STUDIES ON THE APHIDS (HOMOPTERA: APHIDIDAE)
FROM NORTH AND NORTH-WEST INDIA, I

By D. N. Raychaudhuri, L. K. Ghosh and S. K. Das


Abstract

This paper reports 78 aphid species including 6 new ones distributed over 46 genera including 8 new under 6 subfamilies from North and North-West India. Apart from new species and genera 1 species is a new record for India, 9 are for Uttar Pradesh, 1 is for Delhi and 12 are for Himachal Pradesh. Of the collected aphid species oviparous females of 8 species and males of 6 species are reported for the first time.

Authors' address. Aphid Research Unit, Department of Zoology, University of Calcutta, Calcutta, India.
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By D. N. RAYCHAUDHURI, L. K. GHOSE and S. K. DAS 

Research Trips for Forest and Agricultural Insects in the Subcontinent of India 
(Hokkaido University, University of Calcutta, and Zoological Survey of India 
Joint Project) [Grants-in-Aid for Overseas Scientific Survey, Ministry of Education, 

Abstract 

(Homoptera: Aphididae) from North and North-West India, I. Insecta matsum. n. s. 20: 1-42, 
13 figs.

This paper reports 78 aphid species including 6 new ones distributed over 46 genera including 
3 new under 6 subfamilies from North and North-West India. Apart from new species and 
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Calcutta, India.
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In view of the similarity in insect fauna of Japan and India the Entomological Institute, Faculty of Agriculture, Hokkaido University and the Entomology Unit, Department of Zoology, Calcutta University had been envisaging for a joint project for collecting agriculture and forest insects of India. This project ultimately materialised in October, 1978 with the collaboration of Zoological Survey of India.

A team drawn from the three organizations made research trips to some areas in north, north-west and south-India, when samples of different groups of insects were collected. The aphid samples (300 from North and North-West and 214 from South India) collected from these areas are with the Entomology Unit, Department of Zoology, Calcutta University for final determination.

Collection from North and North-West India has revealed a total of 78 species...

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Collection from North and North-West India has revealed a total of 78 species...
distributed over 46 genera under 6 subfamilies. Of these, 6 species and 3 genera are new to science. Apart from the new species and genera stated above 9 species are newly recorded from Uttar Pradesh, 1 species from Delhi and 12 species from Himachal Pradesh. Out of the collected aphid species have been incorporated descriptions of hitherto unknown oviparous females of 8 species, viz. *Aphis fabae* complex, *Dactynotus fagopyri* Chowdhuri et al., *Macrosiphum (Neomacrosiphum) pseudogerani* Chakrabarti and Raychaudhuri, *Macrosiphum (Sitobion) sikkimensis* Ghosh and Raychaudhuri, *Metopolophium rubi* (Narzikulov), *Metopolophium* sp., *Neocorythosiphon* sp., *Eutrichosiphum (Paraterichosiphum) alnicola* Basu; alate male of 6 species, viz. *Aphis fabae* complex, *Amphorophora amplexula* bengalensis Hille Ris Lambers and Basu, *Impatiens impatiens* dalhousiensis Verma, *Macrosiphum* (Sitobion) sikkimensis Ghosh and Raychaudhuri, *Metopolophium rubi* (Narzikulov), *Metopolophium* sp.; apterous viviparous female of *Stomaphis* sp. and alate viviparous female of *Metopolophium* sp. Specific determination of these two has not been possible because of paucity of comparable material as well as literature.

The aphid material, if not otherwise indicated in the text, were collected by Dr. M. R. Ghosh and Dr. P. K. Mondal and are in the collection of Entomological Institute, Faculty of Agriculture, Hokkaido University and Aphid Research Unit, Department of Zoology, Calcutta University.

**Abbreviations used in the systematic account**
- *Aptera/e*: Apterous viviparous female/s
- *Alata/e*: Alate viviparous female/s
- b.d.III: Basal diameter of antennal segment III
- p.t.: Processus terminalis
- u.r.s.: Ultimate rostral segment
- h.t.2: 2nd segment of hind tarsus
- a.s.: Antennal segment
- coll.: Collector
- F.T.C.: First tarsal chaetotaxy
- M: Media of forewing
- H.P.: Himachal Pradesh
- U.P.: Uttar Pradesh

**Systematics**

1. *Aphis fabae* complex (Figs. 1 & 2)

*Aphis fabae* Scopoli, 1763. Entomologia Carniolica, 136.

*Apterous oviparous female* (Fig. 1)

Body about 1.11–1.35 mm in length with 0.70–0.81 mm as maximum width. Head light brown and smooth; dorsal cephalic hairs long with acuminate apices, lingest one being about 1.74–2.12 x b.d. III. Antennae 6-segmented (in some specimens 5-segmented), about 0.82–0.59 x body; flagellum pale to pale brown and imbricated; p.t. about 2.0–2.50 × base of segment VI. Rostrum reaching a little beyond midcoxae; u.r.s. about 1.10–1.26 × h.t.2 bearing 2 secondary hairs. Abdomen pale; dorsal abdominal hairs long with acute to acuminate apices, longest hair on anterior, 7th and 8th tergites being about 1.50–2.0, 2.33–3.0 and 2.33–3.20 × b.d.III respectively. Siphunculi pale brown, cylindrical, about 0.05–0.08 × body and about 0.77–0.87 × thumb-shaped cauda bearing 6–8 hairs. Hind tibiae swollen with numerous pseudosensoria distributed over 0.80 portion from base.
Other characters as in apterae viviparae.

Measurements of one specimen in mm: Length of body 1.08, width 0.69; antenna 0.72, a.s. III: IV:V:VI 0.12:0.10:0.10:0.09+0.21; u.r.s. 0.09; h.t.2 0.08; siphunculus 0.09; cauda 0.10.

Alate male (Fig. 2)

Body about 1.38 mm in length with about 0.60-0.67 mm as the maximum width. Head dark brown. Antennae 6-segmented, concolorous with head, about 0.83-0.92 × body; p.t. about 2.25-2.37 × base of last antennal segment; segment III with 21-28, IV with 23-24 and V with 8-12 round secondary rhinaria distributed irregularly over entire length except the very base. Ultimate rostral segment about 1.18-1.28 × h.t.2 and with 2 secondary hairs. Abdomen pale, with segmentally arranged spinal and marginal dark brown sclerotic patches bearing faint spinular striae; dorsal hairs with acute to acuminate apices, longest hair on anterior, 7th and 8th tergites about 2.0-2.40, 2.0 and 2.80 × b.d.III respectively. Siphunculi short, about 0.07-0.08 × body and about 1.11-1.33 × cauda. Wing venation normal. Other characters as in alate viviparae.

Fig. 1. *Aphis fabae* complex. Apterous oviparous female.

Fig. 2. *Aphis fabae* complex. Alate male.

Measurements of one specimen in mm: Length of body 1.38, width 0.60; antenna 1.15, a.s. III:IV:V:VI 0.24:0.21:0.21:0.12+0.27; u.r.s. 0.09; h.t.2 0.07; siphunculus 0.10; cauda 0.09.

Collection data: 3 yellowish apterae and 2 alata from *Spiraea bella* (Rosaceae), Chail (H.P.), c 2000 m, 27. X. 78; 7 blackish apterae from *Cestrum* sp. (Solanaceae), Mussourie (U.P.), c 1600 m, 27. X. 78; 1 blackish aptera, 8 apterae oviparous and 16 nymphs from *Strobilanthes atropurpureus* (Acanthaceae), Mashobra (H.P.), c 2250 m, 28. X. 78; 1 brownish aptera, 1 alata and 11 nymphs from *Rhamnus* sp.
(Rhamnaceae), Jakhu (H.P.), c 2400 m., 28. X. 78; 4 brownish apterae and 17 nymphs from an unidentified host (Gramineae), Javli (H.P.), c 1300 m, 29. X. 78; 8 blackish apterae and 13 nymphs from Cestrum sp. (Solanaceae), Kasauli (H.P.), c 1850 m, 30. X. 78; 11 brownish apterae, 2 alatae and 8 nymphs from Anaphalis sp. (Compositae), Kumphly (U.P.), c 1220 m, 4. XI. 78.

Distribution: Virtually cosmopolitan.

2. Aphis gossypii complex


Collection data: 1 yellowish aptera from Polyalthia sp. (Anonaceae), Badkhal lake (Haryana), 22. X. 78; 2 brownish apterae from Tridax procumbens (Compositae), Badkhal lake (Haryana), 22. X. 78; 13 yellowish green apterae from Luffa acutangula (Cucurbitaceae), Badkhal lake (Haryana), 22. X. 78; 3 brownish apterae and 1 alata from an unidentified host (Labiatae), Badkhal lake (Haryana), 22. X. 78; 20 brownish apterae and one nymph from an unidentified host (Meliaceae), Badkhal lake (Haryana), 22. X. 78; 6 brownish apterae and 2 nymphs from an unidentified host (Rosaceae), Badkhal lake (Haryana), 22. X. 78; 8 greenish apterae and 9 nymphs from Cestrum sp. (Solanaceae), Badkhal lake (Haryana), 22. X. 78; 15 brownish apterae, 2 alatae and 8 nymphs from Lagerstroemia sp. (Lythraceae), Delhi, c 500 m, 23. X. 78; 1 greenish aptera from Anaphalis contorta (Compositae), Solan (H.P.), c 1450 m, 25. X. 78; 6 greenish apterae and 1 nymph from Goldfussia dalhoussiana, (Acanthaceae), Solan (H.P.), c 1450 m, 25. X. 78; 4 greenish apterae and 8 nymphs from Polygonum sp. (Polygonaceae), Solan (H.P.), c 1450 m, 25. X. 78; 3 greenish apterae from Prunus sp. (Rosaceae), Solan (H.P.), c 1450 m, 26. X. 78; 1 greenish aptera and 3 nymphs from an unidentified host (Acanthaceae), Solan (H.P.), c 1450 m, 26. X. 78; 8 greenish apterae and 12 nymphs from Polygonum sp. (Polygonaceae), Kufri (H.P.), c 2700 m, 26. X. 78; 5 yellowish green apterae and 11 nymphs from Anaphalis sp. (Compositae), Sadhupul (H.P.), c 1300 m, 27. X. 78; 7 blackish alatae from Hypericum oblongifolium (Hypericaceae), Chail (H.P.), c 2000 m, 27. X. 78; 2 blackish apterae from Smilax sp. (Liliaceae), Sadhupul (H.P.), c 1300 m, 27. X. 78; 3 greenish apterae and 9 nymphs from Polygonum sp. (Polygonaceae), Sadhupul (H.P.), c 1300 m, 27. X. 78; 1 blackish alata from Pyrus sp. (Rosaceae), Sadhupul (H.P.), c 1300 m, 27. X. 78; 20 greenish apterae, 1 alata and 51 nymphs from Gynura nepalensis (Compositae), Mashobra (H.P.), c 2250 n, 28. X. 78; 8 greenish apterae and 29 nymphs from Polygonum sp. (Polygonaceae), Mashobra (H.P.), c 2250 m, 28. X. 78; 4 brownish green apterae, 3 alatae and 16 nymphs from Rhamnus sp. (Rhamnaceae), Jakhu (H.P.), c 2400 m, 28. X. 78; 3 yellowish green apterae and 2 nymphs from Ipomoea sp. (Convolvulaceae), Dharampur (H.P.), c 1500 m, 29. X. 78; 5 greenish apterae and 7 nymphs from Hibiscus rosasinensis (Malvaceae), Javli (H.P.), c 1300 m, 29. X. 78; 2 greenish apterae and 8 nymphs from Urtica sp. (Urticaceae), Dharampur (H.P.), c 1500 m, 29. X. 78; 6 greenish apterae, 2 alatae and 8 nymphs from Kasauli (H.P.), c 1850 m, 30. X. 78; 7 greenish alatae and 4 nymphs from Cucurbita sp. (Cucurbitaceae), Solan (H.P.), c 1450 m, 30. X. 78; 1 greenish aptera and 2 alatae from Pyrus sp. (Rosaceae), Solan (H.P.), c 1450 m, 30. X. 78; 11 pinkish apterae and 17 nymphs from Duranta sp. (Verbenaceae), Kasauli (H.P.), c 1850 m, 30. X. 78; 4 greenish apterae, 1 alata and 31 nymphs from Bidens pilosa (Compositae), Barog (H.P.), c 1831 m, 31. X. 78; 3 greenish apterae, 1 alata and 7 nymphs from Conyza japonica
(Compositae), Barog (H.P.), c 1531 m, 31. X. 78; 5 greenish apterae and 20 nymphs from *Tridax* sp. (Compositae), Barog (H.P.), c 1531 m, 31. X. 78; 12 greenish alatae and 10 nymphs from *Origanum vulgare* (Labiatae), Kufri (H.P.), c 2700 m, 31. X. 78; 1 greenish aptera and 29 nymphs from an unidentified host (Myrtaceae), Barog (H.P.), c 1531 m, 31. X. 78; 1 greenish alata from *Ageratum conyzoides* (Compositae), Dehradun (U.P.), c 825 m, 2. XI. 78; 1 greenish alata from *Ageratum* sp. (Compositae), Mussourie (U.P.), c 1800 m, 3. XI. 78; 1 yellowish aptera and 3 nymphs from *Psidium guajava* (Myrtaceae), Dehradun (U.P.), c 1825 m, 2. XI. 78; 3 blackish apterae, 1 alata and 9 nymphs from *Rhamnus* sp. (Rhamnaceae), Kemph (U.P.), c 1220 m, 4. XI. 78.

Distribution: Virtually cosmopolitan.

3. *Aphis kurosawai* Takahashi


Collection data: 9 greenish apterae from *Artemisia* sp. (Compositae), Kemph (U.P.), c 1220 m, 4. XI. 78.

Distribution: India: Assam, Himachal Pradesh, Sikkim, Uttar Pradesh, West Bengal; China; Japan and Taiwan.

4. *Aphis nasturtii* Kaltenbach

*Aphis nasturtii* Kaltenbach, 1843. Mon. der Fam. der Pflanzen, 76.

Collection data: 8 brownish apterae and 21 nymphs from *Solanum nigrum* (Solanaceae), Pinjore (Haryana), c 600 m, 29. X. 78.

Distribution: India: Arunachal Pradesh, Haryana, Himachal Pradesh, Meghalaya, Nagaland, Sikkim, West Bengal; America; Europe; Middle East and Pakistan.

5. *Aphis ruborum longisetosus* Basu


Collection data: 4 yellowish apterae and 15 nymphs from *Rubus ellipticus* (Rosaceae), Solan (H.P.), c 1450 m, 25. X. 78; 3 brownish apterae from *Rubus ellipticus* (Rosaceae), Sadhupul (H.P.), c 1300 m, 27. X. 78; 2 brownish apterae and 8 nymphs from *Rubus* sp. (Rosaceae), Kasauli (H.P.), c 1850 m, 30. X. 78; 1 brownish aptera, 3 alatae and 3 nymphs from *Rubus ellipticus* (Rosaceae), Mussourie (U.P.), c 1600 m, 3. XI. 78; 5 brownish apterae and 3 alatae from *Rubus ellipticus* (Rosaceae), Kemph (U.P.), c 1220 m, 4. XI. 78.

Distribution: India: Arunachal Pradesh, Himachal Pradesh, Meghalaya, Nagaland, Sikkim, West Bengal.

6. *Aphis spiraecola* Patch


Collection data: 6 yellowish apterae, 1 alata and 4 nymphs from an unidentified host (Asclepiadaceae), Badkhal lake (Haryana), 22. X. 78; 17 greenish apterae, 2 alatae and 6 nymphs from *Bidens pilosa* (Compositae), Solan (H.P.), c 1450 m, 25. X. 78; 16 greenish yellow apterae and 13 nymphs from an unidentified host (Compositae), Solan (H.P.), c 1450 m, 25. X. 78; 2 greenish apterae, 7 alatae and 7
nymphs from *Morus* sp. (Moraceae), Solan (H.P.), c 1450 m, 25. X. 78; 2 greenish apterae and 7 nymphs from an unidentified host (Rosaceae), Solan (H.P.), c 1450 m, 25. X. 78; 7 greenish yellow apterae, 5 alatae and 4 nymphs from *Polygonum* sp. (Polygonaceae), Kufri (H.P.), c 2700 m, 26. X. 78; 7 greenish apterae and 7 nymphs from *Urtica* sp. (Urticaceae), Kufri (H.P.), c 2700 m, 26. X. 78; 1 brownish aptera from *Impatiens* sp. (Balsaminaceae), Sadhupul (H.P.), c 1300 m, 27. X. 78; 7 greenish yellow apterae, 5 alatae and 4 nymphs from *Polygonum* sp. (Polygonaceae), Kufri (H.P.), c 2700 m, 26. X. 78; 10 yellowish apterae and 19 nymphs from *Bidens pilosa* (Compositae), Sadhupul (H.P.), c 1300 m, 27. X. 78; 10 brownish apterae and 6 nymphs from *Hypericum* sp. (Hypericaceae), Sadhupul (H.P.), c 1300 m, 27. X. 78; 1 yellowish aptera, 4 alatae and 6 nymphs from *Ficus* sp. (Moraceae), Dharampur (H.P.), c 1500 m, 29. X. 78; 12 pale green apterae and 3 nymphs from *Zinnia* sp. (Compositae), Kasauli (H.P.), c 1850 m, 30. X. 78; 3 greenish yellow apterae, 1 alata and 3 nymphs from an unidentified host (Gramineae) Kasauli (H.P.), c 1850 m, 30. X. 78; 5 yellowish green apterae, 1 alata and 14 nymphs from *Spiraea* sp. (Rosaceae), Kasauli (H.P.), c 1850 m, 30. X. 78; 3 greenish apterae, 15 pale green apterae and 22 nymphs from an unidentified host (Gramineae) Kasauli (H.P.), c 1850 m, 30. X. 78; 22 blackish apterae from *Cestrum* sp. (Solanaceae), Kemphy (U.P.), c 1220 m, 4. XI. 78; 3 blackish apterae, 1 alata and 9 nymphs from *Rhamnus* sp. (Rhamnaceae), Kemphy (U.P.), c 1220 m, 4. XI. 78; 4 greenish apterae from *Prunus* sp. (Rosaceae), Kemphy (U.P.), c 1220 m, 4. XI. 78.

Distribution: India: all over; Africa; Australia; Bermuda Is.; Ceylon; China; Nepal; New Zealand; North America; Pakistan and Syria.

7. *Aphis verbasci* Schrank

*Aphis verbasci* Schrank, 1801. Fauna Boica, II. Ingststadt 2: 106.

Collection data: 3 yellowish green apterae and 7 nymphs from *Verbascum thapsus* (Scrophulariaceae), Kufri (H.P.), c 2700 m, 31. X. 78.

Distribution: India: Himachal Pradesh, Uttar Pradesh; Europe and Middle East.

8. *Hysteroneura solitaria* (Thomas)


Collection data: 2 dark brown apterae and 4 nymphs from an unidentified host (Gramineae), Badkhal lake (Haryana), 22. X. 78; 3 dark brown apterae and 5 nymphs from *Panicum* sp. (Gramineae), Solan (H.P.), c 1450 m, 25. X. 78; 1 brownish aptera and 10 nymphs from *Brachiastra* sp. (Gramineae), Dharampur (H.P.), c 1500 m, 29. X. 78; 10 brownish apterae, 1 alata and 7 nymphs from *Cynodon dactylon* (Gramineae), Dharampur (H.P.), c 1500 m, 29. X. 78; 6 brownish apterae, 3 alatae and 20 nymphs from an unidentified host (Gramineae), Dharampur (H.P.), c 1500 m, 29. X. 78; 2 brownish apterae, 1 alata and 5 nymphs from an unidentified host (Gramineae), Dehradun (U.P.), c 825 m, 2. XI. 78; 2 brownish
apterae and 4 nymphs from an unidentified host (Gramineae), Mussouri (U.P.), c 1600 m, 3. XI. 78.

Distribution: India: all over; Africa; America; Japan; Korea; Philippines and Taiwan.


Collection data: 14 brownish apterae, 3 alatae and 1 nymph from *Phragmites* sp. (Gramineae), Dehra Dun (U.P.), c 825 m, 2. XI. 78.

Distribution: India: Himachal Pradesh, Meghalaya, Tamil Nadu; and Mediterranean region excepting Africa.

10. *Rhopalosiphum maidis* (Fitch)


Collection data: 1 brownish aptera from an unidentified host (Gramineae), Dehradun (H.P.), c 1500 m, 29. X. 78.

Distribution: Virtually cosmopolitan.

11. *Rhopalosiphum padi* (Linnaeus)


Collection data: 3 greenish apterae, 2 alatae and 4 nymphs from *Canna* sp. (Cannaceae), Mashobra (H.P.), c 2250 m, 28. X. 78; 3 brownish green apterae, 1 alata and 4 nymphs from an unidentified host (Cannaceae), Jakhu (H.P.), c 2400 m, 28. X. 78; 16 brownish apterae, 1 alata and 10 nymphs from *Zea mays* (Gramineae), Solan (H.P.), c 1450 m, 1. XI. 78.

Distribution: Virtually cosmopolitan.

12. *Rhopalosiphum rufiabdominalis* (Sasaki)


Collection data: 1 greenish aptera and 1 nymph from *Bidens pilosa* (Compositae), Solan (H.P.), c 1450 m, 25. X. 78; 1 blackish alata from *Abies* sp. (Pinaceae), Kufri (H.P.), c 2700 m, 26. X. 78.

Distribution: Virtually cosmopolitan.

