C H A P T E R - XII

Pharmacognosy and pharmacology of *Merremia emarginata* Hallier

A number of plants is prescribed by practitioners of Ayurvedic system of medicine, under the popular name 'Brahmi', as a brain tonic. In North India, *Centella asiatica* Linn. (syn: *Hydrocotyle asiatica* Linn.- Umbelliferae) is used as 'Brahmi' while in Bengal *Bacopa monniera* Pennell. (syn: *Herpestis monniera* H.B. & K. Scrophulariaceae) is considered as 'Brahmi'. In North Gujarat and Saurashtra, where *C.asiatica* does not grow wild, entire plant of *Merremia emarginata* Hallier (syn: *Ipomoea reniformis* Choisy and *Evolvulus emarginata* Burm. Convolvulaceae) is sold and used as 'Brahmi'. It is also recommended in a number of diseases like that of the kidney, bladder, lung and the uterus (Thakar, 1952; Kirtikar and Basu, 1933). Prasad (1947) has described the pharmacognosy of *C.asiatica* and *B.monniera*.

A number of chemical investigations is recorded both on *C.asiatica* and *B.monniera* (Basu and Walia, 1944; Basu and Pabrai, 1947; Chopra, 1958; Malhotra and Dass, 1959 and Sastry, Dhalla and Malhotra, 1959). Pharmacological studies of the above plants have also been reported (Malhotra, Das, Sastry and Dhalla, 1961; Aithal

Merremia emarginata Hallier

and Sirsi, 1961).

Description of the Plant (Plate XX, 1):

Merremia emarginata is widely distributed and occurs in Southern and Western parts of India, Ceylon and South-east and tropical Africa. In Gujarat, it grows wild. It was collected from the water-logged areas of the University campus, Ahmedabad. Fresh as well as dried samples (sold in Ahmedabad market under the name 'Brahmi') purchased from the market were found to be M. emarginata Hallier.

The plant is an annual herb, sparsely haired and with many filiform creeping branches which root at the nodes. Leaves are alternate, simple, petiolate and exstipulate. Flowers are yellow, bracteate axillary and solitary or in groups of 2-3 on short peduncles which may even be obsolete. The fruit is a subglobose smooth capsule. It is partly surrounded by slightly enlarged, ciliate and persistent calyx (Plate XX, 1). There are 2-4 seeds in the fruit.

M O R P H O L O G Y

Leaf: Leaves are similar to Centella asiatica

Merremia emarginata Hallier

except that they are rather broader when compared to their long axis (Plate XX, 1). The leaf is ovate-cordate in shape and its apex is emarginate and margin crenate. Upper surface is deep green while the lower one is pale green and bears a few whitish, long and soft hairs on prominent veins. Old leaves at times develop red colour at the margin. They possess a strong smell and a slightly acrid taste.

Petioles are about 1.5 - 7 cm. long, hairy when young and grooved on the ventral side. They bear a few tubercle-like structures identical to extrafloral glands.

Stem: Stems and branches are filiform, creeping and covered with whitish, long and soft hairs. They are yellow-green-brown in colour. Internodes are cylindrical and about 3-3.5 cm. long and show faint longitudinal striations. At times, they bear tubercle-like structures as on petiole. Nodes are slightly swollen and bear leaves on the upper side and strike adventitious roots on the lower side.

Root: The plant has a tap root. Adventitious roots help the plant to cover a large area in a short time. They are long and thin and measure upto 16 cm. in length. Young roots are whitish while old ones are slightly brownish in colour.

Merremia emarginata Hallier

H I S T O L O G Y

Leaf (Plate XX) : The ~~epidermal~~ cells of the upper and lower epidermis are of unequal size. Some of these are unusually big. Cells of the upper epidermis measure 30.7-70 μ in length and 27 - 46 μ in width while those of the lower one measure 19-50 μ in length and 19 - 46 μ in width. Some of these cells contain brownish granular contents. Their anticlinal walls are straight (Fig. 2). Thin layer of cuticle is present on both the upper and the lower epidermis. In surface preparation, the epidermal cells show prominent and straight striations which appear to be diverging away from the stomata in all directions (Fig. 3). Stomata which are rubiaceous, are more on the lower epidermis than on the upper one. Glandular hairs which are present on both the surfaces are borne upon single-celled stalks and possess quadricellular heads. In surface view, the hairs are seen as circles divided into four cells (Fig. 3).

