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## COCCID INSECTS IN THE WESTERN SHIVALIK HIMALAYA AND ADJACENT AREAS (INSECTA : HEMIPTERA : COCCOIDEA)

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### INTRODUCTION

Among the sucking insects, aphids and coccids cause maximum havoc, as they reproduce profusely, disperse easily and infest variety of plants, many of which are of considerable economic importance. Some of these insects act as vectors of certain diseases in plants.

Coccid insects, generally known as the scale insects and mealybugs, are quite common in gardens, fruit orchards and on valuable crops like sugarcane, mango and tea. There is no account available at present on these insects occurring in the Shivalik Himalaya. Hence, an attempt has been made here to point out those species of coccids, which have been reported from Himachal Pradesh, Punjab and part of Jammu & Kashmir states. The 'distribution' records shown below, however, have been restricted to India only, although many of the species occur in other countries also.

San Jose scale (*Quadraspidiotus perniciosus*) invited earliest attention in this region. It was studied in Jammu & Kashmir, but was and still is common in Himachal Pradesh as well, on such valuable plants as the apple, peach, plum, pear, almond, apricot, cherry, walnut and oak. Green (1916) described coccids of pine trees. Ansari (1942, 1945) dealt with the then Punjab coccids. Coccid fruit pests of NW India were reported by Pruthi & Batra (1960). Species from Himachal Pradesh have been enlisted by Sharma & Bhalla (1964), Mishra & Bhalla (1975) and recently Ghosh *et al.*, (in press). From some nearer areas, recently Coccids of Western Himalaya-Uttar Pradesh (Varshney, 1995), Coccids of Indian Thar desert (Varshney, 1996) and Coccids of Delhi (Varshney, 1997) have been reported.

Khan & Ansari (1941) reported those scale insects of the then Punjab and NWFP (now in Pakistan) which were mistaken for the San Jose scale. Rao & Chatterjee (1950) also reported on the same subject. Varshney (1984a) counted a total of 16 species only from NW Himalaya. In the present

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paper, 27 species (plus 5 more mentioned in 'Remarks') in 22 genera and 7 families are included. It may be mentioned that from the Eastern Shivalik Himalaya, covering the States of Uttaranchal and Uttar Pradesh, a total of 25 species, belonging to 19 genera and 8 families are known.

Two genera, *Humococcus* Ferris and *Drepanococcus* Williams & Watson, are reported for the first time here in the Indian literature on coccids. A key to separate the families is given by Varshney (1985).

## SYSTEMATIC ACCOUNT

Superfamily COCCOIDEA

Family 1. MONOPHLEBIDAE

Subfamily MONOPHLEBINAE

Tribe ICERYINI

Genus *Icerya* Signoret

1875. *Icerya* Signoret, *Anls. Soc. Ent. France*, (5)4 : 258.

*Type species* : *Coccus sacchari* Guerin-Meneville.

1. *Icerya purchasi* Maskell. Cottony Cushion scale.

(Fig. 1)

1879. *Icerya purchasi* Maskell, *Trans. Proc. New Zealand Instt.*, 11(1878) : 221.

1930. *Icerya purchasi* : Ayyar, *Bull. Imp. Instt. Agr. Res., Pusa*, 197(1929) : 71.

1950. *Icerya purchasi* : Rao, *Indian J. Ent.*, 12 : 34.

*Distribution* : Almost cosmopolitan. In India recorded widely including from Maharashtra, Orissa, Karnataka, Kerala, Tamil Nadu *etc.* (Varshney, 1992).

*Host plants* : On many plant species of *Acacia*, *Berberis*, *Casuarina*, *Ficus*, *Leucas*, *Malus*, *Prunus*, *Pyrus*, *Rhamnus* *etc.*

*Remarks* : Ghosh *et al.*, (in press) have reported it from W. Himalaya (H.P.). Another species, *Icerya pilosa* Green, is reported from areas closer to Shivaliks, like Haryana : Karnal; Delhi and U.P. : Meerut *etc.*

Tribe DROSICHINI

Genus *Drosicha* Walker

1858. *Drosicha* Walker, *List Spec. Hom. Ins. Coll. Br. Mus. Supl.* : 306.

*Type species* : *Drosicha contrahens* Walker.

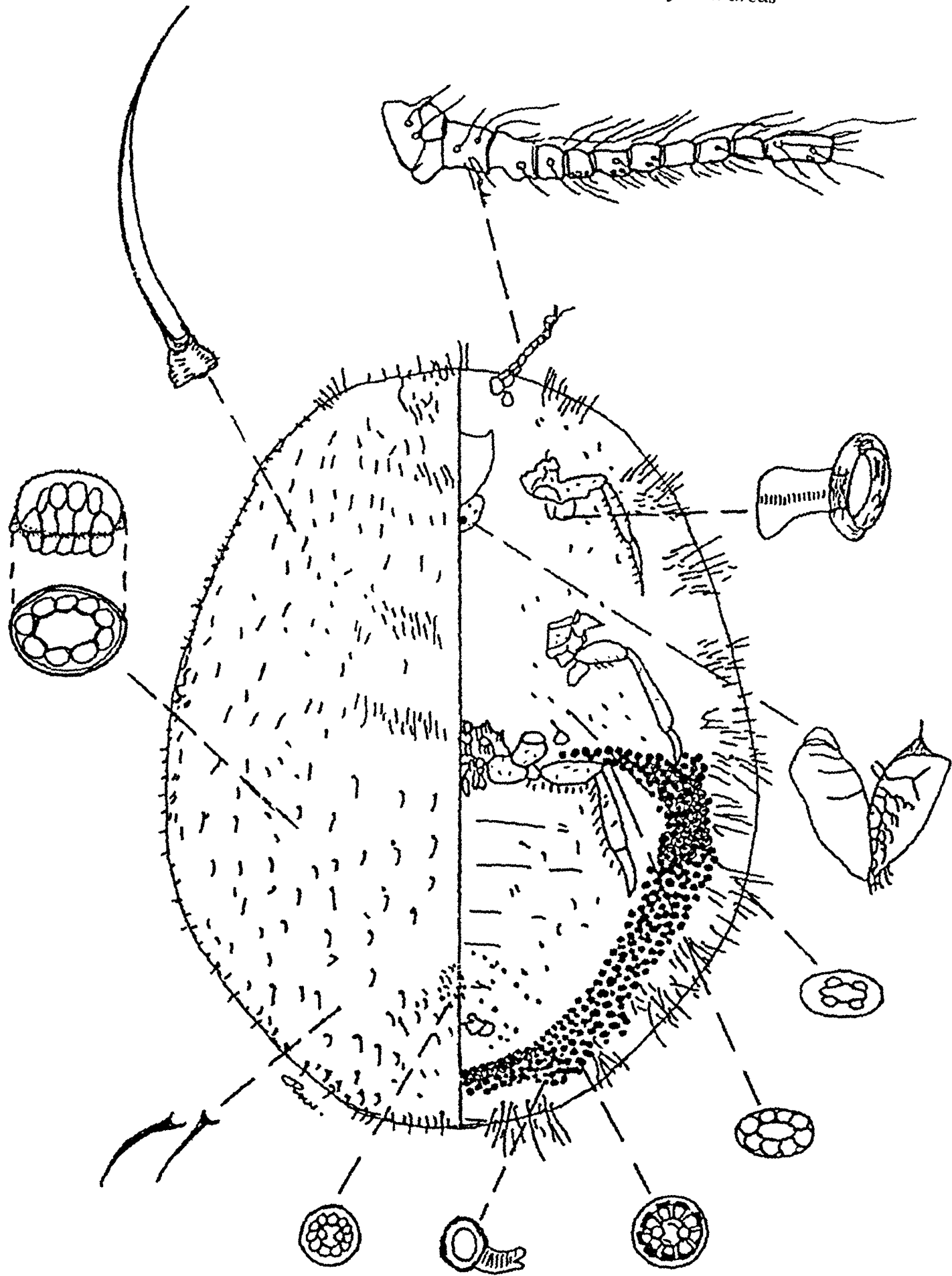


Fig. 1. : *Icerya purchasi* Maskell.

## 2. *Drosicha* sp.

1992. *Drosicha* spp. : Varshney, *Rec. zool. Surv. India, Occ. Paper*, 139 : 17.

*Material examined* : Two ex., one young one and another adult female; from C.P.W.D. Guest House garden, Madhopur, Dist. Gurdaspur, Punjab; Coll. R. K. Varshney, Aug., 2002.

*Distribution* : Genus is distributed widely in India, including H.P., Punjab, Uttaranchal, U.P., Bihar, M.P., etc.

*Host plants* : Jamun (*Syzygium cumini*) and *Hibiscus rosasinensis* of the above material.

*Remarks* : The collection spot was by the side of a big canal of the Ravi river, where a barrage has been built in 1954.

## 3. *Drosicha dalbergiae* (Green)

1903. *Monophlebus dalbergiae* Green, *Indian Mus. Notes*, 5(3) : 101.

1921. *Monophlebus dalbergiae* : Ayyar, *Proc. 4th Ent. Mtg. Pusa* : 337.

1945. *Drosicha dalbergiae* : Pruthi & Mani, *Imp. Agr. Res. Instt. Monogr.*, 16 : 7.

1970. *Drosicha dalbergiae* : Ali, *Indian Mus. Bull.*, 5(1) : 75.

*Distribution* : Mostly in India, including Punjab, Uttaranchal and North Bihar.

*Host plants* : *Dalbergia sissoo*, *Artocarpus integrifolia*, *Annona squamosa*, *Citrus* spp., *Punica granatum*, *Mangifera indica* etc.

*Remarks* : Recorded from the Sutlej Valley in Punjab (Pruthi & Mani, 1945).

## 4. *Drosicha stebbingi* (Green)

1902. *Monophlebus stebbingii* Green, in Stebbing, *Dept. Notes Insects affect. Forestry*, 1 : 135.

1921. *Monophlebus stebbingi* : Ayyar, *Proc. 4th Ent. Mtg. Pusa* : 337.

1970. *Drosicha stebbingi* : Ali, *Indian Mus. Bull.*, 5(1) : 78.

1992. *Drosicha stebbingii* : Varshney, *Rec. zool. Surv. India, Occ. Paper*, 139 : 18.

