 76; height, 73; frontovertex width, 43; POL, 19; AOL, 13; OOL, 11; OCL, 4; torulus height, 6; width, 4; eye height, 38; malar space length, 28; length and width of scape, 30 : 8; pedicel, 12 : 7; F1, 15 : 9; F2, 14 : 9; F3, 14 : 9; F4, 13 : 10; F5, 13 : 11; F6, 12 : 11; clava, 26 : 11.

**Mesosoma:** (Image 5) Dorsum of mesosoma including tegulae finely reticulate (visible at high magnification). Pronotum 6.5× as wide as long (72 : 11) and 0.3× of scutellum length; scutellum 1.3× as long as mesoscutum and slightly longer than wide (46:44); apex of scutellum with a broad transparent flange (Image 5); sides of propodeum almost straight and median length of propodeum 0.26× of scutellum length (12:46); propodeum with a median carina and a pair of submedian grooves; sides of propodeum with dense white setae. Fore wing 2.3× as long as broad (Image 4); posterior margin of fore wing emarginate; costal cell large, 5.5×



Images 5-6. *Neocladia noyesi* sp. nov.  
5 - meso and metasoma dorsal view, 6 - male

as long as broad with five rows of dorsal and three rows of ventral setae; submarginal vein curved; marginal vein punctiform; postmarginal vein  $1.8\times$  as long as stigmal vein; hind wing  $2.6\times$  as long as broad. Mid basitarsus  $1.16\times$  of mid tibial spur; mid tibial length  $3.03\times$  as long as mid basitarsus length; hind femur  $2.8\times$  as long as broad, hind tibiae  $4.5\times$  as long as broad.

**Relative measurements:** pronotum length, 11; width, 72; mesoscutum length, 34; width, 74; scutellum length, 46; width, 44; propodeum length (midline), 12; fore wing length, 91; width, 39; costal cell length, 71; width, 13; hind wing length, 67; width, 26; mid femur length, 52; width, 18; mid tibia length, 70; mid tibial spur length, 20; mid basitarsus length, 23; hind femur length, 52; width, 18; hind tibia length, 55; width, 12.

**Metasoma:** Shorter than mesosoma (46:103) and  $1.48\times$  as broad as long; ovipositor not exerted, hypopygium not reaching apex of metasoma.

**Male:** (Image 6) Length 2.2mm. Differs from female in the following characters: genitalia, color of body (darker than female), color of legs (coxae, trochanter and basal half of femora dark brown with green tinge), antennal

scape ( $3.25\times$  as long as wide), postmarginal vein  $2.8\times$  stigmal vein and metasoma  $1.06\times$  as broad as long.

**Relative measurements:** head width, 75; height, 66; scape length, 21; width, 6.5; mesosoma length, 68; width, 64.

**Host:** Unidentified nymphs of cicadellid on *Cassia* sp.

**Distribution:** India: Tamil Nadu.

**Etymology:** The species is named after the encyrtid expert, Dr. John S. Noyes of the Natural History Museum, London, U.K.

**Comments:** The new species runs near *Neocladia gigantea* (Rao 1973) in the key to species given by Trjapitzin & Triapitsyn (2010) but differs in the following characters: fore wing subhyaline without infusate patch; frontovertex with large thimble-like setigerous punctures, hypopygium not reaching apex of metasoma; hind tibia angulate at apex; all coxae pale yellow; body color green with metallic shine and comparatively smaller, length 2.05mm (in *gigantica*, fore wing strongly infusate in the distal one-third; frontovertex with transversely lineolate-reticulate sculpture and with fine setigerous punctures; hypopygium reaching apex of metasoma; hind tibia rounded apically; all coxae dark brown; body color shining black and comparatively larger, length 4.2mm).

Among Indian species, it is closer to *Neocladia uttara* (Hayat, 2003) and *N. calicutana* (Hayat, 2003). This new species mainly differs from the latter two species by the following characters: fore wing subhyaline without infusate patch; propodeum with a median carina and submedial grooves; body color green with metallic shine; scutellum apex with thin transparent flange; hind tibia  $4.5\times$  as long as wide [in *uttara* and *calicutana*, fore wing infusate; body color dark brown; scutellum without flange and hind tibia nearly  $2.5\times$  as long as wide ( $3.1\times$  as long as wide in *calicutana*)].

#### *Neocladia narendrani* Hayat

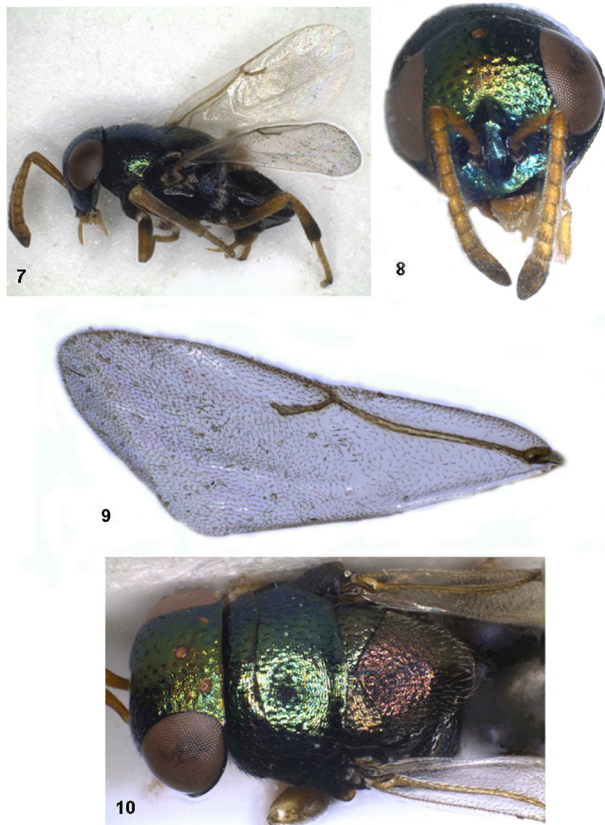
(Images 7–10)

*Neocladia narendrani* Hayat, 2003: 225–226, Holotype, Male: India, Calicut University Campus (NPC).

