

Preliminary Report of the 2001 Edinburgh Nepal Expedition

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1. BACKGROUND

The Royal Botanic Garden Edinburgh has strong historic links with the Sino-Himalayan region, and since the start of the *Flora of Bhutan* project in 1975 has mounted a series of plant collecting to the East Himalaya (including 6 expeditions to Bhutan, two to Sikkim and Darjeeling and two to East Nepal). These expeditions have primarily served to accumulate modern material of general plant collections (preserved and living) and specialist research collections from particular families of interest to RBGE staff, e.g. *Gentianaceae*, *Ericaceae*, *Umbelliferae*. Other objectives have included collection of bryophytes, carpological (seed and fruit) material, photographs, local information on ecology, vernacular names and information on ethnobotanical uses of plants.

Although the *Flora of Bhutan* has now been completed (January 2002), research for that project uncovered many taxonomic problems in critical groups for which further material and research is needed. In addition, the prospect of a *Flora of Nepal* project getting under way is now a likely one and RBGE intends to be a major participant. The expedition was planned to support these objectives and would therefore take place in an area not previously visited by RBGE staff, between the areas covered by the two earlier expeditions to Nepal: KEKE (Kew-Edinburgh Kanchenjunga Expedition, 1989) and EMAK (Edinburgh Makalu Expedition, 1991). This area was thought to be very rich in woody and herbaceous plants as well as bryophytes. Some studies have been carried out in this area by Japanese botanists in the past (June & July 1972) which support this view. It has been 10 years since the last RBGE expedition to Nepal, and the time was considered right to resume field activity in this area.

2. PARTICIPANTS

David G. Long, Dr (Leader)	Science Division (Principal Scientific Officer)
David G. Knott, Mr	Horticultural Division, Dawyck B. G. (Curator)
Mark F. Watson, Dr	Science Division (Principal Scientific Officer)
Simon Crutchley, Mr	Horticultural Division, Inverleith (Gardens Dept.)
Mahendra Subedi, Mr.	Nepalese Liaison Botanist, Dept. of Plant Resources, Kathamndu

3. OBJECTIVES

The main objectives of the expedition were:

Preserved Collections - To collect herbarium material of all available flowering plants and ferns as well as bryophytes from the study area, in at least four sets so that collections could be divided between Nepalese and British herbaria. Special consideration would be given to specialist groups under study at RBGE (e.g. *Cyperaceae*, Bryophytes, *Ericaceae*, *Gramineae*, *Rosaceae*, *Umbelliferae*). Silica gel dried leaf samples would be taken for some of these specialist groups (notably *Umbelliferae*). David Long and Mark Watson were to be primarily responsible for these areas.

Living Collections – Temperate Himalayan plants are important components of RBGE's living collections, and serve both to display the Himalayan Flora to a wide range of visitors and to be used in research on Himalayan plants, for example to support botanists researching the *Flora of Bhutan* and *Flora of Nepal*. Most living collections would be in the form of seed. Priority would be given to material that could be grown outdoors at RBGE, and in particular specialist groups identified in the Garden's Acquisition Policy (e.g. woody *Rosaceae*). David Knott and Simon Crutchley would be primarily responsible for these areas.

Collections for molecular research – Molecular studies are now an integral part of plant systematics. The expedition planned to collect leaf samples in silica gel (supported by a herbarium voucher specimen) of selected plants for a range of on-going research projects at RBGE and elsewhere: eg. liverwort evolution (RBGE), *Umbelliferae* (RBGE), *Thuidiaceae* (Natural History Museum, London). Another RBGE project *Microsatellites as Population Genetic Markers* includes the liverwort *Anastrophyllum joergensenii* (Joergensen's Notchwort) which is disjunct between Scotland and Nepal. Population sampling of this species was a primary goal of the expedition.

Field Experience - The value of studying plants in their natural environment cannot be over-emphasised. New horticultural practices are derived from observing native habitats, bringing improved capabilities in cultivation techniques. Scientific research is also enhanced as workers have the diversity of form seen in wild populations, and can view their subjects as part of an ecosystem (rather than individuals on a herbarium sheet or in a pot). Although David Knott had participated in expeditions in SW China, neither he nor Simon Crutchley had any field experience in the Himalaya. David Long has considerable field experience in the Sino-Himalaya (including Nepal), and Mark Watson has worked in Sikkim, S Nepal and SW China.