13. *Toxoptera aurantii* (Boyer de Fonscolombe)


Collection data: 1 blackish aptera, 1 alata and 1 nymph from an unidentified host (Rutaceae), Dehradun (U.P.), c 825 m, 2. XI. 78.

Distribution: Virtually cosmopolitan.

14. *Amphorophora ampullata bengalensis* Hille Ris Lambers and Basu (Fig. 3)


Alate male (Figs. 3 A & B)

Body 2.71–3.14 mm long with 0.96–1.15 mm as its maximum width. Head pale brown, faintly wrinkled; lateral frontal tubercles well developed and diverging; median frontal prominence conspicuous; dorsal cephalic hairs long with blunt to
incrassate apices. Antennae 6-segmented; longer than body, brown excepting segments I, II and the very base of segment III which are paler; segments I and II with spinules on basal half; 40–48, 1–14 and 10–22 round to oval, nonprotuberant secondary rhinaria present on segments III, IV and V respectively; primary rhinaria round and ciliated; p.t. about 3.0 × base of last antennal segment. Rostrum extending a little beyond mid coxae; u.r.s. obtuse, about 1.22–1.30 × h. t.2 and bears 6–7 secondary hairs besides 3 pairs of preapical ones. Abdomen pale; anterior tergites (3–6) with marginal sclerotic patches; dorsal hairs long, with incrassate to acute apices; pre- and post-siphuncular sclerites well developed. Siphunculi 0.17–0.18 × body, pale brown, distinctly clavate beyond apical half, with a few striae before distinct flange. Cauda pale but apex pale brown, broadest at base and narrowed gradually apicad, bearing 10–12 hairs. Legs pale brown to brown; femora brown except pale proximal 0.33 portion and smooth. F.T.C. 3,3,3. Wing-venation normal. Male genitalia well developed.

Fig. 3. Amphorophora ampullata bengalensis Hille Ris Lambers and Basu. Alate male. A: Antennal segment III. B: Posterior part of the abdomen showing male genitalia.

Measurements of one alate male in mm: Length of body 2.71, width 0.99; antenna 3.42, a.s. III:IV:V:VI 0.91:0.78:0.69: (0.17+0.57); u.r.s. 0.13; h.t.2 0.10; siphunculus 0.46; cauda 0.03.

Collection data: 4 apterous oviparae, 1 alate male and 3 nymphs from an unidentified fern, Mashobra (H.P.), c 2250 m, 28. X. 78.

Distribution: India: Arunachal Pradesh, Himachal Pradesh, Meghalaya, Sikkim and West Bengal.

Note: One alate male of this species could also be found in Sikkim in North East India. Description has also been based on the material recorded from Sikkim.
15. *Aspidophorodon harvensis* Verma


Collection data: 1 reddish green aptera from an unidentified host, Kufri (H.P.), c 2700 m, 26. X. 78.


16. *Aulacorthum sdani* (Kaltenbach)

*Aphis solani* Kaltenbach, 1843. Myn. 3er Fam. der Pflanzen, 15.

Collection data: 2 yellowish apterae and 6 nymphs from Bidens sp. (Compositae) Solan (H.P.), c 1450 m, 25. X. 75; 1 greenish aptera and 3 nymphs from Chrysanthemum sp. (Compositae) Chail (H.P.), c 2000 m, 27. X. 78; 4 chocolate coloured apterae, 1 alata and 4 nymphs from an unidentified host (Acanthaceae), Jakhu (H.P.), c 2400 m, 28. X. 78; 4 pale yellowish apterae, 4 alatae and 14 nymphs from Consularia sp. (Compositae) Mashobra (H.P.), c 2250 m, 28. X. 78; 1 pale green aptera and 1 alata from Glaucium sp. (Iridaceae), Mussourie (U.P.), c 2050 m, 3. XI. 78; 1 pale greenish aptera and 2 nymphs from an unidentified host, Kemphy (U.P.), c 1220 m, 4. XI. 78.

Distribution: Virtually cosmopolitan.

17. *Brachycerus helichrysi* (Kaltenbach)

*Aphis helichrysi* Kaltenbach, 1843. Myn. 3er Fam. der Pflanzen, 102.

Collection data: 4 greenish apterae and 5 nymphs from Anaphalis cinnamomea (Compositae) Kufri (H.P.), c 2700 m, 26. X. 78; 5 yellowish green apterae and 11 nymphs from Anaphalis sp. (Compositae) Sadhupul (H.P.), c 1300 m, 27. X. 78; 3 pale green apterae and 18 nymphs from Chrysanthemum sp. (Compositae) Sadhupul (H.P.), c 1300 m, 27. X. 78; 8 greennish black apterae and 4 nymphs from Anaphalis sp. (Compositae) Kasaull (H.P.), c 1850 m, 30. X. 78; 17 pale green apterae and 37 nymphs from Anaphalis sp. (Compositae) Barog (H.P.), c 1531 m, 31. X. 78; 3 greenish apterae and 8 nymphs from Ageratum sp. (Compositae) Mussourie (U.P.), c 1600 m, 3. XI. 78; 2 greenish apterae and 4 nymphs from Ageratum conyzoides (Compositae) Kemphy (U.P.), c 1220 m, 4. XI. 78; 1 brownish alata, 3 alate males and 5 nymphs from Anaphalis sp. (Compositae) Kemphy (U.P.), c 1220 m, 4. XI. 78; 15 brownish apterae, 1 alata and 8 nymphs from Anaphalis sp. (Compositae) Kemphy (U.P.), c 1220 m, 4. XI. 78; 4 greenish alatae from Prunus sp. (Rosaceae) Kemphy (U.P.), c 1220 m, 4. XI. 78.

Distribution: Virtually cosmopolitan.

18. *Capitophorus hippophaeas javanicus* Hille Ris Lambers

*Capitophorus hippophaeas javanicus* Hille Ris Lambers, 1953. Temminckia 9: 156.

Collection data: 1 pale green aptera and 4 nymphs from Polygonum sp. (Polygonaceae) Sadhupul (H.P.), c 1300 m, 27. X. 78.

Distribution: India: Arunachal Pradesh, Himachal Pradesh, Manipur, Meghalaya, Sikkim, Uttar Pradesh, West Bengal; Australia; China; Europe; Indonesia; Japan; Korea; New Zealand; Pakistan and Taiwan.

19. *Cavariella aegopodii* (Scopoli)

*Aphis aegopodii* Scopoli, 1763. Entomologica Carniolica, 137.
Collection data: 1 greenish aptera, 1 alata and 8 nymphs from an unidentified host (Umbelliferae), Kufri (H.P.), c 2700 m, 26. X. 78; 1 pale green aptera and 4 nymphs from Polygonum sp. (Polygonaceae), Sadhupul (H.P.), c 1300 m; 27. X. 78; 10 greenish apterae and 1 nymph from Salix sp. (Salicaceae), Mashobra (H.P.), c 2250 m; 28. X. 78; 25 greenish apterae and 2 nymphs from Salix sp. (Salicaceae), Kasauli (H.P.), c 1850 m, 30. X. 78; 2 greenish apterae and 2 nymphs from an unidentified host (Umbelliferae), Mussourie (U.P.), c 2050 m, 3. XI. 78; 2 greenish apterae, 1 alata and 2 nymphs from an unidentified host (Umbelliferae), Kemphy (U.P.), c 1220 m, 4. XI. 78.

Distribution: India: Arunachal Pradesh, Himachal Pradesh, Jammu and Kashmir state, Manipur, Meghalaya, Uttar Pradesh, West Bengal; America; Australia; Europe; Japan; Korea; Middle East; New Zealand and Rhodesia.

20. Chaetosiphon gracilicornis David, Rajasingh and Narayanan


Collection data: 22 yellowish green apterae and 9 nymphs from Rosa sp. (Rosaceae), Barog (H.P.), c 1531 m, 31. X. 78.

Distribution: India: Himachal Pradesh.

21. Coloradoa rufomaculata (Wilson)


Collection data: 8 brownish apterae from Chrysanthemum sp. (Compositae), Sadhupul (H.P.), c 1300 m, 27. X. 78; 6 greenish apterae and 6 nymphs from Polygonum sp. (Polygonaceae), Dehradun (U.P.), c 825 m, 2. XI. 78.

Distribution: India: Arunachal Pradesh, Assam, Himachal Pradesh, Meghalaya, Nagaland, Uttar Pradesh, West Bengal; and virtually cosmopolitan.

22. Dactynotus fagopyri Chowdhuri, Basu, Chakrabarti and Raychaudhuri (Fig. 4)


Apterous oviparous female (Fig. 4)

Body about 2.92 mm long with 1.47 mm as maximum width. Head dark brown. Antennae 6-segmented: segments I and II concolorous with the head and rest of the flagellum gradually becoming pale brown; segment III with spinular imbrication at base and with 20 protuberant secondary rhinaria distributed irregularly on distal 0.75 portion; p.t. about 5.81 x base of segment VI. Ultimate rostral segment about 1.25 x h.t.2, bearing 6 hairs. Dorsum of abdomen pale, smooth; dorsal hairs on sclerotic bases long and with acute apices, longest one on anterior and 7th tergites about 2.54 and 3.54 x b.d.III respectively. Siphunculi dark brown, cylindrical, about 0.17 x body and about 2.12 x tongue-shaped cauda, bearing 17 hairs. Hind tibiae swollen with numerous pseudosensoria; F.T.C. 4,4,4. Other characters as in apterae viviparae.

Measurements of the specimen in mm: Length of body 2.92, width 1.47; antenna 3.42, a.s. III:IV:V:VI 0.90:0.58:0.55: (0.16+0.93); u.r.s. 0.18; h.t.2 0.15; siphunculus 0.51; cauda 0.24.

Collection data: 2 greenish brown apterae, 1 apterous ovipara and 3 nymphs from an unidentified host, Mussourie (U.P.), c 2050 m, 3. XI. 78.

Distribution: India: Himachal Pradesh and Uttar Pradesh.
Note: The species was originally described from apterous viviarous female collected on *Fagopyrum cymosum* at Simla (H.P.). The apterous oviparous female of the species is described for the first time.

23. *Dactynotus sonchi* (Linnaeus)


Collection data: 2 greenish apterae and 5 nymphs from *Sonchus arvensis* (Compositae), Solar (H.P.), c 1450 m, 25. X. 78; 1 brownish aptera and 1 nymph from *Sonchus* sp. (Compositae), Dharampur (U.P.), c 1500 m, 29. X. 78; 12 brownish apterae and 1 alata from *Tricholepis dongata* (Compositae), Barog (H.P.), c 1581 m, 31. X. 78; 10 brownish apterae from *Sonchus* sp. (Compositae), Dehradun (U.P.), c 825 m, 2. XI. 78.

Distribution: India: Himachal Pradesh, Manipur, Meghalaya, Sikkim, South India, Uttar Pradesh, West Bengal; Africa; Australia; Egypt; Europe and South America.

![Fig. 4. Dactynotus fagopyri Chowdhuri, Basu, Chakrabarti and Raychaudhuri. Apterous oviparous female. Hind tibia showing pseudosensoria.](image-url)
24. *Hyperomyzus carduellinus* (Theobald)


Collection data: 2 greenish brown apterae, 1 alata and 2 nymphs from *Sonchus arvensis* (Compositae), Solan (H.P.), c 1450 m, 25. X. 78; 11 greenish apterae and 5 nymphs from *Sonchus* sp. (Compositae), Solan (H.P.), c 1450 m, 25. X. 78; 4 greenish apterae and 2 nymphs from *Sonchus* sp. (Compositae), Solan (H.P.), c 1450 m, 25. X. 78; 28 greenish apterae, 2 alatae and 9 nymphs from *Sonchus* sp. (Compositae), Mashobra (H.P.), c 2250 m, 28. X. 78; 23 pale green apterae, 3 alatae and 5 nymphs from *Sonchus* sp. (Compositae), Barog (H.P.), c 1531 m, 31. X. 78.

Distribution: India: Arunachal Pradesh, Assam, Himachal Pradesh, Jammu and Kashmir state, Manipur, Meghalaya, Nagaland, Sikkim, South India, Uttar Pradesh, West Bengal; Africa; Australia; Fiji, Indonesia; Japan; Nepal; New Zealand and Taiwan.

25. *Hyperomyzus lactueae* (Linnaeus)


Collection data: 2 blackish alatae from an unidentified host (Anacardiaceae), Kemphy (U.P.), c 1220 m, 4. XI. 78.

Distribution: Virtually cosmopolitan.

26. *Impatientinum impatiensae dalhousiensis* Verma (Fig. 5)


Alate male (Fig. 5)

Dorsal cephalic hairs about 0.03 mm long with acuminate apices; flagellum dark except pale base of a.s.III and progressively more imbricated apicad: a.s.III with 41–42 small, round secondary rhinaria on outer margin along the entire length except the very base, IV with 13–17 and V with 12–19 similar rhinaria. Dorsal abdominal hairs about 0.046 mm long with finely drawn out apices, the longest one on anterior tergites being about 1.30 × b.d.III; 6 hairs on 8th tergite with upto about 0.062 mm long and about 1.70 × b.d.III. Siphunculi about 0.15 × body, reticulated over distal 0.27 portion. Cauda dusky, with 6 hairs. Male genitalia well developed, with dark claspers. Other characters as in alate viviparous female.

Measurements of one specimen in mm: Length of body 2.55, width 0.99; antenna broken distally, a.s.III: IV: V: VI 0.74: 0.65: 0.52: (0.16 +?); u.r.s. 0.13; h.t.2 0.15; siphunculus, 0.39; cauda 0.15.
Collection data: 10 brownish apterae and 2 nymphs from *Impatiens* sp. (Balsaminaceae), Solan (H.P.), c 1450 m, 25. X. 78; 14 brownish apterae from *Impatiens* sp. (Balsaminaceae), Chail (H.P.), c 2000 m, 27. X. 78; 5 yellowish apterae, 3 alatae males and 7 nymphs from *Impatiens* sp. (Balsaminaceae), Jakhu (H.P.), c 2400 m, 28. X. 78; 8 brownish apterae, 2 alatae and 13 nymphs from *Impatiens* sp. (Balsaminaceae), Mashobra (H.P.), c 2250 m, 28. X. 78; 9 brownish alatae and 1 nymph from *Smilax* sp (Liliaceae), Solan (H.P.), c 1450 m, 30. X. 78.


Remarks: Varma (1969) described the subspecies from only apterous viviparous females collected in Himachal Pradesh. Chakrabarti et al. (1972) described the alate viviparous female from the area wherefrom they reported the apterae viviparae. The alate male is described here for the first time. The oviparous female is yet unknown.

27. *Indumasonaphis inulae* (Ghosh and Raychaudhuri)


Collection data: 18 pale green apterae from *Inula capsa* (Compositae), Dharampur (H.P.), c 1500 m, 29. X. 78; 4 pale green apterae and 1 alata from an unidentified host, Kasauli (H.P.), c 1850 m, 30. X. 78; 2 pale green apterae from an unidentified host, Mussoorie (U.P.), c 1600 m, 30. X. 78; 4 pale green apterae and 5 nymphs from an unidentified host, Kemphy (U.P.), c 1220 m, 4. XI. 78.

Distribution: India: Himachal Pradesh, Meghalaya and Uttar Pradesh.

28. *Liosomaphis atra* Hille Ris Lambers


Collection data: 5 greenish apterae and 34 nymphs from *Berberis* sp. (Berberidaceae), Mashobra (H.P.), c 2250 m, 28. X. 78.

Distribution: India: Himachal Pradesh, Uttar Pradesh; and Pakistan.

29. *Liosomaphis himalayensis* Basu


Collection data: 10 greenish apterae, 1 alata and 8 nymphs from *Berberis* sp. (Berberidaceae), Solan (H.P.), c 1450 m, 25. X. 78; 9 brownish apterae, 1 alata and 7 nymphs from *Berberis* sp. (Berberidaceae), Solan (H.P.), c 1450 m, 25. X. 78; 5 greenish apterae and 5 nymphs from *Berberis* sp. (Berberidaceae), Sadhupul (H.P.), c 1300 m, 27. X. 78; 2 reddish green apterae and 17 nymphs from *Berberis* sp. (Berberidaceae), Chail (H.P.), c 2000 m, 27. X. 78; 6 greenish apterae and 3 nymphs from *Berberis* sp. (Berberidaceae), Dharampur (H.P.), c 1500 m, 29. X. 78; 8 yellowish green apterae and 20 nymphs from *Berberis* sp. (Berberidaceae), Kasauli (H.P.), c 1850 m, 30. X. 78; 6 greenish apterae and 10 nymphs from *Berberis* sp. (Berberidaceae), Barog (H.P.), c 1531 m, 31. X. 78; 10 greenish apterae from *Berberis* sp. (Berberidaceae), Mussoorie (U.P.), c 2050 m, 3. XI. 78; 16 greenish apterae and 5 nymphs from *Berberis* sp. (Berberidaceae), Mussoorie (U.P.), c 1600 m, 3. XI. 78; 13 greenish apterae and 2 nymphs from *Berberis* sp. (Berberidaceae), Kemphy (U.P.), c 1220 m, 4. XI. 78.

Distribution: India: Himachal Pradesh, Meghalaya, Uttar Pradesh, West Bengal; and Nepal.
30. *Macrosiphoniella formosartemisiae* Takahashi


Collection data: 3 brownish apterae and 1 nymph from *Artemisia* sp. (Compositae), Kemphy (U.P.), c 1220 m, 4. XI. 78.

Distribution: India: Arunachal Pradesh, Meghalaya and Uttar Pradesh; China; Japan; Korea and Taiwan.

31. *Macrosiphoniella halimpongense* Basu and Raychaudhuri


Collection data: 11 greenish apterae and 3 nymphs from *Artemisia* sp. (Compositae), Dharampur (H.P.), c 1500 m, 29. X. 78; 5 greenish apterae and 3 nymphs from *Artemisia* sp. (Compositae), Javli (H.P.), c 1300 m, 29. X. 78; 1 greenish aptera from *Artemisia* sp. (Compositae), Kemphy (U.P.), c 1220 m, 4. XI. 78.

Distribution: India: Himachal Pradesh, Uttar Pradesh and West Bengal.

32. *Macrosiphoniella sanborni* (Gillette)


Collection data: 17 blackish apterae and 40 nymphs from *Chrysanthemum* sp. (Compositae), Sadhupul (H.P.), c 1300 m, 27. X. 78; 12 blackish apterae and 6 nymphs from *Chrysanthemum* sp. (Compositae), Kasauli (H.P.), c 1850 m, 30. X. 78; 1 black aptera and 47 nymphs from *Chrysanthemum* sp. (Compositae), Barog (H.P.), c 1531 m, 31. X. 78; 3 blackish apterae and 4 nymphs from *Chrysanthemum* sp. (Compositae), Dehradun (U.P.), c 825 m, 2. XI. 78; 2 blackish alatae from *Chrysanthemum* sp. (Compositae), c 2050 m, 3. XI. 78.

Distribution: India: all over; and virtually cosmopolitan.

33. *Macrosiphoniella yomogifoliae* (Shinji)


Collection data: 2 greenish apterae and 4 nymphs from *Artemisia* sp. (Compositae), Sadhupul (H.P.), c 1300 m, 27. X. 78.

Distribution: India: Arunachal Pradesh, Himachal Pradesh, Meghalaya, Sikkim, South India, Uttar Pradesh, West Bengal; China; Japan; Korea; Malaya and Taiwan.

34. *Macrosiphum pachysiphon* Hille Ris Lambers


Collection data: 2 pinkish apterae and 7 nymphs from *Rubus* sp. (Rosaceae), Jakhu (H.P.), c 2400 m, 28. X. 78.

Distribution: India: Arunachal Pradesh, Himachal Pradesh, Manipur, Meghalaya, Sikkim, Uttar Pradesh, West Bengal; and Pakistan.

35. *Macrosiphum pseudogeranii* Chakrabarti and Raychaudhuri


Apterous oviparous female

Body about 3.45 mm in length with 1.72 mm as maximum width. Head pale. Antennae 6-segmented, brownish, about 1.28 × body; p.t. about 6.78 × base of segment VI, segment III with 10–12 non-protuberant secondary rhinaria arranged in a row. Ultimate rostral segment about 1.2 × h.t.2. Abdominal dorsum pale; longest dorsal hair on anterior, 7th and 8th tergites about 2.5, 2.08 and 2.08 × b.d.111 respectively. Siphunculi brownish cylindrical, with apical 0.32 portion reticulated with isodiametrical cells; about 0.21 × body and about 2.41 × thumb-shaped cauda bearing 16 hairs. Hind tibiae swollen and with numerous pseudosensoria distributed over basal 0.61 portion. Other characters as in apterae viviparae.

Measurements of the apterous oviparous female in mm: Length of body 3.45, width 1.72; antenna 4.44; a.s. III:IV:V:VI 0.97:0.82:0.72: (0.19+1.29); u.r.s. 0.18; h.t.2 0.15; siphunculus 0.75, cauda 0.31.

Collection data: 1 greenish apterous ovipara from Polygonum sp. (Polygonaceae), Kufri (H.P.), c 2700 m, 26. X. 78.

Distribution: India: Himachal Pradesh.

Note: The species is so far known from its type locality (H.P.) and the description was based only on apterous viviparous female. The hitherto unknown apterous oviparous morph is described for the first time.

36. Macrosiphum rosae (Linnaeus)


Collection data: 2 greenish apterae and 8 nymphs from *Rosa* sp. (Rosaceae), Sadhpul (H.P.), c 1300 m, 27. X. 78; 12 reddish apterae, 2 alatae and 18 nymphs from *Rosa* sp. (Rosaceae), Mashobra (H.P.), c 2250 m, 28. X. 78.

