Survey and Herbarium Specimens of Medicinal Vascular Flora of Doi Chiang Dao

Somporn Putiyanan[1*] and J. F. Maxwell[2]

[1]*Department of Pharmaceutical Sciences, Faculty of Pharmacy, Chiang Mai University, Chiang Mai 50200, Thailand*

[2]*Department of Biology, Faculty of Science, Chiang Mai University, Chiang Mai 50200, Thailand*

**Corresponding author. E-mail: somporn@pharmacy.cmu.ac.th*

ABSTRACT

The herbarium in September 1990 included over 9,210 specimens from 226 families (270 fam. in the world) in medicinal plant herbarium, Faculty of Pharmacy, CMU. From January 1989 to September 1990, a tolal of 821 species had been are collected from Doi Chiang Dao wildlife sanctuary, some of which are of considerable economic, medicinal and botanical importance. These plants which have been collected belong to 125 plant families. There have been five new plant records for the flora of Thailand and one emended description. Plants found on the limestone cliffs and outcrops differ from the other species and are habitat-specific calciphytes. No difference has been observed between the morphological characteristic found on soils formed from calcareous and granite/shale bedrocks. The lowland up to 850 m. elevation exhibits two basic kinds of forest : deciduous and mixed evergreen/deciduous facies. The deciduous forests, mostly disturbed due to forest exploitation, are varying degrees of evergreen and deciduous species, the latter kind of plants differing from those found in the dipterocarp-oak areas. There is a distinct dry season (December-May) during which many of the deciduous species flower and friut, many remain leafless. The evergreen species have regular phenologies but this happens throughout the year according to each different species.

This research should be helpful to the interested scientists on Doi Chiang Dao wildlife sanctuary and nearby forested areas.

Key words: Doi Chiang Dao, herbarium specimen, medicinal plants meseum

INTRODUCTION

Doi Chiang Dao wildlife sanctuary is located in Chiang Dao district, Chiang Mai province, Thailand and was established as such by the Royal Forest Department on 24 August 1978. It has an area of 521 km^2 and includes Doi Chiang Dao, one of Thailand's highest mountains (summit 2,175 m) and by far the largest limestone massif in the kingdom.

The first botanist to collect plants on the mountain was the German, Dr.Carl Hosseus (1908), during his first expedition to Siam during 1904-1905. Later, Dr.A.F.G.Kerr (1911), the most famous botanist to ever collect in Thailand, visited the mountain several times (1913-1921) and since that time many other botanists and scientists have found the wildlife there to be very interesting. There has never been a complete flora of the mountain compiled, although there must be well over 1,200 species of vascular plants known from the area.

Smitinand (1966) wrote the first, albeit brief and rather inaccurate, vegetational analysis of the mountain and enumerated 109 families and 570 species of vascular plants on the mountain while Santisuk (1985) provided slightly more information about conservation and the upland flora of the area. It must be noted that Smitinand's examples given for the lowlands are often inaccurate while many species listed in the enumeration have had names changed or are incorrect.

Very little attention has been given to the lowland flora/vegetation of the mountain and even less to the granitic/shale areas surrounding the limestone massif. Smitinand (1966) noted the following forest types on Doi Chiang Dao :

1. below 500 m elevation-mixed deciduous forest,
2. 500-600 módry evergreen forest,
3. 600-700 m-teak (Tectona grandis L., Verbenaceae) forest,
4. 700-1,900 m-hill evergreen forest, and
5. 1,900 m-summit-open hill evergreen forest.

This terminology and certainly the elevational limits, even in 1966, are not only misleading and otherwise incorrect, but quite imaginative. The term mixed deciduous forest is a confusing and inappropriate term for a deciduous forest with many different deciduous tree species, none of which is dominant. This is readily contrasted with deciduous dipterocarp-oak areas which are deciduous areas dominated by Dipterocarpaceae and Fagaceae species (Maxwell, 1988). Indeed, the so-called teak forests, never dominated by its name *Tectona grandis* L. f. (Verbenaceae), is actually a "mixed" deciduous forest. Most deciduous forests in Thailand, and especially in the wildlife sanctuary, have been severely disturbed and are, in essence, now "teakless".

