

# Floral Structure of Some Selected Tropical Plants



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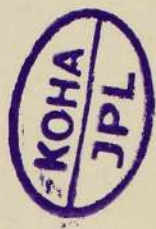
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**FLORAL STRUCTURE  
OF  
SOME SELECTED  
TROPICAL PLANTS**

by



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## PREFACE

Recently we compiled a book entitled 'An illustrated account of some Maldivian plants' for the Ministry of Education of the Republic of Maldives and for use by students in Biology preparing for the London Advanced Level G.C.E. Examination. This experience has been made use of in producing a book on somewhat similar lines for our own students preparing for the local and London Advanced level Examinations. It will also be useful to undergraduates offering Botany during the early years at the University and to those interested in tropical plants.

Our primary intention in this book is to expose the student to the great variety of form and structure by selecting appropriate floral types readily available in the tropics. It is by no means intended that students should study all the types listed here. Nor is it intended that students be restricted to these types alone. Teachers should ensure that the students carefully observe these flowers and flower parts using this book as a guide. It should never be used as a substitute for practical work. Examining sections of ovaries under the dissecting microscope or the low power of the microscope would become necessary to study aspects like placentation. Transverse sections of the flower buds may also provide information of considerable value. Adequate space is available on most of the pages to make the relevant illustrations and notes.

*The Chapter on 'Flowers—How to get to know them'* has been translated into Sinhala and Tamil and these appear immediately after the account in English. Appendix 13 provides a glossary to the text. These should be useful to the large number of students studying in the Sinhala and Tamil media.

We are most grateful to a number of our colleagues for help and advice. The illustrations were all done by Mrs. Suneetha Medis of the Department of Botany, University of Colombo. All illustrations of flowers were done from actual specimens under our guidance.

We have been able to draw upon the wide knowledge and experience of one of our former teachers, Prof. B.A. Abeywickrema currently attached to the Department of Botany of the University of Colombo. We are also thankful to him for the considerable help given to us during the preparation of this book and for critical reading of the manuscript.

R. N. de. F.  
S. B.

15th September 1984.



## FLOWERS—HOW TO GET TO KNOW THEM

In this book we have described and illustrated the vegetative and floral characters of 26 plant species belonging to 26 genera and 16 families. The student of biology should familiarize himself with the infinite variety of form and structure which flowers exhibit. The description of vegetative and floral structure has acquired an extensive vocabulary of technical terms and we have attempted to lighten the burden of the student by providing the necessary information in appendices.

Except for a few, we have on purpose, avoided providing drawings of sections of flowers and floral diagrams. We have also avoided giving the floral formulae. All the important characters are listed and we would expect the student by appropriate sections and dissections to make a thorough study and thereafter make suitable drawings and construct floral diagrams and formulae. These could be made on the book itself.

### Recording the Floral Structure

There are three ways by which the structure of a flower could be recorded.

#### Drawing of a Half Flower

Here the flower is cut along the median plane i.e. the plane in line with the main axis. Most flowers may be cut longitudinally into two symmetrical parts (regular flowers or radially symmetrical or actinomorphic flowers) resulting in two equal and opposite halves (Fig. 1). However in the case of bilaterally symmetrical flowers (irregular or zygomorphic flowers) the flower could be cut only along one plane through the centre to give 2 equal parts eg. *Spathoglottis*, *Torenia*. In the case of asymmetrical flowers as in *Canna* it is not possible to divide the flower into two similar parts. In the case of very minute flowers like that of a grass, cutting becomes very difficult. The best way to study such flowers is to dissect out the outer floral parts.

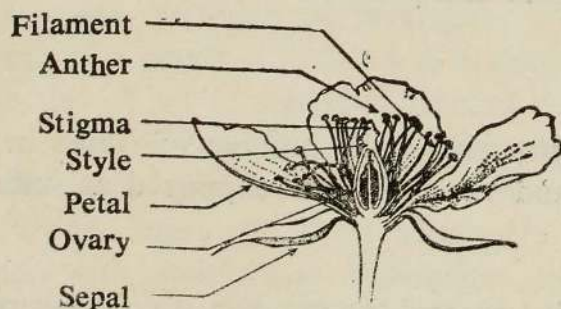


Fig. 1. Half flower of *Muntingia calabura*

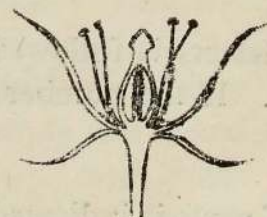


Fig. 2. Longitudinal section of *Muntingia calabura*

A longitudinal section (Fig. 2) differs from a half flower in that in the former only the cut surfaces resulting from the cut are shown. It is necessary only to draw one of the sections.

### Floral Diagram

This is a ground plan of the flower as viewed from above. In other words it is a diagrammatic transverse section of the flower as it would appear in bud. When constructing a floral diagram the flower should be held so that the bract or leaf in the axil of which the flower arises faces you and the pedicel or flower stalk is furthest away. The bract is shown by a crescent and the pedicel by an O with a central dot (Fig. 3A).

The perianth members are represented by crescents. If there is a differentiation of sepals and petals they are distinguished by some slight differentiation of the crescents. Where the members of a whorl are of different size this is indicated by a difference in size of the crescents. The consecutive floral whorls normally alternate. The petals should therefore be indicated inside the gaps between the sepals (Fig. 3 C).

The stamens are represented by outlines of the transverse sections of the anthers. The gynoecium is shown as it appears in a cross section of the ovary (Fig. 3 D). Cohesion of parts in a whorl is indicated by connecting lines. Adhesion of adjacent whorls is indicated by straight lines joining the parts concerned.

### Floral Formulae

This is a representation in symbols of the characters and structure of the flower. The symbols are as follows:

Regular or Radially symmetrical \*

Bilaterally symmetrical  $\cdot| \cdot$  or  $\downarrow$

Bisexual  $\text{\textcircled{♀♂}}$

Unisexual—pistillate ♀

Unisexual—staminate ♂

For the floral whorls the capital letters corresponding to the whorls are as follows:

K for Calyx

C for Corolla

P for Perianth (not differentiated into sepals and petals)

A for Androecium

G for Gynoecium

Each of the letters is followed by the figure giving the number of units in the whorl eg. K 5. If the number is large and variable it is expressed as, infinity (symbol  $\infty$ ).

Cohesion of parts is indicated by a bracket around the number of coherent parts eg. If the 5 carpels in a gynoecium are united this will be indicated as  $G_{(5)}$ .

When some members show cohesion and others not the free members are separated by a + sign. eg. When 9 stamens are united and one is free this is indicated as  $A(9) + 1$ . Also where there is more than one whorl in a set, a + sign separates the members of each whorl, eg. when there are 6 perianth members and they are in 2 whorls this is shown as  $P3 + 3$ .

Adhesion of members of a whorl with members of another whorl is shown by a horizontal bracket joining the symbols. eg. When the stamens are joined to the petals adhesion is shown as  $C \overset{\frown}{A}_5$ .

A superior ovary is designated by placing a line below the gynoecium member eg.  $\underline{G}_{(5)}$ . An inferior ovary is designated by placing a line above the gynoecium member eg.  $\overline{G}_{(5)}$ . The type of placentation is not indicated in a floral formula.

Thus it is clear that a diagram of a half flower or an L.S. of a flower together with the floral diagram and formula enables us to describe all the morphological features without a word of description.

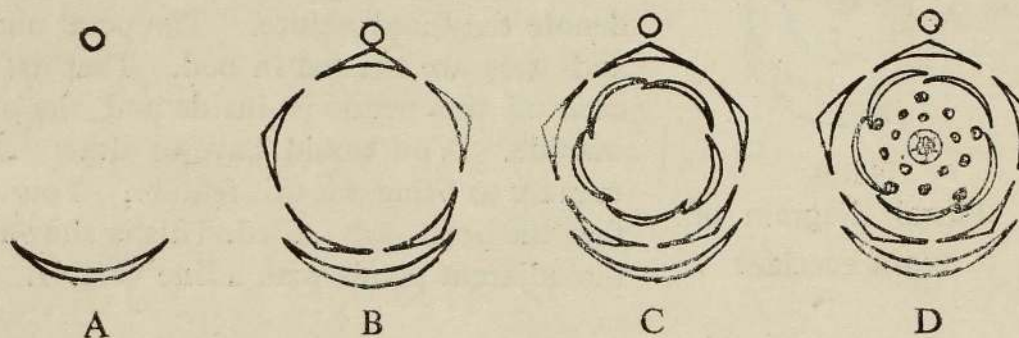


Fig. 3. Stages in constructing a floral diagram of *Muntingia calabura*

Let us now take *Muntingia* as an example (Fig.3).

This is a small tree which flowers throughout the year. Moreover it grows in many provinces in Sri Lanka. Draw the half flower or L. S. of *Muntingia*. You should next get on to constructing a floral diagram. Hold the flower in such a position that the bract faces you and the axis is furthest away. The bract is shown by a crescent and the axis by the symbol O (Fig.3A). This is followed by representing the outermost whorl which is the whorl of sepals (Fig.3B). You would note that there are five sepal members and that they are valvate. The sepals are shown by 5 crescents, valvate in arrangement (Fig.3B). Inner to this is the corolla consisting of 5 petals, contorted in arrangement. Draw 5 crescents, in a whorl and inner to the whorl of sepals somewhat different in shape from those which you drew for the sepals. This whorl alternates with the sepals (Fig.3C). Next is the androecium consisting of numerous stamens which are shown in separate whorls. The outermost whorl alternates with the petals and this alternation is continued with each whorl of stamens (Fig.3D). Innermost is the gynoecium. Is the information we have gathered on the gynoecium by studying the longitudinal section or half flower sufficient? No, a transverse section of the ovary is necessary.

In a transverse section you will note that it is composed of 5 carpels, united, with 5 loculi. Placentation appears to be axile. An L. S. of an immature fruit shows a pendulous placentation but we will represent the placentation as being axile. This information has to be included in the floral diagram (Fig. 3D). Now your floral diagram is complete.

With the information gathered by studying the L.S. of the flower and constructing the floral diagram you should be able to write down the floral formula. The gynoecium as shown in the L.S. of the flower is superior. All the other floral parts are beneath it. The floral formula would then be  $* \bar{\varnothing} K_5 C_5 A_{\infty} \underline{G}_{(5)}$  which means that *Muntingia* is regular, bisexual, calyx 5, free, corolla 5, free, stamens numerous or indefinite, gynoecium composed of 5 carpels, united, ovary superior.

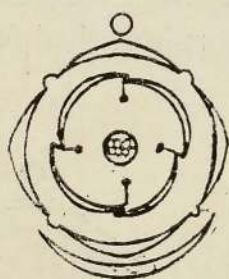


Fig. 4.  
Floral diagram of  
*Ixora coccinea*

Next attempt at the floral diagram of *Ixora*. You would note that unlike in *Muntingia* there are only 4 sepals and they are united. The sepal whorl is shown by 4 crescents (Fig.4). The crescents are joined to denote the fused nature. The petal number is also 4 and they are twisted in bud. That is, one margin of each of the petals is inside and the other margin is outside. You would have to draw the crescents in a manner to bring out this feature. You would also note that the petals are united. This is shown by connecting the adjacent petals with a line (Fig.4).

Inner to the petals is the androecium and you would observe that they are fused to the petals. This you show by connecting the anther to the petal. A transverse section of the ovary becomes necessary. Such a section will reveal that the ovary is formed of 2 united carpels. Placentation is axile (Fig 4).

You now have all the information to write down the floral formula. By the study of the half flower or the L.S. you would know that the ovary is inferior. The floral formula of *Ixora* would be  $* \bar{\varnothing} K_{(4)} \overbrace{C_{(4)}} A_4 \overline{G}_{(2)}$  This means that the flower is regular, bisexual, calyx 4, petals 4, fused; stamens 4, epipetalous; carpels 2, fused; ovary inferior.

In coconut there are two types of flowers, the male flowers and the female flowers. In *Tridax* too there are two types, the ray florets and the disc florets. Each of these flowers would have to be drawn separately with a separate floral diagram and floral formula for each.

**Numerical plan of a flower:** An important feature to note is that most flowers have a definite numerical plan. Monocotyledonous flowers generally have a numerical plan of 3. That is 3 sepals, 3 petals and usually 3 or a multiple of 3 stamens. This plan is called 3-merous (trimerous). In the case of Dicotyledons they have a numerical plan of 4 or 5 and they are said to be 4-merous or 5-merous.

(tetramerous or pentamerous). The numerical plan in both monocotyledons and dicotyledons is most clear in the sepals and petals and is often present in the case of stamens but may be disturbed in the case of carpels.

Another feature worth remembering is that in the case of monocotyledonous flowers (trimerous) a petal is usually present opposite the mother axis. In dicotyledonous flowers (tetramerous and pentamerous) the same arrangement is present in the leguminosae but not so in the others.

With this information you should examine the flowers of different plants. In each case draw the half flower or an L.S. Thereafter construct the floral diagram and give the floral formula. You are advised to start with a simple actinomorphic flower and then get on to those which are zygomorphic.

## පුෂ්ප - ඒවා කෙසේ දැන හඳුනා ගනිමුද?

පුෂ්ප වූ කලී ස්වභාව ධර්මයේ ඉතා දැකුම්කළු දේවලින් එකකි. ගසක ප්‍රජනනයටද පුෂ්ප කෙලින්ම සම්බන්ධවේ. සාමාන්‍යයෙන් දැකුම්කළු වර්ණ සම්පන්නියෙන් සමන්විත වන බැවින් ගෙවත්තට ද නිවසට ද අලංකාරයක් ලෙසින් පුෂ්ප පරිහරණය කෙරේ. එසේ වුවත්, තෘණ වර්ගා දී ඇතැම් පුෂ්පවල කැපී පෙනෙන ස්වරූපයක් නැත.

ශාක කුල 16 කට අයත් ගණ 26ක ශාක විශේෂ 26 ක් වර්ධක සහ පුෂ්පීය ලක්ෂණ සහිතව මෙම පොතෙහි විස්තර කර ඇත. උසස් පෙළ උද්භිද විද්‍යාව හදාරන සිසුන් විසින් පුෂ්පවල ව්‍යුහයේ සහ ආකාරයේ ඇති අසීමිත විවිධත්වය ගැන අවබෝධයක් ලබා ගැනීම ඉතාමත් වැදගත් වේ. ශාකයන්හි වර්ධක හා පුෂ්පීය ව්‍යුහයන් විස්තර කිරීම සඳහා විශේෂ වචන මාලාවක් භාවිතා කරයි. සිසුන්ට මෙම වචන පහසුවෙන් තේරුම් ගැනීම සඳහා අවශ්‍ය කරනු පොතේ අගෙහි උපග්‍රන්ථ මගින් සපයා ඇත.

ශාක කීපයක් සඳහා හැරුන කොට පුෂ්ප ජේද සටහන් පුෂ්ප සටහන් හා පුෂ්ප සූත්‍ර දීම මෙම පොත සකස් කිරීමේ දී වුවමනාවෙන්ම මහහැර ඇත. නමුත්, සිසුන්ගේ පහසුව සඳහා පුෂ්ප සිරස්කඩවල හා අර්ධ පුෂ්පවල රූප සටහන්, මෙන්ම පුෂ්ප සටහන් හා පුෂ්ප සූත්‍ර ද සකස් කරන ආකාරය මේ පරිච්ඡේදයෙන් අපි විස්තරාත්මකව සපයා ඇත. මෙහි විස්තර කර ඇති ලක්ෂණ උපයෝගී කර ගනිමින් ද සුදුසු ජේද හා විච්ඡේදන උපකාරී කර ගනිමින් ද සිසුන් විසින් ම පුෂ්ප අධ්‍යයනය කළ යුතුයි. මේ අධ්‍යයනයෙන් ලබා ගන්නා දැනීමෙන් පමණක් ඔහු ඔහුගේම පුෂ්ප සටහන් හා පුෂ්ප සූත්‍ර නිර්මාණය කළ යුතුයි. මේ පොතෙහි ම ඉඩ ඇති තැන්වල මෙම සටහන් ඇඳිය හැක.

### පුෂ්ප ව්‍යුහය වාර්තා කරන අන්දම;

පුෂ්ප ව්‍යුහය වාර්තා කිරීම සඳහා විධි 3 ක් ඇත.

### අර්ධ පුෂ්පයෙහි රූප සටහනක් ඇඳීම;

මෙහිදී පුෂ්පය එහි මධ්‍යතම තලය නැතහොත් මධ්‍ය අක්ෂය ඔස්සේම කපනු ලැබේ. බොහෝමයක් පුෂ්ප ඒවාවේ ඕනෑම අරයක් ඔස්සේ සිරස්ව කැපීමෙන් සමමිතික කොටස් 2 ක කට වෙන් කල හැක. (Fig 1). මෙම පුෂ්ප අරීය සමමිතියක් දක්වන පුෂ්ප නැතහොත් අරරූපී පුෂ්ප ලෙස හැඳින්වේ. නමුත්, ද්විපාර්ශ්වික සමමිතියක් දක්වන පුෂ්ප එනම්, සමයුග්ථී පුෂ්ප සමාන කොටස් 2 කට වෙන් කළ හැක්කේ එක් තලයක් ඔස්සේ කැපීමෙන් පමණකි. Spathoglottis හා Torenia මෙවැනි පුෂ්පයනට උදාහරණ වේ. Canna වැනි අසමමිතික පුෂ්ප කෙසේවත් සමාන කොටස් 2ක කට වෙන්කල නොහැක. තෘණ පුෂ්ප වැනි ඉතා කුඩා පුෂ්ප ජේදනය කිරීම අපහසු බැවින් ඒවා විච්ඡේදනය කිරීමෙන් අධ්‍යයනය කරනු ලැබේ.

පුෂ්පයක සිරස්කඩ හා අර්ධ පුෂ්පය එකිනෙකින් වෙනස් වේ. (Fig 2.) පුෂ්ප සිරස්කඩක දැක්වෙන්නේ ජේදනය කළ තලයෙන් පෙන්නුම් කරන කොටස් පමණක් වන අතර අර්ධ පුෂ්පයක එම අර්ධයේ ඇති සියළුම පුෂ්ප කොටස් දැක්වේ.

පුෂ්ප අධ්‍යයනය කිරීමේදී ඉහත සඳහන් රූප සටහන් දෙකෙන් එකක් පමණක් බොහෝ විට ප්‍රමාණවත් වේ.

**පුෂ්ප සටහන;**

මෙය පුෂ්පයක භූමි සිතියම නැතහොත් පුෂ්පයක් ඉහලින් සිට බලන විට පෙනෙන ආකාරය ලෙස සැලකිය හැක. එනම්, පුෂ්ප සටහනක් මගින් යම් පුෂ්පයක නොයෙක් පුෂ්ප කොටස් පුෂ්ප අංකුරයේ තිරස් කඩක පිහිටන ආකාරය දක්වයි. පුෂ්ප සටහනක් නිර්මාණය කිරීමේ දී පුෂ්පයේ නිපත්‍රය හෝ පුෂ්පය පැන නගින ස්ථානයේ පිහිටා ඇති පත්‍රය තමා දෙසට හා පුෂ්ප වෘත්තය තමාගෙන් ඉවතට ද සිටිනසේ පුෂ්පය රඳවා ගත යුතුය.

පුෂ්ප සටහනක නිපත්‍ර අඩසඳ ආකාරයේ රූප මගින් ද පුෂ්ප වෘත්තය මැද තිත්ක සහිත ඉංග්‍රීසි O අකුරේ ආකාරයෙන් ද දක්වනු ලැබේ (Fig 3 A). පරිපුෂ්ප කොටස් ද අඩසඳ ආකාරයෙන් දැක්වේ.

පරිපුෂ්පය, මණිපත්‍ර හා දල පත්‍ර වලට විභේදනය වී ඇත්නම් ඒවා වෙන්කර දැක්වීමට එකී නෙකින් සුළු වශයෙන් වෙනස් වන අඩ සඳ රූප ආකාර 2 ක් යොදා ගැනේ. යම් වලයක කොටසක් ප්‍රමාණයෙන් වෙනස් වූ විට ඒවා වෙනස් ප්‍රමාණවලින් යුත් අඩසඳ රූප මගින් දක්වනු ලබයි. යාබද පිහිටි පුෂ්පීය වල සාමාන්‍යයෙන් ඒකාන්තර ලෙස පිහිටයි. එමනිසා දල පත්‍ර මනිපත්‍ර අතර පිහිටි හිදුස්වල දැක්විය යුතුයි. (Fig 3 C). රේණු පරාගධානියෙහි හරස් කඩක් මගින් දැක්වේ. ජායාංගය දැක්වෙන්නේ ඩිමිබ කෝෂයෙහි හරස්කඩක් පෙන්වුම් කරන ආකාරයෙනි (Fig 3 D). වලයක කොටස් බද්ධ වී ඇත්නම් එය, එම කොටස් යා කරන රේඛා මගින් දැක්වේ. යාබද වලයන්හි කොටස් යා වී ඇත්නම් ඒවාද එම කොටස් යා කරන රේඛා මගින් දැක්වේ.

**පුෂ්ප සූත්‍ර :**

පුෂ්ප සූත්‍රයක පුෂ්පයේ ව්‍යුහාත්මක ලක්ෂණ නොයෙක් සලකුණු මගින් දක්වනු ලබයි. මේ සඳහා භාවිතාවන නොයෙක් සලකුණු පහත දැක්වේ.

- ක්‍රමවත් හෝ අරියසමමිතික පුෂ්ප \*
- ද්විපාර්ශ්වික සමමිතයෙන් යුත් .|. නැතහොත් ↓
- ද්විලිංගික ḡ
- ඒකලිංගික—පුමාංගී ♂
- ඒකලිංගික — ජායාංගී ♀

පුෂ්පයේ එක් එක් වලයන් සඳහා පහත දැක්වෙන ඉංග්‍රීසි කැපිටල් අකුරු යොදා ගැනේ.  
 මණිය : K ; මුකුටය : C ; පරිපුෂ්පය (මණිපත්‍ර හා දලපත්‍ර ලෙස විභේදනය වී නැති විට) P; පුමාංගය A ; ජායාංගය G.

පුෂ්පයේ එක් එක් වලයේ ඇති පුෂ්ප කොටස් සංඛ්‍යාව එම වලයට අදාල ඉංග්‍රීසි අක්ෂරයට පසුව සඳහන් කෙරේ. උදා : K<sub>5</sub>

යම්කිසි වලයක ඇති කොටස් ගණන ඉතා විශාල හෝ එම ගණන නියත නොවේ නම් හෝ එය අන්තර්ගත දක්වන ග සලකුණු මගින් දැක්වේ.

එකම වර්ගයේ පුෂ්ප කොටස් එකිනෙක හා සම්බන්ධ වී තිබේ නම් එය, එම වලයේ කොටස් සංඛ්‍යාව දැක්වෙන්නේ අංකය දෙපස වරහන් යෙදීමෙන් පෙන්වනු ලබයි. උදා: එකිනෙක හා යාචු අන්ධප 5 ක් සහිත පුෂ්පයක ජායාංගය පුෂ්ප සූත්‍රයෙහි දැක්වෙන්නේ  $G_{(5)}$  ආකාරයටයි.

පුෂ්පයේ එක් වලයක සමහර පුෂ්ප කොටස් පමණක් එකිනෙක හා සම්බන්ධ වී ඇත්නම් මෙම සංයුක්ත වූ පුෂ්ප කොටස් + ලකුණ මගින් එම වලයේ ඇති නිදහස් පුෂ්ප කොටස් වලින් වෙන්කර දැක්විය යුතුය. උදා: රේණු 10ක් සහිත පුෂ්පයක රේණු 9ක් එකිනෙක හා සම්බන්ධ වී ද එක රේණුවක් නිදහස්වද ඇත්නම් එය  $A_{(9)+1}$  ආකාරයට පුෂ්ප සූත්‍රයෙහි දැක්විය යුතුය.

පුෂ්පයේ යම් කොටසක් වල එකකට වැඩි ගණනකින් යුක්ත වේ නම් එම එක් එක් වලයට අයත් කොටස් ගණන + ලකුණු මගින් වෙන්කර දැක්වේ. උදා: යම් පුෂ්පයක පරිපුෂ්ප 6ක් වල 2 කක පිහිටා ඇති විට එය  $P_{3+3}$  ආකාරයට පුෂ්ප සූත්‍රයේ දැක්වේ.

සමහර විට පුෂ්පයක යාබද වල 2කක පුෂ්ප කොටස් බද්ධ ව තිබිය හැක. මෙය පුෂ්ප සූත්‍රයෙහි දැක්වෙන්නේ එම වලයන්ට අදාළ ඉංග්‍රීසි අකුරු තිරස් වරහනක් මගින් සම්බන්ධ කිරීමෙනි. උදා: යම් පුෂ්පයක රේණු දළ පත්‍රවලට සම්බන්ධ වී තිබීම  $C_5 \overbrace{A_5}$  ආකාරයෙන් පුෂ්ප සූත්‍රයෙහි දැක්වනු ලබයි.

උත්තර ඩිම්බ කෝෂයක් පුෂ්ප සූත්‍රයක දැක්වනු ලබන්නේ ජායාංගය සඳහා යොදන සලකුණට පහලින් කෙටි රේඛාවක් යෙදීමෙනි. උදා:  $\underline{G}_{(5)}$ . අධර ඩිම්බකෝෂයක් දැක්වනු ලබන්නේ ජායාංගය සඳහා යොදන සලකුණට ඉහලින් කෙටි රේඛාවක් යෙදීමෙනි. උදා:  $\overline{G}_{(5)}$ . පුෂ්පයක ඩිම්බ න්‍යාසය පුෂ්ප සූත්‍රයෙහි දැක්වනු නොලැබේ.

ඉහත දැක්වෙන කරුණු අනුව යම්කිසි පුෂ්පයක සියළුම රූප විද්‍යාත්මක ලක්ෂණ වචනයෙන් විස්තර නොකොට පුෂ්පයේ සිරස්කඩක හෝ අර්ධ පුෂ්පයක රූප සටහනකින් ද, පුෂ්ප සටහන හා පුෂ්ප සූත්‍රයද මගින් පමණක් විස්තර කළ හැක.

**Muntingia** (ජූම් ගස) උදහරණයක් ලෙස සලකා බලමු ((Fig 3). මෙය අවුරුද්ද මුළුල්ලේම පුෂ්ප හටගන්නා කුඩා වෘක්ෂයකි. තවද මෙය ලංකාවේ බොහෝ පළාත්වල වැඩෙන ශාකයෙකි. මෙම පුෂ්පයෙහි සිරස්කඩක හෝ අර්ධ පුෂ්පයක රූප සටහනක් නිර්මාණය කරන්න. ඉන්පසුව පුෂ්ප සටහන නිර්මාණය කළ යුතුය.

මේ සඳහා ප්‍රථමයෙන් පුෂ්පයේ නිපත්‍රය ඔබට මුහුණලා සිටින සේද පුෂ්ප වෘන්තය ඔබෙන් ඉවතට සිටිනසේ ද පුෂ්පය රඳවා ගන්න. නිපත්‍රය අඩසඳ රූපයකින් ද පුෂ්පය සවි වී ඇති අක්ෂය O සලකුණ මගින්ද දැක්විය යුතුයි (Fig 3A). දන් පුෂ්පයේ පිටතම වලය වන මණිපත්‍ර වලය පුෂ්ප සටහනේ දැක්විය හැක (Fig 3B). මණි පත්‍ර 5 ක් ඇති අතර ඒවා අනාවෘත ආකාරයකට පිහිටන බව ඔබට පෙනී යනවා ඇත. පුෂ්ප සටහනෙහි මණිපත්‍ර අනාවෘතව පිහිටි අඩසඳ රූප 5 ක් මගින් දැක්විය හැක (Fig 3B). මණිපත්‍රවලට ඇතුළතින් සමාවෘතව පිහිටි දළ පත්‍ර 5කින් යුත් මුකුටය තිබේ. පුෂ්ප සටහනෙහි මෙය මණිපත්‍රවලට ඇතුළතින් තවත් සමාවෘතව පිහිටි අඩසඳ රූප 5 ක් මගින් දැක්විය හැක. මෙහි දී භාවිතා කරන අඩසඳ රූප මණිපත්‍ර සඳහා භාවිතා කළ අඩසඳ රූපවලට වඩා මඳක් වෙනස් විය යුතුයි. තවද පුෂ්ප සටහනෙහි දළ පත්‍ර මණිපත්‍රවලට ඒකාන්තර ලෙස පිහිටිය යුතුයි. (Fig 3 C). මුකුටයට ඇතුළතින් පුෂ්ප සටහනෙහි දැක්විය යුත්තේ ප්‍රමාංගයයි. *Muntingia* පුෂ්පයේ රේණු විශාල සංඛ්‍යාවක් ඇති අතර මේවා වල කිහිපයක පිහිටයි. පිටතම වලයෙහි ඇති රේණු දළ පත්‍රවලට ඒකාන්තර ලෙස පිහිටා ඇත. යාබද වලයන්හි රේණුද පිහිටා ඇත්තේ එකිනෙකට



ඒකාන්තර ලෙසය (Fig 3 D). පුෂ්පයක මධ්‍යයේම දක්නට ලැබෙන්නේ ජායාංගයයි. අර්ධ පුෂ්පයෙහි හෝ පුෂ්පයෙහි සිරස්කඩෙහි අධ්‍යයනයෙන් ජායාංගය ගැන මෙතෙක් රැස්කරගත් කරුණු ප්‍රමාණවත් වේද? නැත. ඩිමිබකෝෂයේ තිරස්කඩක් අධ්‍යයනය කළ යුතුය. මෙම තිරස් කඩෙන් ඩිමිබකෝෂය සමාණ්ඩපික අණ්ඩප 5 කින් යුක්තවන බවද කෝෂ්ට 5 ක් ඇති බවද ඔබට පෙනී යයි. ඩිමිබ න්‍යාසය අක්ෂීය මෙන් පෙනුනද පරිනත නොවූ ඵලයක සිරස් කඩක් ගත් විට ඩිමිබ න්‍යාසය අවලම්බක (එල්ලෙන) බව පැහැදිලිව පෙනේ. කෙසේ වුවද, අපි ඩිමිබ න්‍යාසය අක්ෂීය ලෙස සලකමු.

පුෂ්ප සූත්‍රය නිර්මාණය කිරීම සඳහා පුෂ්පයේ සිරස්කඩක් අධ්‍යයනයෙන් හා පුෂ්ප සටහන සකස් කිරීමෙන් ලබාගත් දැනුම උපයෝගී කරගත හැක. පුෂ්ප සටහනේ දැක්වෙන කරුණු වලට අමතරව සිරස් කඩ අධ්‍යයනයෙන් මෙම පුෂ්පයේ ඩිමිබ කෝෂය උත්තර ඩිමිබ කෝෂයක් වන බවද, පුෂ්පයේ අනෙකුත් කොටස් ඩිමිබ කෝෂයට පහතින් පිහිටන බවද පැහැදිලිවේ. මේ කරුණු අනුව *Muntingia* වල නිවැරදි පුෂ්ප සූත්‍රය \*  $\overline{\overline{K_5 C_5 A_\infty G_{(5)}}}$  වේ.

එනම් *Muntingia* පුෂ්පය ක්‍රමවත් නැතහොත් අරිය සමමිතියෙන් යුත් ද්විලිංගික නිදහස් කොටස් 5 කින් යුත් මුකුටයකින් ද, නිදහස් මණිපත්‍ර 5කින්ද රේණු අසිමිත හෝ ඉතා විශාල සංඛ්‍යාවකින් හා සංයුක්ත අණ්ඩප 5 කින් යුත් උත්තර ඩිමිබකෝෂයකින්ද සමන්විත වේ.

අපි මීලභට *Ixora* (රතඹලා) පුෂ්පයේ පුෂ්ප සටහන සකස් කිරීමට උත්සාහ කරමු. *Ixora* පුෂ්පයේ මණිය *Muntingia* වල මෙන් නොව මණිපත්‍ර 4කින් සකස් වී ඇත. තවත් වෙනසක් නම් මෙම මණිපත්‍ර 4 එකිනෙක හා සම්බන්ධ වී ඇත. රේඛා මගින් සම්බන්ධ වූ අඩසඳ රූප 4 ක් මගින් මෙය පුෂ්ප සටහනෙහි පෙන්විය හැක (Fig 4). මුකුටය දළපත්‍ර 4 කින් යුක්ත වන අතර මේවා පුෂ්ප අංකුරයේ සමාවෘත ලෙස පිහිටයි. සමාවෘත ලෙස හැඳින්වෙන්නේ සෑම දළ පත්‍රයකම එක් දරයක්, දළපත්‍රවලයේ ඇතුළු දෙසට ද අනෙක් දරය වලයේ පිටතට ද යොමු වී තිබීමයි. පුෂ්ප සටහනේ දළ පත්‍ර දක්වන අඩසඳ රූපද සමාවෘත ආකාරයට පිහිටිය යුතුය. තවද මෙම පුෂ්පයේ දළපත්‍ර එකිනෙක හා සම්බන්ධ වී ඇති බැවින් පුෂ්ප සටහනෙහි ද, ඒවා රේඛා මගින් සම්බන්ධ කර දැක්විය යුතුයි.

