A SYNOPSIS OF THE FORMOSAN PLANTS

SHEPLEY S. C. CHEN[1] and MING-JOU LAI[2]

Abstract: The present synopsis is intended to serve as an introduction to the study of the flora of Taiwan. Systematic arrangements of the genera and families of lichens, bryophytes, pteridophytes and spermatophytes indigenous to Taiwan and its offshore islands are offered, with brief historical remarks and bibliographical survey for each plant group.

Contents

INTRODUCTION

Taiwan, also known as Formosa, is at present one of the most prosperous areas in Asia. It is a small island situated in the western Pacific with the Tropic of Cancer running through the middle part. Tropical and subtropical climates prevail at low elevation. However, the main features of the island is a mountain system lying lengthwise. Owing to the fundamental topographical features which make for various climates and abundant rainfall, this island provides a great diversity of environments and exceedingly luxuriant vegetation. Table I summarizes the composition of the flora of Taiwan.

It seems sufficiently clear that for the development of all branches of botanical sciences the knowledge of the correct plant names is a crucial prerequisite. The statement that one should be aware of the botanical heritage of the ground one occupies is important and is well understood. The increased pace of biological researches in this country has indicated that a summary of the plants known from our area is now appropriate. The purpose of this synopsis is to gather information from publications of the past decades and to present in a single treatment our knowledge of the Formosan flora both of cryptogams and phanerogams.

(1) 陳學溝, Professor and Head of the Botany Department, National Taiwan University.
(2) 賴明洲, Department of Botany, National Taiwan University.

Table I. Composition of the flora of Taiwan

Plant group \ Taxa	Families	Genera	Species, Subspecies, varieties and forms
LICHENES	37	97	521
BRYOPHYTA	92	359	1,129
Hepaticae & Anthocerotae	38	116	413
Musci	54	243	716
PTERIDOPHYTA	37	166	638
GYMNOSPERMAE	7	16	30
ANGIOSPERMAE	169	1,148	3,579
Monocots	31	325	1,109
Dicots	138	822	2,470

As a result, it is hoped that this treatise could be served as an introduction to the study of our flora and as a guide to the botanical literature of Taiwan.

The authors are greatly indebted to Dr. Charles E. DeVol, Professor of Botany, National Taiwan University, for his critical review of the manuscript.

I. ALGAE AND FUNGI

Our systematic knowledge of the marine algal flora of Taiwan is due primarily to the works of Heydrich (1894), Horikawa (1919), Okamura (1931, 1932), Skvortzov (1932), Yamada (1936, 1950). In recent years, several important papers dealing with the very subject have been published by Shen & Fan (1950), Fan (1951, 1953, 1974) and Chiang (1960, 1962a, b, 1972, 1973a, b). Articles pertinent to the study of the freshwater algae of Taiwan have also been contributed by various authors: Okada (1932), Ueno (1939), Imahori (1951–53, 1954), Shen (1950, 1955, 1956), Negoro (1953), Chang (1966, 1968, 1969), Hori & Yang (1967), Tschen & Li (1974) and Li (1976). The work of Wang-Yang (1968, 1970) concerned the algal symbionts of lichens.

With regard to the fungal flora of our area, Sawada's work (1919–59, 1931) should deserve mentioning. This is perhaps the greatest single contribution to our knowledge of the fungal flora of Taiwan.

So far as these plants are concerned, Formosa may be considered as a very superficially explored area with respect to her algal and fungal flora, especially as compared with her cormophyte flora.

II. LICHENES

Wang-Yang & Lai (1973) recently reviewed the history of lichenological exploration of Taiwan. A total of 96 genera, 426 species, 7 subspecies, 52 varieties and 36 forms have been described or reported for the lichen flora of Taiwan (cf. Wang-Yang & Lai 1973, 1976a, b). The lichens have still remained superficially explored in many parts of this island, even in the most easily accessible areas. Wang-Yang & Lai's work mentioned above enumerated a rather large number of taxa which have been discovered since the publications of Zahlbruckner (1933) and of Sato (1936–38).

A SYSTEMATIC ARRANGEMENT OF THE KNOWN GENERA OF LICHENS IN TAIWAN

The sequential order of the families and genera presented below chiefly follows the scheme proposed by Hale & Culberson (1970)[1]. The number in parentheses after the name of the genus indicates the number of species, subspecies, varieties and forms in the genus as it is represented in Taiwan. The lichens are placed in a form class among fungi in some classification, otherwise Mattick (1954)[2] segregated the lichenized fungi in a particular *phylum*.

CLASS ASCOMYCETES
SUBCLASS ASCOMYCETIDAE

Order Lecanorales

COLLEMATACEAE
Collema (5)
Leptogium (12)
Physma (3)
PLACYNTHIACEAE
Psoroma (1)
COCCOCARPIACEAE
Coccocarpia (4)
PANNARIACEAE
Pannaria (6)
PELTIGERACEAE
Peltigera (17)
Solorina (1)
NEPHROMATACEAE
Nephroma (6)
STICTACEAE
Lobaria (18)
Sticta (17)
GYALECTACEAE
Coenogonium (2)
STEREOCAULACEAE
Pilophoron (1)
Stereocaulon (14)
BAEOMYCETACEAE
Baeomyces (6)
Pseudobaeomyces (1)
CLADONIACEAE
Cladia (1)
Cladonia (35)
Glossodium (1)
Gymnoderma (1)
UMBILICARIACEAE
Umbilicaria (6)
PERTUSARIACEAE
Coccotrema (1)
Ochrolechia (1)
Perforaria (1)
Pertusaria (14)
ACAROSPORACEAE
Biatorella (1)
LECANORACEAE
Haematomma (1)
Icmadophila (1)
Ionaspis (1)
Lecanora (11)
LECIDEACEAE
Bacidia (2)
Bombyliospora (4)
Catillaria (3)
Lecidea (11)
Lopadium (1)
Megalospora (1)
Mycoblastus (1)
Phyllopsora (2)
Rhizocarpon (1)
RAMALINACEAE
Ramalina (8)
BUELLIACEAE
Buellia (4)
Rinodina (2)
PHYSCIACEAE
Anaptychia (28)
Physcia (6)
Pyxine (4)
PARMELIACEAE
Cetraria (15)
Cetrelia (8)
Hypogymnia (5)
Hypotrachyna (5)
Menegazzia (1)

1. Hale, M. E., Jr. & W. Culberson, 1970. A fourth checklist of the lichens of the continental United states and Canada. -The Bryol. 73(3): 499-543.
2. Mattick, F., 1954. Lichenes. In Melchior, H. & E. Werdermann, A. Engler's Syllabus der Pflanzenfamilien. Zwölfte Auflage. Bd. I. -Berlin: Gebrüder Borntträger.

Parmelia (78)
Platismatia (1)
Reticina (5)
ANZIACEAE
Anzia (7)
USNEACEAE
Alectoria (6)
Oropogon (1)
Thamnolia (1)
Usnea (40)
TELOSCHISTACEAE
Caloplaca (2)
Protoblastenia (1)
Teloschistes (1)

Order Ostropales

DIPLOSCHISTACEAE
Diploschistes (2)
THELOTREMATACEAE
Leptotrema (1)
Ocellularia (1)
Thelotrema (3)
GRAPHIDACEAE
Glyphis (1)
Graphina (10)
Graphis (11)
Gyrostomum (1)
Phaeographina (8)
Phaeographis (1)
Sarcographa (2)

Order Sphaeriales

PYRENULACEAE
Microthelia (1)
Pyrenula (5)
STRIGULACEAE
Porina (3)
Strigula (1)
VERRUCARIACEAE
Endocarpon (1)
Staurothele (1)
Verrucaria (2)

Order Caliciales

CYPHELIACEAE
Tylophoron (1)
SPHAEROPHORACEAE
Sphaerophorus (6)

SUBCLASS LOCULOASCOMYCETIDAE

Order Myrangiales

ARTHONIACEAE
Arthonia (2)
MYRANGIACEAE
Mycoporellum (1)

Order Pleosporales

ARTHOPYRENIACEAE
Anthracothecium (1)
Melanotheca (1)
Pleurotheliopsis (1)
Polyblastiopsis (1)
Pseudopyrenula (1)
Trypethelium (4)

Order Hysteriales

LECANACTIDACEAE
Catinaria (1)
Lecanactis (4)
Schismatomma (1)
OPEGRAPHACEAE
Chiodecton (1)
Opegrapha (1)
Sclerophyton (1)

CLASS BASIDIOMYCETES

Order Agaricales

DICYTONEMATACEAE
Dictyonema (1)

CLASS FUNGI IMPERFECTI

Crocynia (1)

III. BRYOPHYTA

Lai & Wang-Yang (1976) compiled a rather comprehensive list of the genera and species of bryophytes of Taiwan. In that treatment, the 378 species in 116 genera, 9 subspecies, 15 varieties and 4 forms of hepatics; 644 species in 243 genera, 5 subspecies, 58 varieties and 9 forms of mosses hitherto known from the bryophyte flora of our area are listed. The study of these plants has a relatively short history on this island. The relevant articles that has been published on the hepatics of Taiwan are Horikawa (1934), Yang (1960), Inoue (1961, 1972), Nakanishi (1963), Herzog & Noguchi (1955), Liu & Lai (1973, 1975) and Lai (1976a). Along with that on hepatics, the following authors have contributed to the study of mosses of our area: Cardot (1905), Sawada (1914), Sasaoka (1915–18, 1920–28, 1928a, b), Ihsiba (1935), Noguchi (1934–36, 1937, 1959, 1967), Herzog & Noguchi (1955), Nakanishi (1963), Wang (1960, 1961, 1963a, b, 1964, 1967a, b, c, 1968a, 1969, 1970, 1972), Chuang & Iwatsuki (1970), Koponen (1971), Liu & Lai (1973, 1975), Chunag (1973), Lai (1976a, b) and Koponen & Lai (1976).

A SYSTEMATIC ARRANGEMENT OF THE KNOWN GENERA OF BRYOPHYTES IN TAIWAN

The mosses (Musci) and the liverworts (Hepaticae as well as Anthocerotae) together constitute the major group known as Bryophyta. The sequential order of the families and genera presented below chiefly follows that of Schuster (1966)[3] on hepatics and Brotherus *et al.* (1924–25)[4] on mosses. The number in parentheses after the generic name indicates the number of species, subspecies, varieties and forms included in the genus.

CLASS HEPATICAE

SUBCLASS JUNGERMANNIAE

Order Calobryales

HAPLOMITRIACEAE
Haplomitrium (1)

Order Jungermanniales

HERBERTACEAE
Herberta (5)
BLEPHAROSTOMACEAE
Blepharostoma (1)
Pseudolepicolea (2)
Temnoma (1)
ISOTACHIDACEAE
Isotachis (1)
PTILIDIACEAE
Mastigophora (1)
LEPICOLEACEAE
Lepicolea (2)
TRICHOCOLEACEAE
Trichocolea (3)
LEPIDOLAENACEAE
Trichocoleopsis (1)
LEPIDOZIACEAE
Acromastigum (1)
Bazzania (18)
Kurzia (1)
Lepidozia (8)
Zoopsis (1)
CALYPOGEIACEAE
Calypogeia (5)

3. Brotherus, V. F., Paul H. & W. Ruhland, 1924–25. Musci (Laubmoose). In A. Engler & K. Prantl (ed.), Die Natürlichen Pflanzenfamilien. 2nd ed. Vols. 10, 11. -Leipzig.
4. Schuster, R. M., 1966. The Hepaticae and Anthocerotae of North America East of the Hundredth Meridian. Vol. I. -Columbia University Press, New York and London.