Another unacceptable term, dry evergreen forest, actually is meant to contrast with a wet evergreen, i.e., rain forest. The dryness of this kind of forest is, of course, due to the seasonality or monsoon climate of the area. This kind of forest, i.e., seasonal evergreen, does not exist in the wildlife sanctuary since what appears to be evergreen by inexperienced botanists is actually a mixture of evergreen and deciduous tree species. In short, the lowland forests within the wildlife sanctuary are of two major kinds, viz., mixed evergreen-deciduous and deciduous dipterocarp-oak. Due to disturbance, i.e., forest destruction, the composition and limits of these two facies are often mixed and otherwise indistinct. Secondary growth is found in devastated areas in these lowland forests.

Since the vegetation above c. 800 m is only on the limestone of Doi Chiang Dao, it is beyond the study range of this research. Hopefully, a proper and detailed

analysis of the other vegetation on Doi Chiang Dao may be done since the present information on this subject is rudimentary.

METHODOLOGY

Surveying and collecting the essential parts of medicinal plants of Doi Chiang Dao wildlife sanctuary conservation area for taxonomic identification and medicinal herbarium specimens to be authentic specimens in Pharmacy Herbarium, Faculty of Pharmacy, Chiang Mai University. The collection method and criteria are as follow :

- Collect plants that have leaves, flowers and fruits for identification
- Collect root and remove all dirt
- Collect the whole plant
- Choose about 5 blooming and just-budding flowers, with leaves and fruits if possible
- Choose about 5 young and ripen fruits with leaves
- If the specimen is not complete, collect more in other seasons with note attached
- Collect at least 5 duplicates, i.e.,
  2 duplicates for taxonomic identification
  3 duplicates for herbarium specimens

RESULTS, DISCUSSION AND CONCLUSION

Lowland forest types

Mixed Evergreen-Deciduous Forest

As noted above, there are two basic forest types in the lowland areas of Doi Chiang Dao wildlife sanctuary. The most extensive type is a mixed evergreen-deciduous facies which is found on both shale/granite and limestone bedrocks. The species, aside from those actually growing on limestone cliffs and outcrops, and certainly the general appearance of the vegetation, is similar on both kinds of bedrock.

Tectona grandis L. f., teak (Verbenaceae), formerly a common deciduous tree species found throughout the lowland forests of northern Thailand, has been virtually eliminated by forest exploiters in the wildlife sanctuary for many decades. Removal of this and other valuable timber species from the lowlands of Doi Chiang Dao has disrupted the original mixed evergreen-deciduous facies of the forest. Continuous disturbance by loggers, charcoal makers and fire has left the forest in various stages of degradation, ranging from open agricultural area, bamboo thickets, fire-prone deciduous dipterocarp-oak associations, to undisturbed mixed evergreen-deciduous areas. As the name implies, this kind of forest includes both evergreen and deciduous species in all levels of the forest structure. The largest tree species, 50 m tall, include several emergents, for example, *Tetrameles nudiflora* R.Br.ex Benn. (Datiscaceae), *Pterocymbium laoticum* Tard. Emend. Maxw. (Sterculiaceae and a new record for Thailand), *Melia toonsendan* Sieb. & Zucc. (Meliaceae) which

are deciduous and flower when leafless during the dry season (February-May) and evergreen members such as *Dipterocarpus turbinatus* Gaertn. and Dipterocarpus costatus Gaertn. (Dipterocarpaceae). Representative canopy trees, which may grow up to 40 m tall, include the deciduous *Pterospermum grande* Craib (Sterculiaceae), *Acrocarpus fraxinifolius* Wight ex Arn. (Leguminosae : Caesalpinioideae), *Xylia xerocarpa* (Roxb.) Taub. var. *kerrii* (Craib & Hutch.) Niels. and *Parkia leiophylla* Kurz (both Leguminosae : Mimosoideae), *Pterocarpus macrocarpus* Kurz (Leguminosae : Papilionoideae), *Anogeissus acuminata* (Roxb. ex DC.) Guill. & Perr. and *Terminalia bellirica* (Gaertn.) Roxb. (both Combretaceae), and others. The evergreen canopy members include *Sapium baccatum* Roxb. (Euphorbiaceae), *Duabanga grandiflora* (Roxb. ex A. DC.) Walp. (Sonneratiaceae), *Knema linifolia* (Roxb.) Wall. (Myristicaceae), and *Amoora polystachya* (Wall.) Hk.f. & Th. (Meliaceae). The understorey species, also a mixture of evergreen and deciduous plants, is very diverse and includes more species than in the upper levels of the forest.

