

LIST OF FIGURES

Figure No.	DESCRIPTION	Page No.
I.	Plant showing primary and secondary growth in stem.	2
II.	a) Radial division of vascular cambium produces xylem (X) and phloem (P) cells.	4
	b) Secondary growth showing repeated radial division of cambium which produces more xylem than phloem.	4
III.	A) Liana habit showing flattened stem of <i>Macherium</i> sp.	8
	B) Hanging and twining liana of <i>Camposema isopetalum</i> .	8
	C) Stem splitting and high flexibility of <i>Bauhinia</i> sp.	8
IV.	Classification by Philipson W.R., Ward J.M. and Butterfield B.G. (1971).	18
V.	Classification by Sherwin Carlquist (1988).	19
VI.	Modified Classification based on Sherwin Carlquist (1988).	20
VII.	Length-on-age curves for vessel elements, septate and non-septate fibres in <i>Coccinia indica</i> L.	78

1.	Transverse sections of young stem showing development of internal phloem and procambium in <i>Ipomoea hederifolia</i> Linn.	150
2.	Transverse view of young stem showing development of internal cambium and procambium in the pith region of <i>Ipomoea hederifolia</i> Linn.	151
3.	Transverse sections of mature stem showing internal cambium and its derivatives in the pith region of <i>Ipomoea hederifolia</i> L.	152
4.	Transverse view of young stem (A-F) showing development various stages of internal phloem, procambium and vascular bundles development in <i>Ipomoea aquatica</i> Forssk.	153
5.	Transverse section of young stem showing origin of internal phloem in <i>Leptadenia reticulata</i> (Retz.) Wight & Arn.	154
6.	Transverse section of mature stem of <i>Leptadenia reticulata</i> (Retz.) Wight & Arn., showing development of secondary internal phloem.	155
7.	Transverse section of young stem and mature stem of <i>Cressa cretica</i> Linn., showing structure, development of internal phloem and internal cambium.	156
8.	Transverse section of young stem of <i>Solanum pseudocapsicum</i> L., showing origin of internal phloem.	157

9.	Transverse sections of mature stem of <i>Solanum pseudocapsicum</i> L., origin of internal cambium as well internal phloem.	158
10.	Transverse (A-D) and tangential longitudinal (E, F) view of secondary xylem of <i>Strychnos bicolor</i> Prog.	159
11.	Transverse view of <i>Strychnos bicolor</i> Prog stem showing development of cambium, and structure of interxylary phloem and secondary xylem.	160
12.	Transverse view of young stems showing origin and development of medullary bundles in the pith region of <i>Argyreia nervosa</i> (Burm. f.) Bojer.	161
13.	Transverse view of mature stems showing development of medullary bundles in <i>Argyreia nervosa</i> (Burm. f.) Bojer.	162
14.	Tangential longitudinal view of cambium (D) and Transverse view of young and mature stems of <i>Mirabilis jalapa</i> L. (A-D) and <i>Boerhaavia diffusa</i> L. (E-F), showing development of medullary bundles in the pith region.	163
15.	Transverse sections of peduncle branches of <i>Couropita guianensis</i> Aubl., shows different types of cortical bundles and their arrangements.	164
16.	Transverse sections of <i>Couropita guianensis</i> Aubl. showing different stages of cortical bundle development.	165
17.	Transverse views of young and matured stem of <i>Nyctanthes arbortristis</i> L.	166
18.	Transverse (A, D, E) and tangential (B, C) view of stem and roots of <i>Spinacia oleracea</i> Linn., showing xylem structure and development of vascular cambium.	167
19.	Transverse view of roots of <i>Spinacia oleracea</i> Linn., showing xylem structure and development of vascular cambium.	168
20.	Schematic diagrams showing the transverse view of <i>Cocculus hirsutus</i> (L.) Diels., stems.	169
21.	Transverse (A-D) and tangential (E) stem sections of <i>Cocculus hirsutus</i> (L.) Diels.	170
22.	Transverse (A-D) and tangential (E) stem sections of <i>Diplocisia glaucanscens</i> (Bl.) Diels.	171
23.	Tangential (A, D, E) and transverse (B, C) stem sections of <i>Cocculus hirsutus</i> (L.) Diels.	172
24.	Schematic diagrams (A-C) and transverse sections of young and mature stem (D, E) of <i>Antigonon leptopus</i> Hook. & Arn.	173
25.	Transverse sections of thick stem of <i>Antigonon leptopus</i> Hook. & Arn.	174
26.	Transverse section of <i>Dolichos lablab</i> L., stem segments showing the structure of the secondary xylem and different stages of cambium development.	175