*Distribution* : Widely in India, including H.P., Haryana, Uttaranchal, U.P., Bihar, W. Bengal, M.P., Rajasthan etc.

*Host plants* : On many plants including *Shorea robusta*, *Mangifera indica*, *Tamarindus indica*, *Ficus* spp., *Butea monosperma*, *Pyrus malus*, *Prunus cerasus*, *Eugenia jambolana* etc.

*Remarks* : This species is reported from Shimla Division (Himachal Pradesh) on Sal trees (Stebbing, 1903).

Family 2. TACHARDIIDAE

Subfamily TACHARDIINAE

Genus *Kerria* Targioni-Tozzetti

1884. *Kerria* Targioni-Tozzetti, *Ann. di Agr. 1884, Min. di Agr. Indus. e Com., Italy* : 410.

*Type species* : *Coccus lacca* Kerr.

5. *Kerria fici fici* (Green). Ficus Lac insect.

(Fig. 2)

1903. *Tachardia fici* Green, *Indian Mus. Notes*, 5(3) : 97.1923. *Lakshadia ficii* : Mahdihassan, *J. Sci. Asso. Maharajah's College, Vizianagaram*, 1(2-3) : 57.1925. *Laccifer fici* : Chamberlin, *Bull. Ent. Res.*, 16(1) : 36.1977. *Kerria fici fici* : Varshney, *Oriental Ins. Suppl.*, 5(1976) : 34.*Distribution* : India : J. & K., Delhi, Rajasthan, U.P., Bihar, W. Bengal, M.P. and Tamil Nadu.*Host plants* : On species of *Ficus*, *Samanea*, *Ziziphus*, *Butea* and *Litchi*.*Remarks* : One of the two commonest lac insects in India. It is recorded from Jammu in the J. & K. state (Mahdihassan, 1937).

## Family 3. KERMESIDAE

Genus *Kermes* Boitard1828. *Kermes* Boitard, *Les Gallinsectes. In : Man. d'Ent. Hist. Nat. Ins.*, 2 : 171.*Type species* : *Coccus variegatus* Gmelin.6. *Kermes himalayensis* Green1909. *Kermes himalayensis* Green, *Ent. mon. Mag.*, 45 : 10.1921. *Kermes himalayensis* : Ayyar, *Proc. 4th Ent. Mtg. Pusa* : 343.1992. *Kermes himalayensis* : Varshney, *Rec. zool. Surv. India, Occ. Paper*, 139 : 36.*Distribution* : Known from its original record only. It is endemic in North-West Himalaya. Exact locality of occurrence not known.*Host plants* : Oak trees, *Quercus incana* and *Q. dilatata*.*Remarks* : It is a domed-scale, 2–3 mm, living on foliage and branchlets of *Quercus dilatata* (Beeson, 1961).

## Family 4. DACTYLOPIIDAE

Genus *Dactylopius* Costa1835. *Dactylopius* O. G. Costa, *Fauna del Regno di Napoli, Fam. de Cocc. Gallins. Emi. Napoli*, 2 : 15.*Type species* : *Coccus adonidum* Linn.7. *Dactylopius indicus* (Green)

(Fig. 3)

1908. *Coccus indicus* Green, *Mem. Dept. Agr. India, (Ent.)*, 2(2) : 28.1930. *Dactylopius indicus* : Ayyar, *Bull. Imp. Inst. Agr. Res. Pusa*, 197(1929) : 56.

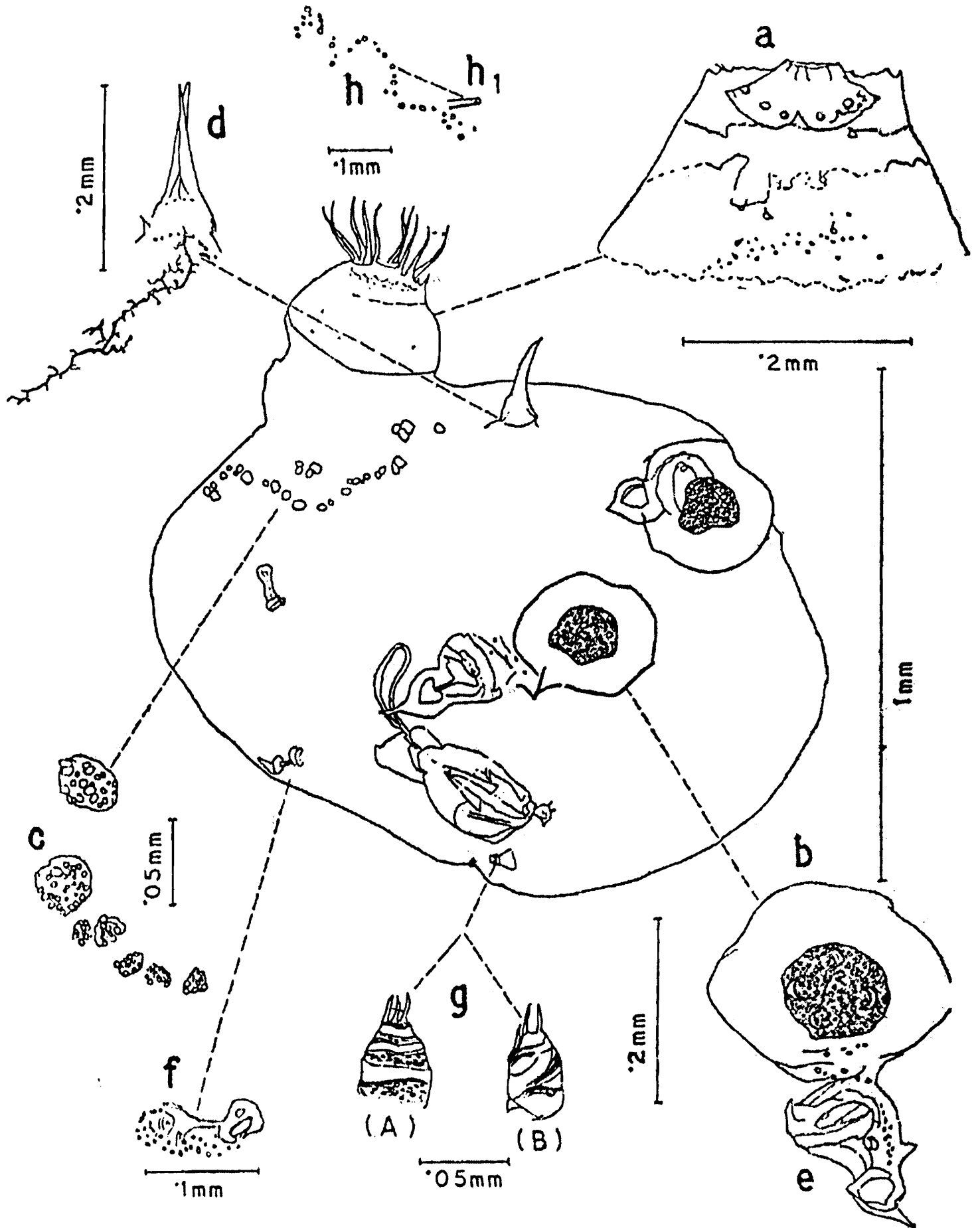


Fig. 2. : *Kerria fici fici* (Green).

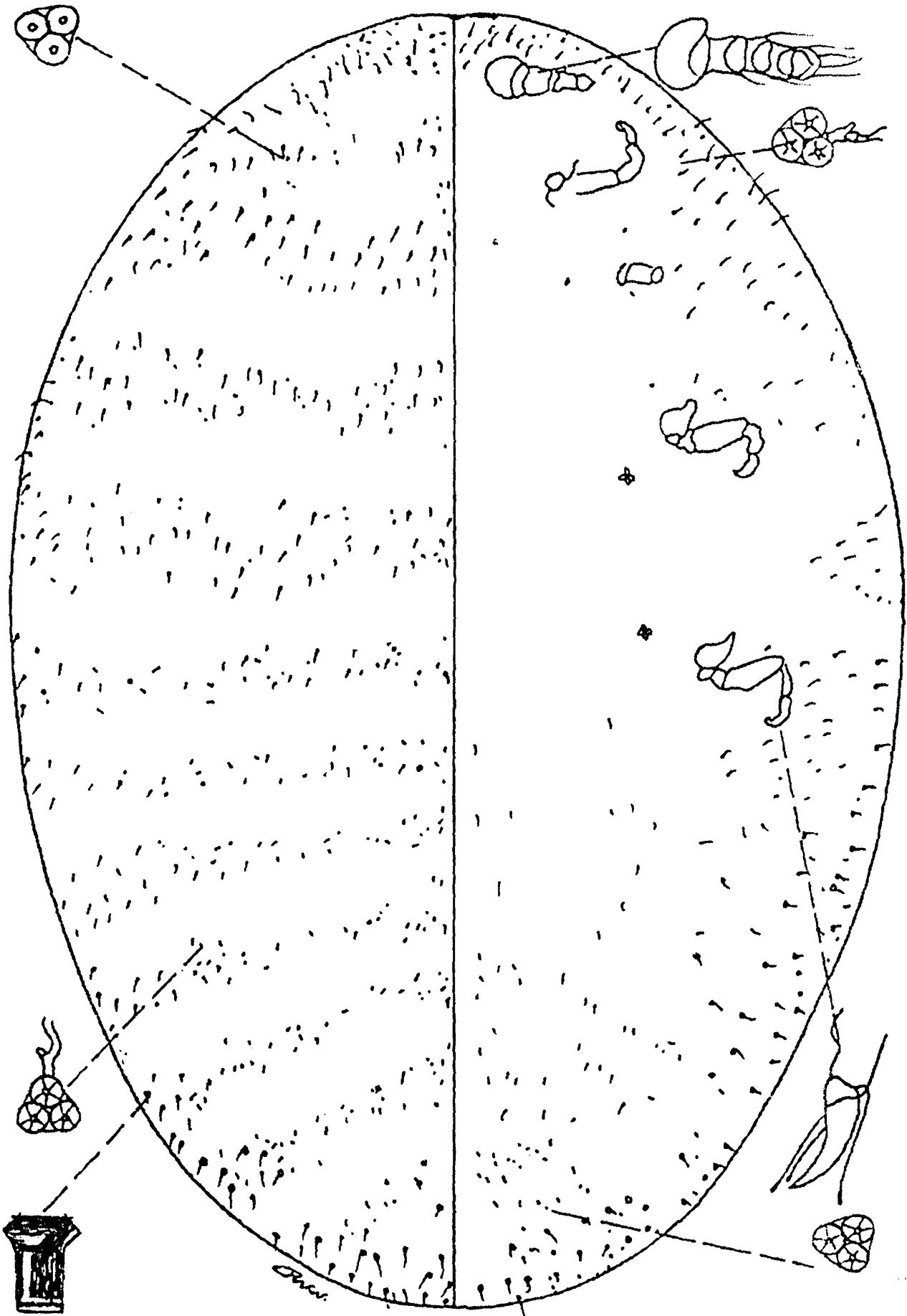


Fig. 3. : *Dactylopius indicus* (Green).

