A PRELIMINARY REVISION OF FORMOSAN LABIATAE (I)[1]

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Abstract: The morphology of the Labiatae including their habit, stems, leaves, inflorescences, floral parts, and pollen grains is described. The hypothetical trend of the phylogeny of the inflorescences, calyx, and corolla are also discussed.

INTRODUCTION

Plants of the family Labiatae or mints consist of about 200 genera and 3,000 species and belong to a cosmopolitan group, but their center of distribution is chiefly in the Mediteranean region where they form a dominant vegetation (Lawrence, 1955: 688). G. Bentham recognized 11 tribes (1832–1836) and later reduced them to 8 tribes (1848, 1876). J. Briquet (1897) established 8 tribes for this family. Six tribes are recorded from Taiwan, namely: Satureieae, Ocimeae, Stachydeae, Ajugeae, Prasieae and Scutellarieae (Kudo, 1929).

The mint family can be distinguished from most other families by having a four-lobed ovary, didynamous stamens, bilabiate calyx and corolla, verticillately cymous inflorescence, square stems and often aromatic oils. It may be confused with the Verbenaceae and Boraginaceae. These three families have many characters in common, however, the family Labiatae differs from the family Boraginaceae by having opposite leaves, 4 nutlets and square stems, and from the family Verbenaceae it differs in usually having a gynobasic style, 4 nutlets and usually an aromatic smell.

In 1896, A. Henry who first dealt with the Labiatae of Taiwan, enumerated 20 genera, 28 species and 8 undetermined species, in his List of Plants from Formosa. In 1906, Matsumura and Hayata described 24 genera and 45 species of the mint family. In 1928, S. Sasaki enumerated 28 genera and 58 species of the family. In 1929 Y. Kudo, in his Labiatarum Sino-Japonicarum Prodromus, described 25 genera and 48 species found in Taiwan, including 2 new genera; *Kinostemon* and *Rubiteucris*. G. Masamune in his Short Flora of Formosa (1936) recorded 36 genera and 69 species, and later (1954) in his A List of Vascular Plants of Taiwan, he enumerated 37 genera and 74 species.

Most mints are important plants, being used in medicine, in industry, as ornamentals and for seasoning food. Almost all the mints are used as local medicines on Taiwan. Plants of the genera: *Mosla*, *Salvia*, *Mentha*, *Pogostemon* are important

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for industrial reasons, those of the genera: *Salvia, Ajuga, Scutellaria* are ornamentals, and those of the genera: *Ocimum, Mesona, Mentha* are used for seasoning foods.

Since mints are one of the important groups of economic plants, the writers have tried to make this study helpful to the general public. Analytical keys and descriptions for the genera and species are included.

MORPHOLOGY

HABIT: Plants of the Labiatae range from small herbs to small shrubs, being annual or perennial, and from 3 to 200 cm high. In the genera: *Ajuga, Basilicum, Chelonopsis, Clinopodium, Coleus, Dysophylla, Elsholtzia, Glechoma, Kinostemon, Lamium, Leonurus, Lycopus, Melissa, Mentha, Mosla, Ocimum, Origanum, Paraphlomis, Perilla, Pogostemon, Prunella, Rubiteucris, Salvia, Scutellaria, Suzukia* and *Teucrium*, most of the species are herbs, while in the genera *Agastache, Hyptis, Gomphostemma, Keiskea, Leucosceptrum, Stachys*, the plants are usually suffruticose plants or shrubs. The coverings of plants are simple septate hairs, glandular septate hairs, stellate hairs, glandular dots or sunken glandular dots (Pl. 1), Plants of almost all genera are covered with simple septate hairs and glandular dots, while in *Gomphostemma* and *Leucosceptrum*, the plants are covered with stellate hairs. In *Anisomeles, Clinopodium, Hyptis, Scutellaria* and *Teucrium*, the floral parts are often covered with glandular septate hairs. The roots of the herbaceous species are taproots, and taproots of the suffruticose plants or shrubs are usually branched.

STEM: Stems of the Labiatae are mostly branched, the branches being opposite, sometimes alternate by the abortion of one branch of a pair, not by the separation of the two branches. The stems are almost always quadrangular, sometimes terete on older portions, glabrous or hairy at the nodes or throughout. Most stems are erect and slender, as in some species of *Acrocephalus, Basilicum, Clinopodium, Coleus, Dysophylla, Elsholtzia, Mentha, Mosla, Mesona, Ocimum, Origanum, Paraphlomis, Prunella, Rubiteucris* and *Scutellaria*, and stout as in *Agastache, Anisomeles, Chelonopsis, Hyptis, Lycopus, Paraphlomis, Perilla, Pogostemon, Stachys* and *Suzukia*, the stems are often creeping or ascending, while in some species of *Ajuga* and *Salvia*, the stems are very short. Some species of *Ajuga* bear stolons.

LEAVES: Almost all the leaves of the Labiatae are simple, but in *Rubiteucris*, the leaves are often trifoliolate, and in some species of *Salvia*, are pinnatifid or pinnate. The phyllotaxy is usually opposite, but is arranged into a basal rosette in some species of *Ajuga, Prunella* and *Salvia*. In *Dysophylla*, the phyllotaxy is verticillate with 3–4 blades. The petioles are flat, or triangular to semicircular, often sulcate above, glabrous or puberulent, the length of the petioles varies from being nearly sessile to 12 cm long. The shape of the blades varies from narrowly elliptic to elliptic, oblong, ovate, or broadly ovate. The apex varies from acuminate to acute and base varies from cuneate to obtuse or round to cordate. Both surfaces

