INSTITUTE OF TERRESTRIAL ECOLOGY

(NATURAL ENVIRONMENT RESEARCH COUNCIL)

REPORT TO THE NATURE CONSERVANCY COUNCIL

ON

# THE INVERTEBRATE FAUNA OF DUNE AND MACHAIR SITES IN SCOTLAND

Vol II Part (3)

The Moray Firth

Site Dossiers

NCC/NERC Contract No. F3/03/62 : ITE Project No. 469

Monks Wood Experimental Station

Abbots Ripton

Huntingdon

Cambs

February 1979

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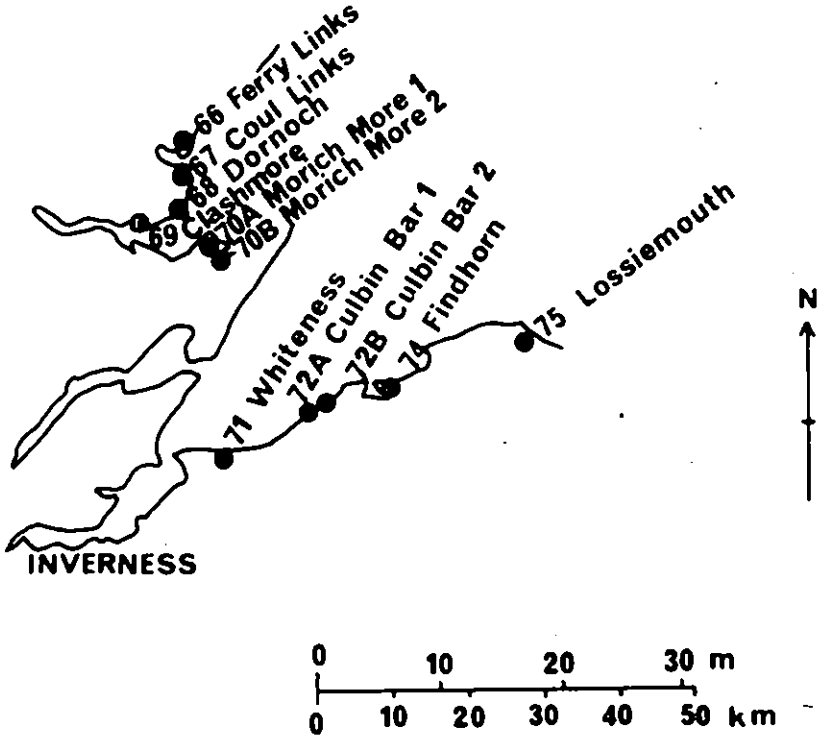
# Map 1

# Moray Firth



## SITES SURVEYED

The sites selected for survey are listed in Table 1 in numerical order. The numbering and names used for the sites follow those adopted by the personnel of ITE Project 340 "Survey of sand-dune and machair sites in Scotland" in agreement with the Nature Conservancy Council. The geographical position of each site is shown in Map 1. The site reports in this volume are arranged in numerical order, as in Table 1. Each site report has separate page numbers.

Table 1 - List of sites surveyed

| Site Number | Site Name | District |
|---|---|---|
| 66 | FERRY LINKS | Sutherland |
| 67 | COUL LINKS | Sutherland |
| 68 | DORNOCH | Sutherland |
| 69 | CLASHMORE | Sutherland |
| 70A | MORRICH MORE 1 | Ross and Cromarty |
| 70B | MORRICH MORE 2 | Ross and Cromarty |
| 71 | WHITENESS | Nairn |
| 72A | CULBIN BAR 1 | Moray |
| 72B | CULBIN BAR 2 | Moray |
| 74 | FINDHORN | Moray |
| 75 | LOSSIEMOUTH | Moray |

## SELECTION OF SITES

Twelve sites in Nairn, Moray and on the east coasts of Sutherland and Ross and Cromarty (Numbers 66-72 and 74-78 inclusive) were listed by the Nature Conservancy Council and were covered in the botanical survey made by ITE staff as part of ITE Project 340.

With the exception of the three Spey Bay sites (76-78, West, Central and East) all these sites were covered in the survey of invertebrates. Sites 76-78 were omitted because our colleagues on ITE Project 340 reported that none of these sites included any substantial area of sand dunes.

Two of the more extensive sites, Morrich More (Site 70) and Culbin Bar (Site 72) were subdivided. Two complete sets of traps were placed at each, in an attempt to sample the variety of terrain and aspect within these sites.

The programme of invertebrate survey was determined by the estimated functional life of the battery-powered light traps, approximately 7 or 8 nights in mid summer.

The selection of sampling sites was made by the participants of the first field trip - Miss H.A. Brundle and J.N. Greatorex-Davies. Prior to this survey a number of sites in the Moray Firth were visited by Dr M.G. Morris in August 1975 as a reconnaisance for the survey and collections of Coleoptera were made. Some records of additional species (Coleoptera) result from these visits by Dr Morris.

## SAMPLING PERIODS

Sampling was by means of a light trap and eight pitfall traps at each site (for description of this equipment see following section). A single light trap operated for eight nights at each site during sampling periods 1 and 3 only (see Table 2). The pitfall traps operated continuously during all three sampling periods.

Table 2 - Dates of sampling periods

Sites 74 and 75

| Sampling period | Dates |
|---|---|
| (1) | 15.6 - 23.6.77 |
| (2) | 23.6 - 13.7.77 |
| (3) | 13.7 - 21.7.77 |

Sites 71, 72A and 72B

| Sampling period | Dates |
|---|---|
| (1) | 16.6 - 24.6.77 |
| (2) | 24.6 - 14.7.77 |
| (3) | 14.7 - 22.7.77 |

Sites 66, 67, 68 and 69

| Sampling period | Dates |
|---|---|
| (1) | 17.6 - 25.6.77 |
| (2) | 25.6 - 15.7.77 |
| (3) | 15.7 - 23.7.77 |

Sites 70A and 70B

| Sampling period | Dates |
|---|---|
| (1) | 18.6 - 26.6.77 |
| (2) | 26.6 - 16.7.77 |
| (3) | 16.7 - 24.7.77 |

## DESCRIPTION OF TRAPPING EQUIPMENT

### Light trap

The specially designed, portable, ultra-violet light trap was powered by a 12 volt, rechargeable lead/acid battery. The light was automatically controlled by a solar switch set to turn the light on at dusk and off at dawn. The catch of moths was killed inside the trap by vapours from "Mafu" strips and collected only at the end of the sampling period. One light trap was placed at each site.