Typical deciduous understorey trees are : *Chukrasia velutina* Wight & Arn. ex Roem (Meliaceae), *Radermachera ignea* (Kurz) Steen. (Bignoniaceae), *Lagerstroemia tomentosa* Presl Salao T. (Lythraceae), *Pterospermum cinnamomemum* Kurz (Sterculiaceae), *Erythrina subumbrans* (Hassk.) Merr. (Leguminosae : Papilionoideae), and others. Some evergreen understorey trees are *Dillenia indica* L. (Dilleniaceae) which grows along streams; Talaum hodgsonii Hk.f. & Th. (Magnoliaceae), *Walsura trichostemon* Miq. (Meliaceae), *Mangifera caloneura* Kurz (Anacardiaceae), *Eugenia albiflora* Duth. ex Kurz (Myrtaceae), *Turpinia pomifera* (Roxb.) Wall. ex DC. (Staphyleaceae), *Sarcosperma arboreum* Benth. (Sapotaceae), *Paravallaris macrophylla* Pierre ex Hua (Apocynaceae); *Diospyros malabarica* (Desf.) Kostel. var. *siamensis* (Hochr.) Pheng., *D. martabanica* Cl., and *D. pilosanthera* Blanco (Ebenaceae); *Baccaurea ramiflora* Lour. (Euphorbiaceae, with edible fruit), and *Picrasma javanica* Bl. (Simaroubaceae).

The mixed evergreen-deciduous forest also has an abundance of woody climbers, both evergreen and deciduous species, some of which are massive (basal diameter 25 cm) and ultimately reach the canopy. Some deciduous examples are *Uvaria cordata* (Dun.) Alst. (Annonaceae), *Acacia pennata* (L.) Willd. ssp. *kerrii* Niels. and *Entada rheedii* Spreng. (both Leguminosae : Mimosoideae), *Ventilago calyculata* Tul. (Rhamnaceae), *Millettia caerulea* Grah. ex Baker (Leguminosae : Papilionoideae), and *Aganosma marginata* (Roxb.) G. Don (Apocynaceae). *Tetrastigma laoticum* Gagnep. and *T. siamensa* Gagnep. & Craib (Vitaceae), *Bauhinia glabrifolia* (Bth.) Baker var. *sericea* (Lace) K. & S.S. Lar. (Leguminosae : Caesalpinioideae), *Strychnos kerrii* A.W. Hill (Loganiaceae), and *Gnetum montanum* Mgf. (Gnetaceae).

Epiphytic plants are in abundance and include evergreen trees such as *Ficus glaberrima* Bl. var. *glaberrima* and *Ficus microcarpa* L. f. var. *microcarpa* forma *microcarpa* (Moraceae); an evergreen hemiparasitic shrub, viz., *Helixanthera parasitica* Lour. (Loranthaceae), and numerous epiphytic herbs, including *Asplenium nidus* L.var *nidus* (Aspleniaceae, the massive "bird nest" fern). Epiphytic

herbs include dicots, monocots, ferns/fern allies, bryophytes, fungi, lichens, algae and the latter 4 groups of plants being non-vascular and, therefore, not included in this project. Epiphytic dicots are few and inculde, for example, *Aeshynanthus macranthus* (Merr.) Pell. and *Didymocarpus rodgeri* W.W.Sm. & Banj. var *siamensis* W.W. Sm. EH (both Gesneriaceae). Epiphytic monocots are far more common and include *Pothos cathcartii* Schott (Araceae), and a numerous Orchidaceae (orchids), e.g., *Coelogyne trinervis* Lindl., *Dendrobium dixanthum* Rchb. F. and *D. gratiosissimum* Rchb. f., *Pteroceras appendiculatum* (Bl.) Holtt., *Robiquetia paniculata* (Lindl.) J.J.Sm., and others.

The shrub and treelet layer in the mixed evergreen-deciduous forest is mostly composed of evergreen species and also includes an abundance of seedlings, saplings and other immature individuals of species found in the upper layers of the forest. *Miliusa thorelii* Fin. & Gagnep. (Annonaceae), *Flemingia sootepensis* Craib (Leguminosae : Papilionoideae), *Duperrea pavettifolia* (Kurz) Pit. and *Psychotria ophioxyloides* Wall. (both Rubiaceae), *Maesa permollis* Kurz (Myrsinaceae), and *Clerodendrum disparifolium* Bl. (Verbenaceae) are some of the more-frequent species found in this level of the forest.

