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The Royal Botanic Gardens Kew, Khon Kaen University and Trinity College Dublin expeditions to Thailand 1990 and 1993

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ABSTRACT

Accounts of two botanical expeditions in Thailand are given with itineraries and notes of some of the more important taxa collected.

INTRODUCTION

This report gives accounts of two expeditions held jointly between staff from Khon Kaen University, the Royal Botanic Gardens Kew, U.K. and Trinity College Dublin, Ireland undertaken in September–October 1990 and February–April 1993. General collecting was carried out on both expeditions. However, as each member of the group is involved in producing family accounts for the Flora of Thailand, special emphasis was placed on observing and collecting material of particular families, namely the Apocynaceae, Cyperaceae, Lecythidaceae and Myrtaceae. This was important because many collections have turned out to be new provincial records for species within these families.

Collections were made in sets of one to 13, where possible the sets going to herabaria at Kew (K), Trinty College, Dublin (TCD), Khon Kaen University, The Forest Herbarium (BKF), Aarhus (AAU), Prince of Songkhla University (PSU) and Leiden (L) respectively. A combination of wet and dry collecting was carried out. The former was preferred in 1990 given the rainy conditions that prevailed and the intermittent supplies of electricity available in the National Parks for powering an electric drying oven. Dry collecting was used more frequently in 1993 as this expedition coincided with the middle of the hot season, and the high temperatures combined with low humidity allowed specimens to be dried relatively quickly. Delicate material, particularly Zingiberaceae, was preserved in spirit.

Naming of specimens is being carried out at Kew, Trinity College Dublin and Khon Kaen University. All data are being compiled on to a specimen database which is being prepared in DBASE format at Kew. Copies of the database will be distributed to Trinity College and Khon Kaen University. A full list of specimens with names so far determined may be obtained from Dr. D.A. Simpson at Kew.

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THE 1990 EXPEDITION

Aims and objectives

The 1990 expedition took place between September and October and, apart from a short excursion to the south-east, most of the time was spent in the north and north-east of Thailand. The latter was considered to be particularly important because very few collections have been made in this part of the country and so there was the potential for obtaining many new records and even new taxa. Also much of the region has only been re-opened to foreigners relatively recently, having been a centre for communist activity during the 1970s and early 1980s. However, despite our efforts, it is clear that there are still many areas in both the north and the north-east to be worked and further collecting is necessary.

Most of the work was carried out in National Parks, Wildlife Sanctuaries and in the vicinity of monasteries and temples where forest and other vegetation types remain relatively undisturbed. Some time was also spent collecting by roadsides and paddy field. A total of 799 numbers were collected. A detailed summary of the Cyperaceae seen in the north-east during the first expedition has been published elsewhere (Simpson 1992).

Participants

The main participants were P. Chantaranothai (Khon Kaen University), J.A.N. Parnell (Trinity College, Dublin) and D.A. Simpson (Royal Botanic Gardens, Kew). The group was also accompanied by K. Sridit (Chulalongkorn University) on Phu Kradueng and S. Thammathaworn (Khon Kaen University) and O. Griffin (Trinity College, Dublin) in Chon Buri and Rayong.

Collecting Itinerary

Numbers in brackets correspond to the localities numbered on the map in Figure 30.

9 September	NE24, Khon Kaen: Khon Kaen University and vicinity (1).
11–15 September	NE17, Loei: Phu Kradueng National Park (2).
16–18 September	N12, Phitsanulok: Thung Salaeng Luang National Park (3).
22 September	SE55, Chon Buri: Si Racha (17).
23 September	SE56, Rayong: various localities (18).
24 September	SE55, Chon Buri: various localities (19).
27 September	NE24, Khon Kaen: Ubol Ratana and Khao Suang Kawang Districts (4).
28–29 September	NE17, Loei: Phu Luang Wildlife Sanctuary (6).
30 September	NE17, Loei: Phu Ruea National Park (5).
1–2 October	N12, Phu Hin Rongkla National Park (7).
6 October	N2, Chiang Mai: Doi Suthep (9).
7 October	N2, Chiang Mai: Doi Inthanon (8).
8 October	N2, Chiang Mai: Northern Botanic Garden, Mae Sa (10).
13–19 October	NE20, Sakon Nakhon: Phu Phan National Park (11).

