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## ON SOME INTERESTING CHALCIDOID PARASITIDS ASSOCIATED WITH *EPHEDRA FOLIATA* BOISS ex C.A. MEYER IN INDIA

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### INTRODUCTION

*Ephedra foliata* Boiss. ex C.A. Meyer (Ephedraceae) is a climber species distributed in Sindh, Baluchistan, Kurram Valley, North-West Frontier Province (N.W.F.P.), Pakistan, and Punjab plains to 800 m in Salt range, Rajasthan, Afghanistan, Arabia and Aden (Stapf, 1889; Sahni, 1990; Price, 1996). Ecologically it acts as a soil builder, economically important source of browse for camel, sheep, goat and an important source of pseudoephedrine (Khanna *et al.*, 1976). Five species of Chalcidoids were collected from the seeds of *Ephedra foliata* from its wild locality in Samod near Jaipur in Rajasthan. They are Eurytomidae : *Eurytoma ephedrae* Narendran & Prabha Sharma sp. nov. and *Eurytoma foliatae* Narendran & Rita Singh sp. nov., Torymidae : *Pseudotorymus ephedrae* Narendran & Prabha Sharma sp. nov. and *Idiomacromerus* sp. and Eupelmidae : *Eupelmus urozonus* Dalman. The new species are described and others commented hereunder. The holotypes of the new species are deposited in the Department of Zoology, University of Calicut (DZUC) but eventually will be transferred to Western Ghat Regional Station of Zoological Survey of India, Kozhikode (ZSIK).

#### 1. *Eurytoma ephedrae* Narendran & Prabha Sharma sp. nov. (Figs. 1-5)

*Holotype* : Female : Length 1.9 mm.

*Colour* : Black except following : antenna brown with base and apex of scape paler; apices of femora, bases and apices of tibiae pale brownish yellow; tarsi pale brownish yellow, wings hyaline with veins pale white.

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*Sculpture* : Face, dorsum of mesosoma, mesepisternum, metapleuron and lateral areas of propodeum covered with contiguous setigerous punctures, interstices microreticulate (except lower face smooth); gena, lateral panel of pronotum and mesepimeron microreticulate; femoral depression and fore coxa reticulate; tegula reticulate; hind coxa cross reticulate on dorsal half. Propodeum with a broad shallow microreticulate area, sides with irregular setigerous pits; metasoma glabrous on dorsal side, microreticulate on lower sides.

*Head* : Posterior margin of gena well carinate and with a groove in front of it; pre- and post-orbital carinae and malar groove indistinct, scrobal basin carinate laterally, scrobe not reaching front ocellus; distance between front ocellus and scrobe more than diameter of front ocellus; median raised ridge extending from interantennal projection to apex of clypeus; face with radiating carinae from mid point of clypeal apex which forms slightly depressed triangle; ratio of lateral ocellus : OOL : POL as 7 : 6 : 24. Antenna with scape not reaching front ocellus; ratio of scape (minus radicle) : pedicel : 2 anelli together : F1 : F2 : F3 : F4 : F5 : clava as 24 : 12 : 2.5 : 10 : 10 : 11 : 10 : 12.5 : 25.

*Mesosoma* : Fore coxa not distinctly depressed ventrally in basal half for reception of lower head, not carinate, mesopleuron/mesepisternum in ventral view with semicircular carinae meeting medially and protruding forwards between fore coxae; sculptural area (mesosternal shelf) flat, wider than mesocoxal diameter; prepectus triangular with a median curved pit; fore wing 2.25x as long as its maximum width, speculum closed below; ratio of marginal vein : postmarginal : stigmal as 8 : 13 : 10.

*Metasoma* : Gaster sessile, distinctly longer than mesosoma but distinctly shorter than head plus mesosoma; ratio of gastral tergites (T1–T7) and ovipositor sheath as 13 : 8 : 10 : 28 : 3 : 7 : 10 : 10.

