

The cyclops which were successfully infected in the present studies were identified as *Mesocyclops leuckarti* Claus, 1857 on the basis of the 1st antenna possessing 17 segments and the presence of a hyaline membrane in its terminal segment. For further development, freshwater fishes obtained from the Madras Fisheries Department and other sources were employed. Six specimens of *Rasbora daniconius* and two of *Tilapia mossambica* were reared in an aquarium, fed with 2 or 3 infected cyclops containing second stage larvæ. Dissection of one *R. daniconius* which died on the 8th day, and all the others in the sixth week after feeding revealed no evidence of infection with *G. spinigerum*. The second intermediate host (fish) of the parasite in this part of the country still remains to be identified.

The syndrome 'Creeping eruption' or 'Cutaneous Larva Migrans' attributed to the wandering larva of *G. spinigerum* in the tissues of man has been unknown in Madras and neighbouring states. The consumption of raw or ill-cooked fish is relatively scarce in these areas and should partly explain this fact. However, the epidemiology of the infection as a zoonosis

cannot be fully understood till the fish intermediate host is determined and its role as a food fish investigated thoroughly.

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1. Alwar, V. S. and Lalitha, C. M., *Indian vet. J.*, 1958, **35**, 292.
2. Chandler, A. C., *Indian J. med. Res.*, 1925 a, **13**, 213.
3. — *Parasitology*, 1925 b, **17**, 237.
4. Maplestone, P. A., *Indian med. Gaz.*, 1929, **64**, 610.
5. — and Bhaduri, N. V., *Ibid.*, 1937, **72**, 713.
6. — Rao, S. S., *Ibid.*, 1939, **74**, 479.
7. Mitter, S. N., *J. trop. Vet. Sci.*, 1910, **15**, 284.
8. —, *Vet. J.*, 1912, **68**, 687.
9. Miyazaki, I., *Exp. Parasit.*, 1960, **9**, 338.
10. Mokerji, A. K. and Bhaduri, N. V., *Indian med. Gaz.*, 1945, **80**, 126.
11. Prommas, C. and Daengsvang, S., *J. Parasitol.*, 1933, **19**, 287.
12. — and —, *Ibid.*, 1936, **22**, 180.
13. — and —, *Ibid.*, 1937, **23**, 115.
14. Rao, S. R. and Kulkarni, V. G. P., *Bombay vet. Coll. Magazine*, 1964, **11**, 1.
15. Refuerzo, P. G. and Carcia, E. Y., *Phil. J. Anim. Ind.*, 1938, **5**, 351.
16. Varma, A. K., *Curr. Sci.*, 1955, **24**, 57.

ON *BACOPA FLORIBUNDA* (R. Br.) WETTST.—A LITTLE KNOWN FLOWERING PLANT IN THE INDIAN FLORA

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BACOPA FLORIBUNDA (R. Br.) Wettst. (Scrophulariaceæ), which is otherwise known from Africa, Java and Australia, has been so far recorded only from S. Kanara, Nellore, Chingleput in India.^{2,3} Cooke¹ doubted its occurrence in the erstwhile Bombay State, whereas Santapau⁴ records it from the same State without citing a locality. Besides these few reports, the present authors are not aware of its record from any other place in India. The plant has been recently collected by us from Hyderabad, which is obviously significant. Since the species has so far been neither fully described nor illustrated in the Indian floras, it was felt to fill this gap. The present paper also includes a detailed account of the various types of trichomes occurring on the different parts of the species and also the epidermal features of its

