



Journal of Population Therapeutics & Clinical Pharmacology

RESEARCH ARTICLE
DOI: 10.47750/jptcp.2023.1083

Uses Of Medicinal Flowering Plant Species In Lang Son Province, Vietnam

Bui Thu Ha¹, Tran The Bach^{2,3*}

¹Hanoi National University of Education (HNUE), 136 Xuan Thuy Street, Cau Giay District, Hanoi, Vietnam

²Institute of Ecology and Biological Resources (IEBR), Vietnam Academy of Science and Technology (VAST), 18 Hoang Quoc Viet Street, Cau Giay District, Hanoi, Vietnam

³Graduate University of Science and Technology (GUST), Vietnam Academy of Science and Technology (VAST), 18 Hoang Quoc Viet Street, Cau Giay District, Hanoi, Vietnam

***Corresponding author:** Institute of Ecology and Biological Resources (IEBR), Vietnam Academy of Science and Technology (VAST), 18 Hoang Quoc Viet Street, Cau Giay District, Hanoi, Vietnam ,
Email : tranthebach.botany@gmail.com

Submitted: 11 November 2022; Accepted: 15 December 2022; Published: 24 January 2023

ABSTRACT

Establishment of list 1074 medicinal flowering plant species of 623 genera, 155 families in Lang Son province of Vietnam based on references, studies at herbaria and investigations. 1074 species with coded diseases/uses data. 10 families with rich number of species are Fabaceae (103 species), Euphorbiaceae (91 species), Asteraceae (75 species), Rubiaceae (36 species), Lamiaceae (36 species), Poaceae (33 species), Caesalpiniaceae (27 species), Rosaceae (22 species), Urticaceae (22 species) and Moraceae (21 species). 13 genera with rich number of species are *Desmodium* (14 species), *Ficus* (14 species), *Solanum* (12 species), *Crotalaria* (11 species), *Ardisia* (9 species), *Euphorbia* (9 species), *Glochidion* (9 species), *Bauhinia* (8 species), *Acacia* (7 species), *Indigofera* (7 species), *Litsea* (7 species), *Mallotus* (7 species) and *Phyllanthus* (7 species). 809 species are used to treat 49 diseases/medical uses (asthma, brain hemorrhage, bronchitis, burned, cancer, cirrhosis, detoxify, diabetes, diuretic, dysentery, encephalitis, eyesore, flu, fracture, galactopoietic, gastritis, gonorrhea, Hemorrhoids, headache, heart and blood pressure diseases, hemostatic, hepatitis, hurt fall, inflammatory bowel, irregular menstruation, keratitis, kidney stone, malaria, measles, mumps, nephritis, obese, oedema, otitis, paralytic, pertussis, pimple, pneumonia, rheumatism, scrofulous, sinusitis, snake bite, sore throat, sterile, syphilis, toothache, tranquilizer, urolithiasis, vaginitis).

26 species are used as dye plants; 79 species are used as edible plants (fruit, seed); 13 species are used as essential oil plants; 15 species are used as fibre plants; 57 species are used as food for animal; 96 species are used as ornamental plants; 77 species are used as timber plants; 141 species are used as vegetable plants. 33 endangered species have been recorded in Vietnam Red Data Book (2007).

Keywords: *Diseases; Lang Son; Flowering Plants; Treatment; Use; Vietnam*

INTRODUCTION

Lang Son is a province in northern Vietnam. This province is the unique geographical location, special climatic conditions, should there be a very diverse and abundant flora of Vietnam. Studying medicinal plants of the flora of Lang Son province will help us understand well the composition of medicinal plant resources. There are almost no studies on the diversity of medicinal plants and medical values in a systematic way, so their use and development face many difficulties. The evaluation of the diversity of medicinal uses will help guide more specific research in medicine and pharmacy. This study will address that problem. For the correct use of plants, identification is an important first step. Vietnam has scientists who specialize in flowering plants, but few scientists who study the rest of the plant groups. Therefore, the topic selected flowering plants for research to ensure high accuracy of species identification. Because of the lack of detailed information in the published papers of list of medicinal plant species with detailed diseases, the direction of studies will be difficult. The research in this paper will overcome that difficulty.

MATERIALS AND METHODS

Establish List of Species in Lang Son province based on references [1-13], investigations in Lang Son province and study on specimens at herbaria (HN herbarium of Institute of Ecology and Biological Resources (IEBR), Vietnam Academy of Science and Technology (VAST); VNM herbarium of Institute of Tropical Biology (ITB), VAST). The identification of species based on the morphological comparison method. Scientific names of species and families according to the Checklist of plants in Vietnam [10, 11].

Names of 49 diseases according to Vo VC (2012) [13] and Medicinal plants and medicinal animals in Vietnam (2006, 2011) [1-3]. List of endangered species based on Vietnam Red Data Book (2007) [12].

Coding uses/diseases

Dy: Dye; Ed: Edible (fruit, seed); Es: Essential oil; Fi: Fibre; FoA: Food for animal; Me: Medicinal plant; Or: Ornamental plant; Ti: Timber; Ve: Vegetable.

1: Tranquillizer; 2: Vaginitis; 3: Paralytic; 4: Obese; 5: Flu; 6: Eyesore; 7: Toothache; 8: Detoxify; 9: Syphilis; 10: Asthma; 12: Gonorrhea; 13: Dysentery; 14: Galactopoietic; 15: Diuretic; 16: Mumps; 17: Snake bite; 18: Urolithiasis; 19: Malaria; 20: Rheumatism; 21: Diabetes; 22: Heart and blood pressure diseases; 23: Hemorrhoids; 24: Cancer; 25: Gastritis; 26: Hepatitis; 27: Keratitis; 28: Sore throat; 29: Encephalitis; 30: Nephritis; 31: Sinusitis; 32: Sterile; 33: Cirrhosis; 34: Brain hemorrhage; 35: Pimple; 36: Hemostatic; 37: Fracture; 38: Burned; 39: Pneumonia; 40: Bronchitis; 41: Hurt fall; 42: Irregular menstruation; 43: Kidney stone; 44: Measles; 45: Headache; 46: Inflammatory bowel; 47: Oedema; 48: Otitis; 49: Pertussis; 50: Scrofulous (Note: 11: a disease is not mentioned, therefore, there are 49 diseases / medical uses).

Coding families (Order of families according to the Checklist of plants in Vietnam [10, 11])

1: MAGNOLIACEAE. 2: ANNONACEAE. 5: HERNANDIACEAE. 6: CHLORANTHACEAE. 8: LAURACEAE. 9: SAURURACEAE. 10: PIPERACEAE. 11: ARISTOLOCHIACEAE. 14: NYMPHAEACEAE. 16: CERATOPHYLLACEAE. 17: ILLICIAEAE. 19: NELUMBONACEAE. 21: SARGENTODOXACEAE. 22:

MENISPERMACEAE. 23: RANUNCULACEAE. HIPPOCASTANACEAE. 141: SABIACEAE. 143:
24: BERBERIDACEAE. 25: PAPAVERACEAE. 26: LINACEAE. 148: OXALIDACEAE. 151:
FUMARIACEAE. 28: ALTINGIACEAE. 29: BALSAMINACEAE. 152: POLYGALACEAE.
PLATANACEAE. 31: ULMACEAE. 32: 156: AUCUBACEAE. 157: ALANGIACEAE. 161:
MORACEAE. 33: CANNABACEAE. 34: ARALIACEAE. 162: APIACEAE. 163:
URTICACEAE. 35: CASUARINACEAE. 36: AQUIFOLIACEAE. 164: ICACINACEAE. 166:
FAGACEAE. 37: BETULACEAE. 40: CELASTRACEAE. 168: RHAMNACEAE. 169:
JUGLANDACEAE. 42: NYCTAGINACEAE. 43: VITACEAE. 170: LEEACEAE. 171: OLEACEAE.
MOLLUGINACEAE. 47: PORTULACEAE. 48: 174: OPILIACEAE. 175: ERYTHROPALACEAE.
BASELLACEAE. 49: CARYOPHYLLACEAE. 50: 176: CARDIOPTERIDACEAE. 179:
AMARANTHACEAE. 51: CHENOPODIACEAE. LORANTHACEAE. 182: ELAEAGNACEAE. 183:
52: POLYGONACEAE. 54: DILLENACEAE. 57: PROTEACEAE. 184: CAPRIFOLIACEAE. 185:
DIPTEROCARPACEAE. 59: THEACEAE. 62: VALERIANACEAE. 187: LOGANIACEAE. 189:
CLUSIACEAE. 63: HYPERICACEAE. 64: APOCYNACEAE. 190: ASCLEPIADACEAE. 191:
ELATINACEAE. 65: FLACOURTIACEAE. 67: GENTINIACEAE. 192: MENYANTHACEAE. 193:
VIOLACEAE. 70: PASSIFLORACEAE. 72: RUBIACEAE. 195: CONVULVACEAE. 196:
CARICACEAE. 73: CUCURBITACEAE. 75: CUSCUTACEAE. 197: HYDROPHYLLACEAE.
BEGONIACEAE. 76: CAPPARACEAE. 78: 198: BORAGINACEAE. 199: SOLANACEAE.
BRASSICACEAE. 80: SALICACEAE. 87: 200: BUDDLEJACEAE. 201:
STYRACACEAE. 88: SYMPLOCACEAE. 89: SCROPHULARIACEAE. 202: BIGNONIACEAE.
EBENACEAE. 90: SAPOTACEAE. 91: 203: PEDALIACEAE. 205: GESNERIACEAE. 207:
MYRSINACEAE. 92: PRIMULACEAE. 94: LENTIBULARIACEAE. 209: ACANTHACEAE.
TILIACEAE. 95: STERCULIACEAE. 96: 211: VERBENACEAE. 212: LAMIACEAE. 213:
BOMBACACEAE. 97: MALVACEAE. 100: CALLITRICHACEAE. 214: CAMPANULACEAE.
EUPHORBIACEAE. 102: THYMELEACEAE. 105: 219: ASTERACEAE. 221: ALISMACEAE. 229:
ITEACEAE. 106: HYDRANGEACEAE. 109: CONVALLARIACEAE. 229: LILIACEAE. 230:
CRASSULACEAE. 111: ROSACEAE. 113: HYPOXIDACEAE. 232: SMILACACEAE. 233:
MIMOSACEAE. 114: CAESALPINIACEAE. 115: STEMONACEAE. 234: DIOSCOREACEAE. 235:
FABACEAE. 116: CONNARACEAE. 120: TACCACEAE. 238: IRIDACEAE. 244:
LYTHRACEAE. 123: RHIZOPHORACEAE. 125: COSTACEAE. 245: ZINGIBERACEAE. 246:
COMBRETACEAE. 126: MYRTACEAE. 127: CANNACEAE. 247: MARANTACEAE. 248:
MELASTOMACEAE. 128: ONAGRACEAE. ORCHIDACEAE. 249: JUNCACEAE. 250:
131: HALORAGACEAE. 132: CYPERACEAE. 251: BROMELIACEAE. 252:
ANACARDIACEAE. 133: SIMAROUBACEAE. COMMELINACEAE. 259: POACEAE. 260:
134: RUTACEAE. 135: MELIACEAE. 136: ARECACEAE. 261: ARACEAE. 262:
STAPHYLEACEAE. 138: SAPINDACEAE. 139: LEMNACEAE. 265: TYPHACEAE.