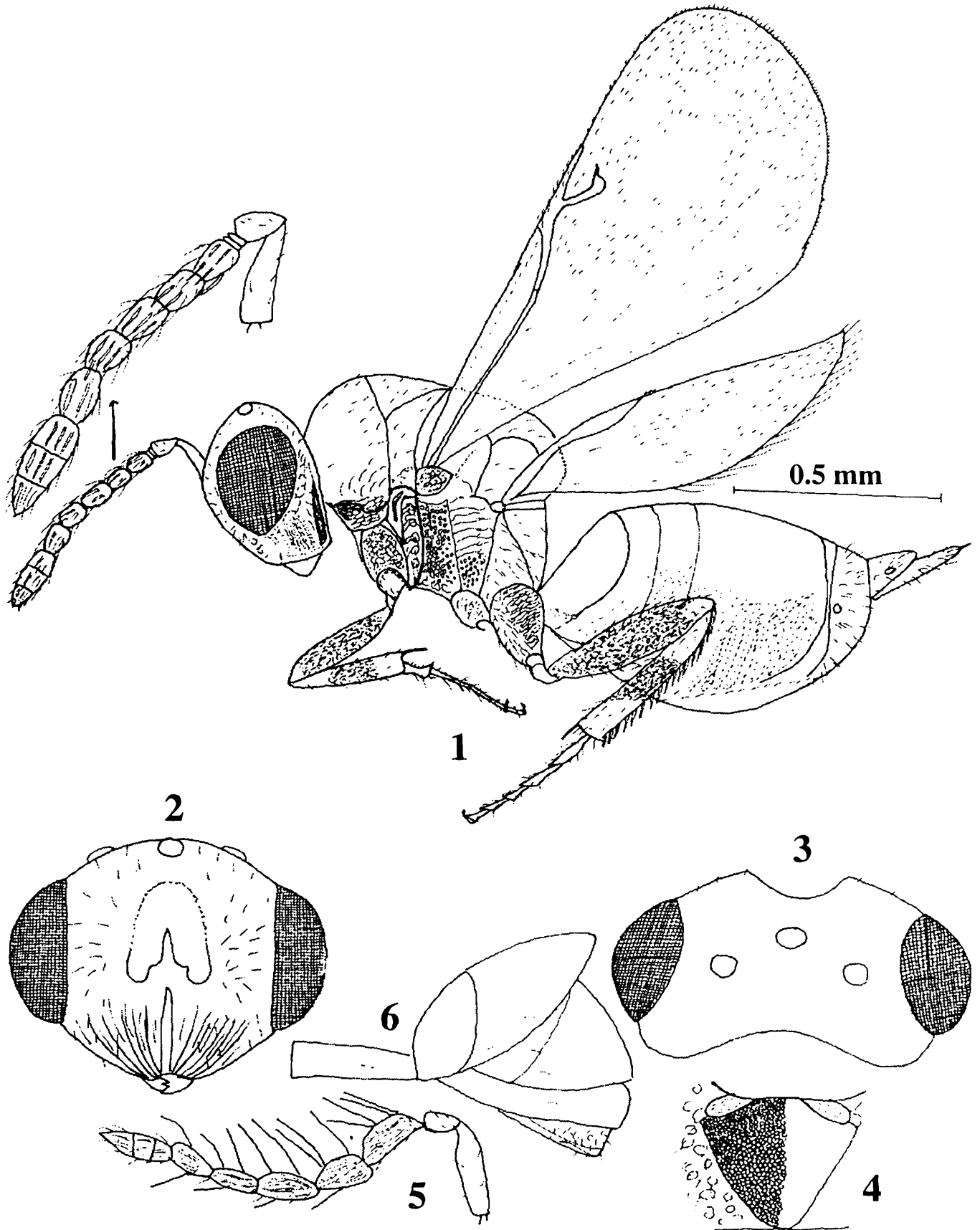
*Male* : Length 1.52–1.6 mm. Similar to female except antennal segment pedicellate (Fig. 5); ratio of antennal segments : scape : pedicel : anelli : funicular segments : clava as 22 : 8 : 2 : 16 : 13 : 14 : 11 : 11 : 17. Gastral petiole in lateral view subcylindrical, dorsal length 2x its greatest thickness, slightly longer than metacoxa, without carinae, mostly smooth with weak reticulations.

