JAMES RENNIE BEQUEST

REPORT ON EXPEDITION/PROJECT/CONFERENCE

Expedition/Project/Conference Title: Abacus Research Programme.....

Travel Dates: 29th June- 25th August 2008.....

Location: Kevo, Finland.....

Group Member(s): Carole Lowther.....

Aims: To gain a better understanding of the role of bryophytes in tundra carbon cycling by tracking C14 through the ecosystem.....

OUTCOME (not less than 300 words):-

On arrival in Kevo, after settling into our beautifully placed research station and enjoying some delicious reindeer lasagne, (our first taste of reindeer but most certainly not our last!!) the first few days were spent looking at the field site. As I had come on the trip as a research assistant to Lorna Street who was working on her PHD, we had to investigate the area and decide where our sites should be for the experiments. The field site was typical arctic mire, showing a transition from birch woodland, through a bog to open water. We had 3main hypotheses to investigate:

1) The rate of carbon flux through the bryophytes and soil continuum differs between the dominant community types

2) The % of carbon retained in the structural tissues differs between dominant community types

3) Carbon turnover in *Spaghnum fuscum* dominated communities is independent of site; including factors such as climate and water table depth

4) The contribution of recent bryophyte photosynthate to dissolved organic carbon in soil pore water is significant. This also differs between dominant communities.

The main focus of the study was to carry out an isotope labelling experiment, using Carbon14 as the label. This was to be pumped over the chosen mosses for a period of time, and respiration and photosynthesis measured. The amount of the label found in the soil and respired gases over different time scales would also be determined, to show us where the carbon went and how long it took to move through the system. We were going to compare two different types of mosses, feather mosses and sphagnum mosses as the main community types mentioned in the hypotheses and had to pick plots of each. Twelve plots in total were chosen, 4 of feather mosses, 4 of sphagnum, and 4 ‘natural abundance’ plots, which included the moss community and the vascular plants. In all the other plots the vascular plants were trimmed away, as we were interested in the responses of the mosses only.

Once the plots were prepared, we could pump them with the label. Each plot was pumped simultaneously with C14 for about 6hours. After which a round of measurements were taken. Moss samples, and vascular samples from the natural abundance sites were taken. This was to see how much label was present in the tissues. As a control, samples from the mosses and vascular plants that hadn't been labelled, were also taken. A round of measurements (moss samples, gas samples) was taken at different time intervals, slowly increasing in distance. A round was taken 1 day after labelling, 2 days, 3days, one week, two weeks etc. This was to show what happened to the carbon over time and where it ended up. As a side investigation, invertebrates were also collected from the plots to try and establish if any of the carbon had been passed onto them via feeding.

Although the samples are now back in the UK, they have to be ground, and sent away to be analysed which may take a long time. Thus we have no complete results to show. However, some of the gas samples have been analysed and the results look promising, indicating a change in the amount of carbon released over time. We also carried out other experiments, such as looking at respiration of the moss communities over time without the labelling experiment, and conducting %cover over several transects. Results on these are also still being worked on.

As well as helping Lorna carry out her experiment, I also helped out with other projects being carried out by other PHD students and other scientists. A big part of this was helping with a harvesting project being carried out. The researchers wanted to try and calculate the biomass, and how the biomasses of different species related to each other and changed across the mire. There were several 25m transects, running from the bog to the woodland, and harvests were taken every 5m. A %cover of the 20x20cm quadrat used was estimated, and all the vascular plants removed by species. A %cover of the remaining bryophytes was then carried out, before they were also removed. The samples were dried and weighed before biomass calculated. Again the results have yet to be released.

Despite working hard, I had an amazing time in Finland and have totally fallen in love with the arctic. I learnt so much in such a short space of time, and was surrounded by incredible people the entire time. The arctic is such a beautiful yet vulnerable place, and I believe that the work carried out over this summer will be put to excellent use and increase understanding of this complex ecosystem. I want to thank the committee for giving me such a wonderful opportunity, and I feel it wont be long before I return to the arctic…..