Metacalypogeia (3)
LOPHOZIACEAE
Anastrepta (1)
Anastrophyllum (3)
Barbilophozia (3)
Chandonanthus (4)
Lophozia (6)
Tritomaria (2)
JUNGERMANNIACEAE
Jamesoniella (3)
Jungermannia (15)
Mylia (3)
Notoscyphus (2)
Scaphophyllum (1)
MARSUPELLACEAE
Marsupella (4)
SCAPANIACEAE
Diplophyllum (3)
Scapania (13)
SCHISTOCHILACEAE
Schistochila (4)
LOPHOCOLEACEAE
Chiloscyphus (3)
Clasmatocolea (1)
Heteroscyphus (12)
Lophocolea (6)
Saccogyna (1)
Saccogynidium (2)
PLAGIOCHILACEAE
Plagiochila (21)
Plagiochilion (2)
Syzygiella (1)
Xenochila (1)
ACROBOLBACEAE
Acrobolbus (1)
CEPHALOZIACEAE
Cephalozia (2)
Nowellia (1)
Schiffneria (1)
CEPHALOZIELLACEAE
Cephaloziella (1)
Cephaloziopsis (1)
Cylindrocolea (1)
ADELANTHACEAE
Jackiella (1)
Marsupidium (1)
Odontoschisma (4)
Wettsteinia (2)
RADULACEAE
Radula (14)
PORELLACEAE
Porella (13)
FRULLANIACEAE
Frullania (28)
Jubula (2)
LEJEUNEACEAE
Aphanolejeunea (2)
Brachiolejeunea (1)
Ceratolejeunea (1)
Cheilolejeunea (4)
Cololejeunea (23)
Colura (2)
Diplasiolejeunea (2)
Drepanolejeunea (10)
Euosmolejeunea (1)
Harpalejeunea (1)
Hygrolejeunea (1)
Lasiolejeunea (1)
Lejeunea (13)
Leptolejeunea (6)
Leucolejeunea (1)
Lopholejeunea (7)
Mastigolejeunea (2)
Microlejeunea (5)
Nipponolejeunea (2)
Phaeolejeunea (1)
Prionolejeunea (1)
Ptychanthus (1)
Ptychocoleus (1)
Pycnolejeunea (2)
Rectolejeunea (2)
Spruceanthus (3)
Taxilejeunea (2)
Thysananthus (4)
Trocholejeunea (1)
PLEUROZIACEAE
Pleurozia (3)

Order Metzgeriales

TREUBIACEAE
Treubia (1)
FOSSOMBRONIACEAE
Fossombronia (2)
BLASIACEAE
Blasia (1)
DILAENACEAE
Calycularia (2)
Makednothallus (1)
Makinoa (1)
Pallavicinia (4)
Pellia (2)
ANEURACEAE
Aneura (1)
Riccardia (8)

METZGERIACEAE
Apometzgeria (1)
Metzgeria (7)

SUBCLASS MARCHANTIAE

Order Marchantiales

TARGIONIACEAE
Targionia (2)
GRIMALDIACEAE
Asterella (2)
Grimaldia (1)
Plagiochasma (3)
Reboulia (1)
CONOCEPHALACEAE
Conocephalum (2)
MARCHANTIACEAE
Dumortiera (1)
Marchantia (6)
Monoselenium (1)
Wiesnerella (1)
RICCIACEAE
Riccia (2)
Ricciocarpus (1)

CLASS ANTHOCEROTAE

Order Anthocerotales

ANTHOCEROTACEAE
Anthoceros (4)
Dendroceros (1)
Megaceros (2)
Nothothylas (1)
Phaeoceros (1)

CLASS MUSCI
SUBCLASS SPHAGNIDAE

Order Sphagnales

SPHAGNACEAE
Sphagnum (6)

SUBCLASS ANDREAEIDAE

Order Andreaeales

ANDREAEACEAE
Andreaea (3)

SUBCLASS BRYIDAE

Order Fissidentales

FISSIDENTACEAE
Fissidens (34)

Order Dicranales

DITRICHACEAE
Ceratodon (3)
Ditrichum (4)
Garckea (1)
Pleuridium (1)
Wilsoniella (1)
BRYOXIPHIACEAE
Bryoxiphium (1)
DICRANACEAE
Amphidium (1)
Aongstroemia (1)
Brothera (1)
Campylopodium (1)
Campylopus (10)
Dicranella (2)
Dicranodontium (4)
Dicranoloma (3)
Dicranum (9)
Leucoloma (1)
Microcampylopus (2)

Oncophorus (3)
Oreoweisia (1)
Paraleucobryum (2)
Rhabdoweisia (1)
Symblepharis (3)
Trematodon (1)

LEUCOBRYACEAE
Exodictyon (2)
Leucobryum (5)
Leucophanes (2)
Octoblepharum (1)

Order Pottiales

CALYMPERACEAE
Calymperes (7)
Syrrhopodon (4)
Thyridium (1)
ENCALYPTACEAE
Encalypta (1)
POTTIACEAE
Anoectangium (2)
Astomum (1)
Barbula (3)
Bryoerythrophyllum (1)
Gymnostomum (2)
Hydrogonium (6)
Hymenostomum (2)
Hymenostylium (1)
Hyophila (2)
Leptodontium (3)
Pleurochaete (1)
Pseudosymblepharis (1)
Reimersia (1)
Scopelophila (2)
Semibarbula (1)
Streblotrichum (1)
Timmiella (1)
Tortula (3)
Trichostomum (1)
Weissia (3)
Weisiopsis (1)

Order Grimmiales

GRIMMIACEAE
Grimmia (5)
Ptychomitrium (1)
Rhacomitrium (8)

Order Funariales

FUNARIACEAE
Entosthodon (2)
Funaria (2)
Physcomitrium (3)
SPLACHNACEAE
Gymnostomiella (1)
Tayloria (2)

Order Tetraphidales

GEORGIACEAE
Tetraphis (1)

Order Eubryales

BRYACEAE
Anomobryum (3)
Brachymenium (4)
Bryum (18)
Epipterygium (1)
Leptobryum (1)
Mielichhoferia (1)
Orthodontium (1)
Pohlia (6)
Rhodobryum (2)
MNIACEAE
Mnium (3)
Plagiomnium (7)
Rhizomnium (5)
Orthomnion (1)
Orthomniopsis (1)
Trachycystis (1)
RHIZOGONIACEAE
Rhizogonium (3)
HYPNODENDRACEAE
Hypnodendron (1)
BARTRAMIACEAE
Anacolia (1)
Bartramia (3)
Bartramiduta (3)
Breutelia (1)
Fleischerobryum (1)
Philonotis (10)
SPIRIDENTACEAE
Spiridens (1)

Order Isobryales

ERPODIACEAE
Glyphomitrium (3)
Solmsiella (1)
Venturiella (1)
ORTHOTRICHACEAE
Macrocoma (1)
Macromitrium (13)
Orthotrichum (1)
Schlotheimia (4)
Ulota (3)
Zygodon (1)
RHACOPILACEAE
Rhacopilum (3)
HEDWIGIACEAE
Hedwigia (1)
CRYPHAEACEAE
Forsstroemia (3)
Pilotrichopsis (2)
LEUCODONTACEAE
Antitrichia (1)
Leucodon (3)
PTYCHOMNIACEAE
Glyptothecium (1)
PRIONODONTACEAE
Taiwanobryum (1)
TRACHYPODACEAE
Diaphanodon (1)
Duthiella (5)
Pseudospiridentopsis (2)
Trachypodopsis (3)
Trachypus (6)
MYURIACEAE
Myuriopsis (1)
Myurium (2)
PTEROBRYACEAE
Endotrichella (1)
Garovaglia (1)
Pireella (1)
Pterobryopsis (5)
Pterobryum (3)
Trachyloma (1)
METEORIACEAE
Aerobryidium (1)
Aerobryopsis (5)
Aerobryum (1)
Barbella (5)
Chrysocladium (6)
Floribundaria (6)
Meteoriella (2)
Meteoriopsis (4)
Meteorium (7)
Neobarbella (3)
Papillaria (2)
Pseudobarbella (10)
PHYLLOGONIACEAE
Horikawaea (1)
NECKERACEAE
Calyptothecium (5)
Himanthocladium (5)
Homaliadelphus (2)
Homaliodendron (9)
Neckera (9)
Neckeropsis (3)
Pinnatella (4)
Porotrichum (2)
Thamnobryum (5)
LEMBOPHYLLACEAE
Dolichomitra (1)
Elmeriobryum (2)
Isothecium (3)

Order Hookeriales

HOOKERIACEAE
Actinodontium (1)
Callicostella (2)
Chaetomitriopsis (1)
Chaetomitrium (2)
Cyclodictyon (1)
Daltonia (2)
Distichophyllum (8)
Eriopus (3)
Hookeria (1)
Hookeriopsis (2)
SYMPHYODONTACEAE
Symphyodon (1)
LEUCOMIACEAE
Leucomium (1)
HYPOPTERYGIACEAE
Cyathophorella (6)
Dendrocyathophorum (1)
Hypopterygium (4)
Lopidium (3)

Order Hypnobryales

THELIACEAE
Fauriella (1)
Myurella (1)

FABRONIACEAE
Fabronia (1)
Habrodon (1)
Schwetschkea (3)
Schwetschkeopsis (1)
LESKEACEAE
Lescuraea (1)
Leskea (1)
Pseudoleskeopsis (1)
Regmatodon (1)
THUIDIACEAE
Abietinella (1)
Actinothuidium (1)
Anomodon (2)
Claopodium (4)
Haplocladium (3)
Haplohymenium (5)
Herpetineuron (1)
Miyabea (1)
Pelekium (2)
Thuidium (10)
AMBLYSTEGIACEAE
Amblystegium (1)
Calliergonella (1)
Campylium (2)
Cratoneuron (2)
Drepanocladus (1)
Hygrohypnum (1)
BRACHYTHECIACEAE
Brachythecium (11)
Camptothecium (1)
Eurhynchium (6)
Homalothecium (3)
Palamocladium (3)
Pseudisothecium (1)
Pseudopleuropus (1)
Rhynchostegiella (1)
Rhynchostegium (2)
ENTODONTACEAE
Entodon (8)
Erythrodontium (1)
Pseudoscleropodium (1)
PLAGIOTHECIACEAE
Plagiothecium (7)
Stereophyllum (1)
SEMATOPHYLLACEAE
Acanthocladium (2)
Acanthorrhynchium (1)
Acroporium (3)
Aptychella (2)
Brotherella (10)
Chionostomum (2)
Clastobryella (1)
Clastobryum (1)
Glossadelphus (2)
Heterophyllium (1)
Mastopoma (1)
Meiothecium (1)
Neacroporium (1)
Rhaphidostichum (3)
Sematophyllum (5)
Taxithelium (3)
Trichosteleum (1)
HYPNACEAE
Ctenidium (5)
Ectropothecicella (1)
Ectropothecium (12)
Eurohypnum (1)
Giraldiella (1)
Herzogiella (1)
Hondaella (1)
Hypnum (11)
Isopterygium (7)
Pilium (1)
Taxiphyllum (7)
Vesicularia (5)
RHYTIDIACEAE
Gollania (8)
Neodolichomitra (1)
Okamuraea (2)
Rhytidium (1)
Trachythecium (2)
HYLOCOMIACEAE
Hylocomium (2)
Macrothamnium (1)

Order Buxbaumiales

BUXBAUMIACEAE
Buxbaumia (1)
DIPHYSCIACEAE
Diphyscium (4)

Order Polytrichinales

POLYTRICHACEAE
Atrichum (2)
Oligotrium (1)
Pogonatum (14)
Polytrichastrum (2)
Polytrichum (2)
Rhacelopodopsis (1)

IV. PTERIDOPHYTA

A total of 638 species, subspecies, varieties and forms in 166 genera have been described or reported for the pteridophyte flora of Taiwan. DeVol (1959, 1960, 1964–70, 1972a, b) and Shieh (1969, 1972–1974) have contributed largely to the study of the pteridophytes in our area. The works of following authors are also relevant to the very subject: Hayata (1911–21), T. Ito (1928), Tagawa (1940–49), Sasaki (1937) and Keng (1952). Numerous articles by H. Ito, K. Iwatsuki, Kurata and Ogata are also referred to in part. Dr. Charles E. DeVol has exerted himself to the preparation of the first volume of "FLORA OF TAIWAN" (Li *et al.* 1975–76), which is the only comprehensive pteridophyte flora of Taiwan available up to now.

A SYSTEMATIC ARRANGEMENT OF THE KNOWN GENERA OF FERNS AND FERN ALLIES IN TAIWAN

The ferns and fern allies together constitute the vascular cryptogams known as Pteridophyta. The sequential order of the families and genera presented below chiefly follows the scheme proposed by Copeland (1947)[5] which were subsequently modified by Ching and Holttum. The number in parentheses after the name of the genus indicates the number of species, subspecies, varieties and forms in the genus.