1970. *Dactylopius indicus* : Ali, *Indian Mus. Bull.*, 5(2) : 74.

1992. *Dactylopius indicus* : Varshney, *Rec. zool. Surv. India, Occ. Paper*, 139 : 37.

*Distribution* : H.P., Bihar, W. Bengal, Orissa, Andhra Pradesh and Tamil Nadu.

*Host plants* : *Opuntia monocantha*, *Opuntia* sp.

*Remarks* : Recorded from 'Kangra in the Punjab' on *Opuntia dillenii* (Green, 1908). Ayyar (1930) stated that this insect has been so far found on *O. monocantha* only and does not infest *O. dilleniae*.

#### Family 5. PSEUDOCOCCIDAE

#### Subfamily PSEUDOCOCCINAE

#### Tribe PHENACOCCINI

#### Genus *Nipaecoccus* Sulc

1945. *Nipaecoccus* Sulc, *Acta Soc. Sci. Nat. Morav.*, 17(3) (Sign. F177) : 1.

*Type species* : *Dactylopius nipae* Maskell.

#### 8. *Nipaecoccus viridis* (Newstead)

(Fig. 4)

1894. *Dactylopius viridis* Newstead, *Indian Mus. Notes*, 3(5) : 25.

1921. *Pseudococcus (Dactylopius) viridis* : Ayyar, *Proc. 4th Ent. Mtg. Pusa* : 343.

1930. *Pseudococcus filamentosus* var. *corymbatus* : Ayyar, *Bull. Imp. Instt. Agr. Res. Pusa*, 197(1929) : 59.

1957. *Pseudococcus vastator* : Ali, *Indian J. Ent.*, 18(4) (1956) : 469.

1970. *Nipaecoccus viridis* : Ali, *Indian Mus. Bull.*, 5(2) : 113.

1992. *Nipaecoccus viridis* : Varshney, *Rec. zool. Surv. India, Occ. Paper*, 139 : 43.

*Distribution* : Very widely in India, including Tamil Nadu, Kerala, Karnataka, Andhra Pradesh, Orissa, Goa, Maharashtra, Delhi, Himachal Pradesh, U.P., Bihar, W. Bengal and NE. India.

*Host plants* : On many plants including *Abrus*, *Abelmoschus*, *Artocarpus*, *Citrus*, *Casuarina*, *Dalbergia*, *Emblica*, *Euphorbia*, *Ixora*, *Morus*, *Nerium*, *Opuntia*, *Psidium*, *Solanum*, *Tephrosia*, *Ziziphus* etc.

*Remarks* : It was collected from Joginder Nagar and Mandi in H.P., by Dr. M. Hayat in 1967, from unidentified hosts (Ali, 1970).

*Nipaecoccus* sp. collected from Nabha and Patiala in Punjab (Varshney, 1992). One immature specimen of another pseudococcid species, *Maconellicoccus hirsutus* (Green), collected on the cotton plant, was reported from Ludhiana (Punjab) for the first time (Varshney, 1984b).



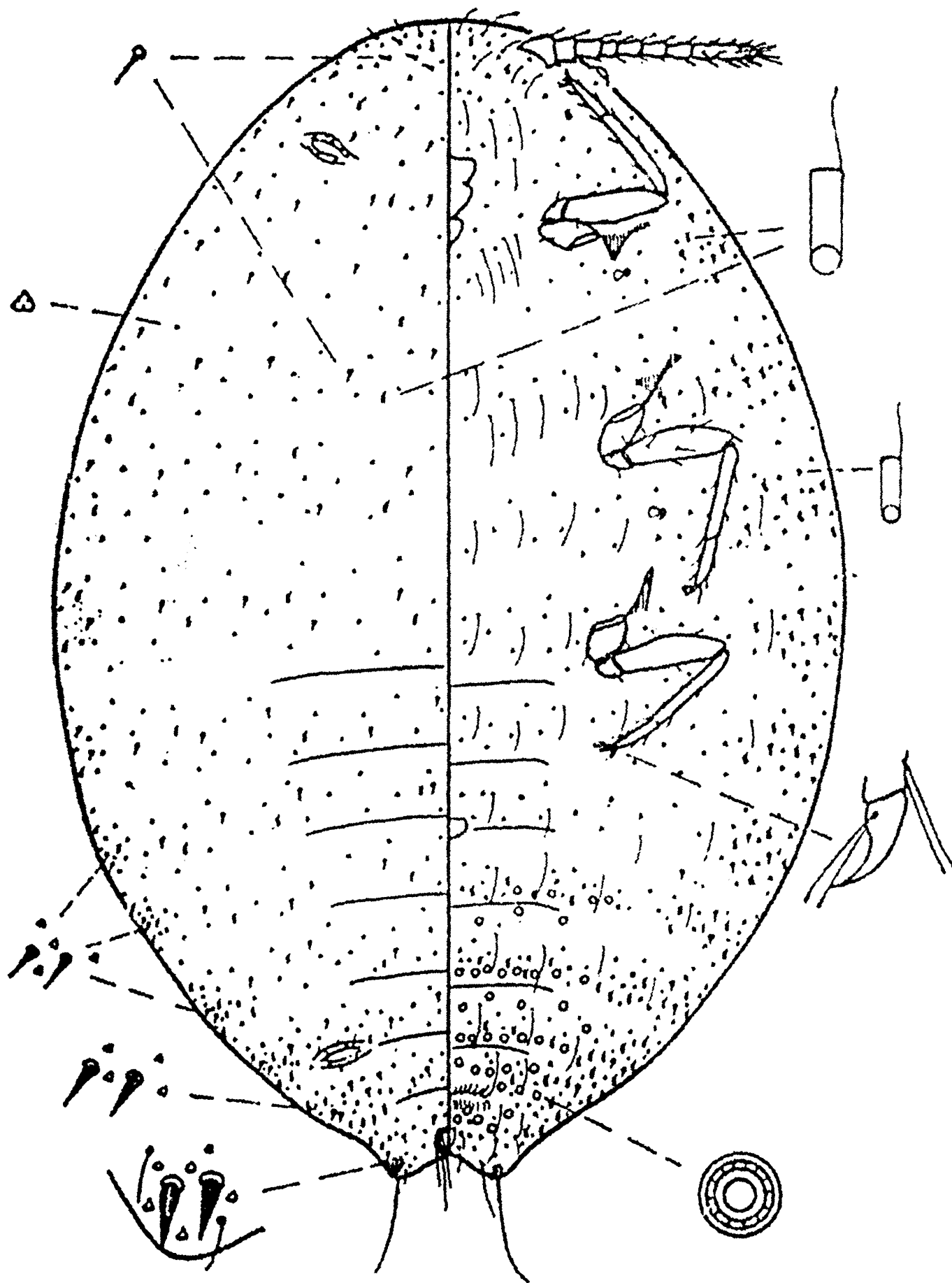


Fig. 4. : *Nipaecoccus viridis* (Newstead).

Genus *Humococcus* Ferris

1953. *Humococcus* Ferris, *Atlas of Scale Ins. N. America*, 6 : 370.

*Type species* : *Ripersia hilariae* Ferris.

9. *Humococcus resinophila* (Green)

1916. *Ripersia resinophila* Green, *Bull. Ent. Res.*, 6 : 395.

1921. *Ripersia resinophila* : Ayyar, *Proc. 4th Ent. Mtg. Pusa* : 345.

1970. *Ripersia resinophila* : Ali, *Indian Mus. Bull.*, 5(2) : 121.

1992. *Ripersia resinophila* : Varshney, *Rec. zool. Surv. India, Occ. Paper*, 139 : 48.

*Distribution* : Known from its original record only. Occurs in NW. Himalaya in Himachal Pradesh, J. & K. and Uttaranchal.

*Host plants* : *Pinus longifolia* and *P. excelsa*.

*Remarks* : Fletcher (1919) reported it from Kumaon and Kashmir under 'Kamraj Division' (Ali, 1970). Varshney (1992) recorded it from Kangra in Himachal Pradesh.

Recently Matile-Ferrero & Ben-Dov (1995) have placed it in the genus *Humococcus*, on the basis of the examination of 'Types' by Dr. D. J. Williams. This genus is reported here for the first time in Indian literature.

## Family 6. COCCIDAE

## Subfamily FILIPPINAE

Genus *Drepanococcus* Williams & Watson

1990. *Drepanococcus* Williams & Watson, *Scale Ins. Trop. S. Pacific Reg.*, Pt. 3 : 102.

*Type species* : *Eriochiton cajani* Maskell.

10. *Drepanococcus cajani* (Maskell)

1891. *Eriochiton cajani* Maskell, *Indian Mus. Notes*, 2(1) : 61.

1908. *Ceroplastodes cajani* : Green, *Mem. Dept. Agr. India, (Ent.)*, 2(2) : 32.

1921. *Ceroplastodes cajani* : Ayyar, *Proc. 4th Ent. Mtg. Pusa* : 346.

1974. *Ceroplastodes cajani* : Ali, *Indian Mus. Bull.*, 6(2) (1971) : 53.

1992. *Ceroplastodes cajani* : Varshney, *Rec. zool. Surv. India, Occ. Paper*, 139 : 106.

*Distribution* : Widely in India, including H.P., Punjab, Gujarat, Bihar, W. Bengal, Orissa, A.P., Tamil Nadu and Kerala.