Use Microsoft Access

manage data, evaluate the diversity of taxa (families, genera, species), uses and medical values.

RESULTS

Coded data of medicinal flowering plants in Lang Son province: Coded family- Scientific name- Coded Use- Coded Medical value /

97-Abelmoschus manihot- Me Ve 18 38 / 97-Abelmoschus moschatus- Me 13 15 17 18 25 35 38 45 / 115-Abrus precatorius- Me 5 35 / 115-Abrus pulchellus- Me 15 20 26 33 / 97-Abutilon indicum- Me 5 15 20 26 39 45 46 / 113-Acacia auriculiformis-Ti Me 17 / 113-Acacia caesia- Me Dy 19 / 113-Acacia concinna- Me Ed Ve / 113-Acacia confusa-Ti Me Dy / 113-Acacia farnesiana- Me Or Es Dy 5 35 36 / 113-Acacia leucophloea- Me Dy 17 / 113-Acacia pennata- Me Ve 17 20 / 100-Acalypha australis- Me / 100-Acalypha brachystachya- Me 13 / 100-Acalypha indica- Me 10 39 45 / 100-Acalypha kerrii- Me / 100-Acalypha siamensis- Me 15 / 100-Acalypha wilkesiana- Me Or 17 20 38 / 161-Acanthopanax trifoliatum- Me 2 5 18 20 32 35 41 43 46 / 50-Achyranthes aspera- Me Ve 5 13 16 19 20 30 41 42 47 / 50-Achyranthes bidentata- Me 19 20 22 28 / 252-Aclisia secundiflora- Me / 134-Acronychia pedunculata- Me 13 15 20 35 41 / 100-Actephila excelsa- Me / 8-Actinodaphne pilosa- Me / 113-Adenanthera microsperma-Ti Me Or Dy 13 / 201-Adenosma caeruleum- Me 3 17 20 26 / 219-Adenostemma lavenia- Me Ve 5 13 17 19 26 38 45 / 115-Aeschynomene indica- Me 13 26 / 139-Aesculus assamica-Ti Me 13 45 / 111-Agrimonia pilosa- Me 13 19 50 / 111-Agrimonia viscidula- Me 5 13 23 35 46 / 133-Ailanthus triphysa-Ti Me 2 13 / 212-Ajuga macrosperma- Me 17 22 35 38 39 40 / 212-Ajuga nipponensis- Me 26 28 39 / 157-Alangium

chinense- Me Dy 17 20 22 41 45 /

157-Alangium kurzii-Ti Me 20 41 / 113-Albizia chinensis-Ti Me Dy 17 46 / 113-Albizia corniculata- Me Or 17 / 113-Albizia procera-Ti Me Dy FoA 10 17 / 100-Alchornea rugosa- Me 5 19 / 100-Alchornea tiliifolia- Me / 100-Alchornea trewioides- Me 13 36 40 / 100-Aleurites moluccana-Ti Me 8 13 / 221-Alisma plantago-aquatica- Me 30 43 / 229-Allium chinensis- Me Ve 2 13 38 / 138-Allophylus caudatus- Me 20 26 30 / 138-Allophylus viridis- Me 5 20 / 261-Alocasia cucullata- Me Or 5 17 38 40 / 261-Alocasia longiloba- Me Ve / 245-Alpinia globosa- Me 8 13 / 245-Alpinia maclurei- Me / 245-Alpinia malaccensis- Me Or Ed / 245-Alpinia officinarum- Me 19 20 25 / 189-Alstonia scholaris-Ti Me 5 10 13 19 20 40 / 115-Alysicarpus vaginalis- Me FoA 13 / 50-Amaranthus spinosus- Me Ve FoA 13 17 22 35 38 47 / 50-Amaranthus tricolor- Me Or Ve 13 17 / 120-Ammannia baccifera- Me / 261-Amorphophallus paeoniifolius- Me 13 20 21 / 169-Ampelopsis cantoniensis- Me 5 20 25 26 28 38 / 169-Ampelopsis heterophylla- Me 20 35 / 261-Anadendrum montanum- Me Ve 17 19 / 251-Ananas comosus- Me Ed 13 38 / 162-Angelica decursiva- Me 5 10 20 40 45 / 212-Anisochilus pallidus- Me 17 20 43 / 219-Anisopappus chinensis- Me 45 / 52-Antenoron filiforme- Me 13 20 / 32-Antiaris toxicaria- Me Ed 13 / 100-Antidesma fordii-Ti Me Ed / 100-Antidesma fruticosum- Me Ed / 100-Antidesma ghaesembilla- Me Ed Ve 20 39 45 / 100-Antidesma paxii- Me 36 / 135-Aphanamixis grandiflora- Me 17 20 / 162-Apium graveolens- Me Ve 4 15 18 20 24 35 40 43 50 / 259-Apluda mutica- Me FoA 17 / 100-Aporosa dioica-Ti Me Ed / 115-Arachis hypogaea- Me FoA / 161-Aralia chinensis- Me 2 17 20 21 26 28 30 41 47 / 161-Aralia dasyphylla- Me 20 41 / 161-Aralia searelliana- Me / 161-Aralia vietnamensis- Me 21 / 113-Archidendron clypearia-Ti Me Dy 38 / 113-

Archidendron lucidum-Ti Me 20 38 / 91-
Ardisia brunnescens- Me / 91-*Ardisia chinensis*- Me
 / 91-*Ardisia conspersa*- Me 41 / 91-*Ardisia elegans*-
 Me 20 41 / 91-*Ardisia lindleyana*- Me 28 41 / 91-
Ardisia maclurei- Me / 91-*Ardisia quinquegona*- Me
 7 / 91-*Ardisia silvestris*- Me 13 28 / 91-*Ardisia*
virens- Me 37 41 46 / 260-*Areca catechu*- Me Or Dy
 5 13 19 46 47 / 260-*Arenga caudata*- Me / 260-
Arenga pinnata- Me Or 5 15 40 / 25-*Argemone*
mexicana- Me 9 27 / 195-*Argyreia capitata*- Me 10
 / 195-*Argyreia pierreana*- Me 20 40 / 11-
Aristolochia contorta- Me 20 47 / 11-*Aristolochia*
kwangsiensis- Me 13 25 28 / 11-*Aristolochia tagala*-
 Me 25 35 46 / 11-*Aristolochia tuberosa*- Me 15 20 /
 2-*Artabotrys hongkongensis*- Me 20 / 219-
Artemisia annua- Me Ve 5 19 / 219-*Artemisia*
carvifolia- Me Ve / 219-*Artemisia indica*- Me Es 20
 / 219-*Artemisia japonica*- Me Ve 5 7 17 19 20 38 45
 / 219-*Artemisia lactiflora*- Me Ve 17 26 38 / 219-
Artemisia vulgaris- Me Es Ve 13 19 20 45 / 32-
Artocarpus styracifolius-Ti Me Ed / 11-*Asarum*
blumei- Me 40 / 11-*Asarum caudigerum*- Me 7 10
 40 44 45 / 11-*Asarum reticulatum*- Me / 229-
Aspidistra tonkinensis- Me Or 36 / 229-*Aspidistra*
typica- Me 8 13 19 20 / 219-*Aster trinervius*- Me 19
 / 115-*Astragalus sinicus*- Me Ve 6 23 28 / 156-
Aucuba japonica- Me / 148-*Averrhoa bilimbi*- Me
 23 / 148-*Averrhoa carambola*- Me Ed 13 19 20 25
 35 44 45 / 100-*Baccaurea ramiflora*-Ti Me Ed Ve /
 100-*Baliospermum montanum*- Me 10 20 28 / 48-
Basella rubra- Me Ve 6 8 12 13 14 15 17 35 37 38
 41 46 / 212-*Basilicum polystachyon*- Me 2 20 / 114-
Bauhinia acuminata- Me Or 17 / 114-*Bauhinia*
bracteata- Me / 114-*Bauhinia championii*- Me 20 41
 / 114-*Bauhinia khasiana*- Me 20 / 114-*Bauhinia*
pyrrhoclada- Me / 114-*Bauhinia scandens*- Me /
 114-*Bauhinia touranensis*- Me / 114-*Bauhinia*
variegata- Me Or Dy 13 17 25 39 46 / 189-
Beaumontia grandiflora- Me 20 / 189-*Beaumontia*
pitardii- Me / 75-*Begonia semperflorens*- Me Or 35
 / 75-*Begonia tonkinensis*- Me 36 / 238-*Belamcanda*
chinensis- Me Or 7 28 / 168-*Berchemia lineata*- Me
 17 19 20 26 40 41 / 168-*Berchemia loureiriana*-
 Me 20 / 64-*Bergia ammannioides*- Me 17 / 37-
Betula alnoides-Ti Me 5 13 17 19 20 / 219-*Bidens*
bipinnata- Me 17 19 20 26 28 30 / 219-*Bidens*
biternata- Me 17 29 46 / 219-*Bidens pilosa*- Me Ve
 5 7 13 19 20 23 25 26 28 / 148-*Biophytum*
sensitivum- Me 12 15 21 35 43 46 / 100-*Bischofia*
javanica-Ti Me Ed Ve 20 24 28 39 / 189-
Blaberopus mairei- Me / 219-*Blumea chinensis*-
 Me / 219-*Blumea hieracifolia*- Me 8 / 219-*Blumea*
lacera- Me Ve 8 35 / 219-*Blumea lanceolaria*- Me
 Ve 5 15 20 28 40 45 / 219-*Blumea martiniana*- Me
 5 45 / 219-*Blumea megacephala*- Me 5 / 34-
Boehmeria macrophylla- Me 20 / 34-*Boehmeria*
nivea- Me Ve Fi FoA 5 15 17 23 30 41 44 47 / 34-
Boehmeria tonkinensis- Me Ve / 96-*Bombax*
malabaricum- Me 12 13 46 / 193-*Borreria*
articularis- Me / 193-*Borreria hispida*- Me Ve /
 198-*Bothriospermum tenellum*- Me Or Ed 8 9 12
 15 / 42-*Bougainvillea brasiliensis*- Me Or Ve 2 42
 / 115-*Bowringia callicarpa*- Me 20 / 49-
Brachystemma calycina- Me / 78-*Brassica*
campestris- Me 35 / 78-*Brassica chinensis*- Me Ve
 17 / 78-*Brassica juncea*- Me Ve / 78-*Brassica*
oleracea- Me Ve 13 17 25 28 35 / 100-*Breynia*
baudouini- Me / 100-*Breynia fruticosa*- Me 2 18 20
 25 / 100-*Breynia rostrata*- Me 5 13 25 38 / 100-
Bridelia monoica-Ti Me 20 44 / 100-*Bridelia*
ovata-Ti Me / 100-*Bridelia stipularis*- Me 8 / 123-
Bruguiera gymnorhiza-Ti Me Dy FoA / 200-
Buddleja asiatica- Me 6 10 13 20 35 37 44 / 200-
Buddleja officinalis- Me 6 20 26 / 114-*Caesalpinia*
minax- Me 5 7 13 20 / 114-*Caesalpinia*
pulcherrima- Me Or 10 19 40 / 114-*Caesalpinia*
sinensis- Me 13 / 115-*Cajanus cajan*- Me FoA 5 8
 13 15 35 / 115-*Cajanus scarabaeoides*- Me 5 20 /
 115-*Cajanus volubilis*- Me / 261-*Caladium*
bicolor- Me Or 13 17 45 / 260-*Calamus*
balansaeanus- Me / 260-*Calamus tetradactylus*- Me
 / 248-*Calanthe angusta*- Me Or 17 / 115-*Callerya*
eurybotrya- Me / 115-*Callerya reticulata*- Me 20 42
 / 115-*Callerya speciosa*- Me 20 26 35 40 45 / 211-
Callicarpa brevipes- Me / 211-*Callicarpa*
candicans- Me 5 35 49 /