Training in Field Botany - The spread of knowledge of the participants was aimed at maximising development of field botany expertise for all members of the team. For Simon Crutchley this would be his first major plant-collecting expedition. Participating on the expedition would have particular benefit for him.

Collaborative links - The expedition would reinforce RBGE's commitments to the planned *Flora of Nepal* in terms of collaboration with Nepalese botanists and focussed collection of relevant plant material. This material will become available to botanists in both Nepal and UK.

4. FINANCE

Support for the expedition was obtained from the following sources:

The Royal Horticultural Society
The University of Edinburgh Davis Expedition Fund
The Gordon Fraser Charitable Trust
Royal Botanic Garden Edinburgh
SEERAD Flexible Fund Project "Microsatellites as Population Genetic markers"
The Merlin Trust
The William Steel Trust
The Percy Sladen Trust
The Oleg Polunin Fund

Costs per head were approximately as follows:

Air fares	£753.50
Excess baggage	10.18
Films	168.32
Misc. food	94.37
Medicines & vaccinations	139.27
Trekking costs incl. local flights, food, tips	1237.75
Transport and local costs	4.56
Hotel Bills	112.22
Liaison Botanist Costs	419.46
Personal equipment allowance	230.00
Misc. batteries, maps, collecting equipment, etc.	287.26
Average total per head	£3456.89
Original budget per head	£2920.00
Overspend* per head	£436.89

*The overspend was brought about by the enforced change of plans during the expedition (see below). In the Arun valley we met a band of armed Maoist guerrillas who posed a severe threat to the expedition. As a result we had to pay for extra internal flights, extra days in a hotel in Kathmandu while we arranged an alternative trek to Central Nepal, and additional transport and trekking costs due to that change of plan.

The potentially greater overspend was mitigated by negotiation of a waiver of excess baggage charges from Gulf Air.

5. ITINERARY

Planned Itinerary

The proposed study area was the Lumbasumba Himal, Jaljale Himal and upper Mewa Khola Valley which form the dividing range between the Arun and Tamur River systems, the two main rivers of East Nepal.

- 16 Sept. Edinburgh - London - Kathmandu (air)
- 17 Sept. Kathmandu (preparation day)
- 18 Sept. Kathmandu to Basantpur, via Biratnagar (air & road)
- 19 - 24 Sept. Basantpur to Mewa Khola, via Tamur Valley (start of trek)
- 25 - 27 Sep. Mewa Khola to Topke Gola
- 28 Sept. - 2 Oct. Topke Gola area
- 3 - 4 Oct. Topke Gola to Thudam
- 5 - 10 Oct. Thudam & upper Lumbasumba Himal
- 11 - 12 Oct. Thudam - Topke Gola
- 13 - 15 Oct. Jaljale Himal
- 16 - 17 Oct. Jaljale Himal - Tumlingtar (end of trek)
- 18 Oct. Tumlingtar - Kathmandu (air)
- 19 - 20 Oct. Kathmandu (2 days processing collections)
- 21 Oct. Kathmandu - London - Edinburgh (air)

Actual Itinerary

Due to the enforced change of plans in the Arun Valley, the above itinerary was abandoned on 28 September and the group returned to Kathmandu. The revised plan took us to Central Nepal, to the sacred lakes of Gosainkund and the Langtang National Park.

- 16 Sept. Edinburgh - London - Abu Dhabi (air)
- 17 Sept. Abu Dhabi - Kathmandu
- 18 Sept. Kathmandu
- 19 Sept. Kathmandu
- 20 Sept. Kathmandu
- 21 Sept. Kathmandu - Biratnagar (air)
Biratnagar - Hile (bus)
- 22 Sept. Hile - Mangmya Khola
- 23 Sept. Mangmya Khola - Puluwa khola
- 24 Sept. Puluwa Khola - Tumlingtar
- 25 Sept. Tumlingtar - Mani Bhanjyang
- 26 Sept. Mani Bhanjyang - Chichila
- 27 Sept. Chichila
- 28 Sept. Chichila - Khandbari (enforced change of plans)
- 29 Sept. Khandbari - Tumlingtar
- 30 Sept. Tumlingtar - Kathmandu (air)
- 1 Oct. Kathmandu