CLASS PSILOTOPSIDA

Order Psilotales

PSILOTACEAE
Psilotum (1)

CLASS LYCOPSIDA

Order Lycopodiales

LYCOPODIACEAE
Lycopodium (23)

Order Selaginellales

SELAGINELLACEAE
Selaginella (15)

Order Isoetales

ISOETACEAE
Isoetes (1)

CLASS ARTICULATAE (*SPHENOPSIDA*)

Orer Equisetales

EQUISETACEAE
Equisetum

CLASS FILICINEAE (*FILICOPSIDA*)
SUBCLASS EUSPORANGIOPSIDA

Order Ophioglossales

OPHIOGLOSSACEAE
Botrychium (1)
Helminthostachys (1)
Japanobotrychium (1)

5. Copeland, E. R., 1947. Genera Filicum. -Chronica Botanica, Ann. Cryptog. Phytopath. No. 5. Waltham.

Ophioderma (1)
Ophioglossum (5)
Sceptridium (3)

Order Marattiales

MARATTIACEAE
Angiopteris (2)
Archangiopteris (2)
Marattia (1)

SUBCLASS LEPTOSPORANGIOPSIDA

Order Osmundales

OSMUNDACEAE
Osmunda (1)
Osmundastrum (2)
Planasium (1)

Order Filicales

SCHIZAEACEAE
Lygodium (2)
Schizaea (2)
GLEICHENIACEAE
Dicranopteris (4)
Diplopterygium (4)
HYMENOPHYLLACEAE
Abrodictyum (1)
Callistopteris (1)
Cephalomanes (1)
Crepidomanes (5)
Crepidophyllum (1)
Gonocormus (1)
Hymenophyllum (5)
Mecodium (8)
Meringium (4)
Microgonium (3)
Microtrichomanes (1)
Nesopteris (2)
Pleuromanes (1)
Selenodesmium (1)
Vandenboschia (7)
PARKERIACEAE
Ceratopteris (1)
DICKSONIACEAE
Cibotium (2)
CYATHEACEAE
Alsophila (6)
Sphaeropteris (1)
PLAGIOGYRIACEAE
Plagiogyria (8)
ONOCLEACEAE
Matteuccia (1)
BLECHNACEAE
Diploblechnum (1)
Blechnum (2)
Brainea (1)
Struthiopteris (3)
Woodwardia (5)
DIPTERIDACEAE
Dipteris (1)
CHEIROPLEURIACEAE
Cheiropleuria (1)
POLYPODIACEAE
Aglaomorpha (1)
Arthromeris (1)
Belvisia (1)
Colysis (7)
Crypsinus (9)
Drymotaenium (1)
Drynaria (1)
Goniophlebium (1)
Lecanopteris (1)
Lemmaphyllum (4)
Lepidogrammitis (1)
Lepisorus (12)
Leptochilus (1)
Loxogramme (6)
Microsorium (8)
Neocheiropteris (1)
Phymatodes (2)
Polypodium (7)
Pseudodrynaria (1)
Pyrrosia (9)
Saxiglossum (1)
GRAMMITIDACEAE
Calymmodon (2)
Ctenopteris (5)
Grammitis (7)
Prosaptia (3)
Scleroglossum (1)
Xiphopteris (1)
VITTARIACEAE
Antrophyum (5)
Vaginularia (2)
Vittaria (6)
DENNSTAEDTIACEAE
Dennstaedtia (4)
Histiopteris (1)
Hypolepis (3)
Microlepia (14)
Monachosorum (2)

Paesia (1)
Pteridium (2)
LINDSAEACEAE
Lindsaea (11)
Sphenomeris (2)
Tapeinidium (2)
DAVALLIACEAE
Araiostegia (1)
Davallia (3)
Humata (6)
Leucostegia (1)
PTERIDACEAE
Cheilanthes (5)
Cryptogramma (2)
Doryopteris (1)
Mildella (1)
Onychium (3)
Pteris (29)
ADIANTACEAE
Adiantum (13)
Anogramma (1)
Coniogramme (4)
Gymnopteris (1)
Hemionitis (1)
Pityrogramma (1)
OLEANDRACEAE
Arthropteris (1)
Nephrolepis (3)
Oleandra (1)
ASPIDIACEAE
Ctenitis (8)
Ctenitopsis (4)
Hemigramma (1)
Hypodematium (1)
Lastreopsis (1)
Pleocnemia (1)
Pteridrys (1)
Quercifilix (1)
Tectaria (10)
LOMARIOPSIDACEAE
Bolbitis (3)
Egenolfia (3)
Elaphoglossum (7)
Lomariopsis (1)
DRYOPTERIDACEAE
Acrophorus (2)
Acrorumohra (3)
Arachniodes (8)
Cyrtogonellum (1)
Cyrtomium (6)
Dryopteris (32)
Leptorumohra (1)
Peranema (1)
Polystichum (27)
THELYPTERIDACEAE
Ampelopteris (1)
Christella (8)
Cyclogramma (2)
Cyclosorus (2)
Dictyocline (2)
Glaphyropteridopsis (1)
Leptogramma (2)
Macrothelypteris (2)
Metathelypteris (4)
Parathelypteris (4)
Phegopteris (2)
Pneumatopteris (1)
Pronephrium (7)
Pseudocyclosorus (1)
Pseudophegopteris (2)
Sphaerostephanos (2)
Stegnogramma (1)
ATHYRIACEAE
Acystopteris (2)
Anisogonium (1)
Athyriopsis (1)
Athyrium (16)
Cornopteris (2)
Cystopteris (5)
Dictyodroma (1)
Diplaziopsis (1)
Diplazium (17)
Dryoathyrium (2)
Gymnocarpium (2)
Lunathyrium (1)
Monomelangium (1)
Pseudocystopteris (1)
Woodsia (1)
ASPLENIACEAE
Asplenium (39)

Order Marsileales

MARSILEACEAE
Marsilea (2)

Order Salviniales

SALVINIACEAE
Salvinia (1)
AZOLLACEAE
Azolla (1)

V. GYMNOSPERMAE

There are 16 genera, 30 species of coniferous plants indigenous to Taiwan. Li & Keng (1954) made very comprehensive illustrations of the native species. Discussions of the phytogeography and coniferous forest communities were offered by T. Liu (1966) and Wang (1968).

A SYSTEMATIC ARRANGEMENT OF THE INDIGENOUS GENERA OF GYMNOSPERMS IN TAIWAN

The sequential order of the families and genera presented below chiefly follows the scheme proposed by Pilger & Melchior (1954)[6]. The number in parentheses after the name of the genus indicates the number of species in the genus.

CLASS CYCADOPSIDA

Order Cycadales

CYCADACEAE
Cycas (1)

CLASS CONIFEROPSIDA

Order Coniferae

PINACEAE
Abies (1)
Keteleeria (1)
Picea (1)
Pinus (4)
Pseudotsuga (2)
Tsuga (1)
TAXODIACEAE
Cunninghamia (1)
Taiwania (1)
CUPRESSACEAE
Calocedrus (1)
Chamaecyparis (2)
Juniperus (4)
PODOCARPACEAE
Podocarpus (7)
CEPHALOTAXACEAE
Cephalotaxus (1)

CLASS TAXOPSIDA

Order Taxales

TAXACEAE
Amentotaxus (1)
Taxus (1)

IV. ANGIOSPERMAE

Modern scientific investigation concerning the flowering plants of Taiwan was not initiated until 1854 when Robert Fortune made his brief visit to the island of Formosa. Later on Charles Ford, Robert Swinhoe, Richard Oldham, William Hancock and Augustine Henry made various visits to this island. The works of Henry (1896) and Forbes & Hemsley (1886–1905) are perhaps the most important contributions to our earlier knowledge of the Formosan flora. Rapid advance in botanical survey began from 1895, when the Japanese occupied this island. Their active vegetation exploration resulted in many monumental works: Matsumura & Hayata (1906), Hayata (1908, 1911, 1911–21, 1917), Kawakami (1910), Yamamoto (1925–33), T. Ito

6. Pilger, R. & H. Melchior, 1954. Gymnospermae. In Melchior, H. & E. Werdermann, A. Engler's Syllabus der Pflanzenfamilien. Zwölfte Auflage. Bd. I. -Berlin: Gebrüder Bornträger.

(1927, 1928, 1929), Sasaki, (1928, 1930), Kanehira (1917, 1936), Masmune (1936, 1954). Successive research efforts have been exerted by our botanists since the Chinese government again took possession of Taiwan. Several ligneous floras have been published recently by T. S. Liu (1960-62), Li (1963) and Y. C. Liu (1972). The preparation of "FLORA OF TAIWAN" (Li *et al.* 1975-76) in six volumes with complete coverage of all native vascular plants provides the fruit of a diligent study of the Chinese and the Japanese botanists. Lai (1971) offered a rather comprehensive survey on the taxonomical literature relevant to our area.

For the subjects such as ecological investigation, forest communities and phytogeography, the works of Wilson (1922), Merrill (1923), Y. Kudo (1931), Masamune (1932), Suzuki *et al.* (1939), Yamamoto (1940), T. Liu *et al.* (1961), T. S. Liu (1962), Shimizu (1962-63), W. F. Lin *et al.* (1968), T. Liu (1968-71, 1972) and Hämet-Ahti *et al.* (1974) should be consulted.

A SYSTEMATIC ARRANGEMENT OF THE INDIGENOUS GENERA OF FLOWERING PLANTS IN TAIWAN

Aabout 3,579 species, subspecies, varieties and forms in 1,147 genera of monocots and dicots have been described or reported for the flora of Taiwan. The sequential order of the families and genera presented below chiefly follows the scheme proposed by Engler & Gilg (1924)[7] and Diels (1936)[8], which is also adopted by the Herbarium of Department of Botany, National Taiwan University (TAI) in arranging the filed specimens. The number in parentheses after the name of the genus indicates the number of species, subspecies, varieties and forms as a whole in the genus as it is represented in our area. Naturalized or introduced genera and species are excluded from the present list.

CLASS MONOCOTYLEDONEAE

Order Pandanales

1. TYPHACEAE
   Typha (2)
2. PANDANACEAE
   Freycinetia (1)
   Pandanus (1)
3. SPARGANIACEAE
   Sparganium (1)

Order Helobiae (*Najadales*)

4. POTAMOGETONACEAE
   Halodule (1)
   Potamogeton (11)
   Ruppia (1)
   Zannichellia (1)
   Zostera (1)
5. NAJADACEAE
   Najas (4)
6. APONOGETONACEAE
   Aponogeton (1)
8. ALISMATACEAE
   Alisma (1)
   Caldesia (1)
   Lophotocarpus (1)
   Sagittaria (2)
10. HYDROCHARITACEAE
    Blyxa (3)
    Halophila (2)
    Hydrilla (1)
    Hydrocharis (1)
    Ottelia (1)
    Thalassia (1)
    Valtisneria (1)

Order Triuridales

11. TRIURIDACEAE
    Andruris (2)

7. Engler, A. & E. Gilg, 1924. Syllabus der Pflanzenfamilien. 9 und 10 Auflage. -Berlin.
8. Diels, L., 1936. Syllabus der Pflanzenfamilien. 11 Auflage. -Berlin.

Order Glumiflorae (*Poales*)

12. GRAMINEAE (*POACEAE*)

Agropyron (2)
Agrostis (5)
Alloteropsis (1)
Alopecurus (2)
Anthoxanthum (1)
Apluda (1)
Aristida (1)
Arthraxon (3)
Arundinella (3)
Arundo (4)
Aulacolepis (2)
Axonpus (1)
Bambusa (8)
Bothriochloa (4)
Brachiaria (4)
Brachypodium (3)
Briza (1)
Bromus (4)
Calamagrostis (1)
Capillipedium (4)
Cenchrus (1)
Centotheca (1)
Chloris (3)
Chrysopogon (1)
Coix (3)
Cymbopogon (3)
Cynodon (2)
Cyrtococcum (2)
Dactylis (1)
Dactyloctenium (1)
Dendrocalamus (2)
Deschampsia (2)
Deyeuxia (4)
Dichanthium (2)
Digitaria (15)
Dimeria (2)
Diplachne (1)
Eccoilopus (3)
Echinochloa (5)
Eleusine (2)
Enteropogon (2)
Eragrostis (16)
Eremochloa (2)
Erianthus (3)
Eriochloa (2)
Euchlaena (1)
Eulalia (3)
Eulaliopsis (1)
Eustachys (1)
Festuca (8)
Garnotia (1)
Glyceria (1)
Hackelochloa (1)
Helictotrichon (1)
Hemarthria (1)
Heteropogon (1)
Hygroryza (1)
Hymenachne (1)
Ichnanthus (1)
Imperata (1)
Isachne (9)
Ischaemum (10)
Leersia (1)
Leptaspis (1)
Leptochloa (2)
Lepturus (1)
Lolium (2)
Lophatherum (1)
Melica (1)
Melinis (1)
Microstegium (8)
Milium (1)
Miscanthus (7)
Muhlenbergia (1)
Narenga (1)
Neyraudia (1)
Oplismenus (8)
Oryzopsis (1)
Ottochloa (1)
Panicum (11)
Paspalidium (1)
Paspalum (11)
Pennisetum (4)
Perotis (2)
Phaenosperma (1)
Phalaris (1)
Phleum (1)
Phragmites (2)
Phyllostachys (4)
Poa (8)
Pogonatherum (2)
Polypogon (2)
Pseudoraphis (1)
Pseudosasa (1)
Rottboellia (1)
Rynchelytrum (1)
Saccharum (3)
Sacciolepis (2)
Schizachyrium (2)
Schizostachyum (1)
Setaria (10)
Sinobambusa (1)
Sorghum (2)
Sphaerocaryum (1)
Spinifex (1)

