wide open arch his neck backwards. At any stage the cow may reject the approach either by diving away or by an agitated flapping of her fore fllipper in the direction of the male, seldom actually striking him (It appears that this "fllippering" is a standard gesture of annoyance, being often used when jostling for positions while hauling out). We saw a few females respond by swimming with the bull while rolling over and over each other. Our observation in 1971 suggests that the next stage, if reached, is copulation in the water, but more evidence is yet required to substantiate this.

As pup birth has been recorded in Seal's Hole we wished to investigate the cave to explore it potential as a breeding site. It seems that the chamber is flooded by the spring tides but after the late summer springs have passed it is likely that a few square yards of sand beach would remain dry. We made three entries to the cave. On the first we left markers that were swept away by the spring tides. On the second we again left markers but an aggressive bull seal and an equally aggressive juvenile did not allow us to re-enter the chamber to investigate the tide level.

From our data on sightings of identified seals it appears that there is some degree of preference by specific seals for certain haul-out rocks, though we have found that wind direction has considerable effect—the seals tending to move into the lee of the island.

Little is currently known about the feeding habits of grey seals and we made only three observations pertaining to this. We observed two instances of fish chasing. The first was a female pursuing what appeared to be grey mullet and the second was a seal pursuing mackerel have apparently lain in wait on the bottom as the fish neared and then giving chase. Both chases occurred in four to six feet of water and involved rapid turns and some swimming up-side-down. In neither case did the seal catch a fish. Only one faecal excretion has so far been observed. It occurred in the water and appeared to contain some orange-red shell of large crustacea.

When inshore but not hauled out the seals spend much time lying in small underwater crevases or on the sea bottom. After between five and twelve minutes they return to the surface for a short time and then dive again. This activity may have some rest value as the actions gone through are repetitive and common to all. It seems to occur mostly at high tide, whereas hauling out seems to occur mostly at low tide. We made timings of the behaviour and though we were unable to gain enough readings to be conclusive it seems that there may be a correlation between length of dive and time spent at the surface. The observations were made of seven specimens: three adult cows, three adult bulls and one juvenile We discarded all readings of less than three hundred seconds as these were taken at times when the seals were alarmed. The ratio of the time on the surface before the dive and the duration of the dive was found for thirty nine dives, the mean ratio being 6.10015 with a standard deviation of 8·59. The ratio of the time on the surface and the duration of the preceding dive was taken for thirty seven dives and had a mean ratio of 6.1667 with a standard deviation of 3.92. A major problem with taking these readings is that the seals may be disturbed and the rhythm broken.

We would like to thank Mr. M. Cleverly and Mr. C. King for making up the team in 1973 thereby doubling our man power. Their assistance was most valuable.

## SOME PRELIMINARY OBSERVATIONS ON THE RECOLONISATION OF THE NORTH END OF LUNDY

PAUL WILKINS and JULIAN R. DEBHAM

### Introduction

In the early 1930s the open moorland of the North End of Lundy was burnt to the bedrock. Two separate fires occurred in successive years. Burning was so severe that the peat underlying the vegetation also caught fire and thus even when trenches were dug in the path of the fire flames managed to spread through runnels of peat between the granite blocks to unburnt areas. Mr. F. W. Gade, who was with the firefighters, remembers that the East Side was burnt from the far north of the island as far south as Gannet's Combe where the dampness of the peat prevented the further progress of the fire. The West Side he remembers as being burnt even further to the south. The fire removed most of the vegetation and some of the peat from much of the North End. It seems reasonable to suppose that once the protective cover of the vegetation was removed the wind was able to make still further inroads on the peat until there existed only bare granite where once had been moorland.

We intended to investigate the course of recolonisation in the burned areas by using numerical techniques to determine the nature of the plant communities north of Threequarter Wall. We hoped to be able to relate our observations to the process of recolonisation by a consideration of previous observations made on the flora of the North End and by a comparison between the burnt and unburnt areas north of Threequarter Wall. This latter approach was based on the premise that the vegetation of the burnt area was originally very much like that of the unburnt areas. Mr. Gade thought that in the light of his memory of the area before the fire this was a reasonable conclusion.