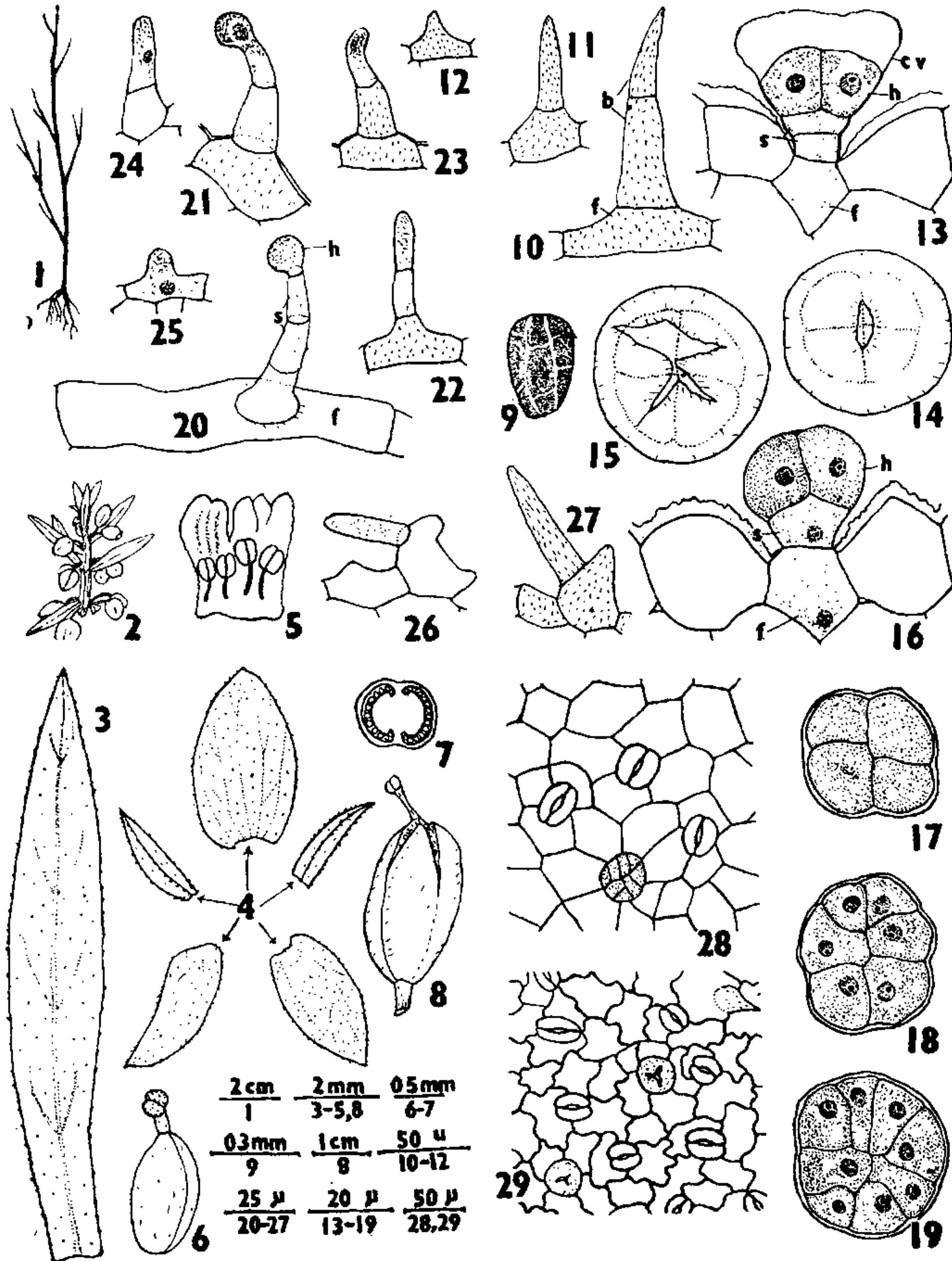
leaf, due to their growing taxonomic importance.

- Bacopa floribunda* (R. Br.) Wettst. in *Eng. Prn. Pfam*, 4 (3b): 77, 1895; Pennell, *Proc. Acad. Nat. Sci. Philad.*, 98: 92, 1943; Santapau, *J. Bombay Nat. Hist. Soc.*, 49: 43, 1950.
- Herpestis floribunda* R.Br. *Prodr.*, 442, 1810; Hook.f., *F.B.I.*, 4: 273, 1884.
- Monniera floribunda* Cooke, *Fl. Pres. Bombay*, 2: 286, 1904; Gamble, *Fl. Pres. Madras*, 2: 953, 1921.

Erect herb, growing upto 10 cm (25 cm) high (Fig. 1). Stems obtusely four-angled, often branched, with glandular hairs which in herbarium specimens appear like bright dots. Leaves sessile, 1-3 × 0.2-0.5 cm, opposite, linear or linear-lanceolate, acute, tapering at

base, entire; lamina punctate due to the shining glandular hairs (Fig. 3). Flowers nearly in the axil of every leaf, 1-3, often 2 in each axil

(Fig. 4), puberulous. Sepals unequal in size; the posterior largest, 5-6 × 4-5 mm, ovate oblong; the two lateral ones narrow, linear-



FIGS. 1-29. *Bacopa floribunda*. Fig. 1. Habit (diagrammatic) showing mere branching. Fig. 2. A branch showing axillary flowers. Fig. 3. A leaf. Fig. 4. Calyx. Fig. 5. Corolla with stamens. Fig. 6. Gynoecium. Fig. 7. T.S. ovary. Fig. 8. Fruit showing apical dehiscence into four valves. Fig. 9. A seed. Figs. 10-12. Uniseriate conical hair showing gradual reduction into papillae. Figs. 13-15. Uniseriate vesicular peltate hair: Fig. 13, L.S., Figs. 14 and 15, top view showing the breaking of the cuticular vesicle. Figs. 16-19. Uniseriate peltate hair: Fig. 16, L.S., 17-19, top view showing 4-8-celled condition of the head. Figs. 20-25. Uniseriate capitate hair: Figs. 21-23, transition towards conical hair; Figs. 20, 24 and 25, gradual reduction into papillae. Figs. 26-27. Abnormal forms between Figs. 20 and 10. Fig. 28. Adaxial leaf epidermis. Fig. 29. Abaxial leaf epidermis. (*b*, body; *cv*, cuticular vesicle; *f*, foot; *h*, head; *s*, stalk.)