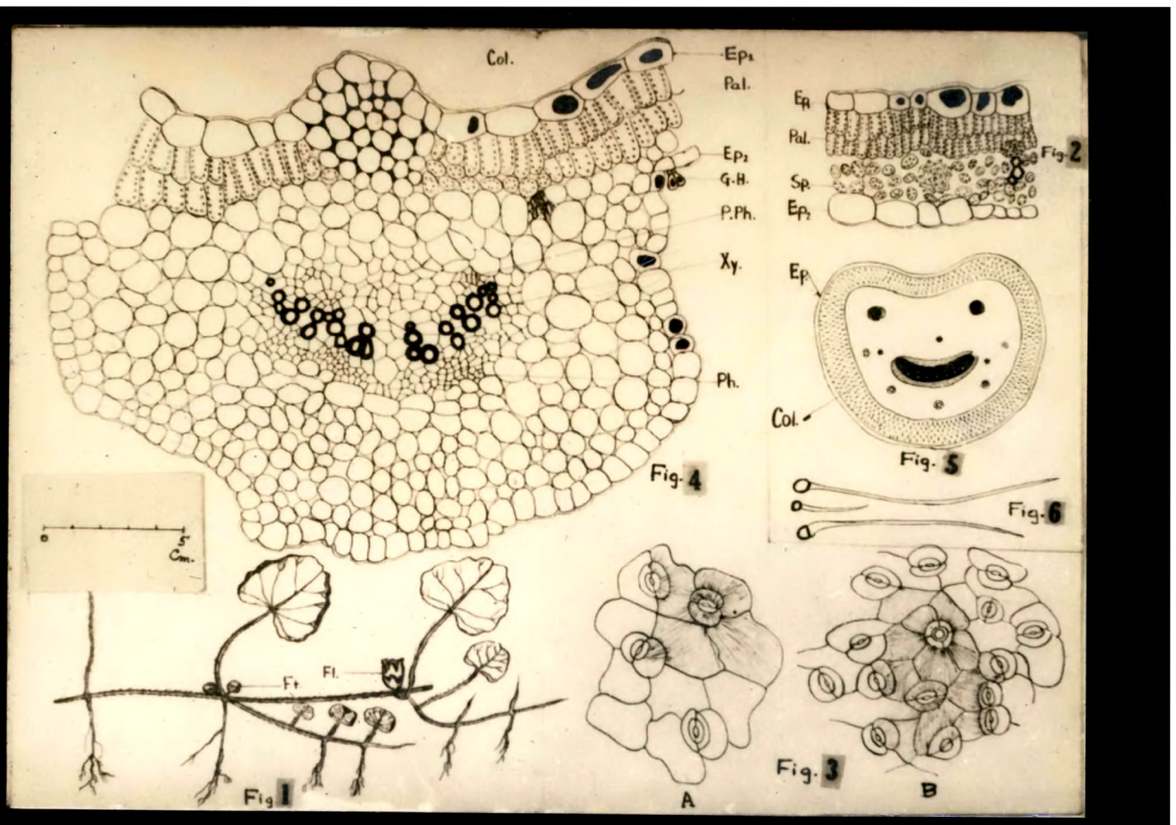
Palisade layer consists of 2-3 rows of closely packed columnar cells full of chloroplasts. The upper palisade layer consists of larger cells than those of the lower ones. Spongy tissue is represented by 3-5 layers of loosely arranged and more or less isodiametéric cells. They also contain chloroplasts. Calcium oxalate cluster crystals measuring about 27-34.6 μ in diameter are present