Distribution: India: Arunachal Pradesh, Assam, Himachal Pradesh, Manipur, Meghalaya, Sikkim, South India, Uttar Pradesh, West Bengal; and virtually cosmopolitan.

37. Macrosiphum (*Sitobion*) indicum (Basu)


Collection data: 7 greenish apterae, 1 alata and 7 nymphs from *Ipomoea* sp. (Convolvulaceae), Solan (H.P.), c 1450 m, 25. X. 78; 2 brownish apterae from an unidentified host (Gramineae), Dharampr (H.P.), c 1500 m, 29. X. 78; 2 brownish apterae, 1 alata and 5 nymphs from an unidentified host (Gramineae), Dehradun (U.P.), c 825 m, 2. XI. 78; 1 brownish aptera and 3 nymphs from an unidentified host (Gramineae), Kempby (U.P.), c 1220 m, 4. XI. 78.

Distribution: India: Arunachal Pradesh, Himachal Pradesh, Meghalaya, Sikkim, Uttar Pradesh and West Bengal.

38. Macrosiphum (*Sitobion*) miscanthi: Takahashi


Collection data: 1 greenish brown aptera and 7 nymphs from *Panicum* sp. (Gramineae), Solan (H.P.), c 1450 m, 25. X. 78; 3 greenish apterae and 8 nymphs from an unidentified host (Gramineae), Solan (H.P.), c 1450 m, 25. X. 78; 2 greenish alatae and 4 nymphs from *Smilax* sp. (Liliaceae) and *Ranunculus* sp. (Ranunculaceae), Solan (H.P.), c 1450 m, 25. X. 78; 1 greenish aptera and 7 nymphs from an
unidentified host (Gramineae), Sadhupul (H.P.), c 1300 m, 27. X. 78; 2 brownish apterae and 6 nymphs from an unidentified host (Gramineae), Dharampur (H.P.), c 1800 m, 29. X. 78; 1 brownish black aptera, 4 alatae and 8 nymphs from *Smilax* sp. (Liliaeeae), Kasauli (H.P.), c 1850 m, 30. X. 78; 2 greenish alatae and 3 nymphs from *Rosa* sp. (Rosaceae), Dehradun (U.P.), c 825 m, 2. XI. 78.

Distribution: India: Arunachal Pradesh, Assam, Bihar, Himachal Pradesh, Manipur, Meghalaya, Nagaland, Sikkim, Uttar Pradesh, West Bengal; Australia; China; England and Taiwan.

39. *Macrosiphum* (Sitobion) *rosaeformis* Das


Collection data: 4 brownish alatae from *Smilax* sp. (Liliaeeae), Solan (H.P.), c 1450 m, 25. X. 78; 3 greenish brown apterae, 1 alata and 14 nymphs from *Rosa* sp. (Rosaceae), Chail (H.P.), c 2000 m, 27. X. 78; 5 reddish apterae, 8 alatae and 7 nymphs from *Rosa* sp. (Rosaceae), Chail (H.P.), c 2000 m, 27. X. 78; 6 greenish apterae and 8 nymphs from *Smilax* sp. (Liliaeeae), Kasauli (H.P.), c 1850 m, 30. X. 78; 7 greenish apterae and 2 nymphs from *Rosa* sp. (Rosaceae), Khasi Hill (K.K.), c 1500 m, 30. X. 78; 8 greenish apterae and 2 nymphs from *Cestrum* sp. (Solanaceae), Kasauli (H.P.), c 1800 m, 30. X. 78; 1 greenish aptera, 1 alata and 1 nymph from *Rosa* sp. (Rosaceae), Chail (H.P.), c 1500 m, 26. X. 78; 5 greenish apterae and 2 nymphs from *Rosa* sp. (Rosaceae), Mussourie (U.P.), c 1600 m, 3. XI. 78.

Distribution: India: Arunachal Pradesh, Assam, Bihar, Himachal Pradesh, Manipur, Meghalaya, Nagaland, Sikkim, South India, Uttar Pradesh, West Bengal; Nepal and Pakistan.

40. *Macrosiphum* (Sitobion) *sikkimensis* Ghosh and Raychaudhuri (Figs. 6, A & B)


Apterous oviparous female (Fig. 6A)

Body elongated, about 2.55–3.15 mm long with 1.23–1.65 mm as its maximum width. Head brown. Antennae 6-segmented, about 1.04–1.21 × body; segment III with 1–2 secondary rhinaria near base and with spatulate hairs which are about 0.45–1.2 × b.d. III; p.t. about 5.8–6.8 × base of segment VI. Rostrum hardly reaches hindcoxae; u.r.s. obtuse, about 0.75–0.88 × h.t.2 and with 4 secondary hairs. Dorsum of abdomen with segmentally arranged brownish pleural patches; dorsal hairs on sclerotic patches, hairs on anterior, 7th and 8th tergites about 1.09–1.27, 1.27–1.60 and 1.45–1.90 × b.d. III respectively. Siphunculi dark brown with both ante- and postsiphuncular sclerites, about 0.20–0.28 × body and about 1.28–1.60 × cauda bearing 8–10 hairs. Hind tibiae swollen with numerous pseudosensoria (Fig. 6A). F.T.C. 3,3,3. Other characters as in apterae viviparae.

Measurements of one specimen in mm: Length of body 2.55, width 1.23; antenna 2.85, a.s. III:IV:V:VI 0.81:0.67:0.49: (0.16:0.96); u.r.s. 0.10; h.t.2 0.13; siphunculus 0.63; cauda 0.40.

Alate male (Fig. 6B)

Body about 2.25–2.55 mm long with 0.75–1.05 mm as the maximum width. Head brown. Antennae dark brown, 6-segmented, about 1.44–1.67 × body; segment
III with 78–98, segment IV with 26–47, segment V with 20–22 secondary rhinaria distributed irregularly over entire length; p.t. about 7.3–8.1 × base of segment VI. Ultimate rostral segment about 0.68–0.72 × h.t.2. Dorsum of abdomen with pleural and marginal sclerotic patches on each of abdominal segments 1–7 besides irregularly shaped spinal patches on these segments, 8th tergite without any patch; dorsal hairs long and fine, those on anterior, 7th and 8th tergites about 1–1.1, 1.3–1.6 and 1.2–1.4 × b.d. III respectively. Siphunculi cylindrical, about 0.16–0.17 × body and about 2.30–2.60 × cauda bearing 7 hairs. Other characters as in alate viviparous females.

Measurements of one specimen in mm: Length of body 2.25, width 0.75; antenna 3.76, a.s. III:IV:V:VI 0.85:0.72:0.61:(0.16+1.21); u.r.s. 0.37; h.t.2 0.54; siphunculus 0.39; cauda 0.15.

Collection data: 6 brownish alatae, 2 alate males and 3 apterae oviparae from an unidentified host (Liliaceae), Solan, (H.P.), c 1450 m, 30. X. 78.

Distribution: India: Himachal Pradesh, Meghalaya, Sikkim and West Bengal.

Note: This species was described from eastern Himalayan region from alate viviparous female (Ghosh and Raychaudhuri, 1968). But find of this species in Himachal Pradesh extends the knowledge of its distribution. The sexuals are described here for the first time. The find of both alate male and apterous oviparous female along with also parthenogenetic morph (alate viviparous female) from the higher elevations hints at the possibility of leading holocyclic life cycle of the species in the Himalayan belt of the Indian subregion.

41. Metopolophium graminum, sp. nov. (Figs. 7, A–C)

Apterous viviparous female

Body oval, pale, about 2.01–2.58 mm long with about 0.90–1.29 mm as
Fig. 6B. *Macrosiphum (Sitobion) sikkimensis* Ghosh and Raychaudhuri. Alate male.
Posterior portion of the abdomen showing male genitalia.

maximum width. Head (Fig. 7A) pale, hairs on vertex about 0.01 mm long with acuminated apices; lateral frontal tubercles well developed, median frontal prominence also developed. Antennae (Fig. 7B) about 0.6 × body, paler on segments I, II, III and basal half of IV, rest of the flagellum dark brown; basal two segments slightly wrinkled and flagellum gradually more distinctly imbricated apicad with base of III slightly swollen; segment III with 3-8 round secondary rhinaria arranged in a row over basal 0.7 portion; p.t. about 2.2-2.9 × base of segment VI and shorter than segment III; flagellar hairs sparse, with acute to acuminated apices, about 0.006-0.01 mm long, longest one about 0.44 × b.d.III. Rostrum extending just past the fore coxae; u.r.s. 0.6-0.7 × h.t.2 and with 2-4 secondary hairs. Abdominal tergum pale, corrugated; anterior dorsal hairs bluntnish, up to about 0.012 mm long and about 0.44 × b.d.III; 8th tergite apparently with 2
hairs which are about 0.55 × b.d.III. Siphunculi (Fig. 7C) pale, cylindrical, imbricated, about 0.13-0.15 × body and 1.40-1.70 × cauda, with 1 or 2 striae just before poorly developed apical flange. Cauda a little dusky, thick, elongate, with a slight median constriction and bears about 7 hairs. Legs pale to pale brown; femora smooth dorsally with sparse imbrications and fine spinules ventrally towards the inner margin at least on distal half; tibiae a little darker than femora, with the apices more darkened; F.T.C. 3,3,3.

Fig. 7. *Metopolophium graminum*, sp. rov. A: Head. B: Antenna. C: Posterior portion of abdominal dorsum.

Measurements of the holotype in mm: Length of body 1.86, width 0.90; antenna 1.26, a.s.III: IV:V:VI 0.36:0.18:0.18: (0.11+0.32) u.r.s. 0.07; h.t.2 0.10; siphunculus 0.26; cauda 0.18.

Collection data: Holotype; Greenish apterous viviparous female from an unidentified host (Gramineae), Simla (H.P.), c 2100 m, 13. XII. 73, coll. L. K. Ghosh; paratype: 4 apterae, data same as for holotype; 2 greenish apterae and 15 nymphs from an unidentified host (Gramineae), Mashobra (H.P.), c 2250 m, 28. X. 78.

Distribution: India; Himachal Pradesh.

Remarks: The present material resembles *Acyrthosiphon* (*Metopolophium*) *chandmani* David and Narayanan 1968, in having similar ratio of ultimate rostral
segment to second joint of hind tarsus and first tarsal chaetotaxy besides slightly swollen base of antennal segment III in apterous viviparous females, but can be distinguished by shorter antenna, shorter siphunculi and more caudal hairs. Moreover, host-plant association is different since this species infests plants of gramineae. Combination of all the morphological characters taken together with host association justifies the erection of the new species. *Metopolophium graminum*, sp. nov. also differs from *Acyrthosiphon (Metopolophium) simlaensis* Chakrabarti et al. 1974 in the much shorter ultimate rostral segment bearing a few secondary hairs (8 in *simlaensis*).

42. *Metopolophium rubi* (Narzikulov) (Fig- 8)


*Apterous oviparous female*

Body elliptical, about 2.10–2.7 mm long with 1.05–1.14 mm as its maximum width. Head pale brown, frons smooth; dorsal cephalic hairs about 0.05 mm long and about as long as b.d.III. Antennae concolorous with head except more darkened segment VI, about 1.10–1.32 × body, imbricated, flagellar hairs short with incrassate apices, longest one on segment III about 0.64 × its basal diameter; segment III with 2–5 small round secondary rhinaria near base; p.t. about 4 × base of segment VI. Ultimate rostral segment reaches beyond hind coxae, with 4 secondary hairs. Abdominal dorsum pale, without any sclerite; dorsal hairs short to long (about 0.02–0.03 mm) with rather blunt apices; 4 hairs on 8th tergite upto about 0.05 mm long and about 0.4 × b.d.III. Siphunculi pale brown, about 0.25 × body, imbricated, with a few transverse striae before well-developed flange, about 2.5 × cauda bearing 10 hairs. Hind tibiae swollen with numerous small round pseudosensoria over entire length excepting the very base and apical 0.18 portion. Femora with a few small round sensoria like structure near base. Other characters as in apterae viviparae.

Measurements of one apterous oviparous in mm: Length of body 2.10, width 1.05; antenna 2.70, a.s.III:IV:V:VI 0.65:0.49:0.40: (0.16+0.75); u.r.s. 0.14; h.t.2 0.13; siphunculus 0.54; cauda 0.22.

*Alate male* (Fig. 8)

Body elongate, about 2.89–3.09 mm long with 1.05–1.14 mm as its maximum width. Head brown, slightly wrinkled; frons smooth; dorsal cephalic hairs about 0.046 mm long and about 0.35 × b.d.III. Antennae concolorous with head, segments I and II wrinkled, segment III brown, imbricated with 43–48 strongly protuberant secondary rhinaria distributed over its entire length excepting the very base, segment V with 12 secondary rhinaria. Abdomen pale with segmental dorsal and marginal sclerites, dorsal sclerites sometimes appearing as transverse bars; tergites 6, 7 and 8 with broken sclerites; 4 hairs on 8th tergite, about 1.4 × b.d.III. Siphunculi slender, imbricated, about 0.19 × body and about 3.2 × cauda bearing 8 hairs. Claspers well developed. Wing venation normal. Other characters as in alate viviparous female.

Measurements of one alate male in mm: Length of body 2.89, width 1.05; antenna 4.39, a.s. III:IV:V:VI 1.02:0.82:0.75: (0.19+1.39); u.r.s. 0.15; h.t.2 0.14; siphunculus 0.88; cauda 0.22.

Collection data: 1 aptera from *Rubus* sp. (Rosaceae), Simla (H.P.), c 2100 m, 18.V.70, coll. K. Narayanan; 5 apterae, 3 apterae oviparae and 1 alate male from
Rubus ellipticus (Rosaceae), Kalpa (H.P.), c 2170 m, 26. X. 76, coll. A. N. Chowdhuri; 7 greenish apterae and 4 nymphs from Rubus ellipticus (Rosaceae), Solan (H.P.), c 1450 m, 25. X. 78; 12 reddish green apterae and 16 nymphs from Desmodium sp. (Leguminosae), Kufri (H.P.), c 2700 m, 26. X. 78; 7 pinkish apterae and 8 nymphs from Polygonum sp. (Polygonaceae), Kufri (H.P.), c 2700 m, 26. X. 78; 2 pinkish aptera ovipara and 2 alate males from Rubus ellipticus (Rosaceae), Kufri (H.P.), c 2700 m, 26. X. 78.

Distribution: India: Himachal Pradesh, Sikkim, West Bengal; Bhutan and U.S.S.R.

Note: Sexuales of this species were hitherto unknown from India.

Fig. 8. Metopolophium rubi (Narzikulov). Alate male.
Fig. 9. Metopolophium sp. Alate male.

43. Metopolophium sonchifoliae, sp. nov.

Apterous viviparous female

Body broadly spindle-shaped, 2.67–2.94 mm long with maximum width 1.05–1.35 mm near middle of abdomen. Head pale yellow, dorsally wrinkled; dorsal hairs on the vertex with bluish apices and atmost 0.036 mm long; lateral frontal tubercles well developed, diverging and smooth. Antennae 6-segmented, concolorous with head except brownish apex of segment V and whole of segment VI, about 1.2 x body; segment I faintly imbricated, with 5–7 small hairs, segment II similarly imbricated with 3–7 similar hairs; flagellum progressively more distinctly imbricated towards apex; segment III with 3–6 small round secondary rhinaria near base; longest hair on segment III about 0.3 x its basal diameter; segment IV about 1.4 x segment V; p.t. about 5 x base of segment VI and a little longer than segment III. Rostrum extends upto mid coxae; u.r.s. about 0.14 mm long and about 1.1 x h.t. 2
and with 8-10 rather small and fine secondary hairs. Abdominal tergum sclerotic, pale to brownish yellow, with brownish muscle plates, slightly wrinkled; hairs on anterior abdominal tergites short with somewhat blunter apices, longest being about 0.015 mm and about 0.41 × b.d.III; 7 hairs on 8th tergite with blunter apices, these being up to about 0.052 mm and nearly as long as b.d.III. Siphunculi concolorous with head, slenderly elongate, cylindrical with expanded base and slightly widened apex, nearly smooth to faintly imbricated and usually with a few coalescing striae below the small but distinct apical flange. Cauda a little darker than siphunculi, elongated with blunt apex, constricted near middle, about 0.4 × siphunculi and with 8-12 long and fine hairs. Legs long, brownish yellow with the apices of tibiae and tarsi blackish; F.T.C. 3,3,3.

Measurements of the holotype in mm: Length of body 2.67, width 1.20; antenna 3.26, a.s. III:IV:V:VI 0.87:0.61:0.45: (0.18+0.92); u.r.s. 0.14; h.t.2 not discernible; siphunculus 0.74; cauda 0.29.

Alate viviparous female
Antennal segment III with 29-34 small, oval secondary rhinaria distributed over almost entire length excepting the paler and more imbricated base. Forewing with M twice-branched. Other characters much like apterae viviparae.

Measurements of the specimen in mm: Length of body 2.70, width 1.05; antenna ?, a.s. III 0.76 (rest broken); u.r.s. 0.14; h.t.2. 0.13; siphunculus 0.65; cauda 0.30.

Collection data: Holotype: Greenish apterous viviparous female, from Sonchus sp. (Compositae), Simla (H.P.), c 2100m, 31. V. 69, coll. L. K. Ghosh; paratype: 2 apterae viviparae, 1 alate vivipara, data same as for holotype; 5 greenish apterae from an unidentified host (Rosaceae), Solan (H.P.), c 1450 m, 25. X. 78.

Distribution: India: Himachal Pradesh.

Remarks: V.F. Eastop, London, when requested for comments on this species, wrote “I did not think I had seen this species before. If you are describing it, strongly sclerotic dorsum should be mentioned.... I have seen what appears to be another apparently undescribed Acyrthosiphon (Metopolophium) from Sonchus in the Himalayas, but in that species the dorsum is almost smooth, the hind tarsi are longer than ultimate rostral segment and the processus terminalis is shorter than most of the malvae group.” In view of the above comments, the new species is erected.

44. Metopolophium (Microlophium) rubifolii Raychaudhuri, Ghosh and Basu


Collection data: 2 pinkish green apterae and 9 nymphs from Potentilla nepalensis (Rosaceae), Kufri (H.P.), c 2700 m, 26. X. 78.

Distribution: India: Himachal Pradesh, Nagaland and Sikkim.

45. Metopolophium sp. (Fig. 9)

Alate viviparous female

Body about 2.53-2.73 mm long with 1.0-1.06 mm as its maximum width. Head pale brown, lateral frontal tubercles and median frontal prominence well developed; dorsal cephalic hairs short with incrassate apices. Antennae 6-segmented, about 0.7-0.8 × body, bearing short and stout hairs, longest one on
segment III about 0.5-0.8 × b.d. III; flagellum gradually more distinctly imbricated apicad; segment III with 21-25 circular secondary rhinaria somewhat irregularly arranged on the outer margin of segment, p.t. about 3.3-3.4 × base of last antennal segment. Rostrum reaching half way to mid coxae; u.r.s. with blunt apex, about 0.65-0.68 × h.t.2 and bears 4 secondary hairs. Abdominal dorsum pale with faint sclerotic spinal, pleural and marginal patches up to segment 5; dorsal hairs short to long with blunt to incrassate apices but those on 8th tergite long and fine. Siphunculus pale brown, cylindrical, with an apical flange, about 0.11-0.13 × body and about 1.53-1.76 × elongated cauda which bears 7-8 hairs. Legs pale brown except distal portion of tibiae which is darker. F.T.C. 3,3,3. Wing venation normal.

Measurements of one alate viviparous female in mm: Length of body 2.62, width 1.08; antenna 2.08, a.s.III:IV:V:VI 0.69:0.34:0.28: (0.15+0.51); u.r.s. 0.34; h.t.2 0.51; siphunculus 0.34; cauda 0.22.

Alate male (Fig. 9)
Head brown and smooth. Antennae 6-segmented (one side broken after 3rd segment), brown, about 1.01 × body; segment III with 46-52 secondary rhinaria distributed over entire length, segment IV with none and segment V with 4-7 secondary rhinaria on apical half; p.t. about 3.36 × base of the segment VI. Ultimate rostral segment about 0.69 × h.t.2. Abdominal dorsum with well-developed brown sclerotic spinal, pleural and marginal patches on tergites 1-7. Siphunculi brown. Claspers well developed. Other characters as in alate viviparous female.

Measurements of the alate male in mm: Length of body 2.41; width 0.97; antenna 2.46; a.s.III:IV:V:VI 0.75:0.46:0.37: (0.16+0.55); u.r.s. 0.34; h.t.2 0.49; siphunculus 0.34; cauda 0.22.

Apterous oviparous female
Body about 2.07 mm long and about 1.0 mm as its maximum width. Head pale and smooth; cōral cephalic hairs with incrassate apices. Antennae 6-segmented; about 0.68 × body; segments I and II pale, rest pale brown; segment III with 1-2 small circular secondary rhinaria near base on outer margin. Rostrum reaching mid coxae, about 0.82 × h.t.2 bearing 4 secondary hairs. Abdominal dorsum pale and smooth. Siphunculi cylindrical, pale brown with distinct apical flange, about 0.14 × body and about 1.63 × cauda. Legs pale brown; hind tibiae swollen bearing numerous pseudosensilla throughout the length but more closely packed on apical 0.75 portion.

Measurements of the apterous oviparous female in mm: Length of body 2.07, width 1.0; antenna 2.07, a.s.III:IV:V:VI 0.42:0.21:0.21: (0.10+0.33); u.r.s. 0.34; h.t.2 0.82; siphunculus 0.30; cauda 0.19.