Notes on the collecting itinerary

The first collecting day aimed to familiarise the participants with a range of vegetation types. In the morning dry dipterocarp forest was visited. Several pockets of this forest type occur in Khon Kaen University campus and are important in terms of conservation and for student teaching. Opportunity was also taken to collect a number of common weeds which are often under-represented in herbaria including *Cyperus compressus, C. distans* (Cypercaeae) and *Lindernia crustacea* (Scrophulariaceae). Material from trees cultivated on the university campus were also collected including *Lagerstroemia* (Lythraceae), *Millingtonia hortensis* (Bignoniaceae) and *Terminalia catappa* (Combretaceae). During the afternoon a short trip was made into the surrounding country to collect mainly by the roadside including further Cyperaceae and *Acacia harmandiana* (Leguminosae). 35 numbers were collected on this first day.

The first major collecting trip was to Phu Kradueng National Park, a table sandstone mountain 1265 m in altitude located in Loei Province and one of the best known of Thailand's parks. A wide range of vegetation types are present within the park boundary, from dry dipterocarp forest and bamboo forest to hill evergreen forest and, on the summit plateau, pine savanna. The walk to the summit is 9 km long, with an altitudinal gain of about 1200 m. Our ascent was made in good weather, allowing ample opportunity for collecting en route. Among the more notable finds were several *Begonia* species which have yet to be named together with a wide range of ferns including *Pyrrosia nummulariifolia* (Polypodiaceae) and *Adiantum zollingeri* (Adiantaceae). Other plants collected on this trail included *Amorphophallus* (Araceae), *Clerodendrum* sp. aff. *colebrookianum* (Verbenaceae), *Hedyotis* (Rubiaceae), *Heterostemma siamica* and *Myriopteron extensum* (Asclepiadaceae), *Thespesia lampas* (Malvaceae) and *Torenia violacea* (Scrophulariaceae). The summit plateau proved to be very rewarding, the visit coinciding with the middle of rainy reason when many herbaceous plants were in flower and fruit. A total of 163 numbers were collected during the three days spent on the summit. Collecting was mainly carried out in pine savanna and in evergreen forest by the sides of rivers running down from the plateau. Established trails were followed, and because the park was closed to the public at that time there was little disturbance. The first day was spent in the pine savanna. This was particularly rich in herbaceous plants, notably Cyperaceae (which were prevalent in rocky areas and by the sides of streams), Eriocaulaceae, Orchidaceae (including *Doritis pulcherrima*) and Xyridaceae (including *Xyris kradungensis*) while on forest margins there were many Acanthaceae and some Scrophulariaceae, in particular the attractive *Torenia fournieri.* Insectivorous plants of the genera *Drosera (D. burmannii* and *D. peltata)* and *Nepenthes* were also seen in some of the wetter, acidic parts of the savanna. Shrubs of the genera *Osbeckia* (Melastomataceae) and *Baeckia (B. frutescens,* Myrtaceae) were also common.

The second and third days were spent mainly in forest. This contained amongst many other species *Polygala arillata* (Polygalaceae), *Carallia brachiata* (Rhizophoraceae), *Quercus* (Fagaceae), *Syzygium* (Myrtaceae) and Menispermaceae. The rare fern *Elaphoglossum dumrongii* as well as a number of herbs including *Viola betonicifolia* (Violaceae) and *Centrolepis cambodiana* (Centrolepidaceae) were also collected. Amongst the Cyperaceae were fine plants of number of forest species such as *Gahnia tristis* and *Carex cruciata.* A constant source of discomfort in the forest was the abundance of leeches which were the worst that any of the participants had experienced!