(Fig. 2). Pedicels 3-5 mm long. Bracteoles subulate, just below the calyx, puberulous, 2-3 mm long. Calyx 5-fid upto the base

lanceolate. Corolla white, 3-4 mm long, upper lip with purple lines inside (Fig. 5). Stamens 4, included, epipetalous, attached just above the

base, didynamous. Ovary ellipsoid, locules two, each with numerous ovules (Fig. 7); style short with rounded and slightly bilobed stigmas (Fig. 6). Fruit ellipsoid, dehiscing at the top into four valves (Fig. 8). Seeds numerous, small, obovate, brown to black with reticulate ridges, about 0.5 mm long (Fig. 9).

TRICHOMES

1. *Uniseriate vesicular peltate hair*: Foot: Unicellular, usually intruding beyond the epidermis. Stalk: Uniseriate, 1-2-celled; cells broader than long; walls thin, contents translucent. Head: Four-celled, circular in outline as seen from above, glandular; cells juxtaposed, nearly isodiametrical, thin-walled; contents dense. Cuticular vesicle thin, usually splitting from the centre towards the periphery. Distribution: Leaf, stem, pedicel, sepals, corolla and ovary (Figs. 13-15).

2. *Uniseriate peltate hair*: As in the above but the foot not deeply intruded; stalk usually 1-celled; head usually 4-celled (occasionally upto 10-celled), glandular, without a cuticular vesicle. Distribution: As that of the above (Figs. 16-19).

3. *Uniseriate conical hair*: Foot: Usually 1-celled. Body: 1-3-celled, tapering above; cells usually longer than broad. Walls thickened, surface with cuticular ridges; contents translucent. Distribution: Leaf, stem, pedicel, bracteoles and sepals (Figs. 10, 11).

4. *Uniseriate capitate hair*: Foot: Usually 1-celled. Stalk: Uniseriate 1-3-celled, tapering above; cells longer than broad; walls thin, smooth; contents translucent, but the terminal cell may be with relatively dense contents. Head: Spherical, 1-celled, glandular; wall thin, smooth; contents usually dense or thinner (on corolla). Distribution: Sepals, corolla (Figs. 20-25).

VARIATIONS IN TRICHOMES

The uniseriate conical hairs become progressively shortened and appear like short unicellular papillae on the sepals (Fig. 10-12). Besides they also merge, on the sepals, into uniseriate capitate hairs through intermediate forms as shown in Figs. 22, 23.

The uniseriate capitate hair also shows variation on the sepals due to reduction and appears like short unicellular papillae (Figs. 20, 24, 25); at this stage the papillate forms of both the uniseriate conical hair and the uniseriate capitate hair become indistinguishable.

Both the above hair types are also characterised by yet another variation on the sepals. In either case, occasionally structural aberrations occur and are represented by bizarre forms as shown in Figs. 26, 27.

FOLIAR EPIDERMIS

Stomata: Predominantly anomocytic, some anisocytic, few with three equal subsidiary cells. Few stomata contiguous along sides, some with one or both the guard cells aborted. Distribution: Irregular, bifacial. Frequency per square millimetre: adaxial 25-100, average 60; abaxial 100-175, average 130 (Figs. 28, 29).

Epidermal cells: Polygonal, surface smooth; cells of the adaxial side with straight to curved walls (Fig. 28), of the abaxial side with wavy to sinuate walls; sinuses U-shaped (Fig. 29).

Trichomes: 1-3 trichome types described above present on both the surfaces (Figs. 10, 13, 16).

ECOLOGY AND DISTRIBUTION

Growing along with *Drosera burmanni*, *D. indica*, *Rotala illecebroides*, *Xyris* sp., *Utricularia* spp., grasses and sedges, in marshy spots. Flowers and fruits: November to January.

India: Nellore, Chingleput, S. Canara and Hyderabad (Thumalla kunta, Rajagopal 650, deposited at Herbarium Bot. Dept., Osmania University, Hyderabad). Tropical Africa, Australia and Java.

In the light of the habitat conditions in which the species has been presently collected, the authors consider that it may really be widespread in distribution in India, but it should be looked for in habitats where the above-mentioned associate species occur. Paucity of its previous record might thus be due to its preference to a specialised habitat and also its insignificant size.

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1. Cooke, T., *Flora of Presidency of Bombay*, 1904, 2, 286.
2. Gamble, J. S., *Flora of Presidency of Madras*, 1921, 2, 953.
3. Hooker, J. D., *Flora of British India*, 1884, 4, 273.
4. Santapau, H., *J. Bombay Nat. Hist. Soc.*, 1950, 49, 43.