Collection data: 5 greenish alatae, 1 alate male, 1 apterous ovipar. and 3 nymphs from Rubus sp. (Rosaceae), Jakhu (H.P.), c 2400 m, 28. X. 78.

Remarks: In view of not having apterous viviparous female and having only alate viviparous females in the collection it has not been possible to identify the material upto species level. However, occurrence of sexuals alongwith viviparae (alatae) suggests the possibility of completion of holocyclic life cycle.

46. *Micromyzodala strobilanthi* Ghosh


Collection data: 1 greenish black aptera from Ruellia tuberosa (Acanthaceae), 26
47. *Myzaphis rosarum* (Kaltenbach)

*Aphis rosarum* Kaltenbach, 1843. Mon. der Fam. der Pflanzen 101.

Collection data: 25 pale greenish apterae and 3 alate from *Rosa* sp. (Rosaceae), Kasauli (H.P.) c 1850 m. 30. X. 78.

Distribution: India: Himachal Pradesh, Uttar Pradesh; Europe; New Zealand and North America.

48. *Myzus dycei* Carver


Collection data: 21 dark green apterae, 2 alatae and 4 nymphs from *Urtica* sp. (Urticaceae), Sadhupul (H.P.), c 1300 m, 27. X. 78; 19 greenish apterae from *Urtica* sp. (Urticaceae), Solan (H.P.), c 1300 m, 27. X. 78.

Distribution: India: Arunachal Pradesh, Himachal Pradesh, Meghalaya, Sikkim, West Bengal; Australia; China; Japan and Nepal.

49. *Myzus obtusirostris* David, Narayanan and Rajasingh


Collection data: 4 blackish apterae and 3 nymphs from *Apluda mutica* (Gramineae), Sadhupul (H.P.), c 1300 m, 27. X. 78.

Distribution: India: Himachal Pradesh, Meghalaya and Uttar Pradesh.

50. *Myzus ornatus* Laing


Collection data: 4 yellowish apterae, 1 alata and 11 nymphs from an unidentified host (Gramineae), Jakhu (H.P.), c 2400 m, 28. X. 78; 4 brownish green apterae, 3 alatae and 16 nymphs from *Rhamnus* sp. (Rhamnaceae), Jakhu (H.P.), c 2400 m, 28. X. 78; 7 yellowish green apterae and 2 nymphs from *Clinopodium umbrosum* (Labiatae), Kufri (H.P.), c 2700 m, 31. X. 78; 6 pale greenish apterae and 4 nymphs from *Rhamnus nepalensis* (Rhamnaceae), Kufri. (H.P.), c 2700 m, 31. X. 78; 27 blackish green apterae and 10 nymphs from *Galium verum* (Rubiaceae), Kufri (H.P.), c 2700 m, 31. X. 78.

Distribution: India: all over; and virtually cosmopolitan.

51. *Myzus persicae* (Sulzer)

*Aphis persicae* Sulzer, 1776. Abgekurg. gesch. Ins., 105.

Collection data: 2 light greenish apterae from *Bidens pilosa* (Compositae) Solan (H.P.), c 1450 m, 25. X. 78; 7 greenish apterae and 34 nymphs from *Mirabilis jalapa* (Nyctaginaceae), Solan (H.P.), c 1450 m, 25. X. 78; 5 pale greenish apterae and 5 nymphs from *Buddleja* sp. (Loganiaceae), Chail (H.P.), c 2000 m, 27. X. 78; 14 greenish apterae and 3 nymphs from *Urtica* sp. (Urticaceae), Kasauli (H.P.), c 1850 m, 30. X. 78.

Distribution: India: all over and virtually cosmopolitan.
52. Neoacyrthosiphon sp.

**Apteronous oviparous female**

Body oval, about 2.82 mm long with its maximum width 1.35 mm near middle of abdomen. Head pale, smooth, with distinct lateral frontal tubercles; median frontal prominence low; dorsal cephalic hairs with blunt apices. Antennae 6-segmented, about 0.73 × body; flagellum pale brown, imbricated, more so apicad; secondary rhinaria absent; primary rhinaria ciliated; flagellar hairs blunt or with incrassate apices, the longest one on segment III about as long as b.d.III. Rostrum reaching beyond midcoxae; u.r.s. with 2 secondary hairs, about 1.02 × h.t.2. Midthoracic furca sessile, with separate arms. Abdominal dorsum pale, smooth with short and stout hairs having incrassate to blunt apices, the longest one on anterior, 7th and 8th tergites about 1.0, 1.33 and 2.22 × b.d.III respectively. Siphunculi cylindrical with slightly swollen distal portion, indistinct flange and bearing spinular transverse striae, about 0.31 × body and about 3.33 × tongue-shaped cauda bearing 12 hairs. Legs brown, smooth, hind tibiae bearing numerous pseudosensoria distributed over entire length except very base and apex. F.T.C. 3,3,3; 2nd segment of hind tarsus with spinules.

Measurements of one specimen in mm: Length of body 2.82, width 1.35; antenna 2.08, a.s. III:IV:V:VI 0.54:0.33:0.37: (0.21+0.42); u.r.s. 0.13; h.t.2 0.13; siphunculus 0.90; cauda 0.27.

Collection data: 1 pale green apterous ovipara from an unidentified host, Kufri (H.P.), e 2700 m, 26. X. 78.

Note: Specific determination has not been possible because of having only one specimen at the disposal.

53. Neomyzus circumflexus (Buckton)

*Siphonophora circumflexa* Buckton, 1876. Monograph of the British Aphides 1: 130.

Collection data: 3 greenish aperae and 13 nymphs from *Dahlia* sp. (Compositae), Chail (H.P.), e 2000 m, 27. X. 78; 21 pale yellowish apterae and 23 nymphs from unidentified host (Solanaceae), Chail (H.P.), e 2000 m 27. X. 78.

Distribution: India: Arunachal Pradesh, Assam, Bihar, Himachal Pradesh, Manipur, Meghalaya, Nagaland, Sikk m, South India, Uttar Pradesh, West Bengal; and virtually cosmopolitan.

Genus *Phtorostris*, gen. nov.

Genome *Phtorostris*, gen. nov.

Median frontal prominence weeky developed; frons nearly smooth. Antennae 6-segmented, longer than body, with up to 10 secondary rhinaria on segment III of apterae. Eyes with ocular tubercles. Ultimate rostral segment with parallel sides, more than 2 × h.t.2 and with many small secondary hairs. Spiracles reniform. Abdominal dorsum pale brown and smooth; dorsal hairs with spatulate apices. Siphunculi subcylindrical, faintly imbricated and with a weekly developed flange. Cauda dark, elongate, with about 7 hairs. Legs pale brown except darker distal half of femora, apices of tibiae and tarsi. F.T.C. 3,3,3.

Type-species: *Phtorostris simiazensis*, sp. nov.

Distribution: India.

Remarks: Present material in having median frontal prominence, much too hairy ultimate rostral segment, tuberculate secondary rhinaria and subcylindrical
siphunculi, do not fit with any known genus of the tribe Macrosiphini and as such a new genus is erected to accommodate this new species.

54. *Pilorostris simlaensis*, gen. et sp. nov. (Figs. 10, A–E)

*Apterous viviparous female*

Body elliptical about 2.10–2.31 mm long with 0.75–0.90 mm as maximum width. Head (Fig. 10A) smooth and pale, median frontal prominence ill developed; dorsal cephalic hairs with spatulate apices, upto about 0.044 mm long. Antennae (Fig. 10B) 6-segmented, about 1.3 × body; segments I and II dark, a little wrinkled on inner side; flagellum pale except the apices of segments III, IV and distal half of segment V and whole of segment VI which are darker; segment III with 3–8 tuberculate secondary rhinaria on basal 0.35–0.50 portion which is incrassate and dusky; very base of segment III with fine imbrications, rest of the segment smooth, segment IV very sparsely imbricated, other segments of flagellum progressively more distinctly imbricated; p.t. about 6.0–7.0 × base of segment VI and distinctly longer than segment III; flagellar hairs sparse, spatulate, the longest one on segment III being subequal to b.d.III. Eyes large with distinct occular tubercles. Rostrum reaches hind coxae; u.r.s. elongate with parallel sides, 2.10–

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**Fig. 10.** *Pilorostris simlaensis*, gen. et sp. nov. Apterous viviparous female.

2.50 × h.t.2 with about 19–24 small secondary hairs (Fig. 10C). Mesosternal furca with a basal stout stem. Abdominal dorsum medially pigmented and pale marginally, dorsal hairs spatulate, longest one on anterior tergites up to about 0.056 mm long and about 1.7–2.0 × b.d.III; 4 hairs on 8th tergite about 0.06 mm long and about 2 × b.d.III. Siphunculi (Fig. 10D) pale with the apex pigmented, subcylindrical, sparsely imbricated, about 0.14–0.19 × body and about 1.60–1.80 × cauda. Cauda (Fig. 10E) dark, elongate, thick with a slight constriction at basal 0.40 portion and with 7 hairs. Legs pale brown except distal half of femora, apices of tibiae and whole of tarsi which are darker; femora smooth; femoral hairs with bluish apices, tibial hairs at base with bluish to spatulate apices and those towards apex with slightly bluish to acuminate apices; F.T.C. 3,3,3.

Measurements of the holotype in mm: Length of body 2.10, width 0.99; antenna 2.85, a.s.III: IV:V:VI 0.72:0.41:0.40: (0.13+0.87); u.r.s. 0.19; h.t.2 0.09; siphunculus 0.36; cauda 0.22.

Alate viviparous female

Body about 1.98–2.40 mm long. Head pigmented; dorsal cephalic hairs up to about 0.036 mm long. Antennal segment III with 30–36 small, round secondary rhinaria scattered almost over entire length except the very base. Anterior dorsal hairs up to about 0.03 mm long and a little longer than b.d.III; longest hair on 8th tergite about 0.036 mm long. Siphunculi pigmented, paler towards base. Media of the forewing twice-branched. Rest of the characters as in apterae viviparae.

Measurements of one specimen in mm: Length of body 1.98, width 0.75; antenna 2.55, a.s.III: IV:V:VI 0.62:0.36:0.39: (0.13+0.92); u.r.s. 0.18; h.t.2 0.11; siphunculus 0.28; cauda 0.18.

Collection data: Holotype: Greenish apterous viviparous female from Strobilanthes dalhousianus (Acanthaceae), Mashobra (H.P.), c 2250 m, 17. X. 74, coll. L. K. Ghosh; paratypes: 3 apterous viviparous females and 2 alate viviparous females, data same as for the holotype; 8 apterous viviparous females, 9 alate viviparous females and 12 nymphs from Conyza stricta (Compositae), Kufri (H.P.), c 2700 m, 26. X. 78.

Distribution: India: Himachal Pradesh.

Genus Senisetotarsaphis, gen. nov.

Head smooth. Antennae 6-segmented, dark, flagellum imbricated; segment III with strongly protuberant irregularly scattered secondary rhinaria over entire length. Rostrum reaches fore coxae; ultimate rostral segment with about 8 secondary hairs. Abdominal dorsum with pleural and spinal sclerites forming dorsal patches; dorsal abdominal hairs moderately long and fine. Siphunculi slender, cylindrical, imbricated, with distinct preapical flange. Cauda elongate, triangular, with 10 hairs. Legs pale brown except the apices of femora, tibiae and whole of tarsi which are darker; first tarsal segments with 6 hairs. Wing venation normal; hind wing with 2 oblique veins.

Type-species: Senisetotarsaphis jakhuensis, sp. nov.

Distribution: India.

Remarks: The present material do not fit into any genus of the tribe Macrosiphini because of presence of 6 hairs on first tarsal segment of all legs, strongly protuberant secondary rhinaria and comparatively short siphunculi. Hence a new
genus, *Senisetotarsaphis*, is erected with the new species *jakhuensis*.

55. *Senisetotarsaphis jakhuensis*, gen. et sp. nov.

*Alate viviparous female* (Figs. 11 A-F)

Body elongated (Fig. 11A), about 1.84 mm long with 0.82 mm as maximum width near the middle of abdomen. Head dark brown with smooth lateral frontal tubercles, dorsal cephalic hairs fine, about 0.22-0.30 mm long, about 1.0-1.3 × b.d.II. Antennae (Fig. 11B) 6-segmented, about 0.96 × body; nearly con-
colorous with head; flagellum smooth on segment III, rest gradually more distinctly imbricated apicad; segment III with 76–87 round strongly protuberant secondary rhinaria distributed irregularly over its entire length except the pale base, segment IV with 2–6 similar secondary rhinaria distributed over distal 0.66 portion; primary rhinaria on segment V and VI ciliated; p.t. about 2.75 × base of segment VI and about 0.44 × segment III; flagellar hairs sparse, small, about 0.01 mm long with fine apices, longest hair on segment III about 0.5 × its basal diameter; Rostrum reaching fore coxae; u.r.s. (Fig. 11C) somewhat bluntnish, about 0.77 × h.t. 2, bearing about 8 secondary hairs. Eyes with distinct ocular tubercles. Thorax dark. Abdominal dorsum pale with broken brownish spinal and pleural sclerites, spinal ones caudad fused posteriorly to form a broad median somewhat trapezoidal patch, postspiphenic scleroties distinct, segment 7 with an indistinct transverse band; dorsal hairs moderately long with fine apices, those on anterior tergites about 0.018 mm long and about 0.83 × b.d.III; hairs on 7th tergite 0.021 mm long and about 1 × b.d.III, 3th tergite with 2 hairs and these about 0.03 mm long, about 1.16 × b.d.III. Siphunculi (Fig. 11E) cylindrical, brownish, about 0.07 × body and 0.86 × cauda, imbricated with distinct preapical flange. Cauda (Fig. 11F) elongated, brownish and with 0 hairs. Legs pale brown except the dark brown apices of femora, tibiae and tarsi (Fig. 11D). First tarsal chaetotaxy 6,6,6. Wing-venation normal.

Measurements of the holotype in mm: Length of body 1.84, width 0.82; antenna 1.78; a.s. III:IV:V:VI 0.75:0.24:0.19: (0 12+0.33); u.r.s. 0.31; h.t. 0.40; siphunculus 0.13; cauda 0.15.

Collection data: Holotype: Greenish alate viviparous female from Rubus sp. (Rosaceae), Jakhu (H.P.), c 2400 m, 28. X. 78; paratype: 1 greenish alate viviparous female from an unidentified host, Simla (H.P.), c 2100 m, 10. XI. 74, coll. L. K. Ghosh.

Distribution: India: Himachal Pradesh.

56. Sinomegoura photiniae (Takahashi)


Collection data: 3 brownish apterae and 3 nymphs from Celtis sp. (Ulmaceae), Javli (H.P.), c 1300 m, 28. X. 78.

Distribution: India: Himachal Pradesh, Meghalaya, Sikkim, West Bengal; China and Japan.

57. Tricaudatus polygoni (Narzikulov)


Collection data: 1 yellowish aptera, 1 alata and 1 nymph from Polygonum barbatum (Polygonaceae), Solan (H.P.), c 1450 m, 25. X. 78; 5 reddish apterae, 6 alatae and 10 nymphs from Polygonum sp. (Polygonaceae), Kush (H.P.), c 2700 m, 26. X. 78; 3 alatae and 4 nymphs from Strobilanthus atropurpureus (Acanthaceae), Mashobra (H.P.), c 2250 m, 28. X. 78; 8 pale greenish apterae, 4 alatae and 9 nymphs from Polygonum sp. (Polygonaceae), Mashobra (H.P.), c 2250 m, 28. X. 78.

Distribution: India: Arunachal Pradesh, Himachal Pradesh, Meghalaya, Sikkim, Uttar Pradesh, West Bengal; Japan; Java; Korea; Taiwan and U.S.S.R.
58. **Vesiculaphis verbasci** Chowdhuri, Basu, Chakrabarti and Raychaudhuri


Collection data: 2 brownish green alatae from *Rhamnus* sp. (Rhamnaceae), Mussorie (U.P.), c 2050 m, 3. XI. 76.

Distribution: India: Arunachal Pradesh, Himachal Pradesh, Manipur, Meghalaya, Nagaland, Sikkim, Uttar Pradesh and West Bengal.

59. **Chaitophorus pakistaniicus** Hille Ris Lambers


Collection data: 6 greenish apterae and 8 nymphs from *Salix* sp. (Salicaceae), Solan (H.P.), c 1450 m, 25. X. 78; 28 greenish apterae, 8 alatae and 9 nymphs from *Salix* sp. (Salicaceae), Dharampur (H.P.), c 1500 m, 29. X. 78.


60. **Machilaphis machili** (Takahashi)


Collection data: 1 green aptera, 1 alata and 2 nymphs from an unidentified host, Mussorie (U.P.), c 2050 m, 3. XI. 78.

Distribution: India: Himachal Pradesh, Meghalaya, Uttar Pradesh; Japan and Taiwan.

61. **Shivaphis celti** Das


Collection data: 16 pale green apterae and 3 alatae from * Celtis* sp. (Ulmaceae), Barog (H.P.), c 1531 m, 31. X. 78.

Distribution: India: Himachal Pradesh, Jammu and Kashmir state, Manipur, Meghalaya, Sikkim and West Bengal; Japan; Korea; Pakistan; Ceylon and Taiwan.

62. **Tinocallis kahawaluokalani** (Kirkaldy)


Collection data: 11 alatae and 2 nymphs from * Lagerstroemia indica* (Lythraceae), Delhi, c 500 m, 23. X. 78.

Distribution: India: Assam, Himachal Pradesh, South India, West Bengal; North America; Hawaii; Japan and Taiwan.

63. **Eutrichosiphum (Eutrichosiphum) tapatii** Mondal, Chatterjee and Raychaudhuri


Collection data: 2 pale green apterae and 8 nymphs from *Quercus* sp. (Fagaceae), Kemphly (U.P.), c 1220 m, 4. XI. 78.

Distribution: India: Himachal Pradesh, Sikkim and Uttar Pradesh.
64. *Eutrichosiphum* (*Neoparatrichosiphum*) *khasyanum* (Ghosh and Raychaudhuri)
*Paratrichosiphum* (*Neoparatrichosiphum*) *khasyanum* Ghosh and Raychaudhuri, 1962.
Collection data: 2 cream coloured apterae and 4 nymphs from *Quercus* sp. (Fagaceae), Barog (H.P.), c 1531 m, 31. X. 78.
Distribution: India: Arunachal Pradesh, Himachal Pradesh, Meghalaya and Uttar Pradesh.

65. *Eutrichosiphum* (*Paratrichosiphum*) *alnicola* (Basu)
*Alate oviparous female*

Body about 2.2–2.4 mm long with 0.82–1.02 mm as maximum width. Head pale brownish, smooth, bearing long dorsal hairs with acuminate apices. Antennae 6-segmented, about 0.72–0.79 × body, flagellar hairs long and fine, longest one on segment III being about 4.71–5.99 × p.t. II; segment III with 10–13 round secondary rhinaria distributed in a row over almost entire length; p.t. about 1.69–1.76 × base of segment VI. Rostrum reaching hind coxae; u.r.s. (4+5) long and pointed, about 1.41–2.18 × h.t.2; rostral segment IV with 14 secondary hairs. Dorsum of abdomen wrinkled with a quadran consolidated patch extending over 2nd–4th tergites, besides irregular patches on tergite 1 and on margins of these segments, segment 5 with a distinct patch spinally in between siphunculi. Siphunculi long, cylindrical, about 0.42–0.44 × body, covered with numerous long and fine hairs and indistinct flange. Legs pale brown except distal portion of femora and tibiae which are slightly darker; hind tibiae with at most 2 pseudorhinarialike structure. Subgenital plate densely hairy.

Measurements of one alate oviparous female in mm: Length of body 2.38, width 0.87; antenna 1.72, a.s. III:IV:V:VI 0.52:0.24:0.28:(0.19+0.33); u.r.s. 0.17; h.t.2 0.12; siphunculus 1.0.

Collection data: 2 greenish apterae from *Quercus* sp. (Fagaceae), Solan (H.P.), c 1450 m, 25. X. 78; 7 brownish alate oviparae and 5 nymphs from *Quercus* sp. (Fagaceae), Mashobra (H.P.), c 2250, 28. X. 78; 2 pale green apterae from *Quercus* sp. (Fagaceae), Solan (H.P.), c 1450 m, 30. X. 78.
Distribution: India: Himachal Pradesh, Sikkim and West Bengal.

Note: Basu (1967) originally described the species from Darjeeling, India, from apterae and alatae infesting on *Alnus nepalensis*. The hitherto unknown oviparous morph is described from *Quercus* sp. collected from northwest Himalaya.