### Pitfall traps

A pitfall trap consisted of a conical plastic beaker of the following approximate internal dimensions: diameter of mouth 75 mm, diameter of base 55 mm, height 105 mm. Three small drainage holes were made 30 mm from the mouth of the beaker to facilitate the run-off of any excess rainwater that might accumulate in the trap. Each trap was charged with approximately 10 cl. of commercial grade 1, 2 Ethanediol (Ethylene Glycol) as a preservative and killing agent at the beginning of each sampling period. Each pitfall trap was placed in a hole in the ground so that the lip of the beaker was flush with the soil surface. Eight pitfall traps, arranged in pairs were placed at each site. On most sites the pairs of traps were positioned about 10 metres apart, with 6 metres between the individual traps of a pair.

## SITE VEGETATION

The description of the vegetation at each site was made at the time of the site selection, ie during the first sampling period in the second half of June. At the end of July, at the time of the second visit, additional species of flowers were recorded. Estimates of the extent of bare ground were made mainly during the first trapping period.

## PERSONNEL

| | |
|---|---|
| ITE Nominated Officer: | Dr M.G. Morris |
| Project leader: | Dr E.A.G. Duffey |
| Identification | |
| Lepidoptera: | J.N. Greatorex-Davies |
| Coleoptera:Carabidae: | Dr R.C. Welch and P.E. Jones |

| | |
|---|---|
| Coleoptera:Hydrophilidae to Scolytidae: | Dr R.C. Welch |
| Aranaea: | R.G. Snazell |
| Mollusca: | D. Green[1] |
| Diplopoda: | A.J.B. Beaumont[2] and J.G. Blower[3] |
| Terrestrial Isopoda: | P.T. Harding |

Field work

| | |
|---|---|
| 1st Trip: | Miss H.A. Brundle and J.N. Greatorex-Davies |
| 2nd Trip: | Miss H.A. Brundle and W.E. Rispin |

Site reports

| | |
|---|---|
| Editor: | P.T. Harding |
| General Introduction: | P.T. Harding and Miss H.A. Brundle |
| Description and siting: | Miss H.A. Brundle and J.N. Greatorex-Davies |
| Lepidoptera: | J.N. Greatorex-Davies |
| Coleoptera:Carabidae: | Dr R.C. Welch |
| :Hydrophilidae to Scolytidae: | Dr R.C. Welch |
| Aranaea: | R.G. Snazell and Dr E.A.G. Duffey |
| Mollusca: | P.T. Harding and Dr R.A.D. Cameron[4] |
| Diplopoda: | P.T. Harding |
| Terrestrial Isopoda: | P.T. Harding |
| Additional species: | Dr R.C. Welch |
| Maps: | R.A. Plant, Miss H.A. Brundle and Miss S. Knight[5] |
| Data handling: | G.J. Moller and J.N. Greatorex-Davies |
| General assistance: | R.A. Plant and Miss H.A. Brundle |

Pitfall trap catches

| | |
|---|---|
| Sorting: | R.A. Plant, W.E. Rispin and J.N. Greatorex-Davies |
| Maintenance of material: | R.A. Plant |

Equipment

| | |
|---|---|
| Equipment supervision: | W.E. Rispin |
| Light trap manufacture: | T.E. Hughes (Entech Services)[6] |

Special adviser on light traps: J. Heath

Transport of equipment: P.T. Harding, G.J. Moller and S. Porter(7)

Secretarial assistance: Mrs D.S. Plant and Mrs G. Sanderson

Notes:

(1): Sandwich course student, Trent Polytechnic.

(2): Undergraduate student, Manchester University.

(3): Zoology Department, Manchester University.

(4): Department of Extramural Studies, Birmingham University.

(5): Sandwich course student, Luton College of Higher Education.

(6): Entech Services, 46 Mersey View, Liverpool.

(7): Sandwich course student, Brunel University.

ACKNOWLEDGEMENTS

Storage and maintenance facilities for equipment were generously provided by the Nature Conservancy Council at their Achantoul, Aviemore office. Thanks are due to staff of NCC at Achantoul and Inverness, particularly Dr P.J. Tilbrook and Mrs J.C. Weston, for help with arranging access to sites and maintaining equipment.

Our colleagues engaged on ITE Project 340 have given invaluable help with information about sites, maps and data handling.

CONTENTS OF SITE REPORTS

3.1 Lepidoptera

3.2 Coleoptera : Carabidae

3.3 Coleoptera : Hydrophilidae to Scolytidae

3.4 Aranaea

3.5 Mollusca (Land snails)

3.6 Diplopoda

3.7 Terrestrial Isopoda

4. ADDITIONAL SPECIES

## REFERENCE

The following publications are referred to in the texts of the site reports.

ALLEN, A.A. (1969). Notes on some British Scydmaenidae (Col.) with corrections to the list. Entomologists' Rec. J. Var. 81, 239-246.

BUCK, F.D. (1954). Handbk. Ident. Brit. Insects, 5 (9) Coleoptera:Lagriidae to Meloidae.

COOMBES, C.W. & WOODROFFE, G. (1955). A revision of the British species of Cryptophagus (Herbst) (Coleoptera:Cryptophagidae). Trans. R. ent. Soc. Lond., 106, 237-282.

CROWSON, R.A. (1956). Some records of Scottish Coleoptera during the years 1953-1955. Scot. Nat., 68, 74-83.

FOWLER, W.W. (1889). The Coleoptera of the British Isles, Vol. III, London Reeve.