*Material examined* : Holotype : Female : INDIA, Rajasthan, Jaipur, Samod (27°12'N 75°49' E), reared from seeds of *Ephedra foliata* Boiss ex C.A. Meyer, May 2005, Rita Singh & Prabha Sharma (Reg. No. MoEF 4784); Paratypes : 1 Female and 4 males of the same collection data of holotype (Reg. Nos. MoEF 4785-4788 & 4794).

*Etymology* : The species is named after the host plant genus *Ephedra*.

*Distribution* : Jaipur (Samod), India.

*Discussion* : This new species comes near *Eurytoma setitibia* Gahan and *Eurytoma apara* Narendran (Gahan, 1919 and Narendran, 1994) in general appearance. It differs from *E. setitibia* in having : (1) Face with radiating carinae (without such radiating carinae in *E. setitibia*);



**Figs. 1-6.** : *Eurytoma ephedrae* Narendran & Prabha Sharma sp. nov.; Figs. 1-4 Female : 1. Body profile; 2. Head front view; 3. Head dorsal view; 4. Propodeum. Figs. 5-6 Male : 5. Antenna; 6. Gaster.

(2) Mesosternal shelf distinctly developed (mesosternal shelf not distinctly developed in *E. setitibia*);  
 (3) Hind tibia with more than 10-15 strong setae on dorsal margin (in *E. setitibia* hind tibia with only 3 stout setae on dorsal margin).

This new species differs from *E. apara* in having : (1) Hind tibia with 10–15 strong setae on dorsal margin (in *E. apara* not such stout setae in dorsal margin of hind tibia); (2) F2 to F5 not strongly wider than long (in *E. apara* F2 to F5 strongly wider than long); (3) Propodeum without a median furrow containing pits (in *E. apara* propodeum with a median furrow containing pits) and (4) Marginal vein shorter than postmarginal (in *E. apara* marginal vein longer than postmarginal).

This new species does not fit to the description of any of the Oriental species of *Eurytoma* listed by Noyes (2005).

## 2. *Eurytoma foliatae* Narendran & Rita Singh sp. nov.

(Figs. 7-10)

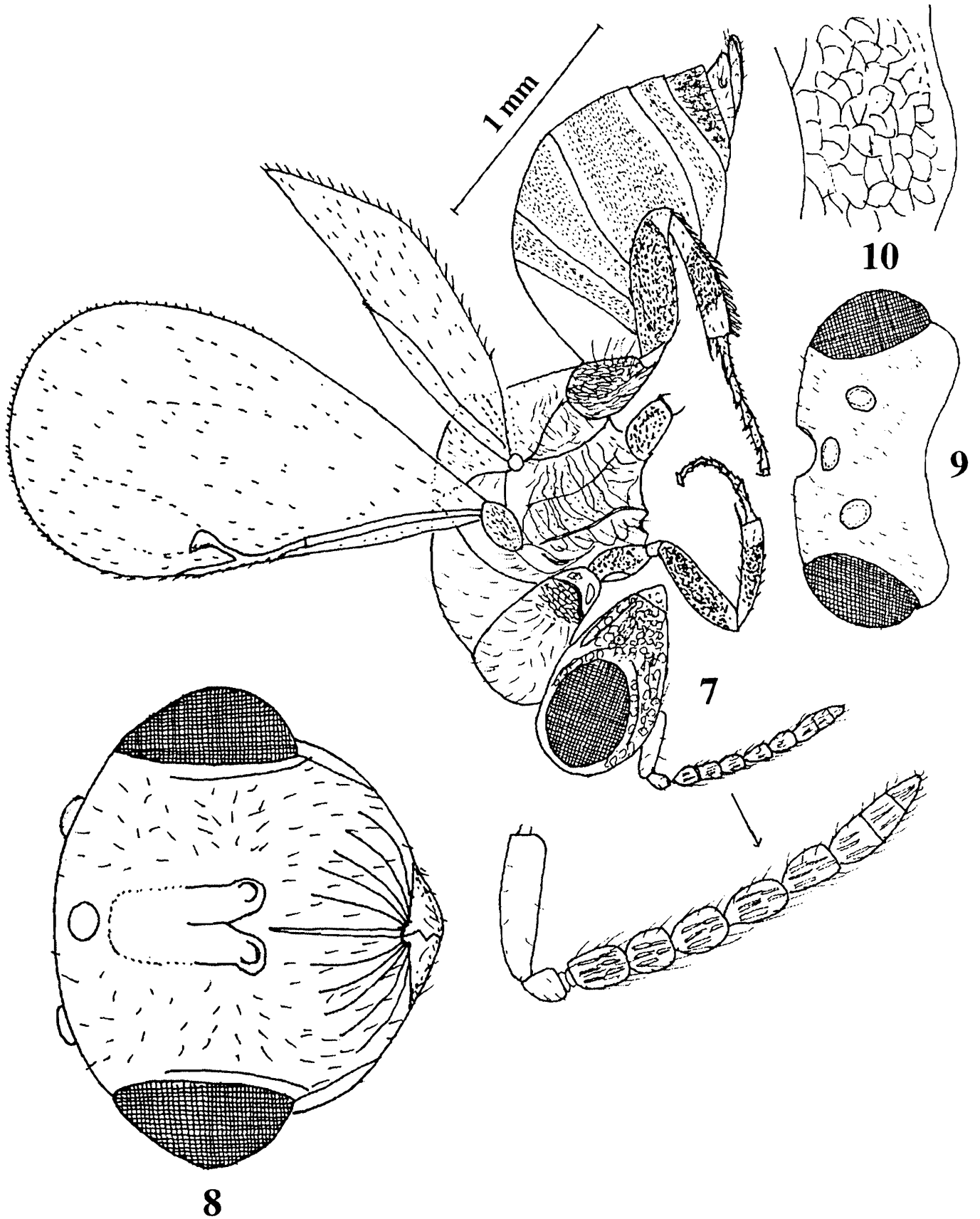
*Holotype* : Female : Length 3.1 mm.

