

REDESCRIPTION OF *PARAYASA ELEGANTULA* DISTANT WITH NOTES
ON ITS BIOLOGY AND IMMATURE STAGES
(HOMOPTERA : MEMBRACIDAE)

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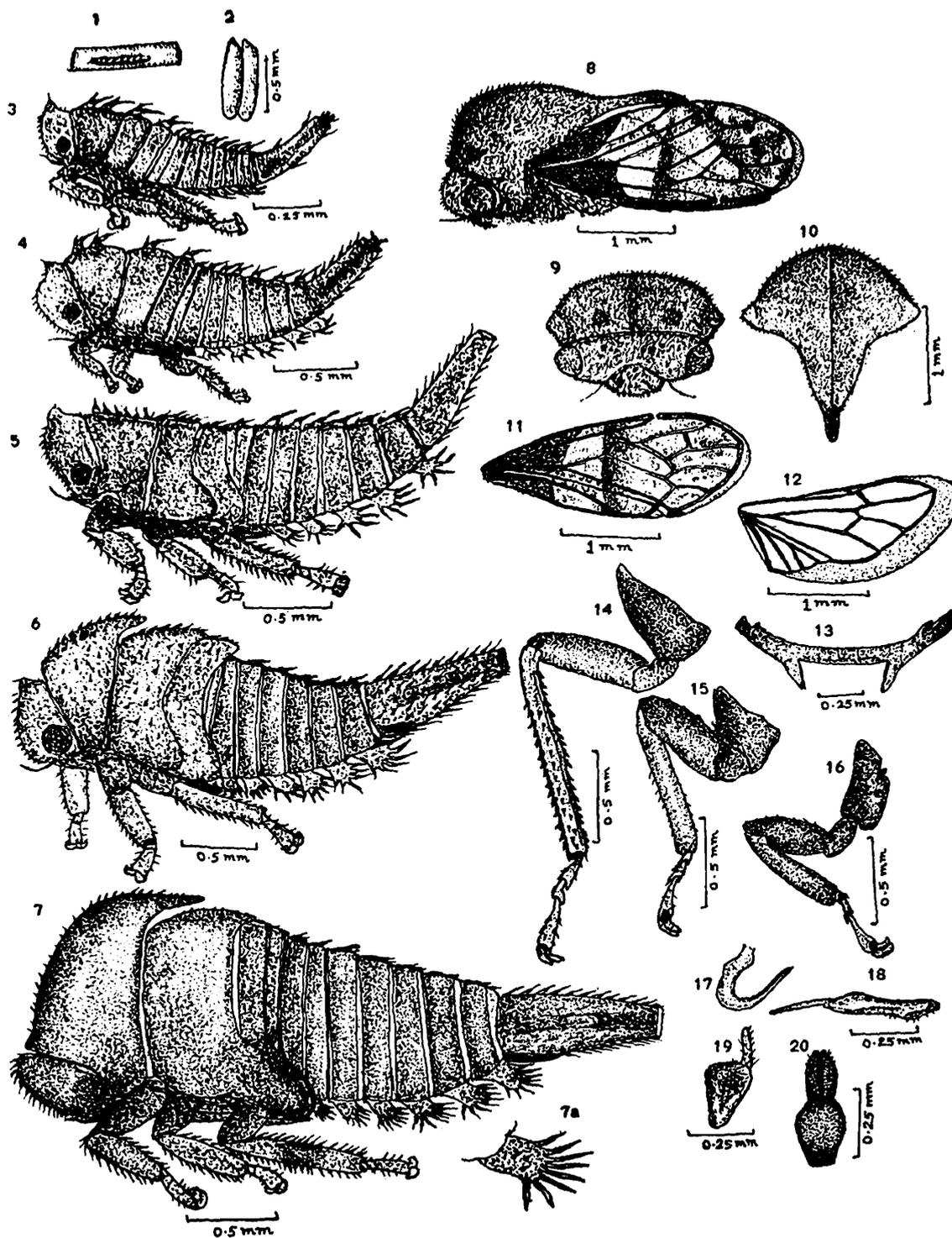
ABSTRACT

Redescription of *Parayasa elegantula* Distant (Homoptera : Membracidae) and its immature stages is made. Biological notes on the species are presented.

