Indian Journal of Plant Sciences ISSN: 2319-3824 (Online)
An Online International Journal Available at http://www.cibtech.org/jps.htm
2013 Vol. 2 (4) October-December, pp.20-43/Asutosh
Research Article

TAXONOMIC DIVERSITY OF CLIMBING PLANTS OF NORTH ANDAMAN FOREST, INDIA

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ABSTRACT
The present paper focuses on the phytosociological survey of climbers and lianas in North Andaman and enlists the plant species with their habitat and forest types they belong. The study area showed seven important forest types viz., evergreen, semi-evergreen, moist deciduous, dry deciduous, mangrove, littoral and degraded. The survey in this islands encountered 147 herbaceous climbers and 106 woody climbers from all the forest types of North Andaman, covering 49 families. In dicotyledons, there are 39 families containing 121 genera and 218 species. In monocotyledons, there are 7 families containing 12 genera and 25 species. Papilionaceae and Dioscoreaceae, among dicot and monocot are found to be dominant family respectively. It also provides a data base on North Andaman plant species which can be utilized in the context of species conservation and future inventories.

Key Words: *Diversity, Climbers, Lianas, North Andaman*

INTRODUCTION
Lianas (woody climbers) and vines (herbaceous climbers) represent a very conspicuous and dominant growth form in tropical forests. Climbing plants not only form an important structural component but also play an important ecological role in the forest dynamics and nutrient recycling within these ecosystems. However, in many forest inventories during the last decades, lianas are ignored (Dallmier and Comiskey, 1998a, b), in contrast to herb, shrubs and trees.

The overall low attention to lianas is most probably due to their low microeconomic importance. Also difficulties in delimiting individuals overall lower minimum size limit in enumerations and general lack of taxonomic studies resulted in the exclusion of lianas in many inventories. More recently, lianas have been included in systematic sampling programmes (Hubbell and Foster, 1983; Hawthorne, 1996; Makana *et al.*, 1998).

Climbers are plants that rely on other plants for support. Resources which self-supporting plants allocate for support may be used by lianas for extension growth and reproduction (Drawin, 1867). Lianas add significantly to vascular plant species as their contribution to species richness ranges from 8-12%. Lianas make up 2 to 7% of total woody biomass; but as much as 6 to 36% of the total leaf biomass and production of litter 36% against that by trees 59%.

Lianas are capable of growing very rapidly in length and large lianas generally grow to the canopy and hence cast shade on their host trees, thereby reducing tree growth rates (Putz, 1984). Although by growing from tree to tree, lianas might increase tree stability (Smith, 1973), trees with lianas suffer higher mortality rates then liana free trees (Putz *et al.*, 1985).

Interest in liana inventory has recently gained currency (DeWalt *et al.*, 2000; Muthuramkumar and Parthasarathy, 2001; Perez- Salicrup *et al.*, 2001; Phillips *et al.*, 2002; Parren, 2003; Reddy and Parthasarathy, 2003; Kouame *et al.*, 2004; Mascaro *et al.*, 2004; Parthasarathy *et al.*, 2004; Rice *et al.*, 2004; Phillips *et al.*, 2005; DeWalt *et al.*, 2006; Prasad *et al.*, 2009; Ghosh, 2013). However, information on medium to long-term inventory is scanty in most cases (Phillips *et al.*, 2005).

Though there is no census of climbers and lianas worldwide, the guess is that about 90% of all such plants are restricted to the tropics (Kelley, 1985) and they make up about 8% of the flora there (Jacobs, 1988).

The regional distribution of climber and lianas is strongly related to overall forest types and forest locations (Grubb *et al.*, 1963).

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Study Area

The Andaman and Nicobar groups of Islands, situated in the Bay of Bengal, comprise of 204 islands of varying sizes. Among them, the North Andaman is the largest one, lying between latitudes 13° 41′ to 12° 50′N and longitudes 92°11′ to 93° 07′E. This big island is separated from the middle Andaman by the Austin Strait.

The climate is warm tropical, with temperatures ranging from 22° to 30°C and the annual rainfall varying between 3000-3800 mm. Rainfall is heavily influenced by monsoons, both S.W. (May to September) and N.E. (October to December).

The coastline is everywhere irregular and is broken by numerous small and large indentations. The topography of the island is irregular and more or less hilly. The highest point is Saddle Peak, at 720 m. These higher elevations contain hard red-brown infertile soil clothed with dense scrub-growth, bamboos and small hard wooded trees.

MATERIALS AND METHODS

Quantitative inventory of climbers was carried out between January 2001 and September 2004, in a total of 130 quadrate plots (32 m x 32m) in North Andaman forest. Voucher specimens were collected and identified by using regional floras (Perkinson, 1923; Hooker, 1872-1885; Gamble and Fisher, 1921-1935; Mathew, 1991). Necessary nomenclature checks have been done from S.S.R. Bennet, 1987 and other relevant literatures. Woody and herbaceous climbers can be classified according to their organ attachment to the supporting tree. The climbing mechanisms of the climber species were determined based on observations on the field and with reference of Putz (1984). This system of classification may not be perfect as several species fall into more than one category, but otherwise most species can be reasonably classified.

RESULTS AND DISCUSSION

The present study could record 147 herbaceous climbers and 106 lianas from all the forests types of North Andaman, covering 49 families. In dicotyledons, there are 39 families containing 121 genera and 218 species. In monocotyledons, there are 7 families containing 12 genera and 32 species; and total number of genera is 2 in the Pteridophytes under 2 families and a single one under the gymnosperms. (Table 1)

Considering all climbers and lianas, 127 species are stem twiners, 30 species are branch twiner, 38 species are tendril climbers, 14 species are root climbers, and 44 species are hook climbers. The Andaman forests are divided into seven main categories (Champion and Seth, 1968) evergreen forest, semi-evergreen forest, moist deciduous forest, dry deciduous forest, mangrove forest, littoral forest and degraded forest.

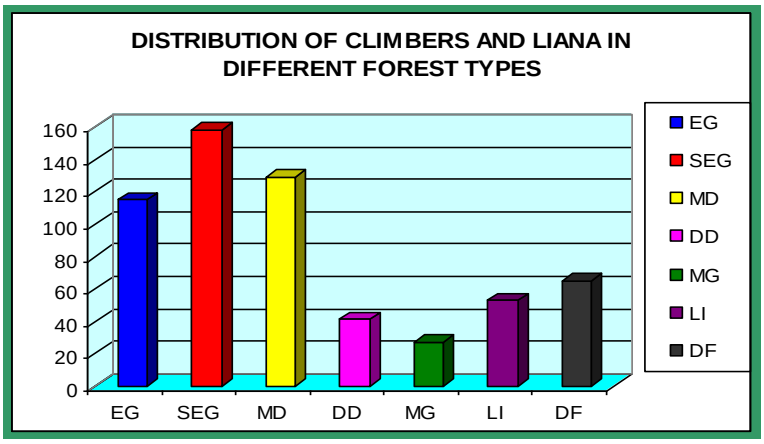

Figure 1: Distribution of climbers and lianas of North Andaman forest

In the evergreen forests, 115 species were found, of which 113 species are angiosperms, one gymnospem (*Gnetum scandens*, Gnetaceae) and one pteridophyte (*Davalia solida*, Davalliaceae). In angiosperms, 96 species are from dicotyledons and 17 species are from monocotyledons.
In such forests, 51 species (44.35%) are stem twiners, 18 (15.65%) branch twiners, 9 (7.82%) tendril climbers, 3 prickle and tendril climbers, 8 (6.95%) root climbers and the rest 26 species (22.6%) are hook climbers.