Unfortunately, very little seems to have been reported of the progress of recolonisation or even of the flora of the area covered by our survey. An expedition from Oxford University in 1962 recorded merely that the vegetation of the North End was "low *Calluna* (*vulgaris*) and a *Campylopus* sp." which must surely be a sweeping generalisation. Previous workers had recorded that "Tongues of unburned grass and heather run across the area". An observer in 1948 recorded the presence of "small plants such as *Polytrichum*, *Radiola linoides* and *Sagina procumbens*." He dismissed these plants as unimportant by which it can be presumed that he meant that they were of small size and had only low a percentage cover since they are probably of great importance in the re-establishment of vegetation. W. A. Gidden (1949) noticed that *Cladonia furcata* was present on burned ground. Dunn and Bristow (1971) found "a large increase in the vegetation cover of the North End of the island, covering what was bare granite only a few years ago". They also made the observation that in the North End heather was dominant to bracken; a conclusion not supported by numerical analysis. We have not been able to find a complete species list of the flora of the burnt areas of the North End for any of the years since the fire.

**Materials and Methods**

Sampling was conducted on a random basis. A grid was laid down on a map of the North End of Lundy. Each intersection was numbered, the total number of intersections being 293. Forty numbers were drawn at random from the numbers 1-293 and these corresponded to our sampling points,

These predetermined points were located in the field by the use of an Ordnance Survey 1:25,000 map. Great care was taken to ensure objectvity in the location of sampling points.

Each stand was 200 sq. m. in area and was marked out in a manner developed by Bunce and Shaw (unpublished). A post was placed in the centre of the plot and from it were run strings such as to mark the diagonals of a 200 sq. m. quadrat. These diagonals were graduated in such a way as to produce a series of nested quadrats of increasing size, the smallest being 4 sq. m. and the largest 200 sq. m.

When the plot had been marked out the ground flora data were recorded. All higher plant species in the innermost quadrat were noted. Additional species present in the next quadrat were then recorded. This process was repeated for each subsequent quadrat size up to and including 200 sq. m. Using this method of recording floral data it is possible to construct species area curves as an aid to interpretation. The next stage in the proceedings was to estimate the percentage cover of each species present within the quadrat to the nearest. 5%. This estimate was not intended as an objective measure and was not used in the analysis; it merely served as a guide to interpretation.

The next stage was the determination of several easily measurable environmental variables. The height of the vegetation at the centre of the plot and at each of the four corners was measured and the plant species at that point was recorded. The slope of the plot and the aspect of the plot along the line of greatest slope were also measured. It was hoped that these three measurements could be related to the degree of exposure of the plot. Soil depth was measured at the centre of the plot and at each of the four corners. Any points of especial interest were noted and a sketch of the profile and/or plan of the plot was drawn.

The analysis of the ground flora data was by several numerical techniques. Principal components analysis was performed according to the method of Orloci (1966), association-analysis was after that developed by Williams and Lambert (1959) and the agglomerative-polythetic method of classification used was that of Williams and Lambert and Lance (1966).

**Discussion**

Our survey was complicated by the extreme shortness of the turf and the lateness of the season. Both these factors made the identification of certain plants difficult. Overgrazing of North End is so severe that most grass and sedge species are clipped to within a centimetre or two of the soil surface. This made positive identification difficult so we decided that the genus *Carex* should be considered as one species for the purposes of our analysis. We felt that although different members of the genus undoubtedly show different habitat requirements these should be reflected by other species. In addition we thought that the presence of members of the genus *Covere* might carry a significant information in itself. It is also possible that the absence of grass flowers and well developed grass plants meant that we overlooked a few of the rarer members of the Craminae. It is extremely unlikely that this would affect the results of the analyses in a significant way.

It is our opinion that the numerical analyses demonstrate the existence of a vegetational continuum north of Threequarter Wall and so we have confined our comments to the information expressed in the principal components analysis. (This demonstrates the relationships between stands in three dimensional space).