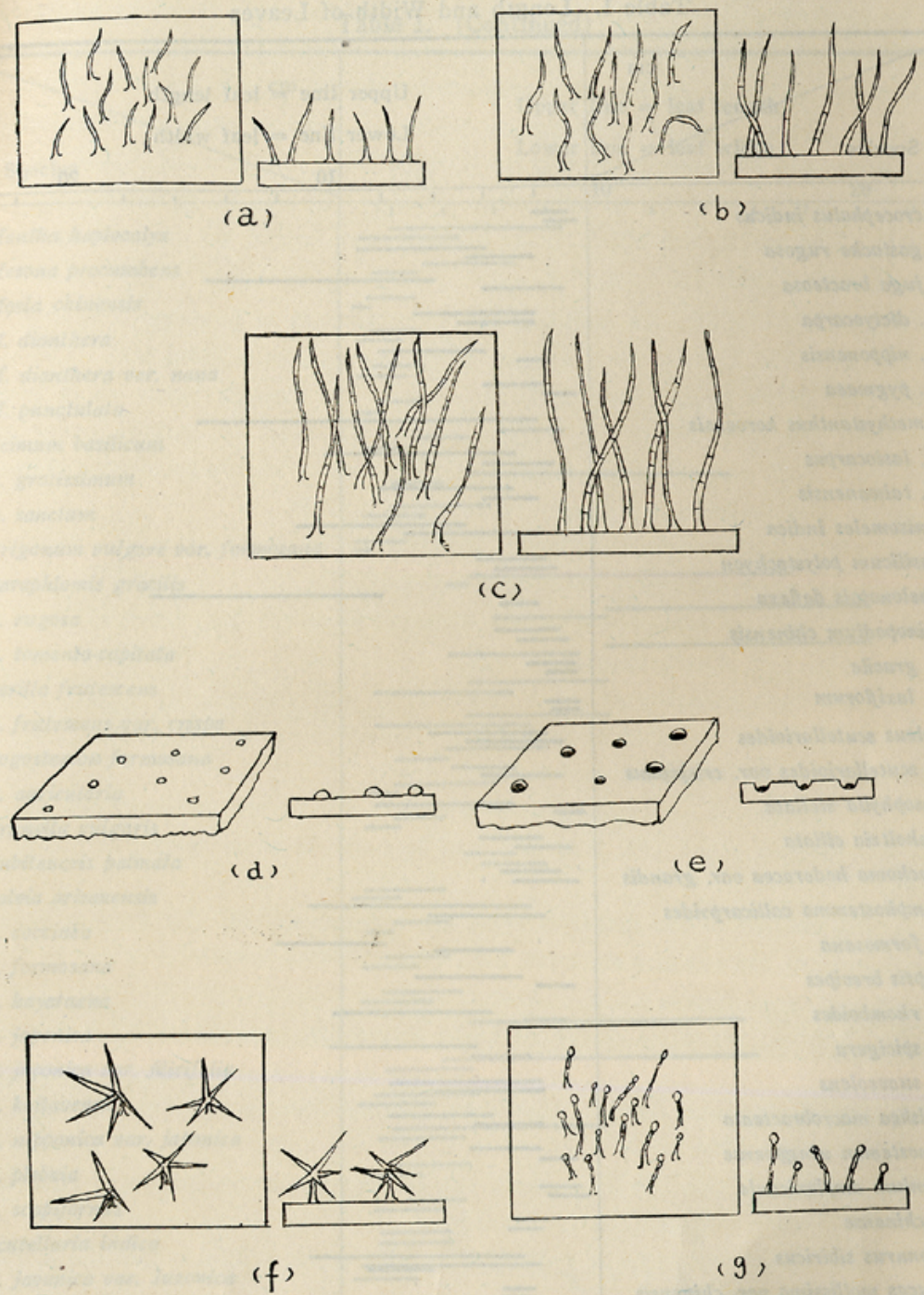


Plate 1. Indument

(a) Simple hairs, minute hairs. (b) Simple septate hairs, puberulent hairs. (c) Simple septate hairs, villous. (d) Glandular dots. (e) Sunken glandular dots. (f) Stellate hairs. (g) Glandular septate hairs.

Table 1. Length and Width of Leaves

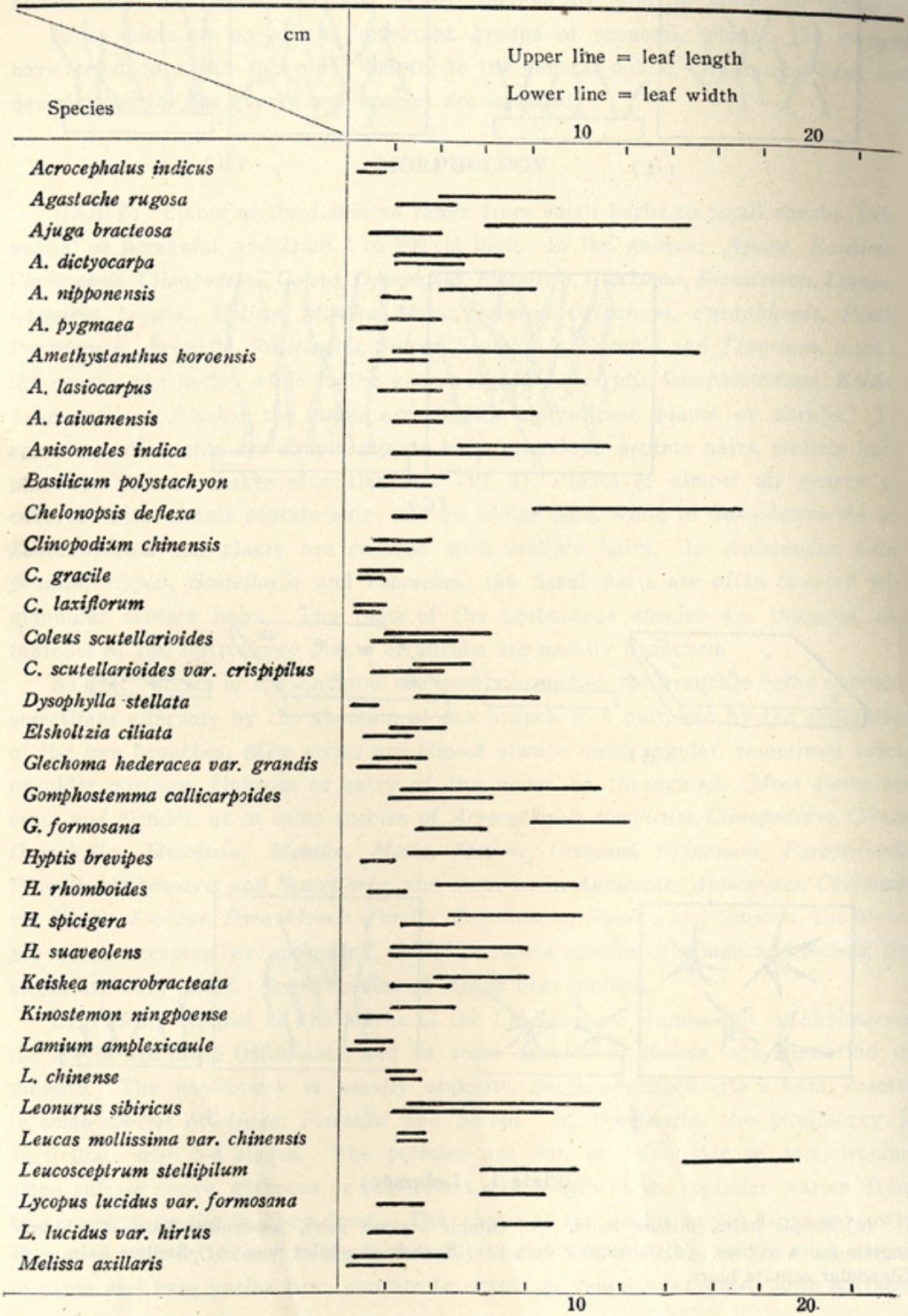
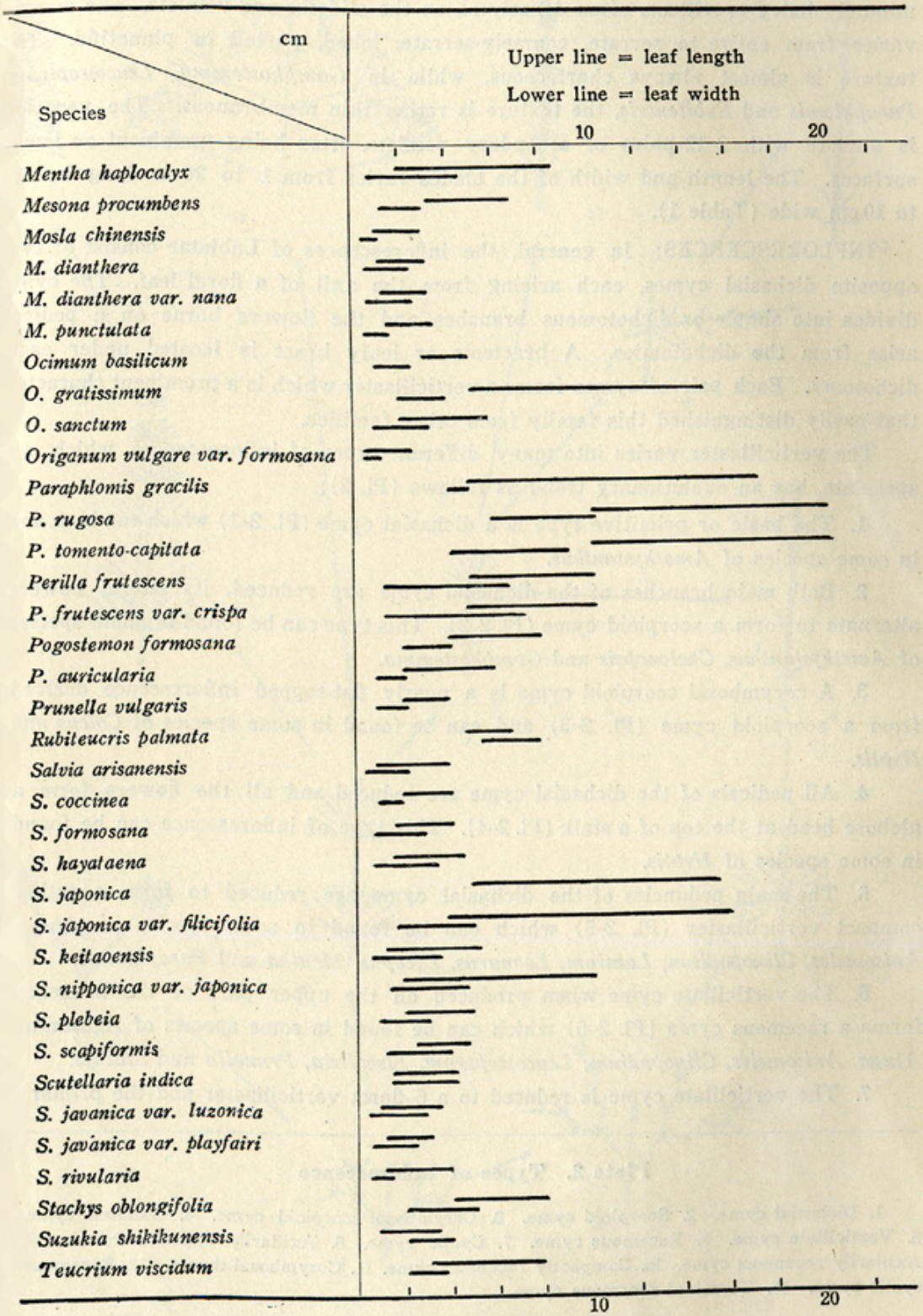