*Colour* : Black except following : eye grey with reflecting yellow and brown patches; ocelli brownish red; antenna brown with scape and pedicel (ventral and apical parts) paler; apices of femora, bases and apices of tibiae pale yellow with median part of tibiae brown; tarsi pale yellow. Wings hyaline and veins and pilosity white.

*Sculpture* : Frons, vertex, dorsum of mesosoma, mesepisternum, metapleuron with deep setigerous pits, with interstices microreticulate (except lower face smooth); lateral panel of pronotum microreticulate; tegula cross reticulate; coxae reticulate, reticulations confined to dorsal half in hind coxa; propodeum (Fig. 10) with irregular pits in a shallow area; metasoma finely microreticulate (Fig. 7).

*Head* : Posterior margin of gena well carinate and with a deep groove in front; pre- and post-orbital carinae distinct; malar groove indistinct, scrobal basin carinate laterally, almost reaching front ocellus; median raised ridge extending from base of interantennal projection to apex of clypeus; submedian carinae diverging from mid point of clypeal apex which forms a distinct semicircular notch; ratio lateral ocellus : OOL : POL as 6 : 7 : 18. Antenna with scape not reaching front ocellus; ratio scape (minus radicle) : pedicel : 2 anelli together : F1 : F2 : F3 : F4 : F5 : clava as 36 : 9 : 2 : 12 : 10 : 12 : 14 : 12 : 25.

*Mesosoma* : Fore coxa depressed ventrally in basal half for reception of lower part of head, depression strongly carinate along outer edge, medially and longitudinally grooved; mesopleuron and mesepisternum with semicircular carinae meeting medially and protruding forward between



**Figs. 7-10.** : *Eurytoma foliatae* Narendran & Rita Singh sp. nov.; Female : 7. Body profile; 8. Head front view; 9. Head dorsal view; 10. Propodeum.

fore coxae; mesosternal shelf flat, wider than mesocoxal diameter; prepectus subtriangular, smooth, shiny with a pit on ventral side; fore wing length 1.76x its maximum width; speculum weakly closed below by cubital line of setae; ratio of marginal : postmarginal : stigmal vein as 9:13:10.

*Metasoma* : Gaster sessile, petiole indistinct, a little longer than mesosoma but distinctly shorter than head plus mesosoma; ovipositor sheath slightly tilted upwards. Ratio of gastral tergites (T1–T7) : ovipositor sheath as 17:9:18:20:8:9:6:4.

