DAVIS EXPEDITION FUND

REPORT ON EXPEDITION / PROJECT

Expedition/Project Title:	Nomenclature of *Amomum* species (Zingiberacae) in Java, Indonesia and Cambodia
Travel Dates:	26/04/12 – 6/06/12
Location:	Java Barat, Indonesia and Thma Baing, Cambodia
Group Members:	Jane Droop and Mark Newman
Aims:	To collect plant specimens for taxonomic study

Outcome (not less than 300 words):-

Nomenclature of *Amomum* species (Zingiberaceae) in Java, Indonesia and Cambodia

Jane Droop, 2012

Team members:

Jane Droop and Mark Newman (Royal Botanic Garden Edinburgh)
Zou Pu (ISBC)

Counterparts:

Cambodia
Ly Viboth
Museéum National d'Histoire Naturelle, Paris, France and RUPP, Phnom Penh, Cambodia

Indonesia
Dr Marlina Ardiyani
Indonesian Institute of Sciences (LIPI),
Cibinong, West Java, Indonesia

Background to project

Amomum Roxb. is the second largest genus in the family Zingiberaceae (the ginger family) with at least 150 species. Revisions of *Amomum* in continental Asia and on the Sunda Shelf are nearing completion. About 65 species will be revised in Cambodia, Laos and Vietnam, Thailand and Sumatra. This is some 35–45% of the genus.

Several critical groups have been recognised during revision of these species, in which species delimitation and geographical distributions are unclear. In some cases, widespread species seem to have been given different names in different parts of their range. In other cases, lack of knowledge of the type specimen of a name makes it difficult to apply correctly and to compare with closely related species. This expedition sought to address two of these groups.

1. *Amomum compactum* group.
The first complex comprises *Amomum compactum* Sol. ex Maton (type from Java), *A. testaceum* Ridl. (type from Peninsular Malaysia) and *A. verum* Blackw. (type from Cambodia). The members of this group are found in Cambodia, Thailand, Sumatra, Peninsular Malaysia, Java, Borneo and the Philippines.

These species have papery bracts and smooth, or faintly ridged fruits which are valued as cardamoms for cooking and medicine. They are not closely related to the true cardamom *Elettaria cardamomum*. Phylogenetic evidence (Droop, 2012, PhD Thesis, University of Aberdeen) suggests that these species form a well-supported monophyletic clade, although it is clear that the morphological differences between the species are not clearly understood and the names have frequently been confused. For example, it seems likely that the plants with long peduncles from Southern Thailand and Peninsular Malaysia, currently determined as *Amomum testaceum,* may represent a regional variety of *A. verum.* A detailed morphological study of all these taxa will be made, the identities of each will be clarified. New descriptions and circumscriptions will be published as necessary. Samples of *A. verum* from Indochina, *A. testaceum* from Thailand and *A. compactum* from Sumatra and an unknown species from the Philippines are available. These samples will be sequenced, along with further collections of *A. compactum* from Java. The resulting data will be analysed with the material from my PhD thesis.

Fruiting collections of *Amomum verum* were collected from the type locality in mid-May 2010 but no complete flowering specimens have been seen. The primary aim of the Cambodian section of this project was to collect flowering material of the wild cardamom of Cambodia in the type locality, the Cardamom Mountains.

Amomum compactum Sol. ex Maton is based on material collected by Solander in Java. I have located Solander's original material, plus sketches and notes at BM. This species shares a number of critical characters with *A. verum* of Cambodia. Fieldwork in Java was required to collect flowering specimens of *Amomum compactum* in the type locality.

2. *Amomum gracile* group.
The second species complex consists of *A. gracile* Blume and *A. longiligulare* T.L.Wu of China, Thailand, Laos and Vietnam. These species are indistinguishable by vegetative characters and the type of *A. gracile* is sterile so flowering material is required in order to say whether one taxon or two are involved. A photograph of the type of *A. longiligulare,* which is in IBSC in China, has been examined, and many specimens of this species from Laos are available for study. A further aim of the Indonesian section of this project was therefore to collect fertile material of *A. gracile*, after which the identities of these two similar species will be assessed.

Aims of Expedition

To collect good quality herbarium specimens, including both spirit material and leaf specimens collected in silica gel of a) *Amomum gracile* Blume from West Java, b) *Amomum compactum* Sol. ex Maton from Princes' Island, Java, and c) *Amomum verum* Blackw. from the Cardamom Mountains, Cambodia.
To deposit these specimens in herbaria in Indonesia and Cambodia, and duplicates in for E.
To make detailed morphological descriptions of these plants,
To collect good quality herbarium specimens of the RBG's other core research families (Begoniaceae, Gesneriaceae and Sapotaceae).
To collect, where possible, living material of these plants for cultivation in RBGE.
To build on the RBG's excellent working relationship with Asian herbaria.