Table 1. (Continued)



may be covered with glandular dots or sunken glandular dots; they may be glabrous, minutely hairy or villous, often densely so on the midribs and veinlets. The margin varies from entire to serrate, coarsely-serrate, lobed, parted or pinnatifid. The texture is almost always chartaceous, while in *Gomphostemma, Leucosceptrum, Paraphlomis* and *Rubiteucris,* the texture is rather thin membranous. The venation is pinnate with 2–12–pairs of secondary veinlets, often being prominent on lower surfaces. The length and width of the blades varies from 1 to 20 cm long by 0.3 to 10 cm wide (Table 1).

INFLORESCENCES: In general, the inflorescences of Labiatae consist of two opposite dichasial cymes, each arising from the axil of a floral leaf. The cyme divides into simple or dichotomous branches and the flowers borne on a pedicel arise from the dichotomies. A bracteole or leafy bract is located under each dichotomy. Each pair of cymes forms a verticillaster which is a prominent character that easily distinguished this family from other families.

The verticillaster varies into many different types of inflorescences which we speculate, has an evolutionary trend as follows (Pl. 2):

1. The basic or primitive type is a dichasial cyme (Pl. 2–1) which can be found in some species of *Amethystanthus.*

2. Both main branches of the dichasial cyme are reduced, its lateral flowers alternate to form a scorpioid cyme (Pl. 2–2). This type can be found in some species of *Amethystanthus, Chelonopsis* and *Gomphostemma.*

3. A corymbosal scorpioid cyme is a nearly flat-topped inflorescence derived from a scorpioid cyme (Pl. 2–3) and can be found in some species of *Coleus* and *Hyptis.*

4. All pedicels of the dichasial cyme are reduced and all the flowers form a globose head at the top of a stalk (Pl. 2–4). This type of inflorescence can be found in some species of *Hyptis.*

5. The main peduncles of the dichasial cyme are reduced to form a rather compact verticillaster (Pl. 2–5) which can be found in some species of *Ajuga, Anisomeles, Clinopodium, Lamium, Leonurus, Lycopus, Mentha* and *Paraphlomis.*

6. The verticillate cyme when produced on the upper part of the branches forms a racemous cyme (Pl. 2–6) which can be found in some species of *Agastache, Ajuga, Anisomeles, Clinopodium, Leucosceptrum, Elsholtzia, Prunella* and *Stachys.*

7. The verticillate cyme is reduced to a 6–floret verticillaster and the primary

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Plate 2. Types of Inflorescence

1. Dichasial cyme. 2. Scorpioid cyme. 3. Corymbosal scorpioid cyme. 4. Globosal cyme. 5. Verticillate cyme. 6. Racemous cyme. 7. Cyclic cyme. 8. Axillarily opposite flowers. 9. Axillarily racemous cyme. 10. Compactly racemous cyme. 11. Corymbosal thyrse. 12. Racemous cyclic cyme. 13. Terminal racemous cyme.