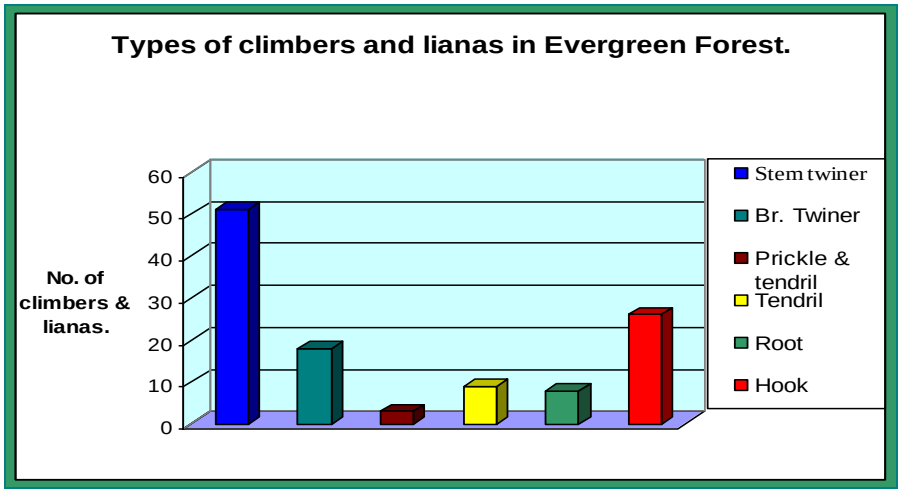

Figure 2: Types of climbers and lianas in Evergreen forest

In the semi-evergreen forests, 158 species were found, of which 156 species are angiosperm, and 2 species are pteridophyte (*Davalia solida*, Davalliaceae and *Lygodium flexuosum*, Lygodiaceae). In angiosperms, 123 species are from dicotyledons (represented by 83 genera of 35 families) and 34 species are from monocotyledons (12 genera of 7 families).
Of these 158 species, 79 species (50%) are stem twiners, 17 (10.76%) branch twiners, 15 (9.49%) tendril climbers, 6 (3.79%) prickle and tendril climbers, 12 (7.59%) root climbers and the rest 29 species (18.35%) are hook climbers.

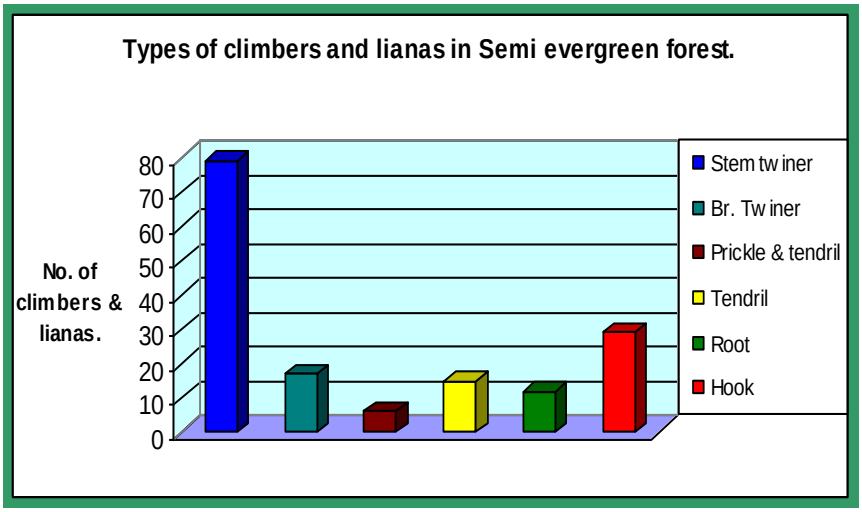

Figure 3: Types of climbers and lianas in Semi-evergreen forest climbers

In the Moist Deciduous forests, 129 species were found, of which 127 species are angiosperm, and 2 species are pteridophyte (*Davalia solida*, Davalliaceae and *Lygodium flexuosum*, Lygodiaceae). In angiosperms, 97 species are from dicotyledons (represented by 66 genera of 25 families) and 30 species are from monocotyledons (13 genera of 7 families).

Of the total number of species, 59 species (45.73%) are stem twiners, 16 (10.06%) branch twiners, 14 (8.80%) tendril climbers, 5 (3.14%) prickle and tendril climbers, 9 (5.66%) root climbers and the rest 26 species (16.35%) are hook climbers.

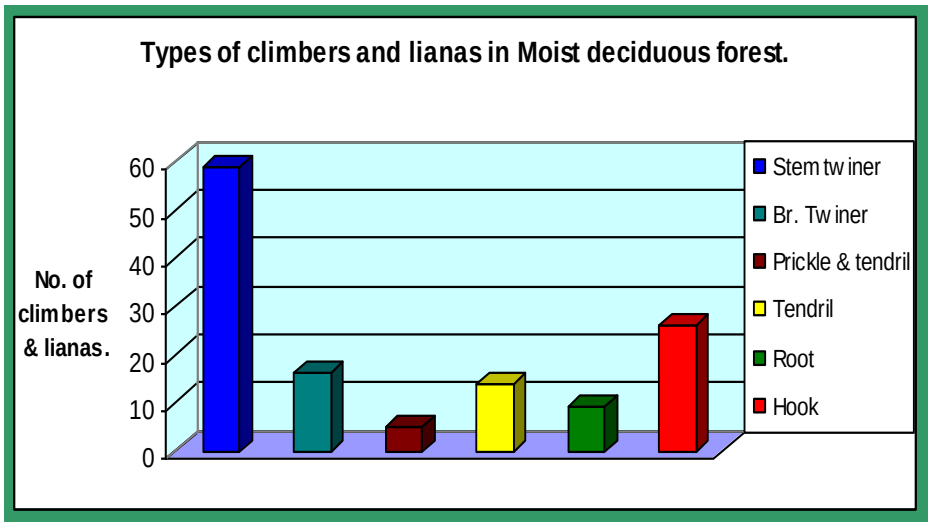

Figure 4: Types of climbers and lianas in moist deciduous forest

In the Dry Deciduous forests, 41 species were found, of which 40 species are angiosperm, and one species is pteridophyte (*Lygodium flexuosum*, Lygodiaceae). In angiosperms, 32 species are from dicotyledons (represented by 28 genera of 14 families) and 8 species are from monocotyledons (6 genera of 3 families). In the dry deciduous forest, 25 species (60.97%) are stem twiners, 4 (9.75%) branch twiners, 8 (19.51%) tendril climbers, and the rest 4 species are hook climbers. In such forest 30 species (73.17%) are climbers and 11 species (26.82%) are lianas.