දළපත්‍රවලට ඇතුළතින් ඇත්තේ පුමාංගයයි. මෙම පුෂ්පයේ පුමාංගී කොටස්, එනම් රේණු දළ පත්‍රවලට බද්ධ වී ඇති බව ඔබට පෙනී යනවා ඇත. පුෂ්ප සටහනෙහි , පරාගධානී හභවන රූප සහ දළපත්‍ර හභවන රූප රේඛා මගින් සම්බන්ධ කිරීමෙන් රේණු දළපත්‍රවලට බද්ධ වී ඇති බව පෙන්විය හැක.

දැන්, පුෂ්ප සටහන සම්පූර්ණ කිරීම සඳහා ඩිමිබකෝෂයේ තිරස් කඩක් ගත යුතුයි. මෙම තිරස්කඩෙහි ඩිමිබන්‍යාසය අක්ෂීය බව හා ඩිමිබ කෝෂය සංයුක්ත අණ්ඩප දෙකකින් යුක්ත වන බවද පැහැදිලි ලෙස දැකගත හැක. පුෂ්පයේ සිරස්කඩ ඩිමිබකෝෂයේ අධරිය බව පෙන්වනු ඇත.

පුෂ්ප සූත්‍රය ලිවීම සඳහා අවශ්‍ය සියළුම කරුණු දැන් ඔබ වෙත ඇත. මේ කරුණු අනුව *Ixora* වල පුෂ්ප සූත්‍රය \*  $\overline{\overline{K_{(4)} C_{(4)} A_4 G_{(2)}}}$  එනම් *Ixora* පුෂ්පය ක්‍රමවත් හා ද්විලිංගික වන අතර එකිනෙක හා බද්ධ වූ කොටස් 4 කින් යුත් මණියකින්ද සංයුක්ත දළපත්‍ර 4 කින් ද අපිදල රේණු 4 කින් හා සංයුක්ත අණ්ඩප 2 කින් යුත් අධර ඩිමිබකෝෂයකින් ද, යුක්ත වේ.

සමහර ශාකවල පුෂ්ප වර්ග එකකට වැඩි ගණනක් ඇත. උදාහරණ වශයෙන් පොල් ගසෙහි පුරුෂ ලිංගික භාස්ත්‍රි ලිංගික වශයෙන් පුෂ්ප වර්ග 2 ක් හටගනී. තවද Tridax නැමති ශාකයේ අංශු පුෂ්පිකා හා මණ්ඩල පුෂ්පිකා නමින් පුෂ්ප වර්ග 2 ක් ඇත. මෙසේ එකම ශාකයේ පුෂ්ප වර්ග එකකට වඩා හටගන්නා විට ඒ එක් එක් පුෂ්ප වර්ගය වෙන වෙනම පුෂ්ප සටහන් හා පුෂ්ප සූත්‍ර මගින් ද විස්තර කළ යුතු වේ.

### පුෂ්පයක සංඛ්‍යාත්මක සැලැස්ම

බොහෝ පුෂ්ප සඳහා නියත සංඛ්‍යාත්මක සැලැස්මක් ඇත. සාමාන්‍යයෙන් ඒක බීජ පත්‍රී ශාකවල පුෂ්පයනට ඇත්තේ ත්‍රි අංක සැලැස්මකි. එනම් එම පුෂ්පයන්හි මණි පත්‍ර 3 ක්, දලපත්‍ර 3 ක්, සාමාන්‍යයෙන් රේණු 3 ක් හෝ 3 කේ ගුණිතයකින්ද ඇත. මෙය ත්‍රිගුණ සැලැස්මකි. ද්විබීජ පත්‍ර ශාක සඳහා සංඛ්‍යාත්මක සැලැස්ම වතුර් අංක සැලැස්මක් හෝ පංච අංක සැලැස්මකි.

ඒකබීජ පත්‍ර හා ද්විබීජපත්‍ර ශාක කොටස් දෙකෙහිම පුෂ්පයන්හි මණිපත්‍ර හා දලපත්‍ර එම පුෂ්පවල සංඛ්‍යාත්මක සැලැස්ම පැහැදිලිව පෙන්වයි.

බොහෝ විට රේණු මගින්ද සංඛ්‍යාත්මක සැලැස්ම පැහැදිලිව දක්වේ. නමුත් අණ්ඩපවල මෙම සංඛ්‍යාත්මක සැලැස්ම බොහෝ විට දක්නට නොලැබේ.

ඒක බීජ පත්‍ර ශාකවල ත්‍රි අංක පුෂ්පයන්හි මවු අක්ෂයට ප්‍රතිවිරුද්ධව දල පත්‍රයක් පිහිටයි. නමුත් ද්විබීජ පත්‍ර ශාක සැලකූ විට ඒවායේ වතුර් අංක හා පංච අංක පුෂ්පයන්හි දලපත්‍රයක් ඉහත ආකාරයට පිහිටන්නේ Leguminosae (රනීල කුලය) කුලයට අයත් ශාකවල පමණකි.

ඉහත සඳහන් කරුණු හැදෑරීමෙන් පසු ඔබට විවිධ ශාක විශේෂයන්ට අයත් පුෂ්ප අධ්‍යයනය කළ හැක. මේ සෑම අවස්ථාවේදීම ප්‍රථමයෙන් අර්ධ පුෂ්පයෙහි හෝ සිරස් කඩෙහි සම්පූර්ණයෙන් නම් කරන ලද රූප සටහනක් ඇඳිය යුතුය. ඉන්පසු පුෂ්ප සටහන හා පුෂ්ප සූත්‍රය නිර්මාණය කළ හැක.

පුෂ්ප අධ්‍යයනයේදී පලමුව සරල ක්‍රමවත් පුෂ්පද පසුව අක්‍රමවත් පුෂ්පද හැදෑරීම සුදුසු වේ.

## பூக்கள்—இவற்றை நாம் எவ்வாறு ஆராய்ந்து, அறிந்து கொள்ளமுடியும்?

இயற்கையில் காணப்படும் பொருட்களில் பூக்கள் மிக அழகானவை. பூக்கள் உயர்வகைத் தாவரங்களின் இலிங்கமுறை இனப்பெருக்கத்துடன் நெருங்கிய தொடர்புள்ள அமைப்புகள். பூக்கள் பெரும்பாலும் கவர்ச்சிகரமான நிறங்களில் தோற்றமளிக்கின்றன. பூக்கும் தாவரங்களை நாம் தோட்டங்களில் வளர்த்து மகிழ்ச்சியடைகிறோம். அலங்காரத்திற்காக, வீடுகளில் மலர்களையும், செடிகளையும் பயன்படுத்துகிறோம். புல்வகைத் தாவரங்களின் பூக்களோ மிகச் சிறியவை. இவை தெளிவாகப் புலப்படாத உறுப்புகளாக அமைந்திருக்கின்றன.

இப்புத்தகத்தில் 25 தாவரவினங்களின் பூக்களை வரைந்து, விவரித்துள்ளோம். பூவுக்குரிய அமைப்புகளை விளக்குவதே எமது பிரதான நோக்கம். அத்துடன் பூக்களின் தோற்றம், கட்டமைப்பு ஆகியவற்றின் வேறுபாட்டுவீச்சை, மாணவர்களுக்கு அறிமுகப்படுத்த முயற்சி செய்துள்ளோம். இங்கே விவரிக்கப்பட்ட ஒவ்வொரு தாவரத்தைப் பற்றியும் சுருக்கமான விபரங்கள் தரப்பட்டிருக்கிறது. பதியவுடலுக்குரிய அமைப்புகளையும், பூவுக்குரிய அமைப்புகளையும் விபரிப்பதற்கு பல கலைச்சொற்கள் தொகுக்கப்பட்டிருக்கின்றன. இச்சொற்களை விளக்கும்பொருட்டு, நூலின் இறுதிப்பாகத்தில், தேவையான விளக்கப்படங்களும் வேறு தகவல்களும் தரப்பட்டிருக்கிறது. இப்பின்னிணைப்புகளின் உதவியுடன் மாணவர்களின் சுமையை ஓரளவிற்குக் குறைக்க முயற்சி செய்துள்ளோம்.

சில தேர்ந்தெடுத்த பூக்கள், அவற்றின் நெடுக்குமுகவெட்டின் வரைபடங்கள், பூவிளக்கப்படங்கள், பூச்சுத்திரங்கள் என்பவற்றால் விளக்கப்பட்டிருக்கின்றன. ஏனைய இனங்களுக்கு, அவற்றின் முக்கிய தன்மைகள் ஒழுங்கான முறையில் தரப்பட்டிருக்கிறது. மாணவர்கள் பூக்களின் நெடுக்குமுகவெட்டுக்களையும், மொட்டுகளையும் பரிசோதித்தபின் தாமே பூவிளக்கப்படங்களையும், பூச்சுத்திரங்களையும் அமைத்துக்கொள்ளுவார்கள் என நாம் எதிர்பார்க்கிறோம்.

### பூவுக்குரிய கட்டமைப்பை குறித்துக்கொள்ளும் முறைகள்

ஒரு பூவின் கட்டமைப்பை மூன்று வகைகளில் குறித்துக்கொள்ளலாம்.

#### பாதிப்பூவின் அமைப்பை வரைதல்

இம்முறையில் மையத்தளத்திற்கூடாக பூ வெட்டப்படுகிறது. இத்தளம் முதலச்சோடு ஒரு கோட்டில் அமைந்திருக்கும் தளமாகும். பல பூக்களை நெடுக்கமுகவெட்டுக்குரிய தளத்தின் ஊடாக இரு சமச்சீரான பாதிகளாக வெட்டலாம். (ஒழுங்கான பூக்கள் அல்லது ஆரைச்சமச்சீரான பூக்கள்). இப்படி வெட்டுவதன் விளைவாக இரு சமனான அல்லது இரு எதிரான பாதிகளைப் பெறலாம் (உருவம் 1). ஆனால் இருபக்கச்சமச்சீரான பூக்களில் (ஒழுங்கற்ற பூக்கள்) இரண்டு சமனான பாதிகளைப் பெறுவதற்கு பூவின் மையத்திற்கு ஊடாகச் செல்லும் ஒரு தளத்தில் மட்டுமே பூவை வெட்டமுடியும். உ-ம்., *Spathoglottis*, *Torenia* மணிவாழை (கன்னா *Canna*) போன்ற சமச்சீரற்ற பூக்

களை இரண்டு சமனான பாதிகளாகப் பிளப்பது சாத்தியமற்றது. புல்லினத் தாவரங்களின் பூக்கள் மிகச் சிறியவை. இவற்றின் நெடுக்குமுகவெட்டுக்களை ஆராய்வது மிகக் கடினமானது. இப்பூக்களின் பகுதிகளை தனித்தனியே பிரித்தெடுத்துப் பரிசோதிப்பதன் மூலம் இவ்வினங்களின் பூவுக்குரிய கட்டமைப்பை அறிந்துகொள்ளலாம். இவ்வகைப் பூக்களுக்கு இதுவே சிறந்த ஆய்வுமுறையாகும்.

### பூவிளக்கப்படம்

பூவை மேலிருந்து நோக்கும்பொழுது புலப்படும் அடிப்படை ஒழுங்கமைப்பைக் காட்டும் படம் பூவிளக்கப்படம் என அழைக்கப்படுகிறது. வேறுவிதமாகக் கூறுவோமானால், இது ஒரு பூ மொட்டின் கிடையான வெட்டுமுகத்தின் தோற்றத்தை காட்டும் வரிப்படமாகும். பூவிளக்கப்படம் அமைக்கும்பொழுது, பூவுடன் காணப்படும் பூவடியிலை அல்லது எந்த இலையின் கக்கத்தில் பூ தோன்றுகிறதோ, அந்த இலை எம்மை நோக்கிய வண்ணம் நாம் பூவை ஏந்திவைத்திருக்க வேண்டும். இப்படி வைந்திவைத்திருக்கும் பொழுது பூக்காம்பு (pedicel) கூடிய தூரத்தில் இருக்கவேண்டும். பூக்காம்பை மையத்தில் புள்ளியிட்ட சிறுவட்டத்தினால் காட்டவேண்டும். பூவடியிலையை விளக்கப்படத்தில் பிறைபோல காட்டவேண்டும் (உருவம் 3A). பூவுறையின் அங்கத்தவர்கள் எல்லாம் பிறைவடிவங்களாக பிரதியிடப்பட வேண்டும். புல்லிகளுக்கும் (sepals) அல்லிகளுக்கும் (petals) இடையே வேறுபாடுகள் காணப்படும் சமயங்களில், பிறைகளின் தோற்றங்களில் சிறு வித்தியாசங்களைப் புகுத்திக் காட்டவேண்டும். ஒரு சுற்றிலுள்ள அங்கத்தவர்கள் வெவ்வேறு பருமனுடையவர்களாகக் காணப்பட்டால், வித்தியாசமான பருமனுள்ள பிறைகளினால் வரைந்து காட்டலாம். பெரும்பாலும் அடுத்தடுத்த பூச்சுற்றுக்கள் ஒன்று விட்ட ஒழுங்கில் அமைந்திருக்கும். எனவே அல்லிகளை (உருவம் 3C) புல்லிகளுக்கிடையே யுள்ள இடைவெளிகளில் உட்புறமாக வரைந்து காட்டவேண்டும்.

கேசரங்கள் (ஆணகம்), மகரந்தக்கூடுகள் குறுக்குமுகவெட்டுக்களில் தோற்றமளிக் கும் வெளிவடிவங்களின் வரிப்படங்களினால் வரைந்து காட்டப்படவேண்டும். பெண்ணகம், சூலகத்தின் குறுக்குமுகவெட்டின் தோற்றத்தினால் காண்பிக்கப்படும் (உருவம் 3D). சுற்றிலுள்ள அங்கத்தவர்கள் இணைந்திருக்குமாயின், அவை தொடுக்கும் கோடுகளினால் காண்பிக்கப்படும். அடுத்தடுத்த சுற்றுகளுக்கிடையே ஒட்டுகள் இருந்தால், அக்குறிப்பிட்ட பகுதிகளை நேர்க்கோடுகளினால் தொடுத்துக் காட்டலாம்.

### பூச்சூத்திரம்

பூச்சூத்திரம், ஒரு பூவின் தன்மைகளையும் கட்டமைப்பையும் குறியீடுகள் மூலம் காண்பிக்கும் முறையாகும். இக்குறியீடுகள் பின்வருமாறு அமையும்:

ஒழுங்கான அல்லது ஆரைச்சமச்சீரான நிலை—Regular or Radially symmetrical \*

இருபக்கச் சமச்சீரான நிலை—Bilaterally symmetrical ↓ or ∙

இருலிங்கத்துக்குரிய பூவின் நிலை — Bisexual ♀

ஏகலிங்கப் பூ - யோனிப் பூ — Unisexual - pistillate ♀

ஏகலிங்கப் பூ - கேசரமுள்ள பூ — Unisexual - staminate ♂

பூச்சுற்றுக்கள், அவற்றின் தலையான எழுத்துக்களைக்கொண்ட குறியீடுகளினால் பின்வருமாறு காண்பிக்கப்படும்:

புல்லிவட்டம் — K for Calyx

அல்லிவட்டம் — C for Corolla

பூவுறை (புல்லிகள், அல்லிகள் என வியர்த்தமடையாத சுற்றுக்கள்) P for Perianth

ஆணகம் — A for Androecium

பெண்ணகம் — G for Gynoecium

ஒவ்வொரு குறியீட்டு எழுத்தும், பூச்சுற்றில் இருக்கும் அலகுகளின் எண்ணிக்கையைக் காட்டும் எண்ணினால் தொடரப்படும். உதாரணம் K5. எண்ணிக்கை மிக உயர்வாகவும் மாறுகிற இயல்புள்ளதாகவும் இருக்குமாயின், முடிவிலி எனக் காண்பிக்கப்படும். (குறியீடு ∞).

இணைந்துள்ள பகுதிகளை, அவற்றைக் குறிக்கும் எண்ணினைச் சுற்றி அடைப்புக் குறி போடுவதனால், அவை இணைந்திருக்கின்றன என எடுத்துக்காட்டப்படும். ஐந்து சூல்வித்திலைகள் இணைந்து அமைந்திருக்கும் பெண்ணகத்தை G(5) என்னும் குறியீட்டினால் எழுதிக்காட்டலாம்.

சில அங்கத்தவர்கள் இணைந்தும், ஏனையவை தனித்தும் காணப்படும் சந்தர்ப்பங்களில், தனித்துக் காணப்படும் உறுப்புக்கள் ஏனையவற்றிலிருந்து + என்னும் சின்னத்தினால் வேறுகப் பிரித்துக் காண்பிக்கப்படும். உதாரணமாக ஒன்பது கேசரங்கள் இணைந்தும், ஒன்று மட்டும் தனித்திருக்கும் நிலையை A(9)+1 என எழுதிக்காட்டலாம். அத்துடன் ஒரு குறிப்பிட்ட தொடரில் ஒன்றுக்கு மேற்பட்ட சுற்றுக்கள் இருக்கும்பொழுது, ஒவ்வொரு சுற்றிலும் அமைந்துள்ள அங்கத்தவர்கள் + என்னும் குறியீட்டினால் பிரித்துக் காண்பிக்கப்படுகின்றன. உதாரணமாக 6 பூவுறைகள் இருசுற்றுக்களில் அமைந்திருந்தால் P3+3 என காண்பிக்கப்படும்.

ஒரு சுற்றிலுள்ள கூறுகள், அதற்கடுத்த சுற்றிலுள்ள கூறுகளோடு ஒட்டியிருந்தால் இரு சுற்றுக்களின் குறியீடுகளையும் கிடையான அடைப்புக் குறியினால் தொடுத்துக் காட்டலாம். உதாரணமாக, கேசரங்கள் அல்லிகளுடன் ஒட்டியிருக்கும் தன்மையை C<sub>5</sub> A<sub>5</sub> என காண்பிக்கலாம்.

உயர்வுச் சூலகத்தை குறியீட்டின் கீழ் ஒரு சிறு கோடு கீறுவதினால் எடுத்துக்காட்டலாம். உ-ம். G(5). அதேமாதிரி, தாழ்வுச் சூலகத்தை எடுத்துக்காட்டுவதற்கு குறியீட்டின் மேல் ஒரு கோடு கீறவேண்டும். உ-ம் Ḡ(5). சூல்வித்தமைப்பின் தன்மை பூச்சுத் திரத்தில் எடுத்துக் காட்டப்படுவதில்லை.

எனவே பூவின் உருவவியலுக்குரிய தன்மைகளை பல சொற்களினால் விவரிக்காமல், அரைப்புவின் வரிப்படம், பூவிளக்கப்படம், பூச்சுத்திரம் என்பனவற்றால் எடுத்துக்காட்டலாம் என்பது தெளிவாகிறது.

முன்றிஞ்சியாவின் (Muntingia) பூவை ஒரு உதாரணமாக எடுப்போம். இது ஆண்டுமுழுவதும் பூக்கும் ஒரு சிறுமரமாகும். அத்துடன் இலங்கையின் பல மாகாணங்களிலும் வளரும் மரமாகும். முதல் முன்றிஞ்சியாவின் அரைப்புவின் தோற்றத்தை அல்லது இப்புவின் நெடுக்குமுகவெட்டின் தோற்றத்தை வரைக. அடுத்ததாக இப்புவின் பூவிளக்கப்படத்தை வரையவும். பூவினை கையில் ஏந்திவைத்திருக்கும்பொழுது, பூவடியிலே உங்களை நோக்கியும், பூவின் அச்சானது விலகியும் இருக்கவேண்டும். பூவடியிலேயே பிறைவடிவத்திலும், அச்சினை O என்ற சின்னத்தினாலும் வரைந்து காட்டவேண்டும். (உருவம். 3A) இதனைத் தொடர்ந்து பூவின் வெளிப்பக்கச் சுற்றான புல்லிவட்டத்தை

வரையவேண்டும், (உருவம். 3B). முன்றிஞ்சியாவின் புல்லிவட்டத்தில், ஐந்து அலகுகள் அல்லது உறுப்புகள் காணப்படுகின்றன. இவை விளிம்பு தொடுகின்ற ஒழுங்கில் அமைந்திருப்பதை நீங்கள் அவதானிக்க வேண்டும். புல்லிகளை ஐந்து பிறைகளினாலும், விளிம்பு தொடுகின்ற ஒழுங்கைக் காட்டும் வண்ணமும் வரையவேண்டும் (உருவம். 3B). இதற்கு உட்புறமாக முறுக்கான ஒழுங்கில் ஐந்து இதழ்களுடைய அல்லிவட்டத்தை அவதானிக்கலாம். அல்லிவட்டத்தின் அங்கத்தவர்களைக் குறிக்க, ஐந்து பிறைகளை ஒரு வட்ட ஒழுங்கில் வரைந்து காட்டலாம். புல்லிகளை வரைந்து காட்டிய பிறைகளைப் பார்க்கிலும் வடிவத்தில் சற்று வித்தியாசமான பிறைகளினால் இவற்றை வரைந்து காட்டவேண்டும். அல்லிவட்டம், புல்லிவட்டத்துடன் ஒன்றுவிட்ட ஒழுங்கில் அமைந்திருப்பதையும் பூவிளக்கப்படத்தில் வரைந்து காட்டவேண்டும் (உருவம். 3C). அடுத்ததாகக் காணப்படும் உறுப்புகள் ஆணகத்துக்குரிய அங்கத்தவர்கள். இப்பூவின் பல கேசரங்கள் பல சுற்றுக்களில் அமைந்திருப்பதை நாம் காட்டவேண்டும். வெளிப்புறமாக இருக்கும் கேசரச் சுற்று அல்லிவட்டத்துடன் ஒன்றுவிட்ட ஒழுங்கில் இருப்பதை நாம் வரைந்து காண்பிக்கலாம். இதேமாதிரி மற்றைய ஆணகச்சுற்றுக்களும் ஒன்றுவிட்ட ஒழுங்கில் அமைந்திருக்கும் (உருவம் 3D). உள்ளாக இருப்பது பெண்ணகம். பூவின் நெடுக்குமுகவெட்டுகளை ஆராய்ந்து பெறும் தகவல்கள், பெண்ணகக் கட்டமைப்பை அறிவதற்குப் போதாது. எனவே குலகத்தின் குறுக்குமுகவெட்டுக்களை நாம் பரிசோதிக்கவேண்டும். குறுக்குமுகவெட்டில், முன்றிஞ்சியாவின் குலகம் ஐந்து இணைந்த சூல்வித்திலைகளால் ஆக்கப்பட்டிருப்பதை அவதானிப்பீர்கள். இங்கே ஐந்து அறைகள் (loculi) காணப்படும். குறுக்குவெட்டில், சூல்வித்தமைப்பு அச்சுக்குரியதுபோல் தோற்றமளிக்கும். முதிர்ச்சியடையாத காய்களின் நெடுக்குமுகவெட்டில் சூல்வித்தகம் தொங்கல் நிலையில் இருப்பதை அவதானிக்கலாம். நாம் பூவிளக்கப்படத்தில் சூல்வித்தமைப்பை அச்சுக்குரியதென குறித்துக்கொள்ளுவோம் (உருவம் 3D). குலகத்தைப் பற்றிய இத்தகவல்கள் பூவிளக்கப்படத்தில் வரைந்து காட்டப்பட வேண்டும். இப்போது உங்கள் பூவிளக்கப்படம் நிறைவுபெற்றுள்ளது.

பூவின் நெடுக்குமுகவெட்டு, பூவிளக்கப்படம் ஆகியவற்றை வரைவதற்குச் சேர்ந்த தகவல்களுடன், நீங்கள் பூச்சுத்திரத்தை எழுதக்கூடிய தரத்தில் இருக்க வேண்டும். நெடுக்குமுகவெட்டில் காட்டியவாறு முன்றிஞ்சியாவின் பெண்ணகம் உயர்வானது, ஏனைய பூவுக்குரிய உறுப்புகள் பெண்ணகத்திற்குக் கீழ் அமைந்திருக்கின்றன. எனவே பூச்சுத்திரம்\*  $\ddot{\text{r}} \text{K5 C5 A } \infty \text{G}(5)$  என எழுதப்படும். இதனால் நாம் அறிவது என்னவெனில், முன்றிஞ்சியா ஒழுங்கான, இருலிங்கத்துக்குரிய, ஐந்து சுயாதீன புல்லிகளையும், ஐந்து சுயாதீன அல்லிகளையும் உடைய மலராகும். முன்றிஞ்சியா மலரில், பல கேசரங்களும், ஐந்து இணைந்த சூல்வித்திலைகளால் ஆக்கப்பட்ட உயர்வான சுலகமும் காணப்படுகிறது.

அடுத்த பயிற்சியில் இக்சோரவின் (Ixora) அல்லது வெட்ச்சி என அழைக்கப்படும் தாவரத்தின் பூவிளக்கப்படத்தை வரைய முயற்சிசெய்வோம். முன்றிஞ்சியாமாதிரி இல்லாமல், இங்கே நான்கு இணைந்த புள்ளிகள் மட்டுமே இருக்கின்றன என்பதை நீங்கள் அவதானிக்க வேண்டும். புல்லிவட்டச்சுற்று நான்கு பிறைகளினால் குறித்துக் காண்பிக்க வேண்டும் (உருவம் 4). பிறைகளைத் தொடுப்பதனால் புல்லிகள் இணைந்த தன்மையை எடுத்துக்காட்டலாம். இக்சோரவில் அல்லிகளின் எண்ணிக்கையும் நான்காக இருக்கும். இவை அரும்பு நிலையில் முறுக்கப்பட்டிருக்கும். அதாவது அரும்பில் ஒவ்வொரு அல்லிச் சோணையின் ஒரு விளிம்பு வெளிப்புறமாகவும், மறுவிளிம்பு உட்புறமாகவும் அடுக்கப்பட்டிருக்கும். இங்கு கூறப்பட்ட இவ்வொழுங்கினை எடுத்துக்காட்டும் வகையில் பிறைகளை வரையவேண்டும். அத்துடன் அல்லிவட்டத்தின் கீழ்ப்பகுதி பிணைந்திருப்பதையும் நீங்கள் அவதானிக்கவேண்டும். அல்லிகளைக் குறிக்கும் அடுத்தடுத்த பிறைகளை சிறுகோடு

களினால் இணைப்பதன் மூலம், அல்லிவட்டம் பிணைக்கப்பட்டிருக்கும் இயல்பை எடுத்துக் காட்டலாம் (உருவம் 4).

ஆணகம் அல்லிவட்டத்திற்கு உட்புறமாகக் காணப்படும். இவை அல்லிகளுடன் ஒட்டியிருப்பதை நீங்கள் அவதானிப்பீர்கள். மகரந்தக்கூட்டை அல்லியுடன் இணைப்பதால் இந்நிலை காண்பிக்கப்படும். சூலகத்தின் குறுக்குமுகவெட்டுக்களை பின்பு ஆராய வேண்டும். இப்படியான முகவெட்டுக்கள், இக்சோரவின் சூலகம் இரண்டு இணைந்த சூல் வித்திலைகளால் ஆக்கப்பட்டிருக்கிறது என்பதை வெளிப்படுத்தும். இதனுடைய சூல்வித் தமைப்பு அச்சுக்குரியதாகும் (உருவம் 4).

இப்போது நீங்கள் இக்சோராவின் பூச்சுத்திரத்தை எழுதுவதற்கான எல்லாத் தகவல்களையும் அறிந்திருக்கிறீர்கள். நெறுக்குமுகவெட்டின் ஆய்வினால் இக்சோராவின் பூச்சுத்திரம் பின்வருமாறு அமையும் : \*  $\frac{1}{2}$  K(4) C(4) A4  $\overline{G}$ (2). எனவே இக்சோராவின் பூ ஒழுங்கானது, இருவிங்கத்துக்குரியது, நான்கு இணைந்த அல்லிகளையுடையது. இப்பூவில் நான்கு அல்லிமேலொட்டிய கேசரங்கள் காணப்படுகின்றன. இப்பூவின் சூலகம் தாழ்வானது. சூலகம் இரண்டு இணைந்த சூல்வித்வித்திலைகளால் அமைக்கப்பட்டிருக்கிறது.

தென்னையில் இரண்டு வகையான பூக்கள் காணப்படுகின்றன. இவை வெவ்வேறான ஆண்பூக்களும் பெண்பூக்களுமாகும். திரைடக்ஸ்சிலும் (Tridax) கதிர்ச்சிறுபூ (ray floret) வட்டத்தட்டுச்சிறுபூ (disc floret) என இருவகையான பூக்கள் காணப்படுகின்றன. இப்படியான நிலைமைகளில் ஒவ்வொரு வகையான பூக்களையும் தனித்தனியே, பூவிளக்கப் படங்கள், பூச்சுத்திரங்கள் ஆகியவற்றினால் குறித்துக்காட்ட வேண்டும்.

### பூவின் எண்ணுக்குரிய ஒழுங்கு

பல பூக்களுக்கு குறிப்பிட்ட எண்ணுக்குரிய ஒழுங்கு அவற்றின் முக்கிய தன்மையாக விளங்குகிறது என்பதை நீங்கள் கவனத்தில் வைத்திருக்க வேண்டும். ஒருவித்திலைத் தாவரங்களின் பூக்களின் எண்ணுக்குரிய ஒழுங்கு, பெரும்பாலும் மூன்றாக அமைந்திருக்கும். அதாவது மூன்று புல்லிகள், மூன்று அல்லிகள், அத்துடன் மூன்று அவ்லது மூன்று மடங்கில் அமைந்திருக்கும் கேசரங்கள் காணப்படும். இவ்வொழுங்கு முப்பாத்துள்ள ஒழுங்கென அழைக்கப்படும். இருவித்திலை தாவரங்களில் நாற்பாத்துள்ள அவ்லது ஐம் பாத்துள்ள ஒழுங்கு காணப்படும். ஒருவித்திலைத் தாவரங்கள் இருவித்திலைத் தாவரங்கள் ஆகிய இரண்டிலும் புல்லிகள், அல்லிகள் ஆகியவற்றைப் பொறுத்தமட்டில் எண்ணுக்குரிய ஒழுங்கு தெளிவாகத் தென்படுகிறது. கேசரங்களைப் பொறுத்தமட்டிலும் இவ்வொழுங்கை அவதானிக்கலாம். ஆனால் சூல்வித்திலைகளைப் பொறுத்தவரையில் இவ்வொழுங்கு குழப்பப்பட்டிருக்கலாம்.

ஒருவித்திலைத் தாவரங்களின் அல்லிகள் தாயச்சுக்கு எதிராக அமைந்திருக்கும். இருவித்திலை தாவரங்களின் பூக்களில் (நாற்பாத்துக்குரிய பூக்களும் ஐம்பாத்துக்குரிய பூக்களும்) இவ்வகையான அடுக்கொழுங்கு அவரைக் குடும்பத்தைச் சேர்ந்த தாவரங்களில் காணப்படும். ஏனைய இருவித்திலைத் தாவரங்களில் இவ்வடுக்கு முறை காணப்படுவதில்லை.

மேல்தரப்பட்ட செயல்முறை விளக்கங்கள், தகவல்கள் ஆகியவற்றுடன், நீங்கள் வெவ்வேறு குடும்பத்தைச் சேர்ந்த தாவரங்களின் பூக்களை ஆராயவேண்டும். ஒவ்வொரு சந்தர்ப்பத்திலும் அரைப்பூவை அவ்லது நெடுக்குமுகவெட்டை முதல் வரையவேண்டும். இதன்பிற்பாடு பூவிளக்கப்படத்தை அமைக்கவேண்டும். இறுதியாக பூச்சுத்திரத்தை எழுதவேண்டும். ஆரைச்சமச்சீரமைப்புடைய எளிய பூக்களுடன் பயிற்சியை ஆரம்பித்து, பின் இருபக்கச்சமச்சீராண பூக்களை ஆராய்ந்து அறிய முயலவேண்டும்.

**Tribulus cistoides L.**

Family = Zygophyllaceae  
Sinhala name = \*Sembunerinchi  
\*Gokatu  
Tamil name = \*Nerinchi

Annual, with numerous long spreading prostrate hairy branches; leaves opposite, the members of each pair unequal; stipulate, pinnate with 3-7 opposite nearly sessile leaflets, silky above, lanceolate, acute apex, margin entire.