211-Callicarpa longifolia- Me 9 / 211-Callicarpa longissima- Me Ed 17 20 / 211-Callicarpa rubella- Me Ed 2 8 20 36 / 213-Callitriche stagnalis- Me Ve / 59-Camellia chrysantha- Me Or 13 / 132-Canarium album- Me 7 8 13 17 28 / 115-Canavalia gladiata- Me Ve FoA 10 13 / 246-Canna edulis- Me 15 26 / 191-Canscora lucidissima- Me 17 26 41 / 174-Cansjera rheedii- Me / 76-Capparis acutifolia- Me 7 20 28 / 76-Capparis micrantha- Me Ed 10 15 22 40 / 78-Capsella bursa-pastoris- Me Ve 18 22 23 35 43 44 46 / 199-Capsicum frutescens- Me Or Ve 13 19 20 28 47 / 123-Carallia diplopetala- Me 20 / 123-Carallia lanceaefolia- Me / 78-Cardamine hirsuta- Me Ve 8 13 17 / 250-Carex cruciata- Me 13 44 / 72-Carica papaya- Me Ed Ve 14 15 19 / 219-Carpesium abrotanoides- Me 28 40 / 219-Carpesium cernuum- Me / 260-Caryota mitis- Me 13 / 260-Caryota monostachya- Me / 114-Cassia grandis- Me Or Ed 13 17 19 44 / 8-Cassytha filiformis- Me 5 9 12 19 26 30 35 45 47 / 36-Castanea mollissima-Ti Me 13 50 / 36-Castanopsis tonkinensis- Me Dy 17 / 35-Casuarina equisetifolia- Me Dy 13 45 / 169-Cayratia geniculata- Me 10 / 169-Cayratia japonica- Me 2 8 13 15 17 20 26 28 50 / 169-Cayratia oligocarpa- Me 7 20 37 / 166-Celastrus gemnatus- Me / 50-Celosia argentea- Me Or 2 13 17 22 23 27 36 / 31-Celtis tetrandra- Me / 162-Centella asiatica- Me Ve 2 8 13 14 15 17 28 35 36 38 44 45 / 219-Centipeda minima- Me 1 6 13 17 19 31 40 49 / 16-Ceratophyllum demersum- Me 40 / 114-Chamaecrista mimosoides- Me FoA 13 17 30 47 / 51-Chenopodium ficifolium- Me Ve 12 13 17 / 205-Chirita hamosa- Me 15 17 / 6-Chloranthus elatior- Me 5 18 20 41 / 115-Christia obcordata- Me 26 30 / 260-Chrysalidocarpus lutescens- Me Or 36 / 219-Chrysanthemum indicum- Me Or 13 17 22 26 29 35 45 / 219-Chrysanthemum maximum- Me Or 17 / 259-Chrysopogon aciculatus- Me / 135-Chukrasia tabularis- Me Es / 8-Cinnamomum balansae-Ti Me Es / 8-Cinnamomum bejolghota- Me 20 / 8-Cinnamomum camphora-Ti Me Es 5 20 25 28 32 35 45 46 / 8-Cinnamomum loureirii- Me / 135-Cipadessa baccifera- Me 5 13 19 20 / 219-Cirsium japonicum- Me 22 26 30 / 219-Cirsium lineare- Me 2 17 35 41 42 / 169-Cissus repens- Me Ed 13 28 30 / 169-Cissus subtetragona- Me 20 / 169-Cissus triloba- Me Ve 17 35 45 / 134-Citrus medica- Me 18 / 134-Citrus reticulata- Me Ed 8 15 19 / 100-Cladogynos orientalis- Me / 100-Claoxylon indicum- Me Ve 16 17 20 / 134-Clausena excavata- Me 35 / 134-Clausena indica- Me Ed 5 20 37 45 / 100-Cleidion brevipetiolatum-Ti Me 26 / 248-Cleisostoma rostratum- Me Or / 100-Cleistanthus sumatranus-Ti Me / 100-Cleistanthus tonkinensis- Me / 126-Cleistocalyx operculatus-Ti Me Ed Dy 5 13 20 26 35 45 / 23-Clematis brevicaudata- Me 15 / 23-Clematis granulata- Me 20 / 23-Clematis leschenaultiana- Me 20 / 23-Clematis loureiriana- Me 5 20 / 23-Clematis smilacifolia- Me 7 47 / 23-Clematis uncinata- Me / 76-Cleome viscosa- Me Ve 20 23 45 / 211-Clerodendrum canescens- Me 13 20 26 / 211-Clerodendrum chinense- Me Or 2 17 20 22 35 42 / 211-Clerodendrum mandarinorum- Me 45 / 211-Clerodendrum serratum- Me Ve 5 6 13 17 19 20 26 28 37 45 / 212-Clinopodium chinense- Me Ve 5 12 13 26 / 212-Clinopodium gracile- Me Ve 5 13 20 35 41 44 45 46 / 100-Cnesmosa javanica- Me / 162-Cnidium monnieri- Me 2 32 / 260-Cocos nucifera- Me 5 12 15 20 38 44 45 / 115-Codariocalyx gyroides- Me FoA / 115-Codariocalyx motorius- Me 20 37 / 214-Codonopsis javanica- Me Ed 15 / 261-Colocasia antiquorum- Me Ve 17 35 / 261-Colocasia esculenta- Me Ve FoA 13 17 24 35 38 / 261-Colocasia gigantea- Me Ve 17 / 125-Combretum latifolium- Me / 125-Combretum sundaicum- Me 45 / 252-Commelina benghalensis- Me 39 40 / 219-Conyza canadensis- Me 7 13 15 18 20 26 40 / 219-Conyza leucantha- Me 5 28 39 45 / 94-Corchorus aestuans- Me Ve Fi 13 15 39 44 45 / 94-Corchorus capsularis- Me Ve Fi 13 / 198-Cordia dichotoma- Me 5 13 17 19 25 45 / 198-Cordia grandis- Me / 162-Coriandrum sativum- Me Es Ve 5 14 20 44 / 26-Corydalis balansae-

Me / 219-Cosmos sulphureus- Me Or 13 / 244-
 Costus speciosus- Me 17 30 33 35 48 49 / 76-
 Crateva religiosa- Me Or 13 20 / 63-Cratoxylum
 pruniflorum-Ti Me Ve 46 / 219-Crossostephium
 artemisioides- Me Or 44 / 115-Crotalaria acicularis-
 Me / 115-Crotalaria alata- Me / 115-Crotalaria
 albida- Me 10 13 17 19 25 26 35 39 / 115-Crotalaria
 calycina- Me 30 / 115-Crotalaria chinensis- Me /
 115-Crotalaria ferruginea- Me 5 30 35 / 115-
 Crotalaria incana- Me FoA 13 17 / 115-Crotalaria
 montana- Me 13 26 / 114-Crotalaria pallida- Me 13
 / 115-Crotalaria sessilifolia- Me 24 35 / 115-
 Crotalaria trichotoma- Me / 100-Croton
 cascarilloides- Me 5 / 100-Croton joufra-Ti Me /
 100-Croton poilanei-Ti Me / 100-Croton
 roxburghii-Ti Me / 100-Croton tiglium- Me 19 20 /
 115-Cullen corylifolium- Me 42 / 230-Curculigo
 capitulata- Me 15 20 30 43 / 230-Curculigo gracilis-
 Me / 230-Curculigo orchioides- Me 10 20 30 / 196-
 Cuscuta australis- Me 32 45 / 196-Cuscuta japonica-
 Me / 259-Cymbopogon caesius- Me Es 32 / 259-
 Cymbopogon goeringii- Me 10 20 / 259-
 Cymbopogon martinii- Me Es / 259-Cymbopogon
 nardus- Me Es 17 19 / 259-Cymbopogon tortilis- Me
 / 259-Cynodon dactylon- Me FoA 13 17 19 20 26 42
 43 / 250-Cyperus diffusus- Me FoA / 250-Cyperus
 malaccensis- Me / 250-Cyperus pilosus- Me FoA 30
 / 259-Dactyloctenium aegyptium- Me / 115-
 Dalbergia polyadelpa-Ti Me 10 20 / 2-
 Dasymaschalon rostratum- Me / 199-Datura metel-
 Me Or 7 10 17 20 / 199-Datura stramonium- Me 7
 10 17 41 / 162-Daucus carota- Me 10 13 15 20 24
 38 43 / 34-Debregeasia longifolia- Me 38 / 50-
 Deeringia amaranthoides- Me Ve 20 / 138-Delavaya
 toxocarpa- Me / 114-Delonix regia-Ti Me Or 19 20
 22 / 248-Dendrobium aduncum- Me Or / 34-
 Dendrocide urentissima- Me / 115-Dendrolobium
 triangulare- Me Dy 13 17 20 / 161-Dendropanax
 proteus- Me 20 / 193-Dentella repens- Me / 115-
 Derris balansae- Me / 115-Derris marginata- Me /
 115-Desmodium diffusum- Me / 115-Desmodium
 gangeticum- Me FoA 10 15 17 47 / 115-Desmodium
 heterocarpon- Me FoA 13 17 28 29 35 41 43 / 115-
 Desmodium heterophyllum-