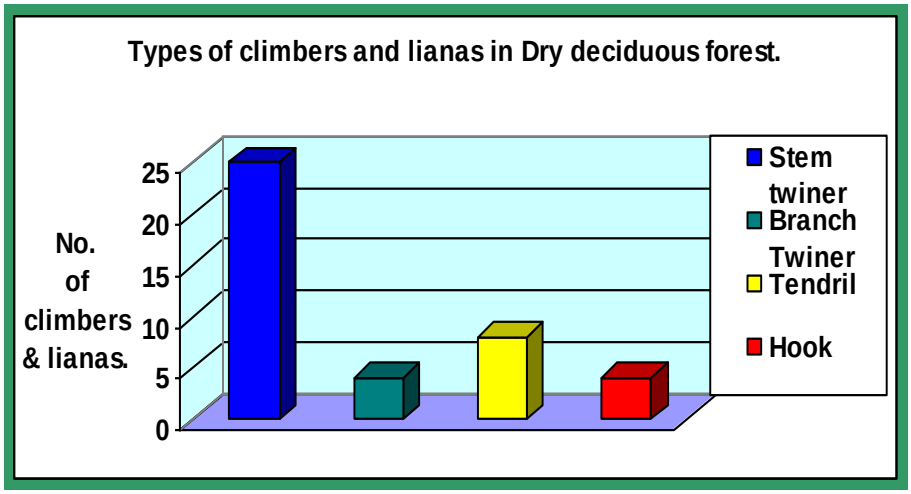

Figure 5: Types of climbers and lianas in Dry deciduous forest

In the Mangrove forests, 27 species were found, of which 26 species are angiosperm, and one species is Pteridophyte (*Davallia solida*, Davalliaceae). In angiosperms, 16 species are from dicotyledons (represented by 11 genera of 9 families) and 10 species are from monocotyledons (7 genera of 6 families). In the mangrove forest, 4 species (14.81%) are stem twiners, 3 (11.11%) branch twiners, 6 (22.22%) tendril climbers, 3 (11.11%) root climbers and the rest 11 species (40.74%)are hook climbers. In such forest, 9 species (33.33%) are climbers and 18 species (66.66%) are lianas.

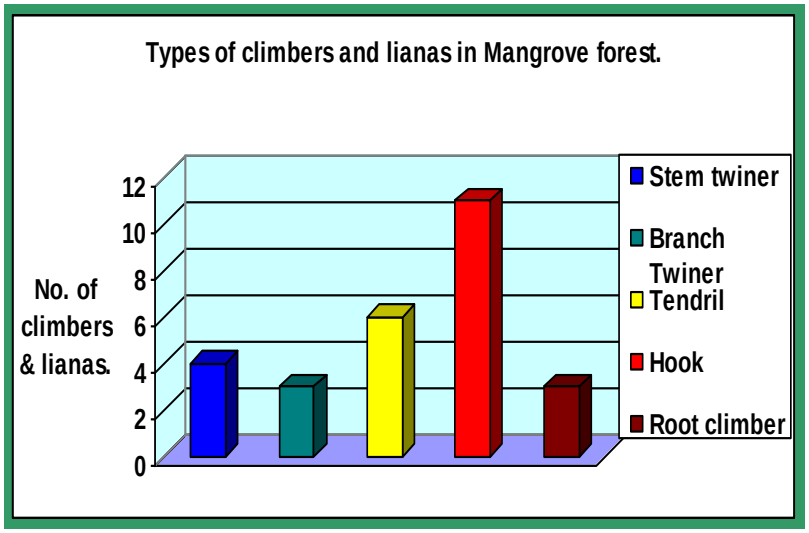

Figure 6: Types of climbers and lianas in Mangrove forest

In the Littoral forests, 53 species were found, of which 52 species are angiosperm, and one species is Pteridophyte (*Lygodium flexuosum*, Lygodiaceae). In angiosperms, 37 species are from dicotyledons (represented by 24 genera of 15 families) and 15 species are from monocotyledons (9 genera of 5 families). In the littoral forest, 20 species (37.73%) are hook climbers, 15 species (28.3%) are stem twiners, 9 (16.98%) tendril climbers, 5 (9.43%) root climbers, and 4 (7.54%) branch twiners. In such forest, 26 species (49.05%) are climbers and 27 species (50.94%) are lianas.

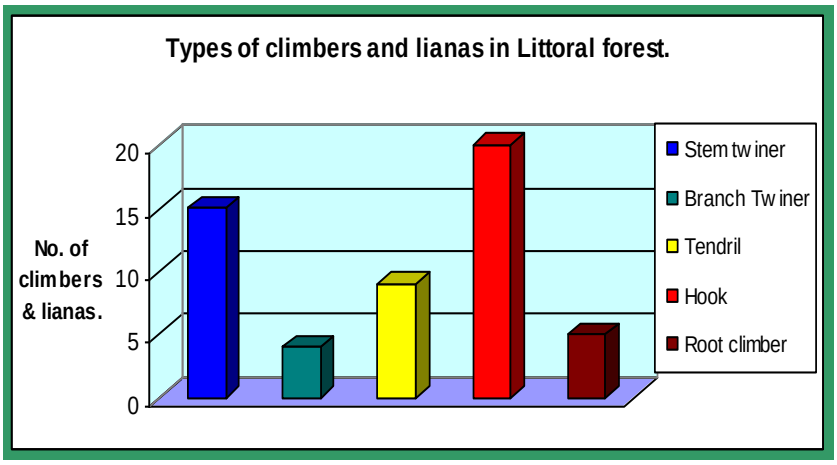

Figure 7: Types of climbers and lianas in Littoral forest

Table 1: Enumeration of climbers and Lianas species found in North Andaman (L-Lianas, C-Climbers; EG-Evergreen Forest, SEG-Semi-evergreen, MD-Moist Deciduous, DD-Dry Deciduous, MG-Mangrove, LI-Littoral, and DF-degraded Forest)

Sl. No.	Specimen name	Family	Habit	Climbing mode	Nature of climbing organ (modification)	Forest types
1	*Abrus precatorius* L.	Papilionaceae	C	Twiner	Stem.	SEG, MD
2	*Abrus pulchellus* Wall. ex. Thw.	Papilionaceae	C	Twiner	Stem.	SEG, MD
3	*Acacia andamanica* Nielsen	Mimosaceae	L	Hook climber	Stem and leaf rachis	SEG, MD, EG
4	*Acacia pennata* (L.) Willd.	Mimosaceae	L	Hook climber	Stem and leaf rachis	EG, SEG
5	*Adenia cardiophylla* (Masters) Engl.	Passifloraceae	C	Tendril climber	Branch and peduncle.	SEG, EG, LI
6	*Adenia trilobata* (Roxb.) Engl.	Passifloraceae	C	Tendril climber	Branch and peduncle.	SEG, LI
7	*Aganosma cymosa* (Roxb.) G. Don	Apocynaceae	L	Twiner	Stem.	SEG, EG
8	*Aganosma marginata* (Roxb.) G. Don	Apocynaceae	L	Twiner	Stem.	SEG
9	*Allamanda cathartica* L.	Apocynaceae	C	Twiner	Stem.	EG, SEG
10	*Alyxia reinwardtii* var. *meiantha* (stap) Markgraf	Apocynaceae	L	Twiner	Stem.	SEG
11	*Ampelocissus barbata* (Wall.) Planch.	Vitaceae	C	Tendril climber	Inflorescence bearing branch tip.	MD
12	*Anamitra cocculus* (L.) Wight & Arn.	Menispermaceae	C	Root climber	Adventitious roots.	SEG, EG
13	*Ancistrocladus attenuatus* Dyer	Ancistrocladaceae	L	Hook climber	Inflorescence axis.	EG, MD
14	*Ancistrocladus tectorius* (Lour.) Merr.	Ancistrocladaceae	L	Hook climber	Inflorescence axis.	SEG, MD, EG, LI
15	*Anodendron manubrium* Merr.	Apocynaceae	L	Twiner	Stem.	SEG, EG
16	*Argyreia capitata* (Vahl) Choisy	Convolvulaceae	C	Twiner	Stem.	EG