*Flowers*- Solitary, axillary, actinomorphic, bisexual on slender pedicels; opening at about 9.00 a.m. and fading at about 2.00 p.m. or earlier, bright yellow.

*Calyx* : Sepals 5, free (polysepalous), linear, apex acute, imbricate.

*Corolla* : Petals 5, free (polypetalous), rounded, bright yellow, imbricate.

*Androecium*: Stamens 10, free, alternate ones larger.

*Gynoecium* : Ovary superior, covered with hairs; carpels 5, fused (syncarpous) 5 locular, style short and stout; placentation axile.

*Fruit* : *T. Cistoides* does not fruit but in the related species *T. terrestris* the fruit is a schizocarp which breaks into 5 woody many seeded cocci. Each coccus has 2 pairs of stiff sharp spines, one pair larger than the other: animal dispersed.

Commonly cultivated; related species *T. terrestris* is common on sandy ground.

\* These names apply to *T. terrestris*



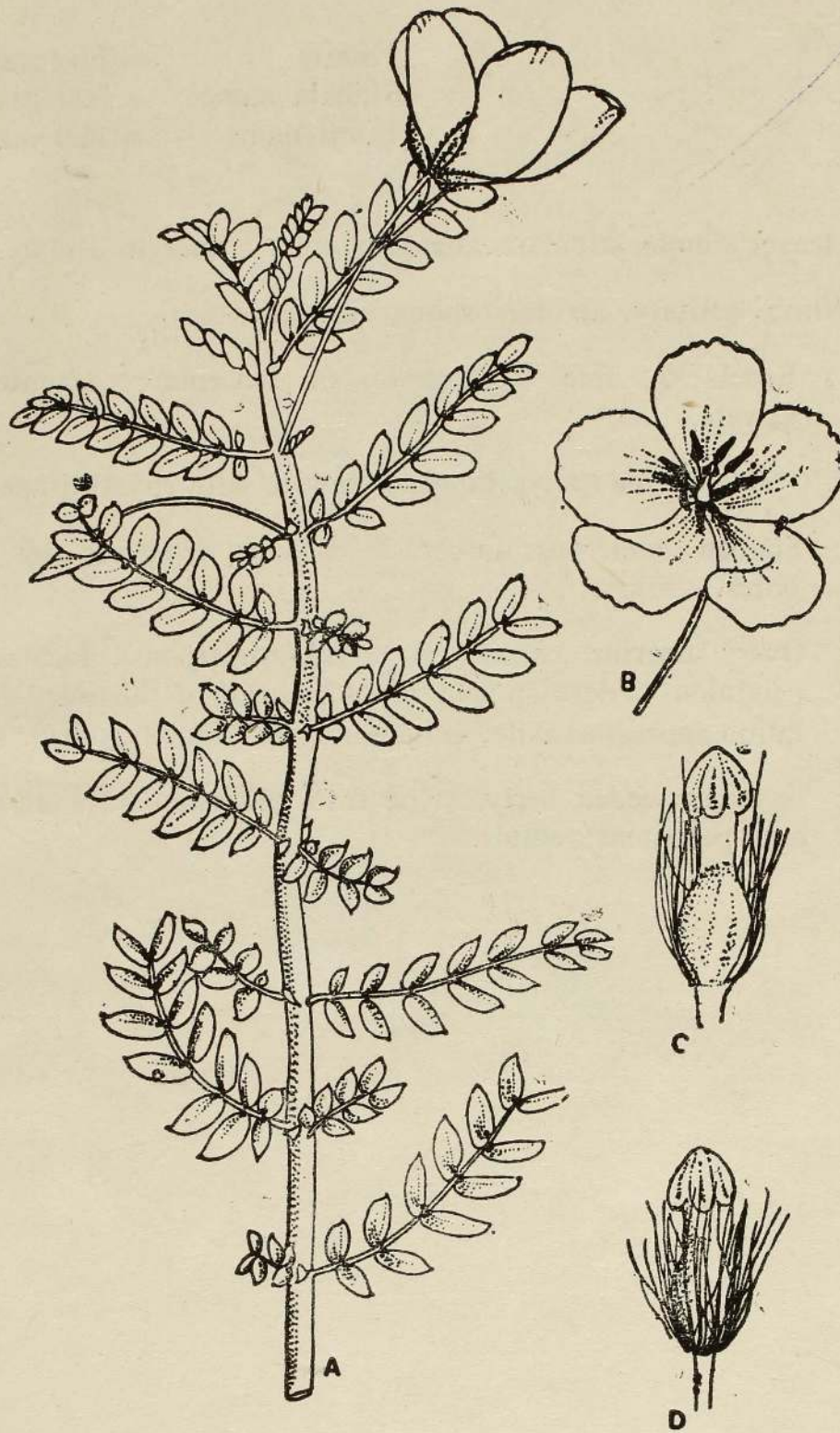


FIG. 5. *Tribulus cistoides* L.

A. Shoot with unequal opposite leaves  $\times \frac{3}{4}$ ; B. flower as seen from above  $\times \frac{3}{4}$ ;  
 C. gynoecium with part of hairs removed to show short and stout style and lobed stigma  $\times 5$ ;  
 D. gynoecium covered with basal hairs  $\times 5$ .

**Muntingia calabura L.**

Family	= Elaeocarpaceae
Sinhala name	= Jam-gas
Tamil name	= Jam-maram

Small tree; leaves simple, stipulate, alternate, elliptic, margin dentate.

*Flowers* – White, solitary, actinomorphic, bisexual.

*Calyx* : Sepals 5, free (polysepalous), lanceolate, acuminate apex, valvate.

*Corolla* : Petals 5, free (polypetalous ) obovate with rounded apex, valvate.

*Androecium*: Stamens numerous, anthers 2 – locular, dehiscing by 2 terminal pores.

*Gynoecium* : Ovary superior, carpels 5, fused (syncarpous), locules 5, ovules pendulous in development but in a section of the ovary the placentation appears as axile, stigmatic head shortly lobed.

*Fruit* : A many seeded berry, ripe fruit pinkish; calyx and stigmatic head persistent; edible.

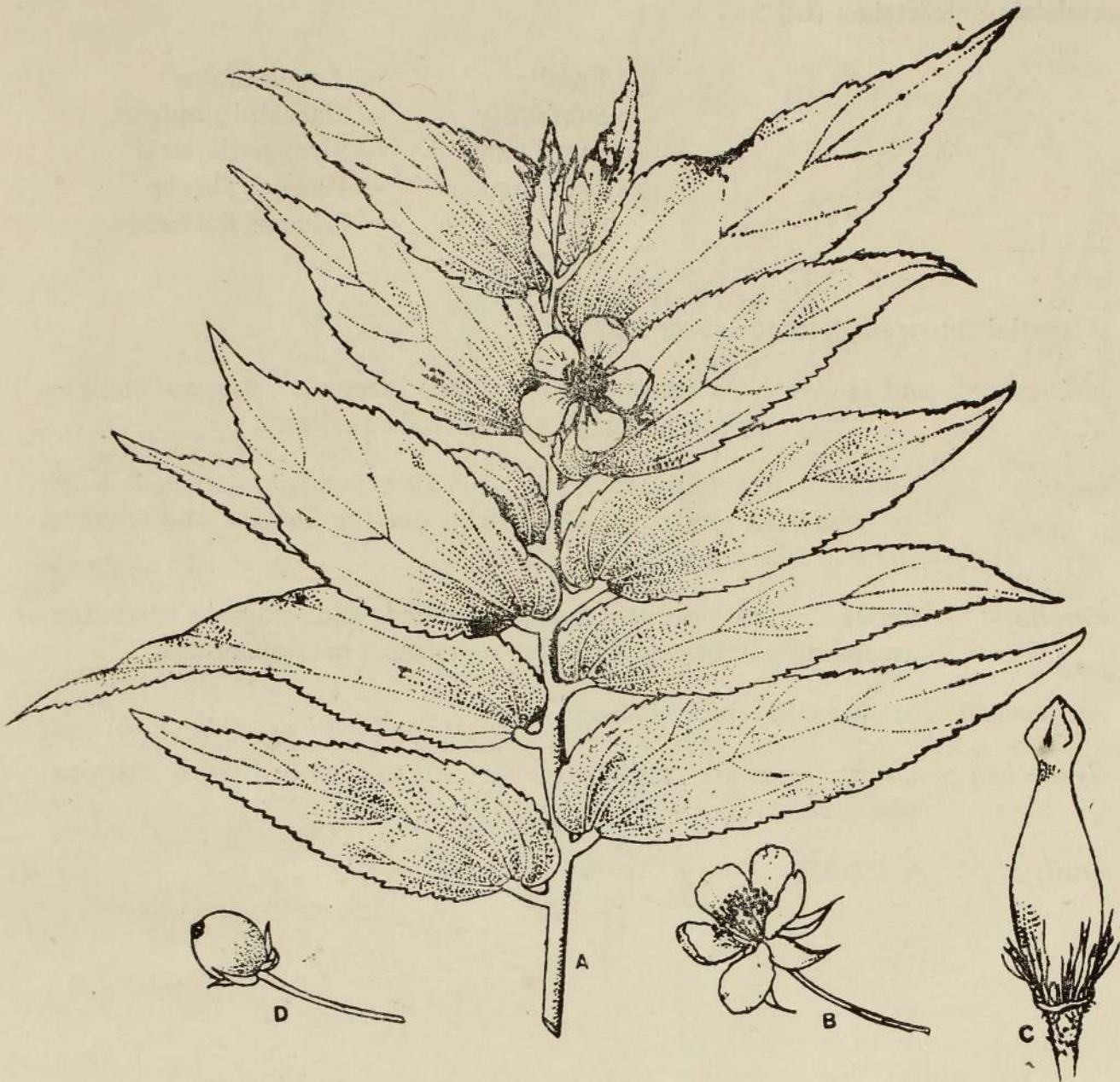


FIG. 6. *Muntinga calabura* L.

A. Flowering shoot  $\times \frac{3}{4}$ ; B. flower  $\times \frac{3}{4}$ ; C. gynoecium showing lobed stigmatic head  $\times 6$ ; D. fruit with persistent calyx and stigmatic head  $\times \frac{3}{4}$ .

**Caesalpinia pulcherrima (L.) Sw.**

Family	= Leguminosae
Subfamily	= Caesalpinioideae
Tamil name	= Sirumayilkonrai
English name	= Peacock flower Pride of Barbados

A small shrub or small tree; leaves bipinnate.

*Inflorescence and flowers* – On terminal or axillary racemes; flowers on long pedicels, bright orange, red or yellow.

*Calyx* : Sepals 5, free (polysepalous) with an expanded flattened base; quincuncially imbricate, the lowest one the largest and covering the bud like a hood.

*Corolla* : Petals 5, free (polypetalous), crinkled and clawed, spreading; ascendingly imbricate with the upper most petal innermost.

*Androecium*: Stamens 10, free, filaments long.

*Gynoecium* : Ovary superior, monocarpellary, many ovuled with marginal placentation.

*Fruit* : A legume.

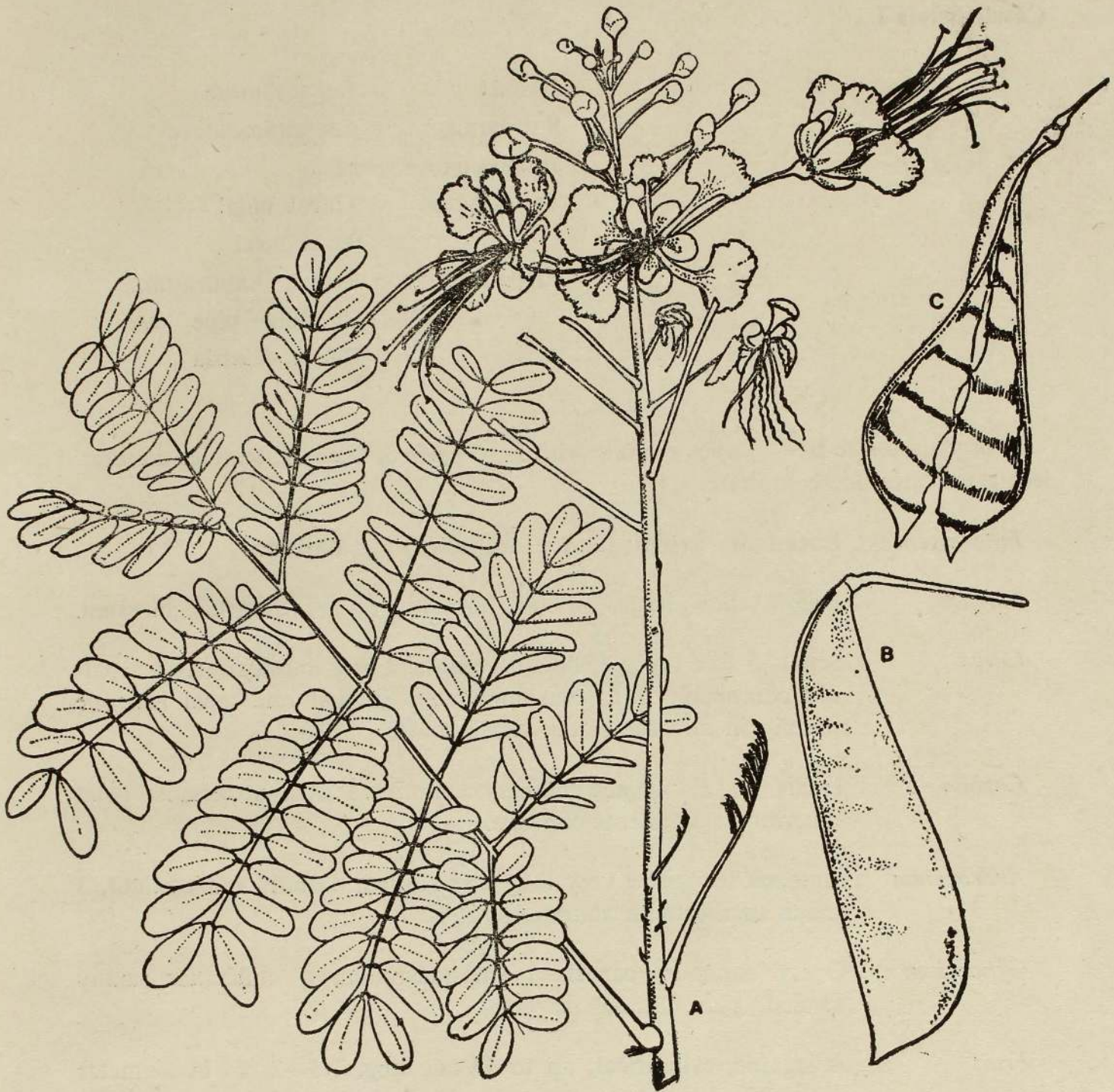


FIG. 7. *Caesalpinia pulcherrima* (L.) Sw.

A. Flowering twig with bipinnate leaves  $\times \frac{3}{4}$ ; B. fruit (legume  $\times \frac{3}{4}$ ), C. dehiscent fruit  $\times \frac{3}{4}$ .

**Cassia fistula L.**

Family = Leguminosae  
Sub family = Caesalpinioideae  
Sinhala name = Ehela  
Tamil name = Thirukondal  
Sarakonrai  
English name = Indian Laburnum,  
Pudding pipe tree  
Purging Cassia

A moderate size tree; leaves pinnate with 2—6 pairs of leaflets; stipules minute; leaflets ovate, acute at base.

*Inflorescence* : Racemose, axillary and pendulous, long stalked.

*Flowers* : Bright yellow, large, 5—7 cm, very slightly zygomorphic, bisexual.

*Calyx* : Sepals 5 free (polysepalous), quincuncially imbricate (two sepals are completely out, two completely in and one sepal has one margin in and the other margin out).

*Corolla* : Petals 5, yellow, ascendingly imbricate with uppermost petal innermost; segments concave.

*Androecium* : Stamens 10; three very long and curved, 4 short and straight, 3 much smaller with abortive anthers.

*Gynoecium* : Ovary superior, carpels 1 (monocarpeilary), unilocular, many ovuled, placentation marginal.

*Fruit* : A legume, cylindrical, up to 45 cm long, 1.5—2 cm in diameter with 25—100 seeds arranged horizontally and separated by transverse partitions.

Flowers used in temple ceremonies. Bark used for medicine and in tanning; pulp of fruit reported to be a purgative.



FIG. 8. *Cassia fistula* L.

A. Pinnate leaf  $\times \frac{1}{2}$ : B. pendulous, racemose inflorescence  $\times \frac{1}{2}$ : C. legume  $\times \frac{1}{3}$ .

**Peltophorum pterocarpum** (DC.) Backer *ex.* K. Heyne  
(*P. inerme* Naves)

Family	= Leguminosae
Sinhala name	= Kaha-mara
Tamil name	= Nilalvakai
English name	= Copper-shield bearer

A large tree; very young parts covered with orange brown velvety hairs; leaves bipinnate, swollen at base; stipules minute, caducous; leaflets sessile, oblong, apex emarginate, margins entire.

*Inflorescence and flowers.* – Flowers large, about 3 cm, yellow, in axillary racemes, bisexual, slightly zygomorphic.

*Calyx* : Sepals 5, free (polysepalous).

*Corolla* : Petals, free (polypetalous), shortly clawed, with a spur petal at the base of which nectar is stored, ascendingly imbricate the uppermost petal is innermost and the lowermost petal is the outermost, in other three one margin is inside and the other margin is outside.

*Androecium*: Stamens 10 (some of them can be staminodes), free.

*Gynoecium* : Ovary superior, carpels 1 (monocarpellary), unilocular, marginal placentation; disc beneath ovary secretes nectar to which the insect is guided by spur petal; stigmatic head expanded.

*Fruit* : A legume, 6 cm by 2.5. cm, reddish brown.

Planted as an ornamental tree.



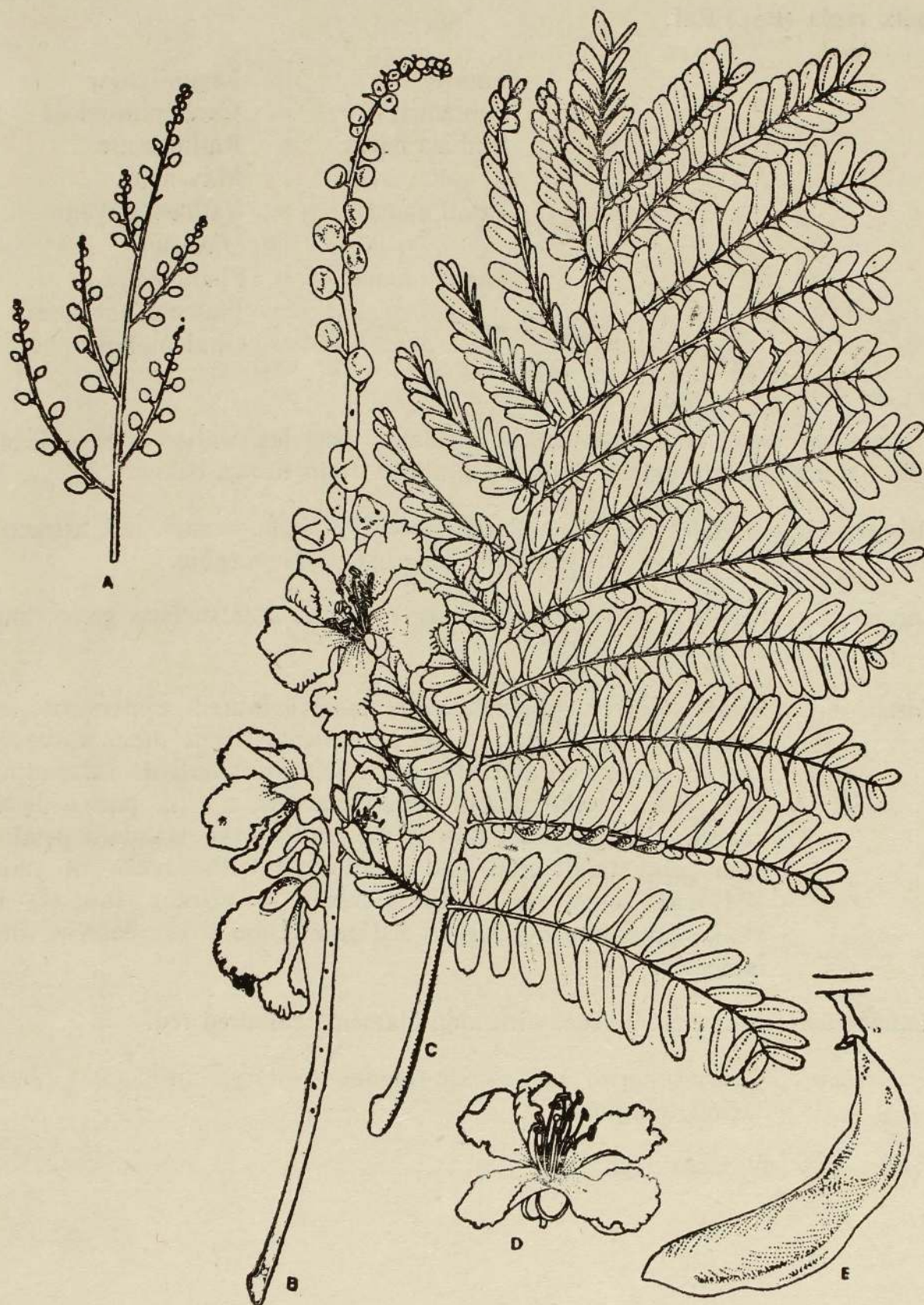


FIG. 9. *Peltophorum pterocarpum* (DC.) Backer ex K. Heyne

A. Young panicle  $\times \frac{1}{4}$ ; B. racemosely arranged flowers  $\times \frac{1}{2}$ ; C. bipinnately compound leaf with swollen base  $\times \frac{1}{2}$ ; D. flower  $\times \frac{1}{2}$ ; E. legume  $\times \frac{1}{2}$ .

**Delonix regia** (Boj.) Raf.

Family	=	Leguminosae
Subfamily	=	Caesalpinioideae
Sinhala name	=	Rathu-mara May-mara
Tamil name	=	Vatha-narayani Mayarum
English name	=	Flamboyant Flame of the forest Ghul-mohur

A large tree, much branched; leaves bipinnate, petioles swollen at base, leaflets sessile, oblong, margin entire, dark green above, light brown below.

*Inflorescence and flowers* – Flowers large, about 12.5 cm across, red, attractive, in panicles; bisexual, zygomorphic.

*Calyx* : Sepals 5, free (polysepalous), large, outer surface green, inner surface red.

*Corolla* : Petals 5, free (polypetalous), flame coloured, uppermost petal innermost, lowermost petal is outermost, in other three one margin is inside and the other margin is outside (ascendingly imbricate), basal part of petal is narrow, apical part wide and round, claw shaped, one of the petals - the standard petal or spur petal stands erect and is coloured with streaks of yellow red and sometimes white, serves to attract insects; the stalk of the spur petal is folded into a tube at the base of which is nectar.

*Androecium*: Stamens 10, free, with long filaments coloured red.

*Gynoecium* : Ovary superior, carpels one (monocarpellary), unilocular, placentation marginal.

*Fruit* : A large legume.

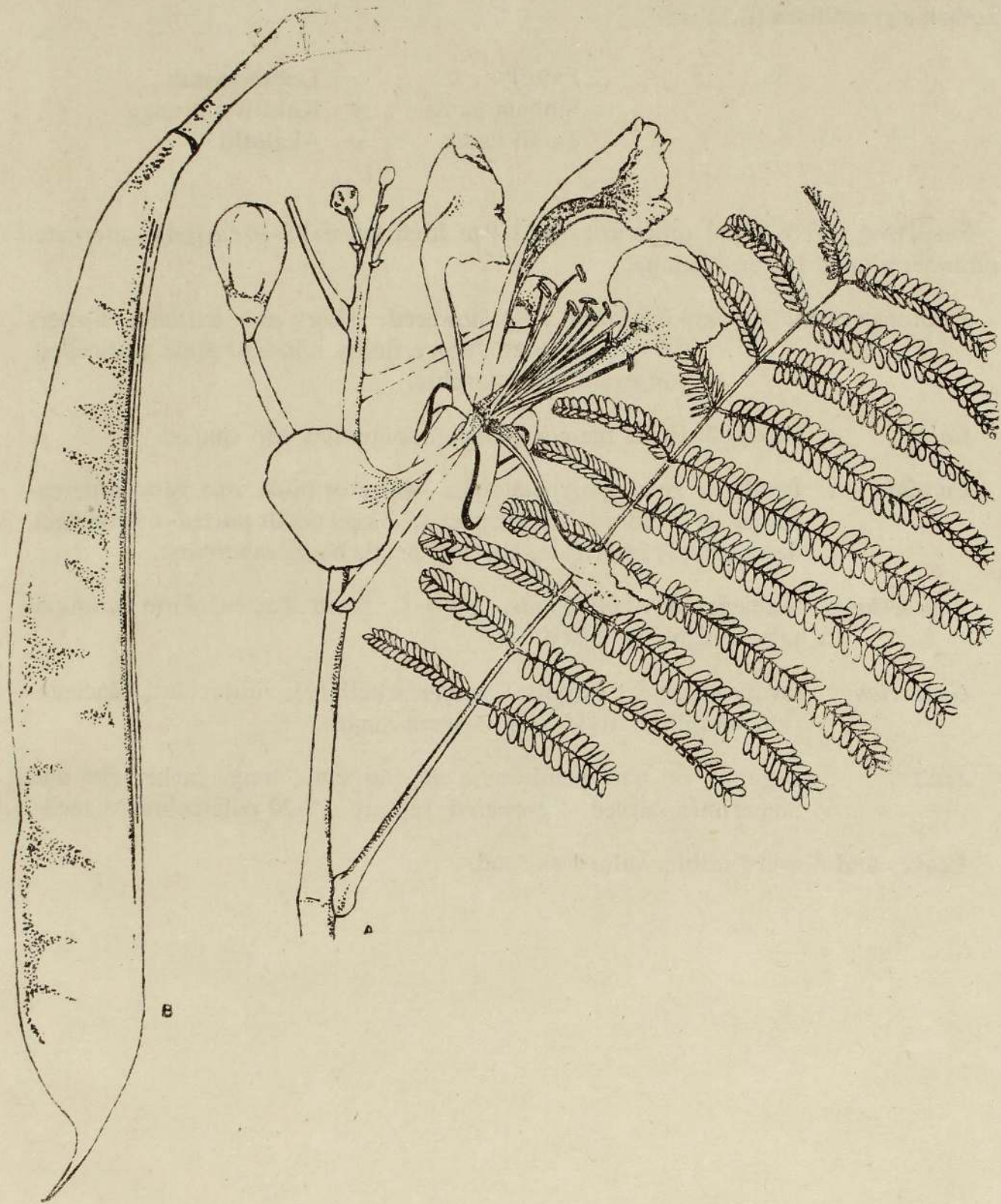


FIG. 10. *Delonix regia* (Boj.) Raf.

A. Part of flowering shoot showing standard petal and bipinnate leaf  $\times \frac{1}{2}$ ; B. legume  $\times \frac{1}{2}$ .

**Sesbania grandiflora (L.) Pers.**

Family	=	Leguminosae
Sinhala name	=	Katurn-murunga
Tamil name	=	Akaththi

Small tree, soft wooded, quick growing, 6-9 m. high, leaves 15-30 cm long, alternate, pinnate, pinnae linear - oblong.

*Inflorescence and flowers* - Racemes 2-4 flowered, short and axillary, flowers 6-10 cm long, showy, fleshy, white or pink, pedicelled, bisexual, zygomorphic.

*Calyx* : Sepals 5, fused (gamosepalous), somewhat cup shaped.

*Corolla* : Petals 5, free (polypetalous), white or pink, one petal differentiated as standard, 2 wing petals, 2 keel petals united to form keel, descendingly imbricate, the keel petals being innermost.

*Androecium*: Stamens 10, diadelphous, (9) + 1, fused stamens form staminal tube enclosing pistil.

*Gynoecium* : Ovary superior, carpels 1 (monocarpellary), unilocular, placentation marginal, style long, stigma small.

*Fruit* : Legume or pod pendulous, 30-60 cm. long, rather flat and sometimes curved, 4 cornered, septate, 15-20 pale coloured seeds.

Leaves and flowers edible, valued as food.



FIG. 11. *Sesbania grandiflora* (L.) Pers.

A. Twig with pinnate leaves and flowers  $\times \frac{1}{2}$ ; B. a single flower showing standard petal, 2 wing petals and keel  $\times \frac{3}{4}$ ; C. diadelphous stamens  $\times \frac{3}{4}$ ; D. legume  $\times \frac{1}{2}$ .

## **Crotalaria pallida** Klotzsch

Family	=	Leguminosae
Sub family	=	Papilionatae
Sinhala name	=	Kaha-Andana-hiriya
Tamil name	=	Kilukiluppai

A much branched stout herb; leaves alternate, trifoliate, leaflets 3 cm to 5 cm long, obovate-oblong, tapering to obtuse base, often with emarginate apex, margin entire; stipules minute or absent.

*Inflorescence* : Spikes terminal, 12—25 cm long.

*Flowers* : Numerous, about 2.5 cm long, yellow, pedicel short and curved, zygomorphic, bisexual; bracteate, bract short and acicular, bracteoles 2, minute.

*Calyx* : Sepals 5, fused (gamosepalous); segments triangular.

*Corolla* : Petals 5, free (polypetalous), papilionaceous, posterior petal referred to as the *standard petal* is the largest (and is slightly bifid), and overlaps others in bud; beneath this on either side are two symmetrical petals which are referred to as *wing petals* (these have one margin outside and the other inside), they overlap the two lower petals (*keel petals*) which are united forming the keel; aestivation imbricate.

*Androecium* : Stamens 10, diadelphous (9)+1, fused, stamens form staminal tube enclosing pistil

*Gynoecium* : Ovary superior, monocarpellary, unilocular, placentation marginal; below ovary is a nectary, the nectar being stored in the staminal tube.

*Fruit* : A legume, 3—4 cm long, cylindrical with tapering base, short stalked; base of style persistent; seeds 15—20, purplish green.

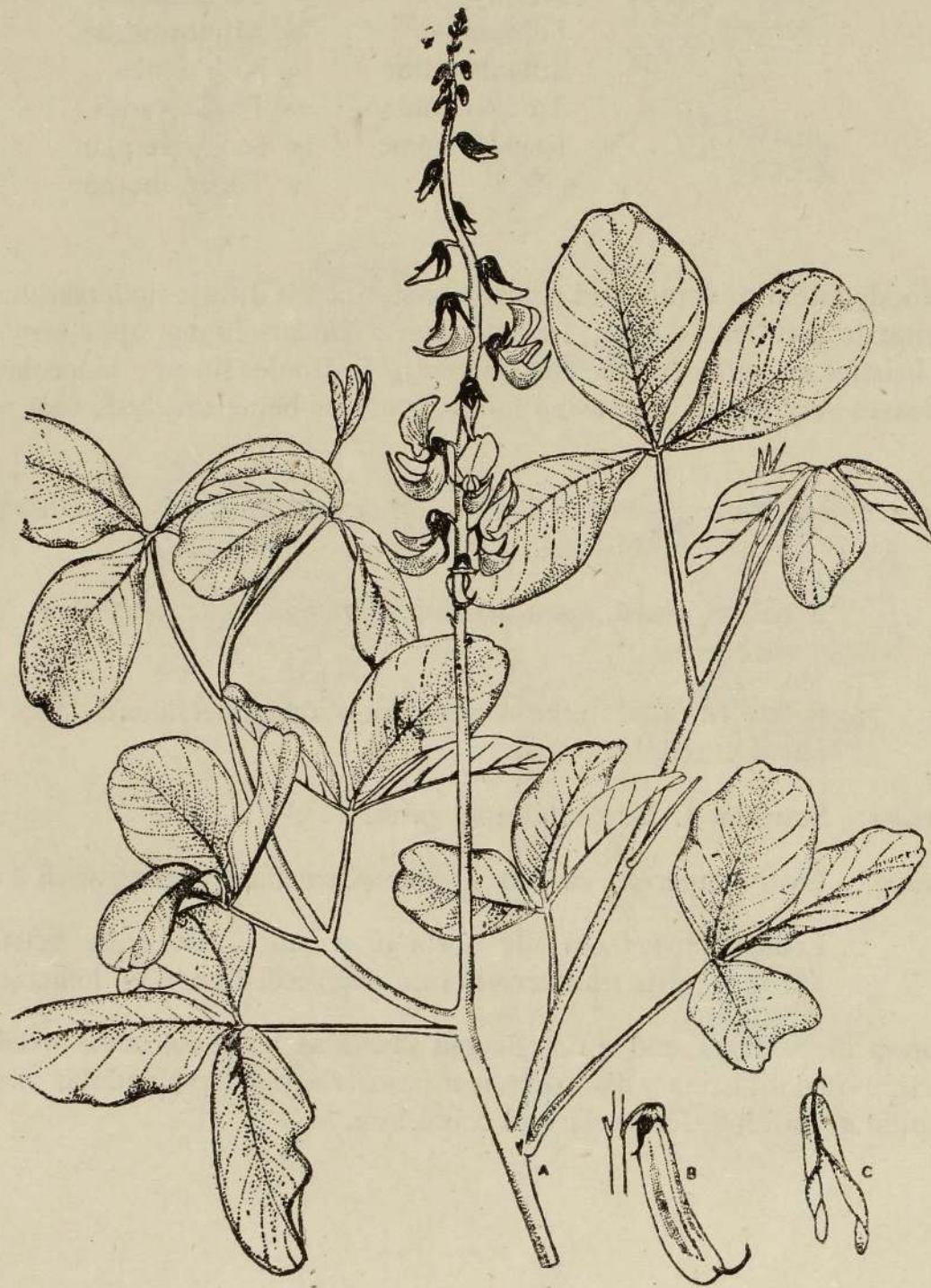


FIG. 12. *Crotalaria pallida* Klotzch

A. Twig with flowers  $\times \frac{1}{2}$ : B. legume  $\times \frac{1}{2}$ : C. dehisced legume  $\times \frac{1}{2}$

**Mimosa pudica L.**

Family	= Leguminosae
Subfamily	= Mimosoideae
Sinhala name	= Nidikumba
Tamil name	= Todda vaddi
English name	= Sensitive plant
	= Touch-me-not

Herb, woody; stem prostrate and prickly, sometimes a diffuse undershrub, leaves small, bipinnate, swollen at base; leaflets sessile, linear-oblong, apex acute, base truncate, bristles on under surface and on margin; stipules linear – lanceolate with bristles; leaves very sensitive, closing immediately on being touched; root nodules present.