Itinerary:

26 – 27th April	Depart from Edinburgh, arrive in Phnom Penh, Cambodia
28th April – 3rd May	Arranging permits in Phnom Penh, visits to RUPP herbarium
4th May	Travel from Phnom Penh to the Cardamom Mountains
5 – 11th May	Collecting in Cardamom Mountains
12th May	Travel from Cardamom Mountains to Phnom Penh
13 – 14th May	Specimen preparation in Phnom Penh
15th May	Travel from Phnom Penh, Cambodia to Jakarta, Indonesia
16 – 24th May	Permit preparation and registration with authorities in Bogor and Jakarta
25th May	Travel from Bogor to Sumur
26 – 27th May	Collecting in Ujung Kulon National Park
28th May	Travel from Sumur to Cikaniki
29th – 31st May	Collecting in Gunung Halimun Salak National Park
1st June	Travel from Cikaniki to Bogor
2nd – 4th June	Specimen preparation and Herbarium work in BO, Cibinong
5 – 6th June	Travel from Jakarta, Indonesia to Edinburgh, UK

Cambodian collections:

Collectors: M. F. Newman, Viboth Ly and A. J. Droop

Location: Koh Kong Province, Thma Baing District
Including only those collections in the RBGE core research groups:

2463	4/05/12	Zingiberaceae	*Amomum verum*	11 41.631	103 28.289	568 m
2469	5/05/12	Zingiberaceae	*Amomum verum*	11 41.646	103 28.294	559 m
2470	5/05/12	Zingiberaceae	*Amomum verum*	11 41.646	103 28.294	559 m
2474	6/05/12	Zingiberceae	*Globba* cf. *candida*	11 47.938	103 29.447	432 m
2475	6/05/12	Zingiberaceae	*Amomum verum*	11 47.938	103 29.447	432 m
2481	7/05/12	Zingiberaceae	*Amomum pierreanum*	11 48.588	103 31.116	471 m
2482	7/05/12	Zingiberaceae	*Amomum verum*	11 48.415	103 31.582	553 m
2484	7/05/12	Zingiberaceae	*Globba geoffrayi*	11 48.28	103 30.772	477 m
2489	7/05/12	Zingiberaceae	*Amomum repoeense*	11 48.28	103 30.772	477 m
2515	9/05/12	Zingiberaceae	*Zingiber*	11 41.838	103 27.406	449 m

Ujung Kulon National Park

Collectors: M. F. Newman, Marlina Ardiyani, A. J. Droop, Yessi Santika, Zou Pu and Anshary Maruzy

Location: Banten Province, Kabupaten Pandeglang, Desa Sumur
Including only those collections in the RBGE core research groups

2523	26/05/12	Zingiberaceae	*Amomum aculeatum*	6 40 45.8 S	105 35 24.5 E	110 m
2524	26/05/12	Zingiberaceae	*Amomum aculeatum*	6 40 56.4 S	105 35 20.9 E	151 m

Gunung Halimun Salak National Park

Collectors: M. F. Newman, Marlina Ardiyani, A. J. Droop, Yessi Santika and Zou Pu

Location: Cikaniki Station
Including only those collections in the RBGE core research groups

2527	29/05/12	Zingiberaceae	*Amomum lappaceum*	6 44 39.1 S	106 32 13 E	1067 m
2528	29/05/12	Zingiberaceae	*Amomum compactum*	6 44 39.1 S	106 31 49.9 E	1115 m
2529	30/05/12	Begoniaceae	*Begonia*	6 44 58.3 S	106 32 0.5 E	1165 m
2530	30/05/12	Zingiberaceae	*Amomum lappaceum*	6 44 47.2 S	106 32 3.4 E	1153 m
2531	30/05/12	Gesneriaceae		6 44 40 S	106 32 9 E	1091 m
2532	30/05/12	Begoniaceae	*Begonia*	6 44 38.1 S	106 32 9.7 E	1080 m
2533	30/05/12	Gesneriaceae		6 44 40 S	106 32 9 E	1091 m
2534	30/05/12	Zingiberaceae	*Etlingera*	6 44 38.1 S	106 32 9.9 E	1071 m
2535	31/05/12	Zingiberaceae	*Hornstedtia*	6 44 58.7 S	106 32 37.2 E	1128 m

Breakdown of costs covered by Peter Davis Funding

International airfares	
Return flight, EDI-BKK 2 @ £700	£1400
Return flight, Bangkok-Phnom Penh 2 @ £60	£120
Return flight, Bangkok-Jakarta 2 @ £170	£340
Internal travel	
Vehicle hire, Cambodia 5 days @ £35	£175
Vehicle hire, Indonesia 5 days @ £45	£225
Local buses and taxis	£25
Postage of Specimens	
Cambodia	£75
Indonesia	£140
Total	£2500

Discussion

The principle aim of the project was to collect species of *Amomum,* in particular *Amomum compactum, Amomum verum* and *Amomum gracile*. *Amomum compactum* and *A. verum* have been collected and material will be deposited at Herbarium Bogoriense and Royal Botanic Garden Edinburgh.

Amomum gracile could not be located at either of the places visited in Java. Detailed examination of the collections at Herbarium Bogoriense showed that most of them had been made in teak plantations at low altitude, no higher than 400 m above sea level. It will, however, be possible to complete our work on this species using the collections at Herbarium Bogoriense. A loan of *Amomum gracile* specimens has been laid out for dispatch to E as soon as possible on our return. Further investigation of the distribution and status of *Amomum gracile* in Java may be made the subject of a student thesis to be supervised by Dr Marlina Ardiyani.