Spodiopogon (1)
Sporobolus (4)
Thaumastochloa (2)
Themeda (3)
Thuarea (1)
Thysanolaena (1)
Tripogon (1)
Trisetum (2)
Urochloa (1)
Vulpia (1)
Yushania (1)
Zoysia (4)

13. CYPERACEAE
Bulbostylis (2)
Carex (79)
Cladium (1)
Cyperus (25)
Diplacrum (1)
Eleocharis (7)
Fimbristylis (28)
Fuirena (2)
Gahnia (1)
Hypolytrum (1)
Juncellus (3)
Kyllinga (3)
Lipocarpha (2)
Mariscus (4)
Pycreus (5)
Remirea (1)
Rhynchospora (5)
Schoenus (1)
Scirpus (11)
Scleria (7)
Torulinium (1)

Order Principes (*Cocoales*)

14. PALMAE (*ARECACEAE, CORYPHACEAE*)
Arenga (1)
Calamus (1)
Daemonorops (1)
Livistonia (1)
Phoenix (1)
Pinanga (1)

Order Spathiflorae (*Arales*)

16. ARACEAE
Acorus (2)
Alocasia (2)
Amorphophallus (4)
Arisaema (7)
Colocasia (3)
Epipremnopsis (1)
Epipremnum (2)
Homalomena (2)
Pinellia (1)
Pistia (1)
Pothoidium (1)
Pothos (1)
Remusatia (1)
Rhaphidophora (2)
Typhonium (1)

17. LEMNACEAE
Lemna (2)
Spirodela (2)
Wolffia (1)

Order Farinosae (*Eriocaulales*)

18. FLAGELLARIACEAE
Flagellaria (1)

22. XYRIDACEAE
Xyris (1)

23. ERIOCAULACEAE
Eriocaulon (9)

27. COMMELINACEAE
Aneilema (1)
Commelina (5)
Cyanotis (2)
Floscopa (1)
Forrestia (1)
Murdannia (4)
Pollia (4)

28. PONTEDERIACEAE
Monochoria (1)

30. PHILYDRACEAE
Philydrum (1)

Order Liliiflorae (*Liliales*)

31. JUNCACEAE
Juncus (9)
Luzula (5)

32. STEMONACEAE
Stemona (1)

33. LILIACEAE
Aletris (2)
Allium (2)
Asparagus (1)
Aspidistra (3)

Campylandra (1)
Dianella (1)
Disporopsis (1)
Disporum (3)
Dracaena (1)
Heloniopsis (3)
Heterosmilax (2)
Lilium (4)
Liriope (4)
Ophiopogon (3)
Paris (3)
Peliosanthes (3)
Polygonatum (2)
Protolirion (1)
Scilla (1)
Smilacina (1)
Smilax (17)
Thysanotus (1)
Tricyrtis (6)
Trillium (1)
Veratrum (1)

35. AMARYLLIDACEAE
Crinum (1)
Curculigo (2)
Hypoxis (1)
Lycoris (1)

38. DIOSCOREACEAE
Dioscorea (19)

39. IRIDACEAE
Iris (1)

Order Scitamineae (*Zingiberales*)

40. MUSACEAE
Musa (3)

41. ZINGIBERACEAE
Alpinia (17)
Costus (1)
Zingiber (1)

43. MARANTACEAE
Donax (1)

Order Microspermae (*Orchidales*)

44. BURMANNIACEAE
Burmannia (2)

45. ORCHIDACEAE
Acanthephippium (3)
Agrostophyllum (1)
Amitostigma (3)
Anoectochilus (2)
Aphyllorchis (1)
Apperdicula (3)
Armodorum (1)
Arundina (1)
Ascocentrum (1)
Bletilla (2)
Bulbophyllum (20)
Calanthe (26)
Cephalanthera (1)
Chamaeanthus (1)
Cheirostylis (7)
Chiloschista (1)
Chrysoglossum (1)
Cleisostoma (5)
Collabium (2)
Corybas (1)
Cremastra (1)
Cryptostylis (2)
Cymbidium (16)
Cyperorchis (1)
Cypripedium (4)
Dendrobium (17)
Dendrochilum (1)
Didiciea (1)
Didymoplexis (1)
Diploprora (1)
Disperis (1)
Epigeneium (2)
Epipactis (1)
Epipogum (1)
Eria (12)
Erythrodes (1)
Eulophia (8)
Galeola (3)
Gastrochilus (9)
Gastrodia (5)
Geodorum (1)
Goodyera (18)
Habenaria (12)
Haraella (1)
Hemipilia (1)
Herminium (2)
Hetaeria (1)
Hippeophyllum (1)
Holcoglossum (1)
Hylophila (1)
Lecanorchis (3)
Liparis (24)
Listera (7)
Luisia (3)
Malaxis (6)
Microtis (1)
Mischobulbum (1)
Myrmechis (3)
Nervilia (3)

Neottia (1)
Oberonia (7)
Odontochilus (3)
Oreorchis (4)
Pachystoma (1)
Phaius (5)
Phalaenopsis (2)
Pholidota (1)
Phreatia (4)
Platanthera (11)
Pleione (1)
Pogonia (1)
Pomatocarpa (2)
Ponerorchis (4)
Pristiglottis (2)
Saccolabium (1)
Spathoglottis (1)
Spiranthes (1)
Stigmatodactylis (1)
Sunipia (1)
Taeniophyllum (4)
Tainia (3)
Thelasis (1)
Thrixspermum (8)
Tipularia (1)
Trichoglottis (2)
Tropidia (3)
Vanda (1)
Vanilla (1)
Vrydagzynea (1)
Yoania (1)
Zeuxine (11)

CLASS DICOTYLEDONEAE

SUBCLASS ARCHICHLAMYDEAE (CHORIPETALAE & APETALAE)

Order Piperales

47. SAURURACEAE
Houttuynia (1)
Saururus (1)
48. PIPERACEAE
Peperomia (5)
Piper (8)
49. CHLORANTHACEAE
Chloranthus (1)
Sarcandra (1)

Order Salicales

50. SALICACEAE
Salix (9)

Order Myricales

52. MYRICACEAE
Myrica (2)

Order Juglandales

55. JUGLANDACEAE
Engelhardtia (1)
Juglans (1)
Platycarya (1)

Order Fagales

58. BETULACEAE
Alnus (1)
Carpinus (6)
Corylus (1)
59. FAGACEAE
Castanea (1)
Castanopsis (9)
Cyclobalanopsis (9)
Fagus (1)
Lithocarpus (2)
Pasania (15)
Quercus (6)

Order Urticales

60. ULMACEAE
Aphananthe (1)
Celtis (5)
Trema (2)
Ulmus (2)
Zelkova (1)
61. MORACEAE
Artocarpus (2)
Broussonetia (2)
Cudrania (1)
Fatoua (1)
Ficus (31)

Humulus (1)
Malaisia (1)
Morus (1)
Poikilospermum (1)

62. URTICACEAE
Boehmeria (8)
Chamabaina (2)
Cypholophus (1)
Debregeasia (1)
Elatostema (10)
Fleurya (1)
Girardinia (1)
Gonostegia (5)
Laportea (3)
Lecanthus (1)
Leucosyke (1)
Maoutia (1)
Nanocnide (1)
Pellionia (6)
Pilea (18)
Pipturus (1)
Pouzolzia (2)
Procris (1)
Urtica (1)
Villebrunea (2)

Order Proteales

63. PROTEACEAE
Helicia (3)

Order Santalales

65. SANTALACEAE
Champereia (1)
Thesium (1)
Hyphear (2)
Scurrula (4)
Taxillus (1)
Viscum (5)

70. LORANTHACEAE
Bifaria (1)

Order Balanophorales

71. BALANOPHORACEAE
Balanophora (4)

Order Aristolochiales

72. ARISTOLOCHIACEAE
Aristolochia (6)
Asarum (8)

73. RAFFLESIACEAE
(*CYTINACEAE; MITRASTEMONACEAE*)
Mitrastemon (2)

Order Polygonales

75. POLYGONACEAE
Polygonum (32)
Rumex (6)

Order Centrospermae (*Chenopodiales*)

76. CHENOPODIACEAE
Atriplex (2)
Chenopodium (6)
Suaeda (1)

77. AMARANTHACEAE
Achyranthes (6)
Aerva (1)
Alternanthera (3)
Amaranthus (2)
Celosia (2)
Cyathula (1)
Deeringia (2)
Philoxerus (1)

78. NYCTAGINACEAE
Boerhavia (2)
Pisonia (3)

79. CYNOCRAMBACEAE
Cynocrambe (1)

80. PHYTOLACCACEAE
Phytolacca (2)

81. AIZOACEAE
Mollugo (3)
Sesuvium (1)
Tetragonia (1)
Trianthemum (1)

82. PORTULACACEAE
Portulaca (4)

84. CARYOPHYLLACEAE
Arenaria (2)
Cerastium (7)
Cucubalus (1)
Dianthus (4)
Drymaria (1)
Melandryum (2)
Moehringia (1)
Sagina (2)
Silene (5)
Spergula (1)
Stellaria (9)

Order Ranales (*Ranunculales*)

85. NYMPHAEACEAE
Brasenia (1)
Euryale (1)
Nuphar (1)
Nymphaea (2)
86. CERATOPHYLLACEAE
Ceratophyllum (2)
87. TROCHODENDRACEAE
Trochodendron (1)
89. RANUNCULACEAE
Aconitum (6)
Anemone (3)
Aquilegia (1)
Calathodes (1)
Clematis (27)
Coptis (1)
Isopyrum (1)
Ranunculus (13)
Thalictrum (7)
Trollius (1)
90. LARDIZABALACEAE
Akebia (2)
Stauntonia (8)
91. BERBERIDACEAE
Berberis (7)
Mahonia (4)
Podophyllum (1)
92. MENISPERMACEAE
Cocculus (3)
Paracyclea (3)
Pericampylus (2)
Stephania (5)
Tinospora (1)
93. MAGNOLIACEAE
Illicium (2)
Kadsura (1)
Michelia (1)
Micheliopsis (1)
Schisandra (1)
97. ANNONACEAE
Fissistigma (2)
Goniothalamus (1)
99. MYRISTICACEAE
Myristica (2)
102. LAURACEAE
Actinodaphne (6)
Beilschmiedia (2)
Cassytha (1)
Cinnamomum (8)
Cryptocarya (2)
Cylicodaphne (3)
Dehaasia (1)
Endiandra (1)
Lindera (6)
Litsea (6)
Machilus (7)
Neolitsea (11)
Notaphoebe (1)
Phoebe (1)
Sassafras (1)
103. HERNANDIACEAE
Hernandia (1)
Illigeria (1)

Order Rhoeadales

104. PAPAVERACEAE
Argemone (1)
Corydalis (8)
Macleaya (1)
105. CAPPARIDACEAE
Capparis (5)
Cleome (1)
Crataeva (1)
Gynandropsis (1)
106. CRUCIFERAE
(*BRASSICACEAE*)
Arabis (3)
Barbarea (1)
Capsella (1)
Cardamine (7)
Cochlearia (1)
Coronopus (1)
Draba (1)
Lepidium (1)
Raphanus (1)
Rorippa (4)
Thalapsi (1)
Wasabia (1)

Order Sarraceniales

113. DROSERACEAE
Drosera (4)

Order Rosales

116. CRASSULACEAE
Bryophyllum (1)
Kalanchoë (5)
Sedum (15)
118. SAXIFRAGACEAE
Astilbe (2)
Cardiandra (1)
Chrysosplenium (3)
Deutzia (3)
Hydrangea (11)
Itea (4)
Mitella (1)
Parnassia (1)
Pileostegia (1)
Ribes (1)
Schizophragma (1)
Tiarella (1)
119. PITTOSPORACEAE
Pittosporum (6)
125. HAMAMELIDACEAE
Corylopsis (3)
Distylium (2)
Eustigma (1)
Liquidambar (1)
Sycopsis (1)
130. ROSACEAE
Agrimonia (1)
Cotoneaster (2)
Duchesnea (1)
Eriobotrya (1)
Filipendula (1)
Fragaria (1)
Geum (1)
Macromeles (1)
Malus (1)
Micromeles (1)
Osteomeles (1)
Photinia (5)
Potentilla (8)
Prinsepia (1)
Prunus (11)
Pygeum (2)
Pyracantha (1)
Pyrus (1)
Rhaphiolepis (3)
Rosa (10)
Rubus (40)
Sanguisorba (1)
Sibbaldia (1)
Sorbus (1)
Spiraea (5)
Stephanandra (1)
Stranvaesia (1)
131. CONNARACEAE
Rourea (1)
132. LEGUMINOSAE
Bauhinia (1)
Caesalpinia (3)
Cassia (3)
Gleditsia (1)