2 Oct.	Kathmandu
3 Oct.	Kathmandu
4 Oct.	Kathmandu – Dhunche (bus) Start of second trek.
5 Oct.	Dhunche - Dhimsa
6 Oct.	Dhimsa – Laurebina village
7 Oct.	Laurebina - Gosainkund
8 Oct.	Gosainkund
9 Oct.	Gosainkund – Shin Gompa
10 Oct.	Shin Gompa - Syabru
11 Oct.	Syabru – Lama Hotel
12 Oct.	Lama Hotel - Langtang
13 Oct.	Langtang – Kyanjin Gompa
14 Oct.	Kyanjin Gompa
15 Oct.	Kyanjin Gompa – Ghora Tabela
16 Oct.	Ghora Tabela – Bamboo Lodge
17 Oct.	Bamboo Lodge - Syabru
18 Oct.	Syabru - Dhunche
19 Oct.	Dhunche – Kathmandu (bus)
20 Oct.	Kathmandu
21 Oct.	Kathmandu
22 Oct.	Kathmandu – Abu Dhabi
23 Oct.	Abu Dhabi – London - Edinburgh

6. RESULTS

In the Final Report the results will be written up in greater detail, along with a list of identifications. Preliminary results can be summarized as follows:

In spite of the difficulties and enforced changes to the plans, the expedition was still an outstanding success. The areas we collected in were not as rich as those we planned to visit, but the personal safety of our team and the approx. 40 porters, cooks and Sherpas was paramount and could not be compromised. In the Gosainkund and Langtang areas we were granted full permission to collect and met most of the aims of the expedition, including the molecular samples for the Microsatellite Project at RBGE. The total number of collections made was not as high as planned. It is hope in future that our original expedition plans can be brought to fruition.

Preserved Collections

A total of 397 collections of herbarium specimens were made, 4 sets of each. Two sets were donated to the national Herbarium and Tribhuvan University Herbarium in Kathmandu. One set is deposited in Edinburgh; the fourth set will be used as gifts or exchange.

Approximately 50% of these have now been identified. When this is complete, a full checklist will be included in the Final Report.

A total of 500 herbarium specimens of bryophytes were made. These have been labelled and packeted and identified to genus. Many will be sent out to specialists for identification over the coming months in 2002.

Living Collections –

237 collections of seeds were made. These have all been sown at RBGE and germination is awaited in spring 2002.

Collections for molecular research –

47 DNA samples of bryophytes were collected.

Field Experience and Training –

The two members of the team who had not worked in the Himalaya previously participated in all aspects of the expedition, including collecting, pressing, data recording, drying, seed collecting, seed cleaning, etc. This gave them excellent experience in all aspects of Himalayan field botany.

Collaborative links -.

Excellent collaborative links were built up with many botanists in Nepal, especially those in the Department of Plant Resources, and in Tribhuvan University. Our unfortunate encounter with armed Maoists had the unexpected benefit of giving us a chance to meet and build links with staff of the British Embassy in Kathmandu. These links have already been utilised in planning for a forthcoming *Flora of Nepal* meeting in Edinburgh in May 2002.

7. ACKNOWLEDGMENTS

We very gratefully acknowledge the funding provided for this expedition by our sponsors. We acknowledge Gulf Air for waiving Excess Baggage charges. We thank fellow botanists at RBGE for help with plant identification.

8. EXPEDITION DIARY

This diary will be included in the Final report.

The account below formed part of a Press Release issued in October 2001. A full-page illustrated account of the expedition appeared in the Southern Reporter on 1 November 2001.

Plans: After nine months of planning and fund-raising (mostly from private trusts including the Royal Horticultural Society) the expedition set out from Edinburgh on 16 September, heading for the Jaljale Himal mountains in East Nepal, between two of the world's highest peaks, Mount Makalu and Kangchenjunga. They planned to explore the

tropical forests of the deep Arun Valley on the ten-day walk-in from the lowland town of Hile, rising up through the temperate oak and conifer forests up to the alpine meadows, screes and glacier moraines at between ten and fifteen thousand feet altitude, where many rare alpine plants grow. The aims were to collect seeds of temperate trees and shrubs (such as Rhododendrons and Rowans) as well as alpine herbs (such as Gentians and Primulas) for cultivation and display at the RBGE's gardens at Edinburgh, Dawyck near Peebles, Benmore near Dunoon and Logan near Stranraer as well as dried herbarium specimens of all plants encountered as part of a planned new major survey of all the six thousand or more Nepalese flowering plants. Another aim was to collect samples of mosses and liverworts for modern high-tech DNA research on the evolution of lower land plants at Edinburgh.