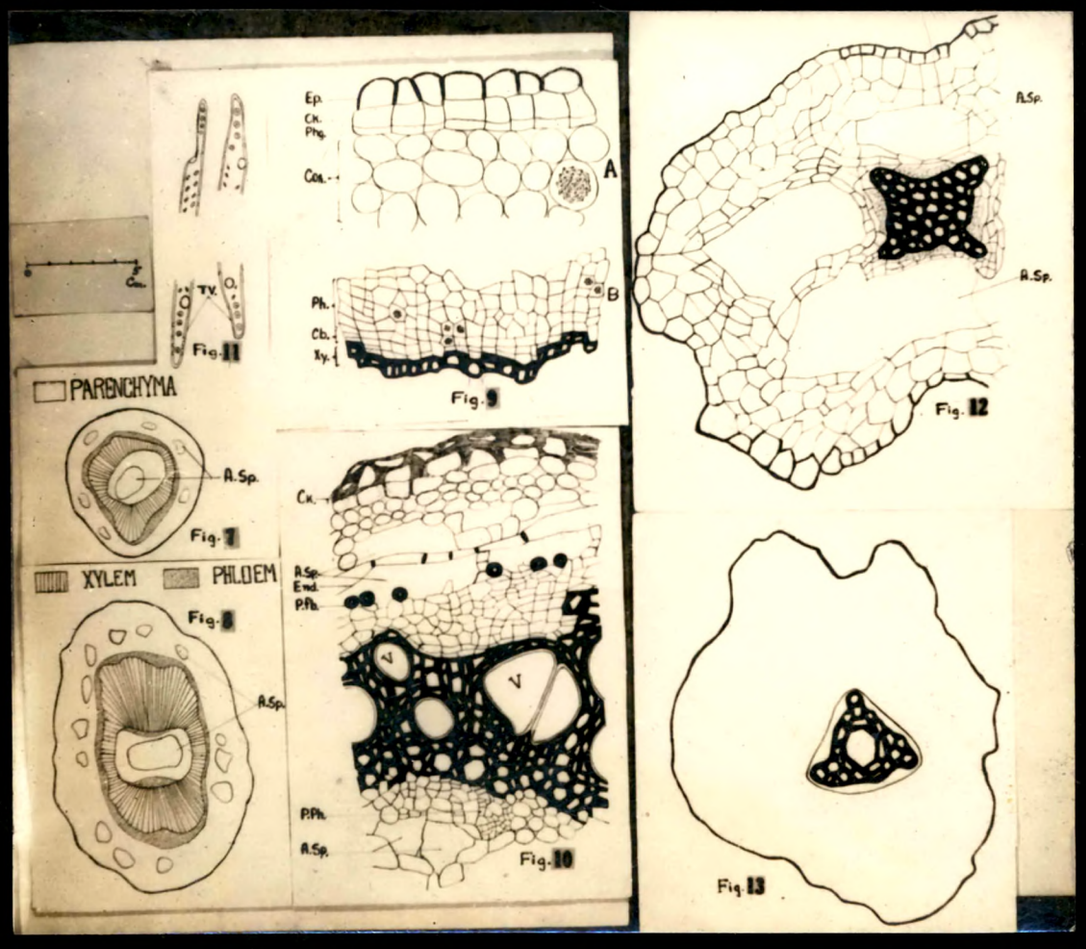
in the spongy tissue. Cells of the palisade also contain a few of such crystals (Fig. 2).

Palisade is discontinuous over the vascular bundle of the midrib (Fig. 4). Vascular bundle consists of a radiating xylem on the adaxial side. Xylem consists of vessels and intervening xylem parenchyma. Phloem is on the abaxial side and consists of sieve tubes, companion cells and phloem parenchyma. Small groups of phloem are also present on the adaxial side and above the xylem. A group of cells in the cortex below the upper epidermis is collenchymatous. The rest of the cortex is parenchymatous (Fig. 4). A few clusters of calcium oxalate crystals are present in the parenchymatous cells of the cortex.

Stomatal index for the upper epidermis is 11-16 and that for the lower epidermis is from 16-20. Palisade ratio is from 19-23.5. Vein islet number is 16-18.

The petiole in transection shows the presence of a groove on its ventral side (Fig. 5). The epidermis is covered by a thin cuticle externally. It bears many long and two celled trichomes (Fig. 6). 4-6 layers of collenchymatous hypodermis form a continuous ring. Rest of the cortex is parenchymatous under which are present three vascular bundles. Two of the vascular bundles occupy the two corners formed by the groove on


Col.
Ep1
Pal.
Ep2
G.H.
P.Ph.
Xy.
Ph.
Fig. 4
Ep
Pal.
Sp.
Ep2
Fig. 2
Ep.
Col.
Fig. 5
Fig. 6
5 Cm.
Ft
Fl.
Fig. 1
A
B
Fig. 3


Ep.
Ck.
Phg.
Col.
A
Ph.
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Xy.
B
Fig. 9
5 Cm.
Tr.
Fig. 11
PARENCHYMA
A.Sp.
Fig. 7
XYLEM
PHLOEM
Fig. 8
A.Sp.
Ck.
A.Sp.
End.
P.Ph.
P.Ph.
A.Sp.
Fig. 10
A.Sp.
A.Sp.
Fig. 12
Fig. 13