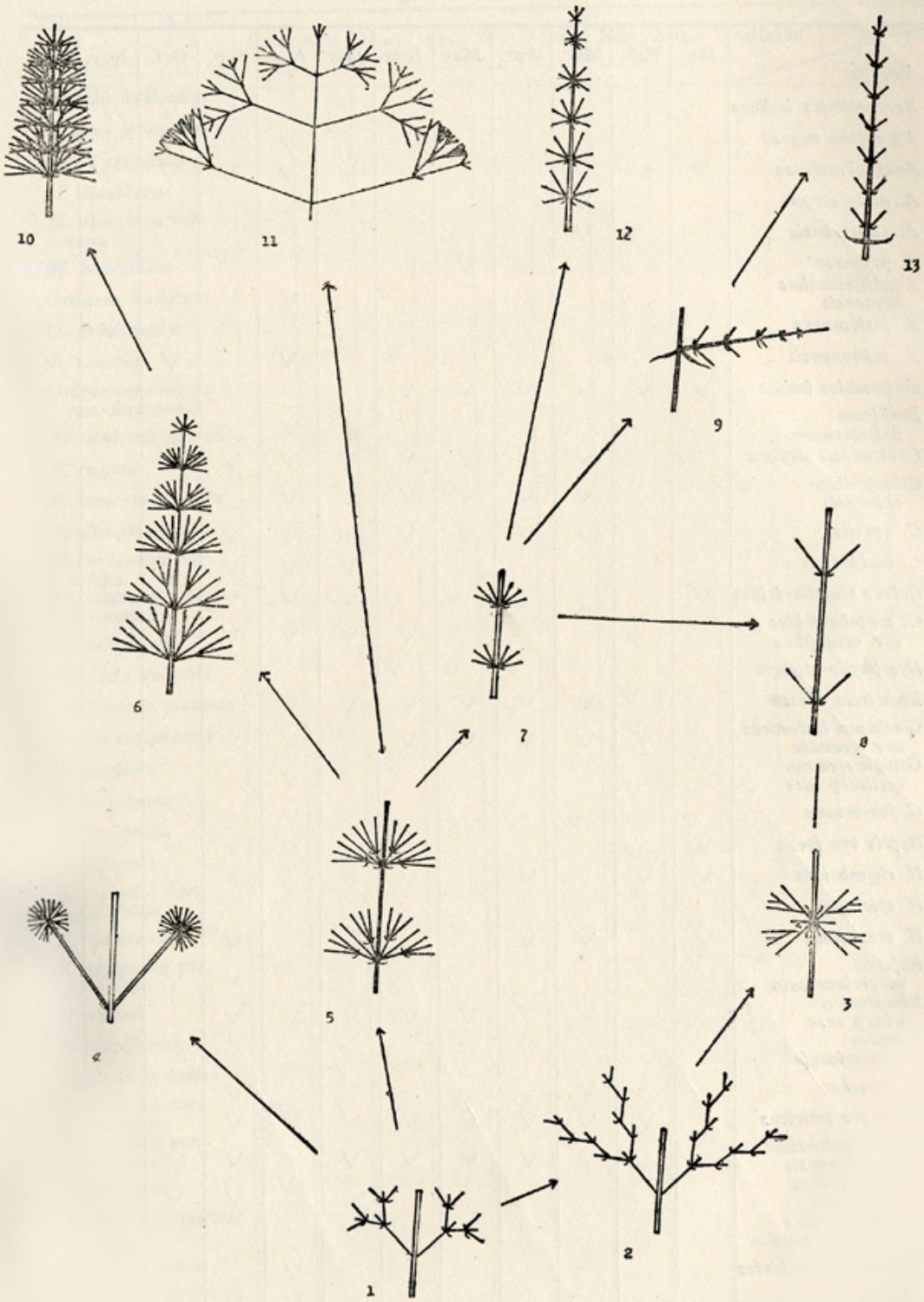
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Table 2. Flowering Time

Species \ Month	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
Acrocephalus indicus									V	V	V	V
Agastache rugosa								V	V	V	V	
Ajuga bracteosa	V	V	V				V	V	V	V	V	V
A. dictyocarpa			V									
A. nipponensis			V									
A. pygmaea				V	V							V
Amethystanthus koroensis								V	V	V		
A. lasiocarpus										V	V	
A. taiwanensis								V		V		V
Anisomeles indica	V	V	V	V	V	V						
Basilicum polystachyon								V				
Chelonopsis deflexa			V	V	V	V	V	V	V			
Clinopodium chinensis			V	V	V	V	V	V				
C. gracile			V	V	V	V	V	V	V	V		
C. laxiflorum							V	V	V	V		
Coleus scutellarioides	V						V	V	V	V	V	V
C. scutellarioides var. crispipilus						V	V	V	V	V	V	
Dysophylla stellata											V	
Elsholtzia ciliata			V	V	V	V	V	V				
Glechoma hederacea var. grandis		V	V	V	V	V	V	V	V	V		
Gomphostemma callicarpoides								V				V
G. formosana								V				
Hyptis brevipes	V							V	V	V	V	V
H. rhomboides	V	V		V		V	V			V	V	V
H. spicigera											V	
H. suaveolens	V		V	V					V	V	V	V
Keiskea macrobracteata									V	V	V	
Kinostemon ningpoense			V	V	V	V	V	V	V			
Lamium amplexicaule				V								
L. chinense			V						V		V	
Leonurus sibiricus		V	V	V	V	V	V	V	V			
Leucas mollissima var. chinensis			V	V	V	V	V	V	V	V	V	
Leucosceptrum stellipilum									V	V	V	V
Lycopus lucidus var. formosana							V					V
L. lucidus var. hirtus								V				
Melissa axillaris							V	V	V	V		

Table 2. (Continued)

Species \ Month	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
Mentha haplocalyx								V	V	V	V	
Mesona procumbens	V	V						V	V	V	V	V
Mosla chinensis							V	V	V			
M. dianthera									V	V	V	V
M. dianthera var. nana									V	V	V	
M. punctulata								V	V	V	V	
Ocimum basilicum			V				V	V	V	V	V	V
O. gratissimum	V							V	V	V	V	V
O. sanctum	V	V	V							V	V	V
Origanum vulgare var. formosana							V	V	V	V	V	V
Paraphlomis gracilis						V	V	V	V	V	V	
P. rugosa							V	V				
P. tomento-capitata				V			V	V	V			V
Perilla frutescens										V	V	
P. frutescens var. crispa									V	V		
Pogostemon formosana	V	V	V	V					V	V	V	V
P. auricularia							V	V	V	V	V	
Prunella vulgaris			V	V	V	V						
Rubiteucris palmata							V	V				
Salvia arisanensis		V					V	V	V	V	V	V
S. coccinea								V				
S. formosana							V	V	V	V		
S. hayataena			V	V	V	V	V	V			V	V
S. japonica							V	V				
S. japonica var. filicifolia							V		V			
S. keitaoensis		V	V	V			V	V		V	V	V
S. nipponica var. japonica	V	V					V	V	V	V	V	
S. plebeia				V	V	V				V		
S. scapiformis				V	V	V	V	V	V			
Scutellaria indica	V	V	V	V					V	V	V	V
S. javanica var. luzonica	V	V	V	V	V	V						
S. javanica var. playfairi								V	V	V	V	V
S. rivularia	V	V	V	V						V	V	V
Stachys oblongifolia										V		
Suzukia shikikunensis					V	V	V	V	V	V		
Teucrium viscidum							V	V				

pedicels are shortened to become subsessile (Pl. 2–7). This kind of inflorescence can be found in some species of *Keiskea, Leucas, Melissa, Ocimum* and *Rubiteucris.*

8. The lateral flowers of each cyclic cyme reduced to form a 2–floret verticillaster (Pl. 2–8) which can be found in some species of *Ajuga, Glechoma* and *Lamium.*

9. The 2 lateral flowers of each cyclic cyme are reduced to form a 2–floret verticillaster. The remaining lateral branches bear florets (Pl. 2–9). This type of inflorescences can be found in some species of *Kinostemon, Mosla* and *Suzukia.*

10. In some species of *Acrocephalus, Dysophylla, Elsholtzia, Hyptis, Prunella* and *Stachys,* the verticillate cyme is compactly arranged to form a distinct terminal or lateral spike-like cyme (Pl. 2–10).