17	*Argyreia kleiniana* (Roemer & Schultes) Raiz	Convolvulaceae	C	Twiner	Stem.	SEG
18	*Argyreia mollis* (N. L. Burman) Choisy	Convolvulaceae	C	Twiner	Stem.	DF, MD
19	*Argyreia osyrensis* (Roth) Choisy	Convolvulaceae	C	Twiner	Stem.	SEG, EG
20	*Argyreia wallichii* Choisy	Convolvulaceae	C	Twiner	Stem.	DF, EG
21	*Aristolochia tagala* Chamisso	Aristolochiaceae	C	Twiner	Stem.	EG, SEG
22	*Artabotrys speciosus* Kurz ex Hook. f. Thomson	Anonaceae	L	Hook climber	Inflorescence axis.	MD, EG
23	*Asparagus racemosus* Willd.	Liliaceae	C	Spiny twiner	Leader axis and branches.	DF
24	*Aspidopterys elliptica* (Bl.) A. Juss.	Malpghiaceae	C	Twiner	Stem.	EG, SEG
25	*Atalantia monophylla* DC.	Rutaceae	L	Hook climber	Stem.	EG, SEG
26	*Bauhinia stipularis* Korth.	Caesalpiniaceae	L	Twiner	Distal leaflets modified	EG, SEG
27	*Bougainvillea spectabilis* Willd.	Nyctaginaceae	L	Hook climber.	Stem.	DF, SEG
28	*Bridelia cinnamomea* Hook.f	Euphorbiaceae	C	Twiner	Stem.	LI
29	*Bridelia stipularis* (L.) Bl.	Euphorbiaceae	C	Twiner	Stem.	SEG, LI
30	*Byttneria andamanensis* Kurz	Sterculiaceae	L	Hook climber	Stem.	SEG, MD
31	*Byttneria grandifolia* DC.	Sterculiaceae	L	Hook climber	Stem.	SEG
32	*Caesalpinia andamanica* (Prain) Hattink	Caesalpiniaceae	L	Hook climber	Prickles on stem & leaf rachis.	SEG, EG, MG, LI
33	*Caesalpinia bonduc* (L.) Roxb.	Caesalpiniaceae	L	Hook climber	Prickles on stem & leaf rachis	SEG, MD, MG, LI
34	*Caesalpinia crista* L.	Caesalpiniaceae	L	Hook climber	Prickles on stem &	MD, DF

					leaf rachis	
35	*Caesalpinia cucullata* Roxb.	Caesalpiniaceae	L	Hook climber	Prickles on stem, leaf rachis & petiole.	SEG, LI
36	*Caesalpinia enneaphylla* Roxb.	Caesalpiniaceae	L	Hook climber	Recurved prickles on stem & leaf rachis	SEG, EG, LI
37	*Caesalpinia hymenocarpa* (Prain) Hattink	Caesalpiniaceae	L	Hook climber	Prickles on stem & leaf rachis	SEG
38	*Cajanus crassus* (Prain & King) van der Maesen	Papilionaceae	C	Twiner	Stem.	DF, SEG
39	*Calamus andamanicus* Kurz	Arecaceae	L	Thorny branch climber	Flagella or rachillar hooks.	SEG, MD, EG, LI
40	*Calamus longisetus* Griff.	Arecaceae	L	Thorny branch climber	Flagella or rachillar hooks.	SEG, MD, EG, MG, LI
41	*Calamus palustris* Griff.	Arecaceae	L	Thorny branch climber	Flagella or rachillar hooks.	SEG, MD, EG, MG, LI
42	*Calamus pseudorivalis* Becc.	Arecaceae	L	Thorny branch climber	Flagella or rachillar hooks.	SEG, MD, MG, LI, EG
43	*Calamus viminalis* Willd.	Arecaceae	L	Hook climber	Flagella or rachillar hooks.	SEG, MD, EG, LI
44	*Calycopteris floribunda* (Roxb.) Lam.	Combretaceae	L	Twiner and root climber.	Stem and presence of some adventitious roots.	SEG, MD, DF
45	*Canavalia cathartica* Thou.	Papilionaceae	C	Twiner	Stem.	EG
46	*Capparis floribunda* Wight	Cappariadaceae	L	Twiner & straggler	Leader axis of main stem and branches.	MD, LI
47	*Capparis micrantha* DC.	Cappariadaceae	L	Twiner & straggler	Leader axis of main	EG, SEG

					stem and branches.	
48	*Capparis sepiaria* L.	Cappariadaceae	L	Twiner & straggler	Leader axis of main stem and branches.	EG, SEG
49	*Capparis zeylanica* L.	Cappariadaceae	L	Twiner & straggler	Leader axis of main stem and branches.	MD, EG
50	*Cardiospermum halicacabum* L.	Sapindaceae	C	Tendril climber	Petiole modified	DF
51	*Cayratia japonica* (Thunb.) Gagnep.	Vitaceae	C	Tendril climber	Axillary branches.	SEG, LI
52	*Cayratia pedata* (Lam.) Juss. Ex Gagnep.	Vitaceae	C	Tendril climber	Axillary branches.	SEG, DF
53	*Cayratia trifolia (*L.) Domin	Vitaceae	C	Tendril climber	Modified axillary branches.	EG, SEG
54	*Celastrus paniculatus* Willd.	Celastraceae	L	Twiner/ branch climber	Leader axis or branch.	EG
55	*Chonemorpha fragrans* (Moon) Alston	Apocynaceae	L	Twiner	Stem.	EG, SEG
56	*Cissampelos pareira* L.	Menispermaceae	C	Twiner	Stem.	MD, DF
57	*Cissus discolor* Bl.	Vitaceae	C	Tendril climber	Axillary tips.	MD, SEG, DF
58	*Cissus elongata* Roxb.	Vitaceae	C	Tendril climber	Axillary tips.	MG, LI
59	*Cissus pentagona* Roxb.	Vitaceae	C	Tendril climber	Axillary tips.	MD
60	*Cissus repens* Lam.	Vitaceae	C	Tendril climber	Axillary tips.	LI
61	*Clematis smilacifolia* Wall. Subsp. *andamanica* Kapoor	Ranunculaceae	C	Tendril and hook climber	Tendril- common petiole and hook- terminal leaflets.	EG
62	*Clitoria ternate* L.	Papilionaceae	C	Twiner	Stem.	SEG, MD, DF
63	*Coccinia grandis* (L.) J. Voigt.	Cucurbitaceae	C	Tendril climber	Stem.	SEG, DF
64	*Cocculus hirsutus* (L.) Diels	Menispermaceae	C	Twiner	Stem.	MD