The genus *Parayasa* was erected by Distant (1916) to accommodate the species closely related to the genus *Yasa* Distant. Members of the former genus are diagnosed by the pronotal posterior process short, more or less concavely sinuous, never reaching the posterior angle of the inner margin of the tegmina, and the hind tibiae slightly curved. Fifteen species of the genus *Parayasa* are known to date, the distribution of which is confined to southern India. The immature stages of none of these species are known except for the short account of the fifth instar nymph of *P. fasciata* Ananthas. (Ananthasubramanian, 1980). The present paper deals with the detailed description of *P. elegantula* Distant, commonly occurring in Nilgiri, Mudumalai and Kodaikanal (Tamil

Nadu), together with descriptions of its immature stages and a brief account of biology.

Female (fig. 8) : General colour pale brownish yellow. Head (fig. 9) vertical, 3.0X as wide across extremities of eyes as length, finely pilose with pale white bristles, upper margin of vertex shallowly sinuate, lower margins somewhat subhorizontally continued to frontoclypeus ; eyes subglobose, pale yellowish ; ocelli closer to eyes than to each other and situated above centro-ocular line ; frontoclypeus broader than long, extending to about one half of its length below lower margins of vertex, sparsely longly pilose, frontoclypeal lobes indistinct. Pronotum (fig. 9) ochraceous, thickly pilose with short, adpressed greyish white bristles, metopidium



Parayasa elegantula Distant

Figs. 1-20. 1. Egg-slit with eggs. 2. Two eggs. 3. First instar nymph. 4. Second instar nymph. 5. Third instar nymph. 6. Fourth instar nymph. 7. Fifth instar nymph; 7a. Lateral lamella. 8. Adult female. 9. Head and pronotum frontal view. 10. Pronotum dorsal view. 11. Tegmina. 12. Hind wing. 13. Scutellum. 14. Hind leg. 15. Middle leg. 16. Foreleg. 17. Aedeagus. 18. Paramere. 19. Lateral valve. 20. Subgenital plate.

about 2.7X as wide as high, vertical, sloping backward to disc; supraocular callosities entire, bare; humeral angles prominent, thickly pilose, apices subacute; posterior distinctly concavely sinuate, its apex black, nearly reaching the posterior angle of the inner margin of tegmina; scutellum (fig. 13) obsolete in the middle; tegmina (fig. 11) 2.6X as long as wide, basal one-third coriaceous, punctate, dark brown, followed by a broad whitish fascia, a narrow yellowish transverse fascia at about the middle, apical half pale white with small brownish yellow patches, veins light brownish yellow, apical limb moderately broad, hyaline, with a distinct spot opposite to the 5th apical cell, 1st apical cell about 5.0X as long as wide, veins to apical area moderately inwardly curved, 1st discoidal cell petiolate, petiole nearly as long as the cell; hind wings (fig. 12) with 3 apical cells; legs dark brownish in the coxal region, tibia yellowish brown, tarsi pale white, femora of pro- and mesothoracic legs with a longitudinal row of setae (figs. 16 & 15), hind tibia with 3 longitudinal rows of cucullate setae (fig. 14); abdomen pale brownish yellow beneath, black above, finely pilose.

Measurements: Length from frontal margin to tips of tegmina 3.5 mm., to tip of posterior process 2.4 mm., width across apices of humeral angles 1.9 mm., at eyes 1.7 mm.

Male: Similar to female in size and general colour. Genitalia with aedeagus U-shaped (fig. 17), shaft with minute teeth on anterior surface; parameres (fig. 18) expanded apically; lateral valves (fig. 19) 0.026 mm. long, its process about 0.5X as long as the valve (0.01 mm.), long, slender, weakly chitinised; subgenital plate (fig. 20)

divided to half of its length from its apex, its basal half conspicuously wide.

Measurements: Length from frontal margin to tips of tegmina 3.4 mm., to tip of posterior process 2.2 mm.; width across apices of humeral angles 1.8 mm., at eyes 1.7 mm.