*Host plants* : On *Cajanus cajan* (= *Cajanus indicus*), *Ziziphus mauritiana*, *Ocimum sanctum*, *Coleus* sp., *Ficus* spp., *Abrus precatorius* etc.

*Remarks* : Recorded from Mandi in Himachal Pradesh and Phillaur in Punjab (Varshney, 1992).

Recently Williams & Watson (1990) have created a new genus *Drepanococcus* to accommodate this group of species. This genus is reported here for the first time in the Indian literature.

11. *Drepanococcus chiton* (Green)

1909. *Ceroplastodes chiton* Green, *Coccidae of Ceylon*, Pt. 4 : 287.  
 1921. *Ceroplastodes chiton* : Ayyar, *Proc. 4th Ent. Mtg. Pusa* : 346.  
 1974. *Ceroplastodes chiton* : Ali, *Indian Mus. Bull.*, 6(2) (1971) : 53.  
 1992. *Ceroplastodes chiton* : Varshney, *Rec. zool. Surv. India, Occ. Paper*, 139 : 107.

*Distribution* : Widely in India, including H.P., Uttaranchal, W. Bengal, N. E. India and Andaman Islands.

*Host plants* : *Cassia* sp., *Cajanus cajan*, *Ficus* spp., *Ziziphus mauritiana*, *Morus alba*, *Carica papaya*, *Citrus aurantifolia*, *Theobroma cacao*, *Solanum melongena* etc.

*Remarks* : Collected from Kulu in Himachal Pradesh, on *Ficus* sp., by Dr. M. Hayat in 1967 (Ali, 1974).

Though originally proposed in *Ceroplastodes* by Green (1908, 1909), this species is now included in genus *Drepanococcus* (Ben-Dov, 1993). This genus is recorded here for the first time in Indian literature.

## Subfamily COCCINAE

## Tribe COCCINI

Genus *Akermes* Cockerell

1902. *Akermes* Cockerell, *Can. Ent.*, 34 : 89.

*Type species* : *Akermes bruneri* Cockerell.

12. *Akermes montanus* (Green)

1908. *Lecanium montanum* Green, *Mem. Dept. Agr. India, (Ent.)*, 2(2) : 30.  
 1909. *Akermes montanum* : Sanders, *U. S. Dept. Agr., Bur. Ent., (Tech.)*, 16(3) : 46.  
 1921. *Lecanium (Akermes) montanum* : Ayyar, *Proc. 4th Ent. Mtg. Pusa* : 350.  
 1974. *Akermes montanus* : Ali, *Indian Mus. Bull.*, 6(2) (1971) : 19.  
 1992. *Akermes montanus* : Varshney, *Rec. zool. Surv. India, Occ. Paper*, 139 : 81.

*Distribution* : Endemic to Himalaya. Known from its original record only, in Himalaya.

*Host plants* : On an undetermined shrub.

*Remarks* : This species was described from a locality called 'Janusai', which is probably in Himachal Pradesh.

Genus *Coccus* Linnaeus

1758. *Coccus* Linnaeus, *Syst. Nat.*, ed. 10 : 455.

*Type species* : *Coccus hesperidum* Linn.

### 13. *Coccus ramakrishnai* (Ayyar)

1919. *Lecanium ramakrishnae* Green in Ayyar, *Bull. Imp. Agr. Res. Instt. Pusa*, **87** : 35.  
 1930. *Lecanium ramakrishnae* : Ayyar, *Bull. Imp. Agr. Res. Instt. Pusa*, **197**(1929) : 47.  
 1985. *Coccus ramakrishnai* : Varshney, *Oriental Ins.*, **19** : 26.  
 1992. *Coccus ramakrishnae* : Varshney, *Rec. zool. Surv. India, Occ. Paper*, **139** : 87.

*Distribution* : Endemic to India. Reported from Andhra Pradesh and Himachal Pradesh only.

*Host plants* : *Ficus bengalensis* and the pear (*Pyrus communis*).

*Remarks* : This species was originally identified by Green, but first published by Ayyar (1919, 1930) as a 'MS' (manuscript name). He however, provided brief description and also illustration, which made the name and species available in terms of International Code of Zoological Nomenclature (Ben-Dov, 1993). This species is not included in the Oriental catalogue by Ali (1974).

Another very common species, *Coccus hesperidum* Linn., the brown soft scale, (Fig. 5), was recorded for the first time from Jammu & Kashmir State : Srinagar, on *Lonicera* plant, by Varshney (1984b).

### Genus *Eulecanium* Cockerell

1893. *Eulecanium* Cockerell, *Trans. Amer. Ent. Soc.*, **20** : 54.

*Type species* : *Lecanium tiliae* Linnaeus, Thorn scale.

### 14. *Eulecanium* sp. (near *tiliae* Linnaeus)

(Fig. 6)

1758. *Coccus tiliae* Linnaeus, *Syst. Nat.*, ed. **10** : 456.  
 1758. *Coccus coryli* Linnaeus, *Syst. Nat.*, ed. **10** : 456.  
 1767. *Coccus capreae* Linnaeus, *Syst. Nat.*, ed. **12** : 741.  
 1974. *Eulecanium capreae* : Ali, *Indian Mus. Bull.*, **6**(2) (1971) : 31.  
 1992. *Eulecanium* sp. (nr. *tiliae*) : Varshney, *Rec. zool. Surv. India, Occ. Paper*, **139** : 90.

*Distribution* : Genus *Eulecanium* is recorded from Jammu & Kashmir, Himachal Pradesh and Uttaranchal, in India.

*Host plants* : Apple (*Malus pumila*), peach (*Prunus persica*), almond (*Prunus amygdalus*), apricot (*Prunus armeniaca*), plum (*Prunus domestica*) etc.

*Remarks* : This record is from Saproon Valley and Kotta-ka-Nala in Himachal Pradesh (Mishra & Bhalla, 1975; Varshney, 1992). *E. capreae* is recorded from Srinagar and Taliskar in Kashmir (Ali, 1974) and *E. coryli* has also been recorded from J. & K.

The name *Coccus coryli* Linn. was rejected by Opinion No. 1303 of the I.C.Z.N. *Coccus capreae* was synonymized with *tiliae*, by Lindinger in 1912 (Ben-Dov, 1993). *E. tiliae* and *E. coryli* have not been included in the Oriental catalogue by Ali (1974).

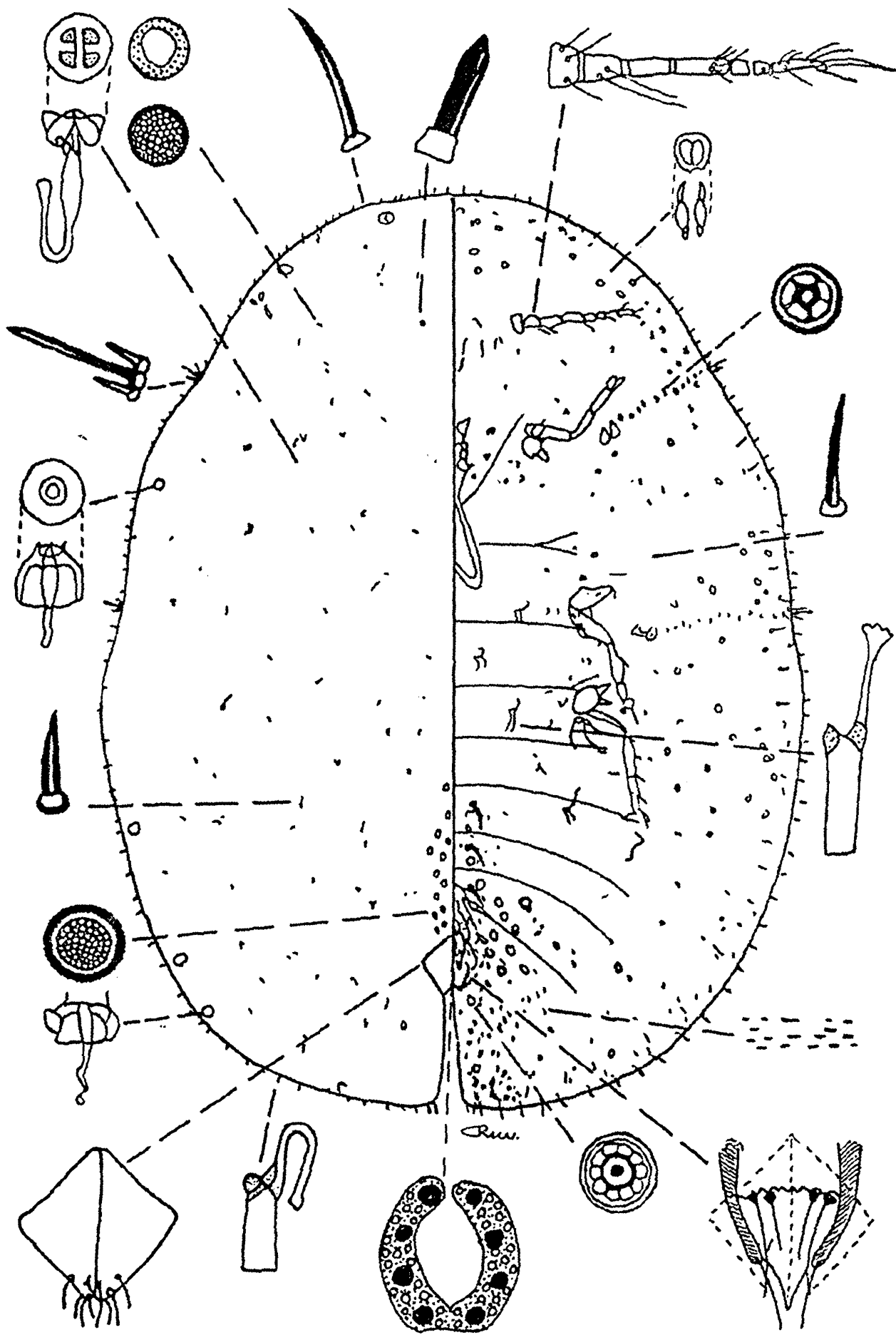


Fig. 5. : *Coccus hesperidum* Linnaeus.