Me FoA 13 14 15 35 / 115-Desmodium
 laxum- Me 17 26 30 / 115-Desmodium
 microphyllum- Me 7 10 13 17 23 25 30 41 42 45 /
 115-Desmodium oblongum- Me 8 / 115-
 Desmodium podocarpum- Me FoA 20 41 / 115-
 Desmodium sequax- Me 10 36 / 115-Desmodium
 strigillosum- Me / 115-Desmodium styracifolium-
 Me 26 30 47 / 115-Desmodium triflorum- Me FoA
 5 13 26 30 / 115-Desmodium velutinum- Me / 115-
 Desmodium zonatum- Me 7 45 / 2-Desmos
 chinensis- Me 13 20 30 / 2-Desmos pedunculatus-
 Me 35 / 106-Dichroa febrifuga- Me FoA 19 / 209-
 Dicliptera chinensis- Me 5 13 20 26 35 38 39 46 /
 259-Digitaria bicornis- Me 17 / 54-Dillenia indica-
 Ti Me Ed 8 19 47 / 234-Dioscorea alata- Me 21 /
 234-Dioscorea bulbifera- Me Or 9 10 13 24 45 /
 234-Dioscorea glabra- Me 13 21 36 / 234-
 Dioscorea persimilis- Me 13 / 89-Diospyros
 decandra- Me Ed 35 38 / 89-Diospyros kaki-Ti Me
 Ed Dy 22 / 73-Diplocyclos palmatus- Me 10 40 /
 229-Dracaena cambodiana- Me Or 13 / 229-
 Dracaena elliptica- Me Or / 132-Dracontomelon
 duperreanum- Me Ed Ve 17 38 / 190-Dregea
 volubilis- Me Ve 5 20 24 / 49-Drymaria diandra-
 Me Ve 6 17 19 26 30 41 / 100-Drypetes
 perreticulata-Ti Me / 111-Duchesnea indica- Me 2
 5 13 17 26 28 35 38 46 / 115-Dunbaria podocarpa-
 Me 8 28 / 193-Duperrea pavettaefolia- Me 17 / 90-
 Eberhardtia aurata- Me / 259-Echinochloa crus-
 galli- Me FoA / 182-Elaeagnus latifolia- Me Ed 10
 13 / 182-Elaeagnus sarmentosus- Me / 34-
 Elatostema balansae- Me Ve 8 / 219-Elephantopus
 scaber- Me 5 7 13 15 17 26 28 30 33 / 212-
 Elsholtzia blanda- Me Ed 5 7 13 19 26 30 / 212-
 Elsholtzia ciliata- Me 3 5 20 25 35 45 46 / 91-
 Embelia laeta- Me 13 28 38 46 / 91-Embelia
 parviflora- Me 37 41 46 / 219-Emilia sonchifolia-
 Me Ve 5 13 17 28 39 44 46 48 / 40-Engelhardtia
 spicata- Me 5 / 113-Entada phaseoloides- Me 20 23
 41 47 / 24-Epimedium macranthum- Me 32 / 259-
 Eragrostis ferruginea- Me / 259-Eragrostis
 japonica- Me / 259-Eragrostis tenella- Me 15 17 /
 209-Eranthemum pulchellum-

Me Or / 248-*Eria corneri*- Me / 219-*Erigeron crispus*- Me / 111-*Eriobotrya deflexa*- Me / 111-*Eriobotrya japonica*- Me Ed 5 10 40 / 115-*Eriosema chinense*- Me 13 44 / 162-*Eryngium foetidum*- Me 17 46 / 115-*Erythrina stricta*- Me Or 1 10 20 / 115-*Erythrina variegata*-Ti Me Or 1 13 22 46 / 175-*Erythralium scandens*- Me Ve 26 30 46 / 114-*Erythrophleum fordii*-Ti Me Dy / 134-*Euodia bodinieri*- Me 17 / 219-*Eupatorium cannabinum*- Me / 219-*Eupatorium chinense*- Me 17 20 39 41 44 / 219-*Eupatorium fortunei*- Me Ve 5 35 47 / 219-*Eupatorium odoratum*- Me 13 36 / 100-*Euphorbia antiquorum*- Me 7 19 20 25 33 / 100-*Euphorbia edulis*- Me / 100-*Euphorbia heterophylla*- Me Or 19 / 100-*Euphorbia hirta*- Me 10 13 / 100-*Euphorbia milii*- Me Or 26 38 / 100-*Euphorbia parviflora*- Me / 100-*Euphorbia prostrata*- Me 13 / 100-*Euphorbia pulcherrima*- Me Or / 100-*Euphorbia thymifolia*- Me 13 / 59-*Eurya groffii*- Me / 94-*Excentrodendron tonkinense*-Ti Me Dy 13 / 100-*Excoecaria cochinchinensis*- Me Or / 52-*Fagopyrum esculentum*- Me / 32-*Fatoua villosa*- Me / 22-*Fibraurea recisa*- Me Ve 13 21 25 35 45 46 / 32-*Ficus abelii*- Me / 32-*Ficus altissima*- Me Or 8 / 32-*Ficus glaberrima*- Me / 32-*Ficus hirta*- Me 2 20 26 41 / 32-*Ficus laevis*- Me / 32-*Ficus nervosa*- Me Or / 32-*Ficus pumila*- Me Or 13 14 20 / 32-*Ficus racemosa*- Me Ve 13 19 20 21 38 / 32-*Ficus semicordata*- Me / 32-*Ficus simplicissima*- Me 2 20 26 / 32-*Ficus subulata*- Me / 32-*Ficus tinctoria*- Me 13 20 / 32-*Ficus variegata*- Me Ed Ve 13 / 32-*Ficus vasculosa*- Me / 250-*Fimbristylis fusca*- Me / 250-*Fimbristylis globulosa*- Me 5 20 / 250-*Fimbristylis miliacea*- Me FoA 25 / 2-*Fissistigma bracteolatum*- Me / 2-*Fissistigma chloroneurum*- Me / 2-*Fissistigma cupreonitens*- Me / 2-*Fissistigma polyanthoides*- Me 5 20 43 / 2-*Fissistigma shangtzeense*- Me / 65-*Flacourtia indica*- Me Ed 20 / 115-*Flemingia macrophylla*- Me 20 / 252-*Floscopa scandens*- Me 6 / 100-*Flueggea virosa*- Me Ed 20 38 / 171-*Fraxinus floribunda*-Ti Me / 250-*Fuirena umbellata*- Me FoA 19 / 62-*Garcinia cowa*- Me 8 / 62-*Garcinia fagraeoides*- Me 17 38 / 62-*Garcinia mangostana*- Me Dy 2 13 / 62-

Garcinia multiflora- Me Ed 35 38 46 / 193-*Gardenia lucida*- Me / 187-*Gelsemium elegans*- Me 23 41 50 / 219-*Gerbera piloselloides*- Me 13 17 25 30 35 41 47 / 212-*Glechoma hederacea*- Me 5 7 20 35 41 42 43 48 / 43-*Glinus lotoides*- Me Ve 35 / 43-*Glinus oppositifolius*- Me Ve 38 / 100-*Glochidion daltonii*-Ti Me / 100-*Glochidion glomerulatum*- Me 13 / 100-*Glochidion hirsutum*-Ti Me / 100-*Glochidion lanceolarium*-Ti Me 31 / 100-*Glochidion lutescens*- Me 17 / 100-*Glochidion obliquum*- Me / 100-*Glochidion rubrum*-Ti Me / 100-*Glochidion sphaerogynum*-Ti Me / 100-*Glochidion zeylanicum*-Ti Me 26 / 115-*Glycine max*- Me Ed Ve FoA 20 45 / 134-*Glycosmis stenocarpa*- Me / 219-*Gnaphalium hypoleucum*- Me Ve 2 5 10 17 20 22 42 / 212-*Gomphostemma chinense*- Me 30 / 212-*Gomphostemma crinitum*- Me / 212-*Gomphostemma leptodon*- Me 35 38 45 / 212-*Gomphostemma microdon*- Me 30 39 / 50-*Gomphrena globosa*- Me Or 6 10 13 15 40 45 49 / 2-*Goniothalamus chartaceus*- Me / 34-*Gonostegia pentadra*- Me Ve / 168-*Gouania javanica*- Me 38 / 168-*Gouania leptostachya*- Me 38 / 219-*Grangea maderaspatana*- Me Ve 23 / 94-*Grewia hirsuta*- Me 35 / 94-*Grewia paniculata*- Me Ed 19 / 94-*Grewia sessilifolia*- Me / 9-*Gymnotheca chinensis*- Me Ve 13 20 35 / 73-*Gynostemma pentaphyllum*- Me / 219-*Gynura nitida*- Me Ve / 219-*Gynura procumbens*- Me Ve 2 6 12 13 20 39 42 / 248-*Habenaria dentata*- Me Or 12 17 / 94-*Hainania trichosperma*- Me 17 / 131-*Haloragis micrantha*- Me 13 38 / 193-*Hedyotis auricularia*- Me 5 13 17 28 35 46 / 193-*Hedyotis capitellata*- Me 5 13 19 20 28 38 / 193-*Hedyotis corymbosa*- Me 17 20 26 38 46 / 193-*Hedyotis crassifolia*- Me 13 17 26 28 35 41 46 / 193-*Hedyotis verticillata*- Me 5 13 17 25 44 45 / 183-*Heliciopsis lobata*- Me Ed 20 26 / 95-*Helicteres angustifolia*- Me 13 17 19 23 28 44 46 50 / 95-*Helicteres hirsuta*- Me 5 13 17 19 44 / 95-*Helicteres plebeja*- Me / 198-*Heliotropium indicum*- Me 13 20 39 / 179-*Helixanthera*