**Material examined:** EDAU/Enc3/2012, 12.ii.2011, one female, yellow pan trap from weed ecosystem, Attur, Salem, Tamil Nadu, India; EDAU/Enc3i/2012, 17.ii.2012, one female, yellow pan trap from weedy field, Annamalai University premises, Chidambaram, coll. S. Manickavasagam & A. Rameshkumar.

**Female:** (Image 7) Length 2.0mm.

**Color:** Body dark brown to black. Head green,



Images 7-10. *Neocladia narendrani* Hayat  
7 - female; 8 - head frontal view; 9 - fore wing; 10 - mesosoma

facial impression blue-violet. Antennal scape, pedicel, funicle and basal part of the clava testaceous brown, clava brown. Mesoscutum greenish and scutellum with reddish reflections; mesopleuron dark brown with green shiny reflections. Metasoma dark brown, smooth and shiny; tip of the ovipositor sheath yellow. Fore and hind wings hyaline. All coxae dark brown, fore legs pale yellow, mid legs yellow with tibiae pale brown in basal third, hind legs with trochanters brown, femora in basal third and tibia in distal third brownish, tarsal segments except fifth segment yellow.

**Head:** (Image 8) Frontovortex more than one-third of head width, facial impression with transverse striations and silvery white setae. Thimble like punctures in head separated by more than their own diameter and not descending between lower eye margin and facial impression, each thimble with a fine white seta. Antennal scape cylindrical about 6× as long as broad, F1 slightly longer than pedicel, antennae setose, the setae brown.

**Mesosoma:** (Image 10) Mesoscutum and axillae with shallow polygonal reticulation, the same much deeper in scutellum; mesoscutum without notaular line;

Scutellum 2× as long as mesoscutum; lateral sides of propodeum with dense long silvery white setae around spiracles; fore wing (Image 9) with marginal vein absent, submarginal vein distally bifurcated into postmarginal vein and stigmal vein, parastigma normal, not swollen, linea calva closed posteriorly by few lines of setae (5 lines), filum spinosum present; hind wing with costal cell setose, the setae hyaline; legs including coxae with white setae; hind tibia not expanded, width less than width of hind femur (15:19).

**Metasoma:** shorter than mesosoma, with long, dark, brown, spine-like setae including hypopygium; hypopygium not reaching apex of metasoma.

**Relative measurements:** Head width, 37; height, 32; frontovortex width, 19; POL, 10; OOL, 3; eye length, 19; malar space length, 24; torulus length, 3.5; inter-torular distance, 4.5; torulus-mouth margin distance, 6.5; scape length, 27; pronotum length, 6; width, 34; mesoscutum length, 15; width, 17; scutellum length, 32; width, 26; propodeal length, 4; distance between propodeal spiracles, 31; fore wing length, 77; width, 34; hind wing length, 56; width, 22; mid tibia length, 36; mid basitarsus length, 8; mid tibial spur length, 10; hind tibia length, 29; width, 6; metasoma length, 31; width, 26.

**Male:** As given in Hayat (2003).

**Host:** Unknown.

**Distribution:** India: Karnataka (Gupta & Poorani 2008), Kerala (Hayat 2003), Tamil Nadu (Manickavasagam & Rameshkumar 2011), Tamil Nadu (first record for female).

## REFERENCES

- Gupta, A. & J. Poorani (2008). New records of Chalcidoidea (Hymenoptera) from southern India. *Biosystematica* 1(2): 21–24.
- Hayat, M. (2003). Records and descriptions of Indian Encyrtidae (Hymenoptera: Chalcidoidea). *Oriental Insects* 37: 187–260.
- Manickavasagam, S. & A. Rameshkumar (2011). First record of three species of Encyrtidae from India (Hymenoptera: Chalcidoidea) and distributional records from Kerala and Tamil Nadu. *Hexapoda* 18(2): 111–118.
- Noyes, J.S. (1982). Collecting and preserving chalcid wasps (Hymenoptera: Chalcidoidea). *Journal of Natural History* 16: 315–334.
- Noyes, J.S. (2012). Universal Chalcidoidea Database. Worldwide Web electronic Publication. [www.nhm.ac.uk/entomology/chalcidoidea/index.html](http://www.nhm.ac.uk/entomology/chalcidoidea/index.html) (Accessed on 12 June 2012).
- Rao, B.R.S. (1973). Descriptions of two new species of *Carabunia* Waterston (Hymenoptera: Encyrtidae). *Oriental Insects* 7(4): 485–489.
- Trjapitzin, V.A. & S.V. Triapitsyn (2010). On the genus *Neocladia* Perkins, 1906 (Hymenoptera: Encyrtidae), with description of two new species. *Russian Entomological Journal* 19(2): 123–135.