11. In most species of *Origanum,* the main peduncle of the lower verticillate cyme elongates to form a flat-topped or half globose corymbosal thyrse (Pl. 2–11).

12. The cyclic cymes gathered at the upper part of the branches form racemous cyclic cymes (Pl. 2–12) which can be found in *Keiskea, Melissa, Ocimum* and *Salvia.*

13. The terminal racemous cyme can be found in some species of *Kinostemon, Mosla, Scutellaria, Suzukia* and *Teucrium* (Pl. 2–13).

The floral leaves are opposite and decussate, and often longer than the calyx. The bracts vary greatly in form and size, and always resemble the floral leaves but are different from the cauline leaves.

FLOWER: The flowers of the Labiatae are bisexual, zygomorphic, or sometimes actinomorphic, hypogynous, and pedicellate, sometimes reduced or sessile. Pedicels and floral parts are always hairy. The flowers are small, ranging from 0.5 to 3 cm long. The flower color varies from white, blue, pink, yellow, purple to red. The flowering period (Table 2) varies through the year, depending on the individual species.

CALYX: The clayx is persistent, often enlarged after flowering. It is gamosepalous with typically 5–toothed, 2–lipped or is regular, and is usually 5–, 10–, 13– or 15–nerved. The shape of the calyx varies from campanulate, tubular to urceolate. The calyx type often provides a prominent character for distinguishing the genera in Labiatae: In *Leucas,* the calyx is 10–toothed and more or less equal in size; in *Stachys, Hyptis,* the calyx tooth is spine-like; in *Coleus* and *Kinostemon,* the calyx is 4–toothed, the lower tooth being bifid. On a typical calyx, the upper lip is always 3–toothed and the lower lip is 2–toothed, as in *Mosla, Perilla, Rubiteucris,* and in

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Plate 3. Calyx Types

1. *Acrocephalus.* 2. *Ajuga, Suzukia.* 3. *Amethystanthus, Keiskea.* 4. *Agastache, Anisomeles, Lycopus, Paraphlomis.* 5. *Chelonopsis.* 6. *Clinopodium.* 7. *Coleus, Kinostemon.* 8. *Dysophylla.* 9. *Elsholtzia, Mentha.* 10. *Glechoma, Lamium.* 11. *Gomphostemma.* 12. *Hyptis.* 13. *Leucas.* 14. *Leucosceptrum.* 15. *Melissa.* 16. *Mesona.* 17. *Mosla, Perilla.* 18. *Ocimum, Basilicum.* 19. *Origanum.* 20. *Orthosiphon.* 21. *Pogostemon.* 22. *Prunella.* 23. *Rubiteucris.* 24. *Salvia.* 25. *Scutellaria.* 26. *Stachys, Leonurus.* 27. *Teucrium.*

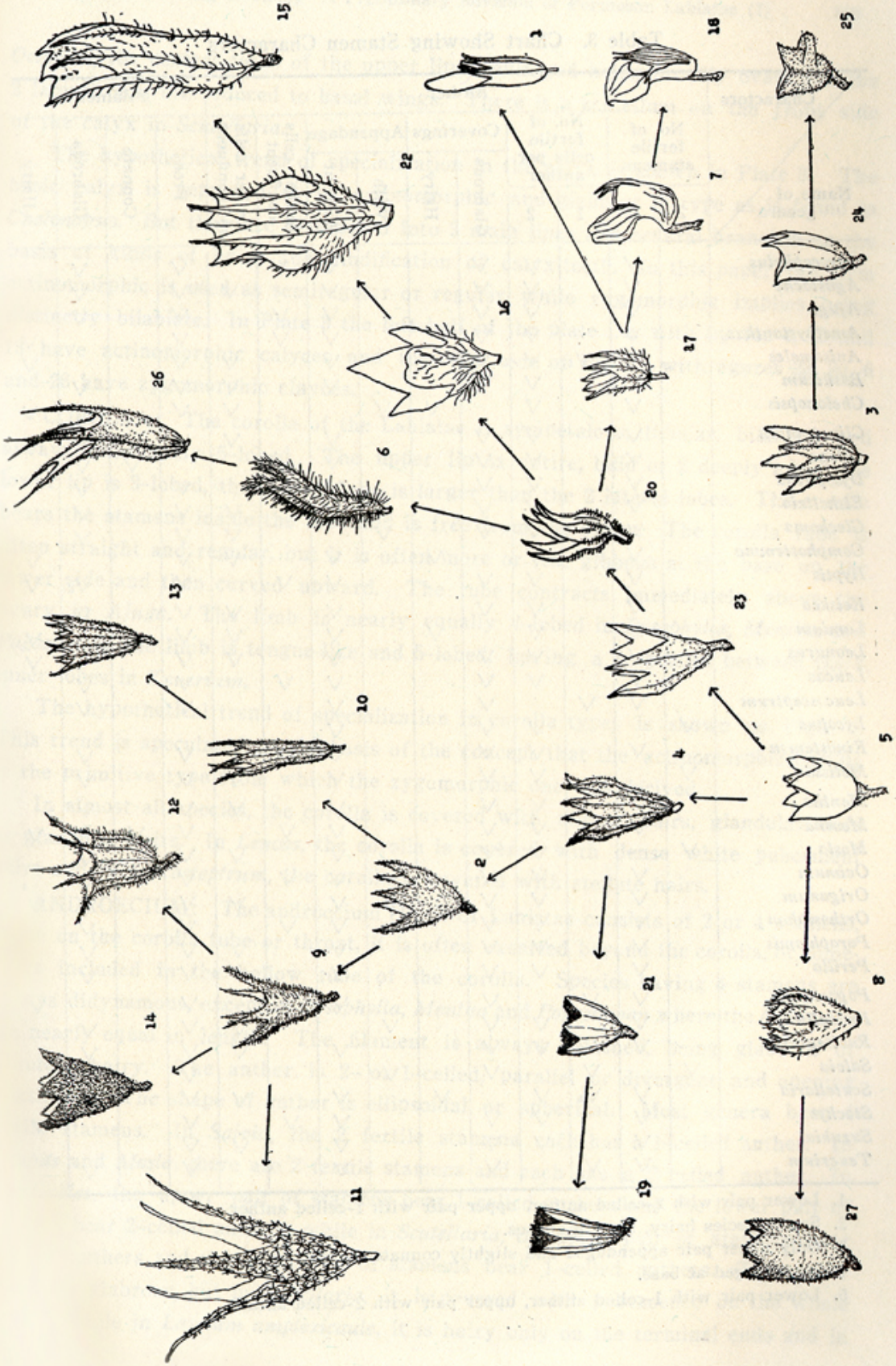
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Table 3. Chart Showing Stamen Characters