65	*Cocculus pendulus* (J.R. & G. Forst.) Diels	Menispermaceae	L	Twiner	Stem.	MD, DF
66	*Colubrina asiatica* (L.) Brongn.	Rhamnaceae	C	Twiner	Stem.	SEG, DF
67	*Combretum latifolium* Bl.	Combretaceae	L	Twiner	Leader axis or branch	EG, LI
68	*Combretum porterianum* (Cl.) Wall. ex Craib.	Combretaceae	L	Twiner/ branch climber	Leader axis or branch	MD, EG, MG
69	*Combretum punctatum* Bl. ssp. *squamossum* (Roxb. ex G. Don.) Excell.	Combretaceae	L	Twiner/ branch climber	Leader axis or branch	SEG, DF
70	*Combretum roxburghii* Spreng.	Combretaceae	L	Twiner/ branch climber	Leader axis or branch	MD, SEG, DF
71	*Connarus semidecandrus* Jack.	Connaraceae	L	Twiner/ branch climber	Leader axis or branch	MD, EG
72	*Cosmostigma racemosum* (Roxb.) Wight	Asclepiadaceae	C	Twiner	Stem.	EG, MD
73	*Cryptolepis buchananii Schultes*	Asclepiadaceae	C	Twiner	Stem.	EG, SEG
74	*Cryptolepis grandiflora* Wight	Asclepiadaceae	C	Twiner	Stem.	EG, MD
75	*Cryptolepis sinensis* (Loureiro) Merr.	Asclepiadaceae	C	Twiner	Stem.	MD
76	*Cucumis melo* L.	Cucurbitaceae	C	Tendril climber	Stem.	DD, DF
77	*Cuscuta reflexa* Roxb.	Convolvulaceae	C	Twiner	Stem.	MD, SEG
78	*Cyathostemma viridiflorum* Griff.	Anonaceae	L	Twiner	Branches twisted and coiled.	SEG, MD
79	*Cyclea peltata* (Lam.) Hook. f. & Thomson	Menispermaceae	C	Twiner	Stem.	SEG, LI
80	*Cyclea pendulina* Miers	Menispermaceae	C	Twiner	Stem.	EG, SEG
81	*Cynanchum corymbosum* Wight	Asclepiadaceae	L	Twiner	Stem.	EG, SEG

82	*Cynanchum wallichii* Wight	Asclepiadaceae	L	Twiner	Stem.	SEG
83	*Daemonorops kurzianus* Hook. f.	Arecaceae	L	Thorny branch climber	Flagella or rachillar hooks.	SEG, MD, EG LI
84	*Daemonorops manii* Becc	Arecaceae	L	Thorny branch climber	Flagella or rachillar hooks.	SEG, MD, EG, LI
85	*Dalbergia candenatensis* (Dennst.) Prain	Papilionaceae	C	Hook climber	Hooks and twisted branches.	SEG, MD, LI
86	*Dalbergia confertiflora* Benth.	Papilionaceae	L	Hook climber	Hooks and twisted branches.	MD, LI
87	*Dalbergia junghuhnii* Benth.	Papilionaceae	L	Hook climber	Hooks and twisted branches.	MG, LI
88	*Dalbergia volubilis* Roxb.	Papilionaceae	L	Hook climber	Hooks and twisted branches.	LI
89	*Davallia solida (Forst.)* Sw.	Davalliaceae	C	Twiner	Stem.	SEG, EG, MD, MG
90	*Derris andaminaca* Prain	Papilionaceae	L	Hook climber	Hooks and twisted branches.	MG, LI
91	*Derris elegans* Benth. *f. andamanensis*	Papilionaceae	L	Hook climber	Hooks and twisted branches.	MD, MG
92	*Derris elegans* Benth. *f. elegans*	Papilionaceae	L	Hook climber	Hooks and twisted branches.	SEG, EG, MG
93	*Derris elliptica* (Wall.) Benth.	Papilionaceae	L	Hook climber	Hooks and twisted branches	MD, EG, LI
94	*Derris scandens* (Roxb.) Benth.	Papilionaceae	L	Hook climber	Hooks and twisted branches	SEG, MD, EG, MG
95	*Derris trifolita* Lour.	Papilionaceae	L	Hook climber	Hooks and twisted	SEG, EG, MG

					branches	
96	*Desmos cochinchinensis* Lour.	Anonaceae	L	Twiner	Branches twisted and coiled.	EG, MD
97	*Dinochloa andamanica* Kurz	Poaceae	L	Branch climber	Branches.	SEG, MD, EG LI, MG
98	*Dinochloa scandens* (Bl. ex Nees) Kuntze	Poaceae	L	Branch climber	Branches.	SEG, EG
99	*Dioclea hexandra* (Ralph) Mabberley	Papilionaceae	C	Twiner	Stem.	MD, DF
100	*Dioscorea alata* L.	Dioscoreaceae	C	Twiner	Stem.	SEG, MD
101	*Dioscorea belophylla* Voigt ex Haines	Dioscoreaceae	C	Twiner	Leader axis.	SEG, MD
102	*Dioscorea bulbifera* L.	Dioscoreaceae	C	Twiner	Stem.	SEG, MD
103	*Dioscorea esculenta* (Loureiro) Burkill	Dioscoreaceae	C	Twiner	Stem.	MD, DF
104	*Dioscorea hispida* Dennst.	Dioscoreaceae	C	Spiny twiner	Stem.	SEG, DF
105	*Dioscorea oppositifolia* L.	Dioscoreaceae	C	Twiner	Leader axis.	DF, SEG
106	*Dioscorea pentaphylla* L.	Dioscoreaceae	C	Twiner	Stem.	SEG
107	*Dioscorea tomentosa* J. Koening ex Sprengel	Dioscoreaceae	C	Twiner	Stem.	SEG
108	*Dioscorea wallichii* Hook.f.	Dioscoreaceae	C	Twiner	Stem.	MD, DF
109	*Diploclisia glaucescens* (Bl.) Diels	Menispermaceae	C	Twiner	Branch	MG,SEG, LI
110	*Dischidia nummularia* R. Brown	Asclepiadaceae	EC	Root climber	Adventitious roots.	EG, SEG, LI, MG
111	*Dregea volubilis* (L. f.) Benth. ex Hook.	Asclepiadaceae	C	Twiner	Stem.	MD, SEG, LI
112	*Entada rheedei* Spr.	Mimosaceae	L	Tendril climber	Axillary branches.	SEG, MG