parasitica- Me 13 20 27 / 205-*Hemiboea cavaleriei*- Me / 205-*Hemiboea subcapitata*- Me / 219-*Hemisteptia lyrata*- Me Ve 12 23 / 161-*Heteropanax chinensis*- Me / 232-*Heterosmilax gaudichaudiana*- Me / 100-*Hevea brasiliensis*-Ti Me / 97-*Hibiscus mutabilis*- Me Or Fi 2 6 17 35 38 / 97-*Hibiscus rosa-sinensis*- Me Or 2 42 / 97-*Hibiscus tiliaceus*- Me Fi / 73-*Hodgsonia macrocarpa*- Me 5 13 19 38 / 189-*Holarrhena pubescens*- Me 13 17 26 / 100-*Homonoia riparia*- Me 5 9 19 26 / 168-*Hovenia dulcis*-Ti Me 8 20 / 190-*Hoya bonii*- Me 17 / 190-*Hoya pubens*- Me 14 / 190-*Hoya villosa*- Me 20 41 / 33-*Humulopsis scandens*- Me 5 13 17 20 25 30 38 46 / 33-*Humulus lupulus*- Me 2 20 24 50 / 189-*Hunteria zeylanica*- Me 22 / 100-*Hura crepitans*- Me 35 / 67-*Hybanthus suffruticosus*- Me 6 15 / 162-*Hydrocotyle nepalensis*- Me Ve 13 41 / 197-*Hydrolea zeylanica*- Me Ve / 193-*Hymenodictyon orixense*- Me 19 35 / 63-*Hypericum japonicum*- Me 17 26 33 41 44 46 / 63-*Hypericum uralum*- Me 5 7 13 14 15 26 28 / 250-*Hypolytrum nemorum*- Me / 212-*Hyptis brevipes*- Me 5 17 45 / 212-*Hyptis rhomboidea*- Me / 212-*Hyptis suaveolens*- Me 5 13 25 36 45 / 189-*Ichnocarpus frutescens*- Me 13 19 20 / 163-*Ilex umbellulata*- Me / 163-*Ilex viridis*- Me 5 / 17-*Illicium difengpii*- Me Ed / 17-*Illicium henryi*- Me / 17-*Illicium verum*- Me Ed Es 15 20 / 5-*Illigera celebica*- Me 20 / 5-*Illigera dunniana*- Me 35 / 151-*Impatiens balsamina*- Me Or 17 20 28 41 / 259-*Imperata cylindrica*- Me 15 18 / 115-*Indigofera galegoides*- Me / 115-*Indigofera hirsuta*- Me / 115-*Indigofera spicata*- Me FoA / 115-*Indigofera suffruticosa*- Me 9 28 / 115-*Indigofera tinctoria*- Me 26 28 / 115-*Indigofera trifoliata*- Me 20 / 115-*Indigofera zollingeriana*- Me FoA / 219-*Inula cappa*- Me 2 13 19 20 23 30 41 42 45 47 / 195-*Ipomoea aquatica*- Me Ve FoA 13 17 21 / 195-*Ipomoea batatas*- Me 5 13 17 21 24 / 195-*Ipomoea cairica*- Me Or 41 47 / 212-*Isodon coetsa*- Me 5 20 36 / 212-*Isodon lophanthoides*- Me 13 26 28 41 46 / 212-*Isodon ternifolius*- Me 7 8 17 19 26 30 / 212-*Isodon walkeri*- Me 26 / 105-*Itea chinensis*- Me 20 41 / 219-*Ixera chinensis*- Me Ve 37 39 41 / 193-
Ixora chinensis- Me 20 22 35 41 42 / 193-
Ixora henryi- Me 17 20 / 171-*Jasminum coarctatum*- Me Ve / 171-*Jasminum pedunculatum*- Me / 100-*Jatropha curcas*- Me 13 / 100-*Jatropha gossipiifolia*- Me Or / 100-*Jatropha multifida*- Me Or 5 36 / 249-*Juncus leschenaultii*- Me 28 / 209-*Justicia adhatoda*- Me 10 20 36 40 / 209-*Justicia grossa*- Me 35 / 209-*Justicia procumbens*- Me 5 13 19 26 28 30 35 46 47 / 209-*Justicia ventricosa*- Me 7 20 / 109-*Kalanchoe pinnata*- Me Or Ve 8 23 35 36 38 48 / 219-*Kalimeris indica*- Me Or Ve 13 19 26 31 41 48 / 189-*Kibatalia macrophylla*- Me / 115-*Kummerowia striata*- Me FoA 5 13 19 26 / 97-*Kydia calycina*- Me Fi 20 25 38 / 250-*Kyllinga brevifolia*- Me FoA 5 6 13 15 19 26 40 49 / 115-*Lablab purpureus*- Me Ve FoA 8 13 17 25 28 / 219-*Lactuca dolichophylla*- Me / 219-*Lactuca indica*- Me Ve 22 50 / 219-*Lactuca sativa*- Me Ve 10 21 30 38 44 49 / 120-*Lagerstroemia indica*- Me Or 5 26 28 33 35 / 211-*Lantana camara*- Me Or 5 16 19 20 22 35 44 / 34-*Laportea violacea*- Me / 261-*Lasia spinosa*- Me Ve 19 20 23 26 28 30 33 45 47 / 193-*Lasianthus chinensis*- Me / 120-*Lawsonia inermis*- Me Or 28 35 38 45 / 170-*Leea guineensis*- Me 20 44 / 170-*Leea indica*- Me 5 13 20 44 / 170-*Leea manillensis*- Me 20 / 201-*Legazia polygonoides*- Me 17 35 47 / 262-*Lemna perpusilla*- Me 44 / 212-*Leonurus japonicus*- Me 15 30 35 47 / 138-*Lepisanthes rubiginosa*- Me Or Ed 49 / 138-*Lepisanthes tetraphylla*- Me / 259-*Leptochloa chinensis*- Me / 115-*Lepedeza juncea*- Me FoA 13 19 25 40 / 113-*Leucaena leucocephala*- Me FoA 21 / 212-*Leucas mollissima*- Me 5 8 30 35 40 41 49 / 229-*Lilium brownii*- Me Or / 201-*Limnophila chinensis*- Me Ve 5 8 17 35 43 49 / 201-*Lindenbergia philippensis*- Me / 8-*Lindera chunii*- Me 20 / 8-*Lindera communis*- Me 5 35 / 8-*Lindera glauca*- Me 20 35 38 / 8-*Lindera tonkinensis*- Me 20 / 201-*Lindernia ciliata*- Me 17 35 41 / 201-*Lindernia crustacea*- Me 2 5 13 17 26 30 35 46 / 201-*Lindernia pusilla*- Me / 201-

Lindernia tonkinensis- Me / 259-Lingnania chungii- Me 38 / 248-Liparis petiolata- Me / 28-Liquidambar formosana- Me Ve 7 10 13 17 20 41 42 / 8-Litsea balansae- Me / 8-Litsea cubeba- Me 17 20 41 42 / 8-Litsea glutinosa- Me Ed 13 20 21 46 / 8-Litsea mollifolia- Me / 8-Litsea umbellata- Me 35 / 8-Litsea variabilis- Me / 8-Litsea verticillata-Ti Me 20 / 166-Loeseneriella merrilleana- Me / 184-Lonicera japonica- Me 13 20 35 44 / 259-Lophatherum gracile- Me 8 15 / 128-Ludwigia adscendens- Me Ve 5 17 44 / 128-Ludwigia octovalvis- Me Ve 5 13 15 28 31 35 45 / 128-Ludwigia perennis- Me Ve / 134-Luvunga scandens- Me 20 33 41 / 199-Lycopersicum esculentum- Me 17 18 22 / 114-Lysidice rhodostegia- Me Or Dy 20 / 92-Lysimachia candida- Me 17 20 22 28 41 / 92-Lysimachia decurrens- Me 41 / 92-Lysimachia fortunei- Me Ve 5 10 13 17 19 20 22 26 41 / 205-Lysionotus pauciflorus- Me 20 41 42 / 100-Macaranga denticulata-Ti Me Fi 26 / 100-Macaranga indica-Ti Me / 100-Macaranga tanarius- Me 13 / 32-Maclura cochinchinensis- Me Ed 17 20 35 41 / 32-Maclura fruticosa- Me 25 41 / 179-Macrosolen bibracteolatus- Me 20 / 90-Madhuca pasquieri- Me 20 38 / 91-Maesa acuminatissima- Me / 91-Maesa balansae- Me FoA 7 20 38 / 91-Maesa indica- Me Ed Ve 9 26 35 44 / 91-Maesa japonica- Me Ed 12 45 / 100-Mallotus barbatus- Me 46 / 100-Mallotus contubernalis-Ti Me / 100-Mallotus macrostachyus- Me 17 36 / 100-Mallotus paniculatus- Me 13 45 48 / 100-Mallotus philippinensis-Ti Me 5 9 13 28 / 100-Mallotus repandus- Me 5 20 45 / 100-Mallotus resinusus- Me / 132-Mangifera indica- Me Ed 7 13 28 40 / 100-Manihot esculenta- Me Ve / 34-Maoutia puya- Me Fi 35 / 247-Marantha arundinacea- Me 15 / 250-Mariscus umbellatus- Me FoA / 202-Markhamia stipulata- Me Ve / 190-Marsdenia tonkinensis- Me 14 / 201-Mazus pumilus- Me Ve 8 17 38 45 / 127-Medinilla assamica- Me / 127-Melastoma affine- Me 13 19 26 41 46 / 127-Melastoma dodecandrum- Me 13 17 20 23 35 46 / 127-Melastoma sanguineum- Me 7 20 35 36 45 /

135-Melia azedarach-Ti Me 2 35 / 174-Melientha suavis- Me Ve / 141-Meliosma simplicifolia-Ti Me 5 / 2-Melodorum vietnamense- Me 20 / 127-Memecylon scutellatum- Me 35 / 212-Mentha arvensis- Me 5 28 44 45 / 195-Merremia boisiana- Me 20 / 195-Merremia hederacea- Me Ve 5 28 35 / 195-Merremia vitifolia- Me 19 21 / 94-Microcos paniculata- Me Ed 5 13 26 45 / 219-Microglossa pyrifolia- Me 13 20 35 / 134-Micromelum hirsutum- Me / 134-Micromelum integerrimum- Me 5 13 19 20 25 41 / 134-Micromelum minutum- Me 5 20 28 41 / 212-Microtoena insuavis- Me 1 5 10 13 46 / 2-Miliusa balansae- Me / 2-Miliusa sinensis- Me / 115-Millettia dielsiana- Me 20 42 / 115-Millettia ichthyochtona-Ti Me Or / 115-Millettia nigrescens-Ti Me Or 17 / 115-Millettia pachycarpa- Me / 115-Millettia pachyloba- Me / 113-Mimosa pudica- Me Or 10 18 19 20 22 26 40 / 259-Miscanthus floridulus- Me FoA 44 / 259-Miscanthus sinensis- Me / 138-Mischocarpus sundaicus- Me Ed / 43-Mollugo pentaphylla- Me Ve 38 / 73-Momordica subangulata- Me 28 / 193-Morinda citrifolia- Me Ed 5 10 13 21 22 47 / 193-Morinda officinalis- Me 20 22 32 / 193-Morinda umbellata- Me 13 20 21 26 35 / 212-Mosla cavaleriei- Me 5 17 25 35 47 / 212-Mosla chinensis- Me 5 13 36 41 / 212-Mosla dianthera- Me Ve 35 45 / 212-Mosla scabra- Me 5 45 / 115-Mucuna bracteata- Me 20 / 115-Mucuna pruriens- Me FoA 6 17 / 252-Murdannia nudiflora- Me FoA / 193-Mussaenda cambodiana- Me Ve 10 19 / 193-Mussaenda dehiscens- Me 19 30 / 193-Mussaenda glabra- Me 19 / 193-Mussaenda rehderiana- Me 10 13 15 / 49-Myosoton aquaticum- Me Ve 7 13 14 35 / 91-Myrsine semiserrata- Me / 19-Nelumbo nucifera- Me Or 1 2 4 13 22 23 36 46 / 8-Neocinnamomum delavayi- Me 20 41 / 8-Neocinnamomum lecomtei- Me / 193-Neonauclea calycina- Me 17 / 113-Neptunia oleracea- Me Ve 9 13 / 248-Nervilia fordii- Me Or 8 17 28 35 / 199-Nicotiana tabacum- Me 17 23 24 36 / 193-Notodontia balansae- Me / 14-Nymphaea nouchali- Me 2 13

