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STUDIES ON ASULAM

The work on Asulam performed under project 48 is divided between the Bangor and Merlewood stations of I.T.E. Prior to the present contract being awarded some work was being carried out at Bangor on Bracken control (I.T.E. 171) under Dr. R. E. Hughes and this work is not covered by the present report.

Bangor J. Dale and A. G. Thompson

Parameters being measured in the Bangor-based section of this project.

- (1) Melynllyn - 30 fixed quadrats (1 sq. metre) in wetland. The presence or absence of all plant species in 25 sub-quadrats are recorded within each quadrat. Quadrats set up on 11th and 23rd July 1975. Sprayed with normal dose of asulam on 12th August 1975. Quadrats recorded in 1975 on 12th, 18th and 20th August.
- (2) Eriophorum angustifolium - Planted in 150 pots kept at Bangor. Divided into three blocks. Within each, ten pots (randomly selected) are exposed to a normal dose of asulam, half-normal, $\frac{1}{4}$ normal, $\frac{1}{8}$ normal, and water.

Plants collected from Melynllyn on 17th April 1975.

Potted on 21st and 22nd April 1975.

Sprayed with various doses of asulam on 28th August 1975.

The following parameters measured (before and on 28th July 1975):-

- (a) No. of leaves per pot
- (b) Height of longest leaf (nearest mm)
- (c) Length and breadth of three fairly large leaves selected at random
- one from the central clump, the other two from peripheral clumps.

Fruiting heads removed when the earliest seeds were being loosened by the wind - 3rd July 1975 - the following parameters were then noted:-

- (a) No. of inflorescences/pod
- (b) No. of florets/inflorescence
- (c) No. of seeds/floret (very small underdeveloped seeds being ignored).

- (3) Ulex gallii - 150 bushes (or parts of bushes) selected on the Great Orme. Divided into three blocks. Within each, ten bushes (randomly selected) are exposed to a normal dose of asulam, normal, normal, normal, and water.

Experimental site selected on 21st May 1975.

A species list of plants growing on experimental site completed 11th June 1975.

Ulex bushes labelled on 7th and 8th July 1975.

No. of flowers per 20 x 20 cm quadrat measured for the centre of each bush - all flowers and reasonably large buds included, very small buds excluded. Counting carried out on 19th, 21st and 22nd August, 1975.

One small branch taken from near the centre of each bush. For each branch, the number of green shoots and entirely dead shoots are counted. Sampling carried out on 19th, 21st and 22nd August 1975.

Bushes sprayed with the various doses of asulam on 26th and 27th August 1975.

From each bush, ten pods are collected and the numbers of seeds they contain are counted. Pods collected on 2nd October and 4th November 1975 - the latter date was much better.

Germination of seeds from experimental and control plants to be tested when ripe.

Merlewood A. D. Horrill

1) Redesdale

The experimental plots at Redesdale have now been assessed for the second year. There are three plots; control, asulam at 6 pints/acre, and asulam at 8 pints/acre. Within each plot there is a grid of nine permanent quadrats each consisting of nine sub-quadrats. The presence and absence of all plant species is recorded in each of the sub-quadrats and a count of Bracken fronds is made.

A subjective assessment of the area at the present time is that the species originally present have expanded to form a grassy sward dominated by Agrostis and Festuca spp. No new species have invaded the area to any extent and the Bracken is showing slight but not statistically significant recovery in the 6 pints/acre treatment. It is anticipated that one more recording of this experiment will be made before the data are processed and a report produced.

2) Woodland sites

20 permanent quadrats have been installed and sprayed with the standard dose of asulam in order to study the response of non-target woodland species. Each 1 metre quadrat is sub-divided into 25 sub-quadrats and the presence and absence of all plant species recorded within each sub-quadrat in a similar manner to the wetland plots being studied at Bangor. Two communities are being studied, one of a dry base-rich wood (Eggerslack wood) dominated by Mercurialis perennis with Phyllitis scolopendrium and Dryopteris dilatata present, the second is an acid oakwood site in Roudsea Wood N.N.R. The field layer is dominated by Vaccinium myrtillus and Deschampsia cespitosa with Pteridium aquilinum and Dryopteris dilatata as the prominent pteridophyta.

3) Sub-lethal effects on Pteridophyllis

Two species are being studied Blechnum spicant and Dryopteris dilatata.

180 plants of each species have been established in culture and these have been divided into 3 replicates of 6 treatments, a treatment containing 10 randomly selected individuals. The treatments consisted of spraying with x1, x2, x4, x8, and x16 dilutions of asulam plus a control sprayed with water. Additional plants were sprayed and the leaves taken for chemical analysis in order to determine the actual amount of spray intercepted by the leaves.

The following parameters were recorded for every plant:-

- a) \bar{N} of fertile fronds
- b) \bar{N} of infertile fronds

and for all fronds of three randomly selected plants from each treatment:-

- a) Frond length
- b) Maximum frond width
- c) In the case of Dryopteris the length of petiole.

Following the spraying at the end of July no effects occurred with respect to the Dryopteris but with Blechnum, which continues to put on a few fronds during the summer months, effects have been noted. The Blechnum plants developed a noticeable red tint sufficient to enable one to distinguish the controls immediately on sight and the growth of new fronds was suppressed. The developing fronds became brownish in colour, did not expand fully and died back from the tips. These effects have been recorded photographically.

This experiment is due to run for two more years, in the first it is hoped that sub-lethal effects will manifest themselves and in the second recovery ~~of~~ of these damaged plants will be recorded.

Work has continued at the main experimental site at Tai Isaf, Conwy Valley (SH765662), where two acres of upland bracken were treated with Asulam in 1973.

The vegetation (excluding bracken) was sampled in July, and values for dry weights of the standing crop of all species were obtained. These data showed that an increase in the amount of *Agrostis tenuis*, *Anthoxanthum odoratum*, and *Rhynchospora squarrosus* on the bracken cleared area had taken place.

In August, the bracken itself was sampled at the full-frond stage, and this gave dry weight values for a range of frond densities.

Small mammal trapping continued throughout the year at two-monthly intervals, and was concluded in February 1976. The numbers of small mammals in the control area continued to show marked seasonal fluctuations whilst few animals were caught at all on the sprayed area.

As part of ITE Project 168, sheep were counted weekly on this and neighbouring census areas. The density of sheep on this asulam-treated plot remained at a high level after the marked increase that took place during the summer of 1974, when the bracken failed to emerge.

Most of the subsidiary experiments that are included in this project had been completed by 1975. However, a concluding examination of the woodland ground flora at Benarth Wood was made, where a small plot of bracken had been treated with asulam. Also, a minor experiment concerning bracken control on the limestone of the Great Orme was finished.

A brief botanical survey was carried out on a former upland bracken area that had been sprayed with asulam by helicopter late in 1974, and where the bracken litter had been burnt subsequently and soil erosion had taken place.

A. G. Thomson
Bangor.