FOWLER, W.W. (1891). The Coleoptera of the British Isles, Vol. V, London Reeve.

HAMMOND, P.M. (1972 (1973)). Notes on the British Staphylinidae 3. The British species of Sepedophilus Gistel (Conosomus Auctt.). Entomologist's mon. Mag., 108, 130-165.

LINDROTH, C.H. (1974). Handbk. Ident. Br. Insects. (4) 2, Coleoptera, Carabidae.

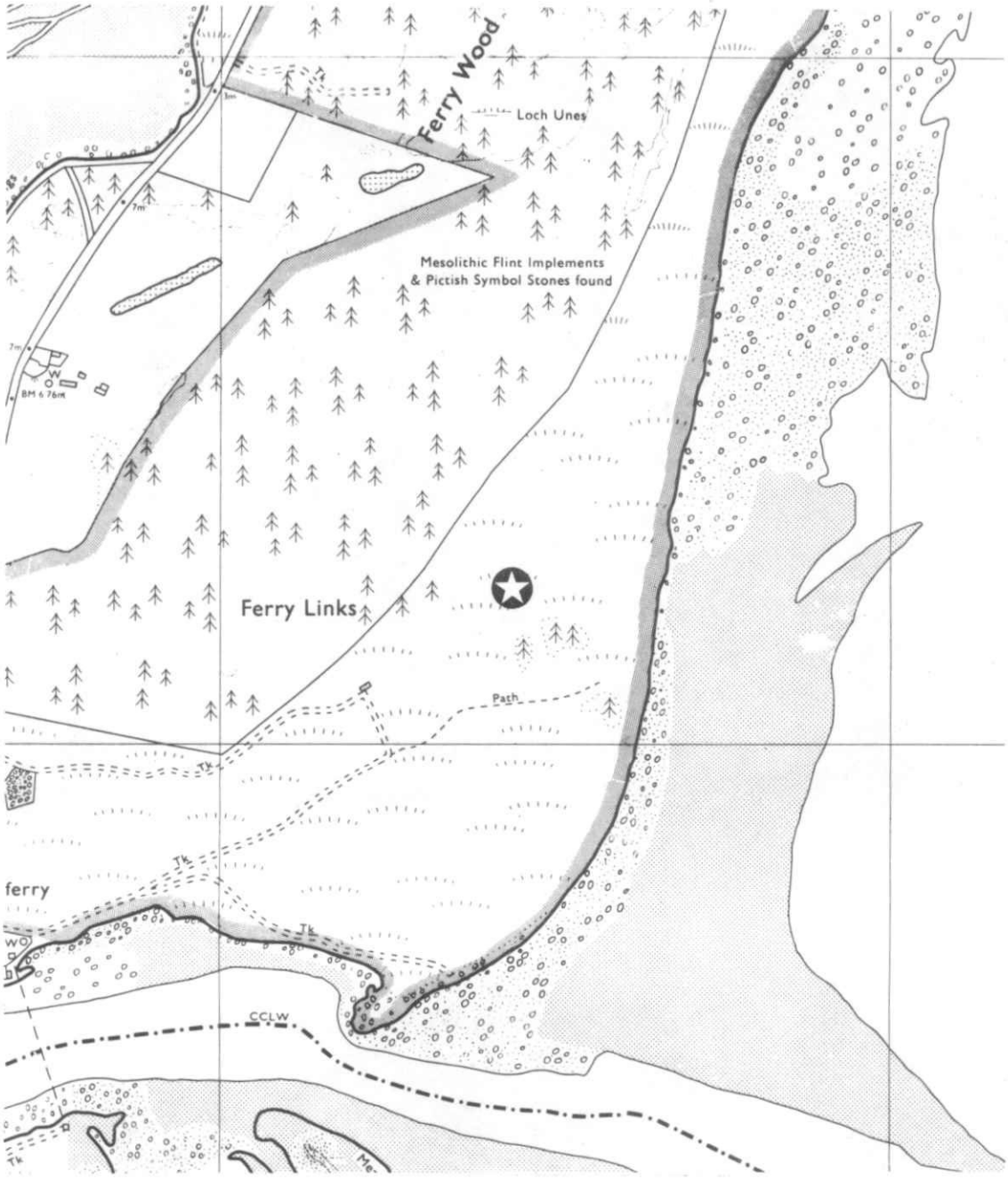
MOORE, B.P. (1957). The British Carabidae (Coleoptera) Part 2: The county distribution of the species. Entomologist's Gaz. 8, 171-180.

MURRAY, A. (1853). Catalogue of the Coleoptera of Scotland, Edinburgh, Blackwood.

SOUTH, R. (1961). The moths of the British Isles, 2 vols., London, Warne.

# Site 66 Ferry Links

# Site 66 Ferry Links




0 500 Metres
0 500 Yards

Light trap & pitfall traps

SITE 66

FERRY LINKS

1. DESCRIPTION OF SAMPLED SITE

1.1 Topography

The site consisted of a well established, flat dune meadow on the landward side of a narrow, low dune ridge.

1.2 Vegetation

The vegetation surrounding the traps was dominated by Ammophila arenaria (60%) in a degenerate state and fine grasses. There were patches of moss and scattered clumps of Empetrum nigrum, and no bare ground. The height of the A. arenaria was 50 cm with the other vegetation being 30 cm.. A fallen dead tree (Pinus sp.) was near pitfall trap pair 4. Other species of plants near the traps were: Potentilla anserina, Thalictrum arenaria, Taraxacum officinale, Veronica officinale, Ulex sp., Lotus corniculatus, Rumex crispus, Viola tricolor, Galium verum and Pinus sylvestris.

1.3 Disturbance

The area was subject to light grazing by rabbits and to some human disturbance. An air-gun pellet was found in one of the marker stakes and the remains of a bonfire was seen nearby, but there was no actual damage done to the traps.

1.4 Distance from sea

The light trap and the pair of pitfall traps were placed approximately 100 metres from the shore, along a 30 metre transect.