*Male* : Unknown.

*Distribution* : Jaipur (Samod), Rajasthan.

*Material examined* : Holotype : Female : INDIA, Rajasthan, emerged from seeds of *Ephedra foliata* Boiss. ex C.A. Meyer, May 2005, Rita Singh & Prabha Sharma (Reg. No. MoEF 4789) (ZSIK). Paratype : 1 Female of the same collection data of holotype (Reg. No. MoEF 4790).

*Etymology* : The species is named after the host plant *Ephedra foliata*.

*Discussion* : This new species comes near *Eurytoma agalica* Narendran in general appearance but differs from it in having (1) Pedicel shorter than F1 (pedicel as long as F1 in *E. agalica*); (2) Gaster shorter than combined length of head plus mesosoma (gaster longer than head plus mesosoma in *E. agalica*); (3) Hind tibia with more than 10–15 stout spines on dorsal margin (no stout spines on dorsal margin of hind tibia in *E. agalica*).

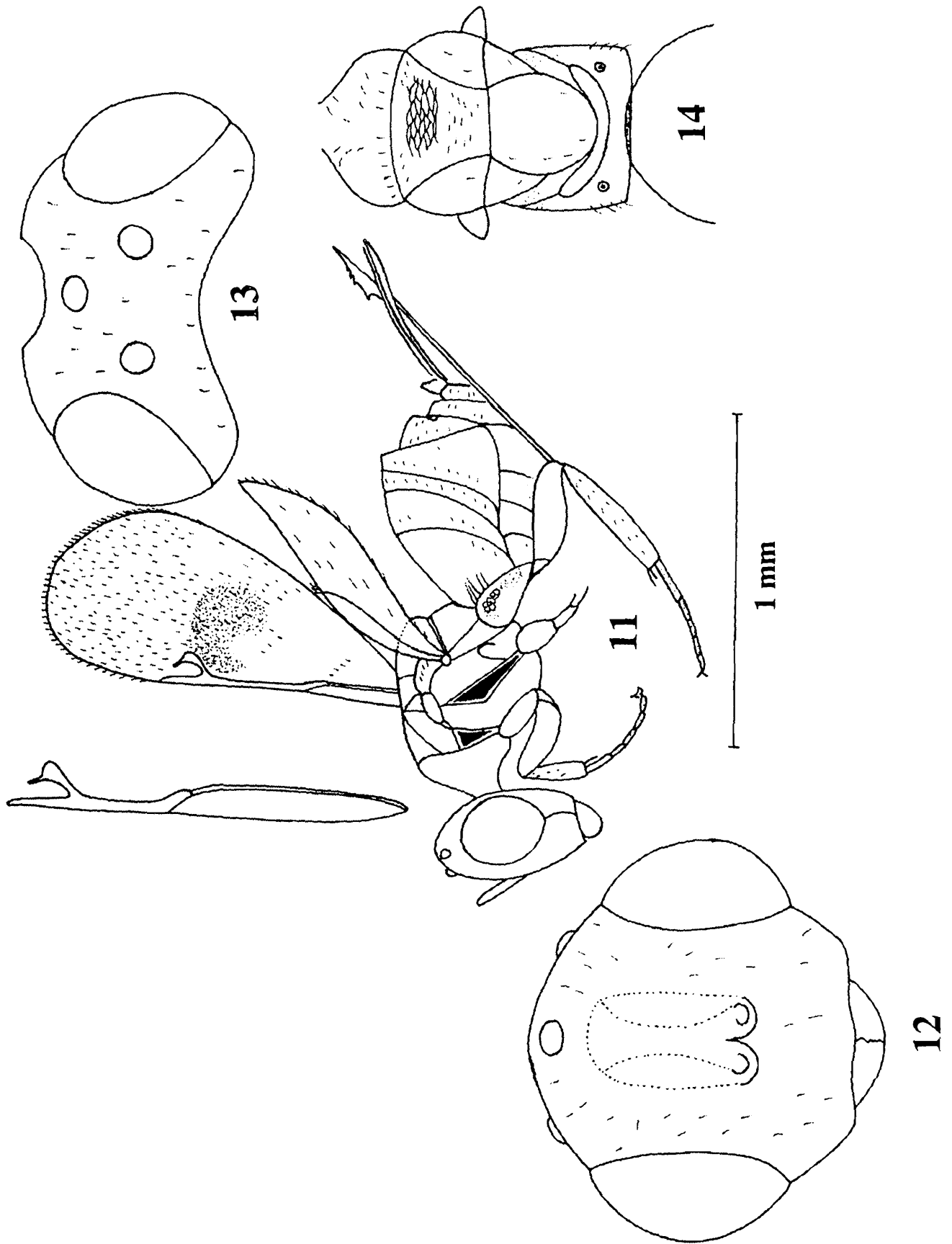
### 3. *Idiomacromerus* sp.