The first point to note is that there is no clear cut distinction between burnt and unburnt stands. This seems in direct contradiction to what is plainly discernible by eye and yet figures for average soil depth, average vegetation height and the percentage cover of bare rock support the view that there is now little to distinguish burnt from unburnt areas. (It should be pointed out that although our rough figures indicate otherwise, on accurate determination of species cover may reflect a difference between burnt and unburnt areas.) It is true that the shallowest soil, the lowest vegetation, the most bare rock and the lowest species number all occur in burnt stands but it is equally true that some of the unburnt stands show similarly low values.

What does this tell us of the recolonisation of North End? The most obvious conclusion is that the process is now, after some forty years, nearing completion. This preliminary study shows that, at least in terms of species composition, there is no startling contrast between burnt and unburnt areas. However, it does appear that there may be a gradient from north west to south east along which species composition changes slowly. We postulate this gradient from our knowledge of field conditions and from the results given here but we wish to stress that it is a matter for conjecture and should be investigated by further field work.

This gradient, should it exist, may reflect either a wave of colonisation moving from the unburnt south-eastern corner of North End towards the burnt north-western corner or a more permanent environmental gradient. This can only be demonstrated by experimentation. It is possible that this gradient would be reflected by species cover rather than species presence.

In addition to the measurements we have reported on above, we noted that it is possible that lichens were playing and had played an important part in the recolonisation of bare rock in the survey area. We observed that there was often a fringe of *Parmelias, Cladonias* and other lichens round heather tussocks. separating these tussocks from bare rock. A similar situation was noted with some tryophyte species. These plants must surely assist in soil development and we consider that a future study of the role of lichens in the recolonisation of the burnt area would be most valuable. We also wondered about the role of wind in the reformation of soils in the North End. We noted that the soils of the east side tended to be rich in mineral matter whereas those on the west side were more peaty. Perhaps this was due to the prevailing winds carrying granite dust from the exposed areas of the west side. Whatever the reason one would expect that recolonisation differed on the two soil types. There is some indication of such an east-west difference but the situation is unfortunately not clear cut.

We found it difficult to draw positive conclusions from our study. On the whole we find that after forty odd years it is difficult to pin-point factors contributing to the recolonisation of the North End. We regard our work as an essentially preliminary study of the floristic structure of the North End and of the patterns of its recolonisation. The main uses of the survey lie in the fact that it points out factors which apparently aren't contributing a great deal to floristic composition and thus were apparently relatively unimportant in recolonisation. We hope that we have eliminated most of the blind alleys and that someone will follow up the leads indicated in this report. The results of our computational work and field sjeets plus other details are available on request.

**References**


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**Results**

The results of the environmental measurements are expressed in Tables 1 to 4 below.

**Table I. Soil Depth (in cms)**

| Plot No. | Centre | Corner 1 | Corner 2 | Corner 3 | Corner 4 |
|---|---|---|---|---|---|
| 1 | 27 | 60 | 18 | 17 | 20 |
| 2 | 21 | 22 | 17 | 20 | 17 |
| 3 | 0 | 7 | 14 | 0 | 0·5 |
| 4 | 7 | 37 | 0 | 18 | 10 |
| 5 | 60 | 60 | 18 | 18 | 10 |
| 6 | 17 | 22 | 0 | 6 | 16 |
| 7 | 9 | 19 | 2 | 19 | 1 |
| 8 | 42 | 22 | 22 | 35 | 15 |
| 9 | 24 | 25 | 22 | 19 | 23 |
| 10 | 7 | 4 | 0 | 32 | 6 |
| 11 | 31 | 21 | 27 | 15 | 35 |
| 12 | 36 | 9 | 26 | 30 | 36 |
| 13 | 21 | 42 | 24 | 4 | 19 |
| 14 | 9 | 5 | 0·5 | 28 | 29 |
| 15 | 36 | 10 | 36 | 60 | 19 |
| 16 | 34 | 37 | 0 | 16 | 37 |
| 17 | 5 | 0 | 0 | 22 | 2 |
| 18 | 6 | 20 | 24 | 60 | 0 |
| 19 | 22 | 31 | 4 | 33 | 17 |