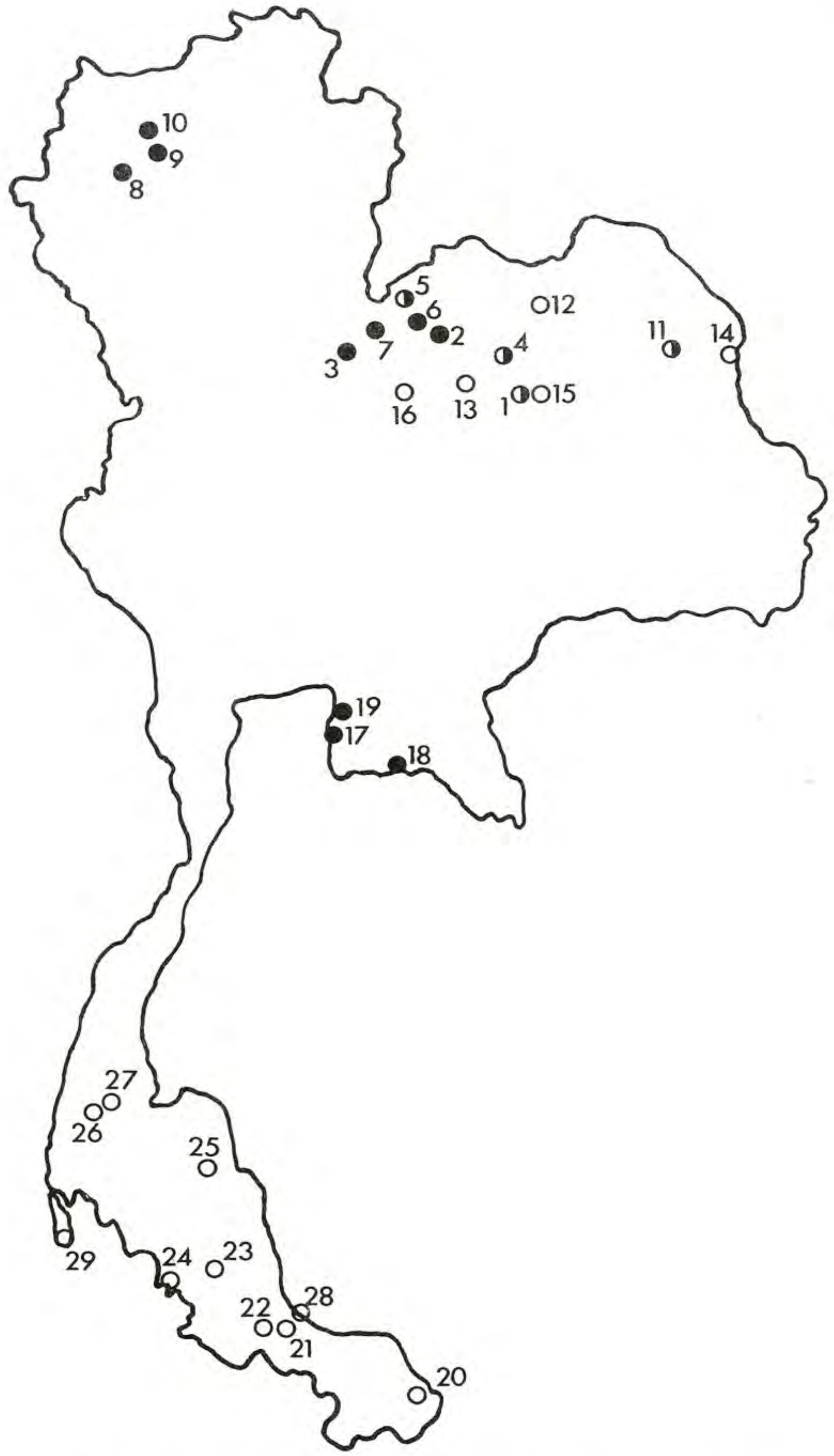

Figure 30. Outline map of Thailand showing localities visited during the two expeditions. ● = localities visited in 1990 only; ◑ = localities visited in 1990 and 1993; ○ = localities visited in 1993 only.

The group then moved on to Thung Salaeng Luang National Park where 75 numbers were collected. As noted by Larsen (1990), much of the area surrounding the park is now devoid of forest, but there are still several main vegetation types including mixed deciduous forest, hill evergreen forest and savanna. The group was based at Park Headquarters. Collecting was mainly carried out along trails leading from Park Headquarters. An attempt to travel by vehicle to the large savanna areas in the southern part of the park was abandoned due to poor road conditions which developed after heavy rain. However, the part of the journey that was undertaken allowed for excellent collecting in areas of hill evergreen forest and savanna, yielding material of many Rubiaceae species including *Hedyotis tetrangularis* and *Neanotis calycina,* as well as *Exacum affine* (Gentianaceae). Some time was taken to collect around Kaeng Sopha waterfall to the west of Park Headquarters. An interesting collection of plants was made here including species of *Impatiens* and *Begonia.* One of the most unusual plants found was *Remusatia vivipara* (Araceae) an aroid which, instead of having a spadix, produces small bulbils along a pedicel. Collections were also made along the Lomsak–Phitsanulok main road in the vicinity of Park Headquarters which included species of *Artocarpus* (Moraceae), *Pterocarpus* (Leguminosae) and Dioscoreaceae.