Characters / Name of genera	Anther										Filament			
	No. of fertile stamens		No. of fertile cells per anther		Coverings		Appendage		Anther cells confluent	Anther cells not confluent	Free	Connate	Glabrous	Hairy
	2	4	1	2	Glabrous	Hairy	With	Without						
Acrocephalus		√		√	√			√	√		√		√	
Agastache		√		√	√			√		√	√		√	
Ajuga		√		√	√			√	√		√		√	
Amethystanthus		√		√	√			√	√		√			√
Anisomeles		√	√[1]	√	√			√		√	√			√
Basilicum		√		√	√			√		√	√		√	
Chelonopsis		√		√		√	√			√	√			√
Clinopodium		√		√	√			√		√	√		√	
Coleus		√		√	√			√	√			√	√	
Dysophylla		√		√	√			√	√		√		√	
Elsholtzia		√		√	√			√		√	√		√	
Glechoma		√		√	√		√			√	√		√	
Gomphostemma		√		√		√		√		√	√			√
Hyptis		√		√	√			√	√		√		√[2]	√
Keiskea		√		√	√			√		√	√		√	
Lamium		√		√		√		√		√	√			√
Leonurus		√		√	√			√		√	√			√
Leucas		√		√	√			√	√		√		√	
Leucosceptrum		√	√		√			√			√		√	
Lycopus	√			√	√			√						
Kinostemon		√		√	√			√	√		√		√	
Melissa	√			√	√			√		√	√		√	
Mentha		√		√	√			√		√	√		√	
Mesona		√		√	√			√	√		√	√[3]		√
Mosla	√			√	√			√		√	√		√	
Ocimum		√		√	√			√	√		√		√	
Origanum		√		√	√			√		√	√			√[4]
Orthosiphon		√		√	√			√	√		√		√	
Paraphlomis		√		√	√			√		√	√		√	
Perilla		√		√	√			√		√	√		√	
Pogostemon		√	√		√			√			√			√
Prunella		√		√	√		√			√	√		√	
Rubiteucris		√		√	√			√		√	√		√	
Salvia	√		√		√		√				√		√	
Scutellaria		√	√[5]	√		√		√		√	√		√	
Stachys		√		√	√			√	√		√			√
Suzukia		√		√	√			√		√	√			
Teucrium		√	√		√			√			√		√	

1. Lower pair with 2-celled anther, upper pair with 1-celled anther.
2. Some species hairy, some glabrous.
3. Only upper pair appendaged and slightly connate at base.
4. Appendaged at base.
5. Lower pair with 1-celled anther, upper pair with 2-celled anther.

Ocimum, the central tooth of the upper lip is enlarged being broadly ovate and the 2 lateral ones are reduced to basal wings. There is a scutellum on the front side of the calyx in *Scutellaria*.

The hypothetical trend of specialization in the calyx is shown in Plate 3. The basic calyx is supposed to be actinomorphic and glabrous in type as is found in *Chelonopsis*. But they are diversified into 3 main lines and several branches on the basis of kinds of hairs and modification of calyx-teeth. In this paper, the term actinomorphic is used as semiregular or regular while zygomorphic implies being distinctly bilabiate. In Plate 3 the left half of the plate i. e. with figures 4, 10 and 13 have actinomorphic calyces and the right side of Plate 3 with figures 23, 20, 6 and 26 have zygomorphic clayces.

COROLLA: The corolla of the Labiatae is sympetalous, tubular, bilabiate and always imbricately 5–lobed. The upper lip is entire, bifid or 2 deeply lobed, the lower lip is 3–lobed, the central lobe is larger than the 2 lateral lobes. The corolla bears the stamens inside the tube and is free from the ovary. The corolla tube is often straight and regular, but it is often more or less gibbous at the base on the lower side and then curved upward. The tube contracts immediately above the ovary in *Ajuga*. The limb is nearly equally 4–lobed in *Dysophylla*, *Mentha*, and *Pogostemon*, the limb is tongue-like and 5–lobed, having a deep cleft between the 2 inner lobes in *Teucrium*.

The hypothetical trend of specialization in corolla types is shown as Plate 4. This trend is speculated on the basis of the concept that the actinomorphic corolla is the primitive type from which the zygomorphic one was derived.

In almost all species, the corolla is covered with minute hairs, glandular dots or glandular hairs. In *Leucas*, the corolla is covered with dense white puberulent hairs and in *Leucosceptrum*, the corolla is covered with stellate hairs.

ANDROECIUM: The androecium (Pl. 5) of Labiatae consists of 2 or 4 stamens, borne on the corolla tube or throat, it is often exserted beyond the corolla, or sometimes included in the hollow tube of the corolla. Species having 4 stamens are always didynamous, except in *Dysophylla*, *Mentha* and *Pogostemon* where the 4 stamens are nearly equal in length. The filament is always flattened, being glabrous or minutely hairy. The anther is 2– or 1–celled, parallel or divergent, and opening lengthwise. The shape of anther is ellipsoidal or spherical. Most genera bear 4 fertile stamens. In *Salvia*, the 2 fertile stamens each has a 1–celled anther. In *Lycopus* and *Mosla*, there are 2 fertile stamens and each has a 2–celled anther. In *Anisomeles*, the upper pair of stamens bear 1–celled anthers and the lower pair of stamens bear 2–celled anthers, while in *Scutellaria*, the upper pair of stamens bear 2–celled anthers and the lower pair of stamens bear 1–celled anthers. The anther is usually glabrous, but in *Scutellaria*, it is covered with pubescence on the whole surface, while in *Lamium amplexicaule*, it is hairy only on the terminal ends and in