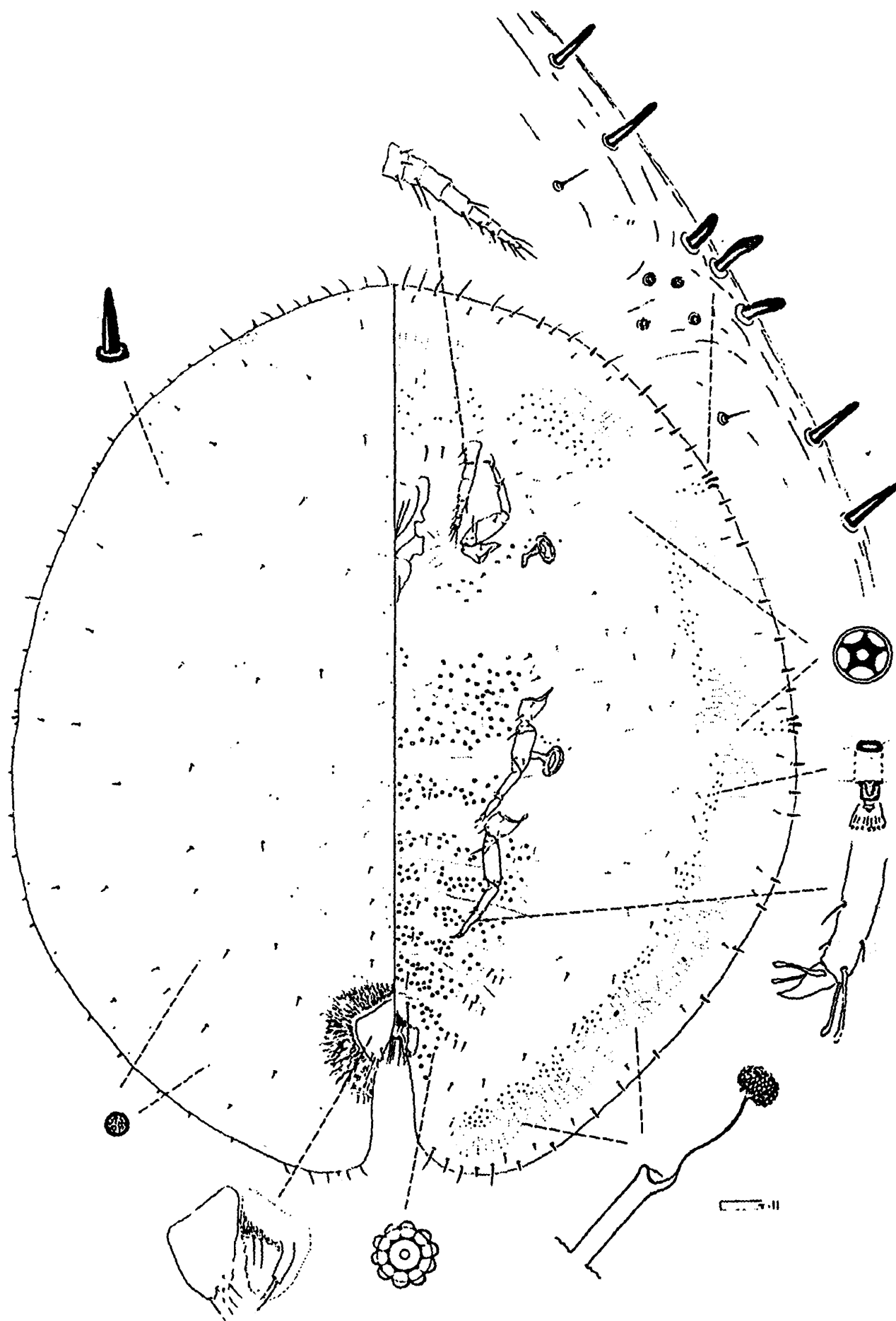


Fig. 6. : *Eulecanium tiliae* (Linnaeus).

Genus *Parthenolecanium* Sulc

1908. *Parthenolecanium* Sulc, *Ent. mon. Mag.*, 44 : 36.

*Type species* : *Lecanium coryli* Sulc nec Linn. (= *Lecanium corni* Bouche).

15. *Parthenolecanium persicae* (Fabr.). European Peach scale.  
(Fig. 7)

1776. *Chermes persicae* Fabricius, *Gen. Ins.*, : 304.

1908. *Lecanium persicae* : Green, *Mem. Dept. Agr. India*, (Ent.), 2(2) : 31.

1921. *Lecanium persicae* : Ayyar, *Proc. 4th Ent. Mtg. Pusa* : 350.

1974. *Parthenolecanium persicae* : Ali, *Indian Mus. Bull.*, 6(2) (1971) : 41.

1992. *Parthenolecanium persicae* : Varshney, *Rec. zool. Surv. India, Occ. Paper*, 139 : 96.

*Distribution* : India (Punjab). *Elsewhere* : Widely in the Palaearctic Region.

*Host plants* : *Morus indica*, *M. alba*, *Prunus amygdalus* and *P. bokhariensis*.

*Remarks* : Recorded from Changa Manga in Punjab (Varshney, 1992). Earlier Ayyar (1921) recorded it from 'Jhelum, Punjab'

## Subfamily CEROPLASTINAE

Genus *Ceroplastes* Gray

1828. *Coccus (Ceroplastes)* Gray, *Spicilegia Zool.*, : 7.

*Type species* : *Coccus (Ceroplastes) janeirensis* Gray.

16. *Ceroplastes ajmerensis* (Avasthi & Shafee)

1979. *Cerostegia ajmerensis* Avasthi & Shafee, *Curr. Sci.*, 48(1) : 36.

1988. *Ceroplastes neoceriferus* Yousuf & Shafee, *Indian J. Syst. Ent.*, 5 : 61.

1991. *Paracerostegia ajmerensis* : Tang, *Coccidae of China* : 304.

1992. *Ceroplastes ajmerensis* : Varshney, *Rec. zool. Surv. India, Occ. Paper*, 139 : 78.

*Distribution* : Endemic to North India. Recorded from Rajasthan and Himachal Pradesh.

*Host plants* : *Cassia fistula*, *Psidium guajava* and *Citrus* sp.

*Remarks* : Originally known from Ajmer (Rajasthan), and as such recorded from there only. *C. neoceriferus* was recorded from Solan (H. P.), on *Citrus* sp. (Yousuf & Shafee, 1988).

17. *Ceroplastes ceriferus* (Fabr.). Indian White Wax scale.  
(Fig. 8)

1798. *Coccus ceriferus* Fabricius, *Suppl. Ent. Syst.* : 546.

1921. *Ceroplastes ceriferus* : Ayyar, *Proc. 4th Ent. Mtg. Pusa* : 346.

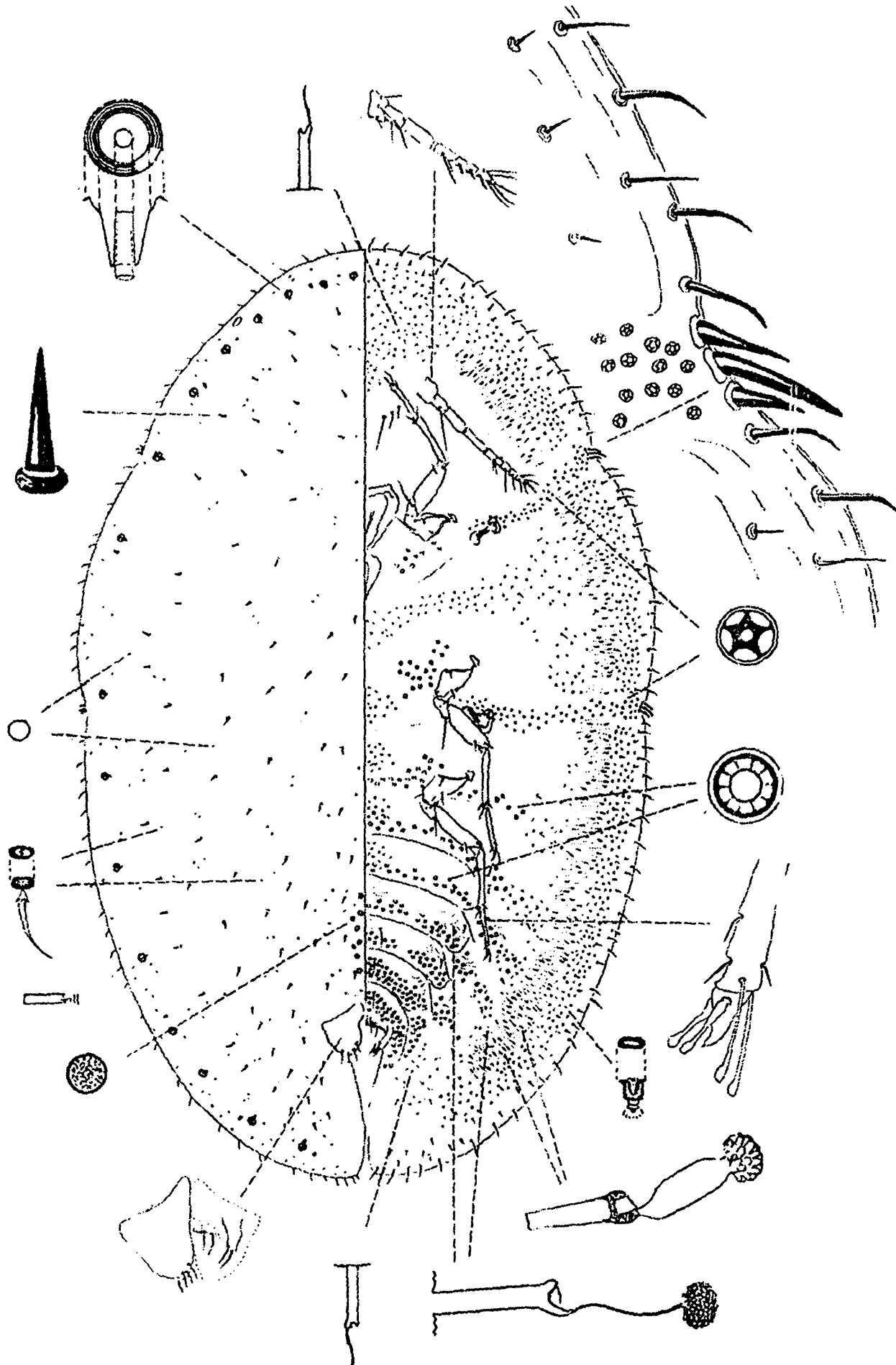


Fig. 7. : *Parthenolecanium persicae* (Fabricius).