The herbaceous ground flora is generally dense, diverse and includes creepers, vines and erect herbs. Some commonly-seen dicot herbs are *Dimeria cordata* (L.) Willd. ex Roem. & Schult. (Caryophyllaceae), which is a prostrate plant usually found along streams; *Shuteria hirsuta* Baker and *S. suffulta* Bth. (Leguminosae : Papilionoideae), *Sonerila tenera* Roy. (Melastomatasese), *Geophila repens* (L.) I.M.John. and *Ophiorrhiza hispidula* Wall. ex G. Don var. *hispidula* and *O. villosa* Roxb. (all Rubiaceae), the saprophyte *Aeginetia indica* Roxb. (Orobanchaceae), various Acanthaceae, e.g., Andrographis laxiflora (Bl.) Lind., *Goldfussia anfractuoua* (Cl.) Brem., *Pseuderanthemum graciliflorum* (Nees) Ridl. and *P. latifolium* (Vahl) B. Han., *Eurysolen gracilis* Prain and *Perilla frutescens* (L.) Britt. ExH. (both Labiatae), and many Urticaceae (nettles) such as *Elatostema integrifolium* (D.Don) Wedd., *E.platyphyllum* Wedd. var. *platyphyllum*, the very irritating *Girardinia hibiscifolia* Miq., and the harmless *Pilea trinervia* Wight. (Urticaceae).

The monocot ground flora is also prominent with *Pollia harskarlii* R. Rao and *Forrestia mollissima* (Bl.) Kds. forma *mollissima* (both Commelinaceae). Numerous Zingiberaceae (gingers), e.g., *Costus speciosus* (Koeh.) J.E. Sm. and the less-common *C. globosus* Bl., *Etlingera littoralis* (Kon.) Gise. the tallest of all gingers in Thailand, *Zingiber kerrii* Craib; *Phrynium capitatium* Willd. (Marantaceae), which is common in shaded, wet places; several Palmae (palms) which include at least 2 presently-undertermined species of Calamus and *Wallichia caryotoides* Roxb.; *Tacca chantrieri* Andre (Taccaceae); several ground Orchidaceae (orchids), e.g., *Corymborkis veratrifolia* (Reinw.) Bl., *Nervilia crispate* (Bl.) Schltr. and *N. plicata* (Andr.) Schltr.

Several kinds of bamboos (Gramineae : Bambusoideae), e.g., *Dendrocalamus membranaceus* Munro, *D. nudus* Pilg. and *Bambusa tulda* Roxb., more commonly found in disturbed, fire-prone areas in the deciduous dipterocarp-oak forest, are

occasionally found in the mixed evergreen-deciduous forest, especially in disturbed places. A stemless Cycadaceae (cycad), *Cycas micholitzii* Dyer var. *simplicipinna* Smit., which were only seen vegetatively, is also found scattered throughout the area.

Fern allies and ferns include *Selaginella delicatula* (Desv.) Alst. (Selaginellaceae) and *Equisetum debile* Roxb. ex Vauch. (Equisetaceae), both preferring moist areas; *Angiopteris evecta* (Forst.) Hoffm. (Marattiaceae), *Microlepia speluncae* (L.) Moore (Dennstaedtiaceae), *Pteris biaurita* L. (Pteridaceae), *Asplenium excisum* Presl (Aspleniaceae); *Bolbitis appendiculata* (Willd.) K. Iw. and *B. heteroclita* (Presl) Chign ex C. Chr. (Lormariopsidaceae), which usually grow on rocks along and in streams; *Tectaria variolosa* (Wall.) C. Chr. (Dryopteridaceae), which is very common; and *Thelypteris terminans* (Hk.) Tag. & K. Iw. (Thelypeteridaceae).

Deciduous dipterocarp-oak (savanna) forest

This kind of forest is a climax, secondary growth facies that has developed as a consequence of destruction of the mixed evergreen-deciduous forest cover, originally and primarily for *Tectona grandis* L. (Verbenaceae, teak) trees. The deciduous dipterocarp-oak forests, like on the east side of Doi Sutep-Pui National Park, are essentially the same as those in Doi Chiang Dao wildlife sanctuary and have developed and flourished for identical reasons. While the deciduous dipterocarp-oak forests in both areas look essentially the same, i.e., well-spaced, single-canopied (up to c. 20 m), deciduous trees, few climbers, many succulent herbaceous epiphytes, thin and rocky soil, dense Cyperaceae (sedge) and Gramineae (grass) ground flora, plus annual fires during the dry and leafless season (February-May), there are some differences which only ascribe to continuous human interference, i.e., a general lack of Fagaceae (oaks) in some areas and more places with dense stands of bamboo.