*Inflorescence and flowers* – Pink flowers on rounded heads, actinomorphic bisexual.

*Calyx* : Sepals 4, fused (gamosepalous), campanulate, very short, almost invisible.

*Corolla* : Petals 4, fused in the lower region (gamopetalous), lobes ovate-oblong, reddish tinted.

*Androecium*: Stamens 4, filaments long, pink.

*Gynoecium* : Ovary superior, carpels 1 (monocarpellary), ovary with 4 ovules.

*Fruit* : Pods arranged in the form of a star, flat with bristles on surface, splits transversely into one seeded parts (=lomentum).

Common in pastures and on neglected lawns as a troublesome weed; leaf decoction used for urinary disorders, leaf paste is applied to glandular swellings; root used as antidote for snake and cobra bite.



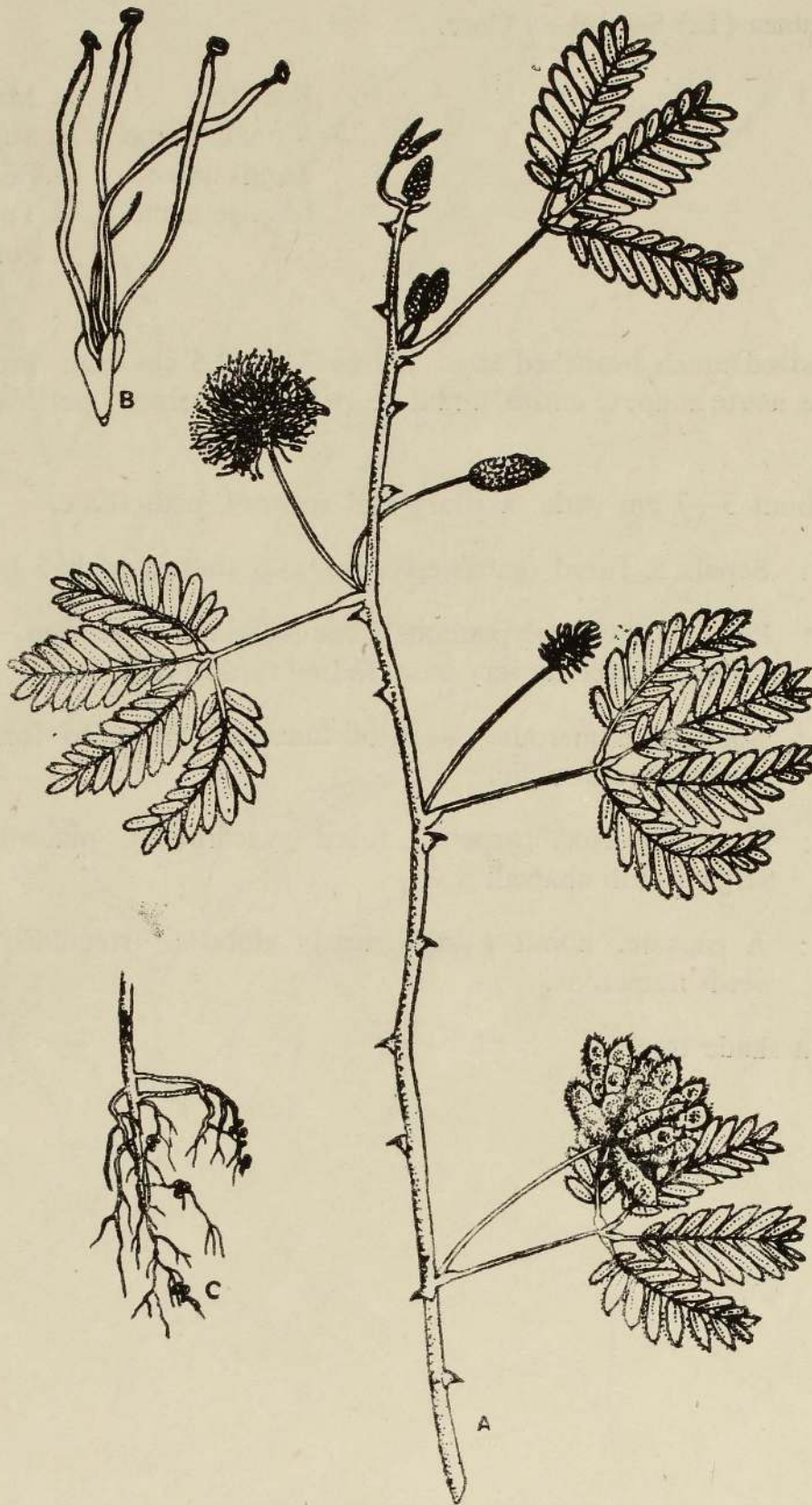


FIG. 13. *Mimosa pudica* L.

A. Twig with flowering head and fruits  $\times \frac{3}{4}$ ; B. flower showing corolla and highly reduced calyx  $\times 8$ ; C. root with nodules  $\times \frac{3}{4}$ .

***Thespesia populnea* (L.) Soland ex Corr.**

Family	= Malvaceae
Sinhala name	= Suriya
Tamil name	= Poovarasu
Englise name	= Tulip tree Portia tree

A medium sized much branched tree; leaves 7.5—12.5 cm long, broadly ovate, cordate at base, acute at apex, entire, undulate, palmately veined; petiolate; stipules deciduous.

*Flowers* – About 5—7 cm wide, axillary and solitary, pedicillate.

*Calyx* : Sepals 5, fused (gamosepalous), cup shaped with 5 teeth.

*Corolla* : Petals 5 free (polypetalous), campanulate, contorted, yellow with crimson patch at very base, fading to dull red.

*Androecium* : Stamens numerous, base of filaments fused to form staminal tube around style.

*Gynoecium* : Ovary superior, carpels 5, fused (syncarpous), placentation axile, stigma club shaped.

*Fruit* : A capsule, about 1 inch, nearly globose, irregularly dehiscent, seeds numerous.

Planted as a shade tree.



FIG. 14. *Thespesia populnea* (L.) Soland ex Corr.

A. Flowering shoot with buds and developing fruits  $\times \frac{1}{2}$ ; B. part of flower showing staminal tube and club shaped stigma  $\times \frac{1}{2}$ ; C. fruit  $\times \frac{1}{2}$ .

**Hibiscus rosa—sinensis L.**

Family	= Malvaceae
Sinhala names	= Sapattu-mal Wadamal
Tamil name	= Chemparathei.
English names	= Shoe flower Chinese rose

A much branched tall shrub; leaves spirally arranged, petiolate, ovate, margin dentate, apex acute ; stipules long and narrow.

- Flowers* : Very showy about 10—14 cm wide, axillary and solitary, actinomorphic, bisexual; with several bracteoles forming epicalyx.
- Calyx* : Sepals 5, green, fused (gamosepalous), with 5 triangular teeth, valvate in bud.
- Corolla* : Petals 5, usually red, free (polypetalous) but fused at base, contorted (twisted).
- Androecium* : Stamens indefinite, monadelphous; filaments fused to form staminal tube which at base is adherent to petals; anthers reniform.
- Gynoecium* : Ovary superior, carpels 5, fused (syncarpous), 5 locular, placentation axile, styles united and covered by staminal tube, stigmas 5 free.
- Fruit* : A loculicidal capsule. *H. rosa-sinensis* does not fruit normally.

*Note.*—Occuring in many varieties or crosses, single or double flowers of different shades, dye of red variety used earlier for colouring foods.

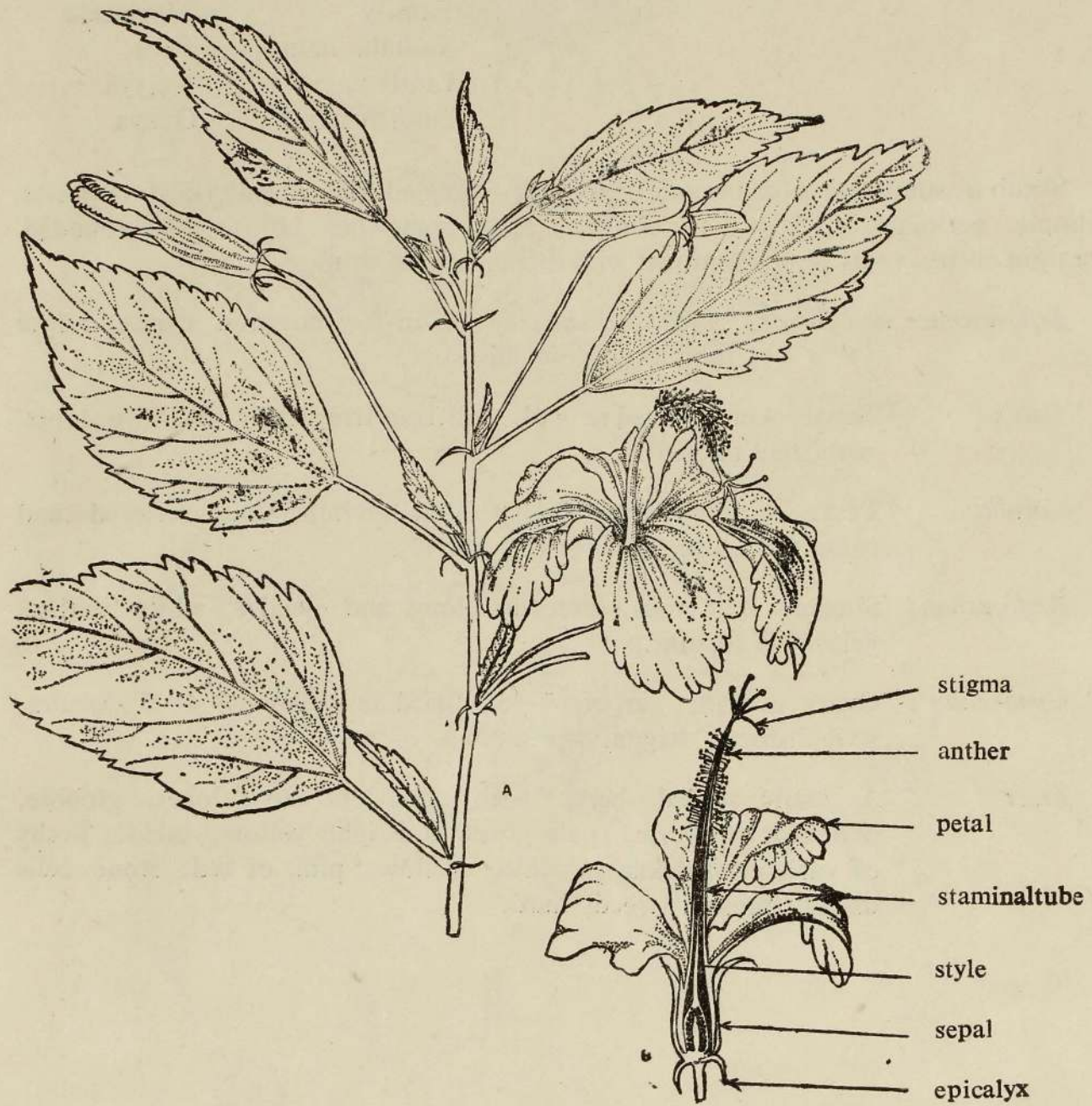


FIG. 15. *Hibiscus rosa-sinensis* L.

A. Twig with spirally arranged leaves and flower x1 B. half flower x $\frac{1}{2}$

**Psidium guajava L.**

Family	= Myrtaceae
Sinhala name	= Pera
Tamil name	= Keiyya
English name	= Guava

Shrub or small tree with smooth bark, twigs 4 angled and ridged; leaves opposite, simple, petiolate, elliptical to obovate, apex somewhat obtuse, base rounded, margin entire, veins very prominent with intramarginal vein.

*Inflorescence and flowers* - Flowers solitary or in few flowered cymes; white actinomorphic, bisexual.

*Calyx* : Sepals 4 or 5, fused in bud, splitting irregularly into 4—6 lobes, persistent on fruit.

*Corolla* : Petals 4 or 5 free (polypetalous), imbricate, reflexed and rounded. white, falling very early.

*Androecium*: Stamens numerous, filaments long and slender, white, anthers yellow, 2 locular.

*Gynoecium* : Ovary inferior, carpels 4—5, fused (syncarpous) 4—5 locular, style filiform, stigma capitate.

*Fruit* : A many seeded berry with persistent calyx lobes, globose, ovoid or pyriform, pale green to bright yellow; inside fleshy of variable thickness, white, yellow, pink or red; stone cells usually present; seeds hard.

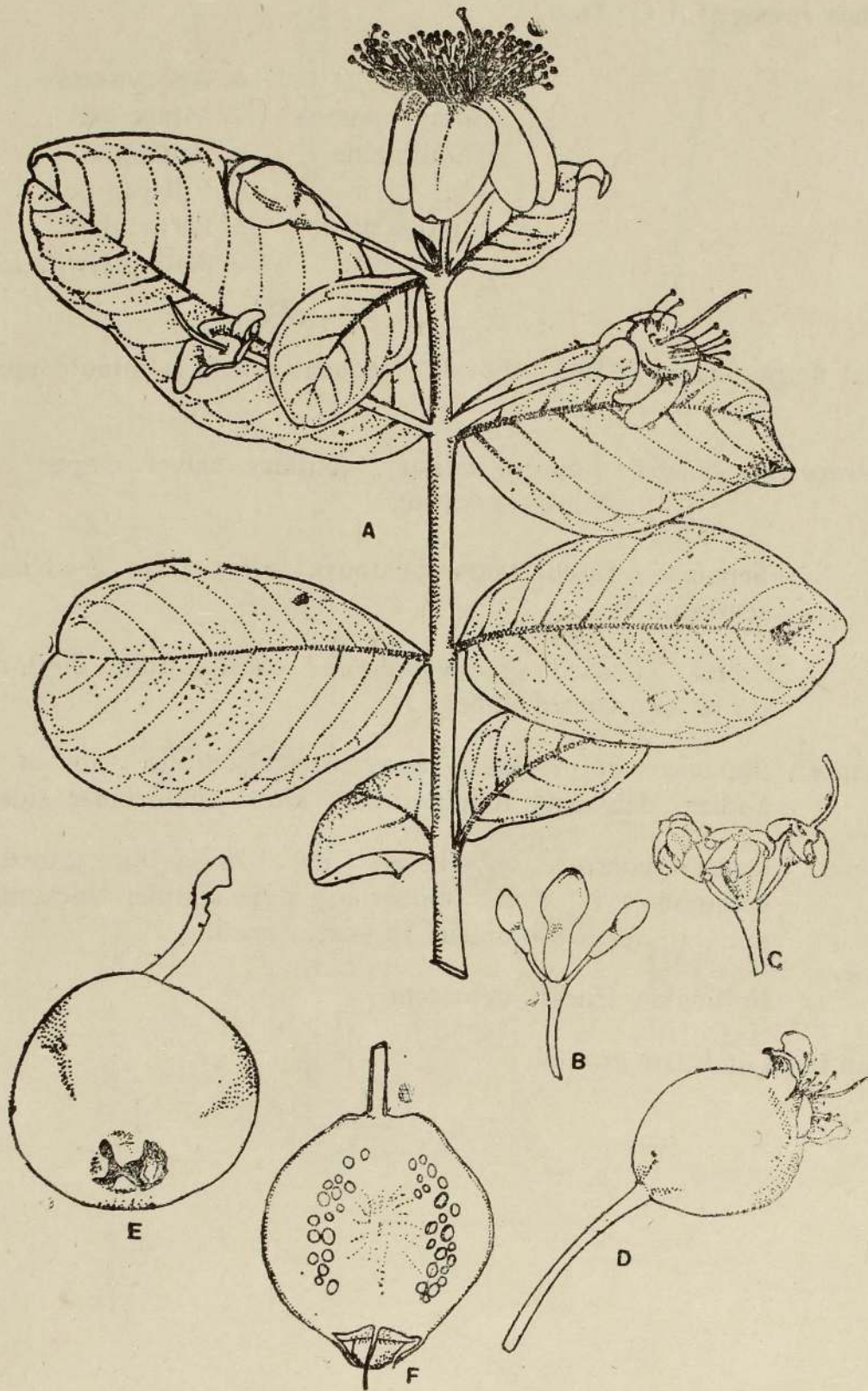


FIG. 16. *Psidium guajava* L.

A. Shoot showing bud, flower and developing fruits  $\times \frac{1}{2}$ ; B. cyme  $\times \frac{1}{2}$ ; C. developing fruits  $\times \frac{1}{2}$ ; D and E. young and mature fruits showing persistent calyx  $\times \frac{1}{2}$ ; F. Longitudinal section of a berry  $\times \frac{1}{2}$ .

**Catharanthus roseus (L.) G. Don.**

Family	= Apocynaceae
Sinhala name	= Minee mal
Tamil name	= Pattippoo
	= Pillayar-poo
English name	= Periwinkle
	= Rose-periwinkle

Perennial herb; leaves simple, obovate, frequently with a minute apiculus at the apex.

*Inflorescence and flowers* - Flowers solitary, axillary, salver shaped; crimson, pink or white.

*Calyx* : Sepals 5, fused (gamosepalous), calyx tube 2—3 mm long, segments 5.

*Corolla* : Petals 5, fused (gamopetalous), corolla tube 2—3 cm long, throat constricted, lobes 5.

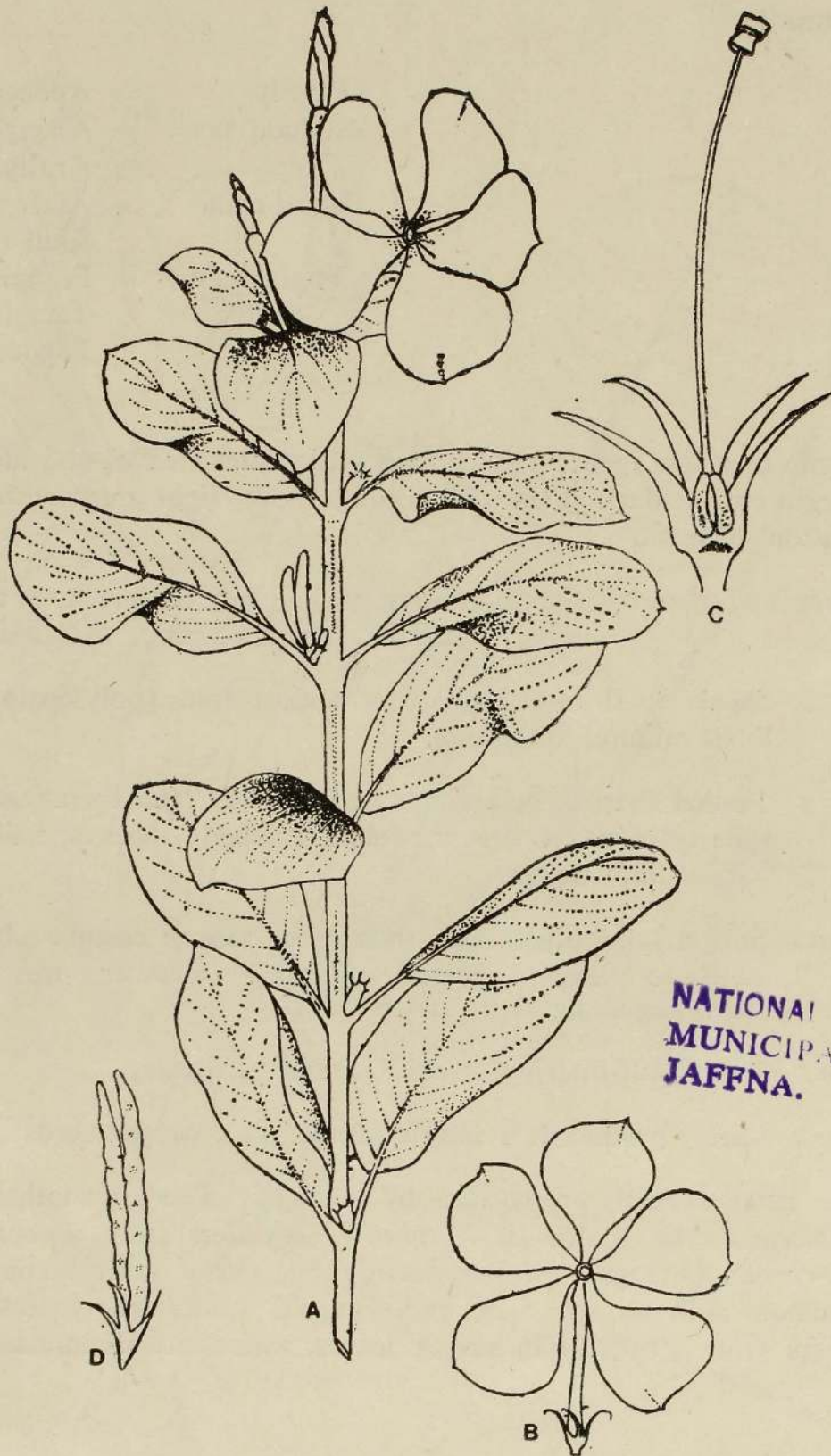
*Androecium*: Stamens epipetalous; inserted on corolla tube at mouth; anthers dehiscing longitudinally along their inner side.

*Gynoecium* : Ovary superior, carpels 2, free at base but joined by the common style; ovules numerous; style simple, thickened at the apex to form prominent stigmatic head.

*Fruit* : Follicular, linear, dehiscent.

Common weed on waste ground.





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FIG. 17. *Catharanthus roseus* (L.) G. Don.

A. Shoot with buds, flower and fruits  $\times \frac{3}{4}$ ; B. flower  $\times \frac{3}{4}$ ; C. Part of a dissected flower showing two carpels, free (below), single style and prominent stigmatic head  $\times \frac{3}{4}$ ; D. follicles  $\times 1$ .

**Plumeria obtusa L.**

Family	= Apocynaceae
Sinhala name	= Alariya Araliya
Tamil name	= Alari Kalli-manthara
English name	= Frangipanni Temple tree Pagoda tree

A large shrub or a low spreading tree with milky latex; leaves obovate, rounded at apex, margin entire, dark green and shining above, light green with very prominent venation beneath.

*Inflorescence and flowers* – Cymes on long peduncles; flowers large and white, highly fragrant, actinomorphic, bisexual.

*Calyx* : Sepals 5, shortly connate or almost free (polysepalous), calyx lobes minute, imbricate.

*Corolla* : Funnel shaped, petals 5, fused at base (gamopetalous), corolla tube cylindrical, 2-3 cm long; 5-lobed, lobes spreading, white with yellow throat.

*Androecium*: Stamens 5, epipetalous, inserted at base of corolla tube, anthers sagittate (arrow shaped), grouped together around stigma, dehiscent along their inner sides.

*Gynoecium* : Ovary half-inferior; carpels 2, free, 2 locular.

*Fruit* : Rarely produced, a double follicle with winged seeds.

**Note:**– The genus is easily propagated by cuttings. There is another species of *Plumeria* in the Maldives, *P. rubra* L. It differs from *P. obtusa* in that the corolla is tinged on the outside by one of several colours. The common colours are dark red, purple, pink and yellow. It also differs from *P. obtusa* in having leaves which are acuminate at apex.

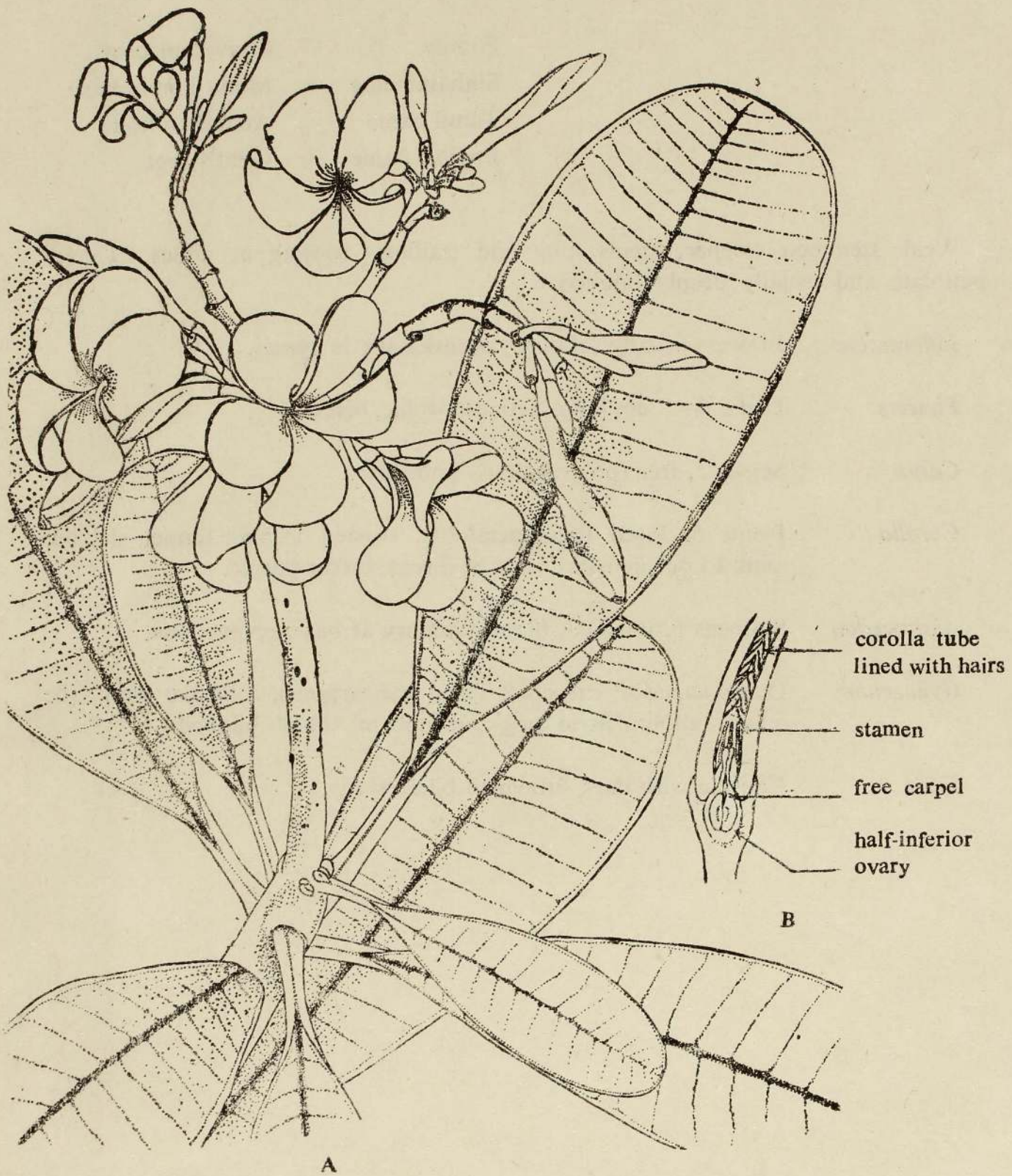


FIG. 18 *Plumeria obtusa* L.

A. Flowering shoot with cyme on long peduncle  $\times \frac{1}{2}$ ; B. half flower (basal portion only) showing half inferior ovary, two free carpels, the stamens and corolla tube lined with hairs  $\times 2$ .

***Ipomoea pes-caprae* (L.) R. Br.**  
(=*I. biloba* Forsk.)

Family = Convolvulaceae  
Sinhala name = Mudu-bintamburu  
Tamil name = Adamban-kodi  
English name = Goat's foot

Weak stemmed creeper; stems long and trailing, rooting at nodes. Leaves petiolate and usually deeply bilobed.

*Inflorescence* : Flowers usually solitary ; occasionally in cymes.

*Flowers* : Large 4—7 cm long, actinomorphic, bisexual.

*Calyx* : Sepals 5, free (polysepalous) imbricate.

*Corolla* : Petals 5, fused (gamopetalous), twisted in bud, funnel shaped, pink to purple with inside of throat darker purple.

*Androecium* : Stamens 5, unequal, filaments hairy at base, epipetalous.

*Gynoecium* : Ovary superior, carpels 2, fused (syncarpous), 2-locular with axile placentation. Style long and filiform, stigma bilobed.

*Fruit* : Capsule with dark brown to black seeds.

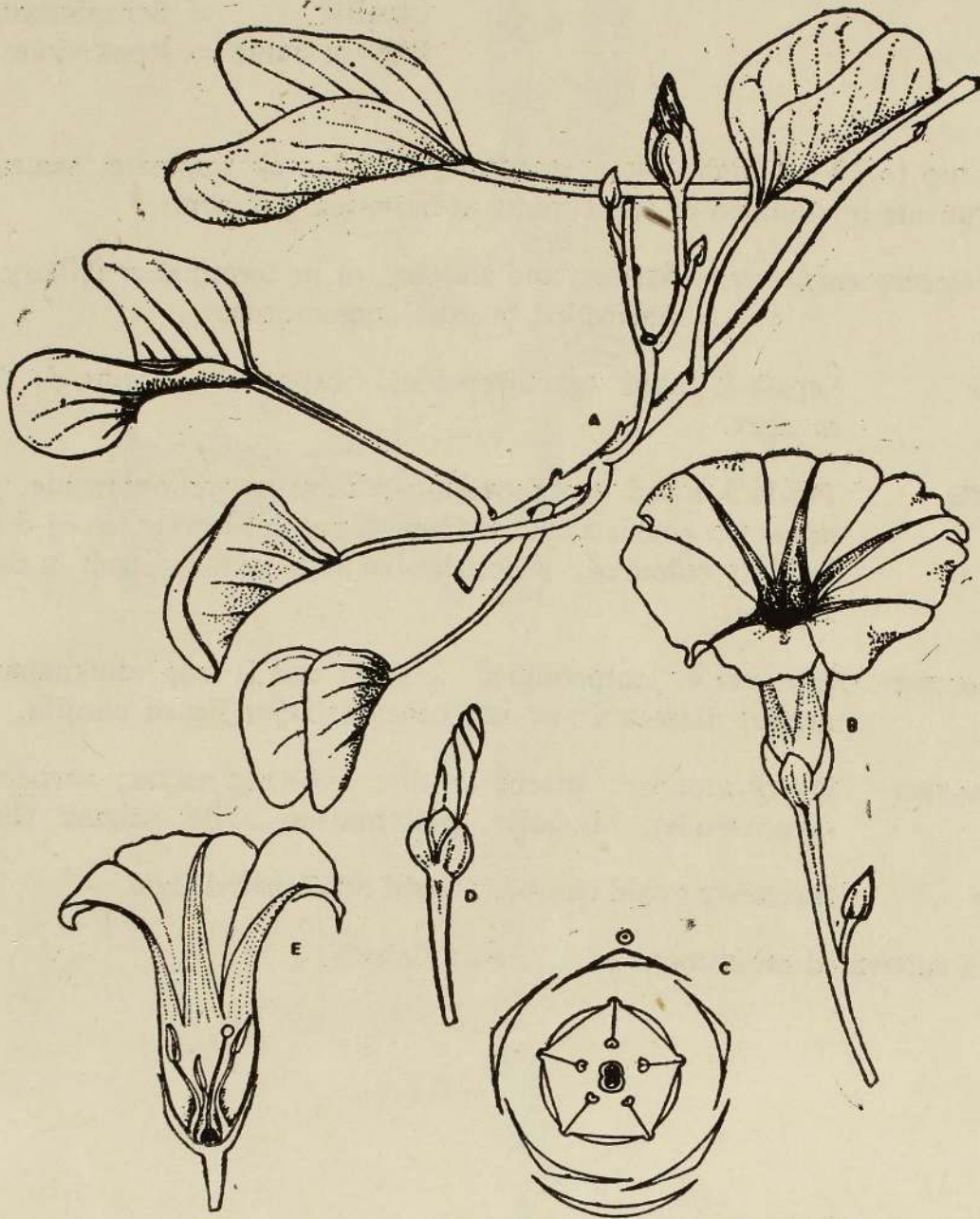


FIG. 19. *Ipomoea pes-caprae* (L.) R. Br.