Acacia (2)
Albizzia (3)
Entada (1)
Pithecolobium (1)

Abrus (1)
Aeschynomene (1)
Alysicarpus (3)
Amphicarpaea (1)
Apios (1)
Astragalus (3)
Campylotropis (1)
Canavalia (2)
Cantharospermum (1)
Clitoria (1)
Crotalaria (15)
Dalbergia (1)
Derris (3)
Desmodium (27)
Dolichos (2)
Dolichovigna (2)
Dumasia (1)
Dunbaria (2)
Erythrina (1)
Euchresta (1)
Galactia (3)
Glycine (4)
Indigofera (11)
Kummerowia (2)
Lespedeza (6)
Lotus (2)
Lourea (2)
Maackia (1)
Medicago (2)
Melilotus (2)
Millettia (4)
Moghania (4)

Mucuna (3)
Ormocarpum (1)
Ormosia (1)
Phaseolus (5)
Pongamia (1)
Pueraria (2)
Pycnospora (1)
Rhynchosia (3)
Smithia (2)
Sophora (2)
Tephrosia (3)
Teramnus (2)
Uraria (4)
Vicia (5)
Vigna (3)
Zornia (1)

Order Geraniales

134. GERANIACEAE
Geranium (4)
135. OXALIDACEAE
Biophytum (1)
Oxalis (3)
140. ZYGOPHYLLACEAE
Tribulus (1)
142. RUTACEAE
Acronychia (1)
Boenninghausenia (1)
Citrus (4)
Clausena (3)
Evodia (4)
Fagara (4)
Glycosmis (1)
Melicope (1)
Murraya (2)
Phellodendron (1)
Severinia (1)
Skimmia (1)
Toddalia (1)
Zanthoxylum (4)
143. SIMAROUBACEAE
Ailanthus (1)
Brucea (1)
Picrasma (1)
145. MELIACEAE
Aglaia (3)
Dysoxylum (3)
Melia (1)
146. MALPIGHIACEAE
Hiptage (1)
Ryssopterys (1)
Tristellateia (1)
150. POLYGALACEAE
Polygala (6)
Salomonia (1)
152. EUPHORBIACEAE
Acalypha (9)
Agyneia (1)
Alchornea (1)
Antidesma (5)
Bischoffia (1)
Breynia (3)
Bridelia (2)
Claoxylon (1)
Croton (2)
Drypetes (3)
Euphorbia (15)
Excoecaria (3)
Gelonium (1)
Glochidion (10)
Homalanthus (1)
Homonoia (1)
Liodendron (1)
Macaranga (2)
Mallotus (5)
Melanolepis (1)
Mercurialis (1)
Phyllanthus (8)
Sapium (2)
Securinega (2)
152*a*. DAPHNIPHYLLACEAE
Daphniphyllum (4)
153. CALLITRICHACEAE
Callitriche (3)

Order Sapindales

154. BUXACEAE
Buxus (1)
Pachysandra (1)
Sarcococca (1)
156. CORIARIACEAE
Coriaria (1)
158. ANACARDIACEAE
Buchanania (1)
Pistacia (1)
Rhus (5)
Semecarpus (2)
162. AQUIFOLIACEAE
Ilex (29)
163. CELASTRACEAE
Celastrus (5)
Euonymus (9)

Genitia (1)
Gymnosporia (2)
Microtropis (5)
Perrottetia (1)
Tripterygium (1)

167. STAPHYLEACEAE
Euscaphis (1)
Turpinia (3)

168. ICACINACEAE
Gonocaryum (1)
Nothapodytes (1)

169. ACERACEAE
Acer (9)

171. SAPINDACEAE
Allophylus (1)
Cardiospermum (1)
Dodonaea (1)
Eurycorymbus (1)
Koelreuteria (1)
Pometia (1)
Sapindus (1)

172. SABIACEAE
Meliosma (4)
Sabia (2)

175. BALSAMINACEAE
Impatiens (3)

Order Rhamnales

176. RHAMNACEAE
Berchemia (3)
Colubrina (1)
Paliurus (1)
Rhamnus (5)
Sageretia (3)
Ventilago (2)

177. VITACEAE
Ampelopsis (2)
Cayratia (3)
Cissus (3)
Leea (2)
Parthenocissus (1)
Tetrastigma (5)
Vitis (5)

Order Malvales

178. ELAEOCARPACEAE
Elaeocarpus (7)
Sloanea (1)

181. TILIACEAE
Corchorus (3)
Grewia (4)
Triumfetta (4)

182. MALVACEAE
Abelmoschus (1)
Abutilon (2)
Hibiscus (5)
Malvastrum (2)
Sida (6)
Thespesia (1)
Urena (2)

184. STERCULIACEAE
Firmiana (1)
Helicteres (1)
Heritiera (1)
Kleinhovia (1)
Melochia (1)
Pterospermum (1)
Reevesia (1)
Sterculia (1)
Waltheria (1)

Order Parietales (*Camelliales*)

187. ACTINIDIACEAE
Actinidia (4)
Saurauia (1)

194. THEACEAE
Adinandra (4)
Anneslea (1)
Camellia (9)
Cleyera (5)
Eurya (11)
Gordonia (1)
Pyrenaria (1)
Schima (2)
Ternstroemia (1)

196. GUTTIFERAE (*HYPERICACEAE*)
Calophyllum (2)
Garcinia (3)
Hypericum (17)

198. ELATINACEAE
Bergia (1)
Elatine (1)

206. VIOLACEAE
Viola (24)

207. FLACOURTIACEAE
Casearia (1)
Homalium (1)

Idesia (1)
Scolopia (1)
Xylosma (1)

208. STACHYURACEAE
Stachyurus (1)

211. PASSIFLORACEAE
Modecca (1)

216. BEGONIACEAE
Begonia (8)

Order Myrtiflorae (*Myrtales*)

222. THYMELAEACEAE
Daphne (4)
Stellera (1)
Wikstroemia (4)

223. ELAEAGNACEAE
Elaeagnus (11)

224. LYTHRACEAE
Ammannia (1)
Lagerstroemia (1)
Pemphis (1)
Rotala (5)

229. LECYTHIDACEAE
Barringtonia (2)

230. RHIZOPHORACEAE
Bruguiera (1)
Ceriops (1)
Kandelia (1)
Rhizophora (1)

232. ALANGIACEAE
Alangium (2)

233. COMBRETACEAE
Lumnitzera (1)
Terminalia (1)

234. MYRTACEAE
Decaspermum (1)
Rhodomyrtus (1)
Syzygium (10)

235. MELASTOMACEAE
Astronia (1)
Barthea (1)
Blastus (2)
Bredia (3)
Medinilla (2)
Melastoma (3)
Osbeckia (2)
Otanthera (1)
Pachycentria (1)
Sarcopyramis (1)

237. ONAGRACEAE (*OENOTHERACEAE*)
Circaea (4)
Epilobium (5)
Ludwigia (6)
Trapa (4)

238. HALORRHAGACEAE
Haloragis (1)
Myriophyllum (3)

Order Umbelliflorae (*Apiales*)

241. ARALIACEAE
Acanthopanax (1)
Aralia (2)
Boerlagiodendron (1)
Brassiopsis (1)
Dendropanax (2)
Fatsia (1)
Hedera (1)
Pentapanax (1)
Schefflera (3)
Tetrapanax (1)

242. UMBELLIFERAE (*APIACEAE*)
Angelica (6)
Bupleurum (1)
Centella (1)
Cnidium (1)
Conioselinum (1)
Cryptotaenia (1)
Glehnia (1)
Hydrocotyle (7)
Oenanthe (2)
Oreomyrrhis (2)
Osmorhiza (1)
Peucedanum (3)
Pimpinella (3)
Sanicula (1)
Sium (1)
Torilis (2)

243. CORNACEAE
Aucuba (1)
Cornus (3)
Helwingia (1)

SUBCLASS METACHLAMYDEAE OR SYMPETALAE (*MONOPETALAE*)

Order Diapensiales

244. DIAPENSIACEAE
Shortia (1)

Order Ericales

246. PYROLACEAE
Chimaphila (1)
Moneses (1)
Monotropa (1)
Monotropastrum (3)
Pyrola (3)

247. ERICACEAE
Gaultheria (2)
Lyonia (3)
Pieris (1)
Rhododendron (23)
Vaccinium (8)

Order Primulales

250. MYRSINACEAE
(*ARDISIACEAE*)
Ardisia (16)
Embelia (4)
Maesa (4)
Myrsine (3)

251. PRIMULACEAE
Anagallis (1)
Androsace (1)
Lysimachia (12)
Primula (1)
Stimpsonia (1)

Order Plumbaginales

252. PLUMBAGINACEAE
Limonium (2)

Order Ebenales

253. SAPOTACEAE
Palaquium (1)
Pouteria (2)
255. EBENACEAE
Diospyros (9)

257. SYMPLOCACEAE
Symplocos (27)
258. STYRACACEAE
Alniphyllum (1)
Styrax (5)

Order Contortae (*Oleales*)

260. OLEACEAE
Chionanthus (1)
Fraxinus (2)
Jasminum (3)
Ligustrum (7)
Linociera (1)
Osmunthus (6)
262. LOGANIACEAE
Buddleia (2)
Fagraea (1)
Gardneria (1)
Geniostoma (1)
Mitrasacme (2)
Strychnos (1)
263. GENTIANACEAE
Centaurium (1)
Gentiana (11)
Nymphoides (3)
Swertia (5)
Tripterospermum (3)
264. APOCYNACEAE
Alyxia (1)
Anodendron (2)
Cerbera (1)
Ecdysanthera (2)
Melodinus (1)
Parsonsia (1)
Rauwolfia (1)
Tabernaemontana (2)
Trachelospermum (3)
265. ASCLEPIADACEAE
Asclepias (1)
Cryptolepis (1)
Cynanchum (5)
Dischidia (1)
Dregea (1)

Gymnema (1)
Heterostemma (1)
Hoya (2)
Marsdenia (2)
Pergularia (1)
Stephanotis (1)
Tylophora (2)

Order Tubiflorae

266. CONVOLVULACEAE
Argyreia (1)
Calonyction (1)
Calystegia (1)
Cuscuta (4)
Dichondra (1)
Erycibe (1)
Evolvulus (2)
Hewittia (1)
Ipomoea (14)
Jacquemontia (1)
Merremia (6)
Operculina (1)
Stictocardia (1)
270. HYDROPHYLLACEAE
Hydrolea (1)
271. BORAGINACEAE
(*EHRETIACEAE*)
Bothriospermum (2)
Coldenia (1)
Cordia (2)
Cynoglossum (3)
Ehretia (6)
Heliotropium (2)
Lithospermum (1)
Messerschmidia (1)
Tournefortia (1)
Trichodesma (1)
Trigonotis (3)
272. VERBENACEAE
Avicennia (1)
Callicarpa (12)
Caryopteris (1)
Clerodendrum (8)
Lippia (1)
Premna (3)
Verbena (1)
Vitex (3)
273. LABIATAE (*LAMIACEAE*)
Acrocephalus (1)
Agastache (1)
Ajuga (4)
Anisomeles (1)
Basilicum (1)
Chelonopsis (1)
Clinopodium (3)
Coleus (2)
Dysophylla (2)
Elsholtzia (1)
Glechoma (1)
Gomphostemma (2)
Hyptis (4)
Keiskea (1)
Kinostemon (1)
Lamium (2)
Leonurus (1)
Leucas (2)
Leucosceptrum (1)
Lycopus (2)
Melissa (1)
Mentha (1)
Mesona (1)
Mosla (4)
Ocimum (2)
Origanum (1)
Paraphlomis (3)
Perilla (1)
Pogostemon (1)
Prunella (1)
Rabdosia (4)
Rubiteneris (1)
Salvia (9)
Scutellaria (5)
Stachys (1)
Suzukia (1)
Teucrinum (1)
275. SOLANACEAE
Capsicum (1)
Datura (1)
Lycium (1)
Physalis (1)
Solanum (12)
Tubocapsicum (1)
276. SCROPHULARIACEAE
Bacopa (1)
Botrypleuron (1)
Calorhabdos (3)
Centranthera (1)
Dopatrium (1)
Ellisiophyllum (1)
Euphrasia (10)
Hemiphragma (1)
Limnophila (3)
Lindernia (11)
Mazus (6)
Micrargeria (1)