| Pot No. | Centre | Corner 1 | Corner 2 | Corner 3 | Corner 4 |
|---|---|---|---|---|---|
| 20 | 9 | 17 | 15 | 12 | 19 |
| 21 | 22 | 38 | 60 | 22 | 33 |
| 22 | 6 | 0 | 17 | 0·5 | 5 |
| 23 | 26 | 0 | 19 | 25 | 60 |
| 24 | 9 | 13 | 1 | 7 | 7 |
| 25 | 60 | 25 | 39 | 20 | 22 |
| 26 | 10 | 27 | 10 | 4 | 8 |
| 27 | 0 | 10 | 10 | 17 | 5 |
| 28 | 20 | 16 | 22 | 20 | 35 |
| 29 | 0 | 0 | 0 | 31 | 9 |
| 30 | 15 | 21 | 0·5 | 13 | 9 |
| 31 | 60 | 18 | 18 | 26 | 42 |
| 32 | 9 | 34 | 13 | 27 | 36 |
| 33 | 15 | 15 | 15 | 13 | 21 |
| 34 | 30 | 29 | 21 | 21 | 14 |
| 35 | 24 | 28 | 20 | 24 | 23 |
| 36 | 34 | 11 | 9 | 26 | 15 |
| 37 | 18 | 25 | 17 | 60 | 50 |
| 38 | 58 | 60 | 37 | 21 | 37 |
| 39 | 34 | 24 | 30 | 22 | 34 |
| 40 | 26 | 7 | 17 | 29 | 21 |

It should be noted that, in the above table, if a soil-depth of 60 cms. is recorded then this means that the actual depth is in excess of 60 cms.

**Table 2. Vegetation Height (in cms)**

| Plot No. | Position | | Height | Species |
|---|---|---|---|---|
| 1 | centre | | 1 | Armeria maritima (Thrift) |
| 1 | corner | 1 | 1 | ,, ,, |
| 1 | ,, | 2 | 5 | ,, ,, |
| 1 | ,, | 3 | 1 | ,, ,, |
| 1 | ,, | 4 | 1 | ,, ,, |
| 2 | centre | | 6 | Calluna vulgaris (Heather). |
| 2 | corner | 1 | 6 | ,, ,, |
| 2 | ,, | 2 | 0·5 | Festuca ovina (Sheep's Fescue) |
| 2 | ,, | 3 | 8 | Calluna vulgaris |
| 2 | ,, | 4 | 0·5 | Festuca ovina |
| 3 | centre | | 0 | —— |
| 3 | corner | 1 | 0 | —— |
| 3 | ,, | 2 | 10 | Holcus lanatus (Yorkshire Fog) |
| 3 | ,, | 3 | 0 | —— |
| 3 | ,, | 4 | 5 | Erica cinerea (Purple Heather) |
| 4 | centre | | 19 | Calluna vulgaris |
| 4 | corner | 1 | 20 | ,, ,, |
| 4 | ,, | 2 | 0 | —— |
| 4 | ,, | 3 | 3 | Festuca ovina |
| 4 | ,, | 4 | 2 | ,, ,, |
| 5 | centre | | 1 | ,, ,, |
| 5 | corner | 1 | 10 | Holcus lanatus |
| 5 | ,, | 2 | 10 | Calluna vulgaris |
| 5 | corner | 3 | 6 | Calluna vulgaris |
| 5 | ,, | 4 | 13 | ,, ,, |
| 6 | centre | | 0 | —— |