- A. Part of creeper with bilobed leaves  $\times \frac{1}{2}$ ; B. flower  $\times \frac{1}{2}$ ; C. floral diagram; D. bud  $\times \frac{1}{2}$ ;  
 E. half flower  $\times \frac{1}{2}$ .

**Torenia fournieri Lind.**

Family = Scrophulariaceae  
English name = Rock violet

Herb, up to 30 cm high; stem quadrangular; leaves opposite, ovate, acute at apex, truncate or rounded or sub-cordate at base, margin serrate.

*Inflorescence and flowers* - Axillary and solitary, or in terminal or axillary racemes; pedicelled, bisexual, zygomorphic.

*Calyx* : Sepals 5, fused (gamosepalous), calyx tube 5 winged; 5 - lobed at apex,

*Corolla* : Petals 5, fused (gamopetalous), tubular, yellow inside; bilabiate, upper lip consists of 2 segments, purple; lower lip of 3 segments, brightly coloured, purplish blue with yellow patch in the middle segment.

*Androecium*: Stamens 4, epipetalous, 2 short and 2 long (didynamous) with arched filaments meeting beneath upper lip of corolla.

*Gynoecium* : Ovary superior, placed on disc secreting nectar; carpels 2, fused (syncarpous), bilocular, placentation axile; stigma rhomboidal.

*Fruit* : Narrowly ovoid capsule, tipped by withered style.

Often cultivated on account of its showy flowers.

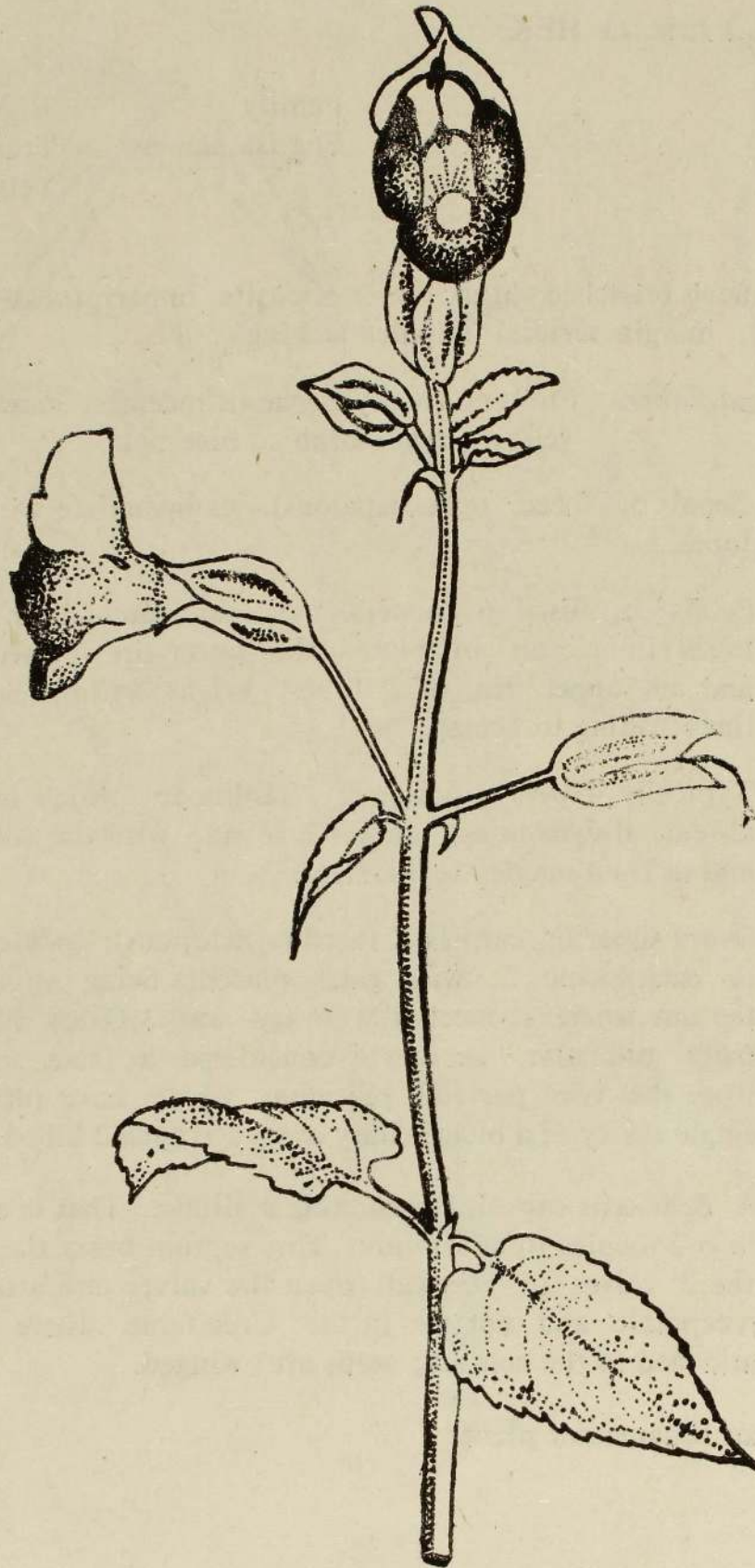


FIG. 20. *Toreniaournieri* Lind.

Twig with flowers (corolla bilabiate)×1.

**Tecoma stans** (L.) Juss. ex HBK.

Family = Bignoniaceae  
English names = Trumpet flower,  
Yellow elder

Small tree or much branched shrub; leaves opposite, imparipinnately compound; leaflets elliptical; margin serrate; stipules lacking.

*Inflorescence and flowers* – Flowers usually borne in racemes, showy and bright yellow, zygomorphic; bisexual.

*Calyx* : Sepals 5, fused (gamosepalous), campanulate with 5 teeth or lobes.

*Corolla* : Petals 5, fused (gamopetalous), campanulate or funnel form, lobes imbricate, bilabiate, the lower lip formed of 3 lobes and an upper lip of 2 lobes, bright yellow with light red lines leading to nectar.

*Androecium*: Typically 4 with a posterior staminode which is occasionally absent, didynamous; anther 2 lobed, with the lobes divergent and at right angles to filament.

*Gynoecium* : Ovary superior, carpels 2, fused (syncarpous), locules 2, placentas in each locule 2, with each placenta being situated on the septum where it meets the ovary wall. Ovary not considered truly bilocular, septum is considered a false septum formed from the two parietal placentas which have intruded into a single cavity of a bicarpellary ovary; stigma 2 lobed.

*Fruit* : A dehiscent capsule, resembling a siliqua. That is a pod divided into 2 locules by a septum. This septum bears the seeds; when the 2 valves of the wall open the valves are attached to the receptacle and not as in the Cruciferae where they remain attached to the septum; seeds are winged.

Cultivated as an ornamental plant.





FIG. 21. *Tecoma stans* (L) Juss ex HBK.

A. Flowering shoot with buds  $\times \frac{3}{4}$ ; B. dissected flower showing didynamous stamens and divergent anthers  $\times \frac{3}{4}$ ; C. two capsules one of which has dehisced  $\times \frac{3}{4}$ ; D. dehiscent capsule with two valves and septum  $\times \frac{3}{4}$ ; E. winged seed  $\times \frac{3}{4}$ .

**Thunbergia grandiflora** (Roxb. ex Rottl.) Roxb., ex Spreng

Family = Acanthaceae

Perennial with a woody twining stem, quick growing, leavaes simple and opposite, ovate to broadly - ovate, margins angle-toothed.

*Inflorescence* : Flowers solitary or in drooping racemes.

*Folwers* : Large and brightly coloured, bluish mauve or white. Bracts absent; bracteoles 2, very large and completely enclosing bud; nectary in the form of a prominent disc at the base of ovary; zygomorphic, bisexual.

*Calyx* : Much reduced, segments numerous, 12—20 in a ring.

*Corolla* : Petals 5, fused (gamopetalous), contorted in bud, lobes 5, large and nearly equal, conspicuously two lipped (bilabiate) with coloured lines in the interior of the lower lip, corolla tube narrow at base and stores nectar below constriction.

*Androecium* : Stamens 4, didynamous, epipetalous, anthers face downwards and provided with a brush of hairs along their lengths.

*Gynoecium* : Ovary superior, carpels 2, fused, 2 locular; placentarion axile, stigma dilated, 2 lobed.

*Fruit* : A loculicidal capsule.

Frequently cultivated as an ornamental creeper.

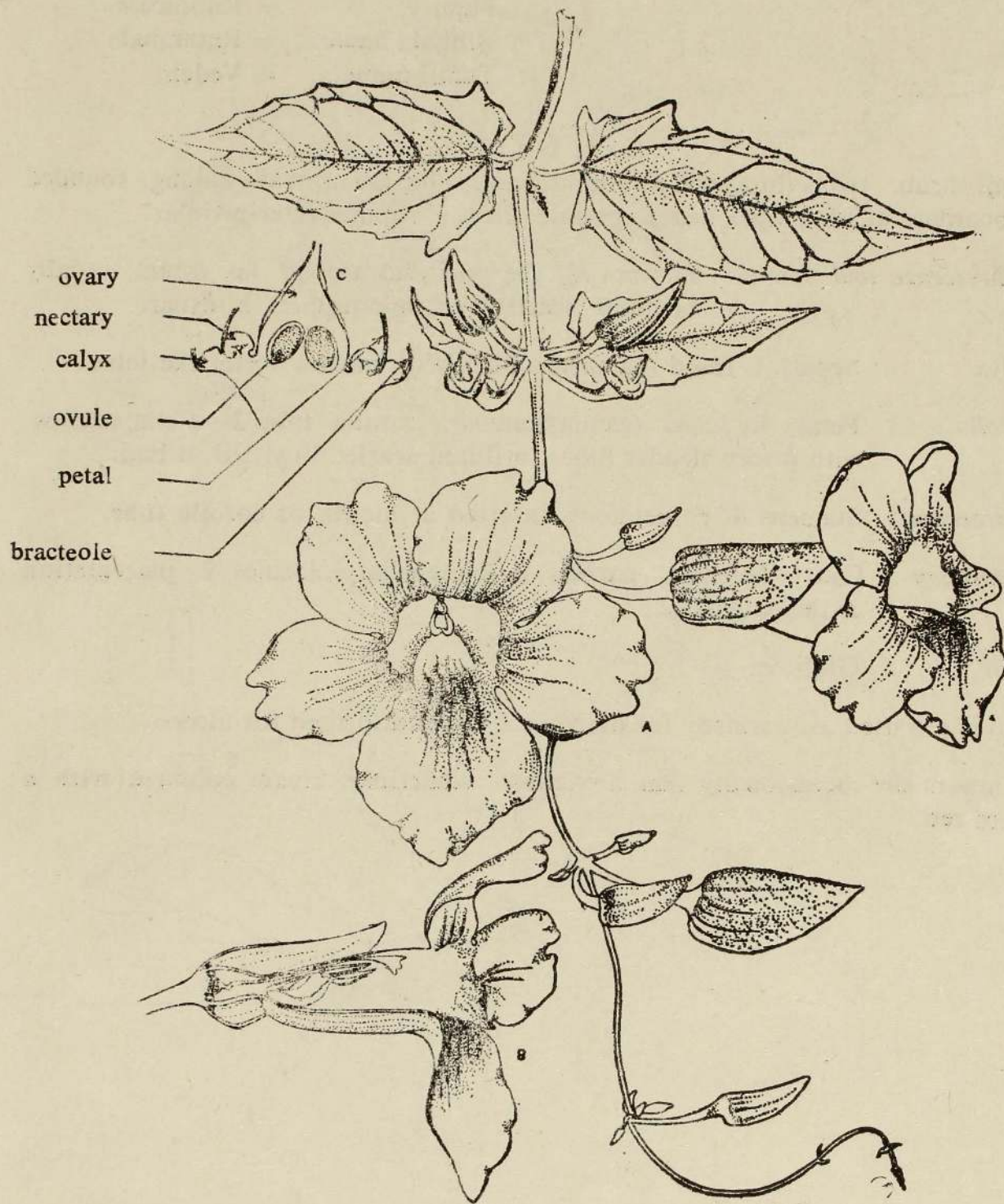


FIG: 22. *Thunbergia grandiflora* (Roxb. ex Rottl.) Roxb., ex Spreng

A. Twig with drooping raceme  $\times \frac{1}{2}$ : B. half flower  $\times \frac{1}{2}$ .

***Ixora coccinea* L.**

Family	= Rubiaceae
Sinhala name	= Ratambala
Tamil name	= Vedchi

Small shrub, twigs thickened at nodes; leaves obovate or oval-oblong, rounded or subcordate at base, apex acute, petiole short; stipules inter-petiolar.

*Inflorescence and flowers* – Flowers all the year and are on lax cymes, usually brilliant scarlet\* actinomorphic, bisexual.

*Calyx* : Sepals 4, fused (gamosepalous), with narrow teeth like lobes.

*Corolla* : Petals 4, fused (gamopetalous), corolla tube 2—4 cm; narrow, with 4 very slender lobes, brilliant scarlet,\* twisted in bud.

*Androecium*: Stamens 4, epipetalous, inserted at mouth of corolla tube.

*Gynoecium* : Ovary inferior, carpels 2 (bicarpellary), locules 2, placentation axile; stigmas 2.

*Fruit* : Globose.

Leaves are used as a remedy for diarrhoea, leaves also used for ulcers.

\* Flowers are occasionally lemon-yellow, sometimes cream coloured with a tinge of red.

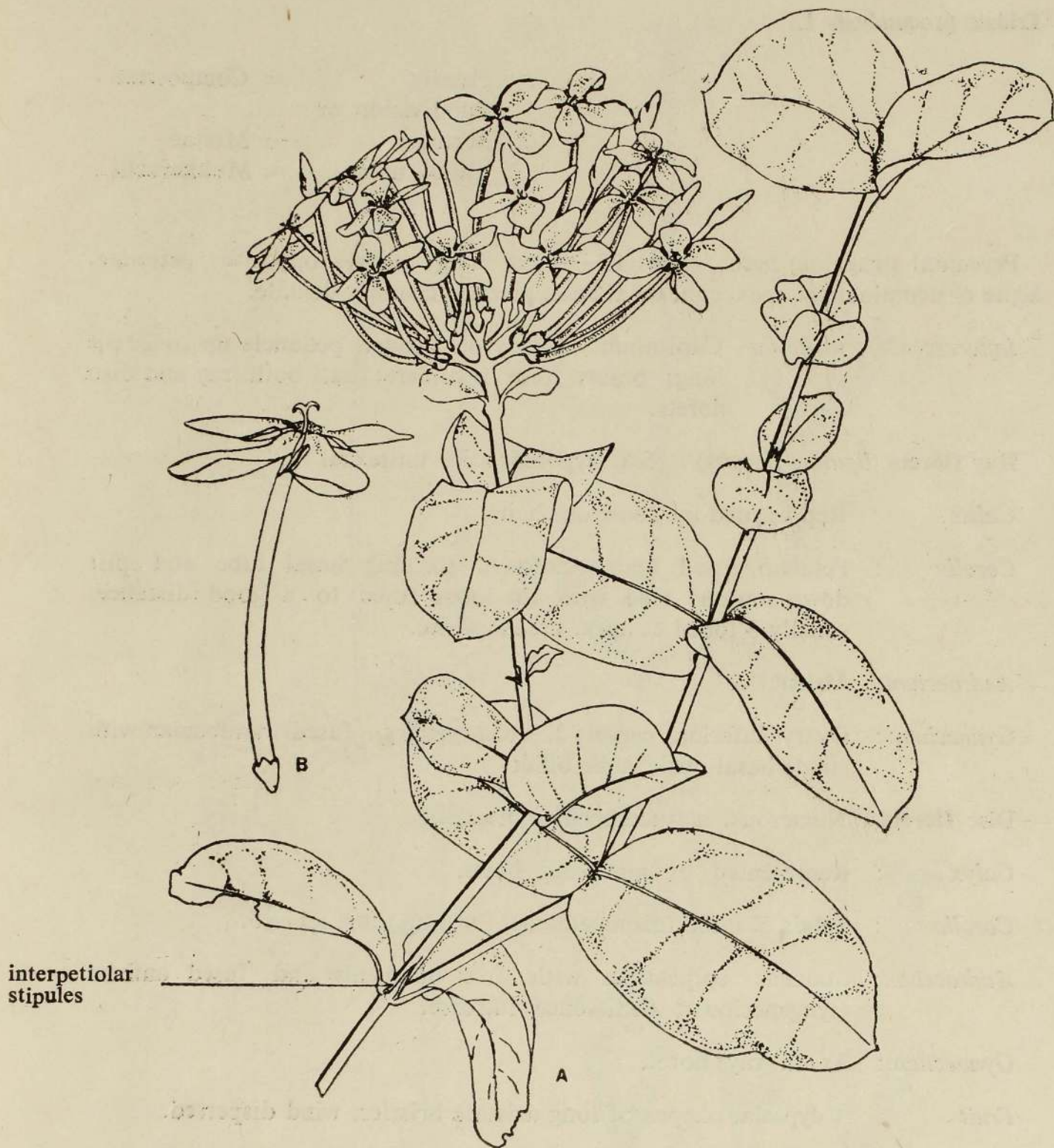


FIG. 23. *Ixora coccinea* L.

A. Flowering twig with lax cymes and interpetiolar stipules  $\times 1$ ; B. flower  $\times 1$ .

**Tridax procumbens L.**

Family = Compositae  
Subdivision or Series = Mixtae  
Tamil name = Mukkarachi

Perennial straggling herb; stems 15—45 cm long; leaves opposite, petiolate, acute or acuminate at apex, cuneate at base, margins coarsely dentate.

*Inflorescence and flower* – Capitulum solitary on slender peduncle up to 20 cm long; bracts form involucre; has both ray and disc florets.

**Ray florets (ligulate flowers):** 5-6, zygomorphic, unisexual.

*Calyx* : Represented by numerous hairs.

*Corolla* : Petals 5, fused (gamopetalous), forming basal tube and split down on one side with the lobes fused to a good distance, usually 3 lobed at apex, cream white.

*Androecium:* Absent

*Gynoecium* : Ovary inferior, carpels 2, (bicarpellary), fused, unilocular with single basal ovule, style bifid.

**Disc florets:** Numerous, actinomorphic, bisexual.

*Calyx* : Represented by numerous hairs.

*Corolla* : Petals 5, fused (gamopetalous) forming tube, lobes 5.

*Androecium:* Stamens epipetalous with free filaments and fused anthers (syngenesious); dehiscence introrse.

*Gynoecium* : As in ray floret.

*Fruit* : A cypsela, pappus of long aristate bristles, wind dispersed.

Roadsides, waste ground, common weed on cultivated ground.

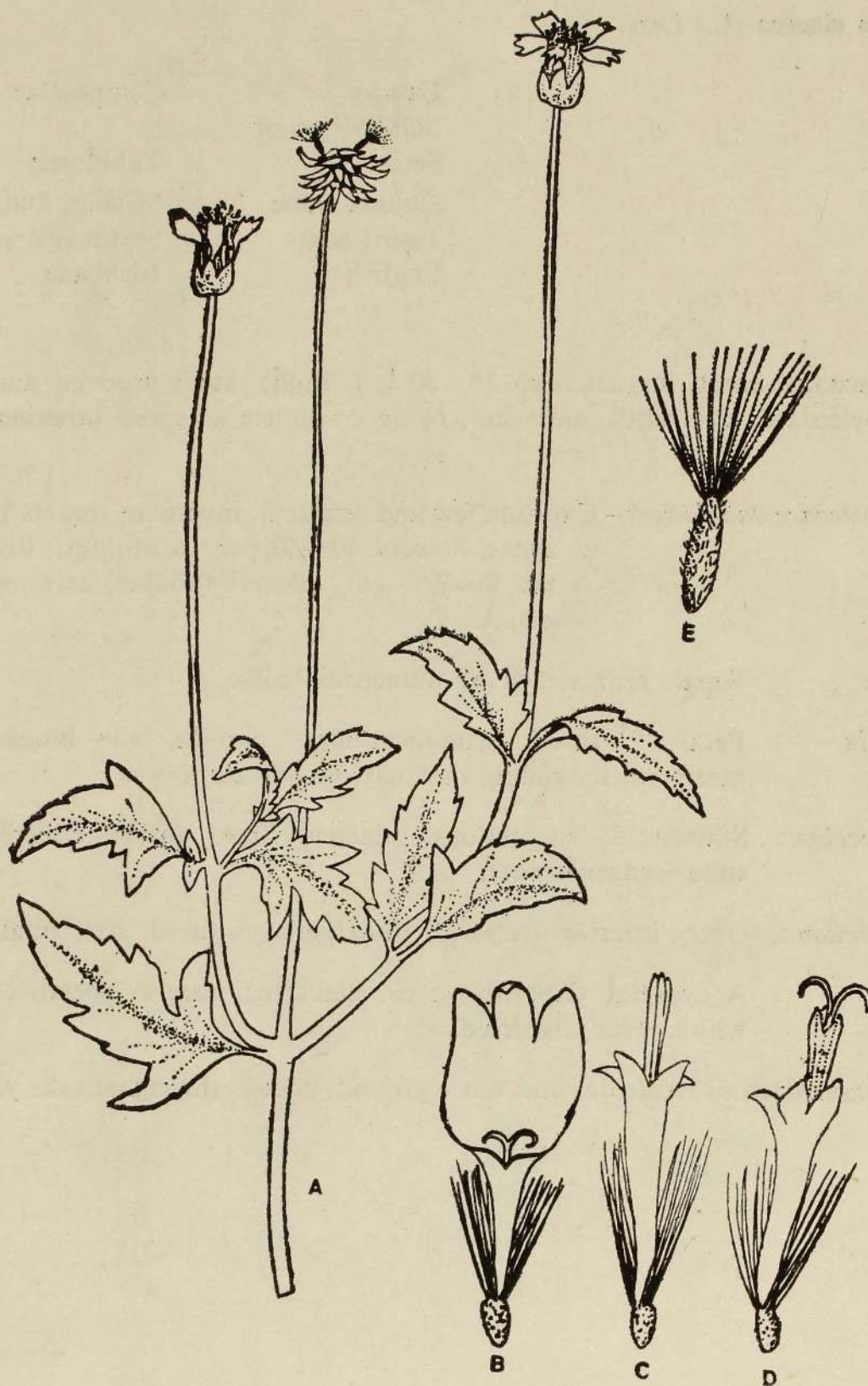


FIG. 24. *Tridax procumbens* L.

A. Aerial portion of plant with capitula, centre one shows mature fruits  $\times 1$ ; B. ray floret (ligulate flower) with bifid stigma  $\times 5$ ; C. young disc floret with syngenesious anthers  $\times 5$ ; D. mature disc floret with syngenesious anthers and bifid stigma  $\times 5$ ; E. fruit (cypsela with aristate bristles)  $\times 7$ .

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**Vernonia cinerea (L.) Less.**

Family	= Compositae
Subdivision or Series	= Tubiflorae
Sinhala name	= Monara kudimbiya
Tamil name	= Seetheviyarsenkalanir
English	= Fleabane

Herbaceous, erect, annual herb 15–30 cm high; stem grooved and ribbed; leaves petiolate, alternate, pubescent, ovate or obtuse at apex, tapering towards base.

*Inflorescence and flowers* – Capitula few and terminal, involucre (bracts) purplish at apex; flowers 20–30 per capitulum; disc florets (small flowers) only; florets tubular, actinomorphic, bisexual.

*Calyx* : Sepals represented by numerous hairs.

*Corolla* : Petals 5, fused (gamopetalous), corolla tube bluish mauve, rarely white, ending in 5 narrow valvate lobes.

*Androecium*: Stamens 5, epipetalous, filaments free, anthers coherent into a tube (syngenesious).

*Gynoecium* : Ovary inferior, carpels 2 (bicarpellary), fused, style bifid.

*Fruit* : A cypsela, dark brown or blackish; pappus (persistent calyx) white. wind dispersed.

Common weed of roadsides and waste ground, flowers throughout the year.



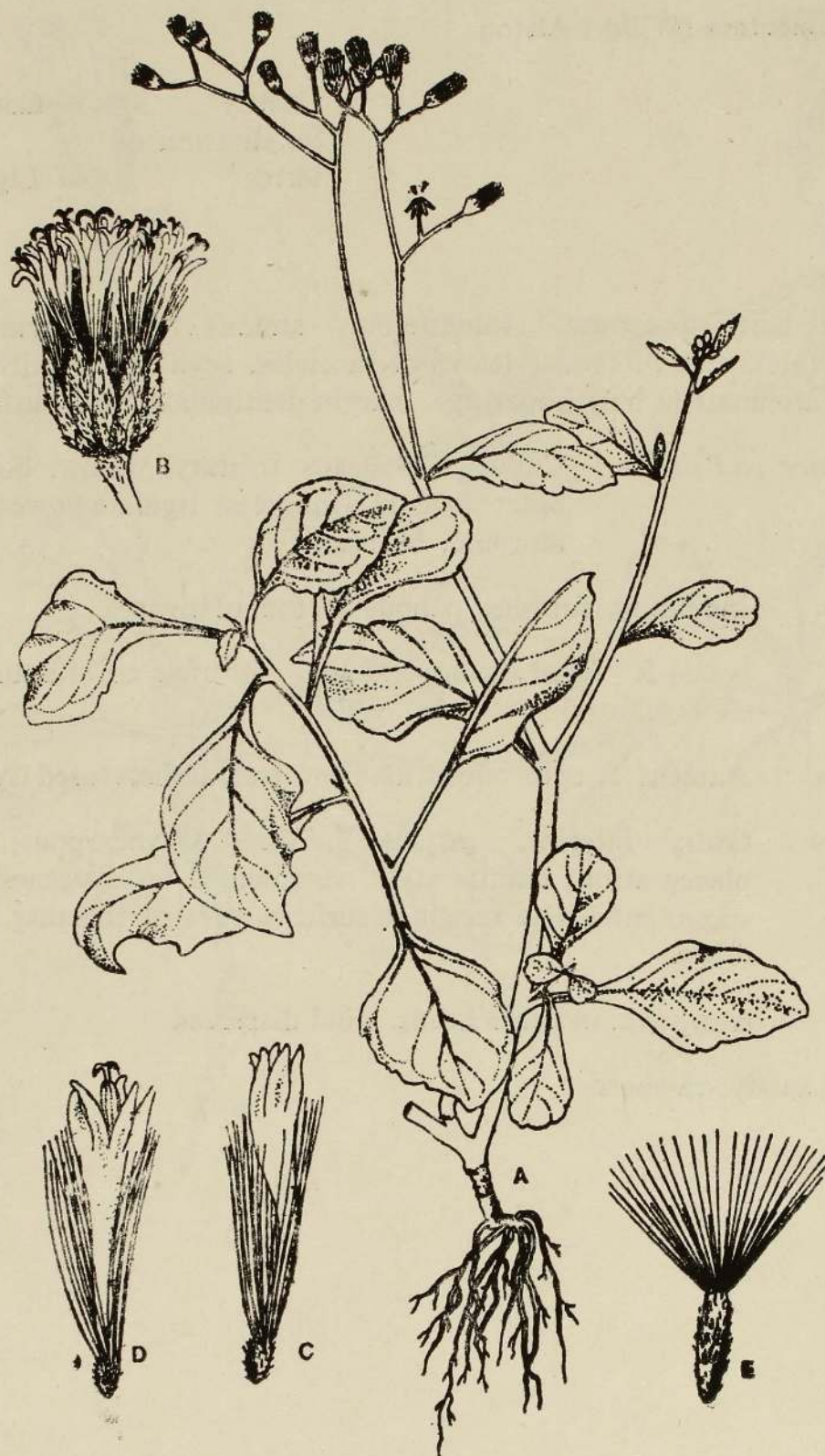


FIG. 25. *Vernonia cinerea* (L.) Less.

A. Entire plant with capitula x 1; B. single capitulum or head x 6; C. young disc floret x 8; D. mature disc floret showing syngenesious anthers and bifid stigma x 8; E. fruit (cypsela) x 8.

**Launaea sarmentosa** (Willd.) Alston

Family = Compositae  
Subdivision or  
Series = Liguliflorae

Perennial herb, prostrate, stoloniferous, stolons long, rooting at nodes; main root thick and tuberous; leaves in fascicles, sessile, pinnatifid, spathulate, apex acute, attenuate at base (tapering), margin denticulate, both surfaces glabrous.

*Inflorescence and flowers*—Capitula or heads solitary, yellow, borne on short bract covered peduncles; ligulate flowers only, zygomorphic, bisexual.

*Calyx* : Indefinite, forming pappus at top of ovary.

*Corolla* : Petals 5, fused (gamopetalous), forming corolla tube, lobes or teeth 5, forming ligule, yellow.

*Androecium*: Stamens 5, epipetalous, filaments free, anthers fused (syngenesious)

*Gynoecium* : Ovary inferior, carpels 2, fused (syncarpous), unilocular, placentation basal; style surrounded by syngenesious anthers; stigma bifid with receptive surfaces pressed together, later curling down.

*Fruit* : A cypsela, in dense heads, wind dispersed.

Grows on sandy sea-shore.



FIG. 26. *Launaea sarmentosa* (Willd.) Alston

A. Entire plant with stolons, tuberous root, spatulate leaves and capitulum  $\times \frac{3}{4}$ ;  
 B. ray floret (ligulate flower) with corolla tube, ligule, syngenesious anthers and bifid  
 stigma  $\times 1\frac{1}{2}$ .

**Agapanthus africanus** (L.) Hoffm. g.  
(*A. umbellatus* 'LHer)

Family = Amaryllidaceae  
English name = African Lily

Herb, perennating by bulbs; leaves large simple.

*Inflorescence* : A large umbel, terminal on a scape.

*Flowers* : Bright blue, or white, bisexual, actinomorphic.

*Perianth* : Segments 3+3, fused at the base, not differentiated into calyx and corolla; petaloid.

*Androecium* : Stamens 6, inserted in 2 whorls on perianth segments, anthers introrse.

*Gynoecium* : Ovary superior, carpels 3 (tricarpellary), fused (syncarpous), placentation axile, ovules anatropous.



FIG. 27. *Agapanthus africanus* (L) Hoffmgg.

A. An umbel  $\times \frac{1}{3}$ ; B. flower  $\times \frac{1}{2}$ ; C. half flower  $\times \frac{1}{2}$ ; D. perianth segment  $\times \frac{1}{2}$ ;  
 E. floral diagram.

**Cocos nucifera L.**

Family	=	Palmae
Sinhala name	=	Pol
Tamile name	=	Thennai

Unbranched tall tree upto 30 m, base of trunk thickened, rest of uniform width. Leaves alternate forming crown, large, pinnately compound, leaf scars prominent, leaflets narrow, linear, parallel veined.

*Inflorescence and flowers* – Flowers in a panicle of branched spikes, covered by spathe which opens exposing flowers.  
Flowers unisexual, monoecious, actinomorphic.

*Female flower*: Few attached to base of spikes; perianth 3+3 free; staminodes represented by a collar at base of ovary; ovary superior, carpels 3, fused, locules 3; with a single ovule in each; stigmatic head sessile.