Immature stages: There are five nymphal instars which display morphological characters specific to each stage.

First instar nymph (fig. 3): General colour pale green, mottled with light brown on dorsal surface, paler on ventral surface. Body subcylindrical, thorax appearing triangular in cross section; head directed obliquely backward, about 2.5X as wide as long, rostral apex reaching base of abdominal segment IV, cranial tubercles reduced to a pair of tuberculated spines; vertex about 2.0X as wide as long, fringed with short setae; eyes pale white, encircled by setae; antennae filiform. Thorax nearly as long as abdomen excluding anal tube; pronotum about as long as the combined length of mesonotum and metanotum, with a pair of dorsal tubercles, each with 2 spines (one inclined forward and the other backward), one slightly shorter tubercle just behind the anterior one, also with a pair of apical spines; mesonotum longer than metanotum, each bearing a pair of dorsal tubercles with 1 apical spine and smaller spines basally. Abdomen with 8 visible segments, segment XIII forming the anal tube; segment II much narrower than III, segments III-VII more or less similar, each with a pair of dorsal tubercles with long, acute, backwardly directed spine and a smaller spine in front; transversely arranged slender setae on lateral aspects of these segments visible only at high magnification; lateral lamellae moderately developed, each

with 2 backwardly inclined tuberculate spines; anal tube about 0.33X as long as total body length, with 2 dorsal tuberculate spines, 1 near base and 1 subterminal; ventral surface of anal tube with 1 basal and 1 subterminal tuberculate spines corresponding to dorsal spines. Length of the nymph 1.1 mm.

Second instar nymph (fig. 4): General colour as in instar I. Body 2.0X as long as instar I. Head obliquely directed downward and then caudad; rostral apex reaching base of abdominal segment III; tuberculate spines on head similar to those of instar I. Thorax with pronotum slightly raised, mesonotum about 2.0X as long as metathorax; prothoracic tergite with 2 pairs of dorsal tubercles each with 2 apical spines on meso- and metathoracic tergites similar to those of instar I but longer. Abdomen slightly longer than thorax excluding anal tube; pilosity scattered over entire abdomen including anal tube; dorsal tubercles of segment II obsolete, those of segments III-VIII as in instar I; abdominal lateral lamellae longer than in instar I, each bearing 2 penicillate spines; anal tube about 4.0X as long as wide and about 0.4X as long as body length, fringed with a circlet of sensory setae apically and lined with 5 or 6 tubercles each with a spine dorsoapically and a similar row of spines ventro-apically. Length of the nymph 2.2 mm.

Third instar nymph (Text-fig. 5): General colour pale green with yellowish hue; first three segments of legs reddish brown with black dots on tubercular bases; vertex of head thickly pilose, cranial tubercles well developed, rostral apex reaching the base of abdominal segment II. Thorax with pronotum directed forward over head and fringed with a double row of dorsal tubercles tipped with

spines directed obliquely forward; meso- and metathoracic tergites fringed with a double row of dorsal tuberculate spines directed backward; wing pads visible as broad, triangular lobes bordered with chalazae. Abdomen with 9 visible segments, the first very narrow and less chitinised; dorsal tubercles on segments II-VIII longer than those of instar II; lateral lamellae conspicuous, each with 5 penicillate spines; anal tube about 0.4X as long as body, the arrangement of tuberculate spines on anal tube similar to that of instar II. Length of the nymph 2.8 mm.

Fourth instar nymph (fig. 6): General colour light green; legs except tibiae and tarsi reddish brown. Body about 3.0X as long as instar I. Head obliquely directed backward and concealed from dorsal aspect due to the forward growth of pronotum. Thorax with metopidium obliquely continued to disc; pronotal posterior process extending over basal half of mesonotum; wing pads more conspicuous than those of instar III, densely setose, margins fringed with short chalazae; dorsal tubercles less prominent than in instar III, inclined backwards. Abdominal dorsal tubercles directed caudad and more or less inconspicuous, adpressed to the tergites; abdominal lateral lamellae very prominent, each with 5-6 tuberculate, penicillate spines arranged in a digital fashion; anal tube 0.33X as long as body, with longitudinal rows of tuberculate spines inclined backward; genitalic rudiments visible at basal one-fifth of anal tube. Length of the nymph 3.25 mm.