17 30 / 14-Nymphaea pubescens- Me Ve 13 17
 23 / 192-Nymphoides hydrophyllum- Me 45 / 192-
 Nymphoides indicum- Me Ve 45 / 212-Ocimum
 gratissimum- Me Es 20 / 195-Operculina
 turpethum- Me 17 20 / 229-Ophiopogon chingii- Me
 / 229-Ophiopogon dracaenoides- Me 20 40 / 229-
 Ophiopogon latifolius- Me / 229-Ophiopogon
 reptans- Me 20 / 229-Ophiopogon tonkinensis- Me /
 193-Ophiorrhiza cantonensis- Me 41 / 193-
 Ophiorrhiza japonica- Me 41 42 / 193-Ophiorrhiza
 tristis- Me 17 / 34-Oreocnide frutescens- Me Fi 7 44
 / 34-Oreocnide integrifolia- Me 35 45 / 34-
 Oreocnide tonkinensis- Me / 115-Ormosia fordiana-
 Ti Me 26 38 / 212-Orthosiphon thymiflorus- Me /
 259-Oryza sativa- Me 13 15 / 148-Oxalis
 corniculata- Me Ve 13 17 22 26 28 38 43 46 / 148-
 Oxalis corymbosa- Me Ve 13 15 / 115-Pachyrhizus
 erosus- Me Ve 17 / 193-Paederia scandens- Me Ve
 13 20 26 41 49 / 259-Panicum repens- Me 20 30 42
 44 / 189-Parameria laevigata- Me 13 20 30 / 209-
 Pararuellia flagelliformis- Me / 259-Paspalum
 conjugatum- Me / 70-Passiflora foetida- Me Ed Ve
 1 10 38 45 47 / 185-Patrinia hispida- Me 20 46 / 185-
 Patrinia villosa- Me 13 26 35 46 / 201-Paulownia
 fortunei- Me 20 35 38 40 41 / 193-Pavetta indica-Ti
 Me Ed 15 20 35 / 248-Pecteilis susannae- Me Or 17
 38 / 100-Pedilanthus tithymaloides- Me Or / 229-
 Peliosanthes humilis- Me / 229-Peliosanthes tetra-
 Me / 34-Pellionia heteroloba- Me 38 41 / 34-
 Pellionia radicans- Me 7 17 41 / 34-Pellionia repens-
 Me 26 / 114-Peltophorum dasyrrhachis-Ti Me / 114-
 Peltophorum pterocarpum- Me Or / 259-Pennisetum
 alopecuroides- Me / 219-Pentanema indicum- Me 5
 19 / 10-Peperomia pellucida- Me Ve 19 38 41 45 /
 212-Perilla frutescens- Me Ve 5 10 20 45 / 176-
 Peripterygium quinquelobum- Me Ve 7 17 / 8-
 Persea americana-Ti Me Ed / 219-Petasites
 japonicus- Me 17 37 41 / 162-Petroselinum
 crispum- Me Ve 6 15 20 / 195-Pharbitis nil- Me 30
 33 47 / 115-Phaseolus coccineus- Me Or / 115-
 Phaseolus vulgaris- Me Ed Ve FoA 17 21 / 259-
 Phragmites maximus- Me /

100-Phyllanthus acidus- Me / 100-Phyllanthus
 amarus- Me 13 15 26 / 100-Phyllanthus emblica-
 Me Ed Ve 5 7 10 13 15 21 28 40 / 100-Phyllanthus
 reticulatus- Me 13 26 30 / 100-Phyllanthus
 urinaria- Me 13 15 18 19 26 28 30 46 / 100-
 Phyllanthus virgatus- Me / 100-Phyllanthus
 welwitschianus- Me 13 / 115-Phyllodium elegans-
 Me 7 13 35 / 115-Phyllodium longipes- Me 5 13 18
 25 26 / 115-Phyllodium pulchellum- Me 5 20 26 33
 / 115-Phyllodium vestitum- Me / 259-
 Phyllostachys nigra- Me Or 10 20 / 199-Physalis
 angulata- Me 5 21 28 / 201-Picris fel-terrae- Me 17
 19 37 39 / 219-Picris hieracioides- Me Ve 13 19 20
 26 / 34-Pilea notata- Me / 34-Pilea peltata- Me 41 /
 34-Pilea peplodes- Me / 34-Pilea plataniflora- Me
 13 20 30 41 / 162-Pimpinella diversifolia- Me 5 13
 17 19 49 / 10-Piper betle- Me 10 38 / 10-Piper
 longum- Me 5 7 13 40 45 / 113-Pithecellobium
 dulce-Ti Me Or Ed 19 21 / 29-Platanus kerrii- Me
 17 / 164-Platea latifolia- Me 17 / 219-Pluchea
 eupatorioides- Me / 24-Podophyllum tonkinense-
 Me 17 35 / 259-Pogonatherum paniceum- Me 5 21
 26 / 212-Pogostemon auricularius- Me 17 20 / 34-
 Poikilospermum suaveolens- Me 6 / 252-Pollia
 japonica- Me 17 45 / 252-Pollia thyrsoflora- Me / 2-
 Polyalthia cerasoides- Me Ed / 2-Polyalthia
 nemoralis- Me 25 / 152-Polygala aureocauda- Me
 26 30 41 42 / 152-Polygala tricornis- Me 17 41 /
 161-Polyscias fruticosa- Me Or 5 13 15 20 / 248-
 Polystachya concreta- Me Or 17 / 138-Pometia
 pinnata- Me / 47-Portulaca grandiflora- Me Or 17
 38 / 47-Portulaca oleracea- Me Ve 2 13 15 18 23
 25 35 46 / 47-Portulaca quadrifida- Me 13 23 / 111-
 Potentilla sundaica- Me 5 17 19 20 28 35 41 49 /
 261-Pothos cathcartii- Me 20 / 261-Pothos
 chinensis- Me 20 47 / 261-Pothos kerrii- Me / 261-
 Pothos pilulifer- Me / 261-Pothos repens- Me FoA
 / 34-Pouzolzia sanguinea- Me Ve Fi 15 44 / 34-
 Pouzolzia zeylanica- Me 5 7 9 13 28 / 111-Prunus
 mume- Me Ed 13 19 50 / 111-Prunus persica- Me
 Or Ed 5 13 20 21 / 111-Prunus salicina- Me Ed 2 7
 13 47 / 126-Psidium guajava-

Me Ed 13 46 / 193-*Psychotria rubra*- Me 5 7 8
 13 17 19 20 28 35 47 / 193-*Psychotria serpens*- Me
 20 35 45 / 193-*Psychotria siamica*- Me 13 17 20 23
 35 41 46 / 115-*Pueraria montana*- Me FoA 5 8 13 17
 28 35 44 / 115-*Pueraria phaseoloides*- Me FoA 19
 35 / 115-*Pycnospora lutescens*- Me / 250-*Pycreus*
sanguinolentus- Me / 111-*Pyrus calleryana*- Me 26 /
 111-*Pyrus pashia*- Me Ed 13 / 111-*Pyrus pyrifolia*-
 Me Ed 13 28 / 125-*Quisqualis indica*- Me 13 / 202-
Radermachera sinica- Me Or 17 20 41 45 / 193-
Randia spinosa- Me 13 20 41 / 23-*Ranunculus*
cantoniensis- Me 7 10 20 26 40 / 23-*Ranunculus*
sceleratus- Me 17 19 20 35 / 78-*Raphanus sativus*-
 Me Ve 10 13 17 35 38 / 189-*Rauvolfia verticillata*-
 Me Ve 17 22 45 / 166-*Reissantia indica*- Me / 102-
Rhamnoneuron balansae- Me Fi 19 / 168-*Rhamnus*
crenata- Me / 168-*Rhamnus nepalensis*- Me / 261-
Rhaphidophora decursiva- Me 5 17 20 28 35 37 38
 49 / 261-*Rhaphidophora hookeri*- Me 20 35 37 49 /
 111-*Rhaphiolepis indica*- Me Ed 41 / 123-
Rhizophora apiculata- Me Dy 20 / 132-*Rhus*
chinensis- Me Dy 5 13 17 20 28 35 38 41 44 / 115-
Rhynchosia volubilis- Me FoA 3 17 20 30 35 38 41
 / 219-*Rhynchospermum verticillatum*- Me 17 / 250-
Rhynchospora rubra- Me 20 / 100-*Ricinus*
communis- Me 13 20 / 248-*Robiquetia succisa*- Me
 / 78-*Rorippa indica*- Me 5 13 15 17 20 26 28 35 40
 / 78-*Rorippa nasturtium-aquaticum*- Me Ve 5 13 20
 21 24 43 50 / 111-*Rosa chinensis*- Me Or Es 2 36 41
 42 / 111-*Rosa laevigata*- Me 2 13 36 38 / 111-*Rosa*
odorata- Me 10 / 120-*Rotala indica*- Me Ve / 120-
Rotala rotundifolia- Me Ve 13 17 26 / 198-*Rotula*
aquatica- Me 19 / 116-*Rourea minor*- Me 35 / 111-
Rubus alcaefolius- Me Ed 15 26 32 / 111-*Rubus*
cochinchinensis- Me Ed 17 26 47 / 111-*Rubus*
etropicus- Me / 111-*Rubus leucanthus*- Me Ed 13 17
 / 111-*Rubus parvifolius*- Me Ed 5 13 20 26 28 30 35
 41 / 111-*Rubus reflexus*- Me Ed 7 13 17 20 38 39 41
 / 259-*Saccharum officinarum*- Me / 259-*Saccharum*
spontaneum- Me 5 26 30 / 168-*Sageretia theezans*-
 Me Ed 44 / 221-*Sagittaria trifolia*- Me 8 / 166-
Salacia chinensis- Me Or 20 /

80-*Salix babylonica*-Ti Me Or 19 20 35 / 80-
Salix tetrasperma- Me / 212-*Salvia plebeia*- Me 2
 12 17 20 23 28 30 35 40 41 45 49 / 184-*Sambucus*
javanica- Me Or 13 15 20 30 41 47 / 100-*Sapium*
discolor-Ti Me 33 / 100-*Sapium rotundifolium*- Me
 Dy 35 / 100-*Sapium sebiferum*- Me 2 26 33 / 114-
Saraca dives- Me Or Ve 20 41 / 6-*Sarcandra glabra*-
 Me 5 13 17 20 24 29 35 39 41 42 46 / 90-
Sarcosperma kachinense- Me / 21-*Sargentodoxa*
cuneata- Me 20 / 100-*Sauropus androgynus*- Me
 Ve 13 39 44 / 9-*Saururus chinensis*- Me 2 17 20 24
 30 35 47 / 161-*Schefflera heptaphylla*- Me Ve 5 8
 15 20 28 32 38 47 / 161-*Schefflera leucantha*- Me
 36 / 161-*Schefflera pes-avis*- Me / 59-*Schima*
superba- Me Or / 250-*Scirpus juncooides*- Me FoA
 44 / 250-*Scleria terrestris*- Me 20 / 65-*Scolopia*
chinensis- Me / 212-*Scutellaria indica*- Me 7 13 41
 46 / 100-*Sebastiania chamaelea*- Me 9 12 / 28-
Semiliquidambar cathayensis-Ti Me 10 20 / 219-
Senecio scandens- Me 13 17 28 35 39 / 114-*Senna*
hirsuta- Me 8 13 20 / 114-*Senna occidentalis*- Me
 6 8 13 20 22 45 / 114-*Senna siamea*-Ti Me Dy /
 114-*Senna sulfurea*- Me Or 12 21 / 114-*Senna*
surattensis- Me Or 13 / 114-*Senna tora*- Me 6 15 26
 27 33 34 / 203-*Sesamum orientale*- Me 6 38 / 115-
Sesbania bispinosa- Me 35 / 115-*Sesbania*
cannabina- Me FoA / 115-*Sesbania grandiflora*-
 Me Ve FoA 5 13 46 / 115-*Sesbania paludosa*- Me
 Ve FoA 17 / 115-*Sesbania sesban*- Me / 97-*Sida*
acuta- Me Fi 5 13 19 20 35 / 97-*Sida mysorensis*-
 Me 23 / 97-*Sida rhombifolia*- Me Ve Fi 2 5 13 18
 19 20 35 44 46 / 97-*Sida subcordata*- Me 5 13 / 219-
Sigesbeckia orientalis- Me 17 19 20 26 35 42 / 232-
Smilax bracteata- Me 15 20 / 232-*Smilax glabra*-
 Me 8 9 20 30 / 232-*Smilax lanceifolia*- Me 9 20 /
 232-*Smilax megacarpa*- Me 20 / 232-*Smilax*
perfoliata- Me 20 / 115-*Smithia sensitiva*- Me Ve
 FoA 17 43 45 / 199-*Solanum album*- Me 7 / 199-
Solanum dulcamara- Me 2 9 10 40 45 / 199-
Solanum ferox- Me 7 / 199-*Solanum indicum*- Me
 Ed 7 10 15 41 / 199-*Solanum mammosum*- Me Or
 50 / 199-*Solanum melongena*- Me Ve 10 13 15 17
 20 23 38 50 / 199-*Solanum nigrum*- Me Ed 13 17