2. SITING OF LIGHT TRAP AND PITFALL TRAPS

2.1 Selection of site

Heavy public use of the area to the south, towards Littleferry, determined that the traps should be placed away from the dune ridges which otherwise would have been a more suitable sampling area.

2.2 Damage or malfunction

The light trap operated from 17 - 25.6.77 and 15 - 23.7.77 and was functional at the end of both periods when tested. The pitfall traps

were all functional during the whole of each of the three periods 17 - 25.6.77, 25.6. - 15.7.77 and 15 - 23.7.77. On 15.7.77 dead shrews (Sorex sp.) were found in traps 1B (2 specimens) and 3A (1 specimen).

2.3 Colour slides available

Box 2, 40-44.

3. THE FAUNA

3.1 Lepidoptera

| | JUNE | JULY | TOTAL |
|---|---|---|---|
| Epirrhoe alternata | 0 | 2 | 2 |
| Epirrhoe galiata | 1 | 1 | 2 |
| Cosmorhoe ocellata | 0 | 7 | 7 |
| Chloroclysta citrata | 0 | 1 | 1 |
| Thera obeliscata | 4 | 4 | 8 |
| Colostygia pectinataria | 0 | 3 | 3 |
| Perizoma albulata | 0 | 1 | 1 |
| Eupithecia absinthiata/gooseniata | 0 | 1 | 1 |
| Eupithecia icterata | 0 | 2 | 2 |
| Eupithecia distinctaria | 0 | 1 | 1 |
| Semiothisa liturata | 0 | 1 | 1 |
| Gnophos obfuscatus | 0 | 5 | 5 |
| Deilephila porcellus | 1 | 0 | 1 |
| Arctia caja | 0 | 3 | 3 |
| Agrotis vestigialis | 0 | 6 | 6 |
| Agrotis clavis | 1 | 38 | 39 |
| Agrotis exclamationis | 0 | 2 | 2 |
| Noctua comes | 0 | 3 | 3 |
| Lycophotia porphyrea | 1 | 39 | 40 |
| Diarsia mendica | 0 | 5 | 5 |
| Hada nana | 5 | 2 | 7 |
| Cerapteryx graminis | 0 | 10 | 10 |
| Mythimna conigera | 0 | 2 | 2 |
| Mythimna impura | 0 | 25 | 25 |
| Mythimna comma | 1 | 1 | 2 |
| Rusina ferruginea | 19 | 1 | 20 |
| Thalpophila matura | 0 | 11 | 11 |
| Apamea monoglypha | 0 | 20 | 20 |

| | JUNE | JULY | TOTAL |
|---|---|---|---|
| Apamea furva | 0 | 1 | 1 |
| Oligia fasciuncula | 0 | 11 | 11 |
| Hoplodrina alsines/blanda | 0 | 17 | 17 |
| TOTAL | 33 | 226 | 259 |

This site produced a rather modest species list and a fairly poor total catch compared with other Moray Firth and East Coast sites although the trap functioned satisfactorily over both periods.

Agrotis vestigialis was the only typical sand dune species represented. It was trapped extensively and often commonly at many sites, especially on the North Coast.

A few of the species recorded were scarce or absent elsewhere. Eupithecia icterata, which feeds on Achillea millefolium, was taken only at this site. Chloroclysta citrata occurred elsewhere only at Site 56. Epirrhoe galiata (which feeds on Galium spp.) and Eupithecia distinctaria (which feeds on Thymus drucei) were only caught at Moray Firth sites. Eupithecia distinctaria only occurred elsewhere at Site 70B.

A number of other species are restricted to a limited range of larval food plants. Epirrhoe alternata, Cosmorhoe ocellata and Deilephila porcellus feed on Galium spp.; the last also takes Epilobium spp. and Lythrum salicaria. Thera obeliscata feeds on Pinus sylvestris and other conifers and Semiothisa liturata feeds on Pinus sylvestris and Larix decidua. Perizoma albulata feeds on the seeds of Rhinanthus minor. Lycophotia porphyrea feeds on Calluna vulgaris and Erica spp.. Gnophos obfuscatus feeds on Calluna vulgaris and Genista anglica and, according to South (1961), is confined to Scotland in Britain.

3.2 Coleoptera : Carabidae

| | JUNE | JN/JL | JULY | TOTAL |
|---|---|---|---|---|
| Cychrus caraboides | 0 | 1 | 0 | 1 |
| Broscus cephalotes | 0 | 1 | 0 | 1 |
| Pterostichus niger | 0 | 1 | 0 | 1 |
| Calathus erratus | 0 | 0 | 1 | 1 |
| Calathus fuscipes | 1 | 29 | 4 | 34 |
| Calathus melanocephalus | 0 | 2 | 0 | 2 |
| Harpalus latus | 0 | 1 | 1 | 2 |
| Badister bipustulatus | 1 | 1 | 0 | 2 |
| TOTAL | 2 | 36 | 6 | 44 |

With the exception of Calathus fuscipes, very low numbers of carabids were captured. Broscus cephalotes and C. erratus are indicative of a sandy coastal area. A single larva of Dromius sp. was trapped during the second sampling period. No adults of this genus were taken.