Plans thwarted by armed Maoist militia:

The team of botanists (four from RBGE, David Long, David Knott, Mark Watson and Simon Crutchley and a Nepalese botanist Mahendra Subedi), sherpa guides (three), cook-staff (five) and porters (twenty-six to carry all the expedition's tents, collecting equipment, personal gear and food for four weeks) flew from Kathmandu to Biratnagar on 21 September and after a short bus journey set off walking from Hile the next day. After three days trekking up the hot and humid Arun River valley, the slow steady uphill climb into the mountains began on 25 Sept. On the second day's climb the team met up with armed Maoist militiamen who had recently moved into the area and were intimidating villagers and stirring up dissent with the Nepal Government and especially the police force (numerous policemen have been murdered by Maoist militia in the past year in Nepal). As the RBGE team were working for the Nepal Government and had a government botanist with them, they were warned that not only would they have to meet demands for money, but that the militia were likely to steal equipment such as binoculars and sleeping bags if they proceeded any further. The sherpa guides handed over some money, and because all the local police and army had fled the district, the RBGE team reluctantly decided to turn back to the safety of the lowlands. After a nervous night in camp, during which a huge thunderstorm and downpour contributed to the difficulty of sleeping, at first light the next morning the team set off quickly retracing their steps. Two days later they reached the tiny airstrip of Tumlingtar and on 30 September flew back on a small plane to Kathmandu.

New plans!

After reporting in detail their experiences to the British Embassy in Kathmandu, new plans were quickly formulated for an alternative collecting expedition to the Langtang Himal of Central Nepal, a very popular trekking area with a conspicuous army presence, which the Maoist militia have not yet infiltrated.

New expedition!

So on 4 October, with the same team of sherpas, cooks and fourteen porters, they drove north up the Trisuli River to start the trek at the village of Dhunche (though a new headache in the form of a huge landslide blocking the road meant an unexpected extra 10 km walk in torrential rain). The next day the summer monsoon ended suddenly and for the whole of the remaining trek the sun shone. The problems seemed to melt away

and the group climbed up through the superb forests to the lakes of Gosainkund at 4300m altitude. These lakes lie on a plateau overshadowed by the huge snowy peak of Langtang Lirung (7225m) close to the border with Tibet. In August each year thousands of Hindu pilgrims from all over Nepal and India make a pilgrimage to these lakes which are dedicated to the god Shiva. In October the lakes were peaceful and surrounded by hills covered in dwarf Rhododendrons and brilliant blue splashes of trumpet gentians. Many of the shrubs and alpine plants were in fruit, enabling seeds to be collected for cultivation at Dawyck Botanic garden back in the Scottish Borders.

After a few days the team made the very steep descent down to 1700m into the valley of the Langtang Khola then slowly climbed up again through the forests to the village of Langtang well above the treeline, into an area of Yak herding on the grassy lower slopes of a huge mountain amphitheatre surrounded by the snow and ice peaks of Langtang Himal. Their highest camp was at Kyanjin Gompa, a remote Tibetan temple nestling at the foot of two huge glaciers, where at night the temperature dropped to minus 7°C. They were glad of their precious down sleeping bags. During the day they explored the wonderful birch woodland nearby (the Himalayan Birch *Betula utilis*, with lovely brown peeling bark) as well as the glacial moraines and screes. Many interesting and rare plants were collected in this area, both in flower and in seed, such as blue poppies, Himalayan edelweiss and other plants covered in woolly hairs as protection against the extreme climate.

Results of expedition

During the expedition scientific dried plant specimens of around 400 different species were collected (four of each) to be deposited in the herbaria (dried plant collections) of Kathmandu and Edinburgh. These specimens now have to be labelled with full details (such as detailed locality information provided by our GPS satellite handsets) and identified with the correct plant names. These specimens will it is hoped be used in the new *Flora of Nepal* project, an ambitious plan to catalogue and describe all the flowering plants of Nepal, to be undertaken by botanists from Kathmandu, Tokyo and Edinburgh.