66. *Eutrichosiphum* (*Paratrichosiphum*) *neoalnicola*, sp. nov. (Figs. 12, A–G)

*Apterous viviparous female*

Body elongate, about 1.66–2.10 mm long with 0.78–0.99 mm as its maximum width. Head (Fig. 12A) pale brown, to dark brown, dorsal cephalic hairs long, about 0.135 mm long and about 3.4 × b.d.III. Antennae (Fig. 12B) 6-segmented, concolorous with head, about 0.5–0.6 × body; segment III faintly imbricated; p.t. about 1.3–1.6 × base of segment VI and about 0.7 × segment III; flagellar hairs mostly long with incrassate apices, longest one on segment III about 2.6 × b.d.III. Rostrum reaches almost up to middle of 2nd abdominal segment; rostral segments 4+5 (Fig. 12C) about 2.1–2.5 × h.t.2, segment 4 about 7.5–8.5 × segment 5 with 10
secondary hairs. Eyes large with distinct ocular tubercles. Margin of pro-, meso- and metathoracic segments with fine spinules dorsally. Abdomen brownish, sclerotic and slightly wrinkled dorsally, ventrally with spinules only marginally, dorsal hairs (Figs. 12E & F) of various lengths, long hairs thick with both fine and furcated apices, longest hair on anterior abdominal tergites about 3.0–3.5 × b.d.II and shortest one about 1.0–1.5 × the mentioned diameter, 8th tergite with 2 fine hairs. Siphunculi brown (Fig. 12 D), elongate, spindle-shaped, without reticulation but with spinules all over, 0.27–0.32 × body, about 3.1–4.7 × its maximum width; width at base about 2.5 at middle about 3.2 and at apex about 1.8 × middle width of hind tibiae; siphuncular hairs numerous with finely drawn out apices, longest hair being about 2 × basal width of siphunculi and upto about 6 × b.d.III. Cauda obtusely conical with about 6 hairs. Legs concolorous (Fig. 12G) with head except for darker tibiae and tarsi; femora smooth, with hairs having fine apices; tibial hairs also with fine apices but the four apical tibial ones thick and stout; F.T.C. 7,7,7.


Measurements of the Holotype in mm: Length of body 1.66, width 0.78; antenna 0.97; a.s.III:IV:V:VI 0.27:0.26:0.14: (0.13+0.19); u.r.s. 0.19; h.t.2 0.07; siphunculus 0.54.

Collection data: Holotype: apterous viviparous female from Quercus sp. (Fagaceae), Nagwain (H.P.), c 1830 m, 7. VII. 70, coll. S. K. Sen; paratypes: 2 apterous viviparous females, data same as for the holotype; 1 apterous viviparous female from Quercus sp. (Fagaceae), Narkanda (H.P.), c 2700 m, 27. IX. 74; 2 green-
ish apterous viviparous females from *Quercus* sp. (Fagaceae), Solan (H.P.), c 1450 m, 25. X. 78.

**Distribution:** India: Himachal Pradesh.

**Remarks:** The new species *Eutrichosiphum (Paratrichosiphum) neoalnicola* comes close to *P. alnicola* Basu in most of the characters but differs from it in having shorter p.t. (about 1.4-1.6 × base of a.s. VI vs. 1.9-2.2 × in *alnicola*); shorter flagellar hairs (longest one on segment III about 2.5-3.0 × b.d.III vs. 3.8-4.0 × in *alnicola*), stouter siphunculus (3.3-5.0 × its maximum diameter vs. 5.6-6.9 in *alnicola*) and more secondary hairs on rostral segment 4.

67. *Astegopteryx minuta* (van der Goot)  


Collection data: 7 brownish alatae from an unidentified host (Gramineae), Dehradun (U.P.), c 825 m, 2. X. 78.

**Distribution:** India: Arunachal Pradesh, Himachal Pradesh, Manipur, Meghalaya, Nagaland, Sikkim, Uttar Pradesh, South India, West Bengal; and Japan.

68. *Ceratovacuna lanigera* Zehntner  


Collection data: 33 brown apterae and 31 nymphs from an unidentified host (Gramineae), Solan (H.P.), c 1450 m, 25. X. 78; 4 brownish apterae and 4 nymphs from an unidentified host (Gramineae), Dehradun (U.P.), c 825 m, 2. XI. 78.

**Distribution:** India: Assam, Himachal Pradesh, Sikkim, Tripura, Uttar Pradesh, South India, West Bengal; Ceylon; Indonesia; Japan and Philippines.

69. *Pseudoregma bucktoni* Ghosh, Pal and Raychaudhuri  


Collection data: 16 black apterae and 3 alatae from *Bambusa* sp. (Gramineae), Dehradun (U.P.), c 825 m, 2. XI. 78.

**Distribution:** India: Himachal Pradesh, Manipur, Meghalaya, Sikkim, South India, West Bengal; Ceylon; Taiwan and Vietnam.

*Pseudothoracaphis,* gen. nov.  

Body semi-oval, strongly scleritized, dark brown. Eyes 3-faceted. Antennae 3-segmented. Prosoma and abdominal segments (2–7) completely separated; submarginal hairs on prosoma and fused abdominal segments absent; dorsal hairs minute. Dorsum of prosoma wrinkled and sculptured but without pustules (Fig. 13 A); submarginal area appears reticulated, posteromesial hairs on prosoma and abdomen absent. Rostrum short; u.r.s. with blunt apex and without any secondary hair. Abdominal segments (2–7) much less wrinkled than prosoma; 8th tergite with 2 spine-like hairs. Cauda knobbed. Subanal plate blobed. Legs normal with claws; dorsoapical hairs on 2nd tarsal segments with expanded apices.

**Type-species:** *Pseudothoracaphis himachali,* sp. nov.

**Distribution:** India.

**Remarks:** The new genus approaches *Allothoracaphis* Takahashi (1958) in the presence of 3-segmented antennae and claws on legs and in the absence of siphunculi
and submarginal setae on fused abdominal segments but differs from the latter in not having long submarginal setae on prosoma as found in *Allothoracaphis* Takahashi.

70. *Pseudothoracaphis himachali*, gen. et sp. nov. (Figs. 13, A–C)

**Apterous viviparous female**

Body (Fig. 13A) dark brown, about 1.45–1.60 mm long with about 1.05–1.15 mm as its maximum width. Eyes 3-faceted. Antennae 3-segmented, about 0.09–0.1 mm long. Prosoma and abdominal segments (2–7) separated, submarginal hairs on prosoma and fused abdominal segments (2–7) absent. Dorsum of prosoma wrinkled and corrugated but without distinct tubercles, marginally indistinctly reticulated. Rostrum short, u.r.s. (Fig. 13B) about 1.45 × h.t.2 and without any secondary hairs. Abdominal segments less wrinkled than prosoma and without submarginal hairs; 8th tergite with 2 spiny hairs, these being about 0.01–0.02 mm long. Siphunculi absent. Cauda knobbled, wider than long, with many hairs, subanal plate bilobed. Legs normal with claws (Fig. 13C); dorsoapical hairs on 2nd tarsal segment with expanded apices.

 Measurements of the holotype in mm: Length of body 1.60, width 1.05; antenna 0.09; u.r.s. not visible, h.t.2 0.04; cauda 0.03.

Collection data: Holotype: Apterous viviparous female from *Ilex* sp. (Aquifoliaceae), Kufri (H.P.), c 2700 m, 31. X. 78; paratypes: 31 apterae, collection

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**Fig. 13. Pseudothoracaphis himachali**, gen. et sp. nov. Apterous viviparous female. 
71. *Reticulaphis distylli rotifera* Hille Ris Lambers and Takahashi

*Reticulaphis distylli rotifera* Hille Ris Lambers and Takahashi, 1959. Tijdschrift Ent. Deel. 102: 12.

Collection data: 18 blackish apterae from *Quercus* sp. (Fagaceae), Mashobra (H.P.), c 2250 m, 28. X. 78.

Distribution: India: Himachal Pradesh; and Indonesia.

72. *Lachnus tropicalis* (van der Goot)


Collection data: 8 brownish apterae, 2 alatae and 34 nymphs from *Quercus* sp. (Fagaceae), Solan (H.P.), c 1450 m, 25. X. 78; 2 brownish apterae and 11 nymphs from *Quercus* sp. (Fagaceae), Mashobra (H.P.), c 2250 m, 28. X. 78; 13 blackish apterae from *Pyrus malus* (Rosaceae), Dehradun (U.P.), c 825 m, 2. XI. 78.

Distribution: Virtually cosmopolitan.

73. *Nippolachnus bengalensis* Basu and Hille Ris Lambers


Collection data: 2 brownish apterae and 3 nymphs from *Quercus* sp. (Fagaceae), Solan (H.P.), c 1450 m, 25. X. 78.

Distribution: India: Himachal Pradesh and West Bengal.

74. *Nippolachnus eriobotryae* Basu and Hille Ris Lambers


Collection data: 5 brownish apterae from *Quercus* sp. (Fagaceae), Solan (H.P.), c 1450 m, 30. X. 78.

Distribution: India: Himachal Pradesh and West Bengal.

75. *Nippolachnus piri* Matsumura


Collection data: 9 greyish brown apterae from *Quercus* sp. (Fagaceae), Barog (H.P.), c 1531 m, 31. X. 78.

Distribution: India: Himachal Pradesh, Meghalaya, West Bengal; Japan; Korea and Taiwan.

76. *Stomaphis* sp.

*Apterous viviparous females*

Body nearly cval, about 4.5 mm long with 2.34 mm as maximum width near the middle of abdomen. Head dark brown; frons smooth; dorsal cephalic hairs long and fine, about 0.83–1.5 × b.d.III. Antennae 6-segmented, about 0.38 × body, dark brown except segment II and basal half of segment III which are pale; p.t. about 0.42 × base of segment VI; hairs on segment III about 0.04–0.15 mm long, longest one being about 0.92–3.07 × b.d.III. Rostrum extending beyond body, rostral segments 4–5 about 0.69 mm long and about 1.58 × h.t.2,
segment 5 with about 18 secondary hairs, segment 4 about 3.18 × segment 5. Abdominal dorsum pale, with numerous hairs these about 0.06-0.11 mm long, longest one being about 1.37–2.38 × b.d.III; 7th and 8th tergites with dorsal transverse brown patches; 8th tergite with about 14 hairs, longest one being about 6.15 × b.d.III. Siphunculi pore-like situated on dark brown hairy cones. Cauda dark, broadly rounded. Subanal plate broader than long, legs dark brown except basal 0.5 portion of femora which is pale; tibiae brownish black with numerous short to long hairs; outer margin of first tarsal segments longer than the dorsal diameter of the segment (about 1.6 ×).

Measurements of the apterous viviparous female in mm: Length of body 4.50, width 2.34; antenna 1.74, a.s. III:IV:V:VI 0.57-0.25:0.30: (0.21+0.09); u.r.s. 0.62; h.t.2. 0.43; cauda 0.12.

Collection data: 1 brownish aptera from Cedrus deodara (Coniferae), Kufri (H.P.), c 2700 m, 31. X. 78.

Remark: The specimen examined does not agree with any of the species dealt with by Takahashi (1960) in his review of the genus. Following Eastop (1958) the specimen comes close to Stomaphis longirostris Fabricius. Due to paucity of literature and comparable material specific determination of the single specimen has not been possible.

77. Eriosoma lanigerum (Hausmann)


Collection data: 21 mealy covered brownish apterae from Pyrus malus (Rosaceae), Chail (H.P.), c 2000 m, 27. X. 78.

Distribution: India: Himachal Pradesh, Meghalaya, South India, Uttar Pradesh; and virtually cosmopolitan.

78. Epipemphigus imaicus (Cholodkovsky)


Collection data: 4 apterae and 15 nymphs from Pyrus malus (Rosaceae), Mashobra (H.P.), c 2250 m, 28. X. 78.

Distribution: India: Himachal Pradesh, Uttar Pradesh; and Pakistan.

DISCUSSION

The collection data reveal that maximum concentration of species is noticed in altitude ranging between 600 m and 1500 m, i.e., in areas enjoying subtropical to warm temperate climate. The same distributional pattern can be observed in other parts of India.

From the list of reported species it is apparent that the subfamily Aphidinae is the most predominating group. The world record also exhibits the same picture. The phenomenon of polyphagism is very well marked among some species of this subfamily, e.g., Aphis fabae complex, Aphis gossypii, Aphis spiraecola, Toxoptera auranti, etc. Preponderance of Palaearctic species is also obvious, though some species like A. gossypii, A. spiraecola and a few others are cosmopolitan in distribution. It may also be pointed out that nearly 50% of such species are also found in Japan. At the generic level such examples are numerous. The commonness as revealed here is because of the location of area surveyed in compara-
tively higher altitude where subtropical to temperate climate exists and which forms transition area between Oriental and Palaearctic realms. The endemcity of area and also of other similar areas in India is no less pronounced.

Countries in the Palaearctic realm including Japan enjoying warm temperate to temperate climate are well known for the prevalence of sexual forms of aphids which are usually less preponderant in an aphid colony because of the perpetuation of parthenogenetic viviparity. In this context position of India in respect of areas situated in higher altitudes and enjoying subtropical to warm temperate climate is not very different since through the present work sexuals of 11 species out of a total collection of 78 species are reported.

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REFERENCES


Appendix

CONSIDERATION OF THE APHID FAUNA OF INDIA 
IN RELATION TO THAT OF JAPAN

By D. N. Raychaudhuri

Recording of the aphids from the Indian subregion can be traced back to late nineteenth century when Cotes and Buckton reported a few species from Assam in North-East India and from Dehradun in North-West India respectively. It was Das, who for the first time in the early part of the present century provided a comprehensive account of the aphids of Lahore (now in Pakistan).

However, in the middle of this century the aphidological works in politically divided India gained momentum through the works of A. N. Basu, S. K. David and his co-workers, D. N. Raychaudhuri and his co-workers and K. D. Verma. Through these works about 700 species of aphids under about 200 genera in seven subfamilies are now known to occur in India. Among the different subfamilies the members of Aphidinae appear most predominant while those of Anoeciinae the least. In Aphidinae again the aphids of the tribe Macrosiphini occur in maximum number. Genus wise break-up of the different species available in India reveals that majority of them have origin in Palaearctic parts of the world and on the contrary, species wise break-up reveals that nearly 50% of the species are endemic.

India having a vast area is ecologically diverse with low lands and high mountains and enjoys different climates, viz., arid, semiarid, tropical, subtropical, warm temperate, cool temperate, and arctic. Careful consideration of region wise distribution in India of the aphids found there reveals that great diversity and abundance of aphid fauna occur in the hilly terrains of the country where subtropical to warm temperate climate exists and which represent the transition area between Oriental and Palaearctic realms. This possibly explains the find of Palaearctic genera as stated above. Among the areas enjoying subtropical to warm temperate climate in the country diversity and concentration of aphids are more pronounced in North-East Indian states. This is an all likeness due to high amount of rain fall and gradual northward increase in altitude which in turn tell upon the temperature. Among the northeastern states as well as others situated in higher altitudinal areas in India maximum concentration and diversity of aphid species can be observed in altitudes ranging between 600-1500 m approx. Such availability and preponderance of aphids in this altitudinal stratum can be looked upon as formation of smaller ecological niches even in areas enjoying subtropical to warm temperate climate.

Comparison of Indian aphids at generic level with those of east Asiatic countries reveals that India and other east Asiatic countries share quite a large number of common genera, even though a few countries like Indoensia and Malaysia enjoy tropical climate. In this connection it must be emphasised that countries like Taiwan, Japan proper (Honshu, Kyushu and Shikoku Islands) and Korea have in common quite a large proportion of the genera available in India. The reason for such commonness may be the prevalence of warm temperate climate in these countries. Information about the aphid fauna of these countries can be found from the works of van der Goot on Indonesian fauna, of Takahashi on Malaysian, Siamese,
Taiwanese and Japanese fauna, of Okajima, Matsumura, Shinji, Miyazaki, Higuchi and Aoki on Japanese fauna, of Paik on Korean fauna, of Sczelegiewicz on Vietnamese fauna and of Tao on Taiwanese aphids.

Among the above named workers Higuchi and Miyazaki have provided a tentative list of the aphids available in Japan. From these it is observed that about 830 species under nearly 202 genera occur there. Subsequent to the above work Miyazaki from Japan described 3 new genera, 13 new species and made 26 new records of aphids under the tribe Macrosiphini and Higuchi from Japan described 2 new genera, 9 new species and made 7 new records of aphids of the subfamily Callipterinae. After Miyazaki and Higuchi, Aoki described 3 new species and made one new record under the subfamily Pemphiginae. Thus the total number of genera and species now known to exist in Japan stands at about 207 and 889 respectively. Comparing Japan with India in respect of aphid genera and species it appears that these two countries are in close approximation. Notwithstanding about it must be borne in mind that quite a large number of genera more particularly the primitive ones under Anoeciinae, Greenideinae, Hormaphidinae and Pemphiginae though common to these countries the species available show only a little similarity. This commonness is, in all likeness, because of Japan’s connection with the continental shelf of Asia and prevalence of warm temperate climate there. However, further explorations will expand our existing knowledge about the closeness of India and Japan in respect of the aphid fauna.
SOME NEW SPECIES AND HITHERTO UNKNOWN MORPHS OF APHIDS (HOMOPTERA : APHIDIDAE) FROM HIMACHAL PRADHESH, NORTHWEST INDIA

S. K. DAS, D. RAYCHAUDHURI & D. N. RAYCHAUDHURI
Entomology Laboratory, Department of Zoology, Calcutta University,
Calcutta, India 700019

(Received 27 July 1980)

Two new species, viz., Aulacorthum delphinae and Dactynotus minatii and four hitherto unknown morphs, viz., apterous oviparous female of Aphis paraverbasci Chakrabarti, alate male and apterous oviparous female of Chaitophorus indicus Ghosh, Ghosh and Raychaudhuri, alate male of Diphorodon cannabis (Passerini) and apterous oviparous female of Nippolachnus sp. of aphids are described from Himachal Pradesh, Northwest India.

(Key words: Aphid taxonomy, new species; unknown morphs)

Since 1973 systematic survey for aphids has been undertaken in the state of Himachal Pradesh, northwest India. Aphid samples so far examined has revealed the existence of 2 new species, viz., Aulacorthum delphinae, Dactynotus minatii and 4 hitherto unknown morphs, viz., apterous oviparous female of Aphis paraverbasci Chakrabarti, alate male and apterous oviparous female of Chaitophorus indicus Ghosh, Ghosh and Raychaudhuri, alate male of Diphorodon cannabis (Passerini) and apterous oviparous female of Nippolachnus sp., which are being described.

Materials are in the collection of Entomology Laboratory, Department of Zoology, Calcutta University.

1. Aulacorthum delphinae sp. nov., (Figs. 1A-E).

Apterous viviparous female: Body about 2.47 - 2.65 mm long with about 1.17 - 1.42 mm as its maximum width. Head (Fig. 1B) finely spinulose on venter, with well developed diverging lateral frontal tubercles; median frontal prominence low but distinct; dorsal cephalic hairs long on tuberculate bases, with blunt apices, about 1.0 - 1.30 x b.d. III. Antennae (Fig. 1E) pale brown, 6-segmented, about 1.09 - 1.10 x body; segment I slightly inwardly projected and smooth; segment II smooth; segment III smooth excepting a few imbrications near base, rest of the flagellum gradually imbricated apicad; segment III with protuberant 16 - 23 secondary rhinaria on basal 0.35 - 0.41 portion; hairs on segment III like those on cephalic dorsum, about 0.40 - 1.10 x b.d. III, Mid thoracic furca sessile, Rostrum reaching hind coxae; u.r.s. (Fig. 1C) with 5 - 9 secondary hairs about 1.0 - 1.10 x h, t, 2, Abdominal dorsum pale; dorsal hairs like those on cephalic dorsum, longest hair on anterior tergites being about 0.70 - 1.03 x b. d. III; 7th and 8th tergites with 5 - 6 and 2 - 4 hairs respectively, longest of these being about 1.20 - 1.70, 1.0 - 1.60 x b.d. III respectively. Siphunculi (Fig. 1D) long, cylindrical, strongly imbricated, with a few
Fig. 1. Aulacorthum delphiniae sp. nov.: Aptera. A—Whole body; B—Head; C—U.r.s.; D—Siphunculus; E—Antenna.

Preapical striae and a well developed cauda bearing 6—8 hairs. Legs normal, flange, about 2.0—2.50 x subpentagonal. F.T.C. 3, 3, 3.
Measurements of the holotype in mm:
Length of body 2.65, width 1.29; antenna 2.94, antennal segments III: IV: V: VI
0.85: 0.45: 0.40: 0.10 + 0.93; u. r. s 0.15;
head 2.0.15; siphunculus 0.54; cauda 0.22.

Collection data: Holotype: apterous viviparous 9, INDIA: HIMACHAL PRADESH,
Mashobra (c 2149 m), 22. vi. 79, from
Delphinium ajacis (Ranunculaceae), coll.
S. K. Das, paratype: 7 greenish apterous
viviparous ♀♀ and 22 nymphs, collection
data same as for holotype.

Remark: The present material cannot
strictly be put in any known genus of
Macrosiphini. But David et al. (1970)
described similar material as a new spe-
cies under Aulacorthum. If their (op:cit.)
idea is applied here then the present
material can be considered at least for
the time being under Aulacorthum and
in that case the present material is tre-
at ed as a new species resembling David’s
species. In future if some other similar
species are found then a new genus may
have to be erected when it should be
characterised by the presence of low me-
dian frontal prominence, diverging lateral
frontal tubercles, and protuberant secon-
dary rhinaria in apterae viviparae.

2. Dactynotus minatii sp. nov. (Figs. 2A-F)
Apterous viviparous female: Body
(Fig. 2A) pale brown, about 1.80—4.38 mm
long with about 1.20—1.80 mm as its
maximum width. Head pale, smooth, with.