*Male flowers* : Numerous on spikes, often 2 male flowers present on either side of female; perianth 3+3, free, arranged in 2 whorls, outer whorl small; stamens 6, in two whorls; pistillode often present in male flower; pollination by wind or by insects.

*Fruit* : Large, drupe, with epicarp, fibrous mesocarp and hard endocarp which has 3 eyes and 3 ridges representing 3 locules; only 1 develops and this has the soft eye beneath which the embryo is located; inner to endocarp is the kernel or solid endosperm, inner to this is the coconut water.

Wood used as rafters; young leaves yellow, used for decorations; mature leaves woven to cadjans and used for thatching.

Unopened inflorescence tapped for sap which is sweet and referred to as sweet toddy (a sweet beverage), when boiled and thickened forms treacle (syrupy liquid) and jaggery (solid). Sweet toddy when fermented and distilled gives an alcoholic beverage referred to as arrack. Toddy also used in the preparation of Vinegar.

“Coconut milk” is obtained from the solid endosperm (kernel), solid endosperm also used to prepare desiccated coconut (shredded coconut, used in confectionary) and copra (yields a valuable oil, used in cooking, lighting, and soap making), The dry leaves, spathes, spikes, husks (epicarp and mesocarp) and shells (endocarp) used as firewood. Mesocarp when retted yields coir fibre which is used for rope, mattresses and brushes. Coconut wood used for rafters and pillars.

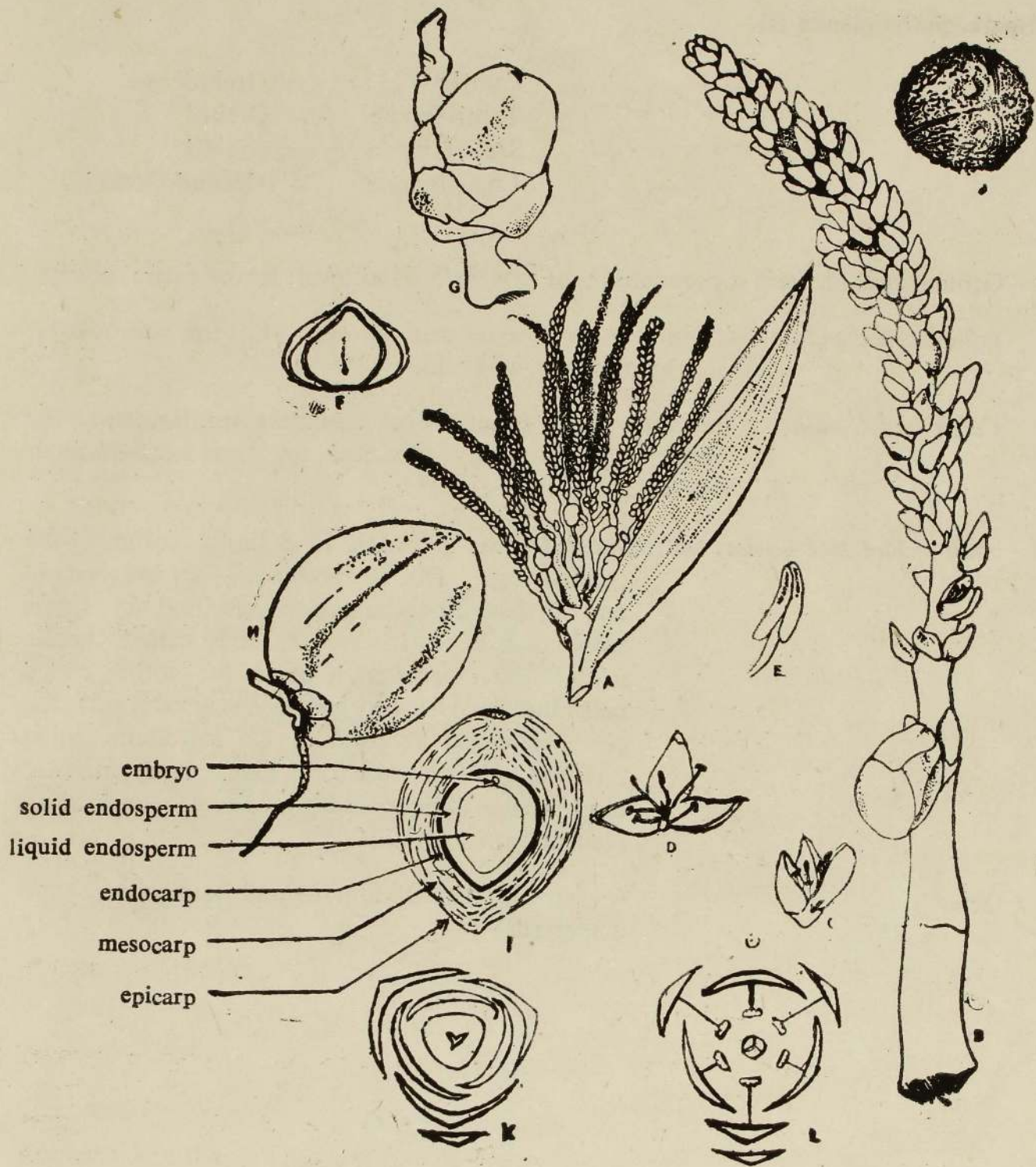


FIG. 28. *Cocos nucifera* L.

A. Panicle with spathe  $\times \frac{1}{2}$ ; B. spike with a single female flower below and many male flowers above  $\times \frac{1}{3}$ ; C & D. male flowers with pistillode in the centre  $\times 1$ ; E. stamen  $\times 4$ ; F. longitudinal section of female flower  $\times \frac{1}{2}$ ; G. developing fruit with persistent perianth  $\times \frac{1}{2}$ ; H. drupe with persistent perianth  $\times \frac{1}{4}$ ; I. drupe in section showing epicarp, fibrous mesocarp, stony endocarp (shaded black), solid endosperm, liquid endosperm and embryo  $\times \frac{1}{6}$ ; J. dehusked drupe showing endocarp with three ridges and three eyes  $\times \frac{1}{6}$ ; K. floral diagram of female flower; L. floral diagram of male flower.

**Spathoglottis plicata B1.**

Family	= Orchideaceae
Tamil name	= Orchid
Sinhala name	= Orchid
English name	= Ground Orchid

Ground orchid, stem a pseudobulb, at or near ground level: leaves entire, plicate.

*Inflorescence and flowers* – Inflorescence a raceme; flowers white or pale mauve, zygomorphic, bisexual.

*Calyx and Corolla* : Perianth 3+3, outer whorl members similar, one of the inner whorl members modified to form a labellum or landing platform.

*Androecium and Gynoecium*: Inner to the perianth is a fleshy column, the gynandrium. This represents the androecium and gynoecium; stamens represented by single anther which consists of 2 lobes called thecae. Each theca contains a mass of pollen called pollinium. Stigma consists of 3 stigmatic surfaces, one sterile and referred to as rostellum, other 2 fused to form receptive part; ovary inferior, carpels 3 (tricarpeal), fused, unilocular, placentation parietal.

*Fruit* : A capsule; seeds minute and numerous, wind dispersed.



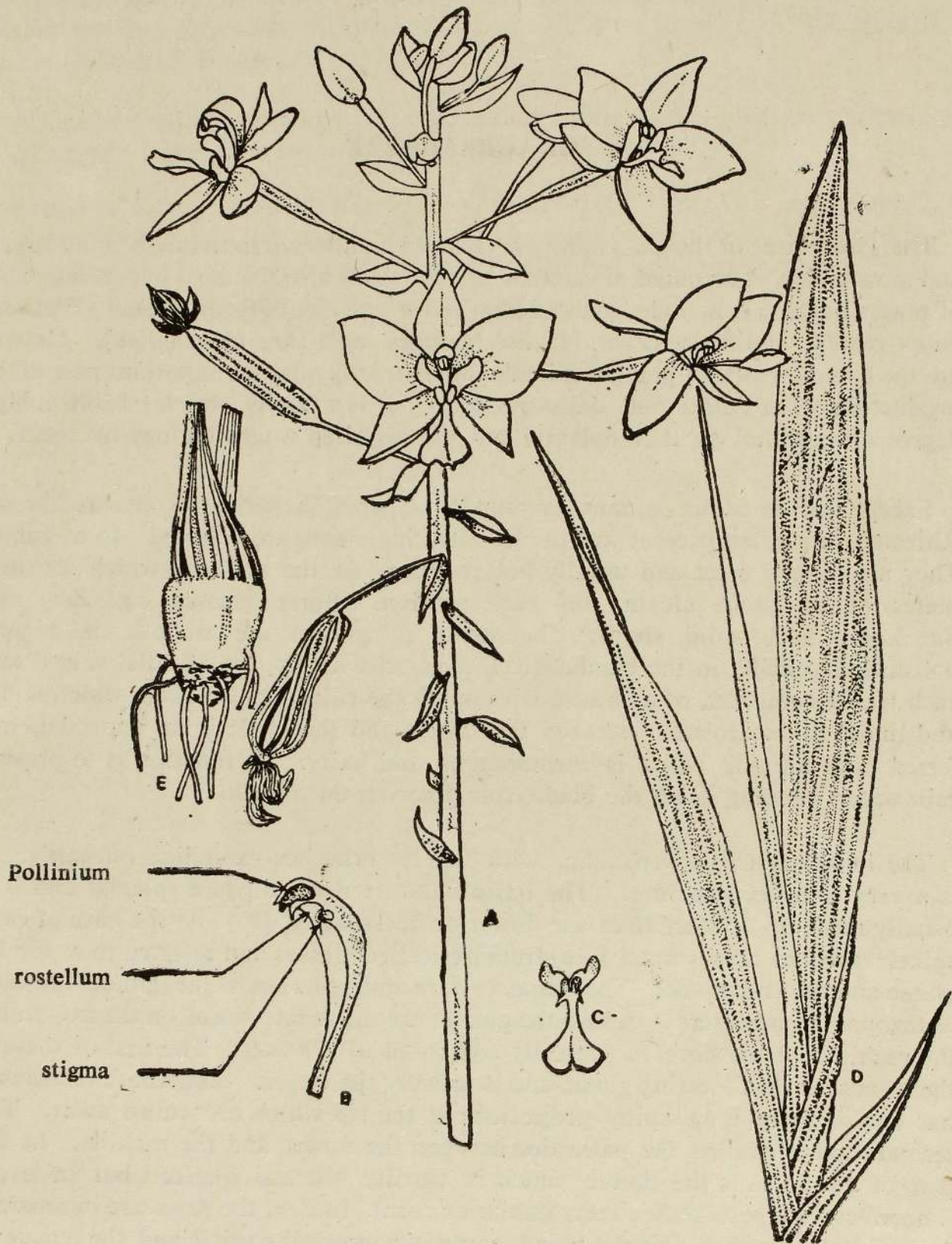


FIG. 29. *Spathoglottis plicata* Bl.

A. Inflorescence axis with buds, flowers and fruit  $\times \frac{3}{4}$ ; B. gynandrium showing pollinia, rostellum and stigma  $\times 3$ ; C. labellum or landing platform  $\times \frac{3}{4}$ ; D. leaves  $\times \frac{1}{4}$ ; E. pseudobulb  $\times \frac{1}{4}$ .

## THE GRAMINEAE

The Gramineae or the grass family in terms of numbers of individuals is the largest and most widely distributed of vascular plants. It is also the most important group of plants because it includes man's cereal crops like rice (*Oryza*), wheat (*Triticum*) oats (*Avena*), and maize (*Zea*). It also includes sugar cane (*Saccharum*). Grasses are the common food of grazing animals and indirectly play an important part in the production of our meat and dairy products. It is a family which exhibits a high degree of morphological complexity and has acquired a terminology to itself.

Except for the bamboos, most are annual or perennial herbs. Roots are fibrous. Rhizomes are often present and the leaf bearing stems are referred to as culms. They are usually erect and usually hollow except at the nodes in which are solid plates of tissue closing off each section. Some grasses e.g. *Zea*, and *Saccharum* have solid stems. The stems of grasses are smooth and highly polished, especially in the bamboos. Leaves arise singly, are parallel veined and each leaf is composed of a sheath, enveloping the culm, and a blade which is flat and linear to lanceolate. Between the sheath and the blade is an appendage referred to as a ligule which is membranous and hairy. Its function is to prevent rain water, running down the blade from entering the sheath.

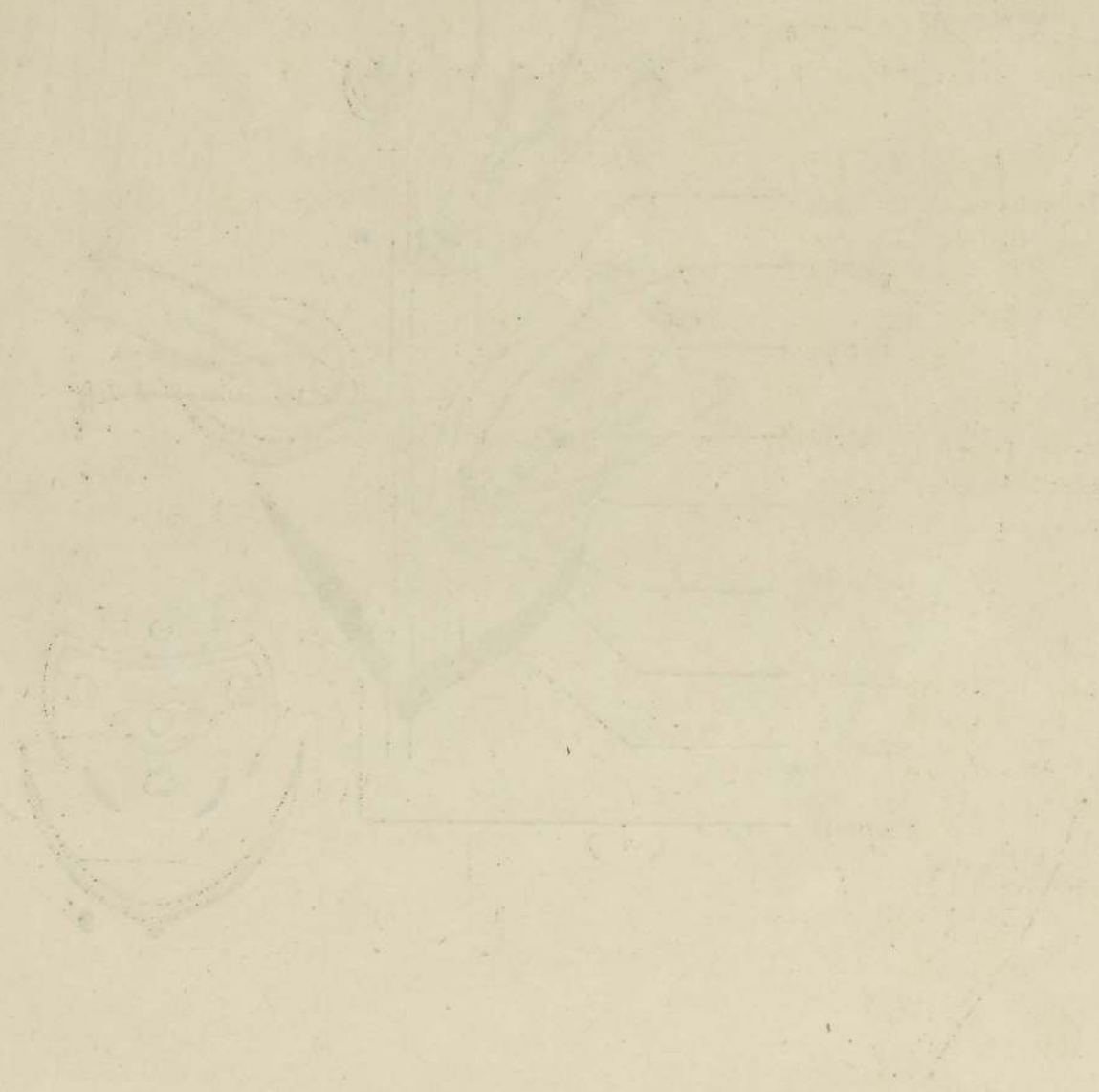
The inflorescence is a panicle, with slender branches extending outwards. It is a very complex structure. The basic inflorescence unit is a spikelet and it is usually made up of more than one flower or floret ( Fig. 30 ). At the base of each spikelet are two sterile bract like structures called glumes and referred to as the 1st glume and the 2nd glume. The shape, texture and venation of the glumes are used as taxonomic characters. Above the glumes are the florets borne on the axis called the rachilla. Each floret is typically composed of 2 bracts. The first of these is the lemma or the flowering glume and is usually the larger. Sometimes the lemma has one or more long spiny projections at the tip which are called awns. The second bract, called the palea lies between the flower and the rachilla. In the axil of the palea is the flower which is usually bisexual (perfect) but unisexual (imperfect) in types like *Zea mays* (maize or corn). In *Zea*, the sexes are in separate flower heads, the male spikelet being borne in a terminal panicle and the female in thick spikes in the axils of the leaf sheaths.

The perianth (sepals and petals), is represented by 2 small oval structures called lodicules. When flowering time is near, the lodicules are filled with sap. They press the lemma and palea apart, opening the flower, and thereafter wither away. The stamens, usually 3 (6 in *Oryza*-paddy) lie in a whorl, inner to the lodicules. The anthers are versatile. The gynoecium, which is innermost, is 3 carpelled and

fused (syncarpous). The ovary is superior and unilocular with one basal ovule. There are usually 2 styles and 2 stigmas which are plumose (feathery). The grasses are usually wind pollinated.

What has been described above is the general structure of a typical grass flower. The spikelets of grasses vary widely in different genera.

The fruit in most grasses is referred to as a caryopsis. This is a single seeded fruit where the pericarp is fused to the testa e.g. *Triticum* and *Zea*. In unhusked paddy (*Oryza sativa*) the caryopsis is enclosed by two persistent glumes. These are removed during the hulling process.



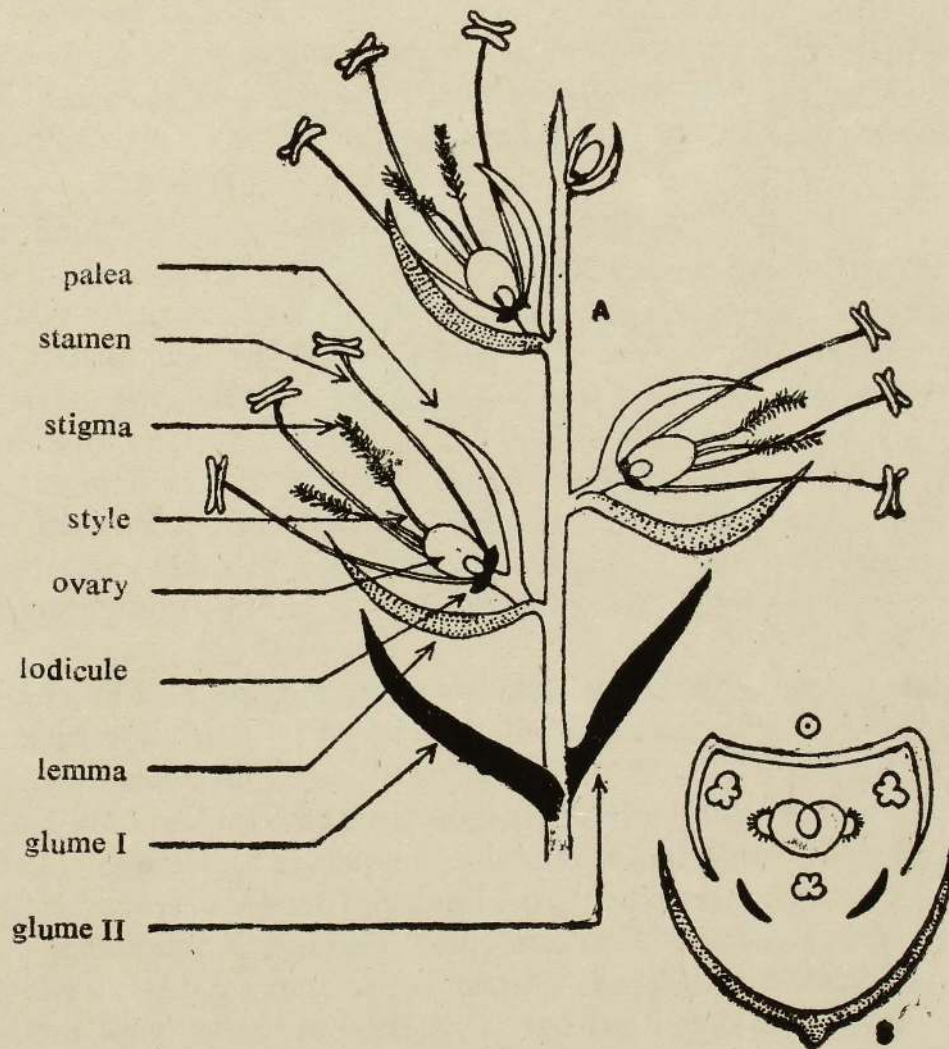


FIG. 30.

A. Diagram to illustrate the structure of a spikelet of grass;

B. Floral diagram of a grass flower.

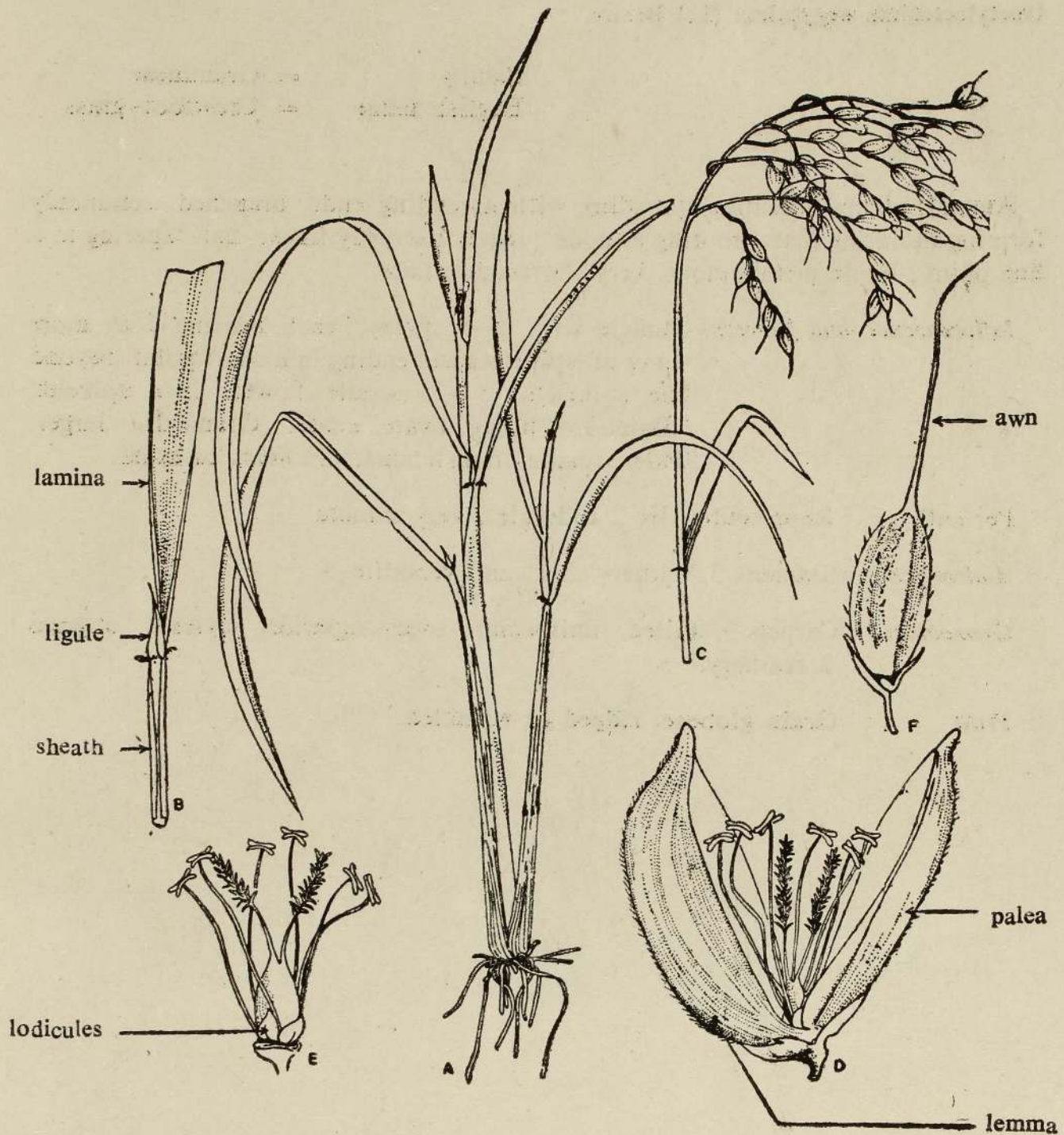


FIG. 31. A. Young plant of *Oryza sativa*  $\times \frac{1}{2}$ ; B. basal part of a leaf  $\times 1$ ; C. fruits  $\times \frac{1}{4}$ ; D. an opened out flower  $\times 10$ ; E. a dissected flower with palea and lemma removed  $\times 12$ ; F. caryopsis  $\times 5$ .

**Dactyloctenium aegyptium (L.) Beauv.**

Family = Gramineae  
English name = Crowfoot-grass

Annual; stems or culms spreading with ascending ends, branched, commonly forming radiating mats; rooting at nodes; leaves narrowly linear, flat, tapering to a fine point; ligule membranous, very short and ciliate.

*Inflorescence and flowers*—Panicle with 2—5 spikes; each bearing 2 or more rows of spikelets and ending in a short point beyond the spikelets; 3—5 sessile flowers in a spikelet. Glume I: oblong, ovate, acute. Glume II: larger. Palea smaller than lemma. Flowers bisexual.

*Perianth* : Represented by 2 lodicules, very minute.

*Androecium*: Stamens 3, anthers short and versatile.

*Gynoecium* : Carpels 3, united, unilocular; ovary superior; styles 2; stigmas 2, feathery.

*Fruit* : Grain globose, ridged or wrinkled.

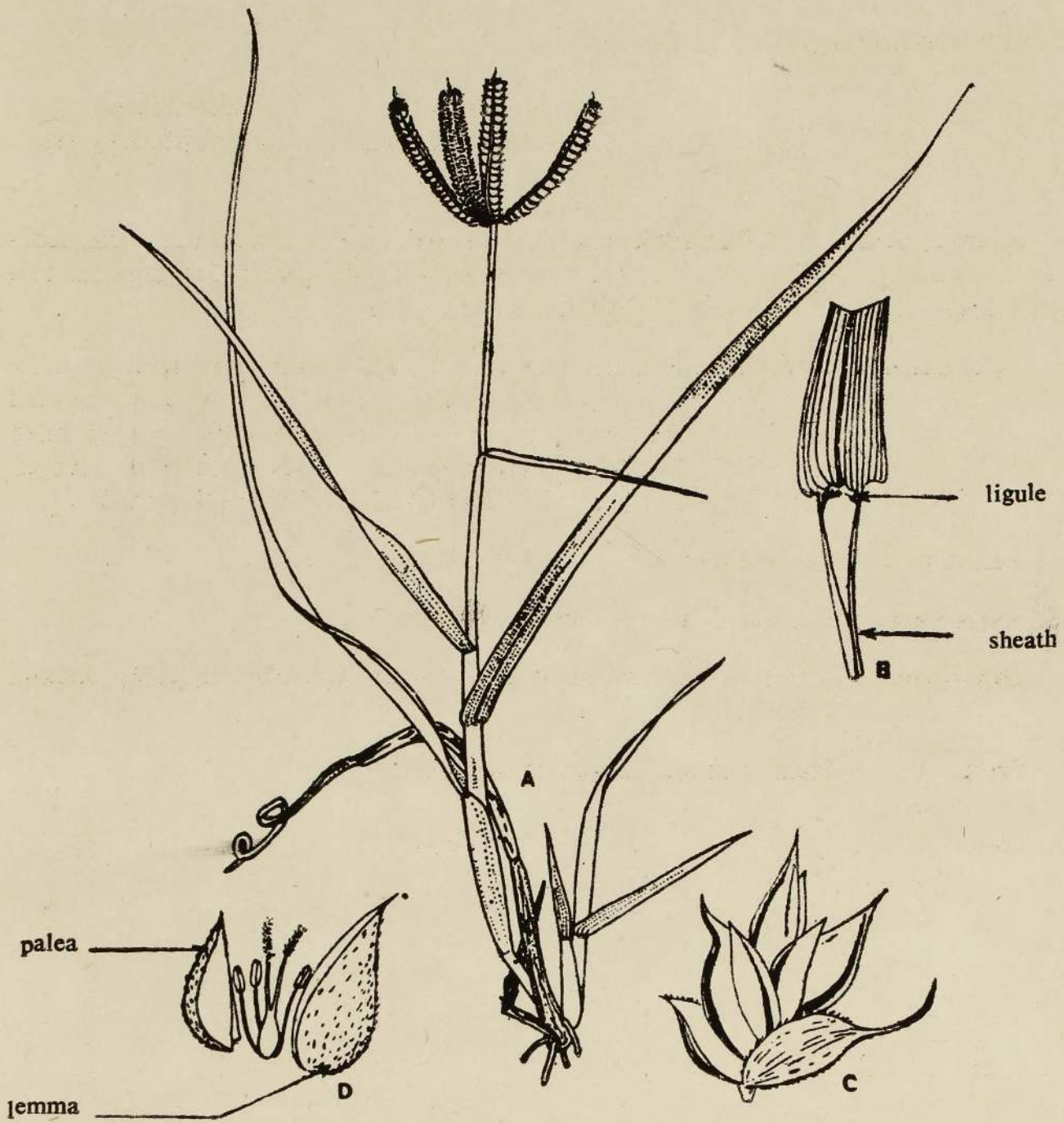
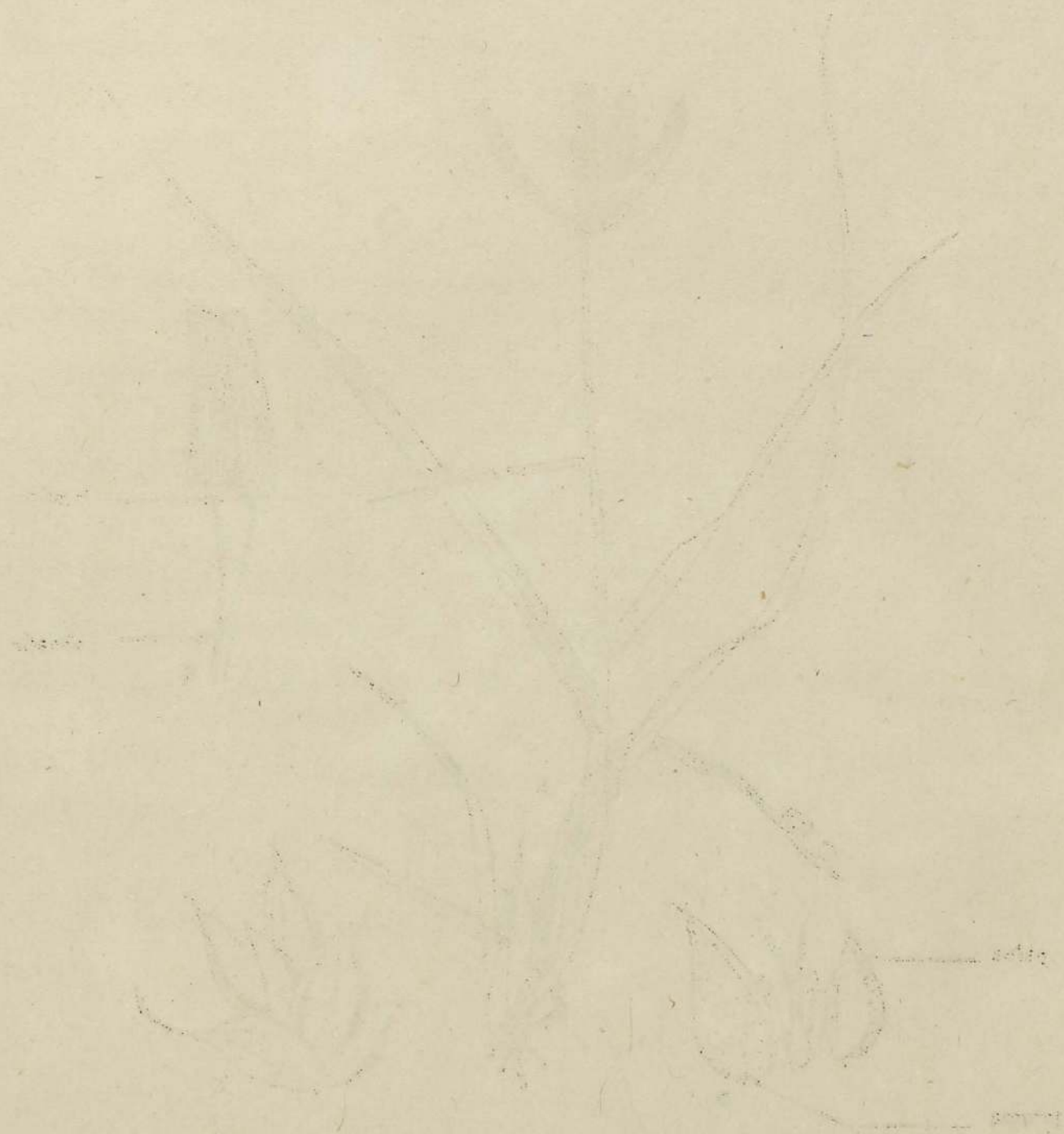


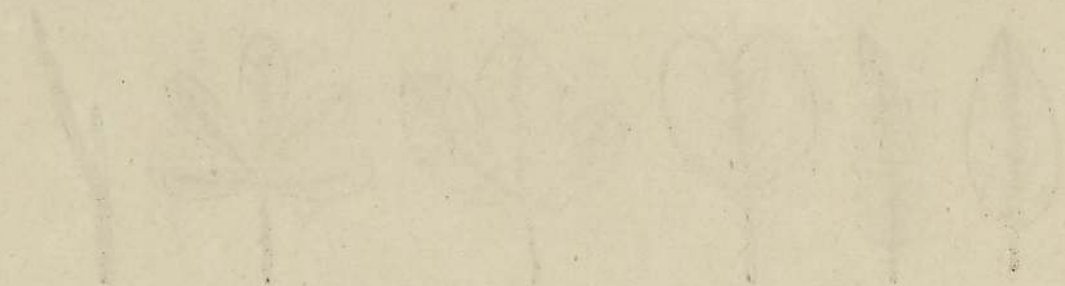
FIG. 32. *Dactyloctenium aegyptium* L.