(Figs. 11-14)

*Female* : Length excluding ovipositor 1.75 mm; ovipositor 0.5 mm.

*Colour* : Head and mesosoma dark metallic green, dorsally mesosoma slightly coppery and with brown tints; gaster brown on dorsal part, sides darker; ovipositor dark brown; scape testaceous ventrally, dark brown dorsally, pedicel and flagellum brown. Legs dark brown with inner sides of femora and tibiae pale brown; tarsi pale yellow; tegula pale yellow with a brown margin; forewing with a large brown patch extending from marginal and stigmal veins to about two-third distance across wing.

*Sculpture* : Head, mesosoma dorsally with distinct raised reticulations; mesepisternum and mesepimeron mostly smooth and shiny; metapleuron weakly reticulate; coxae weakly reticulate. Propodeum smooth medially and weakly reticulate on sides; gaster mostly smooth with weak reticulations.



**Figs. 11-14.** : *Idiomacromerus* sp.; Female : 11. Body profile; 12. Head front view; 13. Head dorsal view; 14. Mesosoma dorsal view.

*Head* : In dorsal view (Fig. 13) 2.15x breadth of mesoscutum; 2.67x as broad as its median dorsal length; POL 3x OOL. Head in front view 1.1x as broad as high, malar space in side view 0.375x height of eye; torulus with ventral edge slightly above level of lower ocular margin; scrobe moderately deep; occiput without carina. Antenna with scape not reaching front ocellus, separated by the diameter of latter; pedicel almost to as long as first four flagellar segments, with many short hairs; flagellum clavate with 3 anelli and five funicular segments; clava about 2x as long as broad apically rounded without a process or spicule.

*Mesosoma* : In dorsal view 1.7x as long as broad; pronotum with dorsal surface rounded in to anterior face; mesonotum dorsally with inconspicuous short, white pilosity. Notauli complete but not deep; scutellum length subequal to its width; propodeum medially 2x as long as dorsellum, its anterior margin with an elongated fovea on either side. Hind leg with dorsal surface of coxa pilose on dorsal margin on basal half; femur 2.83x as long as broad; tibia with 2 distinct apical spurs, outer one longer than inner one. Forewing (Fig. 11) basal cell with 1–3 hairs (excluding hairs on cubital veins); speculum partially open below. Ratio of costal cell : marginal vein : postmarginal vein : stigmal vein as 43 : 19 : 12 : 5; marginal plus postmarginal vein occupying 0.36x wing length.

*Gaster* : (Fig. 11) (excluding ovipositor) distinctly shorter than head plus mesosoma; T1 and T2 with posterior margin weakly incised medially; ovipositor sheath 0.68x as long as rest of gaster, 1.12x length of metatibia.

*Male* : Unknown.

*Distribution* : Jaipur (Samod), Rajasthan.

*Material examined* : 1 Female : INDIA, Rajasthan, Jaipur, Samod (27°12' N 75°49' E), from seeds of *Ephedra foliata* Boiss. ex C.A. Meyer, Rita Singh & Prabha Sharma, May 2005, (ZSIK) (Reg. No. MoEF 4791).

*Remarks* : This new species is not given a name here since the single specimen is not in good condition to designate as a holotype. The genus *Idiomacromerus* reported here is the first record of the genus from Indian subcontinent.

