DAVIS EXPEDITION FUND

REPORT ON EXPEDITION/PROJECT

Expedition/Project Title: Relationships between the Growth of Rhododendrons and Minerals in the Soil.

Travel Dates: 30/08/05 – 12/09/05

Location: NW Yunnan: Lijiang, Zhongdian, Deqin

Group Members: Prof. David W. H. Rankin, Maria Kaisheva, Jane Armstrong

Aims: To collect leaf and soil material from *Rhododendron* species and other plants growing in soils with extremely high limestone content, and from adjacent areas which are largely lime-free. To analyse the collected samples and obtain information on the mechanisms that lime-tolerant plant species have developed in order to survive in extreme conditions.

OUTCOME:

The natural habitat and general growing conditions in the wild of *Rhododendron* and various alpine plant species were observed. 111 dry leaf and soil samples for *Rhododendron,* 47 for *Primula*, 16 for *Gentiana*, 8 - *Daphne*, 2 - *Saxifraga*, 5 - *Rheum*, 11 - *Androsace*, and 4 - *Cassiope* plants were collected. Most of the plants were collected as growing on pure limestone or limestone covered with a thin layer of organic matter and only a few were collected on more organic soil. The range of altitudes of the expedition where collections were made was between 3000 m and 4800 m, which is the typical zone of occurrence of the plants of interest. We also observed same very rare plants that are threatened by extinction due to increased agricultural activity in the region or illegal trade for medicinal purposes. The region was obviously suffering very active deforestation and consequent soil erosion resulting in a decrease in the number of woody plants.

The results for the samples collected have shown a very good agreement with results for samples of the same species collected during past expeditions in the same areas of the Himalayas. The plants that are known as lime-tolerant species were found flourishing in what would be extremely alkaline conditions for most plants. Data from this expedition have demonstrated that plant in the genus *Rheum*, and in one subsection in genus *Primula*, exhibit hyper accumulation of manganese. This has previously been observed only a few shrubby plants (Ericaceae, Camellia, and a few others) and is a most interesting finding.

The visual observations during the expedition, as well as the information that we got from the results of the analyses, will be correlated theoretically and practically to the results obtained from previous sample analyses so far in the research. The data could be used to improve cultivation conditions for lime-tolerant plants that do not, at present, do well in limestone soil in cultivation. Overall, the results of the expedition and of our research are designed to help the long-term

conservation of plants in the wild, some of which are in the list of endangered or threatened plants, by understanding their nutritional needs, and therefore allowing them to be cultivated.