113	*Erycibe expansa* Wall. ex G. Don	Convolvulaceae	C	Twiner	Stem.	SEG, DD
114	*Evolvulus alsinoides* (L.) L.	Convolvulaceae	C	Twiner	Stem.	SEG, DD
115	*Ficus fruticosa* Roxb.	Moraceae	C	Root climber.	Short stiff nodal adventitious roots.	SEG, LI
116	*Ficus sagittata* Vahl	Moraceae	C	Root climber.	Short stiff nodal adventitious roots.	SEG, EG
117	*Ficus sarmentosa* Buchanan-Hamilton ex Smith	Moraceae	C	Root climber.	Short stiff nodal adventitious roots.	SEG, MD, EG, LI
118	*Flagellaria indica* L.	Flagellariaceae	C	Tendril climber	Leaf axis	SEG, MG, LI
119	*Friesodielsia khoshooi* Vasud. & T. Chakrab.	Anonaceae	L	Twiner	Branches twisted and coiled.	EG
120	*Genianthus laurifolius* Hook.f.	Asclepiadaceae	C	Twiner	Stem.	EG, LI
121	*Gloriosa superba* L.	Liliaceae	C	Tendril climber	Leaf tip	MD, DF
122	*Gnetum scandens*(Warburg) Chun	Gnetaceae	L	Twiner	Stem.	EG
123	*Gouania andamanica* var. *andamanica* King	Rhamnaceae	L	Tendril climber	Pedicel or peduncle.	EG, MD
124	*Gouania leptostachya* DC.	Rhamnaceae	L	Tendril climber	Pedicel or peduncle.	SEG, EG, DF
125	*Gymnema latifolium* Wall. ex Wight	Asclepiadaceae	C	Twiner	Stem.	EG, MD, DF
126	*Gymnopetalum cochinchinense* Kurz	Cucurbitaceae	C	Tendril climber	Stem.	MD, DF
127	*Gynochthodes macrophylla* Kurz	Rubiaceae	L	Twiner	Stem.	EG
128	*Harrisonia brownii* A.H.L.Juss.	Simaroubaceae	L	Hook climber	Stem.	LI
129	*Harrisonia perforata* (Blanco) Merr.	Simaroubaceae	L	Hook climber	Stem.	SEG, LI
130	*Heterostemma tanjoreense* Wight &	Asclepiadaceae	C	Twiner/ sometimes root climber	Stem.	MD, DD

	Arn.					
131	*Heterostemma wallichii* Wight	Asclepiadaceae	C	Twiner	Stem.	SEG, MD
132	*Hewittia malabarica* (L.) Suresh	Convolvulaceae	C	Twiner	Stem.	SEG, DF
133	*Hibiscus scandens* Roxb.	Malvaceae	L	Twiner	Stem.	DF, SEG, LI
134	*Hippocratea grahamii* Wight	Celastraceae	L	Twiner	Leader axis or branch.	SEG, DF
135	*Hiptage benghalensis* (L.) Kurz	Malpghiaceae	L	Twiner	Stem.	EG
136	*Hiptage thothathrii* Balakr. & Srivastava	Malpghiaceae	C	Twiner	Stem.	EG
137	*Hoya globulosa* Hook.f.	Asclepiadaceae	EC	Root climber	Adventitious roots from nodes.	MD, SEG, DF
138	*Hoya parasitica* Wall. ex Wight	Asclepiadaceae	EC	Root climber	Adventitious roots from nodes.	SEG, MD, LI
139	*Ichnocarpus frutescens* (L.) W. T. Aiton	Apocynaceae	L	Twiner	Stem.	EG, DF
140	*Illigera appendiculata* Bl.	Hernandiaceae	L	Twiner	Stem.	SEG, DF
141	*Ipomoea alba* L.	Convolvulaceae	C	Twiner	Stem.	SEG, DD, LI
142	*Ipomoea eriocarpa* R. Brown	Convolvulaceae	C	Twiner	Stem.	SEG
143	*Ipomoea hirtifolia* R. C. Fang & S. H. Huang	Convolvulaceae	C	Twiner	Stem.	MD, LI
144	*Ipomoea nil* (L.) Roth	Convolvulaceae	C	Twiner	Stem.	MD, LI
145	*Ipomoea obscura* (L.) Ker Gawler	Convolvulaceae	C	Twiner	Stem.	DF, SEG
146	*Ipomoea pes-caprae* (L.) R. Brown	Convolvulaceae	C	Twiner	Stem.	MD, DF
147	*Ipomoea pes-tigridis* L.	Convolvulaceae	C	Twiner	Stem.	SEG, DD, DF
148	*Ipomoea sepiaria* Roxb.	Convolvulaceae	C	Twiner	Stem.	MD, SEG, DF

149	*Jacquemontia paniculata* (N. L. Burman) H. Hallier	Convolvulaceae	C	Twiner	Stem.	EG, MD, DF
150	*Jasminum angustifolium* (L.) Willd.	Oleaceae	L	Twiner	Stem.	SEG, DF
151	*Jasminum arborescens* Roxb.	Oleaceae	L	Twiner	Stem.	EG, SEG, DF
152	*Jasminum azoricum* L.	Oleaceae	C	Twiner	Stem.	EG, SEG
153	*Jasminum cordifolium* Wall.	Oleaceae	C	Twiner	Stem.	SEG, DF
154	*Jasminum lanceolaria* Roxb.	Oleaceae	C	Twiner	Stem.	MD, SEG, DF
155	*Jasminum multiflorum* (N. L. Burman) Andrews	Oleaceae	C	Twiner	Stem.	EG, SEG
156	*Jasminum sambac* (L.) Aiton	Oleaceae	L	Twiner	Stem.	SEG, MD
157	*Jasminum subglandulosum* Kurz	Oleaceae	C	Twiner	Stem.	EG, MD, DF
158	*Korthalsia laciniosa* (Griff.) Mart.	Arecaceae	L	Thorny branch climber	Flagella or rachillar hooks.	EG, SEG, MD, LI
159	*Lablab purpureus* (L.) Sweet	Papilionaceae	C	Twiner	Stem.	MD, DF
160	*Luffa cylindrica* (L.) M. Roemer	Cucurbitaceae	C	Tendril climber	Stem.	SEG, MD, DD
161	*Lygodium flexuosum (*L.*)* Sw.	Lygodiaceae	C	Twiner	Stem.	SEG, MD, DD, LI
162	*Merremia umbellata subsp. orientalis* (H. Hallier) van Ooststroom	Convolvulaceae	C	Twiner	Stem.	SEG, MD, DD, MG
163	*Momordica charantia* L.	Cucurbitaceae	C	Tendril climber	Stem.	LI, MG
164	*Momordica cochinchinensis* Spreng.	Cucurbitaceae	C	Tendril climber	Stem.	MD, DD, DF
165	*Mucuna gigantea* (Willd.) DC.	Papilionaceae	L	Twiner	Stem.	MD, EG, MG, LI