Fifth instar nymph (fig. 7): General colour as in instar IV. Body laterally compressed. Head 3.0X as wide as long, densely pilose obscuring the ocelli, rostral apex

reaching abdominal segment II ; vertex plane at base, frontoclypeus densely pilose, never extending below lower margins of vertex. Thorax with metopidium convex, gradually sloping backward to disc, fringed with numerous tuberculate setae. Thorax with pronotal posterior process extending over basal half of mesonotum, apex subacute ; mesonotum about 4.0X as long as metanotum ; wing pads conspicuous, their apices reaching the basal part of abdominal segment III ; legs with foretibiae rather broad. Abdomen triangular in cross section, abdominal dorsal tubercles less prominent than those of instar IV, inclined backward, closely adpressed to the tergites ; lateral lamellae (fig. 7a) more or less rectangular, fringed with 8 tuberculate setae arranged in a digitate manner. Anal tube 0.25X as long as body, with tuberculate setae arranged as in instar IV ; genitalic rudiments about 0% as long as anal tube. Length of the nymph 3.4 mm.

Biological notes : According to the observations made at Mudumalai, near the Wildlife sanctuary during the months of December to February of 1984-86, eggs are deposited by *P. elegantula* females on tender twigs of *Vitex negundo* in groups of 4-6. The oviposition injury results in the swelling up of the bark which becomes cracked longitudinally as a very fine, whitish, narrow streak (fig. 1). The eggs (fig. 2) are whitish translucent, obtusely rounded at one end and tapering to an acute angle at the opposite end, with sides almost parallel from rounded end to about three-fifths of length, then gradually tapering to acute tip, with one side slightly flat. The egg measures, on an average, 0.8 mm. long and 0.27 mm. wide. Hatching occurs in 7-10 days. The young nymphs

resemble closely the green colour of the twigs. In the early stages they remain at the bases of petioles in the axils of the host plant and remain gregariously in groups of 4-6 ; they migrate later to the internodal region of the twigs and remain there till the last moulting. The colour of the nymphs blends with the colour of the twigs on which they feed and make them most in conspicuous. If disturbed, they adhere tenaciously and firmly to the twigs. The adults are decidedly solitary, getting scattered considerably on all twigs. Both nymphs and adults of this membracid species are attended by a small species of ant identified as *Paratrechina longicornis* which very often betrays the presence of the otherwise undetectable nymphs. The duration of immature stages is found to be 30—38 days. The eggs of this membracid are observed to be parasitized by two species of Trichogrammatidae, *Brachygrammatella indica* Viggiani and Hayat and *Mirufens afrangiata* Viggiani and Hayat.

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INSECTS ASSOCIATED WITH SOME WEEDS IN SOUTH INDIA

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ABSTRACT

An inventory of insect pests of twelve species of weeds, common in cultivated field in and around Madras is presented. Main characteristics of the pests as well as host plants, life cycles and population trends etc. of the pests and insect-weed relationships are briefly outlined.

The problem of weeds in cultivated field is well known. According to a reliable estimate weeds account for 11.3% of the lose of potential production in Asia. The lose is in yield and quality ; weeds also increase the cost of cultivation. Some weeds act as alternate host plant for insect pests and plant pathogens. Many weeds either do not yield to chemicals or against which use of chemicals is too expensive or impracticable specially when the cultivated crop is also in the field. However, the use of phytophagous insects have been strikingly successful in controlling some of the world's worst weeds, such as prickly pear, *Opuntia* spp. in Australia by the moth *Cactoblastis cactorum* (Berg.) (Dodd, 1959), Kalmath weed, *Hypericum perforatum* L. in U.S.A. by the beetle *Chrysolina quadrigemina* Suffrian (Holloway, 1964 ; Huffaker and Kennett, 1959). A good