3.3 Coleoptera : Hydrophilidae to Scolytidae

| | JUNE | JN/JL | JULY | TOTAL |
|---|---|---|---|---|
| Leiodes dubia/obesa | 0 | 2 | 2 | 4 |
| Choleva fragniezi | 0 | 1 | 0 | 1 |
| Sciodrepoides watsoni | 0 | 12 | 0 | 12 |
| Catops grandicollis | 0 | 2 | 0 | 2 |
| Catops morio | 0 | 2 | 0 | 2 |
| Nicrophorus humator | 0 | 1 | 0 | 1 |
| Nicrophorus investigator | 0 | 1 | 0 | 1 |
| Scydmoraphes helvolus | 0 | 1 | 0 | 1 |
| Stenichnus collaris | 0 | 5 | 0 | 5 |
| Xantholinus linearis | 0 | 1 | 0 | 1 |
| Quedius molochinus | 0 | 4 | 0 | 4 |
| Mycetoporus rufescens | 0 | 1 | 0 | 1 |
| Mycetoporus splendidus | 1 | 0 | 0 | 1 |
| Bolitobius analis | 0 | 1 | 0 | 1 |
| Sepedophilus nigripennis | 2 | 7 | 1 | 10 |
| Atheta gagatina | 0 | 1 | 0 | 1 |
| Drusilla canaliculata | 0 | 7 | 3 | 10 |
| Agriotes acuminatus | 0 | 1 | 0 | 1 |
| Cryptophagus setulosus | 0 | 5 | 0 | 5 |
| Atomaria atricapilla | 0 | 1 | 0 | 1 |
| Corticaria crenulata | 1 | 3 | 0 | 4 |
| Corticaria umbilicata | 1 | 0 | 0 | 1 |
| Otiorhynchus ovatus | 2 | 0 | 0 | 2 |
| TOTAL | 7 | 59 | 6 | 72 |

Coastal species were poorly represented by only a few specimens of Corticaria crenulata, Leiodes dubia and Otiorhynchus ovatus. Sepedophilus nigripennis, although a widespread species, is known to be occasionally common in moss on sand dunes.

The most numerous species, Sciodrepoides watsoni, together with the species of Catops and Nicrophorus, are indicative of the presence of carrion at the site.

Drusilla canaliculata which was also taken as a larva in the second and third trapping periods, is a non-obligate myrmecophile. Cryptophagus setulosus is thought to inhabit the nests of humble bees.

The record of the rare Scydmoraphes helvolus (see Allen, 1969) is of interest since this probably represents its most northerly known locality in Britain, and may even be the first record from Scotland. This is also the most northerly site at which Sepedophilus nigripennis was trapped during this survey and is north of the localities mapped by Hammond (1973) for this species.

3.5 Araneae

| | JUNE | JN/JL | JULY | TOTAL |
|---|---|---|---|---|
| Zelotes pusillus | 8 | 9 | 2 | 19 |
| Gnaphosa leporina | 0 | 7 | 0 | 7 |
| Micaria pulicaria | 0 | 3 | 1 | 4 |
| Pardosa pullata | 28 | 42 | 5 | 75 |
| Pardosa nigriceps | 2 | 2 | 0 | 4 |
| Alopecosa pulverulenta | 24 | 13 | 2 | 39 |
| Hahnia nava | 2 | 6 | 0 | 8 |
| Steatoda phalerata | 0 | 5 | 0 | 5 |
| Robertus lividus | 3 | 0 | 0 | 3 |
| Pachygnatha degeeri | 1 | 2 | 0 | 3 |
| Walckenaera acuminata | 0 | 1 | 0 | 1 |
| Walckenaera antica | 1 | 0 | 0 | 1 |
| Walckenaera melanocephala | 0 | 2 | 0 | 2 |
| Hypomma bituberculatum | 0 | 1 | 0 | 1 |
| Trichopterna thorelli | 2 | 3 | 0 | 5 |
| Tiso vagans | 0 | 1 | 0 | 1 |
| Erigone atra | 1 | 0 | 0 | 1 |
| Agyneta subtilis | 2 | 6 | 0 | 8 |
| Agyneta decora | 3 | 0 | 0 | 3 |
| Centromerus dilutus | 1 | 0 | 0 | 1 |
| Lepthyphantes mengei | 4 | 1 | 1 | 6 |
| TOTAL | 82 | 104 | 11 | 197 |

Zelotes pusillus and Micaria pulicaria are both species normally taken in dry open areas and are more common in southern Britain than in the north. Steatoda phalerata is normally restricted to drier grasslands and heaths and although widespread is rarely abundant. It was taken at nearly all the Moray Firth sites but only at three East Coast

sites. Gnaphosa leporina was recorded at only five sites during the survey, all these being in the Moray Firth group. The species is widespread but only recorded common on some southern heathlands.

Robertus lividus is common and very widespread in grassland, mountain and woodland habitats but prefers damp situations and was taken at two sites during the survey. Walckenaera melanocephala is widely recorded but usually few specimens are taken except in grassy and heathery places in the south of England. Trichopterna thorelli occurs in moss and grass, and is rather local in distribution although common on wet heathland in the south. Hypomma bituberculatum may be taken in a variety of rather wet habitat types but also often occurs on sand dunes. The remaining species are all common in grassland.

3.5 Mollusca (Land snails)

No land snails were recorded at this site

3.6 Diplopoda

| | JUNE | JN/JL | JULY | TOTAL |
|---|---|---|---|---|
| Julus scandinavius | 2 | 17 | 3 | 22 |

Julus scandinavius is associated with areas good amounts of vegetation litter are present and is not infrequently recorded for stabilised areas on sand dunes.

3.7 Terrestrial Isopoda

| | JUNE | JN/JL | JULY | TOTAL |
|---|---|---|---|---|
| Porcellio scaber | 2 | 23 | 4 | 29 |

Porcellio scaber is widely recorded on sandy soils.

4. ADDITIONAL SPECIES

4.1 Neuroptera : Coniopterygidae

The following species was recorded by Dr R.C. Welch

Conwentzia psociformis, 25.6. - 15.7.77 single specimens in pitfall traps 2A and 3A.

4.2 Lepidoptera

The following species were observed in the field during the course of the survey:

Lycaenidae

Polyommatus icarus

Nymphalidae

Argynnis aglaja

Satyridae

Hipparchia semele

Maniola jurtina

Coenonympha pamphilus

4.3 Coleoptera

The following species were recorded by Dr M.G. Morris on 2.8.1975.

Apionidae

Apion dichroum, under Trifolium repens.

Curculionidae

Philopedon plagiatus, dead on sand.