Microcarpaea (1)
Mimulus (1)
Paulownia (3)
Pedicularis (2)
Phtheirospermum (1)
Scoparia (1)
Scrophularia (3)
Siphonostegia (1)
Striga (2)
Torenia (4)
Veronica (10)

277. BIGNONIACEAE
Radermachera (1)

280. OROBANCHACEAE
Aeginetia (1)
Orobanche (1)
Xylanche (1)

281. GESNERIACEAE
Aeschynanthus (1)
Boea (1)
Conandron (1)
Cyrtandra (1)
Didymocarpus (1)
Hemiboea (3)
Lysionotus (3)
Rhynchoglossum (1)
Rhynchotechum (1)
Titanotrichum (1)
Whytockia (1)

283. LENTIBULARIACEAE
Utricularia (8)

285. ACANTHACEAE
Asystasiella (1)
Baphicacanthus (1)
Blechum (1)
Codonacanthus (1)
Dicliptera (1)
Dipteracanthus (1)
Gendarussa (1)
Goldfussia (2)
Hemiadelphis (1)
Hemigraphis (3)
Hygrophila (3)
Hypoestes (2)
Justicia (5)
Kudoacanthus (1)
Lepidagathis (4)
Parachampionella (2)
Peristrophe (2)
Rungia (2)
Semnostachya (1)
Staurogyne (1)

286. MYOPORACEAE
Myoporum (1)

Order Plantaginales

288. PLANTAGINACEAE
Plantago (4)

Order Rubiales

289. RUBIACEAE
Adina (1)
Argostemma (1)
Borreria (3)
Cephalanthus (1)
Damnacanthus (2)
Dentella (1)
Galium (11)
Gardenia (1)
Geophila (1)
Guettarda (1)
Hayataella (1)
Hedyotis (11)
Ixora (1)
Knoxia (1)
Lasianthus (16)
Litosanthes (1)
Mitchella (1)
Morinda (3)
Mussaenda (5)
Neonauclea (1)
Nertera (2)
Ophiorrhiza (7)
Paederia (2)
Pavetta (1)
Plectronia (1)
Psychotria (4)
Randia (5)
Rubia (3)
Serissa (1)
Tarenna (3)
Thysanospermum (1)
Timonius (1)
Tricalysia (1)
Uncaria (2)
Wendlandia (3)

290. CAPRIFOLIACEAE
Abelia (1)
Lonicera (6)
Sambucus (1)
Viburnum (14)

292. VALERIANACEAE
Patrinia (3)
Triplostegia (1)
Valeriana (4)
293. DIPSACACEAE
Scabiosa (1)

Order Cucurbitales

294. CUCURBITACEAE
Actinostemma (1)
Bryonopsis (1)
Gymnopetalum (1)
Gymnostemma (1)
Melothria (5)
Momordica (2)
Neoalsomitra (1)
Thladiantha (3)
Trichosanthes (8)

Order Campanulatae (*Asterales*)

295. CAMPANULACEAE
Adenophora (5)
Campanumoea (2)
Codonopsis (1)
Lobelia (5)
Peracarpa (1)
Pratia (1)
Sphenoclea (1)
Wahlenbergia (1)
296. GOODENIACEAE
Scaevola (3)
300. COMPOSITAE (*ASTERACEAE*)
Adenostemma (2)
Ainsliaea (6)
Anaphalis (5)
Artemisia (17)
Aster (10)
Bidens (4)
Blumea (12)
Cacalia (2)
Carpesium (5)
Centipeda (1)
Chrysanthemum (3)
Cirsium (12)
Conyza (3)
Cotula (1)
Crassocephalum (1)
Crepidiastrum (2)
Crossostephium (1)
Dichrocephala (1)
Echinops (1)
Eclipta (1)
Elephantopus (2)
Emilia (1)
Erechtites (2)
Erigeron (4)
Ethulia (1)
Eupatorium (8)
Farfugium (2)
Glossogyne (1)
Gnaphalium (8)
Grangea (1)
Gynura (4)
Hemistepta (1)
Heteropappus (2)
Hieracium (2)
Ixeris (10)
Kalimeris (2)
Lactuca (4)
Lagenophora (1)
Laggera (1)
Lapsana (1)
Leibnitzia (1)
Leontopodium (1)
Ligularia (3)
Microglossa (1)
Mikania (1)
Myriactis (1)
Paraixeris (1)
Pertya (1)
Petasites (1)
Picris (2)
Pluchea (2)
Prenanthes (1)
Pseudoelephantopus (1)
Rhynchospermum (1)
Saussurea (5)
Senecio (8)
Siegesbeckia (2)
Solidago (1)
Sonchus (2)
Sphaeranthus (1)
Sphaeromorphaea (1)
Spilanthes (1)
Synedrella (1)
Syneilesis (2)
Taraxacum (1)
Vernonia (5)
Tridax (1)
Wedelia (4)
Xanthium (1)
Youngia (1)

NATURAL CLASSIFICATION OF PLANT KINGDOM

The classification of plant kingdom presented below is the scheme proposed by Tippo (1942)[9], Melchior & Werdermann (1954)[10] and Melchior (1964)[11], with only minor modification. This scheme permits accommodation of the extent plants of our area.

Kingdom PLANTAE

Subkingdom THALLOPHYTA (*THALLOBIONTA*)
- Phylum 1. CYANOPHYTA (Blue-green algae)
  - Class Cyanophyceae (*Myxophyceae, Schizophyceae*)
- Phylum 2. CHLOROPHYTA (Green algae)
  - Class Chlorophyceae
- Phylum 3. CHAROPHYTA (Stoneworts, Brittleworts)
  - Class Charophyceae
- Phylum 4. EUGLENOPHYTA (Euglenoids)
- Phylum 5. PYRR(H)OPHYTA (Golden-brown algae)
  - Class Cryptophyceae
  - Class Chloromonadophyceae
  - Class Desmokontae (*Adiniferae*)
  - Class Dinophyceae (*Peridineae*) (Dinoflagellates)
- Phylum 6. CHRYSOPHYTA (Yellow-green algae, Diatoms)
  - Class Heterokontae (*Xanthophyceae*)
  - Class Chrysophyceae
  - Class Bacillariophyceae (*Diatomeae*)
- Phylum 7. PHAEOPHYTA (Brown algae)
  - Class Isogeneratae
  - Class Heterogeneratae
  - Class Cyclosporeae
- Phylum 8. RHODOPHYTA (Red algae)
  - Class Bangiophyceae (*Protoflorideae, Bangioideae*)
  - Class Florideae
- Phylum 9. SCHIZOMYCOPHYTA (Bacteria)
  - Class Schizomycetes
- Phylum 10. MYXOMYCOPHYTA (Slime molds)
  - Class Acrasiomycetes (*Acrasieae*)
  - Class Myxomycetes (*Mycetozoa*)
- Phylum 11. EUMYCOPHYTA (Fungi)
  - Class Phycomycetes (Algal-fungi)
  - Class Ascomycetes (Sac-fungi)
  - Class Basidiomycetes (Club-fungi)
  - Form Class Deuteromycetes (Fungi imperfecti & mycelia sterilia)
- Phylum 12. LICHENES
  - Class Phycolichenes
  - Class Ascolichenes
  - Class Basidiolichenes
  - Class Deuterolichenes (Lichenes imperfecti)

9. Tippo, O., 1942. A modern classification of the plant kingdom. -Chron. Bot. 7: 203-206.
10. Melchior, H. & E. Werdermann, 1954. A Engler's Syllabus der Pflanzenfamilien. Zwölfte Auflage. Bd. I. Bakterien bis Gymnospermae. -Berlin: Gebrüder Bornträger.
11. Melchior, H., 1964. A. Engler's Syllabus der Pflanzenfamilien. Zwölfte Auflage. Bd. II. Angiospermen. -Berlin: Gebrüder Bornträger.

Subkingdom EMBRYOPHYTA (*CORMOPHYTA, EMBRYOBIONTA*)
EMBRYOPHYTA ASIPHONOGAMA (*ARCHEGONIATA*)
Phylum 13. BRYOPHYTA
Class Anthocerotae (*Anthocerotopsida*) (Hornworts)
Class Hepaticae (*Hepaticopsida; Marchantiopsida*) (Liverworts)
Class Musci (*Bryopsida*) (Mosses)

TRACHEOPHYTA (Vascular plants)
Phylum 14. PTERIDOPHYTA (Ferns and fern allies)
Class Psilotopsida
Class Lycopsida (Clubmosses and quillworts)
Class Articulatae (*Sphenopsida*) (Horsetails)
Class Filicineae

EMBRYOPHYTA SIPHONOGAMA
Phylum 15. SPERMATOPHYTA (Seed plants)
Subphylum 1. GYMNOSPERMAE (Coniferous plants)
Class Cycadopsida
Class Coniferopsida
Class Taxopsida

Subphylum 2. ANGIOSPERMAE (*Magnoliophyta*) (Flowering plants)
Class Dicotyledoneae (*Magnoliatae*)
Class Monocotyledoneae (*Liliatae*)

SELECTED BIBLIOGRAPHY ON FORMOSAN BOTANY

Asahina, Y. (ed.), 1939. Nippon Inkwasyokubutu Dukan (Illustrated Flora of Japanese Cryptogams). -Sanseido, Tokyo, Japan.

Cardot, J., 1905. Mousses de l'ile Formose. -Beih. Bot. Centralbl. **19**(2): 85-148.

Chang, T. P., 1966. A preliminary report on the diatoms of the hot springs of Taiwan. -Taiwania **12**: 47-64.

_____, 1968. Some phytoplankton of Tamshui River from Kuantu to Shetzu. *-l. c.*, **14**: 303-323.

_____, 1969. Algae of Taiwan milkfish ponds. -Sino-Amer. J. C. R. R. Fisheries Ser., No. 7: 91-135.

Chen, C. C., Chen, J. S. & Y. S. Huang, 1969. A study of soil fungi from forest nurseries of Taiwan. -Plant Protection Bull. **11**(1): 11-21.

Chen, T. S. & T. W. Hu, 1976. A List of Exotic Ornamental Plants in Taiwan. -Taipei, published by the authors.

Chen, Z. C., 1974-75. Notes on new Formosan forest fungi. **I.** Black mildews on *Abies kawakamii*. -Taiwania **19**(2): 115-122, 1974; **II.** Some lignicolous fungi. *-ibid.*, **20**(2): 201-212; **III.** The genus *Calostoma* Desv. *-ibid.*, **20**(2): 229-233, 1975.

Chiang, Y. M., 1960. Marine algae of northern Taiwan (Cyanophyta, Chlorophyta, Phaeophyta). -Taiwania **7**: 51-76.

_____, 1962a. Marine algae of northern Taiwan (Rhodophyta). *-l. c.*, **8**: 143-165.

_____, 1962b. Marine algae collected from Penghu (Pescadores). *-l. c.*, **8**: 167-180.

_____, 1972. Keys to the genera of marine algae of Taiwan. *-l. c.*, **17**(1): 8-13.

_____, 1973a. Notes on marine algae of Taiwan. *-l. c.*, **18**(1): 13-17.

_____, 1973b. Studies on the marine flora of southern Taiwan. -Bull. Jap. Soc. Phycol. **XXI**(3) 97-102.

Chien, C. Y., 1974. Studies on Taiwanese aquatic fungi. I. *Blastocladia* and *Allomyces*. -Trans. Mycol. Soc. Jap. **15**: 178-185.

Chiou, T. S., Hsu, W. & H. S. Chang, 1975. Aquatic phycomyces of Taiwan. I. -Bot. Bull. Acad. Sinica **16**: 159-176.

Chuang, C. C., 1973. A moss flora of Taiwan exclusive of essentially pleurocarpous families. -J. Hattori Bot. Lab. **37**: 419-509.

_____, & Z. Iwatsuki, 1970. On some Taiwan mosses. -Misc. Bryol. Lichenol. **5**: 68-69.

Chung, H. Y., 1973. Preliminary studies on the fungus disease of freshwater in Taiwan. -J. Fish. Soc. Taiwan **2**: 47-55.