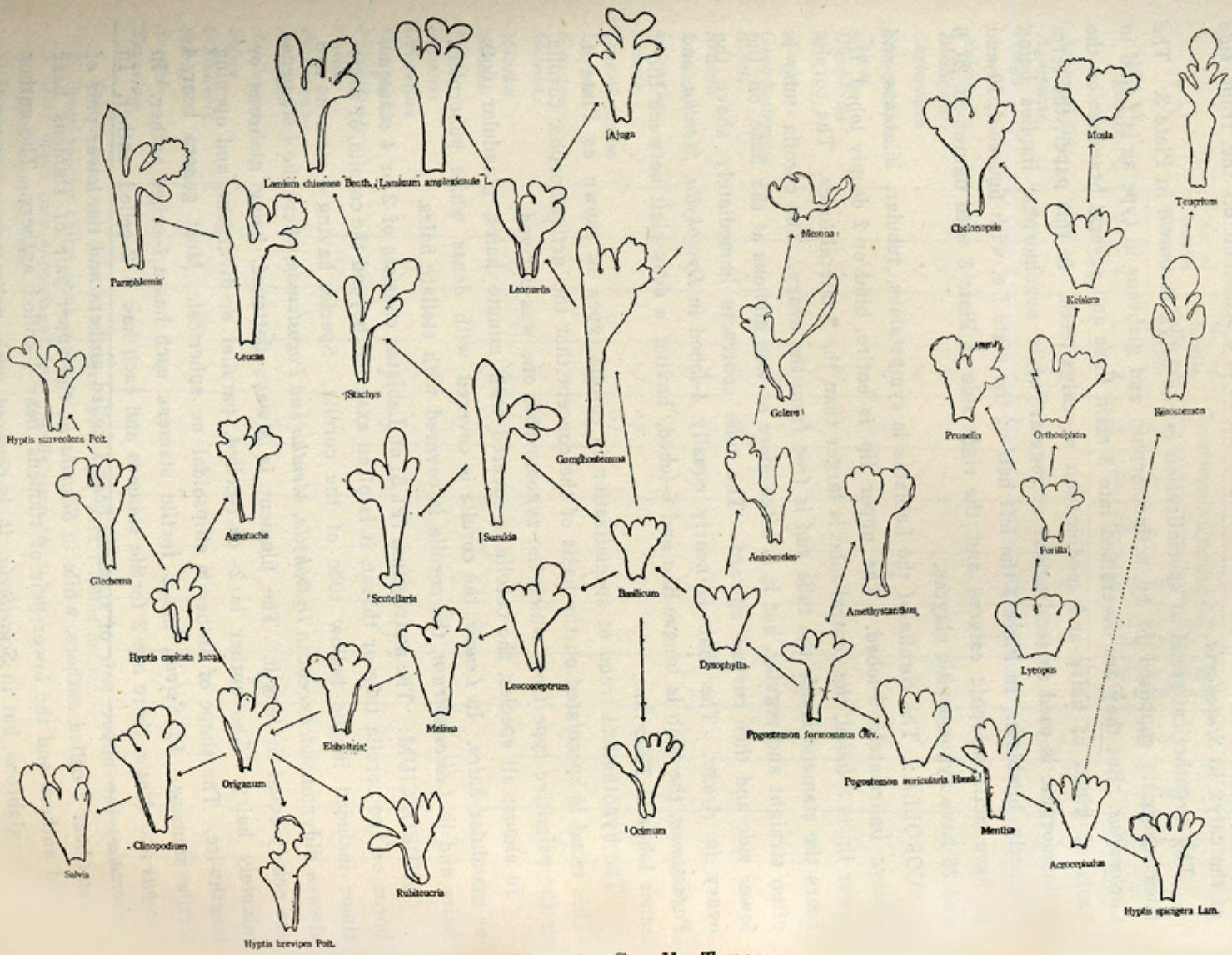


Plate 4. Corolla Types

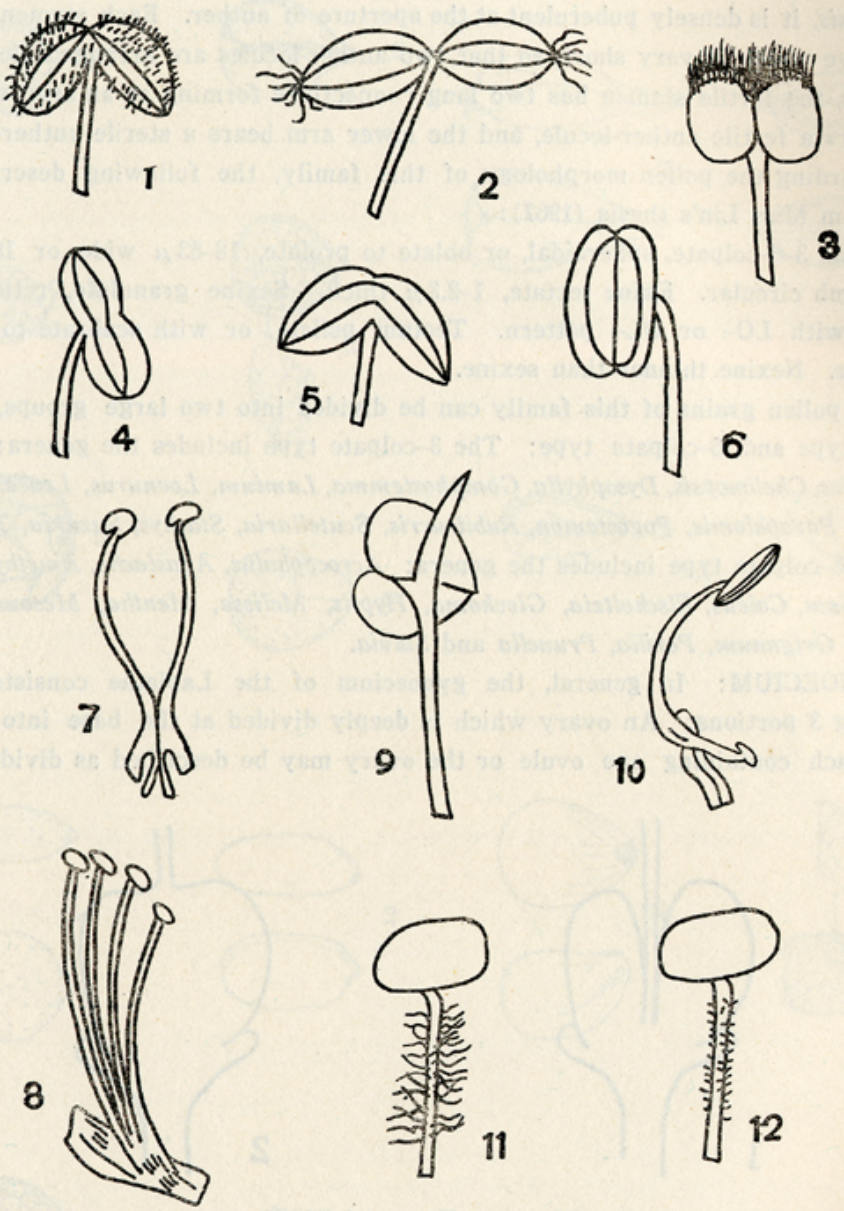


Plate 5. Various Types of Stamens

1. Anther 2-celled, hairs covering the whole surface of anther (*Scutellaria*). 2. Anther 2-celled, hairs only on ends (*Lamium amplexicaule*). 3. Anther 2-celled, hairs on aperture (*Chelonopsis*). 4. Anther 2-celled, confluent (*Leucas*). 5. Anther 2-celled, confluent (*Ajuga, Amethystanthus, Dysophylla, Hyptis, Kinostemon, Lamium, Mesona, Ocimum, Stachys*). 6. Anther 2-celled, confluent (*Acrocephalus, Agastache, Coleus*). 7. Filament appendaged at base, slightly connate (*Mesona*). 8. Filament connate at base (*Coleus*). 9. Anther appendaged by elongation of filament (*Glechoma, Prunella*). 10. Anther 1-celled, armed (*Salvia*). 11. Filament puberulent (*Anisomeles, Chelonopsis, Hyptis, Pogostemon*). 12. Filament minutely hairy (*Amethystanthus, Gomphostemma, Leonurus, Paraphlomis, Stachys*).

Chelonopsis, it is densely puberulent at the aperture of anther. Each stamen has one connective which is very short, so that two anther-locules are arranged closely, but in *Salvia*, the fertile stamen has two long connectives forming as an arm; the upper arm bears a fertile anther-locule, and the lower arm bears a sterile anther-locule.

Regarding the pollen morphology of this family, the following description is cited from Miss Lin's thesis (1967):

Grains 3–6–colpate, spheroidal, or oblate to prolate, 18–83 μ wide or 18–51×12–72 μ. Amb circular. Exine tectate, 1–2.3 μ thick. Sexine granulate, reticulate to striate, with LO– or OL– pattern. Tectum psilate, or with scabrate to echinate processes. Nexine thinner than sexine.