The Dipterocarpaceae, a predominating family in this kind of forest, has mostly Dipterocarpus obtusifolius Teijsm. ex Miq. var. *obtusifolius*, *D. tuberculatus* Roxb. var. *tuberculatus, Shorea siamensis* Miq. var. *siamensis, S. roxburghii* G. Don, *S. farinosa* Fisher, and few other species mixed with various other deciduous tree species found in many other families. *Dillenia parviflora* Griff. var. *kerrii* (Craib) Hoogl. (Dilleniaceae), Bombax malabaricum DC. the same genus, *B. ceiba* Linn. (Bombacaceae), *Buchanania latifolia* Roxb. and *Gluta usitata* (Wall.), Hou the same genus, *G. elegans* Wall. (both Anacardiaceae), *Dalbergia fusca* Pierre (Leguminosae : Papilionoideae), *Tristania rufescens* Hance (Myrtaceae), *Wendlandia tinctoria* (Roxb.) DC. ssp. *floribunda* (Craib) Cowan and *Gandenia sootepensis* Hutch. (both Rubiaceae), *Vaccinium sprengelii* (D.Don) Sleumer (Ericaceae), *Diospyros ehretioides* Wall. ex D. Don (Ebenaceae), *Strychnos nux-vomica* L. (Loganiaceae), *Vitex limoniifolia* Wall. ex Kurz (Verbenaceae); *Antidesma acidum* Retz., *Phyllanthus emblica* L., and *Sapium insigne* (Roy.) Bth. (all Euphorbiaceae).

Vascular epiphytes are common and include several succulent Asclepiadaceae, viz., *Dischidia imbricata* (Bl.) Steud., *D. major* (Vahl) Merr., which had its pitcher leaves full of black ants, *D. nummularia* R. Br. and *Hoya acuta* Haw. var. *acuta* ; various Orchidaceae (orchids), e.g., *Aerides falcata* Lindl., *Coelogyne prolifea*

Lind. and *C. trinervis* Lindl., and *Dendrobium fimbriatum* Hk.; and ferns, expecially *Drynaria rigidula* (Sw.) Bedd., another kind of "bird nest" fern, and *Pyrrosia adnascenes* (Sw.) Ching (both Polypodiaceae). *Scurrula feruginae* (Jack) Dans the same genus as *S. gracilifolia* Dans (Loranthaceae) is an evergreen epiphytic hemiparasitic shrub which is especially conspicuous during the dry season when the host trees are leafless.

Underneath this open, irregular conopy are many seedlings and saplings of the trees noted above, while there is essentially no layer of shrubs or treelets. While an occasional treelet like *Flacourtia indica* (Burm.f.) Merr. (Flacourtiaceae) and *Vernonia parishii* Hk. f. (Compositae), or stout vines, e.g., *Smilax ovalifolia* Roxb. (Smilacaceae) may be found, the unique aspect of this kind of forest is the herbaceous ground flora which, like in Doi Sutep-Pui National Park, is restricted to and thrives in this habitat. The ground flora, most of which is perennial, is at its maximum density during the latter part of the rainy season (September-November) and absent during the dry, fire-prone season (February-May). It is during the height of the dry season that several monocot herbs produce flower before their leaves appear, e.g., *Murdannia scapiflora* (Roxb.) Roy. (Commelinaceae), *Curcuma zedoaria* (Berg.) Rosc. and *Gagnepainia godefroyi* Roy. (Baill.) K.Sch. (both Zingiberaceae), with the unusual *Amorphophallus kerrii* N.E. Br. and *A. macrorhizus* Craib (Araceae), and the orchids *Nervilia aragoana* Gaud. and *Geodorum siamense* Rol. ex Dow. (Orchidaceae).

Sedges (Cyperaceae) up to 1 m tall form a dense covering in many areas and include *Carex continua* Cl., *Scleria benthamii* Cl., *S. kerrii* Turr., *S. levis* Retz., and *S. lithosperma* (L.) Sw. var. *lithosperma*. Grasses (Gramineae) such as *Imperata cylindrica* (L.) P. Beauv. var. *major* C.E. Hubb. ex C.E. Hubb. & Vaugh., *Narenga fallax* (Balan.) Bor. the same Genus, *N. porphyrocoma* Bor., *Panicum notatum* Retz. as well as the bamboos noted above are found in formerly clear-cut and subsequently regularly-burned places. These species are, in fact, good indicators of severe forest disturbance since they do not normally grow in places that are undisturbed.