Fig. 2, Dactynotus minatii sp. nov.: Aptera. A—Whole body;
B—Antennae; C—U. r. s.; D—Siphunculus; E—Cauda; F—Tarsi.
well developed, diverging lateral frontal prominence and a median frontal prominence; dorsal cephalic hairs long with acute apices. Antennae (Fig. 2B) 6-segmented, about 1.30—1.98 × body; flagellum gradually becoming imbricated apicad; p. t. about 5.26—3.92 × base of segment VI and about 0.65—0.81 × segment III; apterae with 12-20 strongly protuberant secondary rhinaria arranged in a row; primary rhinaria ciliated; hairs on flagellum with acute apices, longest hair on segment III about 1.07—1.72 × b. d. III. Midthoracic furca with a basal stem. Rostrum extending beyond midcoxae; u. r. s. (Fig. 2C) about 1.07—1.22 × h. t. 2 and bears 4—6 secondary hairs. Abdominal dorsum pale; dorsal hairs similar to those on cephalic dorsum; longest hair on anterior, 7th and 8th tergites about 2.42—3.0 ×, 2.07—3.83 × and 2.14—3.53 × b. d. III respectively. Siphunculi (Fig. 2D) brown, cylindrical, reticulated on distal 0.12—0.22 portion, about 2.09—2.35 × elongated cauda (Fig. 2E) bearing 11—16 hairs. Legs brown, dark at the apex; F. T. C. 4, 4, 4 (Fig. 2F).

**Measurements of the holotype in mm:**
Length of body 2.14, width 1.42; antennae 4.84, antennal segments III: IV: V: VI 0.91: 0.75: 0.58: 0.18+0.15; u. r. s. 0.15; u. t. 20.13; siphunculus 0.69; cauda 0.33.

**Collection data:** Holotype: Apterous viviparous 9, INDIA: HIMACHAL PRADESH, Kiarighat (c 1500 m), 17.x.79 from an unidentified plant, coll. S. K. Das, paratypes: 5 apterous viviparous 9, Simla (c 2000 m), 22.x.79, from Delphinium sp. (Ranunculaceae); 1 apterous viviparous 9 and many nymphs, Mashobra (c 2149 m), 22. vi. 79, from an unidentified plant of Ranunculaceae; 2 apterous viviparous 9 and 1 nymph, Kufri (c 2633 m), 21, vi. 79, from an unidentified plant of Ranunculaceae, coll. S. K. Das.

**Remark:** The new species in having long body hairs and 4, 4, 4 tarsal chaetotaxy closely resembles *Uroleucon longisetosus* Chakrabarti and Verma, 1975 but can easily be distinguished by the following characters: 0.12—0.22 portion of siphunculi reticulated and siphunculi about 2.09—
2.35 × cauda; 8th tergite with 6—8 hairs.

3. **Aphis paraverbasci** Chakrabarti (Figs. 3A—C)


Apterous oviparous female: Body pale brown, about 1.41—1.57 mm long and about 0.76—0.90 mm wide. Head smooth; dorsal cephalic hairs flagellate. Antennae 6-segmented; segments I and II dark and smooth; flagellum gradually imbricated apicad; p. t. about 1.70—2.0 × base of segment VI; hairs on segment III with acuminate apices, longest one being about 1.10—2.60 × b. d. III. Rostrum long and extending beyond hindcoxae; u. r. s. stiletto-shaped, about 1.90—2.10 × h. t. 2, bearing 2—3 secondary hairs. Abdominal dorsum pale bearing hairs with acuminate apices; longest hair on anterior, 7th and 8th tergites being about 3.60—4.50 ×, 3.30—5.90 × and 2.60—4.20 × b. d. III respectively. Siphunculi dark, cylindrical, imbricated, about 1.30—1.50 × cauda bearing 11—12 hairs. Hindtibiae (Fig. 3B) swollen with many pseudosensoria. F. T. C. 3, 3, 3. Other characters as in apterae viviparae.

**Measurements of one apterous oviparous female in mm:** Length of body 1.41, width 0.78; antenna 0.76 antennal segments III; IV: V: VI 0.16: 0.12: 0.10: 0.09+0.18; u. r. s. 0.18; h. t. 2 0.09; siphunculus 0.10; cauda 0.09.
Fig. 3. Aphis paraverbasci Chakrabarti: Apterous ovipara.
A—Posterior portion of abdomen; B—Hind tibiae

Collection data: INDIA: HIMACHAL PRADESH: Manali (c 2050 m), 22.x.79: 9 apterous viviparous \( \varnothing \), 8 apterous oviparous \( \varnothing \) and 3 nymphs from an unidentified host-plant, coll. S. K. Das.

Remark: Chakrabarti (1976) described the species from apterous viviparous female collected at SIMLA, HIMACHAL PRADESH. Find of apterous oviparous female at MANALI, HIMACHAL PRADESH suggests the possibility of completion of holocyclic mode of life-cycle in the region.
Fig. 4: *Chaitophorus laticus* Ghosh, Ghosh and Raychaudhuri:
Apterous ovipara. A—Posterior portion of abdomen; B—Hind tibiae showing pseudosensoria.
4. Chaitophorus indicus (Figs. 4A—C and 5A,B)


Apterous oviparous female: Head brown and smooth; dorsal cephalic hairs flagellate. Antennae 6-segmented, much shorter than body; flagellum gradually distinctly imbricated apicad; segment IV a little constricted at apical 0.25 portion; p. t. about 3.80 x base of segment VI; primary rhinaria non-ciliated; flagellar hairs long with fine apices, longest one on segment III about 5.0—6.30 x b. d. III. Rostrum reaching midcoxae; u. r. s. about 0.96—1.0 x h. t. 2 bearing 4 secondary hairs. Abdominal dorsum pale with segmentally arranged hair bearing spinopleural and marginal sclerotic patches; dorsal hairs long and with fine apices, longest one on anterior, 7th and 8th tergites about 6.0—7.50 x 5.20—8.70 x and 5.0—8.70 x b. d. III respectively. Siphunculi truncated reticulated over almost entire length. Cauda knobbed and bears 5—7 hairs. Male genitalia as in Fig. 5A. Legs normal. Wing venation normal. Other characters as in alate viviparous female.

Measurements of one alate male in mm:
- Length of body 1.18, width 0.46; antenna 0.97; antennal segments III:IV:V:VI 0.21:0.09:0.10:0.07 + 0.28; u. r. s. 0.11; h. t. 2 0.11; siphunculus 0.04; cauda 0.04.

Measurements of one apterous oviparous female in mm: Length of body 1.47, width 0.91; antenna 1.0, antennal segments III: IV:V:VI 0.21:0.09:0.10:0.07+0.28; u. r. s. 0.11; h. t. 2 0.11; siphunculus 0.04; cauda 0.04.

Alate male: Body pale brown, elongate. Head brown, smooth on both surfaces and without frontal tubercles; dorsal cephalic hairs with acuminate apices. Antennae concolourous with head, 6 segmented, about 0.82—0.95 x body; segment III basally constricted; p. t. about 3.20—3.80 x base of segment VI; segments III, IV & V with 19—22, 9—18 and 5—7 irregularly arranged nonprotuberant secondary rhinaria respectively; primary rhinaria non-ciliated; hairs on flagellum with fine apices, longest one on segment III about 3.60—5.0 x b. d. III. Rostrum reaching midcoxae; u. r. s. about 0.96—1.03 x h. t. 2 bearing 4 secondary hairs. Abdominal dorsum pale with segmentally arranged hair bearing spinopleural and marginal sclerotic patches; dorsal hairs long and with fine apices, longest one on anterior, 7th and 8th tergites about 6.0—7.50 x 5.20—8.70 x and 5.0—8.70 x b. d. III respectively. Siphunculi truncated reticulated over almost entire length. Cauda knobbed and bears 5—7 hairs. Male genitalia as in Fig. 5A. Legs normal. Wing venation normal. Other characters as in alate viviparous female.

Collection data: INDIA: HIMALACH PRADESH: Manali (ca 2050 m), 28. x. 79, 1 alate viviparous, 9, apterous oviparous 9$, 5 alate and 6 nymphs from Populus sp. (Salicaceae), coll. S. K. Das.

Remark: Out of the chaitophorine genera known from India only two species of the genus Periphyllus are represented by sexuals (Chakrabarti, 1977). With the find of alate male and apterous oviparous female of Chaitophorus indicus Ghosh, Ghosh and Raychaudhuri two chaitophorine genera are now known to possess sexuals in Indian condition.

Note: Ghosh, Ghosh and Raychaudhuri (1970) while erecting the species indicus under the genus Chaitophorus Koch stated that ultimate rostral segment bears 8 hairs. Chakrabarti (1977) mentioned that indicus has 8 accessory hairs on ultimate rostral segment. Re-examination of the previously collected material reveals the existence of 3—4 secondary hairs on ultimate rostral segment.
Alate male: Body dark brown. Head brown, sparsely spinulose with lowly developed lateral frontal tubercles; dorsal cephalic hairs with acute apices. Antennae concolourous with head, 6-segmented; segment I with inner apex produced; flagellum gradually imbricated apicad; p.t. about 0.66 x base of segment VI; segment III with irregularly arranged 28–45 non-protruberant secondary rhinaria, segment IV and V with 14–16 and 6 such rhinaria respectively. Rostrum reaching midcoxae; u.r.s. about 1.40 x h.t. 2 bearing 4 secondary hairs. Abdominal dorsum pale with segmentally arranged spinopleural and marginal sclerotic patches; dorsal hairs similar to those on cephalic dorsum, longest one on anterior tergites being about 0.84 x b. d. III. Siphunculi long, cylindrical, with a few interconnecting striae before the apical flange, about 3.40 x cauda bearing 5 hairs. Male genitalia (Fig. 6) well-developed, F. T. C. 3, 3, 2. Wing venation normal.

Measurements of the alate male in mm: Length of body 1.80, width 0.70; antenna 1.69, antennal segments III:IV:V:VI 0.46:0.25:0.25:0.09 + 0.46; u. r. s. 0.12; h. t. 0.08; siphunculus 0.35; cauda 0.08.

Collection data: INDIA; HIMACHAL PRADESH: Manali (c 2050 m), 27.x.79, 6 aper­rous viviparous ♀♀, 9 alate viviparous ♀♀, 1 alate ♀ and 1 nymph from an unidentified host plant, coll. S. K. Das.

Remark: Chowdhuri, Ghosh, Banerjee and Raychaudhuri (1970) reported the species from this region. Find of sexuales along with viviparae suggests the possibility of completion of holocyclic life cycle.

6. Nippolachnus sp. (Figs 7A—C)

Apterous oviparous female: Body pale brown, elongated oval. Head (Fig. 7A) brown, smooth without any frontal tubercle but with a median suture; dorsal cephalic hairs with acuminate apices. Antennae 6-segmented, much shorter than body; flagellum gradually imbricated apicad; p.t. about 0.66 x base of segment VI; flagellar...
Fig. 7. *Nippolachensia* sp.: Apterous ovipara. A—Head; B—Posterior portion of abdomen; C—Hind tibiae showing pseudosensoria.

Hairs with acuminate apices, longest one on segment III about 0.93 × b. d. III. Eyes multifaceted, without ocular tubercles. Rostrum extending beyond hindcoxae; u.r.s. normal, about 0.76 × h.t.2 and bears about 12 secondary hairs. Abdominal dorsum pale, with segmentally arranged sclerotic patches; dorsal hairs similar to those on cephalic dorsum, longest hair on anterior, 7th and 8th tergites about 1.20 ×, 1.0 × and 1.60 × b. d. III respectively. Siphunculi ring-like with well developed chitinized rim. Cauda helmet-shaped with numerous hairs. Subgenital plate as in Fig. 7B. Legs normal; hindtibiae swollen with numerous pseudosensoria (Fig. 7C).

**Measurements of the apterous oviparous female in mm:** Length of body 3.45, width 1.81; antenna 2.22, antennal segments III:
IV: V: VI 0.97: 0.42: 0.36: 0.13+0.09; u.r.s 0.18; h. t. 2. 0.24; siphuncular pore 0.10.

Collection data: INDIA: HIMACHAL PRADESH, Kufri (c 2633 m), 24.x.79, 1 greyish apterous oviparous ♀ and 2 nymphs from Berberis sp. (Berberidaceae), coll. S. K. Das.

Note: The material could not be identified up to species level because of lack of sufficient material.

Acknowledgement:—The authors are thankful to the University Grants Commission, New Delhi for funding for working on the aphids of Himachal Pradesh.

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PARASITES AND PREDATORS OF APHIDS (HOMOPTERA: APHIDIDAE) FROM INDIA—V. NEW RECORDS OF TWO APHIDIID PARASITES, NINE ARACHNID AND ONE DIPTERAN PREDATORS FROM INDIA


Entomology Laboratory, Department of Zoology, University of Calcutta, Calcutta, India 700 019

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This paper reports 2 aphidiids as parasites, 11 spiders, 12 coccinellids and 5 syrphids as predators of aphids from certain parts of India. 2 species of aphidiids, 9 species of spiders and 1 species of syrphid are new records for India. Apart from the above some aphids are recorded as new hosts for 1 spider species, 9 coccinellid species and 3 syrphid species under Indian conditions.

(Key words: parasites and predators of aphids)

This paper presents the results of extensive surveys in some parts of West Bengal, Sikkim, Uttar Pradesh and Himachal Pradesh for the exploration of aphids and their natural enemies.

Analysis of the collection of natural enemies reveals that it includes parasites and predators. Parasites belong to aphidiidae and predators are comprised of coccinellids, syrphids and spiders. In all, 2 species of Aphidiidae, 12 species of Coccinellidae, 5 species of Syrphidae and 11 species of spiders have been found to be natural enemies of 27 species of aphid hosts.

Review of the literature reveals that among parasites 2 species are new records for India. Of the predatory species, 9 species of spiders and 1 species of syrphid are newly reported from India. Besides, at least for India, 23 species of aphids are recorded as new hosts for some of the predators.

In the text new parasite and predator records for India have been denoted by *mark. New host records have been denoted by ** mark.

Examples of the natural enemies as well as the aphid hosts are in the collection of Entomology Laboratory, Department of Zoology, Calcutta University.

A. PARASITES

Family APHIDIIDAE

1. *Aphidius urticae group

Host: Pseudoacrythosiphon holsti (Takahashi) from Rhododendron sp., 18. v. 1979, Darjeeling (c 2000 m), West Bengal.

Outside India this species is known from Korea, Japan, Central Asia and Europe parasitising aphids of genera Amorphophora, Acyrthosiphon, Macrosiphum Masonaphis, Meioptelis, Dactylos (Takada, 1976; Stary, 1976; Stary and Gonjales, 1978). It appears to be the first record of Aphidius
urticae parasitizing Pseudoacyrthosiphon holsii infesting Rhododendron sp. Pseudoacyrthosiphon holsii is restricted to South East Asia.

2. *Monochtonus nervosus* (Haliday)
   Host: Indet. aphid from indet. host, 31. x. 1978, Kufri (c 2700 m), Himachal Pradesh.
   Outside India this species is known from Japan and Europe (Takada 1968). In Europe it parasitizes *Impatiens balsamina* (Kaltenbach).

B. PREDATORS

Order ARANEIDA

Family ARANEIDAE

1. Araneus sp.
   Host: **Cinara (Lachniella) comata** Doncaster from Pinus sp., 24. x. 1979, Kufri (c 2700 m), Himachal Pradesh.
   Raychaudhuri et al. (1978) reported Araneus sp. as aphidophagous in Sikkim and West Bengal feeding on some aphidine aphids.

2. *Clubiona* sp.
   Host: *Mycus ornatus* Laing from indet. host, 28. x. 1979, Manali (c 2350 m), Himachal Pradesh.
   Bradley and Hinks (1968) recorded *Clubiona mixta* as predaceous on aphids in Manitoba, Canada.

3. *Dictyna* sp.
   Host: *Macrosiphum rosae* (L.) from Rosa sp., 15. x. 1979; Jakhu (c 2400 m), Himachal Pradesh.
   From Manitoba, Canada, 5 species of *Dictyna* have been reported by Bradley and Hinks (1968) as predaceous on *Jackpine* aphids.

Family OXYOPIDAE

4. *Oxyopes javanus* Thorell
   Host: *Lipaphis erysimi* (Kaltenbach) from Brassica sp., 5. v. 1979, Howrah, West Bengal.
   Bradley and Hinks (1968) reported *Oxyopes* sp. as aphidophagous in Manitoba, Canada.

Family SALTICIDAE

5. *Salticus ranjitus* Tikader
   Host: *Lipaphis erysimi* (Kaltenbach) from Brassica sp., 23. ii. 1979, Howra, West Bengal.
   In India it is the fourth record of an aphidophagous spider species under the family Salticidae. Raychaudhuri et al. (1978, 1979) reported *Rhene khandaloensis* Tikader and *Marpissa* sp. from West Bengal.

Family THERIDIIDAE

6. Theridion sp.
   Hosts: **Aphis gossypii** complex from Zinnia sp., 16. x. 1979, Solan (c 1450 m), Himachal Pradesh.
   Earlier this genus has been reported by Raychaudhuri et al. (1978, 1979) from India. From Himachal Pradesh, the predator is newly reported.

Family THOMISIDAE

7. *Camaricus formosus* Thorell
   Host: *Lipaphis erysimi* (Kaltenbach) from Brassica campestris, 6. i. 1980; Howrah, West Bengal.
   Bradley and Hinks (1968) recorded *Marpissa* sp. from *Rosa* sp. 16. x. 1979, Manali (c 2050 m), Himachal Pradesh.
   Bradley and Hinks (1968) recorded *Marpissa* sp. from *Rhododendron* sp. 23. ii. 1979, Howrah, West Bengal.
9. *Philodromus* sp.  
Host: Indet. aphid from a pine plant, 29. x. 1979, Manali (e 2050 m), Himachal Pradesh. 

Bradley and Hinks (1968) recorded 4 species of *Philodromus* feeding on Jackpine aphids in Manitoba, Canada.

10. *Thomisus pujilus* Stoliczka  
Host: *Aphis craccivora* Koch from *Dolichos lablab*, 26, i. 1980, Calcutta, West Bengal.

Family ULOBORIDAE

11. *Hiptita* sp.  
Host: *Macrosiphum* (*Sitobion*) rosaei-formis Das from *Rosa* sp., 7. xi. 1979, Simla (e 2000 m), Himachal Pradesh. 

Bradley and Hinks (1968) recorded 43 species of spiders belonging to 11 families as predators of aphids infesting Jackpine in Manitoba, Canada. Of these 6 genera belonging to 5 families are common with spider predators as reported here.

Order COLEOPTERA  
Family COCCINELLIDAE

12. *Ballia* sp.  
Hosts: **Chaitophorus** sp. from *Populus* sp., 29. x. 1979, Manali (e 2000 m), Himachal Pradesh; **Rhopalosiphum maidis** (Fitch) from *Zea mays*, 14. v. 1979, Kalimpong (e 1100 m), West Bengal.

Verma and Chowdhuri (1975) reported *Ballia* sp. as predaceous on *Brachycoryx helichrysi* (Kltb.) in Himachal Pradesh. Agarwala and Raychaudhuri (in press) reported this species from Sikkim feeding on the same aphid host.

13. *Coccinella septempunctata* L.  
Hosts: **Aphis fabae** complex from *Rumex nepalensis*, 16. vi. 1979, Solan (e 1450 m), Himachal Pradesh; **Capitophorus** sp. from an indet. host, 25.x.1979, Mashobra (e 2149 m), Himachal Pradesh; **Dysaphis* emicis (Mimeur) from an indet host, 22. vi 1979, Mashobra (e 2250 m), Himachal Pradesh; **Heteroneura setariae** (Thomas) from an indet. grass, 14. x. 1979, Solan (e 1450m), Himachal Pradesh; **Pentalonia nigronervosa** Coquerel from *Musa* sp. 14. v. 1979, Kalimpong (e 1100 m), West Bengal; **Pseudocyrtocephalus holstii** (Takahashi) from *Rhododendron* sp., 18. v. 1979, Darjeeling (e 2100m), West Bengal.

In the area of survey this well known cosmopolitan predator of aphids has been found to be most prevalent among the aphidophagous insect and feed on a wide range of aphid hosts. Here six aphid species are recorded as new hosts of this predator. Previously the predator was known to feed on 21 species of aphids in India (Agarwala and Raychaudhuri, in press).

14. *Coccinella transversalis* F.  
Hosts: **Brevicoryne brassicae** (L.) from *Brassica* sp., 17. vi. 1979, Solan (e 1450m), Himachal Pradesh; **Macrosiphum rosae** (L.) from *Rosa* sp. 16. x. 1979, Solan (e 1450m), Himachal Pradesh; **Myzus persicae** (Sulzer) from *Raphanus sativus*, 23. x. 1979, Fagu (e 2510m), Himachal Pradesh.

Nath and Sen (1976) and Ghosh et al. (in press) recorded this predator from West Bengal feeding on *Lipaphis erysimi* (Kaltenbach) infesting mustard and *Aphis craccivora* Koch attacking *Dolichos lablab*.

15. *Coelephora bissellata* Mis.  
Host: **Rhopalosiphum maidis** (Fitch) from *Zea mays*, 14. v. 1979; Kalimpong, (e 1100m), West Bengal.

Agarwala and Raychaudhuri (1981) have mentioned this predator species as also its aphid hosts found in India.
16. Coelophora sexareata Mis.

Hosts: **Pemphigus? napeus** (Buckton) from Populus sp., 23. vi. 1979, Simla (c 2000m), Himachal Pradesh; **Rhopalosiphum maidis** (Fitch) from Zea mays, 14. v. 1979, Kalimpong (c 1100m), West Bengal.

This predator species is new to Himachal Pradesh. Earlier Agarwala et al. (1930) reported the species from Manipur.

17. Cryptogonus quadriguttatus (Weid.)

Host: **Rhopalosiphum maidis** (Fitch) from Zea mays, 14. v. 1979, Kalimpong (c 1100m), West Bengal.