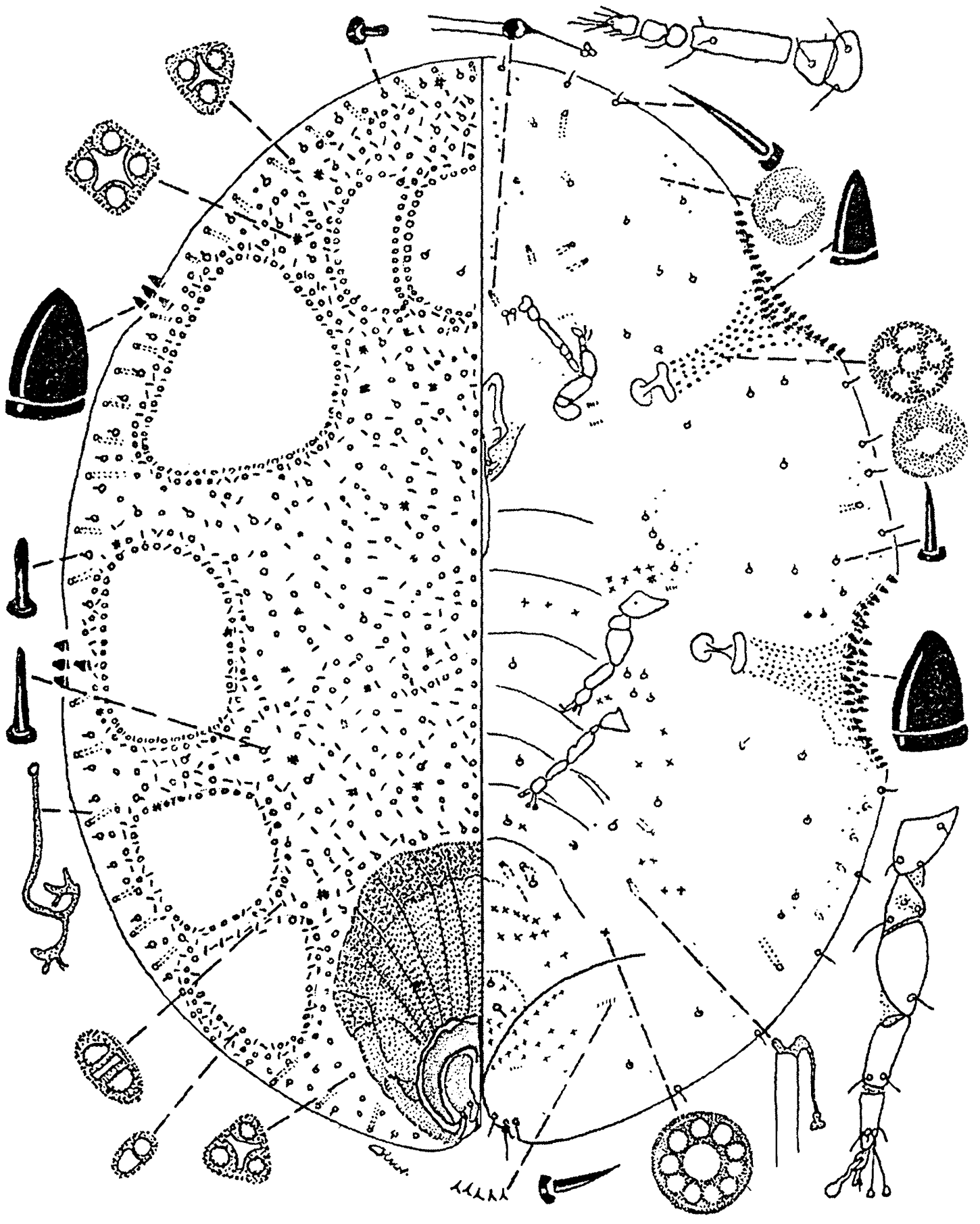


Fig. 8. : *Ceroplastes ceriferus* (Fabricius).

1974. *Ceroplastes ceriferus* : Ali, *Indian Mus. Bull.*, 6(2) (1971) : 16.

1992. *Ceroplastes ceriferus* : Varshney, *Rec. zool. Surv. India, Occ. Paper*, 139 : 78.

*Distribution* : Very widely in India, including H.P., Uttaranchal, M.P., Maharashtra, Jharkhand, W. Bengal, Assam and Tamil Nadu.

*Host plants* : Polyphagous. Reported on several plants including *Celastrus ceriferus*, *Asclepiadron* sp., *Lawsonia inermis*, *Terminalia* sp., *Citrus* spp., *Ficus* spp., *Carissa spinarium*, *Morus indica* etc.

*Remarks* : Reported from the Kangra Valley in Himachal Pradesh on tea plant (Atkinson, 1890), and from Kalka in H.P., collected by Dr. M. Hayat in 1967 on *Carissa spinarium* (Ali, 1974).

#### Family 7. DIASPIDIDAE

#### Subfamily PARLATORIINAE

#### Tribe LEUCASPIDINI

#### Genus *Suturaspis* Lindinger

1906. *Suturaspis* Lindinger, *Jahrb. Hamburg Wiss. Anst.*, (1905), 23(3) : 26.

*Type species* : *Leucaspis pistaciae* Lindinger.

#### 18. *Suturaspis indiaorientalis* (Lindinger)

1911. *Leucodiaspis indiae-orientalis* Lindinger, *Zeit. f. Wiss. Insektenbiol.*, 7(4) : 127.

1921. *Suturaspis indiae-orientalis* : MacGillivray, *Coccidae* : 268.

1970. *Suturaspis indiaorientalis* : Ali, *Indian Mus. Bull.*, 5(1) : 28.

2002. *Suturaspis indiaorientalis* : Varshney, *Rec. zool. Surv. India, Occ. Paper*, 191 : 4.

*Distribution* : Known by its original record only. Endemic to India, particularly Himachal Pradesh.

*Host plants* : *Pinus khasya*.

*Remarks* : Recorded from Shimla in Himachal Pradesh originally.

#### Tribe PARLATORIINI

#### Genus *Cryptoparlatoarea* Lindinger

1905. *Cryptoparlatoarea* Lindinger, *Insekten Borse*, 22 : 132.

*Type species* : *Cryptoparlatoarea leucaspis* Lindinger.

#### 19. *Cryptoparlatoarea pini* Takahashi

1938. *Cryptoparlatoarea pini* Takahashi, *Proc. R. ent. Soc. Lond.*, (B)7 : 271.

1966. *Cryptoparlatoarea pini* : Borchsenius, *Catalogue Arm. Scale Ins. of World* : 204.

1970. *Cryptoparlatoresia pini* : Ali, *Indian Mus. Bull.*, 5(1) : 14.

2002. *Cryptoparlatoresia pini* : Varshney, *Rec. zool. Surv. India, Occ. Paper*, 191 : 5.

*Distribution* : Known by its original record only, from India : Himachal Pradesh.

*Host plant* : *Pinus* sp.

*Remarks* : Originally recorded from 'Manali, The Punjab'

### Subfamily ASPIDIOTINAE

#### Tribe ASPIDIOTINI

*Note* : Ayyar (1921) recorded *Aspidiotus theae* Maskell (which is now *Pseudaonidia rhododendri thearum* Cockerell) on tea plant, from 'Kangra, Punjab' This was however, not accepted by Ali (1970), because "tea is not and has never been in the Kangra Valley (grown)" Hence, this species is not included here. *Aspidiotus destructor* Sign. reported from Punjab by Ansari (1942) was perhaps from present day Pakistan.

#### Genus *Aonidiella* Berlese & Leonardi

1895. *Aonidiella* Berlese & Leonardi, *In Berlese, Riv. di Patol. Veg.*, (1896) 4 : 77, 83.

*Type species* : *Aspidiotus aurantii* Maskell.

#### 20. *Aonidiella aurantii* (Maskell). Red scale or Orange scale.

(Fig. 9)

1879. *Aspidiotus aurantii* Maskell, *Trans. Proc. New Zealand Instt.*, 11(1878) : 199.

1966. *Aonidiella aurantii* : Borchsenius, *Catalogue Arm. Scale Ins. of World* : 292.

1970. *Aonidiella aurantii* : Ali, *Indian Mus. Bull.*, 5(1) : 33.

2002. *Aonidiella aurantii* : Varshney, *Rec. zool. Surv. India, Occ. Paper*, 191 : 20.

*Distribution* : Common all over India. Recorded from H. P., Punjab, Delhi, Bihar, W. Bengal, Assam, Tripura, Orissa and all southern states.

*Host plants* : Polyphagous. A pest of *Citrus* spp. Also recorded on mulberry, rose, guava, *Nerium*, *Jasminum*, *Pyrus*, *Prunus*, *Tamarix*, *Aegle*, *Annona*, *Cycas*, *Eugenia* etc.

*Remarks* : Recorded from various places in the country as well as abroad, this damaging species is known from Delhi, Punjab and Himachal Pradesh. Varshney (1984b) reported it from Sarol in Chamba Dist. (H.P.) and Salem Tabri in Ludhiana (Punjab).

Another similarly damaging sister species, *Aonidiella orientalis* (Newstead), the Oriental scale, is also known from Punjab.

#### Genus *Quadrspidiotus* MacGillivray

1921. *Quadrspidiotus* MacGillivray, *Coccidae* : 388.

*Type species* : *Aspidiotus ostreaeformis* Curtis.