28 30 35 40 / 199-Solanum torvum- Me 7 10 15
 17 19 41 / 199-Solanum tuberosum- Me 22 25 38 /
 199-Solanum undulatum- Me 7 17 / 199-Solanum
 verbascifolium- Me 17 20 35 / 199-Solanum
 virginianum- Me 7 10 20 35 40 41 / 219-Solidago
 virgaurea- Me 15 17 30 35 39 41 / 219-Sonchus
 asper- Me Ve 8 10 / 219-Sonchus oleraceus- Me Ve
 5 13 15 21 22 28 33 46 48 / 219-Sonchus
 wightianus- Me Ve 13 15 28 / 115-Spatholobus
 suberectus- Me 20 42 / 219-Spilanthes callimorpha-
 Me 7 / 259-Sporobolus humilis- Me FoA / 212-
 Stachys oblongifolia- Me FoA 13 / 211-
 Stachytarpheta jamaicensis- Me 8 13 15 19 20 28 35
 / 49-Stellaria uliginosa- Me 5 13 / 233-Stemona
 cochinchinensis- Me / 22-Stephania longa- Me 20
 28 / 22-Stephania rotunda- Me 10 13 19 35 45 / 22-
 Stephania sinica- Me 10 13 25 28 35 / 95-Sterculia
 lanceolata- Me Fi 2 35 41 / 95-Sterculia nobilis- Me
 FoA 13 20 41 / 95-Sterculia populifolia-Ti Me 15 /
 32-Streblus ilicifolius- Me Ed 35 / 32-Streblus
 tonkinensis- Me / 201-Striga lutea- Me 26 / 209-
 Strobilanthes cusia- Me 5 26 28 29 / 209-
 Strobilanthes cystolithigera- Me / 189-Strophanthus
 caudatus- Me / 100-Strophoblachia fimbriicalyx-
 Me / 187-Strychnos wallichiana- Me 20 28 32 47 48
 / 87-Styrax annamensis- Me Ve 17 / 51-Suaeda
 maritima- Me Ve 15 / 88-Symplocos lancifolia-Ti
 Me 41 / 88-Symplocos paniculata- Me 6 19 24 38 44
 / 88-Symplocos racemosa-Ti Me Ed 41 / 219-
 Synedrella nodiflora- Me Ve 5 20 45 48 / 126-
 Syzygium cuminii- Me Ed 10 15 21 / 189-
 Tabernaemontana bovina- Me / 235-Tacca
 chantrieri- Me 7 20 22 26 38 / 235-Tacca
 plantaginea- Me 26 / 115-Tadehagi triquetrum- Me
 5 13 26 28 30 46 / 219-Tagetes erecta- Me Or 5 7 49
 / 219-Tagetes patula- Me Or 13 / 114-Tamarindus
 indica-Ti Me Ed 13 19 25 36 / 209-Tarphochlamys
 affinis- Me 14 / 179-Taxillus parasitica- Me 3 14 22
 / 115-Tephrosia purpurea- Me 5 13 25 / 125-
 Terminalia catappa- Me Ed Dy 5 7 13 20 / 54-
 Tetracera scandens- Me 2 15 20 47 / 134-Tetradium
 glabrifolium- Me 44 / 161-Tetrapanax papyriferus-
 Me 12 14 15 17 / 169-Tetrastigma erubescens- Me
 44 / 212-Teucrium

viscidum- Me 17 20 23 35 41 / 259-Themeda
 caudata- Me / 97-Thespesia lampas- Me 9 20 / 209-
 Thunbergia grandiflora- Me Or 41 / 22-Tinospora
 sagittata- Me 8 13 16 17 25 28 35 50 / 143-Tirpitzia
 sinensis- Me / 219-Tithonia diversifolia- Me 25 /
 135-Toona sinensis- Me Ve 13 17 20 23 35 46 /
 135-Toona surenii-Ti Me 13 19 / 201-Torenia
 glabra- Me 7 12 13 25 48 / 162-Torilis japonica-
 Me / 198-Tournefortia montana- Me 20 / 189-
 Trachelospermum jasminoides- Me 5 20 28 35 41 /
 252-Tradescantia zebrina- Me Or 13 28 38 43 45 /
 31-Trema angustifolia- Me 19 41 / 161-Trevesia
 palmata- Me 3 14 20 21 41 47 / 100-Trewia
 nudiflora-Ti Me Ed 20 / 135-Trichilia connaroides-
 Me 20 28 / 219-Tridax procumbens- Me 20 / 115-
 Trifolium pratense- Me 10 38 40 / 115-Trifolium
 repens- Me FoA / 259-Triticum aestivum- Me / 94-
 Triumphetta pilosa- Me / 94-Triumphetta pseudocana-
 Me 5 13 35 / 94-Triumphetta rhomboidea- Me 13 18
 20 / 1-Tsoongiodendron odorum-Ti Me Or / 161-
 Tupidanthus calyptratus- Me 5 20 26 41 / 136-
 Turpinia pomifera-Ti Me / 265-Typha angustifolia-
 Me 13 15 36 / 261-Typhonium blumei- Me 10 /
 261-Typhonium trilobatum- Me 10 17 23 25 28 35
 45 / 193-Uncaria homomalla- Me 20 22 44 45 /
 193-Uncaria macrophylla- Me 22 44 45 / 193-
 Uncaria rhynchophylla- Me 22 44 45 / 115-Uraria
 cochinchinensis- Me / 115-Uraria crinita- Me Or 5
 13 19 20 / 115-Uraria lacei- Me 19 / 115-Uraria
 lagopodioides- Me 13 35 / 115-Uraria picta- Me 5
 17 45 / 115-Uraria rufescens- Me / 189-Urceola
 rosea- Me Ve 20 / 97-Urena lobata- Me Fi 5 10 13
 17 19 20 / 207-Utricularia aurea- Me 44 / 2-Uvaria
 calamistrata- Me / 2-Uvaria microcarpa- Me Ed /
 248-Vanda concolor- Me Or 20 35 / 57-Vatica
 odorata-Ti Me 17 / 100-Vernicia montana- Me 7 /
 219-Vernonia anthelmintica- Me / 219-Vernonia
 chevalierii- Me / 219-Vernonia parishii- Me 5 20
 26 / 219-Vernonia solanifolia- Me 20 25 45 / 219-
 Vernonia villosa- Me 35 46 / 201-Veronica
 javanica- Me 13 35 / 184-Viburnum erubescens-
 Me / 184-

Viburnum luzonicum- Me / 115-Vicia cracca- Me 20 / 115-Vigna radiata- Me FoA 5 21 45 / 115-Vigna umbellata- Me Ve FoA / 115-Vigna unguiculata- Me Ed Ve FoA 8 15 17 21 45 / 67-Viola betonicifolia- Me / 67-Viola philippica- Me 13 26 / 211-Vitex negundo- Me Or 2 3 5 10 13 19 26 40 42 45 46 47 / 169-Vitis pentagona- Me 2 12 15 40 42 / 219-Wedelia chinensis- Me 5 8 39 44 49 / 219-Wedelia urticaefolia- Me 39 / 193-Wendlandia paniculata- Me 20 / 102-Wikstroemia indica- Me 10 17 20 39 41 / 189-Wrightia pubescens-Ti Me 20 26 33 40 / 189-Wrightia tomentosa-Ti Me / 219-Xanthium strumarium- Me 5 7 13 19 20 22 24 28 35 / 152-Xanthophyllum hainanense- Me 17 / 189-Xylinabariopsis napeensis- Me 6 35 / 2-Xylopa vielana- Me 19 20 / 65-Xylosma longifolium- Me 37 41 / 219-Youngia japonica- Me Ve 5 13 20 35 / 134-Zanthoxylum avicennae- Me 20 26 30 35 41 / 134-Zanthoxylum laetum- Me 35 37 38 41 / 134-Zanthoxylum nitidum- Me 5 7 19 20 28 41 / 134-Zanthoxylum scandens- Me 20 / 259-Zea mays- Me 15 21 22 26 30 33 43 / 245-Zingiber purpureum- Me 13 20 / 168-Ziziphus mauritiana- Me Ed 7 13 36 38 / 168-Ziziphus oenoplia- Me FoA 8 13 / 115-Zornia gibbosa- Me 5 13 25 26 28 /

Diversity of Medicinal Flowering Plants

1074 species, 623 genera, 155 families are recorded in Lang Son province. 10 families with rich number of species: FABACEAE (103 species), EUPHORBIACEAE (91 species), ASTERACEAE (75 species), RUBIACEAE (36 species), LAMIACEAE (36 species), POACEAE (33 species), caesalpiniaceae (27 species), ROSACEAE (22 species), URTICACEAE (22 species), MORACEAE (21 species). 13 genera with rich number of species: Desmodium (14 species), Ficus (14 species), Solanum (12 species), Crotalaria (11 species), Ardisia (9 species),

Euphorbia (9 species), Glochidion (9 species), Bauhinia (8 species), Acacia (7 species), Indigofera (7 species), Litsea (7 species), Mallotus (7 species), Phyllanthus (7 species).

The Diversity of Uses of Medicinal Flowering Plants in Lang Son Province

809 species are used to treat 49 diseases. 265 remain medicinal plant species are used to treat other diseases.