Intermediate areas

There are many areas that cannot be called mixed evergreen-deciduous or deciduous dipterocarp-oak forests because of the amount of species mixing plus abundance of bamboo in these intermediate areas. Nearly pure stands of bamboo among old stumps of former canopy trees are common and charred logs, etc., litter the ground. In some instances, there has been some forest succession, that is, the mixed evergreen-deciduous forests are regrowing, but in other places the bamboo provides the shade for a diverse, seasonal but perennial herbaceous ground flora which includes species from both mixed evergreen-deciduous and deciduous dipterocarp-oak facies, generally call these places deciduous (hardwood)-bamboo disturbed areas since there is a general lack of evergreen trees in these places. Scattered deciduous trees such as *Kydia calycina* Roxb. (Malvaceae), *Oroxylum indicum* (L.) Vent. (Bignoniaceae), and *Sterculia pexa* Pierre (Sterculiaceae); the deciduous, spiny shrub *Harrisonia perforata* (Blanco) Merr. (Simaroubaceae); deciduous, spiny

climbers, e.g., *Ziziphus oenoplia* (L.) Mill. var. *oenoplia* (Rhamnaceae) and *Plerolobium macropterum* Kurz (Leguminosae : Caesalpinioideae) along with dense stands of underlying bamboo, especially *Dendrocalamus nudus* Pilg. B, The same genus of and *D. latifloues* Munro. are present in areas that have yet to show signs of recovery.

Secondary growth

In contrast, the quick-growing, relatively ephemeral species which form secondary growth in agricultural or settled areas and along roads, are quite different from any of the plants and related associations as described above. Secondary or weedy growth, when left undisturbed, usually develops into a different kind of vegetation depending on the kind of forest nearby. Ruderal herbaceous weeds such as *Eupatorium odoratum* L., *Tridax procumbens* L., *Vernonia cinerea* (L.) Less. var. *cinerea* (Compositae) ; *Phyllanthus amarus* Schum. & Thonn. and *P. urinaria* L. (Euphorbiaceae) as well as various sedges (Cyperaceae), e.g., *Cyperus rotundus* L. ssp. *rotundus*, ;, grasses (Gramineae) like *Chloris barbata* Sw. and *Digitaria setigera* Roth ex Roem. & Shult. var. *setigera* are common. Weedy shrubs and treelets like *Clerodendrum glandulosum* Colebr. ex Ldl. and *C. infortunatum* L. (Verbenaceae), *Microcos paniculata* L. (Tiliaceae), etc. plus small trees like *Macaranga denticulata* (Bl.) M.-A. and *Mallotus philippensis* (Lmk.) var. *philippensis* (Euphorbiaceae), *Broussonetia papyrifera* (L.) Vent. (Moraceae), and others are also seen in forested areas that have been locally disturbed, such as tree-fall and flood zones of streams, but these places are eventually, in most instances, "healed" by the surrounding forest.

Lowland Limestone Flora

As noted above, while the basic vegetation types on both the shale/granite and limestone bedrocks are the same, most of the plants actually growing on the limestone are different and do not even grow on the soil below the escarpment. Doi Chiang Dao, like other limestone mountains, is unique in this resepct since only certain plants can grow in this habitat and are likewise not found elsewhere. Some limestone species, i.e., calciphytes, that are not found outside of this habitat in the wildlife sanctuary are : *Begonia fibrosa* Cl. (Bignoniaceae), a presently-unidentified species of *Argostemma sp., A. umbellatum* Ridl. H. (Rubiaceae), *Chlamydoboea* aff. *Sinensis* (Oliv.) Stapf and *Ornithoboea arachnoidea* (Diels) Craib (topotype) (both Gesneriaceae); and *Garrettia siamemsis* Flet. (topotype) (Verbenaceae). *Actephila excelsa* (Dalz.) M.-A. var. *excelsa* (Euphorbiaceae), *Dichapetalum kerrii* Craib (Dichapetalaceae) and found in calcareous areas and suspect that *Allospondias lakonensis* (Pierre) Stapf (Anacardiaceae) may also be in this category. More work on this aspect of the vegetation is needed.

Plant Collection on Doi Chiang Dao, Chiang Mai
January 1989 to September 1990

Group of Plant Collection	Families	sp., ssp., var.	Topotype	New Record
Angiosperms				
Dicotyledons	94	611	8	4
Monocotyledons	16	167	4	-
Gymnosperms				
Fern Allies	2	2	-	-
Ferns	13	41	-	-
Total	**125**	**821**	**12**	**4**

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none