In complete contrast the next collecting trip was made to south-east Thailand where work was carried out over three days in degraded mangrove swamp and remnant whitesand forest. Much of this has been affected by coastal development or clearance for cultivation but there are small areas where pockets of both vegetation types survived and these proved to be fairly rewarding with 66 numbers being collected. Among the taxa collected in the mangrove were several members of Rhizophoraceae including *Ceriops tagal, Rhizophora apiculata* and *Bruguiera gymnorrhiza.* There was a wide range of Myrtaceae including *Melaleuca cajaputi, Rhodomyrtus tomentosa* and *Zizyphus* (Rhamnaceae). A number of Cyperaceae were collected in open damp or sandy areas including *Cyperus radians,* and the second record of *Eleocharis spiralis* for Thailand.

Returning to the north-east a day was spent visiting two areas in Khon Kaen Province to collect in dry dipterocarp forest. Both are in the vicinity of buddhist temples and the forest here is afforded some protection. Among the taxa collected were several *Desmodium* species (Leguminosae), *Dioscorea* (Dioscoreaceae), *Waltheria indica* (Sterculiaceae), *Aganonerion polymorphum* (Apocynaceae), *Rhynchospora longisetis* (Cyperaceae) and *Syzygium albiflorum* (Myrtaceae, another new provincial record).

A tour was then made of three further protected areas in the north-east, namely Phu Luang Wildlife Sanctuary and Phu Ruea National Park (Loei Province) and Phu Hin Rongka National Park (Phitsanulok Province). At Phu Luang the party was based at Huay Bang park substation on the eastern side of the mountain and fieldwork was carried out along trails through mixed dipterocarp forest leading from the substation. Fifty numbers were collected over two days. Among the more interesting taxa were *Syzygium megacarpum* (Myrtaceae, a new provincial record), *Typhonium fallax* (Araceae, the second only collection of this species), a so far unidentified genus of Balanophoraceae, two species of *Begonia* and several species of Urticaceae and Gesneriaceae including *Chirita* cf. *micromusa.*

Phu Ruea National Park, located near the border with Laos west of Loei town, has a range of vegetation types from evergreen forest to pine savanna, and one day was spent collecting along the trail to the summit. A primary aim of the visit was to collect flowering and fruiting material of *Rhodamnia parvifolia* (Myrtaceae) at one of

its two known localities. Previously-collected material of this species did not have mature flowers or fruit. A number of individual plants were seen near the summit which were in both flower and fruit, allowing the description of this species to be considerably amplified for the forthcoming Flora of Thailand Myrtaceae account (Chantaranothai & Parneil in prep, & Parnell & Nic Lughadha 1992). A number of Cyperaceae were collected including material of several *Fimbristylis* species and *Rhynchospora rubra.* Other taxa of interest included *Clerodendrum serratum* (Verbenaceae), *Hedyotis elegans* (Rubiaceae), *Dyschoriste depressa* (Acanthaceae), two species of *Castanopsis* (Fagaceae) and a magnificent species of *Hedychium* (Zingiberaceae). 32 numbers were collected.

Three localities were visited during the two days spent collecting at Phu Hin Rongka National Park, namely Laan Hin Taek, Laan Hin Poom and Rom Klao waterfall. Sixty-one numbers were collected. Much of the park has been reduced to *Imperata* grassland, but these three areas provide remnants of the former more diverse vegetation. Laan Hin Taek and Laan Hin Poom proved to be most interesting with deep fissures in the sandstone rock colonised by a wide range of plants, including *Sonerila deflexa* (Melastomataceae), *Impatiens* (Balsaminaceae), *Syzygium grande* (Myrtaceae), *Fagraea* (Loganiaceae) and various species of Orchidaceae and Cyperaceae. At Laan Hin Poom a very attractive *Utricularia* was collected with bright purple flowers together with *Magnolia* and several species of Verbenaceae. Rom Klao waterfall provided a damp, shaded habitat in a narrow valley where two species of *Begonia* were collected as well as several ferns.

The party then moved to the north and was based at Huay Kaew Arboretum in Chiang Mai with collecting trips to Doi Suthep, Doi Inthanon and the Northern Botanic Garden. Doi Suthep is probably one of the best known of Thailand's National Parks and, as a consequence, is under great pressure from visitors. There are, however, areas away from the main road where the vegetation is more-or-less undisturbed. One such area was in the vicinity of the army camp near Phu Phing Palace where plants such as *Begonia, Osbeckia* (Melastomataceae), *Aeschynanthus* and a species of Caryophyllaceae were collected. Further down the mountain about 2 km from Huay Kaew a small river crossed the road which provided further opportunities for collecting. Amongst the plants here was superb material of *Ceropegia monticola* (Asclepiadaceae) 30 numbers were collected from Doi Suthep.