Another project of David Long's involved detailed sampling of liverworts and mosses, in particular 'Joergensen's Notchwort', a very rare liverwort which occurs only in Scotland, Norway and the Himalayan mountains. Liverworts may be the earliest plants to colonise land millions of years ago, and modern methods of DNA analysis used in the laboratories at RBGE can be used to try to work out how this colossal leap in evolution took place. Why should one kind of tiny liverwort only occur in Nepal and Scotland? It is hoped that the samples from Sutherland and Langtang might unlock new information hidden in the DNA for millions of years about how early land plants evolved and spread around the world.

For the Borders, it is hoped that plants of many beautiful Himalayan trees, shrubs and herbs can be raised from the 237 seed collections and later planted out at Dawyck Botanic Garden, for visitors of the future to see.

Background to RBGE's Himalayan work:

The Royal Botanic Garden Edinburgh has long been associated with plants of the Himalayas and China, both in terms of scientific research and cultivation of living collections for public display and education. Himalayan plants can be seen at Edinburgh, Benmore Botanic Garden near Dunoon (which has a large Bhutanese garden under development), Logan Botanic Garden near Stranraer and our own local botanic garden at Dawyck near Peebles where David Knott is Curator. Scotland's cool moist climate is especially suited to growing these plants, including the familiar Rhododendrons and Blue Poppies for which Dawyck is famous. The gardens are rich in collections both from recent expeditions by RBGE staff and from the big names of the past such as George Forrest.

Edinburgh is the leading world centre on research on Rhododendrons, as well as involved in research on plants from China (*Flora of China*) and Bhutan (*Flora of Bhutan*). It is hoped that very soon a new *Flora of Nepal* project will begin and the search for financial sponsors has begun. Edinburgh is also a leading centre for research and conservation of lower plants such as lichens, ferns, algae, fungi, mosses and liverworts, where the numerous native Scottish species are just as important as those from the Himalayas and China.

Dawyck Botanic Garden and its Himalayan plants

The climatic conditions at Dawyck in the Scottish Borders with cool winters and relatively warm summers provide ideal conditions for the cultivation of a wide range of plant material from the Himalayas. The number of plants growing in the living plant collection at Dawyck has increased in recent years including many plants of Himalayan origin. Documented wild origin plants of *Berberis*, Birch, *Cotoneaster*, Rowan and *Spiraea* collected on previous expeditions to the Himalayas are now maturing and at this time of year these plant groups provide great interest with spectacular autumn colour, fruit or berries and attractive bark. In future years plants grown from seed collected on this expedition will be planted and add further interest to the living plant collection at Dawyck

Personal profiles:

Dr David Long was born in Duns, Berwickshire and educated at the Berwickshire High School and Edinburgh University. He lives with his family at Spottiswoode near Westruther and works as a research botanist at the Royal Botanic Garden in Edinburgh. He has participated in and led many expeditions to the Himalayas, including five to Bhutan, a small Himalayan kingdom in the East Himalayas, two to Sikkim (in northern India between Nepal and Bhutan) and four expeditions to Nepal. He has also collected plants on three expeditions to China and others to Bangladesh, the Kalahari Desert in Africa, Yemen, Mexico, Alaska and Greenland. Most of his work has been writing, with several collaborators, the *Flora of Bhutan*, a major project at RBGE for the past twenty years, which has resulted in publication of nine volumes (the final part on orchids to be published later this year) which catalogue and describe all the flowering plants of Bhutan for the first time. His other research interest is on bryophytes (mosses and

liverworts) where he has strong interests in researching the bryophytes of Scotland (and their conservation) as well as those from the Himalaya and China.

David Knott was born in Edinburgh and educated in Perth and at the Royal Botanic Garden Edinburgh. He lives with his family in Peebles and has been Curator of Dawyck Botanic Garden for the last nine years. He has previously participated in two plant collecting expeditions to China and has a special interest in woody and larger herbaceous plants.

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9. APPENDIX: PLANTS COLLECTED

To be included in Final Report (identifications not yet complete)