**Table 2 continued**

| Plot No. | Position | | Height | Species |
|---|---|---|---|---|
| 6 | corner | 1 | 5 | Calluna vulgaris |
| 6 | ,, | 2 | 6 | ,, ,, |
| 6 | ,, | 3 | 4 | ,, ,, |
| 6 | ,, | 4 | 0 | ——— |
| 7 | centre | | 0 | ——— |
| 7 | corner | 1 | 7 | Calluna vulgaris |
| 7 | ,, | 2 | 8 | ,, ,, |
| 7 | ,, | 3 | 2 | ,, ,, |
| 7 | ,, | 4 | 0 | ——— |
| 8 | centre | | 15 | Caluna vulgaris |
| 8 | corner | 1 | 8 | ,, ,, |
| 8 | ,, | 2 | 12 | ,, ,, |
| 8 | ,, | 3 | 9 | ,, ,, |
| 8 | ,, | 4 | 12 | ,, ,, |
| 9 | centre | | 0·5 | Sagina sp. Pearlwort) |
| 9 | corner | 1 | 3 | Calluna vulgaris |
| 9 | ,, | 2 | 4 | ,, ,, |
| 9 | ,, | 3 | 3 | ,, ,, |
| 9 | ,, | 4 | 0·5 | Festuca ovina |
| 10 | centre | | 3 | Calluna vulgaris |
| 10 | corner | 1 | 6 | ,, ,, |
| 10 | ,, | 2 | 0 | ——— |
| 10 | ,, | 3 | 13 | Calluna vulgaris |
| 10 | ,, | 4 | 4 | ,, ,, |
| 11 | centre | | 4 | Calluna vulgaris |
| 11 | corner | 1 | 4 | Holcus lanatus |
| 11 | ,, | 2 | 7 | Calluna vulgaris |
| 11 | ,, | 3 | 4 | ,, ,, |
| 11 | ,, | 4 | 8 | ,, ,, |
| 12 | centre | | 1 | Holcus lanatus |
| 12 | corner | 1 | 0·5 | Festuca ovina |
| 12 | ,, | 2 | 1 | Agrostis tenuis (Common Bent) |
| 12 | ,, | 3 | 0·5 | Festuca ovina |
| 12 | ,, | 4 | 2 | Holcus lanatus |
| 13 | centre | | 6 | Calluna vulgaris |
| 13 | corner | 1 | 1 | Festuca ovina |
| 13 | ,, | 2 | 10 | Calluna vulgaris |
| 13 | ,, | 3 | 10 | ,, ,, |
| 13 | ,, | 4 | 8 | ,, ,, |
| 14 | centre | | 3 | ,, ,, |
| 14 | corner | 1 | 6 | ,, ,, |
| 14 | ,, | 2 | 6 | ,, ,, |
| 14 | ,, | 3 | 13 | ,, ,, |
| 14 | ,, | 4 | 47 | Pteridium aquilinum (Bracken) |
| 15 | centre | | 55 | ,, ,, |
| 15 | corner | 1 | 0·5 | Armeria maritima |
| 15 | ,, | 2 | 0·5 | Festuca ovina |
| 15 | ,, | 3 | 90 | Juncus effusus (Soft Rush) |
| 15 | ,, | 4 | 8 | Erica cinerea |
| 16 | centre | | 0·5 | Sedum anglicum (English Stonecrop) |
| 16 | corner | 1 | 112 | Pteridium aquilinum |
| 16 | ,, | 2 | 0 | ——— |
| 16 | ,, | 3 | 0·5 | Festuca ovina |
| 16 | ,, | 4 | 0·5 | ,, ,, |
| 17 | centre | | 0 | ——— |