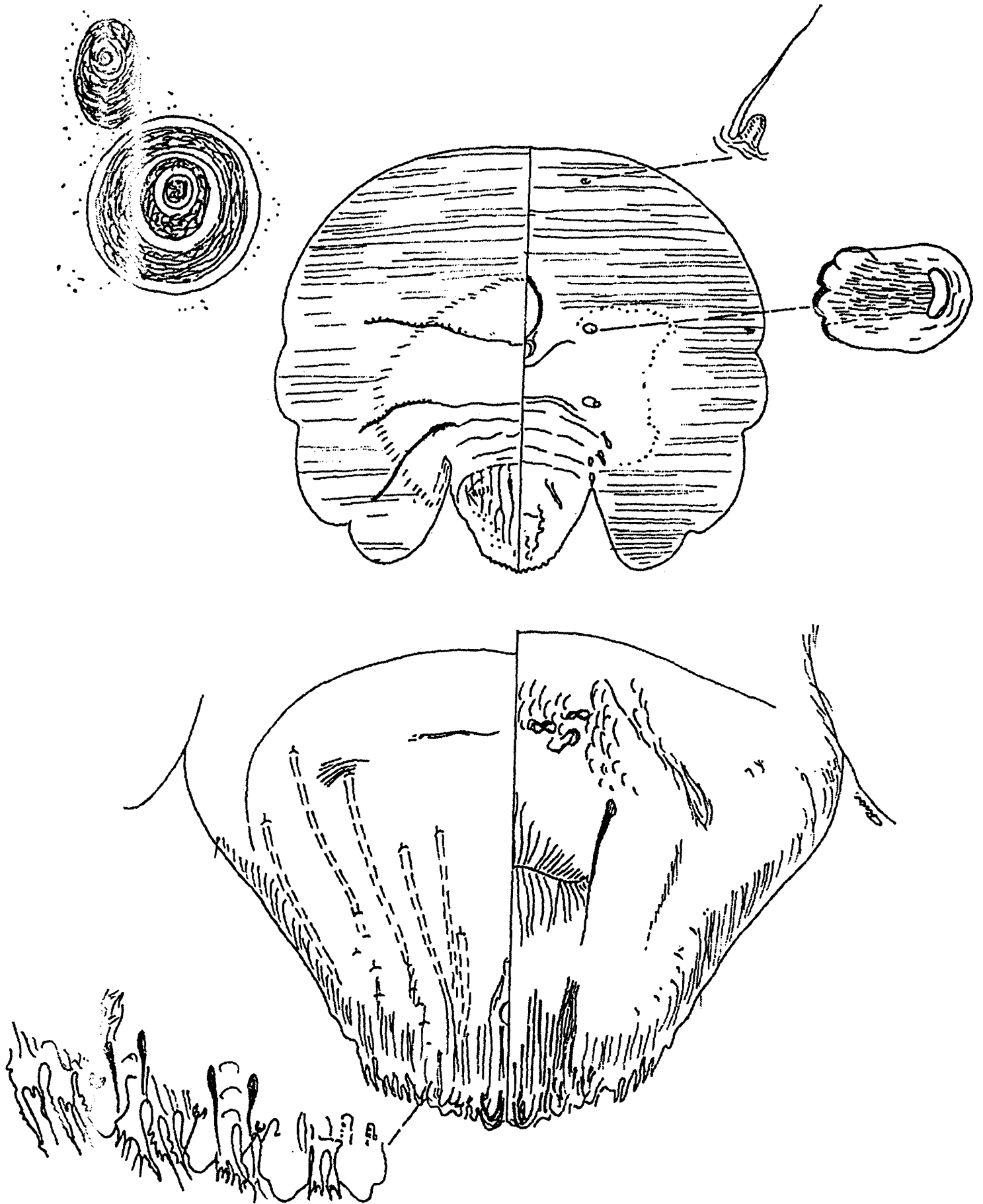


Fig. 9. : *Aonidiella aurantii* (Maskell).

21. *Quadraspidiotus perniciosus* (Comstock). San Jose scale.

(Fig. 10)

1881. *Aspidiotus perniciosus* Comstock, *U.S. Dept. Agr. Rept.*, 1880 : 304.  
 1966. *Quadraspidiotus perniciosus* : Borchsenius, *Catalogue Arm. Scale Ins. of World* : 336.  
 1970. *Quadraspidiotus perniciosus* : Ali, *Indian Mus. Bull.*, 5(1) : 53.  
 2002. *Quadraspidiotus perniciosus* : Varshney, *Rec. zool. Surv. India, Occ. Paper*, 191 : 38.

*Distribution* : Mostly dispersed with the fresh furits or fruit plants, widely in India, right in the north from J. & K., H. P., Uttaranchal, U. P., Sikkim, W. Bengal, Meghalaya, Orissa, Maharashtra, to the down south in Karnataka and Tamil Nadu.

*Host plants* : On apple, peach, pear, plum, almond, apricot, cherry, grape vine, birch, beech, poplar, currant, chestnut, mulberry, oak, eucalyptus, walnut, rose and other fruit plants, forest trees and bushes.

*Remarks* : Occurs on twigs, leaves and fruits, causing formation of pink colour patches at the places of attachment. Reported from Kashmir as well as Shimla, Craignano and Kullu in H. P., and from Punjab (Ali, 1970).

## Subfamily DIASPIDINAE

## Tribe DIASPIDINI

Genus *Aulacaspis* Cockerell

1893. *Aulacaspis* Cockerell, *Instt. Jamaica J.*, 1 : 180.

*Type species* : *Aspidiotus rosae* Bouche.

22. *Aulacaspis vitis* (Green)

1896. *Chionaspis vitis* Green, *Indian Mus. Notes*, 4 : 3.  
 1966. *Phenacaspis vitis* : Borchsenius, *Catalogue Arm. Scale Ins. of World* : 127.  
 1969. *Phenacaspis vitis* : Ali, *Indian Mus. Bull.*, 4(2) : 72.  
 2002. *Aulacaspis vitis* : Varshney, *Rec. zool. Surv. India, Occ. Paper*, 191 : 58.

*Distribution* : Occurs in India in H. P., Bihar, Assam, Orissa, Karnataka and Tamil Nadu.

*Host plants* : On leaves of mango, *Elaegnus latifolia*, *Loranthus* sp., *Vitis lanceolaria*, *Mallotus* sp., *Grewia* sp., *Artocarpus* sp. etc.

*Remarks* : Recorded from Kangra in Himachal Pradesh (Varshney, 2002).

Genus *Chionaspis* Signoret

1869. *Chionaspis* Signoret, *Ann. Soc. Ent. de France*, (4)8 : 844.

*Type species* : *Coccus salicis* Linnaeus.

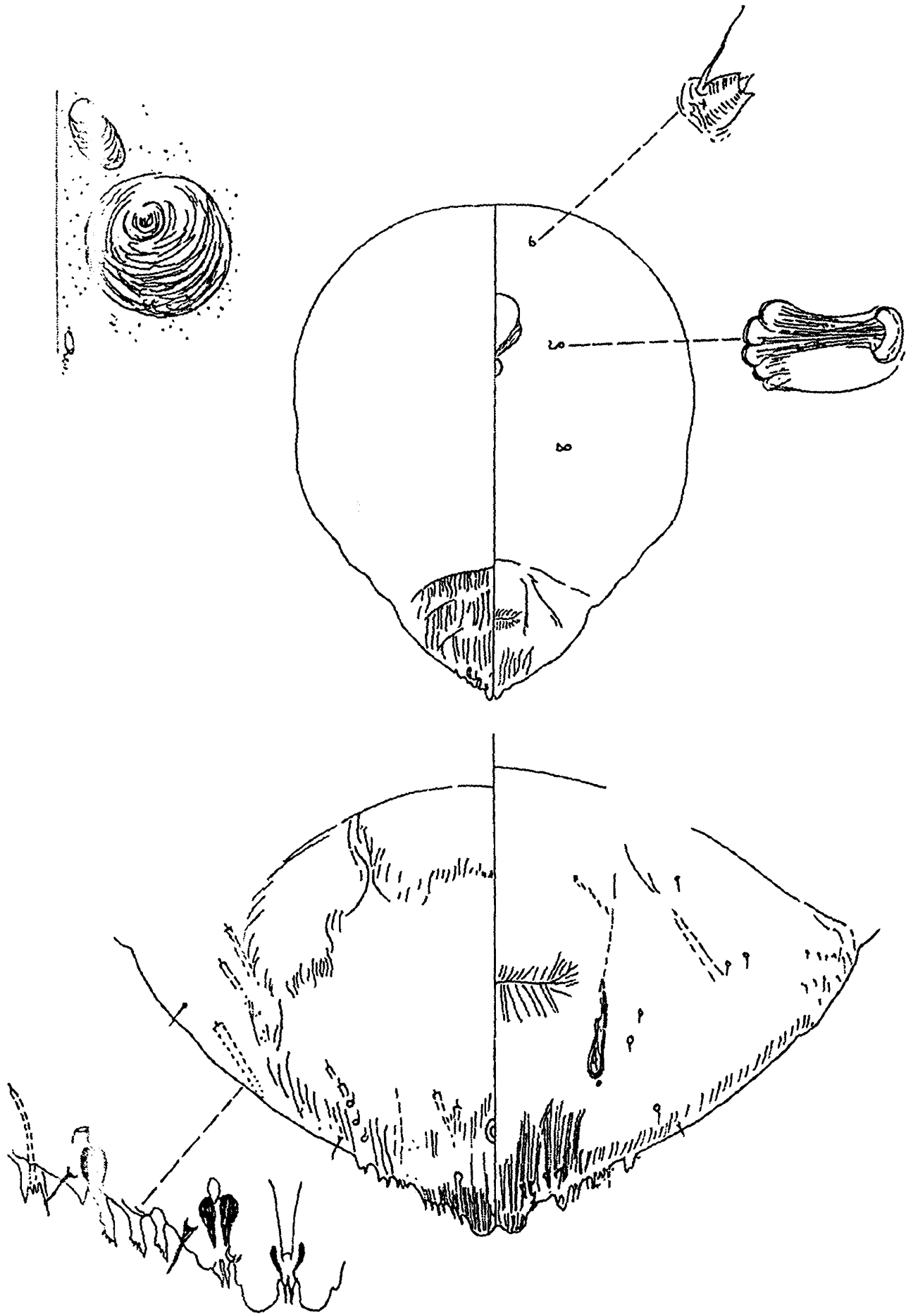


Fig. 10. : *Quadraspidiotus perniciosus* (Comstock).