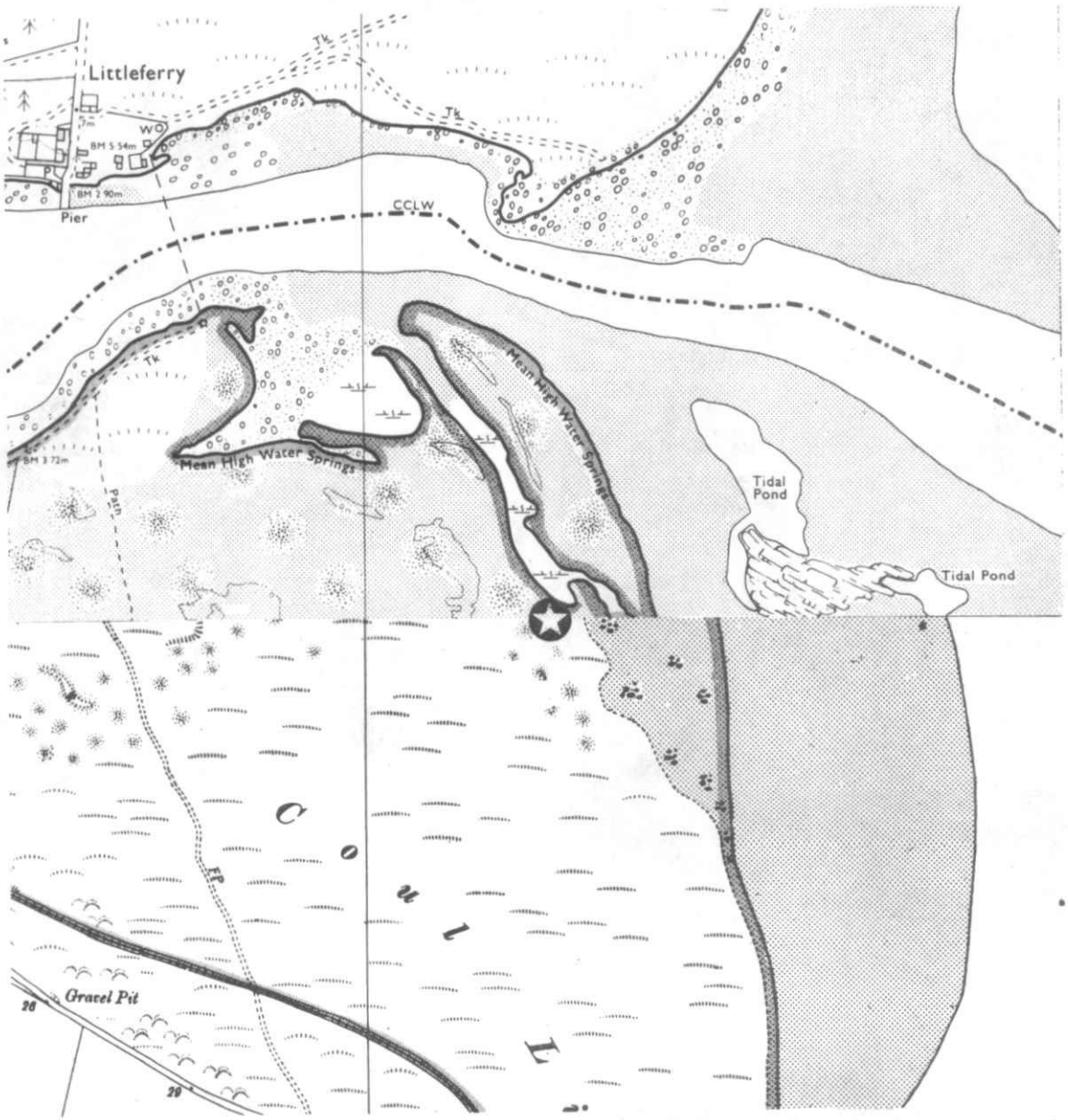
Sitona lineellus, under Lotus corniculatus.

S. regensteinensis, beating Ulex europaeus.

Micrelus ericae, sweeping Calluna vulgaris.

# Site 67 Coul Links

# Site 67 Coul Links




0 500 Metres
0 500 Yards

★ Light trap & pitfall traps


I.T.E. (N.E.R.C.) Bangor

# SITE 67

## COUL LINKS

### 1. DESCRIPTION OF SAMPLED SITE

#### 1.1 Topography

The site consisted of an extensive dune system ranging from low fore dunes and 7 - 10 metres high yellow dunes to well established scrub-covered areas further inland. The marram transition zone was particularly extensive and consisted of dunes 7 - 10 metres high.

#### 1.2 Vegetation

The vegetation surrounding the traps was dominated by Ammophila arenaria (50%), with fine grasses and Lotus corniculatus. There was no bare ground. The height of the A. arenaria was about 50 cm. with the other vegetation at about 20 cm.. Other species of plants in the sampling area included: Senecio jacobaea, Holcus lanatus, Hieracium sp. Rosa pimpinellifolia, Veronica chamaedrys, Veronica officinalis, Galium verum, Trifolium repens, Festuca sp., Elymus arenarius, Plantago lanceolata, Cochlearia officinalis, Armeria maritima, Viola tricolor, Achillea millefolium, Thymus drucei, Glaux maritima, Anthyllis vulneraria and Sedum acre.

#### 1.3 Disturbance

There was evidence of light grazing by rabbits. A private track crossed the site. It led to a pier on the edge of the site which was used by anglers.

#### 1.4 Distance from sea

The traps were placed approximately 200 metres inland from the shore along a 30 metre transect parallel to it.

### 2. SITING OF LIGHT TRAP AND PITFALL TRAPS

#### 2.1 Selection of site

The area chosen for sampling was bounded on the landward side by a fence which marked the limit of cattle grazing and on the seaward side by a dry salt marsh in an inlet and the marram transition zone behind yellow dunes. It was decided to place the traps to the landward side of the salt marsh area, although many other areas would have been suitable on such an extensive site.