**Table 2 continued**

| Plot No. | Position | | Height | Species |
|---|---|---|---|---|
| 17 | corner | 1 | 0 | ——— |
| 17 | ,, | 2 | 0 | ——— |
| 17 | ,, | 3 | 1 | Calluna vulgaris |
| 17 | ,, | 4 | 0 | ——— |
| 18 | centre | | 0·5 | Holcus lanatus |
| 18 | corner | 1 | 10 | Calluna vulgaris |
| 18 | ,, | 2 | 13 | ,, ,, |
| 18 | ,, | 3 | 2 | Agrostis tenuis |
| 18 | ,, | 4 | 0 | ——— |
| 19 | centre | | 0·5 | ? |
| 19 | corner | 1 | 8 | Calluna vulgaris |
| 19 | ,, | 2 | 4 | ,, ,, |
| 19 | ,, | 3 | 21 | ,, ,, |
| 19 | ,, | 4 | 0 | ——— |
| 20 | centre | | 5 | Calluna vulgaris |
| 20 | corner | 1 | 1 | Ameria maritima |
| 20 | ,, | 2 | 1 | Festuca ovina |
| 20 | ,, | 3 | 2 | Calluna vulgaris |
| 20 | ,, | 4 | 8 | ,, ,, |
| 21 | centre | | 3 | Carex sp. (Sedge) |
| 21 | corner | 1 | 4 | Festuca ovina |
| 21 | ,, | 2 | 63 | Juncus effusus. |
| 21 | ,, | 3 | 1 | Festuca ovina |
| 21 | ,, | 4 | 5 | Holcus lanatus |
| 22 | centre | | 4 | Erica cinerea |
| 22 | corner | 1 | 0 | ——— |
| 22 | ,, | 2 | 3 | Erica cinerea |
| 22 | ,, | 3 | 0 | ——— |
| 22 | ,, | 4 | 0 | ——— |
| 23 | centre | | 1 | Festuca ovina |
| 23 | corner | 1 | 0 | ——— |
| 23 | ,, | 2 | 5 | Holcus lanatus |
| 23 | ,, | 3 | 1 | Festuca ovina |
| 23 | ,, | 4 | 40 | Juncus effusus |
| 24 | centre | | 7 | Calluna ulgaris |
| 24 | corner | 1 | 25 | Carex sp. |
| 24 | ,, | 2 | 0 | ——— |
| 24 | ,, | 3 | 11 | Calluna vulgaris |
| 24 | ,, | 4 | 0·5 | Sedum anglicum |
| 25 | centre | | 1 | Festuca ovina |
| 25 | corner | 1 | 2 | Holcus lanatus |
| 25 | ,, | 2 | 3 | Carex sp. |
| 25 | ,, | 3 | 5 | Calluna vulgaris |
| 25 | ,, | 4 | 10 | Carex sp. |
| 26 | centre | | 2 | Calluna vulgaris |
| 26 | corner | 1 | 12 | ,, ,, |
| 26 | ,, | 2 | 12 | ,, ,, |
| 26 | ,, | 3 | 0 | ——— |
| 26 | ,, | 4 | 0 | ——— |
| 27 | centre | | 3 | Calluna vulgaris |
| 27 | corner | 1 | 12 | ,, ,, |
| 27 | ,, | 2 | 16 | ,, ,, |
| 27 | ,, | 3 | 13 | ,, ,, |
| 27 | ,, | 4 | 0 | ,, ,, |
| 28 | centre | | 5 | Erica tetralix (Cross-leaved Heather) |

