CHAPTER IV

DISCUSSION

Barleria Linn. is a considerable genus of the family Acanthaceae. Many species are medicinal in various countries.

From the macroscopic study of the indigenous *Barleria cristata* Linn. ("Angkaap"), *Barleria lupulina* Lindl. ("Salet phangphon"), *Barleria prionitis* Linn. ("Angkaap nuu") and *Barleria strigosa* Willd. ("Sangkoranee"), it appears that the plants are readily distinguishable from the outer appearance. The comparable diagnostic characters of the plants are as follows:

	Barleria cristata Linn.	*Barleria strigosa* Willd.
Plant	spineless.	spineless.
Leaf	opposite, entire.	opposite, entire.
Colour	grass-green.	dark green.
Surface	hairy beneath.	subglabrous above, fulvous-strigose on the nerves beneath.
Size	up to 16 x 5 cm.	up to 21 x 7.5 cm.
Shape	elliptic-oblong-lanceolate or subobovate, pointed at the tip.	ovate acute, long decurrent on the petiole.
Inflorescence	1-3 nate, axillary or terminal spikes.	very dense, glomerate spikes, more or less crowded at the tops of the branchlets.

	Barleria cristata Linn.	*Barleria strigosa* Willd.
Bracteole	linear, spinule-tipped.	lanceolate or subobovate.
Sepal	persistent; outer pair large, ovate-lanceolate, laciniately toothed.	persistent; outer pair large, ovate, nervose, ciliate-denticulate.
Corolla	violet or violet with white bands.	light blue.
Ovary	superior, bicarpellary.	superior, bicarpellary.
Disc	toothed cup.	toothed cup.
Capsule	4-seeded.	4-seeded.
Seed	orbicular.	orbicular.

	Barleria lupulina Lindl.	*Barleria prionitis* Linn.
Plant	spiny.	spiny.
Leaf	opposite, entire.	opposite, entire.
Colour	dark green with a red midrib above, paler beneath.	light green with a not-red costa on the upper surface.
Surface	glabrous or subglabrous.	glabrous or pubescent on the nerves beneath.
Size	up to 15 x 12.7 cm.	up to 18 x 6.5 cm.
Shape	linear-lanceolate, spinule-tipped.	elliptic, narrowed and pointed at both ends, spinule-tipped.
Inflorescence	erect or nodding spikes, terminal.	1-3 nate, axillary with the upper ones in terminal spikes.
Bracteole	broadly obovate, conspicuously convex, green with a purple upper half, spinule-tipped.	linear-lanceolate-channelshaped, green, hard, spinule-tipped.
Sepal	persistent; shortly aristate, pubescent, spinule-tipped.	persistent; broadly lanceolate, acuminate, long aristate, glabrous, spine-tipped.

	Barleria lupulina Lindl.	*Barleria prionitis* Linn.
Corolla	orange-yellow.	yellow.
Ovary	superior, bicarpellary.	superior, bicarpellary.
Disc	annular.	annular.
Capsule	2-seeded.	2-seeded.
Seed	ovate.	ovate.
Spine	2 per axil, 1-2 cm long.	3-5 per axil, 0.5-1 cm long.

The quantitative values of leaf also show marked differences and thus could be used to distinguish the plants either in intact or powdered forms. The comparative values are shown below:

	Barleria cristata Linn.	*Barleria lupulina* Lindl.	*Barleria prionitis* Linn.	*Barleria strigosa* Willd.
Palisade ratio	15.04	4.82	8.82	11.14
Stomatal number	434.48	387.36	412.64	455.17
Stomatal index	28.94	23.44	21.61	24.52
Vein-islet number	12.18	4.27	5.44	4.93
Veinlet termination number	4.38	3.92	5.53	2.72

The leaf powder of the plants under the microscope (Fig. 9, 14, 19, 24), other than the typical tissues, shows the presence of:

1. Free cystoliths.
2. Non-glandular trichomes with or without trichome bases;

the trichomes are absent in *Barleria lupulina* Lindl.

3. The calcium oxalate crystals, composed of prisms; but in *Barleria lupulina* Lindl., also composed of rosette aggregates.
4. The stomata of labiatae, or caryophyllaceous type, free or on fragments of the lower epidermis.
5. The helical vessels.

   (The pitted and scalariform vessels are also present in *Barleria lupulina* Lindl. and *Barleria prionitis* Linn. Tracheids with bordered pits are occasionally present in *Barleria lupulina* Lindl.)

Other microscopical diagnostic characters of the leaves are that they have a pair of epidermal cells containing calcium carbonate crystals, or cystoliths (Fig. 7, 12, 17, 22), distributed throughout the lamina and the midribs; and that the epidermises consist of a single layer of epidermal cells, except in *Barleria prionitis* Linn. of which the upper epidermial cells are 3-layered.

Marked differences in the layers of epidermal cells of young stems are also observed (Fig. 8, 13, 18, 23). Young stems of *Barleria cristata* Linn. and *Barleria strigosa* Willd. consist of 1-layered epidermal cells; while in *Barleria lupulina* Lindl. and *Barleria prionitis* Linn., the epidermal cells are 3- and 2-layered respectively.

Two-dimensional thin-layer patterns of chemical constituents of the leaves have indicated marked differences from species to species and could be used as an important tool and as an additional in the identification and differentiation of the plants.

A coding system has been set up for the purpose of describing the individual spot occurring on the chromatograms, involving: (1) R_f values obtained in two different solvent systems, (2) fluorescence and quenching of the substances under ultraviolet light before or after spraying with spray reagents, (3) colours of spots in daylight before spraying, and (4) colour reactions obtained from treatments with various detection reagents. Determination of the sameness of compounds occurring in different species can be done by direct matching of the code numbers.

The advantages of two-dimensional thin-layer chromatography, over two-dimensional paper chromatography, are excellent sharpness of separation, high sensitivity, rapidity and the possibility of using more drastic reagents than could be on paper chromatograms. Reproducible results can be obtained by controlling of the conditions affecting the R_f values such as the layer thickness, the temperature and the time interval for drying and activating the coated plates, moisture content of the thin layers, the amount of samples applied, saturation of the chromatography tanks, the compositions of the solvent systems, and the conditions and the time interval of the intermediate drying after each development.[66] In the present work, ambient temperature throughout the development of the chromatograms was about 25°C.