Raychaudhuri et al. (1978 and 1979) recorded this predator from West Bengal attacking some other aphid hosts.

18. Menochilus sexmaculatus (F.)

Hosts: **Aphis ruborum longisetosus** Basu from an indet. host, 1. xi. 1979, Kulu (c 1200m), Himachal Pradesh; **Macrosiphum rosae** (L.) from Rosa sp., 19. vi. 1979, Simla (c 2000m), Himachal Pradesh; **Pemphigus? napeus** (Buckton) from Populus sp., 23. vi. 1979, Simla (c 2000m), Himachal Pradesh.


19. Oeneopia kirby Mis.

Hosts: **Aphis gossypii** complex from Rumex nepalensis, Simla (c 2000m) Himachal Pradesh and an indet. host, 15. v. 1979, Gangtok (c 1675m), Sikkim; **Macroseraphium rosae** (L.) from Rumex hastatus, 5. xii. 1979, Nainital (c 1940m), Uttar Pradesh; **Diphorodon cannabis** (Passerini) from an indet. host, 27. x. 1979, Manali (c 2050m), Himachal Pradesh; **Macrosiphum rosae** (L.) from Rosa sp., 16. x. 1979, Solan (c 1450m), Himachal Pradesh; **Myzus persicae** (Sulzer) from an indet. host, 16. x. 1979, Solan (c 1450m), Himachal Pradesh.

Rao (1969), Chowdhuri and Pal (1971), Raychaudhuri et al. (1978) and Agarwala et al. (1980) have recorded this predator on a number of aphid hosts from different parts of India.

20. Oeneopia insutusculata Mis.

Hosts: **Aphis gossypii** complex from an indet. host, 15. v. 1979, Gangtok (c 1675m), Sikkim; **Rhopalosiphum maidis** (Fitch) from Zea mays, 14. v. 1979, Kalimpong (c 1100m), West Bengal.

This predator is a new record for Sikkim. Raychaudhuri et al. (1978, 1979) and Ghosh et al. (in press) and Agarwala et al. (1980) have recorded the predator from West Bengal and Manipur respectively.

21. Oeneopia sauzeti Mis.

Hosts: **Aphis gossypii** complex from Rumex nepalensis, Simla (c 2000m) Himachal Pradesh and an indet. host, 15. v. 1979, Gangtok (c 1675m), Sikkim; **Coelophora sexareata** Mis. from an indet. host, 19. vi. 1979, Solan (c 1450m), Himachal Pradesh.

This predator is a new record. Raychaudhuri et al. (1978) and Agarwala et al. (1980) have recorded the predator from Manipur and Andhra Pradesh respectively. For Himachal Pradesh this predator is a new record.
Order DIPTERA
Family SYRPHIDAE

Agarwala and Raychaudhuri (in press) showed the distribution and the host spectrum of the syrphid species given below except Syrphus corollae F., the latter being newly reported from India.

23. Episyrphus balteatus (De Geer)
   Host: **Macrosiphoniella sanborni** Gillette from Chrysanthemum sp. 22. x. 1979, Simla (c 2000m), Himachal Pradesh.

24. Ischiodon scutellaris F.
   Host: **Aphis* viridula* Schrank from an indet. host, Kulu (c 1200m), Himachal Pradesh.

25. Melanostoma orientale Wied.
   Hosts: **Macrosiphum* (Sitobion) rosaeformis** Das from Rosa sp., 6. xi. 1979, Sadsupul (c 1300m), Himachal Pradesh.

26. Syrphus corollae F.
   Hosts: *Brevicoryne brassicae* (L.) from *Raphanus sativus*, 27. x. 1979, Manali (c 2050m), Himachal Pradesh; *Myzus persicae* (Sulzer) from *Raphanus sativus*, 27. x. 1979, Manali (c 2050m), Himachal Pradesh.

27. Xanthogramma sp.
   Host: **Hyperomyzus carduellinus** (Theobald) from *Emilia sonchifolia* 14. x. 1979, Solan (c 1450m), Himachal Pradesh.

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STUDIES ON THE APHID PARASITES (HYMENOPTERA:APHIDIIDAE)
FROM HIMACHAL PRADESH, INDIA

and D. Raychaudhuri

Abstract: Eleven species belonging to 7 genera of Aphidiidae
are reported from the state of Himachal Pradesh, India. Of
these, 1 new species Prion hyperomyzus and 2 new records
from India viz. Lysiphlebia rugosa Stary and Schlinger and
Lysiphlebus (Phlebus) confusus Tremblay and Eady are
described.

Out of 80 species of Aphidiidae of India (Agarwala et al., 1981;
Bhagat, 1981), the state of Himachal Pradesh is so far known to be
represented by 4 species under 4 genera.

More systematic survey for aphidiid parasites of Himachal Pradesh
during 1979—81 has resulted in the find of 11 species under 7
genera. These include, 1 new species Prion hyperomyzus, 2 new
records from India, Lysiphlebia rugosa Stary and Schlinger and
Lysiphlebus (Phlebus) confusus Tremblay and Eady, 6 new records to
the state, viz. Aphidius colemani Viereck, Aphidius matricariae
Halday, Aphidius uzbekistanicus Luzhetski, Lysiphlebus (phlebus)
ambiguus (Halday), Ephedrus plagiator (Nees), Trioxys (Ephedrus)
indicus Subha Rao and Sharma and 22 species of aphids (marked with *)
as new host records from India.

Present paper accounts for the aphidiid parasites of Himachal
Pradesh, collected by the Entomology Laboratory, Dept. of Zoology,
Calcutta University. In doing so, a generic key, species key
wherever necessary, collection data for each of the species along
with taxonomic notes wherever needed have been provided besides
the descriptions of new species and newly recorded species from
India.

The materials are deposited in the collection of the Entomology
Laboratory, Dept. of Zoology, University of Calcutta, India.
Abbreviations used are: IOL = Interocular line; FL = Facial line; HW = Width of head; TFL = Transfacial line; ITL = Inter tentorial line; TOL = Tentorio-ocular line; VED = Vertical eye diameter; LED = Longitudinal eye diameter; \( F_1 \) = Length; \( F_2 \) = Breadth; \( P_1 \) = \( P_2 \) length; \( P_2B \) = Breadth; \( P_1B \) = Pterostigma length; \( P_2P \) = Width; MC = Metacarpus; \( R \) = Radial vein; \( R_1 \) = Radial abs.; \( R_2 \) = Abs. II; \( R_3 \) = Abs. III; Tergite I = L = Length; B = Breadth at spiracular level.

Key to the genera

1. Wing venation well developed; pterostigmal cell complete; interradial veins I and II present.......................... Ephedrus Haliday
   - Wing venation ill developed; pterostigmal cell incomplete.................. 2
2. Median vein completely developed but 1st and 2nd interradial veins absent. Pupation under the host aphid in a separate cocoon.......................... Praon Haliday
   - Median vein incompletely developed or absent........................ 3
3. Radial and median cells confluent, open, not completed by interradial vein II along their external margin; median vein absent.......................... 4
   - Radial and median cells confluent, distinctly completed by interradial vein II along their external margin.......................... 5
4. Terminal abdominal sternite with anal prong; antennae 11-segmented in female.............................. Trioxys Haliday
   - Terminal abdominal sternite without anal prong; antennae 13-segmented in female.......................... Diaeretiella Starf
5. Intermedian + median veins present; ovipositor sheaths slightly curved upward; antennae with various number...... Aphidius Nees
   - Part of median vein visible, under interradial vein II, or absent.......................... 6
6. Propodeum completely areolated; tergite I coarsely rugose, with central longitudinal carinae...... Lysiphlebus Starf and Schlinger
   - Propodeum without complete areola, sometimes entirely smooth or with two divergent post median longitudinal carinae at the posterior part; tergite I smooth and without carina.......................... Lysiphlebus Förster

I. Genus Aphidius Nees


(Type-species: Aphidius avenae Haliday, 1834)
Key to the species

1. Pterostigma 3.2 times as long as its maximum width; antennae 16–17 segmented; tentorial index 0.46..................
   - Pterostigma 4.6 – 5.0 times as long as its maximum width; antennae 14–15 segmented; tentorial index between 0.3 – 0.4.
   ..............................uzbekianicus Luzhetski

2. Pterostigma 5.0 times as long as its maximum width; tergite I 3.4 times as long as its maximum width at spiracles; tentorial index 0.32..................matricariae Haliday
   - Pterostigma 4.6 times as long as its maximum width; tergite I 2.5 times as long as its maximum width at spiracles; tentorial index 0.4..........................colemani Viereck

1. Aphidius colemani Viereck
   Measurements of the female in mm: Length of body — 2.51. Head: IOL 0.35; FL 0.35; HW 0.48; TFL 0.18; TTL 0.11; TLC 0.04; GW 0.06; SD 0.06; SOL 0.03; VE 0.20; LED 0.15; Antenna - broken; FjL 0.10; F2L 0.04; F2R 0.10; F2B 0.04. Wing: Fl 0.44; FM 0.10; MC = 0.32; R 0.13; R 0.09. Tergite I : L 0.30; B 0.12.
   Host: *Aphis fabae* sp. on indet host plant; coll. Loc. Solan, c 1450 m, 27.3.1980.

2. Aphidius matricariae Haliday
   Measurements of one female in mm: Length of body — 2.14. Head: IOL 0.29; FL 0.30; HW 0.36; TFL 0.13; TTL 0.16; TLC 0.03; GW 0.01; SD 0.01; SOL 0.03; VE 0.20; LED 0.11; Antennal segment 1h; FjL 0.08; F2L 0.04; F2R 0.09; F2B 0.03. Wing: Fl 0.40; FM 0.08; MC 0.35; R 0.19; R 0.19. Tergite I : L 0.24; B 0.07.
   Host: *Aphis fabae* group on *Sesamum indicum*, coll. Loc. Solan, c 1450 m, 16.6.1979; *Aphis nasturtii* Kaltenbach on indet plant host; coll. Loc. Solan, c 1450 m, 25.3.1980; *Capitophor us carduinus* (Walker) on indet plant host, coll. Loc. Manali, c 2050 m, 17.10.1979; *Capitophorus formosartemisiae* (Takahashi) on *Artemisia* sp., coll. Loc. Solan, c 1450 m, 26.3.1980; *Diplophorodon cannabis* (Passerini) on *Cannabis sativa*, coll. Loc. Chamba, c 726 m, 3.11.1980; coll. Loc. Palampur, c 1250 m, 6.11.1980; *Maerospisiphonella pseudoartemisiae* Shinji on *Artemisia* sp., coll. Loc. Solan, c 1450 m, 26.3.1980; *Myzus*
Aaphidius uzbekistanicus Luzhetzki

The measurements of one female in mm are as follows: Length of body — 2.88; Head: IOL 0.40; FL 0.33; HW 0.46; TFL 0.18; TOL 0.03; GW 0.07; SD 0.04; SOL 0.02; VED 0.23; LED 0.11. Antennal segments — 14; F1L 0.11; F2L 0.03; F3L 0.10; F2B 0.18. Wing: PL 0.40; PW 0.08; MC 0.30; R 0.25. Tergite I: L 0.33; B 0.11.


II. Genus Diaeretiella Starý


(Type-species: *Aphi d ius rapae* M'Intosh, 1855)

4. Diaeretiella rapae (M'Intosh)


Measurements of one female in mm: Length of body — 2.28; Head: IOL 0.40; FL 0.33; HW 0.46; TFL 0.18; TOL 0.03; GW 0.07; SD 0.04; SOL 0.02; VED 0.23; LED 0.11. Antennal segments — 14; F1L 0.11; F2L 0.03; F3L 0.10; F2B 0.18. Wing: PL 0.40; PW 0.08; MC 0.30; R 0.25. Tergite I: L 0.33; B 0.11.


III. Genus Ephedrus Haliday


(Type-species: Bracon plagiator Nees, 1811)

Key to the species

1. Pterostigma 6.5 times as long as its maximum width; F1 5.0 times as long as broad; abdomen dark brown entirely................

.............................................. lacertosus (Haliday)

- Pterostigma 4.2 to 5.2 times as long as its maximum width; ovipositor sheath very slender; radial abscissa II distinctly longer than interradial vein I................... plagiator (Nees)

5. Ephedrus lacertosus (Haliday)

Aphidius (Ephedrus) lacertosus Haliday, 1833, Ent. Mag, 1: 486.

Measurements of the male in mm: Length of body — 2.15. Head: IOL 0.39; FL 0.33; HW 0.43; TTL 0.18; TFL 0.10; TOL 0.03; GW 0.08; SD 0.05; SOL 0.02; VED 0.23; LED 0.13. Antennal segments 11; F1L 0.24; F1B 0.05; F2L 0.19; F2B 0.06. Wing: PL 0.72; PW 0.11; MC 0.83; R1 0.34; R11 0.65. Tergite 1: L 0.28; B 0.24.

Hosts: *Dactyloctenium aterrimum* Mas, Raychaudhuri and Raychaudhuri on Delphinium sp. coll. Loc. Simla, c 2000m, 22.10.1979; *Macroarthrum (Stichonis) miscanthi* Takahashi on indet host plant, coll. Loc. Simla, c 2000m, 22.10.1979.

6. Ephedrus plagiator (Nees)


Measurements of one female in mm: Length of body — 2.47. Head: IOL 0.40; FL 0.37; HW 0.45; TTL 0.21; TFL 0.09; TOL 0.03; GW 0.03; SD 0.06; SOL 0.02; VED 0.23; LED 0.10. Antennal segments 11; F1L 0.13; F1B 0.05; F2L 0.13; F2B 0.05. Wing: PL 0.52; PW 0.10; MC 0.65; R1 0.27; R11 0.52. Tergite 1: L 0.28; B 0.14.

IV. Genus Lysiphlebia Stary and Schlenger


(Type-species: Lysiphlebia japonica Ashmead, 1906)

7. Lysiphlebia rugosa Stary and Schlenger


Lysiphlebia rugosa Stary and Schlenger, being a new record from the Indian subcontinent, its description is given below.

Female: (Fig. 1a-1d). Head rounded, smooth, sparsely haired, little wider than thorax at tegulae; temple 1/3 of vertical eye diameter; gena about 1/2 of longitudinal eye diameter; eyes large, oval and sparsely haired; inter-ocular line 2.5 times longer than transfacial line; facial line about 1/2 of intertentorial line;

Fig. 1: a - d. Lysiphlebia rugosa Stary and Schlenger
a. Head; b. Wing; c. Propodeum; d. Tergite I
socket-ocular line 2/5 shorter than socket diameter. Antenna broken.

Mesoscutum arcuately falling to prothorax, smooth, with sparse hairs. Propodeum areolated; carina prominent, some irregular. Wing: Pterostigma 4 times as long as wide; metacarp little longer than 1/2 of the pterostigmal length, radial abscissa 1/3 longer than width of pterostigma. Abdomen lanceolate. Tergite I less than twice as long as width at spiracles, coarsely rugose. Spiracles prominent. Distance between spiracular tubercle and apex of tergite I a little shorter than width at spiracles. Coloration: Head yellowish brown; lower part of intertentorial line and mouth parts yellow. Scapes, pedicel and F3 yellowish brown. Thorax brown, mesoscutum and scutellum appear yellowish. Wings hyaline, venation brown. Legs pale yellow. Anterior portion of abdomen yellow; posterior abdominal segments blackish brown laterally.

Measurements of one female in mm: Length of body—1.58. Head: IOL 0.28; FL 0.36; HW 0.40; TFL 0.18; TETL 0.09; TOL 0.04; GW 0.07; SD 0.05; SOL 0.03; VED 0.18; LED 0.13. Antennae broken; F1 0.10; F2 0.06; P2L 0.06; P3L 0.10; P4L 0.06. Wing: FL 0.40; PW 0.10; NW 0.26; K7 0.16; K8 0.14. Tergite I: L 0.23; B 0.14.

Host: *Brachycaitdus beliobrysi* (Kaltb.) on *Gnaphaliun* sp. coll. Loc. Solan, c 1400 m, 16.10.1979.

Note: Present material differs from the original one of the species (Starf and Schlinger, 1967) in the following respects:
1. Gena 1/2 as long as longitudinal eye diameter, 2. Transfacial line half to subequal of intertental line, 3. Tergite I 1.64 times as long as wide at spiracular level.

V. Genus Lysiphlebus Förster


(Type-species: *Aphidius* [Bowco] *dissolatus* [Nees] [Starf, 1961])

Key to the species:
1. Radial abscissa less than 1/2 of the pterostigmal length; P3 less than 2 times of its breadth; temple 1/5 of vertical eye diameter; hairs of lower and anterior margin of fore wing longer than those on surface....................*ambiguus* (Haliday)
2. Radial abscissa more than 1/2 of the pterostigmal length; P3 2.5 times as long as its breadth; temple less than 1/4 of vertical eye diameter....................*confusus* Tremblay & Eady
8. Lysiphlebus (Phlebus) ambiguus (Haliday)

Aphidius (Aphidius) ambiguus Haliday, 1834. Ent. Mag. 2: 104.


Measurements of the female in mm (Fig. 2a — 2b).

- Length of body: 1.37
- Head: IOL 0.26, FL 0.26, HW 0.38, TFL 0.19, ITL 0.10, TOL 0.06, GW 0.08, SD 0.05, SOL 0.04, VED 0.15, LED 0.09.
- Antennal segments: I 0.07, II 0.07, III 0.07, IV 0.03.
- Wing: PL 0.30, PW 0.08, MC 0.28, % 0.13, Fu 0.13.
- Tergite I: L 0.19, B 0.10.


9. Lysiphlebus (Phlebus) confusus Tremblay and Eady


This species is new to India, and described as below.

Female (Fig. 3a — 3c).
- Head wider than thorax at tegulae; widely transverse, hairless; temples about 1/3 narrower than vertical eye.
diameter; gena nearly as long as longitudinal eye diameter; eyes moderate round, slightly convex; transfacial line slightly more than 1/2 of inter-ocular line; tentorio-ocular line 2/3 of inter-tentorial line; socket-ocular line 3/5 of socket diameter. Antennal segments 13. $F_1$ and $F_2$ of equal length, 2.5 times as long as broad at base.

Mesoscutum with short hairs, notaulics effaced on disc and poorly indicated at ascending part. Propodeum smooth, few hairs laterally. Wing: Pterostigma triangular, 3.8 times as long as wide; metaecarpus about 2/3 of pterostigmal length. Abdomen lanceolate. Tergite I 1.66 times as long as its width at spiracles. Spiracular tubercles prominent. Lower half with sparse hairs.


Measurement of one female in mm: Length of body — 2.51. Head: IOL 0.30; FL 0.33; HW 0.14; TTL 0.17; ITTL 0.10; TOL 0.07; GW 0.13; SD 0.05; SOL 0.03; VED 0.20; LED 0.14; Antennal segments 13; $F_1L$ 0.10; $F_2L$ 0.04; $F_3L$ 0.10; $F_4L$ 0.04. Wing: PL 0.38; PW 0.10; MC 0.25; $R_1$ 0.18; $R_2$ 0.24. Tergite I: L 0.25; B 0.12.


VI. Genus Praon Haliday


(Type-species: *Praon eoleius* Hees, 1811)

10. *Praon hyperomyzus*, n. sp.

Present material shows close resemblance to *Praon grossum* Starg, but can be differentiated by tergite I and mesoscutum.

Holotype: Female (Fig.4a — 4f): Head subcubical, smooth, sparsely haired; gena 1/2 of longitudinal eye diameter. Eyes of medium size, oval, without hairs; inter-ocular line little shorter than transfacial line. Tentorio-ocular line about 1/3 of inter-tentorial line. Antennae filiform, broken (partly), $F_1$ about 5 times as long as wide, $F_2$ 2/3 of $F_3$, socket-ocular line 2/3 of socket diameter. Mesoscutum falling vertically to prothorax. Central lobe pubescent, major portion of lateral lobes hairless. Propodeum smooth, pubescent. Pterostigma about 4 times as long as wide, metaecarpus 2/3
of radial vein. Abdomen lanceolate. Tergite I little longer than wide at spiracles with distinct lateral carina. Distance between spiracular tubercles and apex 1/2 of the width at spiracles. Spiracular tubercles prominent. Genitalia as figured (Fig. 4f).


Length of body — 2.68 mm. Male. Antennal segments 22. Apex of abdomen brown otherwise description is similar to female excepting some minor differences.

Material: #Hyperomyzus carduellinus# (Theobald), Simla, o 1450 m (Himachal Pradesh), 14.10.1979 on #Emilia sonchifolia#. Holotype: female; paratypes: 1 female, 1 male.

Fig. 4: a — f. Praon hyperomyzus, n. sp. a. Head; b. Wing; c. Mesoscutum; d. Propodeum; e. Tergite I; f. Genitalia.
Measurements of one female in mm: Length of body — 2.68. Head: IOL 0.32; FL 0.30; HW 0.40; TFL 0.12; ITL 0.10; TOL 0.05; GW 0.06; SD 0.06; SOL 0.04; VED 0.05; LED 0.12; Antennal segments broken; F1L 0.14; F2B 0.03; F2L 0.10; F2B 0.03. Wing: FL 0.46; PW 0.12; MC 0.16; R 0.26. Tergite I: L 0.22; B 0.16.


VII. Genus Trioxys Haliday

Tryoxys Haliday, 1833. Ent. Mag., 1: 261, 488.

