broader asci and ascospores and prominent constriction at the septum of the ascospores.

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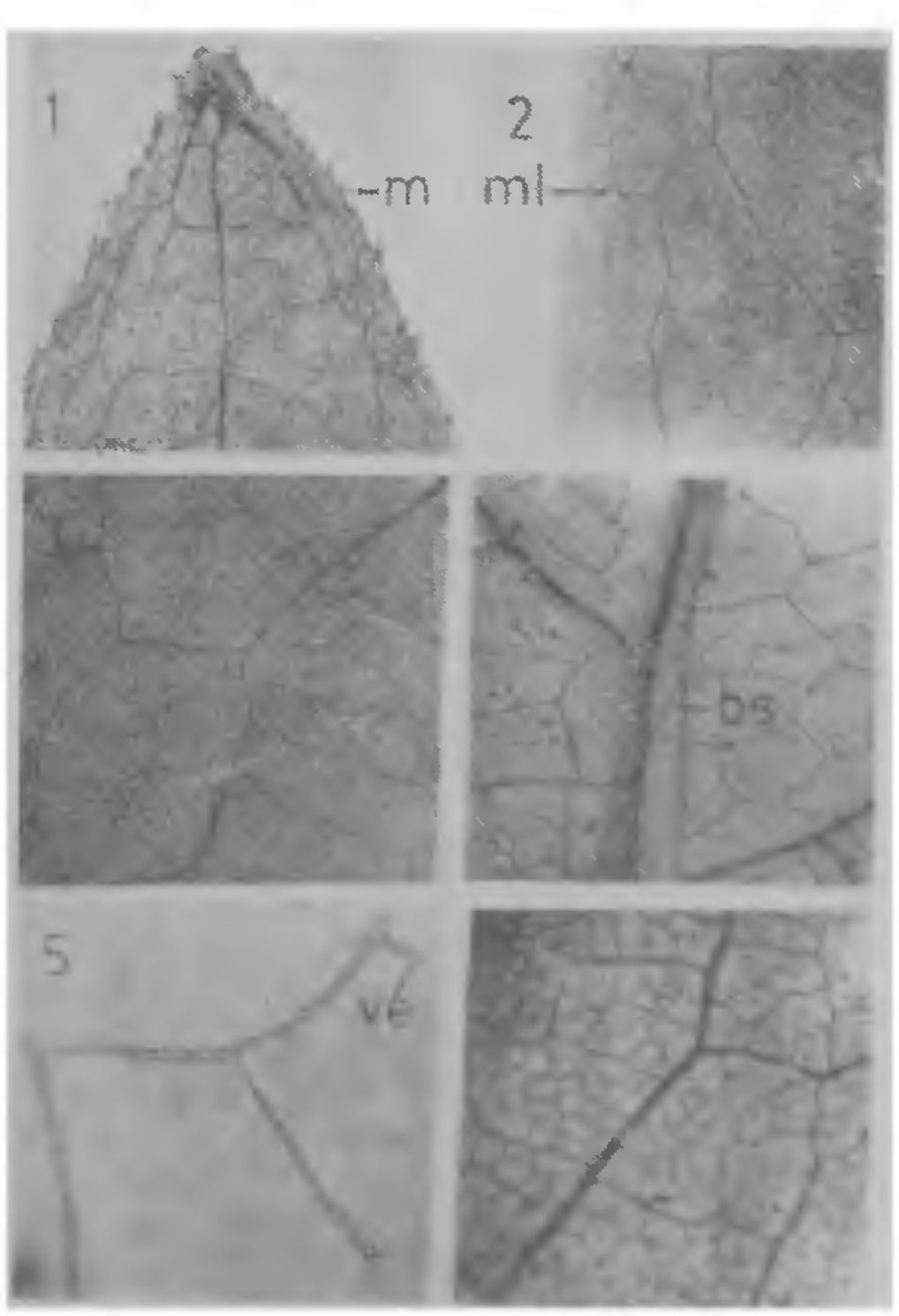
STUDIES IN LAMIACEAE

V. Venation Pattern in *Ocimum* L.

It has been stressed that venation pattern should be studied intensively[1,2]. Its diagnostic value in systematics has also been emphasized[3]. The present investigation on venation pattern of 10 species of *Ocimum* L. has been undertaken to determine its value in the systematics of this taxon (Table I). Mature leaves of different species were cleared to observe shape, size and absolute number of vein-islets and vein-endings using the schedule and terminology followed in an earlier communication[4].