23. *Chionaspis himalaica* Takagi

(Fig. 11)

1985. *Chionaspis himalaica* Takagi, *Ins. matsum.*, (n.s.), 33 : 16.2002. *Chionaspis himalaica* : Varshney, *Rec. zool. Surv. India, Occ. Paper*, 191 : 59.

*Distribution* : Known from its original record only. Reported from Himachal Pradesh only in India, besides Nepal.

*Host plant* : *Quercus semecarpifolia*.

*Remarks* : Originally collected from Kufri (2500 m) in Himachal Pradesh, by Prof. Dr. S. Takagi, who surveyed NW. Himalaya alongwith the author, in 1978.

Genus *Duplachionaspis* MacGillivray1921. *Duplachionaspis* MacGillivray, *Coccidae* : 307.

*Type species* : *Chionaspis graminis* Green.

24. *Duplachionaspis divergens* (Green)1899. *Chionaspis graminis* var. *divergens* Green, *Coccidae of Ceylon*, Pt. 2 : 123.1908. *Chionaspis graminis* var. *divergens* : Green, *Mem. Dept. Agr. India*, (Ent.) 2(2) : 37.1921. *Duplachionaspis divergens* : MacGillivray, *Coccidae* : 334.1930. *Chionaspis graminis* : Ayyar, *Bull. Imp. Instt. Agr. Res. Pusa*, 197(1929) : 16.1966. *Greenaspis divergens* : Borchsenius, *Catalogue Arm. Scale Ins. of World* : 108.1985. *Duplachionaspis divergens* : Varshney, *Oriental Ins.*, 19 : 38.2002. *Duplachionaspis divergens* : Varshney, *Rec. zool. Surv. India, Occ. Paper*, 191 : 63.

*Distribution* : Discontinuously recorded in India from Punjab in the north and Tamil Nadu and Kerala in the south.

*Host plants* : On grass, *Andropogon* spp., sugarcane, *Spinifex* sp. and undetermined plants.

*Remarks* : Originally collected from Bharwain in Hoshiarpur, Punjab, by I. H. Burkill, on *Andropogon* (Green, 1908).

Genus *Fiorinia* Targioni-Tozzetti1868. *Fiorinia* Targioni-Tozzetti, *Soc. Ital. di Sci. Nat. Atti*, 11 : 42.

*Type species* : *Fiorinia pellucida* Targioni-Tozzetti (= *Diaspis fioriniae* Targioni-Tozzetti).

25. *Fiorinia himalaica* Takagi

(Fig. 12)

1975. *Fiorinia himalaica* Takagi, *Ins. matsum.*, (n.s.) 6 : 26.1985. *Fiorinia himalaica* : Varshney, *Oriental Ins.*, 19 : 38.2002. *Fiorinia himalaica* : Varshney, *Rec. zool. Surv. India, Occ. Paper*, 191 : 65.



Fig. 11. : *Chionaspis himalaica* Takagi.



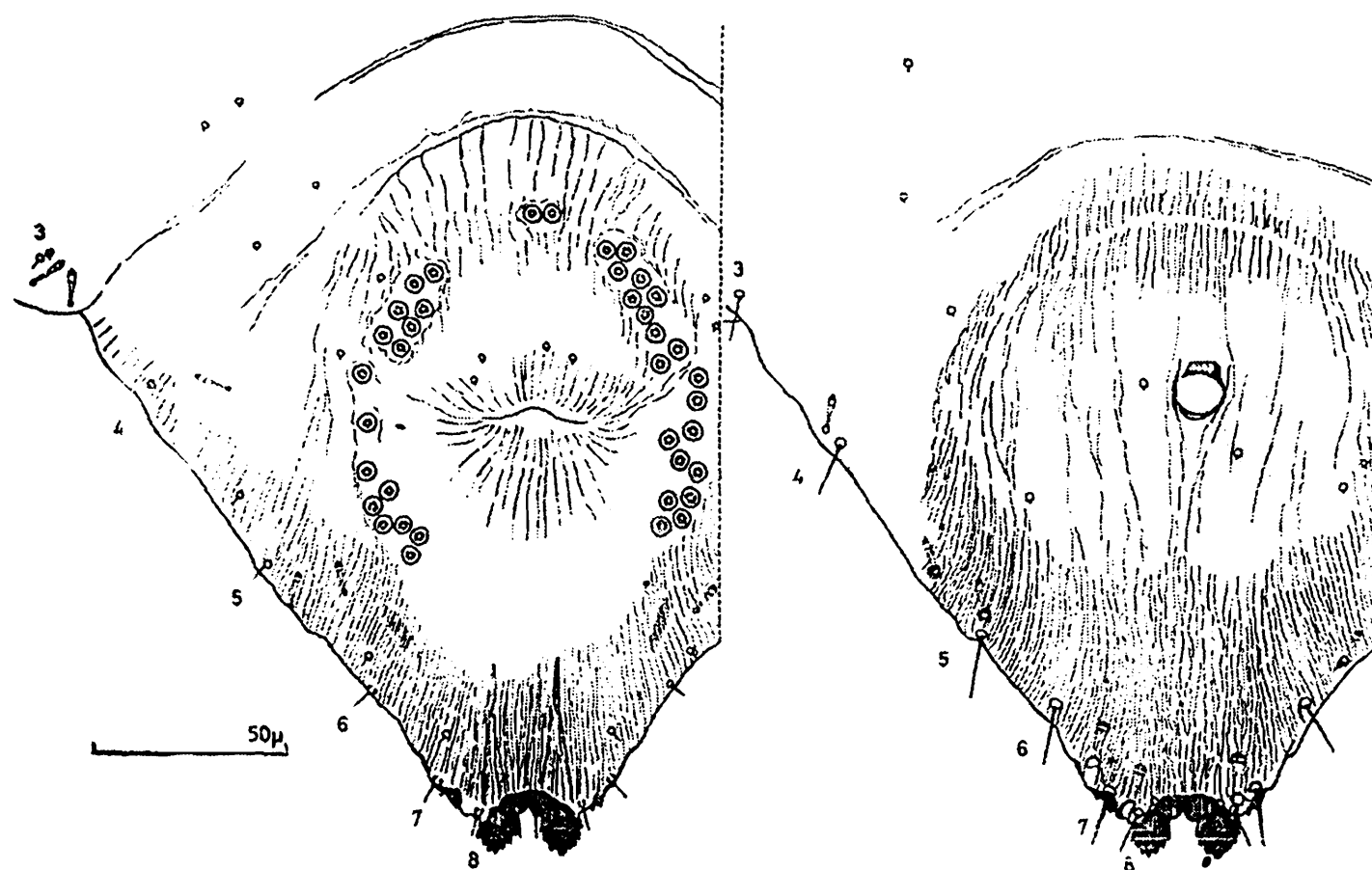


Fig. 12. : *Fiorinia himalaica* Takagi.

*Distribution* : Known from its original record only. Reported from Himachal Pradesh and Uttaranchal in India, besides Nepal.

*Host plants* : *Rhododendron arboreum*.

*Remarks* : Originally described from Nepal and then collected from Chail in H. P. and Mussoorie in Uttaranchal in India, by Prof. Dr. S. Takagi, when he surveyed the NW. Himalaya alongwith the author in 1978.

### Genus *Pseudaulacaspis* MacGillivray

1921. *Pseudaulacaspis* MacGillivray, *Coccidae* : 305.

*Type species* : *Aulacaspis pentagona* Targioni-Tozzetti.

### 26. *Pseudaulacaspis manni* (Green)

1907. *Chionaspis manni* Green in Green & Mann, *Mem. Dept. Agr. India*, (Ent.) 1 : 344.

1908. *Chionaspis manni* : Green, *Mem. Dept. Agr. India*, (Ent.) 2(2) : 37.

1965. *Phenacaspis manni* : Varshney, *Proc. Ent. Soc. Washington*, 67(1) : 5.

1966. *Diaspis manni* : Borchsenius, *Catalogue Arm. Scale Ins. of World* : 172.

1969. *Phenacaspis manni* : Ali, *Indian Mus. Bull.*, 4(2) : 70.

2002. *Pseudaulacaspis manni* : Varshney, *Rec. zool. Surv. India, Occ. Paper*, 191 : 74.

*Distribution* : In India reported from Himachal Pradesh, West Bengal, Assam and Tamil Nadu.

*Host plants* : On tea plant (*Thea chinensis*), *Ficus* spp., *Solanum melongena* and *Citrus* sp.

*Remarks* : Originally recorded from Assam, collected by H. H. Mann, this species was soon after collected from Kangra Valley (H. P.) on *Ficus* sp., by I. H. Burkill (Green, 1908).

### 27. *Pseudaulacaspis venui* (Menon & Khan)

1961. *Chionaspis venui* Menon & Khan, *Proc. 48th Indian Sci. Congr.*, Pt. 3 : 425.

1969. *Chionaspis venui* : Ali, *Indian Mus. Bull.*, 4(2) : 40.

1985. *Chionaspis venui* : Varshney, *Oriental Ins.*, 19 : 37.

2002. *Pseudaulacaspis venui* : Varshney, *Rec. zool. Surv. India, Occ. Paper*, 191 :

*Distribution* : Known from its original record only. Endemic in Himachal Pradesh.

*Host plant* : *Ficus palmata*.

*Remarks* : Ali (1969) stated that this species was described from the collection of E. E. Green. Menon & Khan (1963) published a detailed description of it. Borchsenius (1966) erroneously named it as 'venni' It is known from its original record of Palampur, Kangra (H. P.) only.

## SUMMARY

Altogether 27 species (plus 5 mentioned in Remarks) belonging to 22 genera and 7 families, have been reported from Western part of the Shivalik Himalaya and adjacent areas in Northern India, covering the Indian States of Jammu & Kashmir, Himachal Pradesh and Punjab. Some taxonomic citations, distribution in India and host plants are mentioned in each case. San Jose scale (*Quadrastpidiotus perniciosus*) is the earliest known and prominent species. Nine species are known from their original records only, mostly from Himachal Pradesh. One species, *Aspidiotus theae*, though earlier claimed to occur in Kangra, is not included here, since its host plant (tea) does not occur in this region. Two genera, *Humococcus* and *Drepanococcus*, have been reported for the first time here in Indian coccid literature.

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