**Table 2 continued**

| Plot No. | Position | | Height | Species |
|---|---|---|---|---|
| 28 | corner | 1 | 6 | Calluna vulgaris |
| 28 | ,, | 2 | 2 | ,, ,, |
| 28 | ,, | 3 | 1 | Festuca ovina |
| 28 | ,, | 4 | 9 | Calluna vulgaris |
| 29 | centre | | 0 | —— |
| 29 | corner | 1 | 0 | —— |
| 29 | ,, | 2 | 0 | —— |
| 29 | ,, | 3 | 7 | Calluna vulgaris |
| 29 | ,, | 4 | 10 | ,, ,, |
| 30 | centre | | 17 | ,, ,, |
| 30 | corner | 1 | 13 | ,, ,, |
| 30 | ,, | 2 | 0 | —— |
| 30 | ,, | 3 | 11 | Erica tetralix |
| 30 | ,, | 4 | 11 | Calluna vulgaris |
| 31 | centre | | 2 | Carex sp. |
| 31 | corner | 1 | 20 | ,, ,, |
| 31 | ,, | 2 | 4 | Erica cinerea |
| 31 | ,, | 3 | 10 | Calluna vulgaris |
| 31 | ,, | 4 | 14 | ,, ,, |
| 32 | centre | | 8 | Calluna vulgaris |
| 32 | corner | 1 | 4 | ,, ,, |
| 32 | ,, | 2 | 9 | ,, ,, |
| 32 | ,, | 3 | 3 | Carex sp. |
| 32 | ,, | 4 | 7 | ,, ,, |
| 33 | centre | | 2 | Anthoxanthum odoratum (Scented Vernal Grass) |
| 33 | corner | 1 | 4 | Calluna vulgaris |
| 33 | ,, | 2 | 2 | Festuca ovina |
| 33 | ,, | 3 | 8 | Calluna vulgaris |
| 33 | ,, | 4 | 6 | Erica tetralix |
| 34 | centre | | 2 | Holcus lanatus |
| 34 | corner | 1 | 3 | Festuca ovina |
| 34 | ,, | 2 | 2 | ,, ,, |
| 34 | ,, | 3 | 2 | ,, ,, |
| 34 | ,, | 4 | 12 | Calluna vulgaris |
| 35 | centre | | 3 | Carex sp. |
| 35 | corner | 1 | 5 | Calluna vulgaris |
| 35 | ,, | 2 | 7 | Carex sp. |
| 35 | ,, | 3 | 10 | Pteridium aquilinum |
| 35 | ,, | 4 | 5 | Holcus lanatus |
| 36 | centre | | 0 | —— |
| 36 | corner | 1 | 0 | —— |
| 36 | ,, | 2 | 0 | —— |
| 36 | ,, | 3 | 1 | Calluna vulgaris |
| 36 | ,, | 4 | 17 | ,, ,, |
| 37 | centre | | 3 | Carex sp. |
| 37 | corner | 1 | 1 | Holcus lanatus |
| 37 | ,, | 2 | 2 | Festuca ovina |
| 37 | ,, | 3 | 4 | Carex sp. |
| 37 | ,, | 4 | 4 | Holcus lanatus |
| 38 | centre | | 3 | Carex sp. |
| 38 | corner | 1 | 19 | Juncus effusus |
| 38 | ,, | 2 | 4 | Festuca ovina |
| 38 | ,, | 3 | 3 | Carex sp. |
| 38 | ,, | 4 | 2 | ,, ,, |

**Table 2 continued**

| Plot No. | Position | | Height | Species |
|---|---|---|---|---|
| 39 | centre | | 47 | Pteridium aquilinum |
| 39 | corner | 1 | 33 | " " |
| 39 | " | 2 | 33 | " " |
| 39 | " | 3 | 37 | " " |
| 39 | " | 4 | 4 | Holcus lanatus |
| 40 | centre | | 2 | Festuca ovina |
| 40 | corner | 1 | 6 | Pteridium aquilinum |
| 40 | " | 2 | 5 | Anthoxanthum odoratum |
| 40 | " | 3 | 20 | Pteridium aquilinum |
| 40 | " | 4 | 16 | Anthoxanthum odoratum |

**Tables 3 and 4. Slope and Aspect (in degrees)**

| Plot No. | Slope | Aspect | Plot No. | Slope | Aspect |
|---|---|---|---|---|---|
| 1 | 27 | 348 | 2 | 2 | 124 |
| 3 | 5 | 180 | 4 | 3 | 158 |
| 5 | 18 | 90 | 6 | 2 | 222 |
| 7 | 4 | 78 | 8 | 2 | 142 |
| 9 | 1 | 218 | 10 | 8 | 88 |
| 11 | 2 | 56 | 12 | 4 | 156 |
| 13 | 5 | 210 | 14 | 8 | 116 |
| 15 | 2 | 112 | 16 | 32 | 156 |
| 17 | 3 | 236 | 18 | 6 | 96 |
| 19 | 3 | 142 | 20 | 4 | 360 |
| 21 | 4 | 70 | 22 | 6 | 359 |
| 23 | 3 | 6 | 24 | 3 | 48 |
| 25 | 5 | 45 | 26 | 4 | 39 |
| 27 | 3 | 342 | 28 | 1 | 48 |
| 29 | 3 | 108 | 30 | 3 | 80 |
| 31 | 4 | 20 | 32 | 5 | 260 |
| 33 | 4 | 12 | 34 | 4 | 336 |
| 35 | 6 | 342 | 36 | 10 | 90 |
| 37 | 4 | 318 | 38 | 3 | 0 |
| 39 | 5 | 0 | 40 | 1 | 20 |