The leaves of all the species are petiolate, simple, symmetrical with opposite decussate phyllotaxy; shape of leaves is narrow ovate except in *O. basilicum* and *O. kilimandascharicum*, where it is elliptical; margins are serrate; apices are acute; bases of lamina are obtuse with the exception of *O. basilicum* and *O. kilimandascharicum* where it is acute; and texture is chartaceous.

The major venation is of the pinnate, camptodromous type. The primary vein gives rise to the secondary veins in opposite or sub-opposite manner. The angle of divergence of secondary vein is narrow, acute to wide acute in all the species. The secondaries graudally diminish along the margins, where they are connected by the supra-adjacent secondaries by a series of cross veins (Fig. 1). Their ultimate branches from distinct marginal loops (Fig. 2). However, a number of veinlets come out of the loops and appear as free vein endings (Fig. 3). The veins of the next order, *i.e.*, tertiary and quaternary are quite thin. They are randomly oriented and form the reticulum. Only primary and secondary veins are covered with bundle sheath in all the species (Fig. 4). Development of areoles or vein-islets is perfect, though their shape is highly variable. Each areole contains one to many blind vein-endings which remain undivided or divide once or twice (Fig. 5). Table I depicts the data on various aspects of minor venation pattern in different species of *Ocimum* and in hundred mature leaves of almost the same size in *Ocimum basilicum*. Unconnected veinlet has been observed rarely in *O. minimum* only.



Figs. 1-6. Photo Micrographs of cleared leaves of *O. carnosum*, *O. canum*, *O. citriodorum*, *O. minimum*, *O. kilimandascharicum* and *O. sanctum* respectively; *bs*—bundle sheath; *m*—margin; *ml*—marginal loops; *ve*—vein ending.

TABLE I

Variation in the minor venation pattern of different species of ocimum* and *different leaves of O.* basilicum**

Sr. No.	Name of the taxon	Leaf area in mm²	Average size of areole in mm²	No. of areole/mm²	No. of veinlets entering areoles/mm²	No. of vein endings/ mm²	Absolute No. of vein endings	Absolute No. of vein islets
1.	*Ocimun americanum* L.	238	0·09	11·5	6·0	8·5	2023	2737
2.	*O. canum Sims.*	515	0·16	6·3	5·0	6·6	3399	3244
3.	*O. carnosum* Link and Otto. Ex. Benth.	764	0·41	2·4	2·6	3·0	2292	1833
4.	*O. citriodorum* Blance	675	0·41	2·4	2·0	2·4	1621	1621
5.	*O. crispum* Thunb.	625	0·19	5·2	5·0	5·5	3387	3250
6.	*O. gratissimum* L.	2375	0·36	2·8	1·6	2·2	5225	6650
7.	*O. kilimandscharicum Guerk.*	*1630*	*1·00*	*1·0*	*1·0*	*1·4*	*1630*	*2282*
8.	*O. minimum* L.	1175	0·80	1·2	1·5	3·5	4112	1469
9.	*O. sanctum* L.	633	0·06	16·0	7·5	11·5	7279	10125
10.	*O. basilicum* L.	495	0·11	8·9	7·0	8·9	4405	4405
11.	,,	540	0·05	17·4	11·5	14·0	7560	9396
12.	,,	552	0·06	15·5	7·4	9·4	5188	8556
13.	,,	625	0·07	13·7	11·5	13·0	9114	8562
14.	,,	*628*	*0·06*	*15·3*	*8·0*	*8·0*	*5024*	*9608*

* Average of 10 readings ; ** Average of 20 readings.

Levin[5] has postulated that vein-islet number in a unit area is more or less constant for a species. Gupta[6] has proposed that the absolute number of vein-islets and vein-endings are constant for a species in a mature leaf. On the contrary studies of Nicely[7], Sehgal and Paliwal[8], and Singh *et al.*[9], showed that there are variations in shape, size and absolute number of vein-islets and vein-endings in a unit area in mature leaves. All these authors opine that venation pattern can be of major value, along with other characters of the leaf. Our observations on 10 species of *Ocimum* lend support to their findings. Table I shows the overlapping in shape, size of areole, their number per unit area and absolute number of vein-islets and vein-endings in different species of *Ocimum* (Figs. 4, 6). Nearly a hundred leaves of *O. basilicum* were studied to verify the postulates of Levin[4], Gupta[6] and Hickey[2], but there is so much range and overlapping that no positive conclusion can be drawn. In addition to venation pattern and gross morphological features, anatomy of node, petiole, leaf and dermotypes of all these species have been studied[10] Leaving aside dermotypes, other features including venation pattern do not have much significance at least in the delimitation of species in the genus *Ocimum*, except in *O. minimum* where very rarely detached veins have been observed.

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