166	*Mucuna monosperma* DC. ex Wight	Papilionaceae	L	Twiner	Stem.	MD, LI
167	*Myxopyrum smilacifolium* Bl.	Oleaceae	C	Twiner	Stem	EG, MD, DF
168	*Olax imbricata* Roxb.	Olacaceae	L	Twiner	Branch	EG
169	*Operculina turpethum* (L.) S. Manso	Convolvulaceae	C	Twiner	Stem.	SEG, DD
170	*Operculina riedeL* (Oliv.) Oost	Convolvulaceae	C	Twiner	Stem.	MD, DF
171	*Paederia foetida* L.	Rubiaceae	C	Twiner	Stem.	SEG, MD
172	*Paederia scandens* (Lour.) Merr.	Rubiaceae	C	Twiner	Stem.	SEG, MD, DF
173	*Parabaena sagittata* Miers ex Hook. f. & Thomson	Menispermaceae	L	Twiner	Stem.	EG, MD, DF
174	*Paramignya andamanica* (King) Tan.	Rutaceae	L	Hook climber	Stem.	SEG, EG, LI
175	*Parsonsia alboflavescens* (Dennstedt) Mabberley	Apocynaceae	L	Twiner	Stem.	EG, SEG, MD
176	*Passiflora foetida* L.	Passifloraceae	C	Tendril climber	Branch and peduncle.	SEG, MD, DF
177	*Pathos scandens L.*	Araceae	C	Root climber	Adventitious roots from nodes	EG, SEG, MD, MG, LI
178	*Piper betle* L.	Piperaceae	C	Root climber	Nodal adventitious roots	EG, SEG, LI
179	*Piper longum* L.	Piperaceae	C	Root climber	Nodal adventitious roots	SEG, MD
180	*Piper pedicellatum* C. de Candolle	Piperaceae	C	Root climber	Nodal adventitious roots	EG, MD, SEG, LI
181	*Piper wallichii* (Miquel) Handel-Mazzetti	Piperaceae	C	Root climber	Nodal adventitious roots	EG, MD, DD
182	*Pisonia aculeata* L.	Nyctaginaceae	L	Hook climber	Stem	EG, MD, DF

183	*Plecospermum andamanicum* King	Moraceae	L	Hook climber.	Short stiff nodal adventitious roots.	SEG, MD, EG, LI
184	*Porana spectabilis* Kurz	Convolvulaceae	C	Twiner	Stem	MD, EG
185	*Pterolobium macropterum* Kurz	Caesalpiniaceae	L	Hook climber	Prickles on stem & leaf rachis.	EG, SEG
186	*Pueraria tuberosa* (Willd.) DC.	Papilionaceae	L	Twiner	Stem.	SEG, MD
187	*Pycnarrhena longifolia* (Decne ex Miq.) Bece.	Menispermaceae	C	Twiner	Stem.	EG, DD, DF
188	*Quisqualis indica* L.	Combretaceae	L	Twiner/ branch climber	Leader axis or branch	SEG, MD
189	*Raphidophora pertusa* (Roxb.) Schott	Araceae	L.	Root climber	Adventitious roots from nodes	SEG, MD, EG, DF, MG, LI
190	*Salacia exsculpta* Korth.	Celastraceae	L	Twiner	Leader axis or branch.	EG, SEG
191	*Salacia tortuosa* Griff.	Celastraceae	L	Twiner	Leader axis or branch.	EG, SEG
192	*Sarcostemma acidum* (Roxb.) Voigt	Asclepiadaceae	C	Twiner	Stem.	MD, SEG
193	*Sarcostigma kleinii* Wight & Arn.	Icacinaceaceae	L	Twiner	Stem.	EG
194	*Scindapsus officinalis* (Roxb.) Schott	Araceae	C	Root climber	Adventitious roots from nodes.	SEG, MD, LI
195	*Smilax aspera L.*	Smilacaceae	C	Prickle and tendril climber	Tendril-modified stipule.	SEG, MD
196	*Smilax aspericaulis* Wall. ex A. de Candolle	Smilacaceae	L	Prickle and tendril climber	Tendril-modified stipule.	EG, MD, SEG, MG, LI

197	*Smilax bracteata* C. Presl	Smilacaceae	C	Prickle and tendril climber	Tendril-modified stipule.	SEG, MD
198	*Smilax glabra* Roxb.	Smilacaceae	C	Prickle and tendril climber	Tendril-modified stipule.	EG, MD
199	*Smilax hemsleyana* Craib	Smilacaceae	C	Prickle and tendril climber	Tendril-modified stipule.	SEG
200	*Smilax lanceaefolia* Roxb.	Smilacaceae	C	Prickle and tendril climber	Tendril-modified stipule.	EG, SEG
201	*Smilax ovalifolia* Roxb.	Smilacaceae	C	Prickle & tendril climber	Tendril-modified stipules	SEG, MD
202	*Spatholobus acuminatus* Benth.	Papilionaceae	L	Twiner	Stem.	EG, SEG, MD, DF
203	*Sphenodesme involucrata* (Presl) Robinson	Verbenaceae	L	Twiner	Stem.	MD, SEG, DF
204	*Stephania andamanica* Diels	Menispermaceae	C	Twiner	Branch modified	EG, MD
205	*Stephania elegans* Hook.f. & Thomson	Menispermaceae	C	Twiner	Branch modified	EG, SEG
206	*Stephania hernandifolia* (Willd.) Walpers	Menispermaceae	C	Twiner	Branch modified	EG, MD
207	*Stephania japonica* (Thunb.) Miers	Menispermaceae	C	Twiner	Branch modified	LI
208	*Stephania japonica* var: *discolor* (Bl.) Forman	Menispermaceae	C	Twiner	Branch modified	SEG, MD
209	*Stictocardia tiliifolia* (Desrousseaux) H. Hallier	Convolvulaceae	C	Twiner	Stem.	EG, MD, DD, DF
210	*Stixis suaveolens* (Roxb.) Pierre	Cappariadaceae	L	Twiner	Leader axis of main stem and branches.	SEG

211	*Strongylodon lucidus* (Frost.) Seemann	Papilionaceae	C	Twiner	Stem.	MD, SEG, DF
212	*Strophanthus caudatus* (L.) Kurz	Apocynaceae	C	Twiner	Stem.	EG, MD, DF
213	*Strophanthus wallichii* A. de Candolle	Apocynaceae	C	Twiner	Stem.	EG, DF
214	*Strychnos anandamanensis* Hill.	Loganiaceae	L	Hook climber	Hooks and twisted branches	EG, MD, MG
215	*Strychnos axillaris* Colebrooke	Loganiaceae	L	Hook climber	Hooks and twisted branches	EG, MD,
216	*Strychnos minor* Dennst.	Loganiaceae	L	Tendril climber	Modified branchlet ends.	MD, EG, MG
217	*Strychnos wallichiana* Steudel ex A. de Candolle	Loganiaceae	L	Tendril climber	Modified branchlet ends.	SEG, MD, EG
218	*Tetracera sarmentosa ssp. andamanica* (Hoogl.) Hoohl.	Dilleniaceae	L	Twiner	Rough stem and leader axis.	SEG, MD, EG, MG, LI
219	*Tetrastigma andamanicum* (King) Suesseng.	Vitaceae	L	Tendril climber	Apical part of the main axis, apparently leaf opposed.	SEG, MD, EG
220	*Tetrastigma lanceolarium* (Roxb.) Planchon in A. & C. DC.	Vitaceae	C	Tendril climber	Apical part of the main axis, apparently leaf opposed.	SEG, EG, LI
221	*Tetrastigma leucostaphyllum* (Dennst.) Alston ex Mabb.	Vitaceae	C	Tendril climber	Apical part of the main axis, apparently leaf opposed.	MD, DD
222	*Tetrastigma planicaule* (Hook.) Gagnepain	Vitaceae	C	Tendril climber	Apical part of the main axis, apparently leaf opposed.	SEG, MD
223	*Tetrastigma serrulatum* (Roxb.) Planch.	Vitaceae	C	Tendril climber	Apical part of the main axis, apparently	SEG, MD