(Type-species: *Aphidius cirrati* Curtis, 1831)

11. *Tryoxys* (Binodoxys) indicus Subba Rao and Sharma


Measurements of one female in mm: Length of body — 1.22. Head: IOL 0.34; FL 0.35; HW 0.41; TFL 0.16; ITL 0.11; TOL 0.05; GW 0.08; SD 0.05; SOL 0.03; VED 0.22; LED 0.11. Antennal segments 11; F1L 0.14; F2B 0.04; F2L 0.14; F2B 0.04. Wing: FL 0.42; PW 0.11; MC 0.22; R 0.41. Tergite I: L 0.28; B 0.11.

Host: *Aphis fabae* group on *Rubus ellipticus*, coll. Loc. Mandi, c 2050 m, 26.10.1979; *Aphis gossypii* group on *Solanum nigrum*, coll. Loc. Solan, c 1495 m, 15.10.1979; *Maurostrongylus (Stictocephalidae) poaeiformis* Das on indet host plant, coll. Loc. Simla, c 2000 m, 22.10.1979; *Proaiphilus* sp. on *Populus* sp., coll. Loc. Mandi, c 2050 m, 27.10.1979.

Acknowledgement

The authors are gratefully indebted to late Prof. D. N. Raychudhuri for suggesting the work. Stark, P. deserves sincere thanks for identifying some of the studied materials and Profs. M. Sasakawa and H. Takada for critically going through the manuscript. Helps rendered by Mr. S. K. Basu for camera lucida drawings is also thankfully acknowledged. Thanks are also due to UGC for partly financing the work and to Prof. K. C. Ghosh, the Head of Dept. of Zoology for providing laboratory facilities.
References


Authors’ address: J. L. Saha, S. C. Poddar, S. K. Das and D. Raychaudhuri
Entomology Laboratory, Department of Zoology, Calcutta University, 35, Ballygunge Circular Road, Calcutta - 19, India.

B. K. Agarwala
Department of Life Science, P.G. Studies Centre, Calcutta University, Agartala - 799 004, India.
PARASITOIDS AND PREDATORS OF APHIDS (HOMOPTERA: APHIDIDAE) FROM INDIA - VI. NEW RECORDS OF SEVEN ARACHNIDS, ONE DIPTERAN AND ONE NEUROPTERAN PREDATORS FROM HIMACHAL PRADESH, INDIA

S. K. Das & D. Raychaudhuri
Entomology Laboratory, Department of Zoology, Calcutta University, Calcutta, India 700 019

(Received 10 April 1982)

This paper reports 2 aphidids as parasitoids, 13 spiders, 12 coccinellids, 8 syrphids and 1 chrysopid as predators of aphids from Himachal Pradesh, Northwest India. 7 species of spiders, 1 species of syrphid and the species of chrysopid are new records for India. Apart from the above the aphids are recorded as new hosts for the parasitoids and predators.

(Key words: Parasitoids and predators of aphids)

This paper reports the parasitoids and predators of aphids of Himachal Pradesh collected during the period 1979-81. Out of the 34 recorded species of predatory components, 21 are insects and 13 are spiders. Insect predators are comprised of 12 coleopterans, 8 dipterans and 1 neuropteran species. Similar studies for aphid parasitoids revealed the occurrence of 2 belonging to the family Aphidiidae.

Aphid predators include 9 species as new records for India. Besides, host records for each of the predators and parasitoid species are new for India.

New records for Predators have been denoted by (*) mark.

Examples of the natural enemies, except the parasitoid No. 2 (Presently with Dr. Shuja Uddin) as well as the aphid hosts are in the collection of Entomology Laboratory, Department of Zoology, Calcutta University.

A. PARASITOIDS:

Family : Aphidiidae

Host record for each of the parasitoids mentioned below are further additions to the list of host spectrum of Indian Aphidiidz provided by Agarwala et al. (1981 a, b), (Saha et al. 1982).

<table>
<thead>
<tr>
<th>Parasitoids</th>
<th>Aphid host</th>
<th>Host plants</th>
<th>Locality</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Aphidius smithi</td>
<td>Anaphorophora</td>
<td>Indet fern</td>
<td>Katrain (c 1464 m)</td>
<td>31.viii.80</td>
</tr>
<tr>
<td>Sharma and Subba Rao</td>
<td>ampullata bengalensis Hrl &amp; Busu</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Lysaphidus quadrii</td>
<td>Myzus ornatus</td>
<td>Indet plant</td>
<td>Simla (c 2000 m)</td>
<td>11.xi.80</td>
</tr>
<tr>
<td>Shuja Uddin</td>
<td>Laing</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
B. PREDATORS

Order: ARANEIDA

Agarwala et al. (1981a), Battu and Singh (1975), Raychaudhuri et al. (1978, 1979) so far recorded 22 species of spiders as the natural enemies of all aphid species from India.

<table>
<thead>
<tr>
<th>Parasitoids</th>
<th>Aphid hosts</th>
<th>Host plants</th>
<th>Locality</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Family: Araneidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Araneus sp.</td>
<td>Capitophorus formosae (Yak.)</td>
<td>Artemisia sp.</td>
<td>Katrain (c 1464 m)</td>
<td>7.V.80</td>
</tr>
<tr>
<td>2. Neoscona rumpfi (Thorell)</td>
<td>Myzus dycet Carver</td>
<td>Urica</td>
<td>Solan pur-siflora (c 1450 m)</td>
<td>14.X.71</td>
</tr>
<tr>
<td>3. Neoscona spp.</td>
<td>Chaitophorus kaphri Hrl</td>
<td>Populus sp.</td>
<td>Manali (c 2050 m)</td>
<td>24.VI.81</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Liosomophis himalayensis Basu</td>
<td>Berberis sp.</td>
<td>do</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Metopolophium phaseoli (Chakrabarti, Ghosh and Raychaudhuri)</td>
<td>Spiraea canescens</td>
<td>do</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Neomegaurapis dowerensis (Ghosh and Raychaudhuri)</td>
<td>Indet</td>
<td>Mashobra (c 2149 m)</td>
</tr>
<tr>
<td>Family: Clubionidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Clubiona sp.</td>
<td>Aphis gossypii complex</td>
<td>Indet plant</td>
<td>Manali (c 2050 m)</td>
<td>28.X.7</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Macrosiphoniella sonborni (Gillette)</td>
<td>Chrysanthemum sp.</td>
<td>Solan (c 1450 m)</td>
</tr>
<tr>
<td>Family: Dictynidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Dictyna sp.</td>
<td>Chaeosiphon</td>
<td>Rosa sp.</td>
<td>Jakhull (c 2455 m)</td>
<td>21.X.7</td>
</tr>
<tr>
<td></td>
<td>(Pentatrichopus tettorholum (Walker))</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Family: Tetragnathidae</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>6. Eucta javana</td>
<td>Aphis spiraccola</td>
<td>Solanum nigrum</td>
<td>Solan (c 1450 m)</td>
<td>18.VI.7</td>
</tr>
<tr>
<td>Thorell</td>
<td>Patch</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Family: Theridiidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. Theridion sp.</td>
<td>Globulicauduphis pakistanica HRL</td>
<td>Quercus sp.</td>
<td>Mashobra (c 2149 m)</td>
<td>10.XI.81</td>
</tr>
<tr>
<td></td>
<td>Nippolachnus piri Mats.</td>
<td>Quercus sp.</td>
<td>Simla (c 2000 m)</td>
<td>27.VI.81</td>
</tr>
<tr>
<td>Family: Thomisidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. Misumena sp.</td>
<td>Macrosiphum roseae (Lin.)</td>
<td>Rosa sp.</td>
<td>do</td>
<td>19.VI.79</td>
</tr>
</tbody>
</table>
### Parasitoids and Predators of Aphids

<table>
<thead>
<tr>
<th>Predators</th>
<th>Aphid hosts</th>
<th>Host plants</th>
<th>Locality</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>9. <em>Misumenops</em></td>
<td><em>Macrosiphum indicum</em></td>
<td>Basu</td>
<td>Indet grass</td>
<td>1.xi.80</td>
</tr>
<tr>
<td>khandalaensis</td>
<td></td>
<td></td>
<td>Banikhet</td>
<td></td>
</tr>
<tr>
<td>Tikadar</td>
<td></td>
<td></td>
<td>(c 1610 m)</td>
<td></td>
</tr>
<tr>
<td>10. <em>Oxypilla</em></td>
<td><em>Myzus ornatus</em></td>
<td>Indet plant</td>
<td>Dalhousie</td>
<td>10.vi.81</td>
</tr>
<tr>
<td>sp.</td>
<td>Laing</td>
<td></td>
<td>(c 2036 m)</td>
<td></td>
</tr>
<tr>
<td>11. <em>Philodromus</em></td>
<td><em>Brevicoryne</em></td>
<td><em>Raphanus</em></td>
<td>Fagu</td>
<td>23.x.79</td>
</tr>
<tr>
<td>decoratus</td>
<td>brassicae (Lin.)</td>
<td>sativus (c 2510 m)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tikadar</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12. <em>Xysticus</em></td>
<td><em>Myzus mumecola</em></td>
<td>Indet plant</td>
<td>Kufri</td>
<td>11.iv.80</td>
</tr>
<tr>
<td>minutus</td>
<td>(Mats.)</td>
<td></td>
<td>(c 2633 m)</td>
<td></td>
</tr>
<tr>
<td>Tikadar</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13. <em>Xysticus</em></td>
<td><em>Eutrichosiphum</em></td>
<td><em>Quercus</em></td>
<td>Dharmasala</td>
<td>17.vi.81</td>
</tr>
<tr>
<td>sp.</td>
<td>(Neoparatrichosiphum)</td>
<td>sp.</td>
<td>(c 1435 m)</td>
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<tr>
<td></td>
<td><em>khasyanum</em> (Ghosh and Raychaudhuri)</td>
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</tr>
<tr>
<td></td>
<td><em>Myzus ornatus</em></td>
<td>Indet plant</td>
<td>Dalhousie</td>
<td>10.vi.81</td>
</tr>
<tr>
<td></td>
<td>Laing</td>
<td></td>
<td>(c 2036 m)</td>
<td></td>
</tr>
</tbody>
</table>

Order: COLEOPTERA
Family: Coccinellidae

1. *Adonia* variegata (Goeze)
   *Aphis spiraecola* (Patch)
   Predatory stage—
   grub and adult
   do Indet plant Joginder-nagar
   do Rumex nepalensis Kasauni
   do *Raphanus sativus* Simla
   do *Brassica* sp. (c 2000 m) 3.iv.80
   do *Sonchus* sp. (c 1927 m) 30.iii.80
   *Brevicoryne brassicae* (Lin.)
   do *Raphanus sativus* (c 2510 m) 23.x.79
   do *Brassica* sp. (c 1495 m) 15.x.79
   *Daectynotus sonchii* (Lin.)
   do *Sonchus* sp. (c 1927 m) 30.iii.80
   *Hyperomyzus cardue linus* (Theobald)
   do (c 1296 m) 7.xi.80
   *Liosonaphis himalayensis* Basu
   *Berberis* sp. Simla
   (c 2000 m) 1.iv.80
   *Macrosiphum rosae* (Lin.)
   *Rosa* sp. Solan
   (c 1495 m) 15.x.79
   *Myzus ornatus* Laing
   *Salvia* sp. Chail
   (c 2250 m) 5 xi 79
<table>
<thead>
<tr>
<th>Predators</th>
<th>Aphid hosts</th>
<th>Host plants</th>
<th>Locality</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>2. Coccinella Septempunctata Linnaeus</td>
<td><em>Aphis ruborum</em> longiseiosus Baus</td>
<td><em>Rubus ellipticus</em></td>
<td>Solan (c 1450 m)</td>
<td>25.iii.80</td>
</tr>
<tr>
<td>Predator stage—grub and adult</td>
<td><em>Cavariella nектoporbid</em> (Scopoli)</td>
<td><em>Salix</em> sp.</td>
<td>Kasauli (c 1927 m)</td>
<td>30.iii.80</td>
</tr>
<tr>
<td></td>
<td>do</td>
<td><em>Indet plant</em></td>
<td>Simla (c 2000 m)</td>
<td>1.iv.80</td>
</tr>
<tr>
<td></td>
<td><em>Cheetosiphon (Chaetosiphon)</em> graccicorns David, Rajasingh and Narayanan</td>
<td><em>Rosa</em> sp.</td>
<td>Kharighat (c 1596 m)</td>
<td>28.iii.80</td>
</tr>
<tr>
<td></td>
<td><em>Lionomapis atra</em> HRL</td>
<td><em>Valeriana wallichii</em></td>
<td>Simla (c 2000 m)</td>
<td>2.iv.80</td>
</tr>
<tr>
<td></td>
<td><em>Macrosiphum rosaeformis</em> Das</td>
<td><em>Rosa</em> sp.</td>
<td>Kharighat (c 1596 m)</td>
<td>28.iii.80</td>
</tr>
<tr>
<td></td>
<td><em>Matsumuraja capitophorodes</em> HRL</td>
<td><em>Rosa</em> sp.</td>
<td>Simla (c 2000 m)</td>
<td>1.iv.80</td>
</tr>
<tr>
<td></td>
<td><em>Myzus cymbalariae</em> Siroyan</td>
<td><em>Indet plant</em></td>
<td>do</td>
<td></td>
</tr>
<tr>
<td></td>
<td><em>Myzus dycei</em> Carver</td>
<td><em>Urtica</em> sp.</td>
<td>Kasauli (c 1927 m)</td>
<td>30.iii.80</td>
</tr>
<tr>
<td></td>
<td><em>Myzus numecola</em> (Mats.)</td>
<td><em>Indet plant</em></td>
<td><em>Kufri</em> (c 2633 m)</td>
<td>11.iv.80</td>
</tr>
<tr>
<td></td>
<td><em>Myzus ornatus</em> Laing</td>
<td><em>Salvia</em> sp.</td>
<td>Chail (c 2250 m)</td>
<td>5.xi.79</td>
</tr>
<tr>
<td></td>
<td>do</td>
<td><em>Indet plant</em></td>
<td>Simla (c 2000 m)</td>
<td>1.iv.80</td>
</tr>
<tr>
<td></td>
<td><em>Nippolachmis</em> sp.</td>
<td><em>Quercus</em> sp.</td>
<td>Kufri (c 2633 m)</td>
<td>24.x.79</td>
</tr>
<tr>
<td></td>
<td><em>Tricaudatus polygoni</em> (Nart.)</td>
<td><em>Spiraea cantonensis</em></td>
<td>Kasauli (c 1927 m)</td>
<td>30.iii.80</td>
</tr>
<tr>
<td>3. Coelophora sexareata Mulsant</td>
<td><em>Indosiljopius gerani</em> (Chowdhuri, Basu, Chakrabarti and Raychaudhuri)</td>
<td><em>Indet plant</em></td>
<td>Barog (c 1531 m)</td>
<td>27.iii.80</td>
</tr>
<tr>
<td>Predator stage-adult</td>
<td><em>Macrosiphum miscanthi</em> Tak.</td>
<td><em>Indet plant</em></td>
<td>do</td>
<td>27.iii.80</td>
</tr>
<tr>
<td>Predators</td>
<td>Aphid hosts</td>
<td>Host plants</td>
<td>Locality</td>
<td>Date</td>
</tr>
<tr>
<td>-----------</td>
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</tr>
<tr>
<td>4. Cryptognus sp</td>
<td>Aphis spiraecola</td>
<td>Ipomea sp.</td>
<td>Solan (e 1495 m)</td>
<td>15.x.79</td>
</tr>
<tr>
<td>Predatory stage adult</td>
<td>Capitophorus formosorum (Tak.)</td>
<td>Artemisia sp.</td>
<td>Chamba (e 726 m)</td>
<td>3.xi.80</td>
</tr>
<tr>
<td>Impatiens semperflorens</td>
<td>Impatiens sp.</td>
<td>Dalhousie (e 2036 m)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Verma</td>
<td>Plectrhophorus glandulosus (Kitch.)</td>
<td>Artemisia sp.</td>
<td>Chamba (e 726 m)</td>
<td>3.xi.80</td>
</tr>
<tr>
<td>Pterostylis spinicostata</td>
<td>Myzus persicae</td>
<td>Ipomea sp.</td>
<td>Solan (e 1495 m)</td>
<td>15.x.79</td>
</tr>
<tr>
<td>(Sulzer)</td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>5. Exochomus neopygialis Mulsant</td>
<td>Myzus ornatus Laing</td>
<td>Indet plant</td>
<td>Simla (e 2000 m)</td>
<td>1.iv.80</td>
</tr>
<tr>
<td>Predatory stage adult</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Letis dimidatus (Fabricius)</td>
<td>Myzus ornatus Laing.</td>
<td>Salvia sp.</td>
<td>Chail (e 2250 m)</td>
<td>5.xi.79</td>
</tr>
<tr>
<td>Predatory stage adult</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. Menochilus semivittatus (Fabricius)</td>
<td>Cavariella similisnensis</td>
<td>Indet plant</td>
<td>Kufri (e 2633 m)</td>
<td>11.iv.80</td>
</tr>
<tr>
<td>Chowdhuri, Basu and Raychaudhuri</td>
<td>Coloradoa raumamulata (Wilson)</td>
<td>Chrysanthenum sp.</td>
<td>Solan (e 1450 m)</td>
<td>15.x.79</td>
</tr>
<tr>
<td>Predatory stage grub and adult</td>
<td>Hyaduphis coriandri Das</td>
<td>Indet plant</td>
<td>do</td>
<td>31.iii.80</td>
</tr>
<tr>
<td>Liosomus aspis (HRL)</td>
<td>Berberis sp.</td>
<td>do</td>
<td>26.iii.80</td>
<td></td>
</tr>
<tr>
<td>8. Oenopia kirby Mulsant</td>
<td>Aphis spiraecola</td>
<td>Solanum nigrum</td>
<td>Palampur (e 1260 m)</td>
<td>6.xi.80</td>
</tr>
<tr>
<td>Predatory stage grub and adult</td>
<td>Aphis parvicornutus</td>
<td>Indet plant</td>
<td>do</td>
<td>6.xi.80</td>
</tr>
<tr>
<td>9. Oenopia parvicornutus (Sulzer)</td>
<td>Myzus persicae</td>
<td>Zinnia elegans</td>
<td>Simla (e 2000 m)</td>
<td>22.x.79</td>
</tr>
<tr>
<td>Predatory stage grub and adult</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Predators</td>
<td>Aphid hosts</td>
<td>Host plants</td>
<td>Locality</td>
<td>Date</td>
</tr>
<tr>
<td>--------------------</td>
<td>------------------------------</td>
<td>--------------</td>
<td>----------</td>
<td>-------</td>
</tr>
<tr>
<td>10. <em>Oenopia sauzeti</em></td>
<td><em>Aphis kurosawai</em> Tak.</td>
<td><em>Artemisia</em> sp.</td>
<td>Chamba</td>
<td>2.xi.80</td>
</tr>
<tr>
<td>Preparatory stage-adult</td>
<td><em>Capitoaphorus</em></td>
<td>do</td>
<td>do</td>
<td>4.xi.80</td>
</tr>
<tr>
<td></td>
<td><em>formosarumisae</em> (Tak.)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><em>Covariella aegopodii</em> (Scopoli)</td>
<td><em>Rhus ellipticus</em></td>
<td><em>Kulu</em></td>
<td>7.iv.80</td>
</tr>
<tr>
<td></td>
<td><em>Liozonomassia atra</em> HRL</td>
<td><em>Berberis</em> sp.</td>
<td><em>Solan</em></td>
<td>26.iii.80</td>
</tr>
<tr>
<td></td>
<td><em>Melisangis donets</em> (Passerini)</td>
<td><em>Indet grass</em></td>
<td>Chamba</td>
<td>4.xi.80</td>
</tr>
<tr>
<td>11. <em>Rhus pyrochelias</em></td>
<td><em>Capitoaphorus formosarumisae</em> (Tak.)</td>
<td><em>Artemisia</em> sp.</td>
<td>do</td>
<td>4.xi.80</td>
</tr>
<tr>
<td>Preparatory stage-adult</td>
<td><em>Covariella aegopodii</em> (Scopoli)</td>
<td><em>Salix</em> sp.</td>
<td><em>Kasauli</em></td>
<td>30.iii.80</td>
</tr>
<tr>
<td>12. <em>Scymnus</em> sp.</td>
<td><em>Covariella aegopodii</em> (Scopoli)</td>
<td><em>Indet plant</em></td>
<td>Solan (c 1435 m)</td>
<td></td>
</tr>
</tbody>
</table>

Order: DIPTERA
Family: Syrphidae

Agarwala et al. (1081 a), Agarwala et al. (1982) have listed the host range, distribution of 31 syrphid species from India. *Syrphus vitripennis* Meigen is being reported here as a new aphidophagous insect from India.

1. *Betasyrphus serra tus* (Weidmann) | *Aphis verbasci* Schrank | *Verbascum thapsus* | Solan (c 1450 m) | 15.xi.79 |
2. *Episyrphus balteatus* (de Geer) | *Indoiopterus gerani* (Chowdhuri, Basu, Chakrabarti and Raychaudhuri) | *Urtica* sp.  | *Jakhu* (c 2455 m) | 12.iii.80 |
3. *Ischiodon scutellaris* (Fabricius) | *Aphis ponicae* Passerini | *Indet plant* | Solan (c 1450 m) | 26.iii.80 |
The species is known to feed on 8 species of aphids in Taiwan (Tao and Chiu, 1971). Earlier Atwal and Sethi, (1963), Behura (1963, 1965), Ghosh et al. (1981), Rahman (1940) and Rao (1969) reported this genus from India as aphidophagous.

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REFERENCES
S. K. DAS AND D. RAYCHAUDHURI