2.2 Damage or malfunction

The light trap operated from 17 - 25.6.77 and 15 - 23.7.77. On 25.6.77 the solar switch was not functional but as the trap contained several moths, including one that was still alive, it is possible that the trap had functioned throughout most of the period. The trap was functional on 23.7.77 when tested. The pitfall traps were all functional during the whole of each of the three periods 17 - 25.6.77, 25.6. - 15.7.77 and 15 - 23.7.77. On 15.7.77, pitfall trap 1B was found to contain a dead shrew (Sorex sp.).

2.3 Colour slides available

Box 2, 45-52.

3. THE FAUNA

3.1 Lepidoptera

| | JUNE | JULY | TOTAL |
|---|---|---|---|
| Hepialus fusconebulosa | 4 | 0 | 4 |
| Macrothylacia rubi | 1 | 0 | 1 |
| Scotopteryx chenopodiata | 0 | 41 | 41 |
| Scotopteryx luridata | 0 | 4 | 4 |
| Camptogramma bilineata | 0 | 1 | 1 |
| Cosmorhoe ocellata | 0 | 5 | 5 |
| Chloroclysta citrata | 0 | 1 | 1 |
| Thera obeliscata | 0 | 2 | 2 |
| Colostygia pectinataria | 0 | 5 | 5 |
| Perizoma blandiata | 0 | 1 | 1 |
| Perizoma albulata | 0 | 5 | 5 |
| Eupithecia absinthiata/goossensiata | 0 | 1 | 1 |
| Eupithecia nanata | 0 | 1 | 1 |
| Cleorodes lichenaria | 0 | 1 | 1 |
| Campaea margaritata | 0 | 1 | 1 |
| Gnophos obfuscatus | 0 | 4 | 4 |
| Deilephila porcellus | 1 | 0 | 1 |
| Dasychira fascelina | 0 | 1 | 1 |
| Arctia caja | 0 | 5 | 5 |
| Agrotis vestigialis | 0 | 1 | 1 |
| Agrotis clavis | 11 | 17 | 28 |
| Agrotis exclamationis | 0 | 3 | 3 |
| Noctua pronuba | 0 | 2 | 2 |

| | JUNE | JULY | TOTAL |
|---|---|---|---|
| Noctua comes | 0 | 3 | 3 |
| Lycophotia porphyrea | 2 | 10 | 12 |
| Diarsia mendica | 0 | 2 | 2 |
| Xestia sexstrigata | 0 | 1 | 1 |
| Hada nana | 26 | 1 | 27 |
| Lacanobia oleracea | 0 | 2 | 2 |
| Ceramica pisi | 0 | 1 | 1 |
| Cerapteryx graminis | 0 | 8 | 8 |
| Mythimna conigera | 0 | 10 | 10 |
| Mythimna impura | 0 | 35 | 35 |
| Mythimna comma | 1 | 1 | 2 |
| Blepharita adusta | 1 | 0 | 1 |
| Rusina ferruginea | 11 | 0 | 11 |
| Thalpophila matura | 0 | 51 | 51 |
| Apamea monoglypha | 0 | 19 | 19 |
| Apamea furva | 0 | 1 | 1 |
| Oligia fasciuncula | 0 | 5 | 5 |
| Mesoligia literosa | 0 | 1 | 1 |
| Mesapamea secalis | 0 | 1 | 1 |
| Hoplodrina alsines/blanda | 0 | 37 | 37 |
| Plusia festucae | 0 | 1 | 1 |
| TOTAL | 58 | 292 | 350 |

This site produced a fairly large species list but a relatively low total catch compared with other sites on the Moray Firth and East Coast.

Agrotis vestigialis a common sand dune species was trapped extensively and often commonly at many sites, especially on the North Coast.

A few species were scarce elsewhere. Chloroclysta citrata was taken elsewhere only at Site 66. Cleorodes lichenaria which feeds on lichens only occurred elsewhere at Site 70B and Campamea margaritata, a woodland species, occurred at Site 90.

This was the only mainland site at which Perizoma blandiata occurred. It feeds on the flowers and seeds of Euphrasia spp. and was taken at several sites in the Hebrides. A number of other species are restricted to a limited range of larval food plants. Hepialus fusconebulosa feeds on the roots of Pteridium aquilinum and was trapped

widely at a number of sites. Cosmorhoe ocellata and Deilephila porcellus feed on Galium spp.; the latter also feeds on Epilobium spp. and Lythrum salicaria. Scotopteryx luridata feeds on Sarothamnus scoparius and Ulex spp.. Thera obeliscata feeds on Pinus sylvestris and some other conifers. Perizoma albulata feeds on Rhinanthus minor. The following species feed on Calluna vulgaris: Eupithecia nanata, Lycophotia porphyrea (also on Erica spp.) and Gnophos obfuscatus (also on Genista anglica). According to South (1961) G. obfuscatus is confined to Scotland, in Britain.

3.2 Coleoptera : Carabidae

| | JUNE | JN/JL | JULY | TOTAL |
|---|---|---|---|---|
| Notiophilus aquaticus | 0 | 1 | 1 | 2 |
| Dyschirius globosus | 6 | 7 | 0 | 13 |
| Calathus fuscipes | 0 | 17 | 15 | 32 |
| Calathus melanocephalus | 0 | 3 | 4 | 7 |
| Amara aenea | 0 | 1 | 0 | 1 |
| Harpalus latus | 2 | 1 | 0 | 3 |
| Badister bipustulatus | 1 | 1 | 0 | 2 |
| TOTAL | 9 | 31 | 20 | 60 |

This was one of only three non-Hebridean sites (the others being 90 and 93) at which Dyschirius globosus was taken during this survey, however this is a very eurytopic species of moist open ground.