A day was spent at Doi Inthanon. Initially the party travelled to the summit where plants such as *Galium* (Rubiaceae), *Plantago* (Plantaginaceae) and *Polygonum* (Polygonaceae) were found, together with *Syzygium angkae* (Myrtaceae) and two *Impatiens* species were collected. However, the highlight of the day was a walk along a trial located at ca 2000 m, 42 km along the summit road. Most of the trail ran through relatively undisturbed montane evergreen forest but eventually it led to an area of steeply sloping savanna which had spectacular views of the surrounding mountain scenery. In the forest a number of ferns were collected including *Neocheiropteris normalis* (Polypodiaceae), *Vittaria forrestiana* (Vittariaceae) and *Peranema aspidiodes* (Dryopteridaceae). *Acorus* (Acoraceae) was also found in a stream within the forest as well as the sedge *Carex baccans* and a new subspecies of *Pedicularis thailandica* (Parnell, in press) was found in a disturbed area near the savanna. The savanna itself yielded a range of plants including *Gaultheria sleumeri* (Ericaceae), *Parochetus communis* (Leguminosae) and a number of Compositae species. 52 numbers were collected in total.

The final day in the north was spent at the Northern Botanic Garden, Mae Sa near Chiang Mai. The morning was spent touring the garden with PC and JANP studying the collections of Myrtaceae. In the afternoon two trails were followed leading along rivers in the vicinity of the garden with 12 numbers being collected, including good material of *Tectona grandis* and a species of *Balanophora* (Balanophoraceae). An excellent specimen of *Tacca* was not collected but was much photographed.

The party then returned to Khon Kaen after which DAS returned to the UK. A trip was undertaken to various localities east of Khon Kaen particularly Phu Phan National Park.

Phu Phan is a very large (666 km^2) and floristically varied National Park containing both open, dry dipterocarp and wet, semi-evergreen forest. A visit to a newly established field-station in the wet semi-evergreen forest was made allowing collection of bark samples of a huge *Lagerstroemia* sp. (Lythraceae); however disappointingly few other species in flower or fruit were seen. However the 4 remaining full working days were spent in the dry dipterocarp forest where wet pools yielded a number of, as yet unidentified, *Eriocaulon* species (Eriocaulaceae) as well as a number of Cyperaceae including *Cyperus leucocephalus* and *Kyllinga cylindrica.* In the forest itself numerous Rubiaceae (including *Randia* sp.) and common Dipterocarp species (e.g. *Shorea siamensis*) were collected. The rare fern *Bolbitis copelandii* (793) was also seen.

THE 1993 EXPEDITION

Aim and objectives

The 1993 expedition took place between February and April, with collections being made in the north-east and peninsular regions. In the north-east it was decided to return to some of the localities visited during the 1990 expedition, allowing collections to be made at a contrasting time of year. This proved to be most rewarding with many different taxa in flower and fruit. As most members of the group had not previously visited the Peninsula, this also proved extremely interesting, the vegetation in the wetter south being a complete contrast to that in the drier north-east.

Most of the localities visited were again in National Parks or Wildlife Sanctuaries together with areas around monasteries and temples. A total of 760 numbers were collected; 755 were under the group's numbering series which was continued from the 1990 expedition. The remainder were collected under individuals' own numbering series.

Participants

The expedition members were P. Chantaranothai (Khon Kaen University), D.J. Middleton (Trinity College, Dublin), J.A.N. Parnell (Trinity College, Dublin) and D.A. Simpson (Royal Botanic Gardens Kew). The group was also joined in the Peninsula by K. Chayamarit (The Forest Herbarium) and R. Simpson (Royal Botanic Gardens, Kew).

Collecting itinerary

Numbers in brackets correspond to the localities numbered on the map in Figure 30.