DeVol, C. E., 1959. A key to the genera of the pteridophytes. -Quart. J. Taiwan Mus. **12**: 55-65.

_____, 1960. The Gleicheniaceae of Taiwan and adjacent areas. -Taiwania **7**: 17-32, *pl.* 1-5, 1960.

_____, 1964-70. The pteridophytes of Taiwan. I. -Taiwania **10**: 89-104, 1964; II. Lycopodiaceae. -*ibid.*, **11**: 41-55, *pl.* 1-4, 1965; III. Selaginellaceae. -*ibid.*, **12**: 65-90, *f.* 1-14, 1966; IV. The aquatic ferns of Taiwan. -*ibid.*, **13**: 1-11, *f.* 1-2, 1967; V. Hymenophyllaceae: *Trichomanes*. -*ibid.*, **14**: 89-132, 1968; VI. Hymenophyllaceae: *Hymenophylum*. -*ibid.*, **15**: 271-300, 1970.

_____, 1972a. *Isoetes* found on Taiwan. -*l. c.* **17**(1): 1-7.

_____, 1972b. The *Plagiogyria* of Taiwan. -*l. c.* **17**(3): 277-292.

Fan, K. C., 1951. The genera *Gelidium* and *Pterocladia* of Taiwan. -Taiwan Fish. Res. Inst. Lab., Biol. Rep. No. **2**: 1-22, *pls.* 1-5.

_____, 1953. A list of edible sea-weeds in Taiwan. -*l. c.*, No. **5**, **6**: 1-11.

_____, 1974. Notes on algal taxonomy. I. A review of certain new taxa of the marine algae of Taiwan Province, China. -Act. Phytotax. Sin. **12**: 253-255.

Forbes, F. B. & W. B. Hemsley, 1886-1905. An enumeration of all the plants known from China proper, Formosa, Hainan, Corea, the Luchu Archipelago, and the Island of Hongkong, together with their distribution and synonymy. -J. Linn. Soc. Bot. **23**: 1-521, 1886-1888; -*ibid.*, **26**: 1-592, 1889-1902; -*ibid.*, **36**: 1-686, 1903-1905. (Reprinted and titled as Index Florae Sinensis, Vols. **I-III**.)

Gan, W. S., 1958-65. Manual of Medicinal Plants in Taiwan. Vols. **I-III**. -National Research Institute of Chinese Medicine, Taipei, Taiwan.

Hämet-Ahti, L., Ahti, T. & T. Koponen, 1974. A scheme of vegetation zones for Japan and adjacent regions. -Ann. Bot. Fennici **11**: 59-88.

Hatusima, S., 1970. An enumeration of the plants collected by G. Ikeda in Botel Tobago Island. -Mem. Fac. Agr. Kagoshima Univ. **VII**(2): 295-341.

Hayata, B., 1908. Flora Montana Formosae. -J. Coll. Sci. Imp. Univ. Tokyo, Jap. **XXV**: 1-260, *pl.* i-xxvii.

_____, 1911. Materials for a Flora of Formosa. -*l. c.* **XXX**: 1-471.

_____, 1911-21. Icones Plantarum Formosanarum, nect non et Contributiones ad Floram Formosanam. (臺灣植物圖譜). Vols. **I-X**. -Bureau of Productive Industries, Government of Formosa, Taihoku.

_____, 1917. General Index to the Flora of Formosa (Supplement to Icones Plantarum Formosanarum **VI**) (臺灣植物總目錄). -Bureau of Prod. Ind., Gov. Formosa, Taihoku.

Henry, A., 1896. A list of plants from Formosa with some preliminary remarks on the geography, nature of the flora and economic botany of the island. -Trans. Asiat. Soc. Japan **XXIV**: 1-118.

Herzog, T. & A. Noguchi, 1955. Beitrag zur Kenntnis der Bryophytenflora von Formosa und den benachbarten Inseln Botel Tobago und Kwashyoto. -J. Hattori Bot. Lab. **14**: 29-70.

Heydrich, F., 1894. Beiträge zur Kenntnis der Algenflora von Ost-Asien besonders der Insel Formosa, Molukken und Liukiu-Inseln. -Hedwigia **33**: 267-306, *pl.* 14-15.

Hori, S. & Y. H. Yang, 1967. Desmidoj en Formoso. (1) En Sun-luno-lago. -Sci. Rep. Gunma Univ. **16**: 55-59.

Horikawa, Y., 1919. Marine algae of Taiwan. -Trans. Nat. Hist. Soc. Formosa **9**: 13-16.

_____, 1934. Monographia hepaticarum austri-japonicarum. -J. Sci. Hiroshima Univ., Ser. B., Div. 2, **2**(2): 101-325, *figs.* 1-63, *pls.* 11-21.

Hsieh, A. T. & T. I. Yang, 1969. Nomenclature of Plants in Taiwan (新撰臺灣植物名彙). -College of Agriculture, National Taiwan University, Taipei, Taiwan.

Hsu, C. C., 1971-. Illustrations of Common Plants in Taiwan. **I-X**. (臺灣常見植物圖鑑). -Taiwan Provincial Education Press, Taipei, Taiwan.

Huang, T. C., 1972. Pollen Flora of Taiwan. -Botany Dept. Press, National Taiwan University, Taipei, Taiwan.

Imahori, K., 1951-53. Studies on the Charophyta in Formosa. I. -Sci. Rep. Kanazawa Univ. **1**: 201-221, *pl.* 1-3, *f.* 1, 1951; II. -*ibid.*, **2**: 115-137, *pl.* 1-4, 1953.

_____, 1954. Similarity between the Characeae of Formosa and the Philippine Islands. -Act. Phytotax. Geobot. **15**: 123-128.

Inoue, H., 1961. Hepatics collected by Mr. K. Sawada in Formosa. -J. Jap. Bot. **36**: 184-188.

Inone, H., 1972. Studies on Formosan Hepaticae. I. Introduction and Scapaniaceae. -Jap. J. Bot. **20**(5): 311-327.

Ihsiba, E., 1935. Index Muscorum Formosarum. -Trans. Trop. Agr. Soc. Taihoku Imp. Univ. **7**(2): 197-204.

Ito, T., 1927. Illustrations of Taiwan Plants (臺灣植物圖說). -Tokyo, Japan.

_____, 1928. Zoku Taiwan Shokubutsu Dzusetsu (續臺灣植物圖說).

_____, 1929. Flora Alpine Formosana (臺灣高山植物圖說). -Yamadasyu, Sanziuken, Japan.

Iwatsuki, Z. & A.J. Sharp, 1970. Interesting mosses from Formosa. -J. Hattori Bot. Lab. **33**: 161-170.

Kanehira, R., 1917. Formosan Trees. -Taihoku.

_____, 1936. Formosan Trees (臺灣樹木誌). Revised edition. -Taihoku.

Kawakami, T., 1910. A List of Plants of Formosa (臺灣植物目錄). -Bureau of Productive Industry, Government of Formosa, Taihoku.

Keng, H., 1952. Families and genera of Formosan pteridophytes. -Quart. J. Taiwan Mus. **5**: 25-56.

Koponen, T., 1971. Keys for the Mniaceae in Taiwan. -Ann. Bot. Fennici **8**: 297-304.

_____, & M.J. Lai, 1976. ***Rhizomnium tuomikoskii*** T. Kop. (Mniaceae) newly recorded from Taiwan. -Quart. J. Taiwan Mus. **29**. (in press)

Kudo Yakudo, 1934. List of Plants Cultivated in the Department of Forestry. -Govern. Res. Inst., Taihoku, Taiwan.

Kudo, Yushu, 1931. The Vegetation of Taiwan (臺灣の植物). 48 pp. -Tokyo.

_____, & G. Masamune, 1932. Genera plantarum Formosanarum. I. -Ann. Rep. Taihoku Bot. Gard. **II**: 1-141.

Lai, M.J., 1971. A bibliography of Formosan forest botany. Part I. Selected works on taxonomy of Angiosperms. -Sylva **5**: 54-69.

_____, 1976a. A key to the families of Bryophyta in Taiwan. -Taiwania **21**(1): 73-82.

_____, 1976b. The Hypopterygiaceae (Musci) of Taiwan. -Taiwania **21**(2). (in press)

_____, & J.R. Wang-Yang, 1976. Index Bryoflorae Formosensis. -Taiwania **21**(2). (in press)

Li, C.W., 1976. A study on the benthic diatoms communities of mountain streams in central Taiwan. -Taiwania **21**(1): 52-72.

Li, H.L., 1949. Families and genera of Formosan Plants. I. Monocotyledons. -Quart. J. Taiwan Mus. **II**(2, 3): 45-156.

_____, 1963. Woody Flora of Taiwan. -Livingston Publishing Company, Narberth, Pennsylvania.

_____, & H. Keng., 1954. Icones gymnospermum Formosanarum. -Taiwania **5**: 25-84.

_____, Liu, T.S., Huang, T.C., Koyama, T. & C.E. DeVol, 1975-76. Flora of Taiwan. Vols. **1-6**, -Epoch Publishing Co., Ltd., Taipei, Taiwan.

Lin, T.P., 1975. Native Orchids of Taiwan. 1-268. Chiayi, Taiwan.

Lin, W.F., Chang, L.M. & T. Liu, 1968. Forest plants of Taiwan. -Quart. J. Chinese Forestry **I**(2): 1-78.

Liu, C.H. & B.Y. Yang., 1973. Studies on certain species of Taiwan Mucorales. -Taiwania **18**(1): 73-82.

Liu, T., 1966. Study on the phytogeography of the conifers and taxads of Taiwan. -Bull. Taiwan For. Res. Inst. **122**: 1-33.

_____, 1968-71. Studies on the classification of the climax vegetation communities of Taiwan. I. Classification of the climax formation of the vegetation of Taiwan. -Bull. Taiwan Forestry Res. Inst. **166**: 1-26, 1968; II. The alpine tundra and coniferous forest formation. -*ibid.*, **203**: 1-24, 1971; III. Studies on the hardwood forest formations and tropical savanna formation. -Proc. Nat. Sci. Council **4**(II): 1-36, 1970; IV. The origin development and regional differentiation of the vegetation communities. -J. Agr. Ass. China, n. ser. **76**: 39-62, 1971.

_____, 1972. The forest vegetation of Taiwan. -Quart. J. Chinese Forestry **V**(4): 55-86.

_____, Koh, C.C. & Bing-Yuen Yang, 1961. Ecological survey on Taiwan important forest types. -Bull. Taiwan For. Res. Inst. **72**: 1-65.

Liu, T.S., 1956. List of Economic Plants in Taiwan. -Taipei.

_____, 1960-62. Illustrations of Native and Introduced Ligneous Plants of Taiwan (臺灣木本植物圖誌). Vols. **I-II**. -Taipei.

_____, 1962. A phytogeographic sketch on the forest flora of Taiwan (Formosa). -Act. Phytotax. Geobot. **XX**: 149-157.

Liu, T. S., (ed.), 1972. Chuang-San Encyclopaedia of Natural Science, Vol. 8. Botany (中山自然科學大辭典，第八冊植物學). -Taipei.

_____, & M. J. Lai, 1972. A census of genera of plants native to Taiwan. -Sylva 6: 63-85. Reprinted as For. Bull. No. 55, Exp. Forest, College of Agr., National Taiwan Univ., Taipei.

_____, & _____, 1973. A census of the genera and families of bryophytes and lichens of Taiwan. -Sylva 7: 136-144.

_____, & M. J. Lai, 1975. The classification of Bryophyta of Taiwan. -Ann. Bull. Taiwan Museum 18: 57-92. (in Chinese)

_____, & J. C. Liao, 1971. Trees indigenous to Lanyu (Botel Tobago Island). -For. Bull. No. 49, Exp. Forest, College of Agr., National Taiwan Univ., Taipei.

_____, Sasaki, S. & H. Keng, 1955-57. An enumeration of the plants of Lanyu (Botel Tobago). -Quart. J. Taiwan Mus. 8(4): 283-328, 1955; *-ibid.*, 10(2): 57-61, 1957.

_____, Wang J. L. & J. C. Liao, 1967. The exotic woody species in Taiwan. -Quart. J. Taiwan Forestry 3(1): 114-163.

Liu, Y. C., 1972. Ligneous Plants of Taiwan (臺灣木本植物誌). -College of Agriculture, National Chung-Shing University, Taichung, Taiwan.

Masamune, G., 1932. Phytogeographic position of Formosa when her indigenous genera of phanerogamic plants are concerned. -Trans. Nat. Hist. Soc. Formosa 22: 164-194; 365-371.