27.	Schematic diagram of <i>Dolichos lablab</i> L., showing the origin and distribution of normal and functionally reverse vascular bundles in transverse view.	176
28.	Transverse view of the secondary xylem of a mature <i>Dolichos lablab</i> L. stem.	177
29.	Transverse section of stem showing origin of cambium in <i>Ipomoea hederifolia</i> L.	178
30.	Transverse view of secondary xylem in the stem of <i>Ipomoea hederifolia</i> L.	179
31.	Transverse view of secondary xylem in the stem of <i>I. quamoclit</i> Linn. (A, B) and <i>I. biloba</i> Forsk. (C-E).	180
32.	Transverse section of mature stem of <i>Leptadenia reticulata</i> (Retz.) Wight & Arn., showing included phloem.	181
33.	Transections of stem secondary xylem (A, C-E) and tangential section (B) of <i>Salvadora persica</i> L.	182
34.	Transverse views of secondary xylem in the mature stem of <i>Coccinia indica</i> L.	183
35.	Macerated xylem fibres (A), transverse (B) and tangential longitudinal view (C-E) of vessel elements of <i>Coccinia indica</i> L.	184
36.	Transverse views of mature stem of <i>Coccinia indica</i> L.	185
37.	Transverse view of mature stem of <i>Coccinia indica</i> L., showing interxylary phloem and ray cambium.	186
38.	Mature stem (A), radial (B) and tangential (C, D) view of secondary xylem of <i>Coccinia indica</i> L.	187
39.	Transverse (A, C-F) and radial longitudinal (B) view of the secondary xylem in the mature stem of <i>Ipomoea hederifolia</i> L.	188
40.	Transverse (A-F) view of the secondary xylem in the mature stem of <i>Ipomoea hederifolia</i> L.	189
41.	Transverse (A, C-E) and tangential longitudinal (B) view of xylem, included phloem and cambium of <i>Canavalia ensiformis</i> (L.) DC.	190
42.	Transverse view of main stem showing development of included phloem in <i>Mucuna pruriens</i> var. <i>pruriens</i> (Linn.) DC.	191
43.	Transverse view of stem showing development of interxylary phloem in <i>Strychnos bicolor</i> Prog.	192
44.	Transverse view of main stem showing development of included phloem in <i>Calycopteris floribunda</i> Lamk.	193
45.	Transverse view of secondary xylem showing included phloem islands in <i>Calycopteris floribunda</i> Lamk.	194
46.	Transverse (A), tangential (B and C) and radial (D-F) longitudinal view of secondary xylem of <i>Calycopteris floribunda</i> Lamk.	195
47.	Transverse (A-F) and tangential (G and H) longitudinal view of secondary xylem of <i>Camptosema isopetalum</i> (Lam.) Taub.	196

48.	Tansverse view of stem <i>Phanera glabra</i> Jacq. (A-C, E-H) showing flattened stem development and lobed stem in <i>Phanera outimouta</i> (Aubl.) Queiroz (D).	197
49.	Transeverse view of young and mature thick stem of <i>Begonia alliacea</i> L. showing developmental stages of phloem wedges.	198
50.	Transverse sections of young and matured stem of <i>Aristolochia indica</i> Linn. (A-D) and <i>Tinospora cordifolia</i> (Thunb.) Miers.(E, F).	199
51.	<i>Serjania corrugata</i> Radlk. (Sapindaceae) and <i>Serjania caracasana</i> (Jacq.) Willd	200
52.	Transverse sections of thick stem <i>Ipomoea triloba</i> L. successive rings of secondary xylem alternating with phloem.	201
53.	Transverse view of <i>Macherium aculeatum</i> Raddi. Lantana aff. Fulcata Lindl., stem.	202
54.	Transverse view of young and mature stem of <i>Securidaca rivinaefolia</i> A. St.-Hill & Moq.	203
55.	Transverse view of young and mature stems of <i>Securidaca rivinaefolia</i> A. St.-Hill & Moq., showing different stages of cambial origin.	204
56.	Macroscopic (A) transverse view (B-D) of mature stems of <i>Securidaca rivinaefolia</i> A. St.-Hill & Moq., showing different stages of cambial origin.	205
57.	Transverse (A-C) and tangential longitudinal (D-F) view of secondary xylem of <i>Securidaca rivinaefolia</i> A. St.-Hill & Moq.	206