19 February	NE18, Udon Thani: Phu Phra Bat Historical Park (12).
21 February	NE24, Khon Kaen: Phu Wiang National Park (13).
23 February	NE20, Sakon Nakhon: Phu Phan National Park (11).
24 February	NE20, Sakon Nakhon and NE21, Nakhon Phanom: various localities between Phu Phan and That Phanom (11 and 14).
25–26 February	NE20, Sakon Nakhon: Phu Phan National Park (11).
2–6 March	NE17, Loei: Phu Ruea National Park (5).
8 March	NE24, Khon Kaen: irrigation areas 10 km E of Khon Kaen (15).
9 March	NE24, Khon Kaen: Ubol Ratana and Khao Suang Kawang Districts (4).
10 March	NE24, Khon Kaen: Khon Kaen University (1).
11–12 March	E25, Chaiyaphum: various localities (16).
15–17 March	PEN72, Narathiwat: Toh Daeng swamp forest (20).
20 March	PEN69, Songkhla: Kho Hong Hill near Hat Yai (21).
21 March	PEN69, Songkhla: Ton Nga Chang waterfall. Morning (22).
22 March	PEN67, Trang: Southern Botanic Garden, Khao Chong (23)
23 March	PEN67, Trang: Various localities on coast (24).
24 March	PEN67, Trang: Southern Botanic Garden, Khao Chong (23).
25 March	PEN65, Nakhon Si Thammarat: Kamjan, SE side of Khao Luang National Park (25).
26 March	PEN65, Nakhon Si Thammarat: Khao Luang National Park (25).
28 March	PEN61, Surat Thani: Khao Sok National Park (26).
29 March	PEN61, Surat Thani: Khao Sok National Park (26).
30 March	PEN61, Surat Thani: Ratchaprapha Dam (27).
2 April	PEN69, Songkhla: Songkhla Beach (28).
5 April	PEN63, Phuket: Ao Pawa (29).

Notes on the collecting itinerary

The first few days of the expedition were spent re-accustomising most of the members to the flora. During this time a number of collecting trips of short duration were made. The first was to Phu Phra Bat Historical Park in Udon Thani Province. Here, in the dry dipterocarp forest, the expedition found *Gnetum* (Gnetaceae), the spectacular yellow-flowered *Peltophorum dasyrrhachis* (Leguminosae), *Syzygium cumini* (Myrtaceae) and an attractive parasitic Loranthaceae growing on *Aporusa* (Euphorbiaceae). Two days later at Phu Phra Bat in Khon Kaen Province a number of Cyperaceae were collected including *Fimbristylis littoralis* as well as *Limnocharis flava* (Limnocharitaceae). On the way to visit and in Phu Wiang National Park, the site of the recent discovery of dinosaur footprints and fossils, Araliaceae *(Schefflera),* Myrtaceae *(Syzygium siamense* and *S. cumini)* and Sapindaceae *(Lepisanthes)* were found. In all 48 numbers were accumulated at these sites.

On 24 February the expedition travelled to That Phanom and Kok Si Suphan District between Ban Teng and That Phanom and near Nong Hian. A large number of Cyperaceae *(Eleocharis, Fimbristylis littoralis, Schoenoplectus, Kyllingia* and *Lipocarpa)*

were collected from dried out river beds beside the road as well as many Eriocaulaceae (including *Eriocaulon* cf. *nigrum*). A nearby plantation of *Eucalyptus* (Myrtaceae) was also visited. 26 numbers were collected in total.

Phu Phan was one of the last National Parks to be visited on the last expedition and one of the first to be visited this time. The contrast in terms of the range of species flowering was marked with many new species being seen. Although many of the trees were not flowering in the dry dipterocarp forest it was still very attractive with *Dillenia* (Dilleniaceae) and *Stemona* (Stemonaceae) being especially memorable. In addition many Apocynaceae were noted, for example *Alstonia scholaris* and *Tabernaemontana bufalina* on the way to Kaeng Mot Daeng and *Holarrhena curtisii* and *H. pubescens* on the way to An Gop. Near to Park Headquarters a muddy area was found surrounding a permanent pond. In this were several wetland species including members of the Lentibulariaceae *(Utricularia),* Pontederiaceae *(Monochoria),* Melastomataceae *(Osbeckia),* ?Lobeliaceae, Guttiferae *(Hypericum)* and Eriocaulaceae *(Eriocaulon).* In all 75 numbers were collected in Phu Phan.

Phu Ruea National Park had been visited at a later time of the year during 1990 expedition. Again there was a marked contrast in the species seen in flower compared to the previous visit. However the most striking aspect of the park in 1993 was the massive enlargement and improvement of the main road leading to the summit of Phu Ruea. Unfortunately considerable areas of forest have been flattened during the road's construction. Indeed the route taken by the road has destroyed one of the few known sites for the rare and endemic species *Rhodamnia kerrii* (Myrtaceae). Luckily there are still large numbers of plants of this species present on the summit of the mountain. It is to be hoped that they will be able to survive there despite the likelihood of increased human disturbance brought by the new road. However the new road did provide easy access to the forest and many interesting plants were collected including *Amorphophallus* (Araceae), *Dillenia* (Dilleniaceae), *Stephania elegans* (Menispermaceae), *Lithocarpus* (Fagaceae) as well as *R. kerrii.* By following the trail to Huay Phai Waterfall a number of Araliaceae and Myrtaceae were collected including *Syzygium claviflorum* and *S. siamense* as well as *Acorus* (Acoraceae), *Poikilospermum* (Cecropiaceae), *Helicia* (Proteaceae) and a lovely purple flowered and very large tree in the Leguminosae, prosaically named by our Guide as 'Khee Muu' (Pig excreta). Overall Phu Ruea yielded 118 collections.