Treat asthma: 63 species, 24 genera, 19 families. Treat brain hemorrhage: 1 species, 1 genera, 1 families. Treat bronchitis: 43 species, 40 genera, 30 families. Treat burned: 76 species, 69 genera, 47 families. Treat cancer: 15 species, 15 genus, 14 family. Treat cirrhosis: 16 species, 15 genera, 12 families. Detoxify: 43 species, 36 genera, 26 families. Treat diabetes: 30 species, 16 genera, 16 families. Diuretic: 75 species, 54 genera, 38 families. Treat dysentery: 255 species, 202 genera, 82 families. Treat encephalitis: 5 species, 5 genera, 4 families. Treat eyesore: 21 species, 19 genera, 17 families. Treat flu: 148 species, 129 genera, 52 families. Treat fracture: 15 species, 14 genera, 11 families. Galactopoietic: 14 species, 14 genera, 11 families. Treat gastritis: 42 species, 40 genera, 24 families. Treat gonorrhea: 18 species, 18 genera, 16 families. Treat hemorrhoids: 30 species, 27 genera, 22 families. Treat headache: 86 species, 75 genera, 41 families. Treat heart and blood pressure diseases: 37 species, 33 genera, 20 families. Treat hemostatic: 28 species, 27 genera, 22 families. Treat hepatitis: 106 species, 90 genera, 44 families. Treat hurt fall: 105 species, 83 genera, 45 families. Treat inflammatory bowel: 58 species, 53 genera, 35 families. Treat irregular menstruation: 27 species, 27 genera, 16 families. Treat keratitis: 4 species, 4 genera, 4 families. Treat kidney stone: 18 species, 18 genera, 12 families. Treat malaria: 100 species, 90 genera, 48 families. Treat measles: 48 species, 44 genera, 31 families. Treat mumps: 4 species, 4 genera, 4 families. Treat nephritis: 59 species, 52 genera, 34

families. Treat obese: 2 species, 2 genera, 2 families. Treat oedema: 37 species, 36 genera, 25 families. Treat otitis: 10 species, 10 genera, 7 families. Treat paralytic: 6 species, 6 genera, 6 families. Treat pertussis: 17 species, 16 genera, 12 families. Treat pimple: 149 species, 129 genera, 57 families. Treat pneumonia: 27 species, 25 genera, 14 families. Treat rheumatism: 283 species, 226 genera, 81 families. Treat scrofulous: 13 species, 12 genera, 11 families. Treat sinusitis: 4 species, 4 genera, 3 families. Treat snake bite: 189 species, 156 genera, 69 families. Treat sore throat: 88 species, 80 genera, 39 families. Treat sterile: 10 species, 10 genera, 9 families. Treat syphilis: 16 species, 15 genus, 13 family. Treat toothache: 54 species, 47 genera, 28 families. Tranquillizer: 6 species, 5 genera, 5 families. Treat urolithiasis: 17 species, 16 genera, 14 families. Treat vaginitis: 41 species, 38 genera, 25 families. 265 remain medicinal plant species treat other diseases /medical uses.

26 species, 22 genera, 15 families are used as dye plants; 79 species, 65 genera, 37 families are used as edible plants (fruit, seed); 13 species, 9 genera, 9 families are used as essential oil plants; 15 species, 12 genera, 6 families are used as fibre plants; 57 species, 46 genera, 16 families are used as food for animal; 96 species, 83 genera, 39 families are used as ornamental plants; 77 species, 60 genera, 30 families are used as timber plants; 141 species, 115 genera, 56 families are used as vegetable plants.

Endangered Species Have Been Recorded in Vietnam Red Data Book (2007)

33 endangered species have been recorded in Vietnam Red Data Book (2007). 1 Critically Endangered (CR) species: *Aucuba japonica*. 12 Endangered (EN) species: *Acanthopanax trifoliatum*, *Aristolochia kwangsiensis*, *Aristolochia tuberosa*, *Curculigo orchioides*, *Excentrodendron tonkinense*, *Gynostemma pentaphyllum*, *Hainania trichosperma*, *Lilium brownie*, *Madhuca pasquieri*, *Nervilia fordii*, *Podophyllum tonkinense*,

Tetrapanax papyriferus. 20 Vulnerable (VU) species: *Ardisia silvestris*, *Asarum caudigerum*, *Callerya speciosa*, *Chukrasia tabularis*, *Cinnamomum balansae*, *Cirsium japonicum*, *Codonopsis javanica*, *Embelia parviflora*, *Illicium difengpii*, *Markhamia stipulata*, *Melientha suavis*, *Myrsine semiserrata*, *Ophiopogon tonkinensis*, *Peliosanthes teta*, *Phyllostachys nigra*, *Platanus kerrii*, *Rauvolfia verticillata*, *Stemona cochinchinensis*, *Tinospora sagittata*, *Tsoongiodendron odorum*.

DISCUSSION

Specific data on diseases treated with medicinal plants will provide a clear direction when studying medicine. It is not easy to develop medicinal plants with only research institutes. The scientists who know the information will have suggestions for cooperation with the companies. We should have suitable cooperations of research institutes and companies for development of medicinal plants:

- 1074 medicinal plant species: suggestion for cooperations of research institutes and pharmaceutical companies.

- 26 dye species: suggestion for cooperations of research institutes and pharmaceutical, fashion, clothes companies.

- 79 edible species: suggestion for cooperations of research institutes and pharmaceutical, food, fruit companies.

- 13 essential oil species: suggestion for cooperations of research institutes and pharmaceutical, cosmetic companies.

- 15 fibre species: suggestion for cooperations of research institutes and pharmaceutical, fashion, clothes companies.

- 57 species are used as food for animal: suggestion for cooperations of research institutes and pharmaceutical, agriculture companies.

- 96 ornamental species: suggestion for cooperations of research institutes and pharmaceutical, construct, ornamental companies.

- 77 timber species: suggestion for cooperations of research institutes and pharmaceutical, forestry, construct companies.

- 141 vegetable species: suggestion for cooperations of research institutes and pharmaceutical, agriculture, vegetable companies.

- Species with many uses: proposed cooperation of research institutes with many companies

- 33 endangered species: suggestion for cooperations of research institutes, organizations of conservation and companies related to uses of plants. The combination of efforts from many agencies will bring great resources for the conservation and sustainable development of medicinal plant resources in Vietnam.

CONCLUSIONS

1074 medicinal flowering plant species of 623 genera, 155 families are recorded in Lang Son province. Among them, 809 species are used to treat 49 diseases. 26 species, 22 genera, 15 families are used as dye plants; 79 species, 65 genera, 37 families are used as edible plants (fruit, seed); 13 species, 9 genera, 9 families are used as essential oil plants; 15 species, 12 genera, 6 families are used as fibre plants; 57 species, 46 genera, 16 families are used as food for animal; 96 species, 83 genera, 39 families are used as ornamental plants; 77 species, 60 genera, 30 families are used as timber plants; 141 species, 115 genera, 56 families are used as vegetable plants. 33 endangered species have been recorded in Vietnam Red Data Book (2007). List of 1074 medicinal flowering plant species in Lang Son province with coded diseases/uses data.

FUNDING

This research was funded by Hanoi National University of Education (HNUE) grant number SPHN22-19.

ACKNOWLEDGEMENTS

We thank the directors and curators of the herbaria HN and VNM for allowing study on herbarium specimens to identify species.

REFERENCES

1. Do, B.H.; Dang, C.Q.; Bui, C.X.; Nguyen, D.T.; Do, D.T.; Pham, H.V.; Vu, L.N.; Pham, M.D.; Pham, M.K.; Doan, N.T.; Nguyen, T.; Tran, T. Medicinal plants and medicinal animals in Vietnam; Publishing House for Science and Technology: Hanoi, Vietnam, 2006; Volume 1, pp. 79-1063.
2. Do, B.H.; Dang, C.Q.; Bui, C.X.; Nguyen, D.T.; Do, D.T.; Pham, H.V.; Vu, L.N.; Pham, M.D.; Pham, M.K.; Doan, N.T.; Nguyen, T.; Tran, T. Medicinal plants and medicinal animals in Vietnam; Publishing House for Science and Technology: Hanoi, Vietnam, 2006; Volume 2, pp. 75-1157.
3. Do, B.H.; Dang, C.Q.; Bui, C.X.; Nguyen, D.T.; Do, D.T.; Vu, L.N.; Pham, M.D.; Pham, M.K.; Doan, N.T.; Nguyen, T.; Tran, T. Medicinal plants and medicinal animals in Vietnam; Publishing House for Science and Technology: Hanoi, Vietnam, 2011; Volume 3, pp. 35-818.
4. Do, L.T. Medicinal plants and medicine in Vietnam; Medical Publisher: Ha Noi, Vietnam, 2000.
5. Lee, J.; Tran, B.T.; Le, C.X.; Joung, H. Useful flowering plants in Vietnam; Korea Research Institute of Bioscience and Biotechnology: Republic of Korea, 2011.

6. Lee, J.; Tran, B.T.; Park, H.S.; Do, H.V.; Choudhary, R.K.; Bui, Q.H.; Choi, S.H.; Vu, C.T.; Lee, C.; Sy, T.D.; Kim, J.; Ha, T.M.; Park, M.; Le, C.X. Useful Flowering Plants in Vietnam II; Korea Research Institute of Bioscience and Biotechnology: Republic of Korea, 2012.
7. Nguyen, T.; Ngo, T.V.; Nguyen, C.; Do, B.H.; Pham, H.T.; Nguyen, N.Q.; Nguyen, K.M.; Nguyen, T.D.; Bui, C.X.; Nguyen, H.Q.; Nguyen, H.B.; Pham, H.D.; Ngo, P.D.; Le, S.T.; Hoang, T.V.; Phan, T.V. Checklist of medicinal plants in Vietnam; Publishing House for Science and Technology: Hanoi, Vietnam, 2016; pp. 21-1164.
8. Phan, T.V.; Pham, H. T.; Lai, H.V.; Nguyen, N.Q.; Dang, T.M.; Nguyen, H.V.; Tran, L.V.; Nguyen, K.M.; Nham, P.M.; Nguyen, T.T.; Bui, M.T. Diversity of Medicinal Plant Resources in Lang Son Province, Vietnam. *Journal of Medicinal Materials* 2020, Volume 25 (5), pp. 316-320.
9. Sangmi, E.; Tran, B.T.; Oh, S.R.; Choi, S.; Lee, C.; Kim, J.; Bae, D.Y.; Park, J.K.; Tran, T.H.; Do, H.V.; Vu, C.T.; Bui, Q.H.; Nguyen, H.T.T.; Duong, H.T.; Thieu, T.T.H. Useful Flowering Plants in Vietnam III; The Korea Research Institute of Bioscience and Biotechnology: Republic of Korea, 2016.
10. Tran, A.P.T.; Nguyen, B.T. (ed.); Le, B.K.; Nguyen, B.Q.; Ha, D.T.; Nguyen, D.V.; Tran, D.D.; Nguyen, D.K.; Nguyen, D.T.; Nguyen, H.H.; et al. Checklist of plants in Vietnam; Agricultural Publishing House: Hanoi, Vietnam, 2003; Volume 2.
11. Tran, A.P.T.; Tran, B.T.; Nguyen, B.T. (ed.); Le, B.K.; Nguyen, B.Q.; Nguyen, D.V.; Nguyen, D.T.; Vu, H.V.; Huyen, D.D.; Tran, K.C.; et al. Checklist of plants in Vietnam; Agricultural Publishing House: Hanoi, Vietnam, 2005; Volume 3.
12. Tran, A.P.T.; Tran, B.T.; Nguyen, B.T.; Le, B.D.; Le, B.K.; Nguyen, B.Q.; Nguyen, C.; Phan, D.H.; Vu, D.V.; Nguyen, D.V.; et al. Vietnam Red Data Book, Part II. Plants; Publishing House for Science and Technology: Hanoi, Vietnam, 2007.
13. Vo, C. V. Dictionary of medicinal plants in Vietnam; Medical Publishing House: Ho Chi Minh city, Vietnam, 2012.