A. Plant with terminal panicle  $\times \frac{1}{3}$ ; B. base of leaf showing leaf sheath, ligule, and part of lamina  $\times 1$ ; C. a single spikelet  $\times 10$ ; D. dissected flower showing lemma, palea, three stamens and gynoecium with two styles and feathery stigmas  $\times 12$ .



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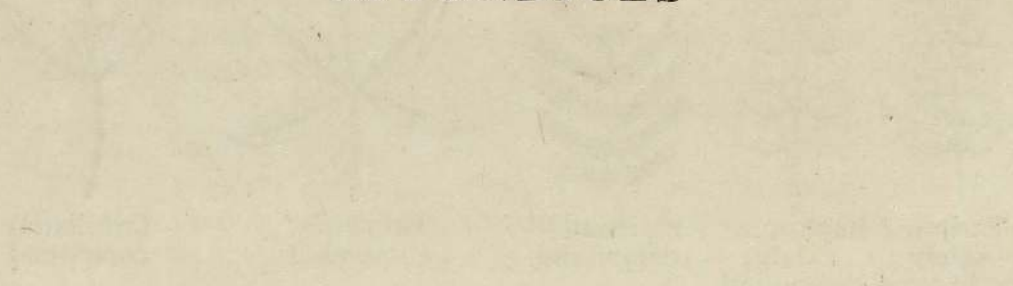




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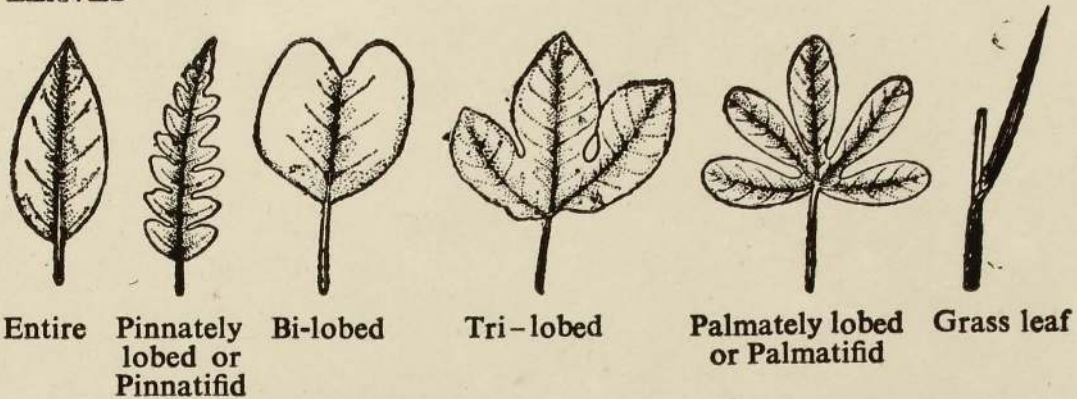
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# APPENDICES



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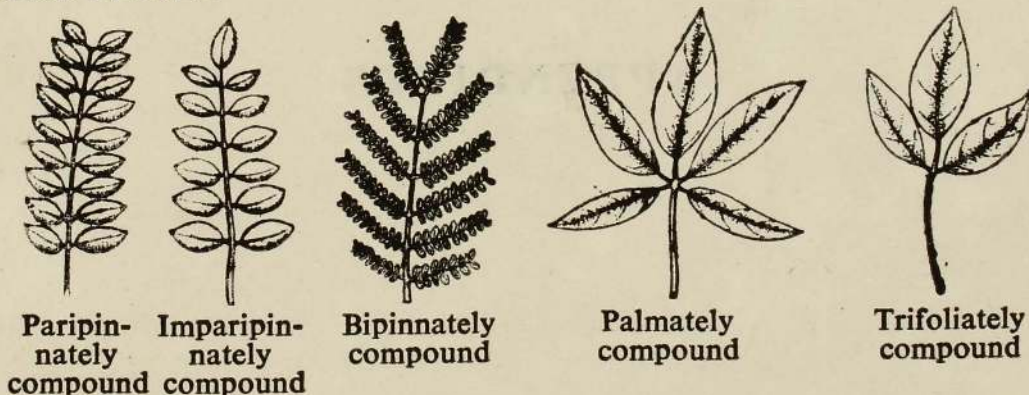
**SIMPLE LEAVES**



This is a leaf with a single blade which may be entire or dissected into lobes or pinnately or palmately divided. However, if there are incisions these do not cut the lamina into distinct leaf like structures or leaflets.

- |                                |   |
|--------------------------------|---|
| Entire.                        | No incisions.   |
| Pinnately lobed or Pinnatifid. | Cleft or parted on either side of the midrib.                 |
| Bi-lobed                       | Two lobed.  |
| Tri-lobed                      | Three lobed.  |
| Palmately lobed or Palmatifid. | Lobed or divided to about halfway down in a palm like manner. |

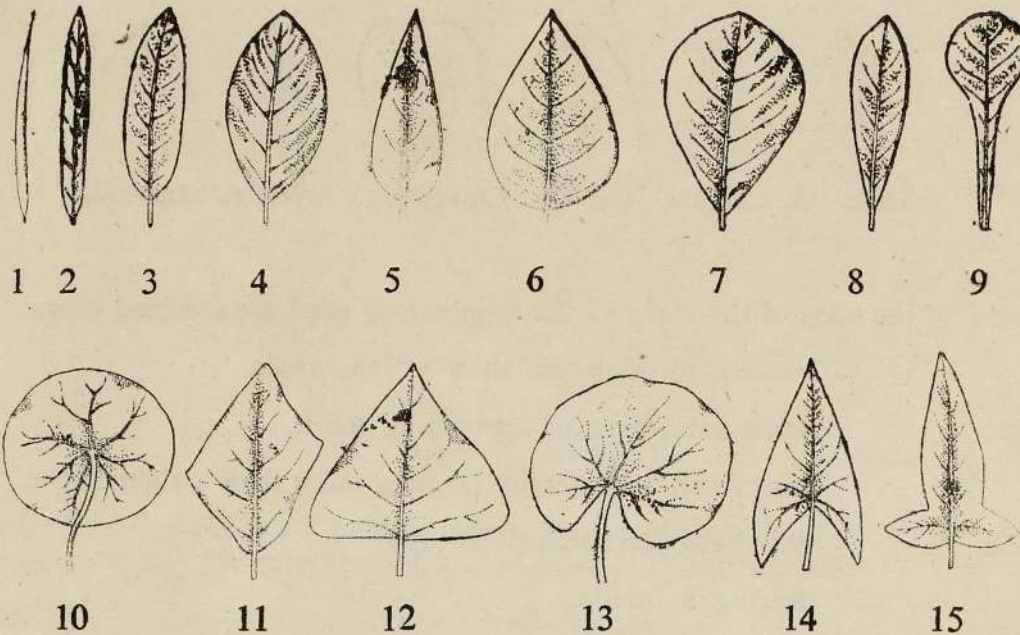
**COMPOUND LEAVES**



A compound leaf is one where the incisions are so deep resulting in the leaf getting cut into distinctly separate blades called leaflets. The midrib becomes the rachis on which the leaflets are borne.

- |  |  |
|--|--|
| Pinnately compound                       | : Like a feather with the leaflets symmetrically arranged on either side of the rachis. Pinnately compound leaves could be paripinnately compound or imparipinnately compound. |
| Paripinnately compound or Even pinnate   | : Leaflets in pairs. No terminal leaflet, total number is an even number.  |
| Imparipinnately compound or Odd. pinnate | : Leaflets in pairs with a single terminal leaflet. Odd pinnate total number is an odd number.   |
| Bipinnately compound or Decomound        | : Twice pinnate, which means that the leaflets of a pinnately compound leaf are cut into smaller units. The secondary leaflets are then referred to as pinnules.               |
| Palmately compound                       | : Digitate with the leaflets like fingers on a palm.   |
| Trifoliately compound or Ternate         | : Leaf has three leaflets, one at the tip and two below.   |

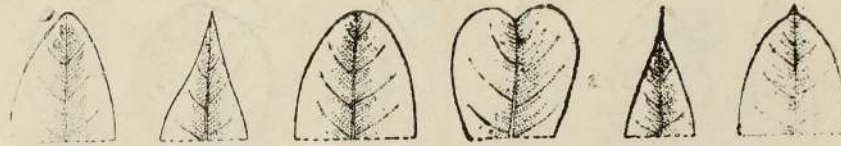
LEAF SHAPES



This refers to the general outline of the blade. The common terms describing leaf shapes are as follows.

1. Filiform. Thread like, long and very slender.
2. Linear. Long and narrow, with sides parallel or nearly so. Length generally more than ten times the width.
3. Oblong. Longer than broad with the sides more or less parallel most of the length. The length usually less than ten times the width.
4. Elliptic. Like an ellipse, longer than wide, narrowed to rounded ends and widest at or about the middle.
5. Lanceolate. Lance-shaped, much longer than broad, widening above the base and tapering to the apex, broadest point below the middle.
6. Ovate. With an outline like that of a hen's egg, the broadest point below the middle.
7. Obovate. The reverse of ovate, the terminal half broader than the basal.
8. Oblanceolate. The reverse of lanceolate, broader at the distal third than at the middle and tapering towards the base.
9. Spatulate. Spoon or spatula shaped, broader towards the upper end, with a rounded apex.
10. Orbicular. Circular.
11. Rhomboidal. Shaped like a rhomboid.
12. Deltoid. Broadly triangular, with the base nearly straight and the sides often a little curved towards the apex.
13. Reniform. Kidney shaped, broader than long, with rounded ends and with a broad basal sinus.
14. Sagittate. An arrow-head in shape, triangular with the basal lobes pointing downwards or concavely towards the stalk.
15. Hastate. Having the shape of an arrow-head but with the basal lobes pointed or narrow and standing nearly or quite at right angles.

LEAF APICES

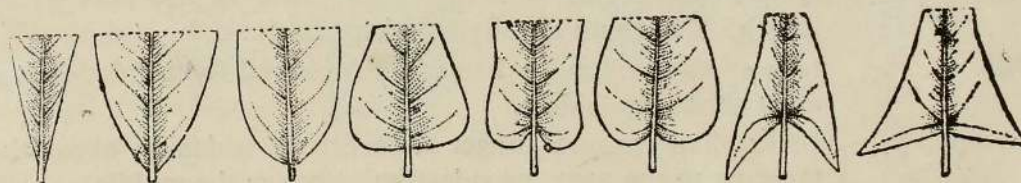


Acute Acuminate Obtuse Emarginate Aristate. Mucronate

The shapes of the apex of the leaf and the terminology used are outlined below.

Acute	Pointed, forming less than a right angle.
Acuminate	Acute apex, tapering into a long point.
Obtuse	Blunt, rounded, usually forming more than a right angle.
Emarginate	With a swollen notch at the apex.
Aristate	Bearing a bristle.
Mucronate	Terminating abruptly by a short sharp point at the apex.

LEAF BASES

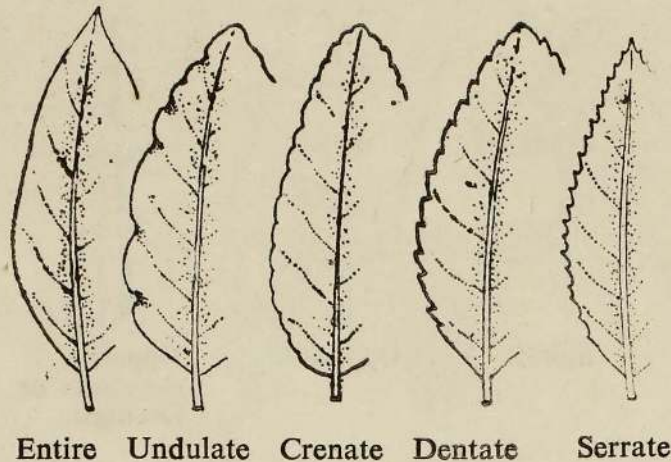


Attenuate Acute Obtuse Truncate Auriculate Cordate Sagittate Hastate

The leaf bases show great diversity among the different kinds of plants. The common types and the terminology are as follows.

Attenuate	Showing gradual tapering, drawn out into a narrowed portion.
Acute	Pointed, forming less than a right angle.
Obtuse	Blunt, usually more than a right angle.
Truncate	Appearing as if cut off, nearly or quite straight across.
Auriculate	Having an ear-shaped part or appendage.
Cordate	Heart-shaped with a basal notch or sinus and ovate in general outline.
Sagittate	Triangular, shaped like an arrow-head, the basal lobes pointed downwards.
Hastate	Triangular, shaped like an arrow-head but with the basal lobes pointed or narrow and standing nearly or quite at right angles.

**LEAF MARGINS**

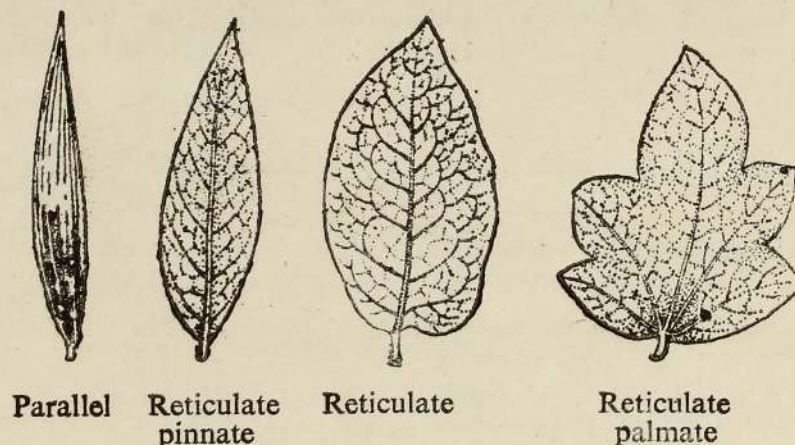


Among the different kinds of plants there is a considerable diversity in the edge or the margin of the leaf. The common types of margins are described below.

- Entire**                      With an unbroken and even margin.
- Undulate**                Having a wavy margin.
- Crenate**                 Shallowly round toothed, scalloped.
- Dentate**                With sharp, rather coarse teeth, directed outwards.
- Serrate**                 With fine teeth pointing forwards.

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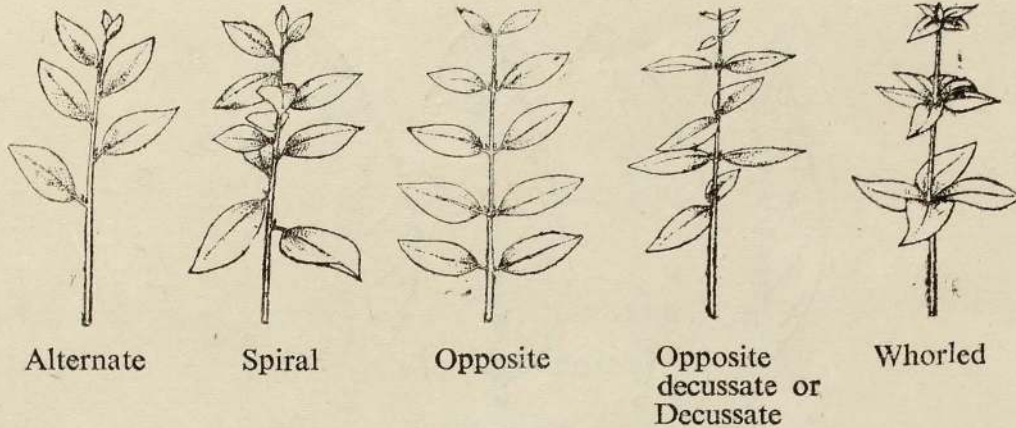
**VENATION**



Venation is the arrangement of veins. Leaves of Angiosperms exhibit one of two main types.

- Parallel**                    The veins are more or less parallel. This is the characteristic type of venation in most monocotyledons.
- Reticulate**              The veins form a reticulum or net. This is characteristic of dicotyledonous leaves. The terms pinnate and palmate are also used to describe venation. In the case of those having pinnate venation the main vein (midrib) gives off rather prominent veins on either side. In palmately veined types the main veins diverge from a common base. Both types are reticulately veined.

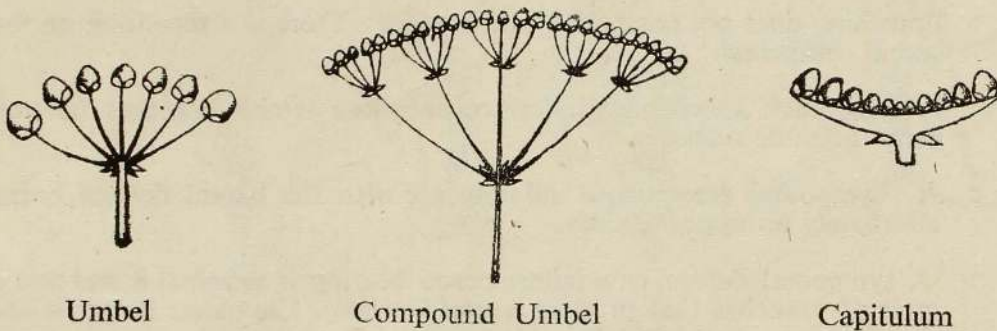
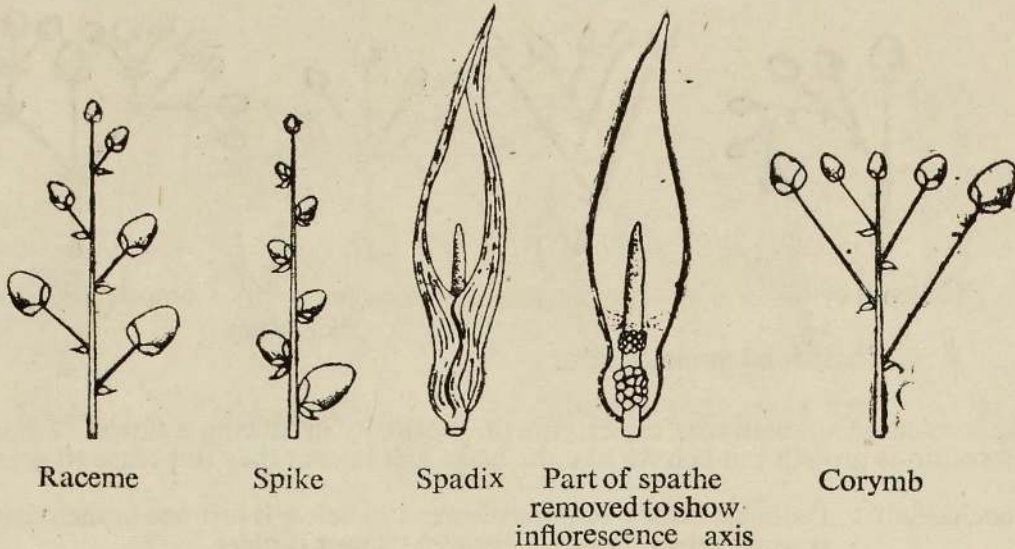
## PHYLLOTAXY OR LEAF ARRANGEMENT



Phyllotaxy is the manner of arrangement of leaves on the stem. Most plants have a single kind of arrangement. The main arrangements are described below.

Alternate	Leaves placed singly and alternately at different heights on the axis of stem. Leaves on the same plane.
Spiral	Leaves arranged singly but they arise all round the stem facing different planes
Opposite	Arise in pairs on opposing sides of an axis.
Opposite decussate or Decussate	Leaves in pairs on opposite sides of an axis but alternating pairs at right angles.
Whorled	Three or more leaves arising in a circle. Leaves face different planes
Fascicle	A condensed closed cluster.

**INFLORESCENCES**



An inflorescence is a cluster of flowers on a plant. The main inflorescence axis is called the peduncle. The stalks of single flowers are called

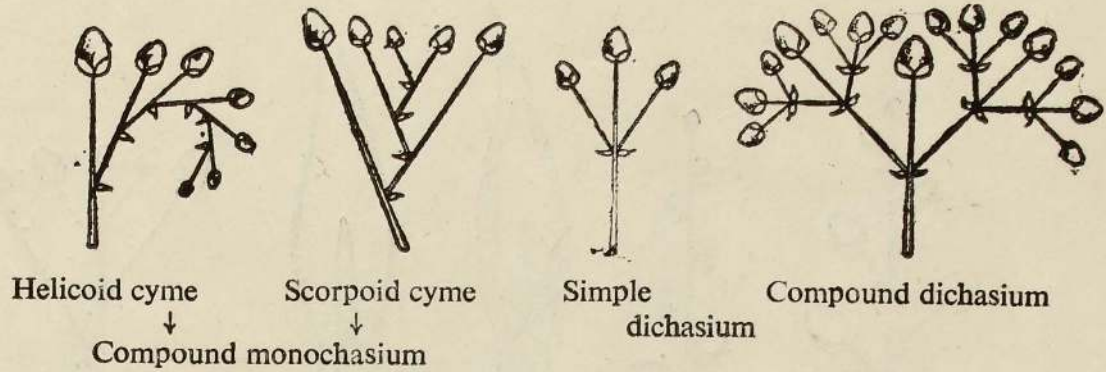
pedicels. Flowers arise in the axils of reduced leaf-like structures called bracts. A cluster of bracts constitute an involucre. Inflorescences could be classified into three major categories. The racemose and the cymose inflorescence constitute the two main types. Those which do not strictly fall into one of these categories are considered as special types. The common kinds of inflorescences under each category are described below.

**RACEMOSE INFLORESCENCES**

Branching is monopodial. That is, the main axis grows continuously producing lateral members, the younger being nearer the apex.

- Raceme** : A simple elongated indeterminate inflorescence with stalked flowers. Order of blooming is usually from base to apex.
- Spike** : Usually unbranched, elongated, indeterminate inflorescence whose flowers are sessile or sub-sessile. Order of flowering is usually from base to apex.
- Spadix** : A thick fleshy spike, surrounded or subtended by a spathe (a large, often showy bract). Flowers usually unisexual and minute.
- Corymb** : Short and broad, more or less flat topped, indeterminate inflorescence in which the flower stalks are attached at intervals on an elongate axis and are of unequal length, the lower ones longer.
- Umbel** : An indeterminate, often flat topped inflorescence whose flower stalks are of equal length and attached to the summit of the peduncle. Order of blooming from the outside towards the centre.
- Compound umbel** : Similar to umbel, main branch not ending in cluster of flowers but give rise to secondary umbellets.
- Capitulum** : A highly condensed inflorescence, round or flat topped, comprised of an aggregation of usually sessile flowers. Progression of blooming is from the outside towards center.

**CYMOSE INFLORESCENCES**



Branching is sympodial, main axis ceases growth, normally producing a flower. Lateral branch or branches continue growth but behave like the main axis in that they too cease to grow.

**Simple monochasium :** Peduncle bears a terminal flower and below it just one branch that produces a single lateral flower. Terminal flower is older.

**Compound monochasium :** Branching does not cease with one branch. There is a repetition on the lateral branches.

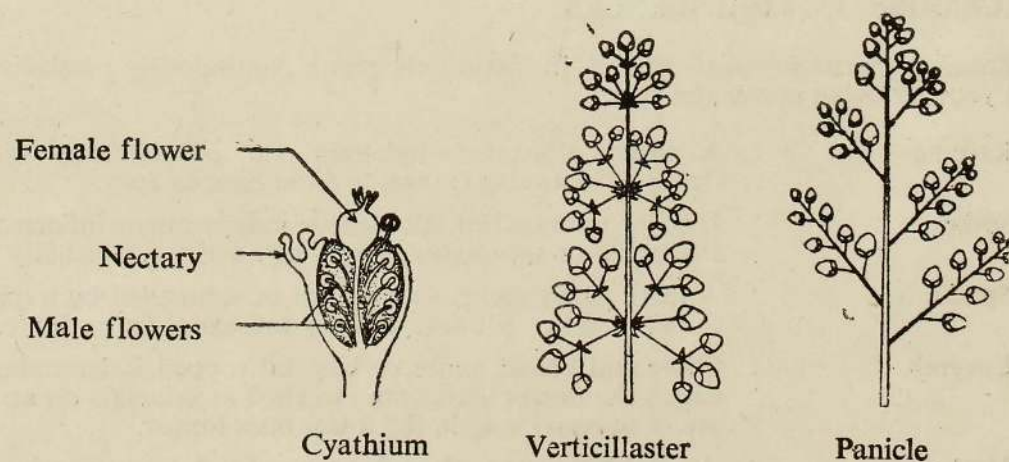
**Helicoid cyme :** A sympodial determinate inflorescence whose lateral branches develop from the same side.

**Scorpoid cyme :** A sympodial determinate inflorescence with the lateral flowers borne alternately on opposite sides.

**Simple dichasium :** A sympodial determinate inflorescence bearing a terminal flower and a pair of branches that produce lateral flowers. The oldest flower is the central one.

**Compound dichasium:** A repetition of the above on the lateral pairs of branches.

**SPECIAL TYPES**



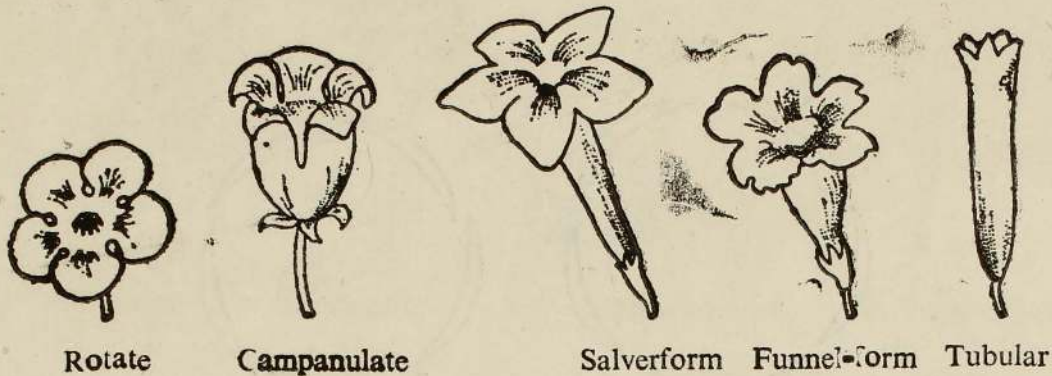
**Cyathium :** Characteristic of *Euphorbia*. Unisexual flowers condensed within a cup like structure.

**Verticillaster :** One with flowers on the axis in whorls. The whorled appearance is false being actually composed of sessile cymes crowded together.

**Panicle :** Elongated inflorescence with a central axis along which there are branches that are themselves branched.



SHAPES OF COROLLA



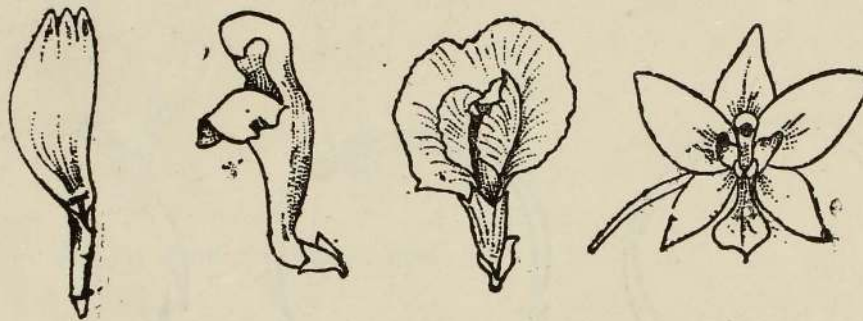
Rotate

Campanulate

Salverform

Funnel-form

Tubular



Ligulate

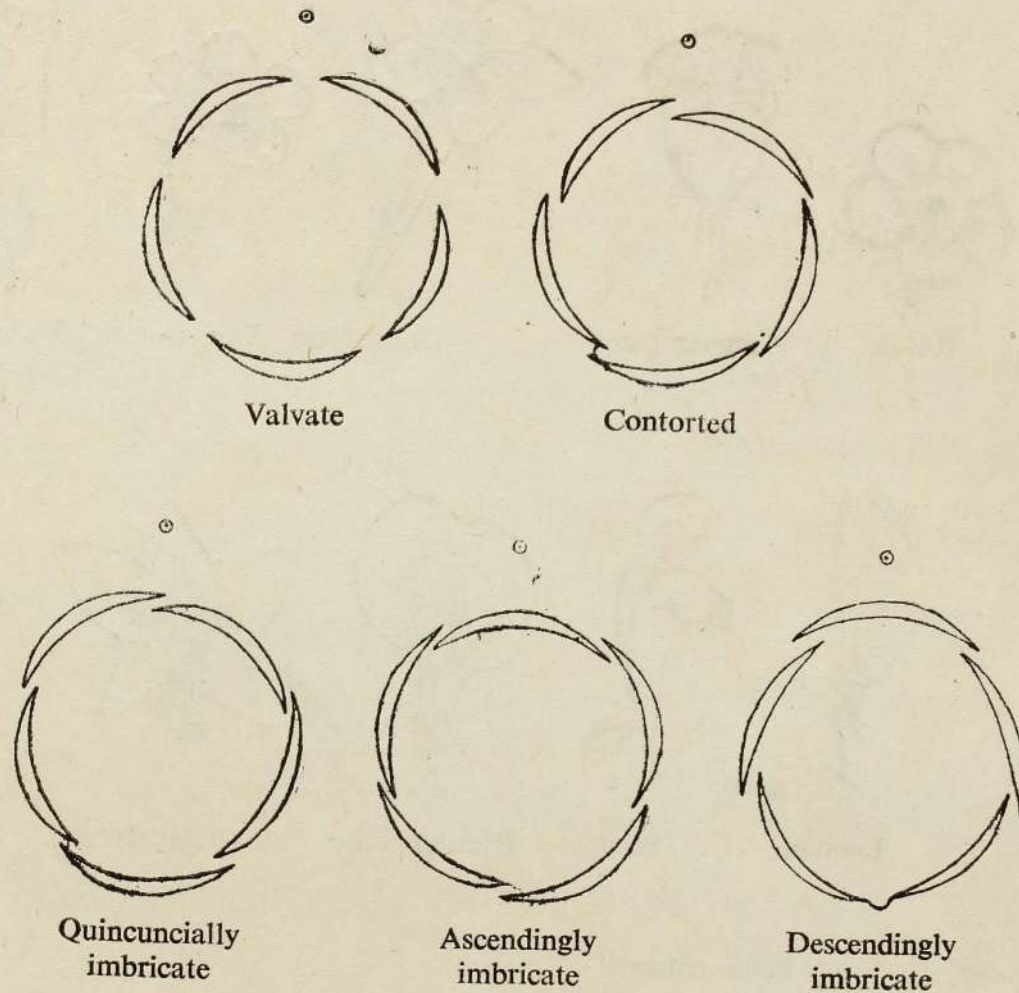
Bilabiate

Papilionaceous

Orchidaceous

- Apetalous** : Petals reduced.
- Rotate** : Wheel shaped, having a short tube and a widely spreading circular limb at right angles.
- Campanulate** : Shaped like a bell.
- Salverform** : Corolla is tubular in the basal region and abruptly forms flat spreading limb at right angles to corolla tube.
- Funnel-form** : Shaped like a funnel with gradually widening tube.
- Tubular** : Shaped like a tube. Used to describe corolla that have a well defined tubular portion with little or no limb portion.
- Ligulate** : Tongue or strap shaped.
- Bilabiate** : Two lipped, each lip may or may not be lobed or toothed.
- Papilionaceous** : Like the corolla in the members of the sub-family Papilionatae of the family Leguminosae. Having a standard petal, two wing petals and two keel petals. The keel petals are more or less united.
- Orchidaceous** : Petals resembling those of an orchid flower. Of the three petals two are alike, the other is differently shaped and forms a labellum which serves a landing platform for the insect.