The next trip again re-visited some areas previously surveyed around Khon Kaen in 1990. This is a major rice-growing area although pockets of forest do still remain, for example on Khon Kaen University Campus, and in various fairly small reserves in Ubol Ratana and Khao Suang Kawang Districts. These had changed little since the last visit. Three days collecting in these habitats resulted in accumulation of many Cyperaceae including *Fimbristylis umbellata, Cyperus iria* and *C. difformis* from the rice-paddy areas whilst the walk downhill through the dry dipterocarp forest near to the temple at Wat Tat Fa yielded *Aganonerion polymorphum* (Apocynaceae), *Schleichera oleosa* (Sapindaceae), *Buchanania* (Anacardiaceae) and many Rubiaceae (including *Randia*).

The last excursion in the northern half of Thailand was to Chaiyaphum Province where collections in a variety of habitats ranging from dry dipterocarp to wet evergreen forest and roadside scrub. Of the 22 numbers that were collected several were climbers including members of Combretaceae, Loganiaceae *(Strychnos),* Solanaceae,

Ascelpiadaceae, Elaeagnaceae and Compositae.

The expedition then moved south to the Peninsular, commencing with Toh Daeng peat swamp forest in Narathiwat Province. This highly interesting forest type, excellently documented by Phengklai & Niyomdham (1991), covers about 8000 hectares. The first day proved exceptionally reawarding as most of the party had not been in this vegetation type before. Even the wet ground and pools on the outskirts of the forest contained plants of interest including *Eriocaulon* (Eriocaulaceae), *Utricularia* (Lentibulariaceae), *Burmannia* (Burmanniaceae), *Lindernia* and *Limnophylla micrantha* (Scrophulariaceae), *Mitrasacme* sp. aff. *pygmaea* (Loganiaceae) and numerous Cyperaceae (e.g. *Eleocharis, Fimbristylis pauciflora*). The immediate outskirts of the forest were surrounded by a mixture of Myrtaceae *(Melaleuca cajaputi)* and Melastomataceae *(Melastoma* sp. aff. *candidum).* Although difficult to penetrate the interior of the forest contained numerous taxa such as *Campnosperma coriacea* (Anacardiaceae) and the spiny *Eleiodoxa conferta* (Palmae).

During the following day, collections were made near the forest office close to the newly constructed walkway through the swamp forest. This proved valuable as many different taxa were seen including *Hanguana* (Hanguanaceae), *Alstonia spathulata* (Apocynaceae) and *Scleria ciliaris* (Cyperaceae). The nearby roadside contained *Gelsemium elegans* (Loganiaceae) as well as the common *Rhodamnia tomentosa* and *Syzygium claviflorum* (Myrtaceae). The day was completed by climbing a newly constructed observation platform which rose to ca 50 m and gave exceptional views over a vast area of swamp forest as well as enabling an intimate study of its crown structure and epiphytes. The return to Forest Headquarters was undertaken in torrential rain during an intense thunderstorm which reached its height while the group travelling over an open plain in the back of a pick-up truck! In total 65 numbers were collected during these two days.

On the 17th March at Paa Waai, a sudden mishap with the vehicle allowed a survey the degraded peat swamp forest along the roadside. This proved very varied with common species such as the shrubby, bright orange-flowered, *Cassia alata* and *Centrosema pubescens* (Leguminosae) and more interestingly a number of rarer species including climbers such as *Poikilospermum* (Cecropiaceae) and some Araceae. Later in the day a boat-trip was taken along various canals near Forest Headquarters. Although large areas of the canal banks were dominated by *Melaleuca cajaputi* forest which is species poor and difficult to penetrate, other areas of the canal banks were very varied in floristic composition and a large number of interesting taxa were found including various Eriocaulaceae *(Eriocaulon)* and Cyperaceae *(Fuirena umbellata, Eleocharis* sp. and *Lepironia articulata)* as well as *Cerbera odollum* (Apocynaceae), *Barringtonia racemosa* and *B. macrostachya* (Lecythidaceae). An unknown, but highly attractive Loranthaceae was also collected with purplish leaves, a green calyx with a white rim and a corolla which was yellowish at its base, purplish further up and finally green with a whitish opening at the tip. The major difficulty on this day was not collecting material but choosing what material to collect. Although only 17 collections were made further survey work of the canal system would undoubtedly prove worthwhile.