*Discussion* : This new species comes very near *Idiomacromerus silybi* Askew (Askew *et al.*, 2004) but differs from it in having : (1) 3 anelli (or 1 anellus with 2 anelliform funicular segments) (In *I. silybi* antenna with 2 anelli), (2) mesoscutum 1.7x as long as broad (In *I. silybi* mesoscutum 1.55x as long as broad). (3) ovipositor sheath 1.12x as long as metatibia (In *I. silybi* ovipositor sheath 1.4x as long as hind tibia; (4) marginal vein 1.58x postmarginal vein (In *I. silybi* marginal vein 3.09x postmarginal vein); (5) forewing with a brown patch extending from marginal and stigmal veins to about two-thirds across the wing (In *I. silybi* no submedian brown patch present) and in several other features.



4. *Pseudotorymus ephedrae* Narendran & Prabha Sharma sp. nov.

(Figs. 15-16)

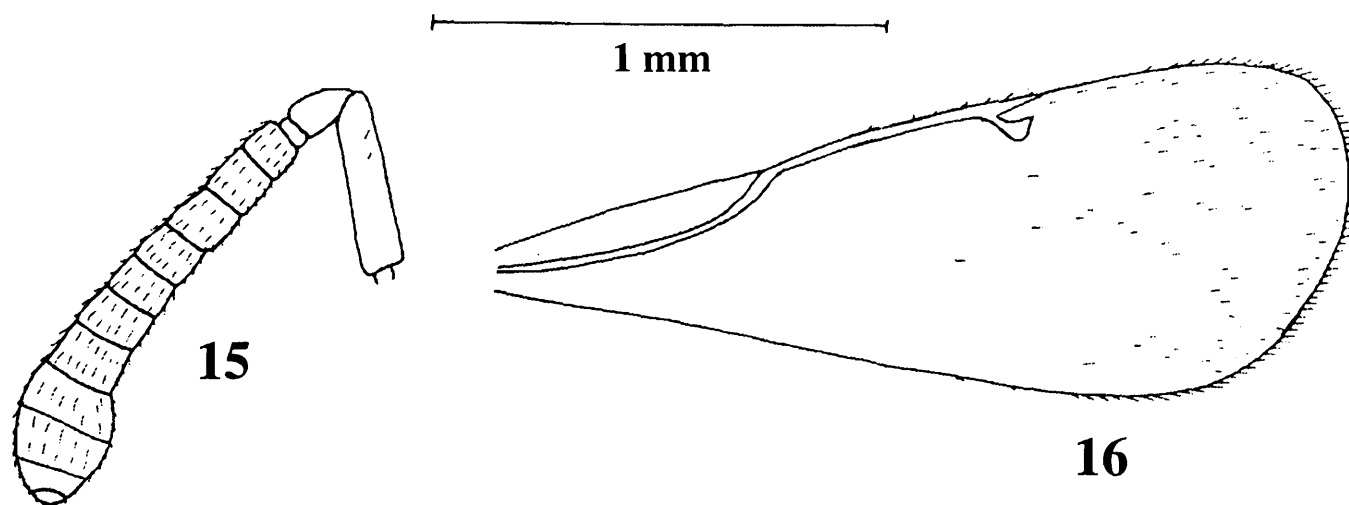
*Holotype* : Female : Length excluding ovipositor sheath 2 mm; ovipositor sheath 1.82 mm.

*Colour* : Black with metallic greenish blue reflections; eyes and ocelli brown; antenna pale brown with scape and ventral half of pedicel pale yellow; all tibiae and tarsi (except brown fifth tarsal segment) pale yellow, ovipositor pale yellow. Wings hyaline, veins pale yellow with stigmal veins brown; pubescence on body silvery.

*Sculpture* : Head and dorsum of mesosoma with raised reticulations; episternum reticulate; epimeron reticulate on anterior lower marginal area, remaining part smooth and shiny, metapleuron reticulate; fore and mid coxae weakly reticulate; hind coxa strongly reticulate on dorsal half; all femora reticulate. Propodeum smooth in middle, reticulate on sides; gaster weakly reticulate on sides.