					leaf opposed.	
224	*Thunbergia alata* Bojer ex Sims	Thunbergiaceae	C	Twiner	Stem.	MD, DF, DD
225	*Thunbergia coccinea* Wall. ex Don.	Thunbergiaceae	C	Twiner	Stem.	SEG, DF
226	*Thunbergia fragrans* Roxb.	Thunbergiaceae	C	Twiner	Stem.	SEG, EG
227	*Thunbergia grandiflora* (Rottler) Roxb.	Thunbergiaceae	C	Twiner	Stem.	EG, SEG, DD, DF
228	*Thunbergia laurifolia* Lindley	Thunbergiaceae	C	Twiner	Stem.	SEG, MD, EG, LI
229	*Thunbergia mysorensis* (Wight) Anderson ex Bedd.	Thunbergiaceae	C	Twiner	Stem.	MD, DF
230	*Tinospora cordifolia* (Willd.) Hook.f. & Thomson	Menispermaceae	C	Twiner	Stem.	SEG, MD, EG, LI
231	*Tinospora glabra* (Burm.f.) Merr	Menispermaceae	C	Twiner	Stem.	EG, SEG
232	*Tournefortia ovata* Wall. ex G. Don	Boraginaceae	C	Twiner	Leader axis of main stem or branches.	MD, SEG, DF
233	*Toxocarpus concanensis* Hook.f.	Asclepiadaceae	C	Twiner	Stem	EG
234	*Toxocarpus himalensis* Falconer ex Hook.f.	Asclepiadaceae	C	Twiner	Stem.	EG, DF
235	*Tridynamia megalantha* (Merr.) Staples	Convolvulaceae	C	Twiner	Stem.	MD, DD, DF
236	*Tylophora capparidifolia* Wight & Arn.	Asclepiadaceae	C	Twiner	Stem.	DF, DD
237	*Tylophora glabra* Costantin	Asclepiadaceae	C	Twiner	Stem.	MD, SEG
238	*Tylophora zeylanica* Dene.	Asclepiadaceae	C	Twiner	Stem.	SEG, DF, LI
239	*Tylophora. indica* (Burm.f.) Merr.	Asclepiadaceae	C	Twiner	Stem.	MD, SEG, DF

240	*Uncaria sessilifructus* Roxb	Rubiaceae	L	Hook climber (Paired hooks)	Axillary branchlets.	EG, MD
241	*Uvaria andamanica* King	Anonaceae	L	Branch climber	Branches twisted and coiled.	MD, SEG
242	*Uvaria cordata* (Dunal) Alston	Anonaceae	L	Branch climber	Branches twisted and coiled.	MD, EG
243	*Uvaria hamiltoni* var. *Kurzii* Arn.	Anonaceae	L	Branch climber	Branches twisted and coiled.	EG, MD
244	*Uvaria rufa* Bl.	Anonaceae	L	Branch climber	Branches twisted and coiled.	MD, SEG
245	*Vallaris solanacea* (Roth) Kuntze	Apocynaceae	C	Twiner	Stem.	EG, SEG
246	*Ventilago denticulate* Willd.	Rhamnaceae	L	Twiner	Stem.	EG, MD
247	*Ventilago madraspatana* Gaertn.	Rhamnaceae	L	Twiner	Stem.	SEG, EG, LI
248	*Vigna adenantha* (G. F. Meyer) Marechal & Stainier	Papilionaceae	C	Twiner	Stem.	MD, DD, DF
249	*Vigna marina* (Burm. f.) Merr.	Papilionaceae	C	Twiner	Stem.	MD, SEG
250	*Vigna pilosa* (Willd.) Baker	Papilionaceae	C	Twiner	Stem.	SEG, DF
251	*Vigna unguiculata* (L.) Walp. ssp. *cylindrical* (L.) van Eseltine	Papilionaceae	C	Twiner	Stem.	MD, DF
252	*Ziziphus oenoplia* (L.) Mill var. *oenoplia*	Rhamnaceae	L	Hook climber	Stem and thorns.	EG, SEG
253	*Ziziphus oenoplia* (L.) Mill Var. *pallens* Bhandari & Bhansali	Rhamnaceae	L	Hook climber	Stem and thorns.	EG, MD

In the Degraded forests, 65 species were found, of which all are angiospermous. Within the angiosperms, 56 species are from dicotyledons (represented by 45 genera of 19 families) and 9 species are from monocotyledons (6 genera of 4 families).

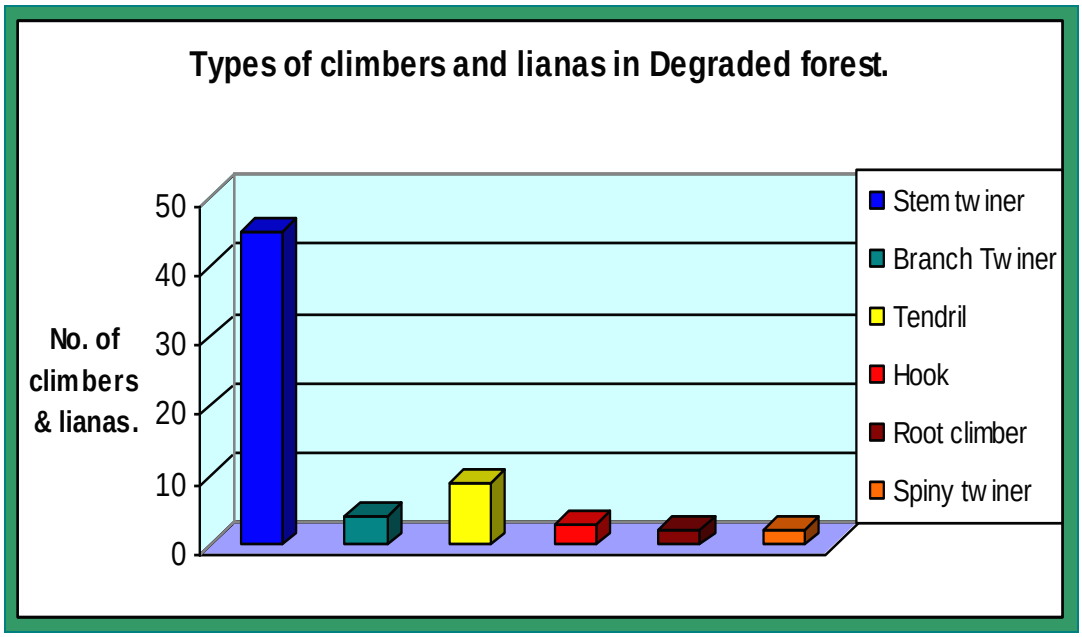

Figure 8: Types of climbers and lianas in degraded forest

In degraded forest, 46 species (70.76%) are stem twiners, 9 (13.84%) tendril climbers, 4 (6.15%) branch twiners, 3 (4.61%) hook climbers, 2 (3.07%) root climbers, and 2 spiny twiners. In these forests, 49 species (75.38%) are climbers and 16 species (24.61%) are lianas.

ACKNOWLEDGMENT
I am grateful to Dr. C. B. S. Dutt, NRSA and Prof. P.K.Mukherjee, Department of Botany; Calcutta University. Author is also thankful to Forest Department of Andaman & Nicobor Islands for their necessary logistic support. This study was funded by DBT- DOS. India.

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