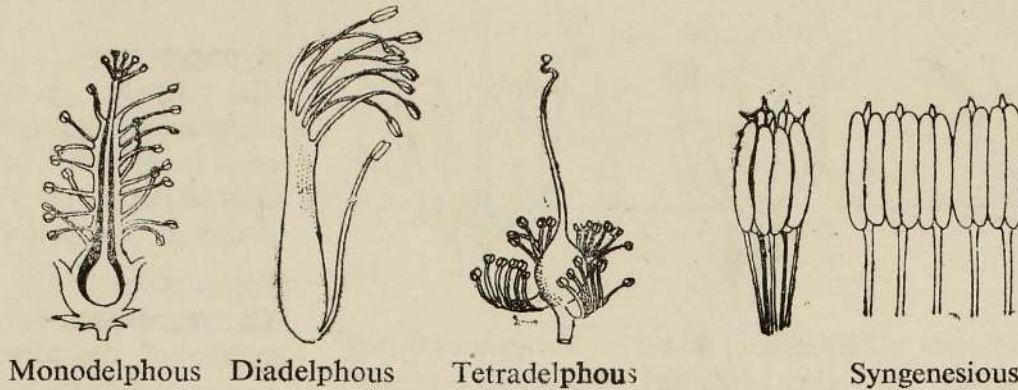
AESTIVATION



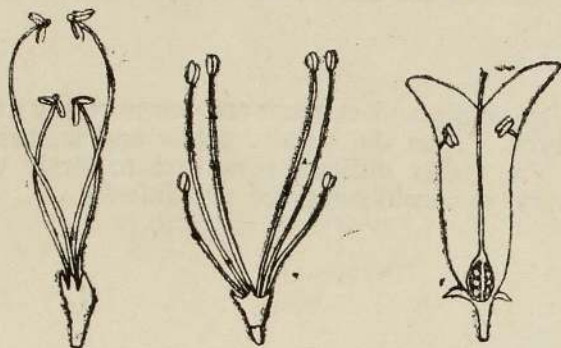
The arrangement of the perianth or its parts in the bud.

- Valvate : Meeting by the edges without overlapping.
- Contorted or Twisted : One margin overlap the hind margin of the petal in front of it.
- Imbricate : Regularity of contorted arrangement is disturbed
  - Quincuncially imbricate .. Of the petals or sepals two are completely in, two completely out, one in and out
  - Ascendingly imbricate .. Present in the subfamily Caesalpiinoideae of the family Leguminosae. Here the petal nearest the axis is innermost and the one nearest the bract is outermost.
  - Descendingly imbricate .. Present in the subfamily Papilionatae of the family Leguminosae. Here the petal which is nearest the axis is outermost. In this family two petals are more or less united and these fused petals are innermost

ANDROECIUM



At the left the stamens are shown as they would appear in the flower; at the right they are shown spread out flat.

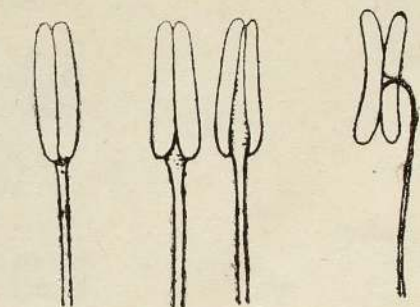


The androecium consists of the stamens or the male reproductive parts.

- Monadelphous : Joined into one group by their filaments.
- Diadelphous : Joined into two groups by their filaments.
- Tetradelphous : Joined into four groups by their filaments.
- Didynamous : Stamens are of unequal length, of the four stamens two are long and two are short.
- Tetradynamous : Of the six stamens four are long and two are short.
- Syngenesious : Filaments are free, anthers are united to form a tube.
- Epipetalous : Stamens are attached to the petals by their filaments.

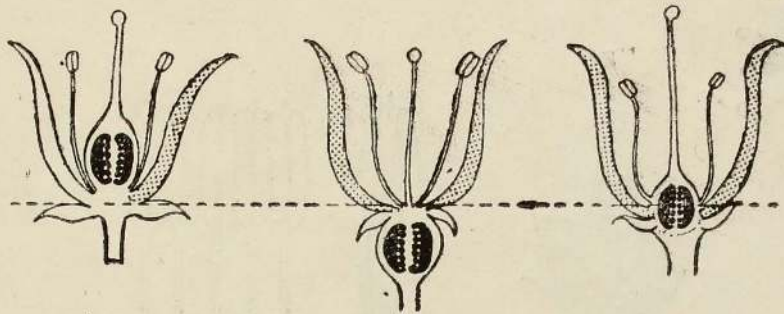
ATTACHMENT OF ANTHER TO FILAMENT

- Basifixed : Anther is attached at its base to the top of the filament.
- Dorsifixed : The filament is prolonged along the back of the anther
- Versatile : Anther is attached to the filament at its middle so that it is free to move.



Basifixed Dorsifixed Versatile (two views)

**HYPOGYNOUS, EPIGYNOUS AND PERIGYNOUS FLOWERS**



Hypogynous flower (Ovary superior)      Epigynous flower (Ovary inferior)      Perigynous flower (Ovary half-inferior)

The floral organs, namely, the sepals, petals, stamens are above the ovary. The ovary is considered to be inferior.

**Hypogynous:—**

The sepals, petals and stamens are inserted on the torus (receptacle) below the level of the ovary. The ovary is said to be superior.

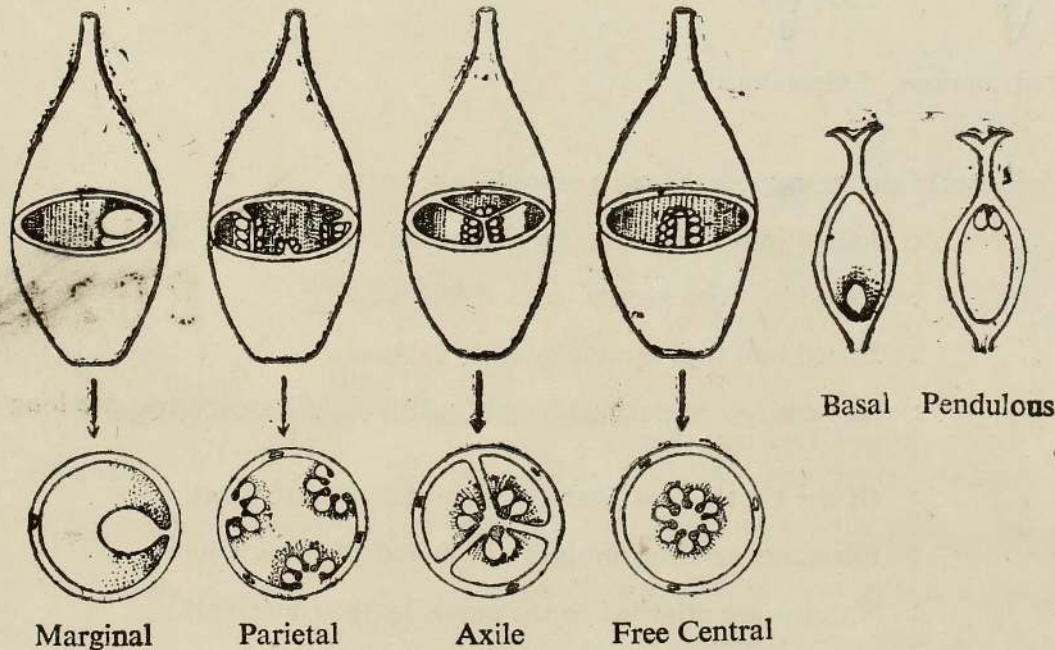
**Epigynous:—**

The gynoecium is at the middle of the torus but is surrounded by the torus fully.

**Perigynous:—**

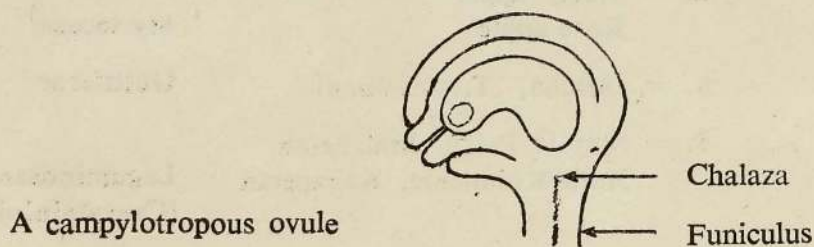
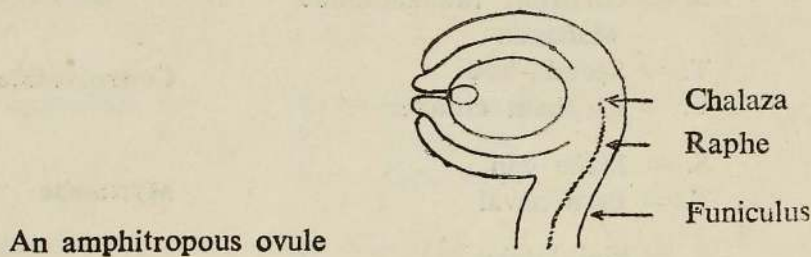
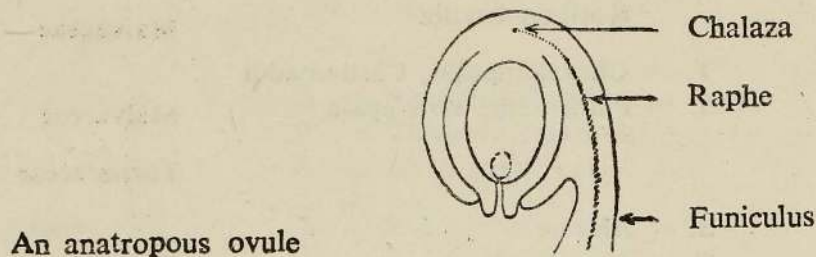
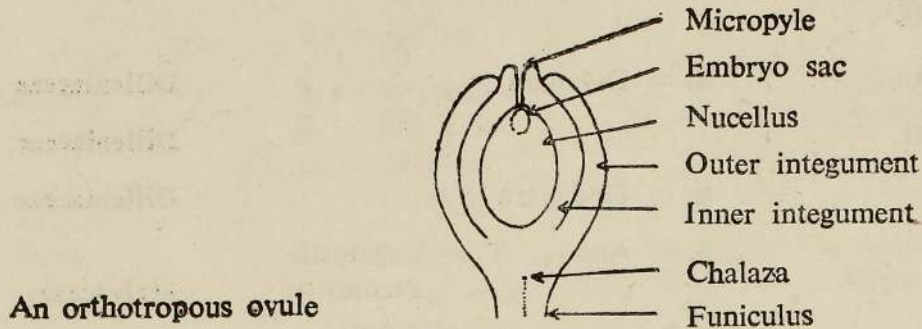
Here the sides of the torus grow up and the sepals, petals and stamens are borne on the rim. The gynoecium is borne in the middle of the torus. Thus the sepals, petals and stamens are not underneath but round the gynoecium. A rather difficult condition to study as there are so many degrees of perigyny. The ovary is considered to be half inferior.

**PLACENTATION**



- Marginal : Ovules along the inner margin of a monocarpellary, unilocular ovary
- Parietal : Ovary is formed by the fusion of two or more carpels and is unilocular. Ovules are attached to the inner margin of the ovary wall along the lines of fusion.
- Axile : Margins of carpels protrude inside and they fuse to form a central column. The ovules become attached to the central axis.
- Free-central : Formed in the same way as an ovary with axile placentation but septa disappear early. Ovary becomes unilocular with the placentae attached to the central axis.
- Basal : A single ovule borne at the base of the ovary.
- Pendulous : Ovules are few and suspended from top into the cavity of the ovary.

FORMS OF OVULES



80240

Several types of ovules are distinguished by variations in general form and in the general position of the micropyle.

- Orthotropous** : The ovule is straight. The chalaza (basal region of ovule), funiculus (stalk attached at one end to ovule and at the other end to the placenta), and the micropyle are along a straight line.
- Amphitropous** : Here too the body of the ovule is straight but the funiculus is at right angles to the body of the ovule.
- Anatropous** : The ovule is inverted and the funiculus is fused to some distance with the body of the ovule. This forms the raphe. The micropyle is close to the hilum (point of attachment of funiculus) and the chalaza is towards the other end.
- Campylotropous** : The ovule is curved and the micropyle lies close to the funiculus. The hilum, chalaza and the micropyle all lie close together.

## SOME ALTERNATIVE FLOWERS SUITABLE FOR STUDY

S. = Sinhala name	T. = Tamil name	E. = English name:
<b>DICOTYLEDONS</b>		
<i>Wormia triquetra</i>	S. = Diyapara	Dilleniaceae
<i>Wormia burbridgei</i>		Dilleniaceae
<i>Dillenia retusa</i>	S. = Godapara	Dilleniaceae
<i>Abutilon</i> spp.	S. = Anoda, T. = Vadatutti Peruntutti	Malvaceae
<i>Sida</i> spp.	S. = Bevilla, Gas-bevilla, Giri-vadi-bevilla, Kotikan-bevilla	Malvaceae
<i>Urena</i> spp.	T. = Chevakapudu, Chittamaddi S. = Patta-epla, Hin-epala	Malvaceae
<i>Turnera ulmifolia</i>		Turneraceae
<i>Morinda</i> spp.	S. = Ahu T. = Mancha-una	Rubiaceae
<i>Argyreia</i> spp.	S. = Giritilla, Mahadumudu Mabanda T. = Seenda-kodi E. = Elephant climber	Convolvulaceae
<i>Syzygium cumini</i>	S. = Maha-dan T. = Peru-naval	Myrtaceae
<i>Eugenia malaccensis</i>	S. = Pini-Jambu T. = Jambu E. = Malay apple Rose apple	Myrtaceae
<i>Calophyllum inophyllum</i>	S. = Domba, T. = Punnai	Guttiferae
<i>Bauhinia</i> spp.	S. = Mayila, Petan, Malapetan, Rath-Koboleela, Kahapetan T. = Kattatti, Tiruvatti, Athi	Leguminosae (Caesalpinioideae)
<i>Cassia</i> spp.	S. = Bintora, Rata-tora Ranawara, Ratu-va, Bimsiyambala, Peti-tora, Va-aramana, Uru-tora Pani-tora, T. = Seemai-akati, Avarum, Tirukkondai or Sarakonral, Vakai, Peyavarai, Ponavarasu, Takara, Oositakarai	Leguminosae (Caesalpinioideae)
<i>Clitoria ternatea</i>	S. = Anoda, T. = Karuthappoo	Leguminosae (Papilionatae)

<b>Erythrina spp.</b>	S. = Erabadu, Eramudu Yak-Erabadu T. = Mullumurungai Mullu-murukku E. = Dadap	Leguminosae (Papilionatae) Leguminosae (Papilionatae)
<b>Gliricidia sepium</b>	S. = Gliricidia T. = Gliricidia E. = Madera Gliricidia	Leguminosae (Papilionatae)
<b>Samanea saman</b>	S. = Mara T. = Nilal-vakai E. = Rain Tree	Leguminosae (Mimosoideae)
<b>Leucaena leucocephala</b>	S. T. & E. = Ipil Ipil	Leguminosae (Mimosoideae)
<b>Tithonia diversifolia</b>	S. = Wal-suriyakanthi T. = Kattu-suriyakan'hi E. = Wild-sunflower	Compositae (Mixtae)
<b>Zinnia haageana</b>	S. T. & E. = Zinnia	Compositae (Mixtae)
<b>Cosmos bipinnatus</b>		Compositae (Mixtae)
<b>Ageratum conyzoides</b>	S. = Hulan-tala T. = Pumpullu E. = Goat weed	Compositae (Liguliflorae)
<b>Lactuca sativa</b>	S. = Salada T. = Lettuce E. = Lettuce	Compositae (Tubiflorae)

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GLOSSARY

A

Actinomorphic	அரர்ஃபி	ஆரைச்சமச்சீரான
Acuminate	அகிநிபு	ந்ண்டு படர்ந்த
Acute	கிர்பு	கூர்மையான
Alcoholic	அலகஃலிக	மதுசாரமான
Alternate	அகாந்நர	ஒன்றுவிட்ட
Amphitropous	அமிதரூ	இருதிருப்பமுள்ள
Anatropous	அநிதரூ	கண்ம் ந்திருக்கின்ற
Androecium	அந்தரூ	ஆணகம்
Annual	அந்நிக	ஆண்டுக்குரிய
Anther	அந்தரூ	மகரந்தக்கூடு
Antidote	அந்திதூ	எதிரெடை
Apiculus	அபிகுலசு	சிறுச்சி
Aristate	அரிஸ்டேட்	மேற்கூரான
Ascendingly imbricate	அஸ்கெண்டிங் இம்பிரிகேட்	நிமிர்கின்ற ஒட்டடுக்கான
Attenuate	அடீனுவேட்	ஒருங்குகின்ற
Auriculate	அயூரிகுலேட்	சோணையுருவான
Awns	அவ்ன்	மேற்கூர்
Axile	அக்ஸிலே	அச்சுக்குரிய
Axillary	அக்ஸிலேரி	கக்கத்துக்குரிய

B

Basifixed	பாசிபிக்ஸ்ட்	அடித்தொடுப்புள்ள
Basal	பாஸல்	அடிக்குரிய
Berry	சதையம்	
Beverage	பேவரி	பானம்
Bicarpellary	பிகார்பல்லரி	இரு சூல்வித்திலையுள்ள
Bilabiate	பிலாபியேட்	ஈருதடுள்ள
Bilocualr	பிலாகூலர்	ஈரறையுள்ள
Bipinnate	பிபினேட்	இரட்டைச்சிறையுள்ள
Bisexual	பிசெக்ஸுவல்	இருலிங்கத்துக்குரிய
Bract	ப்ராக்ட்	பூவடியிலே
Bristles	ப்ரிஸ்டிள்	வன்மயிர்

C

Cadjan	காட்கான்	கிடுகு
Caducous	காடகூசு	முன்னுதிர்கின்ற
Calyx	காலிக்ஸ்	புல்லீவட்டம்
Campanulate	காம்பானூலேட்	மணிவடிவமான
Campylotropous	காம்பிலுட்ரஃபூசு	வளைந்த திருப்பமுள்ள
Capitate	காபிட்டு	தலையுள்ள
Capitulum	காபிட்டுலம்	தலையுரு
Capsule	காப்சூல்	வில்லையம்
Carpel	கார்பல்	சூல் வித்திலை
Caryopsis	காரியாப்சிஸ்	கொட்டையுருவுளி
Cereal	சீரல்	தானியம்
Chalaza	காலாஸா	சூல் வித்தடி
Ciliate	சிலியேட்	பிசுர்கொண்ட
Claw shaped	கிளவு வடிவ	கொடுக்கு வடிவமான
Club shaped	கிளப் வடிவ	குண்டாந்தடியுருவான
Coccus	காக்கசு	கொக்கசு
Compound dichasium	காம்பவுண்ட் டிகாசிம்	கூட்டுவிணைக்கிளை யுள்ளி
Compound Monochasium	காம்பவுண்ட் மொனாசிம்	கூட்டு தனிக்கிளை யுள்ளி
Compound umbel	காம்பவுண்ட் அம்பல்	கூட்டு குடைப்பூந்துணர்
Confectionary	கான்பெக்ஷரி	இனிப்புப்பண்டம்
Connate	காநேட்	ஒருங்காட்டிய
Constricted	காண்ட்ரிக்ட்டட்	ஒடுக்கப்பட்ட
Contorted	காண்ட்ரூட்	முறுக்கான
Copra	காப்ரா	கொப்பரா
Cordate	கார்டேட்	இதயவருவான

Corolla	மூலகம்	அல்லிவட்டம்
Corymb	பலகையம்	மட்டச்சிகரி
Cream	நீலம் - கை பாவம் ஹர்	ஆடைநிற / மஞ்சள் நிறமான
Crenate	பலகை	அரைவட்ட வெட்டுள்ள
Crimson	நீலம்	செந்நிறம்
Cruciferae	சார்சபம்	குருசிபரே
Culms	நாசு அகலி	புற்றண்டுக்கள்
Cuneate	கிரைபி, கிரைகார	ஆப்புருவான
Cuspidate	அகலி	கூர்முடிவுள்ள
Cyathium	பலகை	கண்ணாறுவான பூந்துணர்
Cyme	பல அகலம்	நுனிவளராப் பூந்துணர்

D

Deciduous	பலகை	உதிருகின்ற
Decussate	அகலி	ஒன்றுக்கொன்று குறுக்கான
Didynamous	அகலி	இருவலுவுள்ள
Dehisced	புடி	வெடித்த
Dentate	அகலி	பல்லுள்ள
Descendingly imbricate	அகலி	இறங்குகின்ற ஒட்டக்கான
Desiccated coconut	வெடித்த பால்	உலர்ந்த தென்னம்பருப்பு
Diadelphous	அகலி	இருகற்றையுள்ள
Diarrhoea	பலகை	கழிச்சல்
Digitate	அகலி	விரலொழுங்குள்ள
Disc	பலகை	வட்டத்தட்டு
Discfloret	பலகை	வட்டத்தட்டுச் சிறுபூ
Dissect	பலகை	வெட்டிப் பரிசோதித்தல்
Distilled	அகலி	வடித்தல்
Divergent	அகலி	விரிகின்ற
Dorsifixed	பலகை	முதுகுபுறவொட்டி
Drupe	அகலி	உள்ளோட்டுச் சதையம்

E

Edible	கொழுதி	உண்ணத்தகுந்த
Elliptic	அகலி	நீள்வளையமான
Emerginate	அகலி	உச்சிவெட்டுள்ள
Embryo Sac	அகலி	முளையப்பை
Endocarp	அகலி	உட்கனியம்
Endosperm	அகலி	வித்தகவிழையம்
Entire	அகலி	தொடர்விளிம்புள்ள
Epicarp	அகலி	வெளிக்கனியம்
Epigynous	அகலி	குலகமேலான
Epipetalous	அகலி	அல்லிமேலொட்டிய
Eyes	அகலி	கண்கள்

F

False septum	பலகை	போலிப் பிரிசுவர்
Fascicle	அகலி	சிறுகட்டு
Fermented	அகலி	நொதியப்பட்ட
Fibre	அகலி	நார்
Fibrous	அகலி	நாரான
Filament	அகலி	இழை
Filiform	அகலி	இழையுருவான
Flame coloured	அகலி	சுவாலை நிறமுண்டய
Floret	அகலி	சிறு பூ
Follicular	அகலி	சிறுறுறையுருவான
Fragrant	அகலி	நறுமணமான
Free central	அகலி	சுயாதீனமையமான
Funiculus	அகலி	குல்வித்திழை
Funnel-form	அகலி	புனல் உருவமான

**G**

Gamopetalous	பெட்டிப்பை	அல்லியிணைந்த
Gamosepalous	பெட்டிப்பை	புல்லியிணைந்த
Globose	கோளாக்கார	கோளவுருவான
Glume	குழிய	உயி
Gynandrium	பூச்சாயாங்கு	பெண்ணணகம்
Gynoecium	காயாங்கு	பெண்ணகம்

**H**

Half inferior	அரைமீற	குறைத்தாழ்வு
Hastate	கூந்தாக்கார	சட்டியுருவான
Helicoid cyme	சுருளாவிட்டு அங்கு	நத்தையுரு நுனிவளராப் பூந்துணர்
Husk	கெட்டி, போந்த	கோது
Hypogynous	அடியேக்காயாங்கு	குலகக்கீழான

**I**

Imbricate	அடிமேலான	ஒட்டடுக்கான
Imparipinnately compound	அடிமேலான சட்டி	சமனில்சிறைப்பிரிப்பாக கூட்டான
Imperfect	சீக குறை	நிறைவில்
Inferior	அடியே	தாழ்வான
Inflorescence	பூச்சு அங்கு	பூந்துணர்
Integument	பிழிபாவிருகை	கவசம்
Interpetiolar	அந்தரம் வான்கு	இலைக்காம்புக்கிடையான
Intramarginal	கெட்டி	விளிம்புக்குள்ளான
Introrse	அந்தரமேலான	உட்புறத்திரும்பிய
Involucre	கிழிப்பை	பாளைச்சுற்று

**J**

Jaggery	கரு	கருப்பட்டி
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**K**

Keel	கோணக	ஏரா
Keel Petal	கோணக கெட்டி	ஏரா அல்லி
Kernel	கெட்டி	பருப்பு

**L**

Labellum	அடியே	சிறுதடு
Lanceolate	கோணக	வேலுருவான
Landing platform	கொடுக்கை	இறங்கும் பீடம்
Latex	கீரை	மரப்பால்
Lax	பெரு, சிதை	தளர்ந்த
Leaf apices	பூ அங்கு	இலை உச்சி
Leaflets	பூக்கா	சீறிலை/சிறுநிலை
Legume	கெட்டி	அவரையம்
Lemma	சுருகுழிய ; அடிப்பை	வெளியுயி
Lemon yellow	கெட்டி சாய; கருப்பை	இலமன் மஞ்சளான
Ligulate	சீலை	சிறுநாவுருவான
Ligule	சீலை	சிறு நா
Linear	கெட்டி	நேர்கோடு போன்ற
Linear lanceolate	கெட்டி கோணக	நேர்கோடு போன்ற வேலுருவான
Linear oblong	கெட்டி கோணக	நேர்கோடு போன்ற நீளவளையுரு
Locular	கோணக	அறையுள்ள
Lodicules	கூடு	சிறுமுடிகள்
Lomentum	கொணக	உவரீயம்

M

Maize	ஓரிடி	சோளம்
Marginal	டிர்	விளிம்புக்குரிய
Mesocarp	மெயாவரணம்	இடைக்கனியம்
Micropyle	அனுடிவாரம்	நுண்ணுவாரம்
Monocarpellary	பீகாண்டிப	ஒருகுலவித்திலையுள்ள
Monodelphous	பீகாண்டிப	ஒருகேசரமுள்ள
Mucronate	பூலிகாறு	கூர் நுனியுள்ள

N

Nectar	மலர்நீர்	அமுதம்
Node	நாடம்	கணு
Nucleus	நுணுக்கம்	கரு

O

Oats	ஓட்டு	ஓட்ஸ் (ஒருவகைத் தானியம்)
Oblong	அடிநாடி	நீளவளையுருவமான
Obovate	புறநாடி	நேர்மாறு முட்டையுருவான
Obtuse	மூலம்	விரிந்த
Opposite	எதிர்ப்பு	எதிரான
Opposite decussate	எதிர்ப்பு அகல்காந்திரிக	எதிராக ஒன்றுக்கொன்று குறுக்கான
Orchidaceous	ஓக்கிவகை	ஓக்கிட்டுக்குரிய
Ornamental	அலங்காரம்	அலங்காரத்திற்கான
Orthotropous	செங்குத்து	நேர்திருப்பமுள்ள
Oval	வட்டவகை	முட்டைவடிவான
Ovary	பிண்டிகை	குலகம்
Ovate oblong	அகல்காந்திரிக, அடிநாடி	முட்டையுருவான
Ovule	பிண்டி	குல்வித்து

P

Palea	அடிநாடி, அடிநாடி	உள்ளும்
Palmately	பாண்டி	அங்கையுருவான
Palmately veined	பாண்டி, நார்பி டிரிக	அங்கையுருவான நரம்பு
Palmatifid	மேயாண்டி	அங்கைப் பிளவுள்ள
Panicle	பண்டிகை	குஞ்சம்
Papilionaceous	பண்டிகை	வண்ணத்திப்பூச்சியுருவான
Parallel	பண்டிகை	சமாந்தமான
Parietal	பண்டிகை, பாண்டி	சுவருக்குரிய
Paripinnately compound	பண்டிகை பண்டிகை	சமச்சிறைப்பிரியமான கூட
Pasture	பண்டிகை	மேய்ச்சனிலம்
Pedicel	பண்டிகை	புன்னடி
Pendulous	பண்டிகை	தொங்குகின்ற
Perennial	பண்டிகை	பல்லாண்டு வாழ்கின்ற
Perfect	பண்டிகை	நிறைவான
Perianth	பண்டிகை	பூவுறை
Perigynous	பண்டிகை	குலகச்சுற்றிலுள்ள
Persistent	பண்டிகை	நிலைபேறான
Petals	பண்டிகை	அல்லி
Petiolate	பண்டிகை	இலைக்காம்புள்ள
Pinnate	பண்டிகை	சிறைப்பிரிப்பான
Pinnately	பண்டிகை	சிறைப்பிரிப்பான முறையில்
Pinnatifid	பண்டிகை	சிறைப்பிளவுள்ள
Pinnule	பண்டிகை	சிறு சிறையிலை
Pistillode	பண்டிகை	யோனிப்போலி
Placenta	பண்டிகை	குல்வித்தகம்
Placentation	பண்டிகை	குல்வித்தமைப்பு
Plicate	பண்டிகை	மடிப்புள்ள
Pod	பண்டிகை	உறையம்
Pollen	பண்டிகை	மகரந்தம்



Staminodes	வடி ரேணுவ, ரேணுவாழை	கேசரப்போலி
Standard petal	பதாகை டலைய	கொடி அல்லி
Stigma	கலங்கைய	குறி
Stipulate	டபபதி	இலையடிச்செதிலுள்ள
Stipule	டபபது	இலையடிச்செதில்
Stolon	டாவகைய	படரி
Stoloni ferous	டாவகைய சிதை	படரிகள்கொண்ட
Stone cell	டபல சேலைய	வன்கலம்
Stragglng	தீதீரீ யும	அலைந்துதிரிகின்ற
Style	கீலைய	தம்பம்
Subcordate	மந்தி நாடகார	சிறிது இதயவுருவான
Superior	டபநர	உயர்வான
Syncarpous	சமீகமபிக	குல்வித்திலையொட்டிய
Syngenesious	சமீபராத	மகரந்தக்கூடொட்டிய

T

Taxonomic	வர்க்கைகளைய	பாகுபாட்டியலுக்குரிய
Terminal	அழை	முனையிலுள்ள
Tetradynamous	வந்தி தீர்சக	நால்வலுவுள்ள
Thatching	சோல் அது சேலிலைவா	வேயப்பட்ட
Thecae	சேலிகாவ	உறைகள்
Toddy	ரா	களளு
Treacle	புகை	சீனிப்பாணி
Trifoliately	தி பாதி	முச்சிறிற்றையுள்ளதான
Truncate	இசை	தலைதுணிந்த
Tuberous	அகண்டி	முகிமுருவான
Tubular	நாலாகார	குழாயுருவான
Twisted	சமாவை	முறுக்கான

U

Ulcers	வகைய	புண்கள்
Umbel	சுறைய	குடைப்பூந்துணர்
Under shrub	யிபடரூ	சிறுபுதர்
Undulate	நரமீ	தொடரலை போன்ற
Unilocular	சீககைச்சீயக	ஓரறையுள்ள
Unisexual	சீககிளிக	ஓரிலிங்கத்திற்குரிய
Urinary	மேறு ; இறு	சிறுநீருக்குரிய

V

Valvate	அநாவை	விளிம்பிற்றெருடுகின்ற
Valve	கைபாடு	வால்வு
Venation	நாரவி விநாயகைய	நரம்பமைப்பு
Versatile	வெறுகை	சுழலும்
Verticillaster	வாய் வலைய	சிறுவட்டவுரு
Vinegar	விநாகிரி	வின்னாகிரி

W

Wheat	கிரிஷ	கோதுமை
Whorl	வலைய	சுற்று
Whorled	வலைய ; வலிய	சுற்றுன
Winged	பக்கைய	சிறகு உடைய
Wing petal	பக்க டலைய	சிறையல்லி
Wrinkled	டலி வடிவ	திரங்கிய

Z

Zygomorphic	யுமரூபி	இருபக்கச் சமச்சீரான
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