deal of information is available on the biological control of weeds in developed countries e.g. Batra, 1979 ; Bendixen, 1981 ; Bess and Huffaker, 1951 ; King, 1966 ; Kumar jayaraj and Muthukrishnan, 1979 ; Mc Fadyen, 1979 ; Miller, 1936 ; Palel *et al* 1964 ; Robbins *et al* 1942 ; Simmonds, 1982 ; Tillyard, 1930 ; Verma *et al* 1978 and Vogt, 1960. Basic information such as the natural enemies of weeds, their taxonomy, feeding habits and biology is essential in selecting the best insect agent for biological control of the weed. With this in view an attempt has been made to list natural insect pests of weeds in cultivated fields in South India. Various groups of insect pests of weeds with their main characteristics, seasonal life cycles and the insect-weed relationship are briefly outlined. Considerable attention has been paid in India to pest of crops, but very little

is known about the natural enemies of weeds.

Some of the common weeds in South India includes *Cleome viscosa* Linn., *Gynandropsis pentaphylla* Dc., *Euphorbia hirta* Linn., *Leucas aspera* Spreng., *Amaranthus spinosus* Linn., *Digera arvensis* Forsk., *Cyperus rotundus* Linn., *Echinochloa crusgallai* Beauv., *Eclipta alba* Hassk., *Croton sparsiflorus* Morong., *Cassia occidentalis* Linn., *Ludwigia parviflora* Roxb. *Trianthema portulacastrum* Linn., *Centella asiatica* Urban, *Oldenlandia umbellata*, *Grangea maderaspatana* Poir., *Lactuca runcinata* Dc., *Sonchus oleraceus* Linn., *Heliotropium indicum* Linn., *Solanum xanthocarpum* Schard & Wendl., *Datura fastuosa* Linn., etc. (Tadulingam and Venkatanarayana, G., 1955, Barnes, D.E. and Chandapillai, M.M., 1972).

Surveys were conducted at regular intervals in cultivated fields in and around Madras for an inventory of insects infesting some of the common weeds. All weeds have been numbered with Roman and insect pests with Arabic numbers.

I *Cleome viscosa* Linn.

Family : CAPPARIDACEAE

(Hindi : Hulhul ; Tamil : Manja Kadugu ; Malayalam : Nai Kadugu ; Telugu : Kukka vaminta).

Herbaceous annual, erect, 30-90 cm. high ; stems grooved, densely clothed with glandular and simple sticky hairs. Fruit is a lean capsule 5-7.5 cm. long. The plant is easily distinguished by its viscid hairs, 3-5 foliolate leaves, glandular sessile ovary and the yellow flowers. It has a saltish bitter taste and a strong odour.

1. *Phyllotreta chotanica* Duvr.

Tiny beetle, 2 mm long, shiny dark brown

to black ; antennae extend a little beyond the middle of elytra ; first segment long, thickened and club-shaped ; second shorter than first ; third slightly longer than second ; last five segments slightly thickened ; prothorax broader than long ; scutellum small, triangular.

The flea beetles are by far the most important pest of *Cleome viscosa*. The adult beetles cause severe injury to the plant by eating off the leaves and flower buds, resulting in small rounded or irregular holes in the leaves and buds. Heavy feeding on the foliage retards growth of the plants. As many as 40-45 adult beetles were found feeding on a plant in May-August.

The Beetles jump readily when approached. The hind coxae are distinctly enlarged and thickened. They attack young plants as soon as they come up and the damage continues for some time.

Distribution : This species is previously recorded from Darjeeling.

2. *Acrosternum graminea* Fabr.

(Hemiptera : Pentatomidae)

Yellowish-green stink bugs, 7-9 mm long ; thickly punctate ; apex of scutellum with two small whitish spots ; antennae greenish.

Adults and nymphs cause injury to the plant by sucking on stems, leaves, flower buds and pods. They congregate on the plant in large numbers and suck the sap, stunting the plants and destroying developing seeds. 20-24 adult bugs may be found on a plant during peak activity (September-November). The most important damage is caused by puncturing the pods and seeds. The pods become crooked and when seriously infested,