*Head* : Width subequal to width of mesoscutum; width in anterior view 1.13x its length; POL 3x OOL, malar space 0.3x eye height in side view, torulus with ventral edge slightly above level of lower ocular margin; scrobe moderately deep. Antenna with scape almost reaching front ocellus; scape a little less than 4x as long as wide (15 : 4); pedicel as long as wide; F1 a little more than 1.3x as wide as its length; F2 length subequal to its width; F3 slightly wider than long; F4 to F7 wider than long; clava 1.25x as long as broad without a process or spicule at apex.

*Mesosoma* : In dorsal view a little more than 1.27x as long as its width; pronotum and mesoscutum with short white pilosity; notauli complete but not deep; scutellum length subequal to its width; propodeum medially about 2x as long as dorsellum, its anterior margin with a row of small carinulae; a weak median carina present. Hind coxa with two or three setae, posterior margin, ventral half pilose, hind femur 2.5x as long as broad. Fore wing length a little more than 2.3x its



**Figs. 15-16.** : *Pseudotorymus ephedrae* Narandran and Prabha sp. nov.; Female : 15. Antenna; 16. Fore leg.

maximum width; speculum open below; ratio of costal cell : marginal vein : postmarginal vein : stigmal vein as 37 : 31 : 6.5 : 5; marginal plus postmarginal occupying about 0.35x wing length.

*Gaster* : Excluding ovipositor as long as head plus mesosoma; T1 and T2 with posterior margin incised medially; ovipositor sheath about as long as rest of gaster, 3.1x length of metatibia.

*Male* : Unknown.

*Distribution* : Jaipur (Samod), Rajasthan.

*Material examined* : Holotype : Female : INDIA, Rajasthan, Jaipur, Samod (27°12' N 75°49' E), from seeds of *Ephedra foliata* Boiss. ex C.A. Meyer, Rita Singh & Prabha Sharma, May 2005 (ZSIK) (Reg. No. MoEF 4792).

*Discussion* : This new species comes near *Pseudotorymus amuthae* Narendran in the key to species of Indian subcontinent by Narendran (1994) but differs from it in having : (1) Scape a little shorter than 4x length of F1 (In *P. amuthae* scape a little longer than 4x length of F1); (2) ovipositor sheath 2x as long as gaster (in *P. amuthae* ovipositor sheath 1.1x larger than gaster; (3) clava 1.25x as long as wide (in *P. amuthae* clava 2x as long as wide); (4) clava 2.25x as long as preceding segment (in *P. amuthae* clava a little more than 3x as long as preceding segment; (5) Inhabitant of *Ephedra foliata* (Ephedraceae) seeds (*P. amuthae* inhabitant of *Jasminum sambac* (L.) Ait, (Oleaceae).

### 5. *Eupelmus urozonus* Dalman

1820. *Eupelmus urozonus* Dalman, *K. avenska Vet. Akad. Handl.*, **41** : 378 (? NRS).

*Disgnosis* : Body dark metallic green with blue and bronze tinge; legs brown or pale brown with base and apex of hind femur pale and middle region darker; ovipositor sheath medially pale yellow and apex dark; ovipositor sheath shorter than hind tibia; MV 4x as long as PMV.

*Host* : Parasitic on many species of Diptera and Hymenoptera associated with plant galls (Narendran & Anil, 1995) and probably seeds also.

*Distribution* : West Europe, Africa, Australia, Former USSR, India (Gujarat, North Bengal, Tamil Nadu) (Narendran & Anil, 1995). Here it is recorded for the first time from Delhi.

*Material examined* : 1 Female, INDIA, Delhi (28°40' N 77°14' E), Reared from seeds of *Ephedra foliata*, Coll. Prabha Sharma, May 2005 (ZSIK) (Reg. No. MoEF 4793).

### SUMMARY

Four new species viz., *Eurytoma ephedrae* Narendran & Prabha Sharma, *E. foliatae* Narendran & Rita Singh, *Pseudotorymus ephedrae* Narendran & Prabha Sharma, *Idiomacromerus* sp. (unnamed)

and a known species *Eupelmus urozonus* Dalman are reared from the seeds of *Ephedra foliata* Boiss. ex C.A. Meyer. The new species are described and the known species are commented.

### ACKNOWLEDGMENTS

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