After leaving Narathiwat a visit was made to Hat Yai and Prince of Songkhla University. This allowed consolidation of the collections and arrangements were made to send them to Khon Kaen University. The opportunity was also taken to visit Kho Hong, a small hill with rather disturbed vegetation cover behind Prince of Songkhla

University. Unfortunately little of interest was found beyond various Rubiaceae and Cyperaceae such as *Mapania palustris* and *Hypolytrum nemorum.*

In the morning of the next day, a visit was made to Ton Nga Chang waterfall. The steep sides of the waterfall again yielded a large number of Cyperaceae including *Fimbristylis dura* and *Barringtonia macrostachya* (Lecythidaceae).

The next major collecting trip was to the Southern Botanic Gardens at Khao Chong. These contain a large area of more or less pristine wet evergreen forest. Here, the first day's collecting yielded a large variety of plants belonging to many different families including Apocynaceae such as *Alstonia macrophylla,* Sonneratiaceae *(Duabanga grandiflora),* Palmae (*Caryota* and Rattan), Zingiberaceae (one a carmine-red-flowered ginger with yellow edges to the perianth segments, another with a purple and white-mottled perianth), Musaceae, Salicaceae, Cyperaceae *(Hypolytrum nemorum)* and some Araceae including a flowering *Pothos.*

A one-day trip to the coast was also included where amongst the common sea-shore species such as *Scaevola taccada* a number of Cyperaceae including *Eleocharis dulcis* as well as members of Apocynaccae including *Holarrhena curtisii* and *Spirolobium cambodianum.*

A second excursion in the Southern Botanic Gardens was also highly successful going through dense evergreen forest. This excursion was particularly notable for the large number of Rubiaceae collected as well as a spectacular member of the Sterculiaceae with a bright scarlet seed-case and near a river another 2.75 m tall, bright-red-flowered ginger (*Zingiber,* Zingiberaceae) and finally another *Musa.* In all 74 numbers were collected at Khao Chong.

The trip to Khao Luang National Park, which includes some relatively undisturbed areas, included a visit to the S.E. side of the park where the expedition followed disturbed ground alongside a river and on up a hillside through areas of durian cultivation. This yielded a large number of Cyperaceae including *Cyperus sphacelatus, C. distans, Pycreus polystachyos,* a number of ferns and many herbs in the families Commelinaceae, Piperaceae and Araceae as well as small member of the Musaceae and *Tabernaemontana peduncularis* in the Apocynaceae. The next day the trail to Karom Waterfall was followed. This also yielded a large number of Cyperaceae (12 collections) including *Cyperus haspan* and *Kyllingia brevifolia* as well as Myrtaceae *(Syzygium cerasiforme* and *S. siamense)* and a strongly aromatic, epiphytic *Pandanus* (Pandanaceae) and even more ferns, including some Hymenophyllaceae. In all 113 numbers were collected in the Park.

In Khao Sok National Park excursions were made along the trail through evergreen forest to Sip Et Chan waterfall. Among the species collected were *Mapania palustris* (Cyperaceae) as well as a the highly attractive *Carex helferi* with white inflorescences. In addition *Barringtonia acutangula* was found as well as *B. macrocarpa* (Lecythidaceae). Myrtaceae also proved highly interesting with *Syzygium diospyrifolium* being found together with an undescribed *Syzygium* (Myrtaceae). Many other taxa were seen and collected including a number of Rubiaceae and some Araceae. In all 70 numbers were collected over the two day period.

A short excursion was made on a very hot day along an abandoned road near to the Ratchaprapha Dam where a variety of taxa were collected from the roadside including an as yet unidentified *Bauhinia* (Leguminosae) as well as a number of shrubs.

However overall the flora of the area was disappointing, the vegetation being entirely secondary and much damaged. Only eight numbers were collected.

The last few days of the expedition were spent in Songkhla and Phuket where only a few numbers were collected including *Cyperus stoloniferus* (Cyperaceae) by the coast at Songkhla.

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