_____ (ed), 1936. Short Flora of Formosa (最新臺灣植物誌目錄). -The Editorial Department of Kudoa, Taihoku, Taiwan. (Cooperated with Fukuyama, N., Hosokawa, T., Kamikoti, S., Mori, K., Sasaki, S., Shimada, H., Suzuki, S., & T. Suzuki)

Masamune, G., 1954. A List of Vascular Plants of Taiwan. -Hokurikunoshokubutzunokai Press, Kanazawa, Japan. (in mimeographical printing)

Matsumura, J. & B. Hayata, 1906. Enumeratio Plantarum Formosanarum. -J. Coll. Sci. Imp. Univ. Tokyo, Jap. XXII: 1-702.

Merrill, E. D., 1923. Die Pflanzengeographische Scheidung von Formosa und den Philippinen. -Bot. Jahrb. 58: 599-604.

Nakanishi, S., 1963. A record of travels in Taiwan. -Hikobia 3(4): 316-327.

Negoro, K., 1953. Phytoplankton of Formosan lakes. -Act. Phytotax. Geobot. 15: 5-11, *f.* 1-3.

Noguchi, A., 1934-36. Contributions to the moss flora of Formosa. I. -Trans. Nat. Hist. Soc. Formosa 24: 289-297; II. *-ibid.*, 24: 469-473, 1934; III. *-ibid.*, 25: 63-68, 1935; IV. *-ibid.*, 26: 34-43; V. *-ibid.*, 26: 139-147, 1936.

_____, 1937. Contributions to the moss flora of Japan and Formosa. VI. -J. Jap. Bot. 13: 86-95; VII. *-ibid.*, 13: 407-413; VIII. *-ibid.*, 13: 784-794.

_____, 1959. A Preliminary List of Mosses of Japan and its Adjacent Areas.

_____, 1967. A Revised List of "A Preliminary List of Mosses of Japan and its Adjacent Areas".

Okada, K., 1932. The freshwater algae of Botel Tobago Island or Kotosho, Formosa. -Bull. Biogeogr. Soc. Japan 3: 36-62, *pl.* 2-5.

Okamura, K., 1931. On the marine algae from Kotosho (Botel Tobago). -Bull. Biogeogr. Soc. Jap. 2(2): 95-122, *pl.* 10-12, *f.* 1.

_____, 1932. The distribution of marine algae in Pacific Waters. -Rec. Oceanogr. Works Jap. 4: 30-150.

Sasaki, S., 1928. List of Plants of Formosa (臺灣植物名彙). -The Natural History Society of Formosa, Taihoku, Formosa.

_____, 1930. A Catalogue of the Government Herbarium (林業部臘葉館目錄). -Report No. 9, Department of Forestry, Government Research Institute, Taihoku, Formosa.

_____, 1937. Phytogeographical and floristical studies on the islandsseres of Kotosyo, generally including Kotosyo (Botel Tobago Isl. proper), Syo-Kotosyo (Little Botel Tobago Isl.), and Kwasyoto (Samasana Isl.). Part 1. Enumeration of hitherto known indigenous pteridophytes and their geographical distribution. -Rep. Dept. For. Govern. Res. Inst. Taihoku 21: 1-126, *f.* 1-18.

Sasaoka, H., 1915-18. Additions to the mosses of Taiwan. -Trans. Nat. Hist. Soc. Formosa 5: 55-56, 1915; *-ibid.*, 8: 135, 1918.

_____, 1920-28. Additions to the mosses of Taiwan. I. -Trans. Nat. Hist. Soc. Formosa 10: 285, 1920; II. *-ibid.*, 11: 75-76, 1920; III. *-ibid.*, 17: 240-242, 1927; IV. *-ibid.*, 18: 131-133, 1928.

Sasaoka, H., 1928a. A list of Taiwan mosses. I. -Trans. Nat. Hist. Soc. Formosa **18**: 180-193; II. 248-252; III. 359-366; IV. 414-423.

_____, 1928b. Corrections of Taiwan mosses. I. -Trans. Nat. Hist. Soc. Formosa **18**: 78-83.

Sato, M., 1936-38. Enumeratio lichenum ins. Formosae. I. -J. Jap. Bot. **12**: 426-432. II. 569-575, 1936; III. -*ibid*., **13**: 595-599, 1937; IV. -*ibid*., **14**: 463-469; V. 783-791, 1938.

Sawada, K., 1914. Mosses of Formosa. -Trans. Nat. Hist. Soc. Formosa **4**(14), Suppl.: 1-8.

Sawada, K., 1918. Mushrooms of Formosa. -Trans. Nat. Hist. Soc. Formosa **8**: 59-60.

_____, 1919-59. Descriptive Catalogue of Formosan Fungi (臺灣產菌類調查報告). Parts **1-11**.

_____, 1931. List of fungi found in Formosa. 1-103. -Taihoku.

Shen, Y. F., 1950. Notes on the freshwater algae of Mount. A-li. -Taiwania **1**: 347-357.

_____, 1955. Phytoplankton collected from the University Pond, in the experimental forest of Taiwan University at Chitou. -*l. c*., **6**: 13-22.

_____, 1956. Studies on the freshwater algae of Taiwan, Scenedesmaceae from Taiwan. -Rep. Inst. Fish Biol. Ministry of Econ. Affairs & Nat. Taiwan Univ. **I**(1): 47-61.

_____, & K. C. Fan., 1950. Marine algae of Formosa. -Taiwania **1**: 317-345.

Shieh, W. C., 1969. Ferns and Fern Allies (蕨類植物). -Taichuang, Taiwan.

_____, 1972-74. An enumeration of indigen(o)us pteridophytes in Taiwan. 1. -Quart. J. Chinese Forestry **VI**(1): 31-45; 2. -*ibid*., **VI**(2): 81-98; 3. -*ibid*., **VI**(3): 97-116; 4. -*ibid*., **VI**(4): 87-106, 1972; 5. -*ibid*., **VII**(3): 81-93, 1974.

Shimizu, T., 1962-63. Studies on the limestone flora of Japan and Taiwan. I. -J. Fac. Textile Sci. & Technol., Shinshu Univ., No. 30, ser. A., Biol., **11**: 1-105, 1962; II. -*ibid*., No. 36, ser. A., Biol. **12**: 1-88, 1963.

Skvortzov, B. V., 1932. Marine diatoms from Formosa Strait. -Philip. J. Sci. **47**: 151-161.

Suzuki, S., 1937. Synopsis of Formosa Trees (臺灣樹木便覽). -Hort. Society, Taihoku Imp. Univ., Taihoku, Taiwan.

Suzuki, T., Fukuyama, N. & H. Shimada, 1939. On the alpine plant communities of Taiwan, with special reference to those of the alpine rocky cliffs and the talus lands near Bunakkei, Mt. Nankotaizan. -Bull. Biogeogr. Soc. Jap. **9**: 99-131.

Swinhoe, R., 1863(?). List of Plants of the Island of Formosa or Taiwan.

Tagawa, M., 1940-49. Studies on Formosan ferns. 1. -Acta Phytotax. Geobot. **9**: 87-96; 2. -*ibid*., **9**: 139-148; 3. -*ibid*., **9**: 203-215, 1940; 4. *ibid*., **10**: 193-208; 5. -*ibid*., **10**: 275-289, 1941; 6. -*ibid*., **11**: 303-311, 1942; 7. -*ibid*., **14**: 8-10, 1949.

Tsai, Y. P. *et al*, 1970. List of Plant Diseases in Taiwan (臺灣植物病害名彙). -Plant Quarantine Bull. No. **6**, Bureau of Commodity Inspection & Quarantine, Ministry of Econ. Affairs, R. O. C.

Tschen, J. & C. W. Li, 1974. Diatoms from Nan-tow and Chia-yi Counties, Taiwan. -J. Sci. Engin. **XI**: 1-24.

Ueno, M., 1939. Plankton studies in Formosan island waters. -Philip. J. Sci. **69**: 35-67, *pl*. 1, *f*. 1, *tab*. 1-22.

Van Steenis, C. G. G. J., 1968. The herb flora of Taiwan or how to master a flora without types and with only a few books. -Fl. Mal. Bull. **22**: 1562-1567.

Volz, P. A., Hsu, Y. C. & C. H. Kiu, 1974. Fresh water fungi on northern Taiwan. -Taiwania **19**(2): 230-234.

Wang, C. K., 1960. An enumeration of all species of Musci recorded from Taiwan, with some species recently known from this area (excluding Isobryales and Hypnobryales). -Biol. Bull. Tunghai Univ. **3**: 1-38.

_____, 1961. (Isobryales). -Biol. Bull. Tunghai Univ. **5**: 1-31.

_____, 1963a. (Hypnobryales). -Quart. J. Taiwan Mus. **16**: 213-259.

_____, 1963b. Phytogeographical affinities between the moss floras of Formosa and her neighbouring districts. -Biol. Bull. Tunghai Univ. **17**: 1-18.

_____, 1964. Distribution of mosses in Formosa. -Biol. Bull. Tunghai Univ. **21**: 1-11.

_____, 1967a. On the ecology and distribution of the bryophytes of Taiwan. -Quart. J. Taiwan Forest. **3**(1): 76-106. (in Chinese)

_____, 1967b. Mosses recently found in Formosa. -Biol. Bull. Tunghai Univ. **28**: 1-30.

_____, 1967c. Mosses new to Formosa. -Biol. Bull. Tunghai Univ. **31**: 1-14.

Wang. C. K. 1968a. Notes on Formosan moss flora. I. -Biol. Bull. Tunghai Univ. **35**: 1-12.
_____, 1968b. The coniferous forests of Taiwan. -Biol. Bull. Tunghai Univ. **34**: 1-52.
_____, 1969. A collection of mosses from Botel Tobago. -Biol. Bull. Tunghai Univ. **38**: 1-15.
_____, 1970. Phytogeography of the Mosses of Formosa. 1-576. -Tunghai Univ. Press, Taichung, Taiwan.
_____, 1972. Mosses new to Botel Tobago. -Chinese Bioscience **1**(3): 49-54.
Wang-Yang, J. R., 1968. A morphological study of the algal symbionts of four Taiwan lichens: *Anaptychia comosa*, *A. dendricata*, *Parmelia caperata* and *P. rudecta*. -Taiwania **14**: 53-60.
_____, 1970. Some species of *Trebouxia*, a genus of lichenized algae, isolated from Taiwan fructicose lichens. -Taiwania **15**(1): 181-188.
_____, & M. J. Lai, 1972. Lichens. In T, S. Liu (ed.), Chuang-San Encyclopaedia of Natural Science, Vol. **8** (Botany): 492-518. -Taipei.
_____, & _____, 1973. A checklist of the lichens of Taiwan. -Taiwania **18**(1): 83-104.
_____, & _____, 1976a. Notes on the lichen genus *Sphaerophorus* Pers. of Taiwan, with descriptions of three new species. -Taiwania **21**(1): 83-86.
_____, & _____, 1976b. Additions and corrections to the lichen flora of Taiwan. -Taiwania **21**(2). (in press)
Wilson, E. H., 1922. A phytogeographical sketch of the ligneous flora of Formosa. -J. Arnold Arb. **2**: 25-41.
Yamada, Y., 1936. The species of *Eucheuma* from Ryukyu and Formosa. -Sci. Papers Inst. Algol. Res. Fac. Sci. Hokkaido Imp. Univ. **1**: 119-134, *pl.* 21-29.
_____, 1950. A list of marine algae from Ryukyusho, Formosa. -Sci. Papers Inst. Algol. Res. Fac. Sci. Hokkaido Univ. **3**: 173-194.
Yamamoto, Y., 1925-32. Supplementa Iconum Plantarum Formosanarum (續臺灣植物圖譜). Vols. **I-V**. -Department of Forestry, Government Research Institute, Taihoku, Formosa.
Yamamoto, Y., 1940. The Vegetation of Taiwan (臺灣植物槪論). 34 pp. -Taihoku.
Yamamoto, W., 1961. Formosan sooty mold fungi belonging to the Meliolaceae, Parodiellinaceae, Asterimaceae and Capnodiaceae, -College of Agr., Nat. Taiwan Univ., Spec. Publ. No. **10**. Taipei, Taiwan.
Yang, B. Y., 1960. A preliminary list of the Hepaticae of Taiwan. -Quart. J. Taiwan Mus. **XIII**(3-4): 231-236.
Yang, T. I. 1973. A List of Plant(s) in Taiwan (臺灣植物名彙). -Taipei.
Zahlbruckner, A., 1933. Flechten der Insel Formosa. -Repert. Sp. Nov. Fedde, **31**: 194-224; *-ibid.*, **33**: 22-68.