The pollen grains of this family can be divided into two large groups, i.e., 3–colpate type and 6–colpate type: The 3–colpate type includes the genera: *Ajuga, Anisomeles, Chelonopsis, Dysophylla, Gomphostemma, Lamium, Leonurus, Leucas, Leucosceptrum, Paraphlomis, Pogostemon, Rubiteucris, Scutellaria, Stachys, Suzukia, Teucrium;* and the 6–colpate type includes the genera: *Acrocephalus, Agastache, Amethystanthus, Clinopodium, Coleus, Elscholtzia, Glechoma, Hyptis, Melissa, Mentha, Mesona, Mosla, Ocimum, Origanum, Perilla, Prunella* and *Salvia.*

GYNOECIUM: In general, the gynoecium of the Labiatae consists of the following 3 portions: An ovary which is deeply divided at the base into 4 equal lobes, each containing one ovule or the ovary may be described as divided into 2

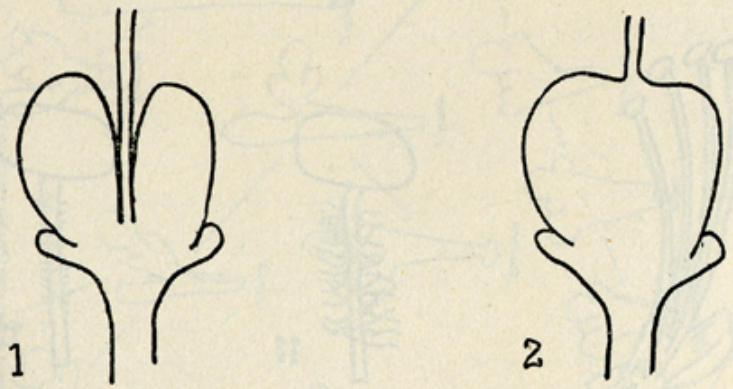
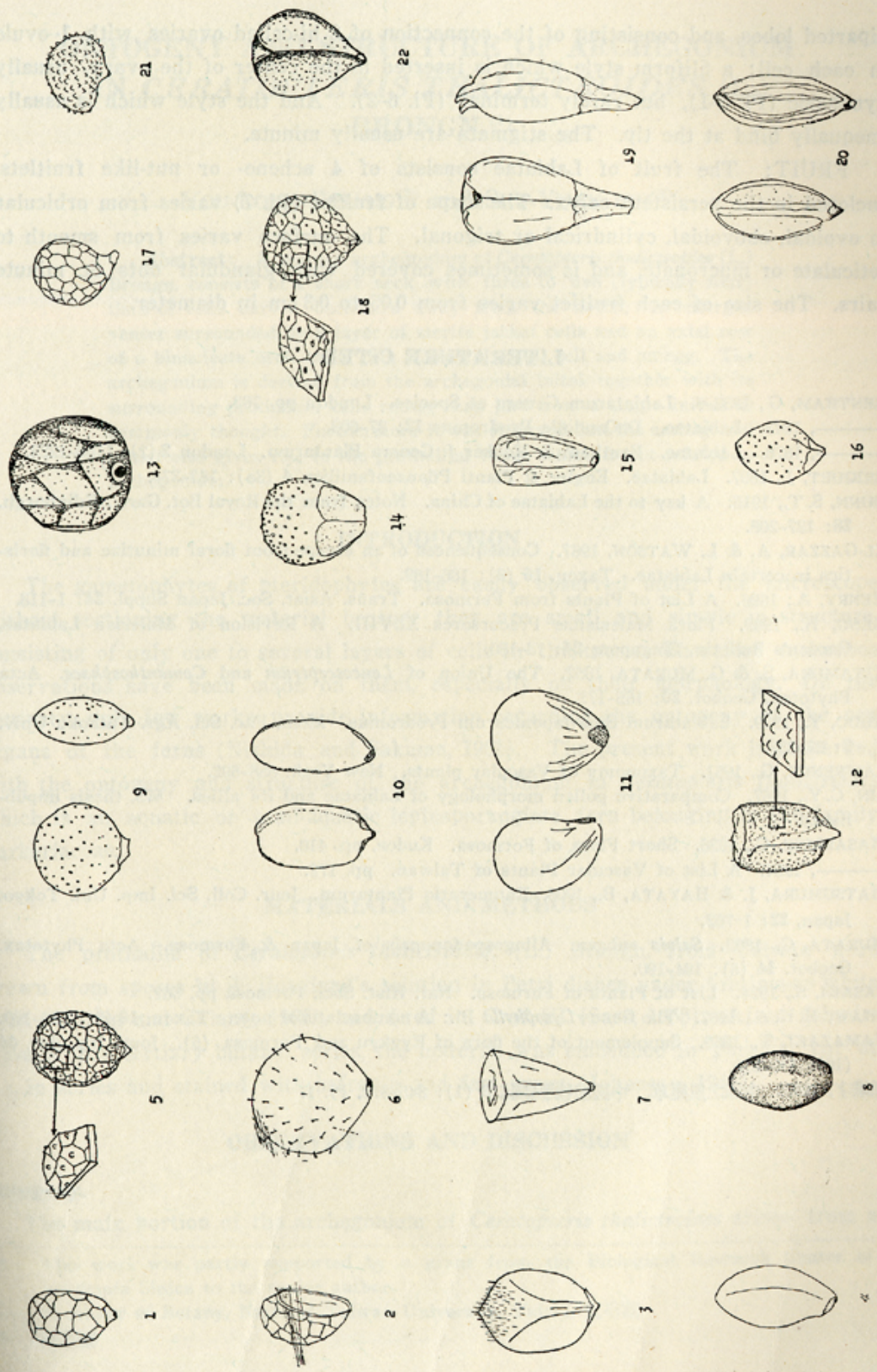


Plate 6. Types of Pistils

1. Style gynobasic. 2. Style terminal.

Plate 7. Types of Fruitlets

1. *Acrocephalus.* 2. *Ajuga.* 3. *Agastache, Amethystanthus.* 4. *Anisomeles, Clinopodium, Elsholtzia.* 5. *Basilicum, Ocimum.* 6. *Chelonopsis.* 7. *Lamium, Leonurus, Leucas, Leucosceptrum.* 8. *Dysophylla, Hyptis, Mesona, Origanum, Pogostemon, Salvia.* 9. *Coleus.* 10. *Glechoma.* 11. *Gomphostemma.* 12. *Hyptis suaveolens.* 13. *Keiskea.* 14. *Kinostemon, Rubiteucris, Teucrium.* 15. *Melissa.* 16. *Mentha.* 17. *Mosla, Perilla.* 18. *Mosla chinensis.* 19. *Paraphlomis.* 20. *Prunella.* 21. *Scutellaria.* 22. *Suzukia.*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biparted lobes, and consisting of the connection of 2 bi-celled ovaries with 1-ovule in each cell; a filiform style which is inserted in the center of the ovary, usually gynobasic (Pl. 6-1), but rarely terminal (Pl. 6-2). And the style which is usually unequally bifid at the tip. The stigmata are usually minute.

FRUIT: The fruit of Labiatae consists of 4 achene- or nut-like fruitlets, enclosed in the persistent calyx. The shape of fruitlet (Pl. 7) varies from orbicular to ovoidal, obovoidal, cylindrical or trigonal. The surface varies from smooth to reticulate or mucronate, and is sometimes covered with glandular dots or minute hairs. The size of each fruitlet varies from 0.05 to 0.3 cm in diameter.

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