

# JAMES RENNIE BEQUEST

## REPORT ON EXPEDITION/PROJECT/CONFERENCE

**Expedition/Project/Conference Title:** Resource Allocation and Allometry of Plant Growth in the Arctic  
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**Travel Dates:** 15/07/04-28/08/04.....

**Location:** Abisko Scientific Research Station and Latnja Field Station, Sweden .....

**Group Member(s):** Robert Bell.....

**Aims:** To gain experience in ecological research through project participation and to further my own research into the effects of measuring Normalised Difference Vegetation Index at different scales.....

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### OUTCOME (not less than 300 words):-

The Swedish project was conducted in parallel with another at the same latitude (68°N) in Toolik Lake, Alaska; both projects investigating primary production, Carbon fluxes, Nitrogen turnover, Normalised Difference Vegetation Index (NDVI), and canopy structure across a range of vegetation types. Our main aim in the first three weeks was to take gas flux measurements across sites ranging from exposed *Empetrum* heath to dense *Salix* shrub using a Perspex chamber connected to a Licor Gas analyser. Through use of shade cloths we were able to lower the amount of Photosynthetically Active Radiation (PAR) reaching the vegetation inside the chamber, enabling us to measure plant response to changing light conditions. NDVI was taken at each site, which can be used as a surrogate for the amount of leaf area as well as Nitrogen levels in the canopy.

Finally a destructive harvest was carried out at each site; the results showing the primary production and total biomass of the different species present. In the fourth week we moved to Latnja Field Station situated well above the tree line at 980m elevation. This area provided a variety of sites very different to those common in the Abisko area. These sites included species rich Calcareous grasslands as well as tussock tundra; a vegetation type abundant in Alaska but relatively rare in Sweden. A successful series of fluxes was carried out in Latnja and the team enjoyed the change from the established routine taking evenings off to explore the local area and examine the many sites of geological interest as well as the splendid sauna facility.

During my last two weeks in Sweden I collected results for my personal project into the repercussions of NDVI measurement at different scales. This involved mapping NDVI across a 500\*500m grid divided into one hundred equally sized grid squares. These grid squares were then mapped at different levels of intensity and I was lucky to be able to finish my research by taking one overall NDVI reading using instrumentation attached to a helicopter. The data collected in Sweden is now being analysed back in Edinburgh with a view to including it in my honours project.

The data collected for the general project is being analysed at the Marine Biological Laboratory, Massachusetts and will provide a valuable comparison with that collected in past and present years

at Toolik Lake. The Arctic provides a useful study area for Ecologists because of its relatively simple systems and undisturbed habitats and I would like to conduct more research there.

My six weeks in Absiko taught me many things. On an academic level I learnt many practical field skills such as those used vegetation harvests and flux measurements. I also improved my ability to handle complex technology standing me in good stead in the increasingly computerised world of ecology and modelling. Finally I improved my social skills and interaction with other members of the project and field station enhanced my ability to work cohesively with people from different and varied backgrounds. I would like to thank the James Rennie Bequest for their contribution towards my travel costs enabling me to exploit this exciting opportunity.