3.3 Coleoptera : Hydrophilidae to Scolytidae

| | JUNE | JN/JL | JULY | TOTAL |
|---|---|---|---|---|
| Leiodes dubia/obesa | 0 | 5 | 1 | 6 |
| Agathidium laevigatum | 0 | 0 | 1 | 1 |
| Choleva oblonga | 1 | 0 | 0 | 1 |
| Catops fuliginosus | 1 | 8 | 0 | 9 |
| Stenichnus collaris | 3 | 0 | 0 | 3 |
| Anthobium atrocephalum | 0 | 1 | 0 | 1 |
| Stenus brunnipes | 1 | 1 | 0 | 2 |
| Stenus clavicornis | 0 | 1 | 0 | 1 |
| Xantholinus linearis | 0 | 4 | 0 | 4 |
| Quedius molochinus | 1 | 0 | 1 | 2 |
| Quedius semiobscurus | 1 | 1 | 0 | 2 |
| Sepedophilus nigripennis | 1 | 7 | 1 | 9 |
| Tachyporus chrysomelinus | 1 | 3 | 0 | 4 |
| Aloconota gregaria | 0 | 1 | 0 | 1 |

| | JUNE | JN/JL | JULY | TOTAL |
|---|---|---|---|---|
| Amischa analis | 0 | 2 | 0 | 2 |
| Amischa cavifrons | 1 | 0 | 0 | 1 |
| Geostiba circellaris | 1 | 0 | 0 | 1 |
| Atheta atramentaria | 0 | 1 | 0 | 1 |
| Drusilla canaliculata | 3 | 27 | 8 | 38 |
| Oxypoda islandica | 0 | 2 | 0 | 2 |
| Serica brunnea | 0 | 1 | 1 | 2 |
| Agriotes acuminatus | 1 | 3 | 0 | 4 |
| Cryptophagus setulosus | 0 | 1 | 0 | 1 |
| Nephus redtenbacheri | 0 | 1 | 0 | 1 |
| Corticaria crenulata | 0 | 2 | 0 | 2 |
| Corticaria umbilicata | 0 | 4 | 2 | 6 |
| Corticarina fuscula | 2 | 4 | 1 | 7 |
| Apion loti | 0 | 3 | 0 | 3 |
| Strophosomus sus | 0 | 1 | 0 | 1 |
| Sitona lineellus | 4 | 3 | 0 | 7 |
| TOTAL | 22 | 87 | 16 | 125 |

Drusilla canaliculata, a species with an apparent non-obligate association with various ant species, was the most abundant species recorded, with its larvae also being collected in the first two sampling periods.

The remaining species do not show any particularly strong affinities. Coastal, or psammophile species such as Leiodes dubia, Serica brunnea, Corticaria crenulata and possibly C. umblicata were poorly represented in the catch. Phytophagous species include Sitona lineellus which feeds on Trifolium spp., Apion loti on Lotus corniculatus, and Strophosomus sus on Erica spp. and Calluna vulgaris.

Catops fuliginosus occurs in carrion and in the nests and runs of small mammals. Choleva fragniezi is also associated with small mammal nests and runs and Cryptophagus setulosus occurs in bees nests.

3.4 Araneae

| | JUNE | JN/JL | JULY | TOTAL |
|---|---|---|---|---|
| Drassodes cupreus | 1 | 0 | 0 | 1 |
| Haplodrassus signifer | 7 | 10 | 0 | 17 |
| Zelotes pusillus | 2 | 6 | 0 | 8 |
| Gnaphosa leporina | 1 | 3 | 1 | 5 |
| Micaria pulicaria | 0 | 1 | 0 | 1 |

| | JUNE | JN/JL | JULY | TOTAL |
|---|---|---|---|---|
| Clubiona neglecta | 1 | 0 | 0 | 1 |
| Pardosa monticola | 1 | 1 | 0 | 2 |
| Pardosa pullata | 46 | 77 | 20 | 143 |
| Pardosa nigriceps | 1 | 1 | 1 | 3 |
| Alopecosa pulverulenta | 35 | 11 | 1 | 47 |
| Trochosa terricola | 0 | 0 | 1 | 1 |
| Hahnia nava | 9 | 4 | 0 | 13 |
| Steatoda phalerata | 0 | 3 | 1 | 4 |
| Pachygnatha degeeri | 4 | 1 | 0 | 5 |
| Walckenaera acuminata | 0 | 1 | 0 | 1 |
| Walckenaera melanocephala | 1 | 0 | 0 | 1 |
| Dismodicus bifrons | 1 | 0 | 0 | 1 |
| Trichopterna thorelli | 0 | 1 | 0 | 1 |
| Pelecopsis parallela | 1 | 0 | 0 | 1 |
| Minyriolus pusillus | 0 | 1 | 0 | 1 |
| Agyneta subtilis | 1 | 2 | 0 | 3 |
| Agyneta conigera | 0 | 1 | 0 | 1 |
| TOTAL | 112 | 124 | 25 | 261 |

Both Zelotes pusillus and Micaria pulicaria are spiders of dry open areas and are rather more common in the south of Britain than the north. Gnaphosa leporina is a widespread but uncommon species, very often associated with heathland in the south. It was taken at several of the Moray Firth sites but nowhere else. Clubiona neglecta is widely distributed in Britain in both a widespread and very damp and dry vegetation and is very often found on sand dunes. Steatoda phalerata occurs throughout Britain but is only locally common. It was taken on most of the Moray Firth sites and at three along the East Coast. It is usually found in places with dry grass or heather. Walckenaera melanocephala occurs in similar places to the previous species but may be fairly common on heathland in the south of England. Pelecopsis parallela and Minyriolus pusillus are both common grassland spiders, the former being abundant on chalk grassland. Both species were taken at several sites in the Moray Firth area but not elsewhere. Trichopterna thorelli is a widespread but local species associated with damp places where there is grass and moss. It may be common on wet heathland in southern England. The remaining species are all taken commonly in grassland.

3.5 Mollusca (Land snails)

| | JUNE | JN/JL | JULY | TOTAL |
|---|---|---|---|---|
| Punctum pygmaeum | 1 | 0 | 0 | 1 |
| Euconulus fulvus | 0 | 0 | 1 | 1 |
| Candidula intersecta | 0 | 7 | 7 | 14 |
| Trichia striolata | 0 | 0 | 6 | 6 |
| Cepaea hortensis | 2 | 6 | 2 | 10 |
| TOTAL | 3 | 13 | 16 | 32 |

The greatest number of species taken at a site in the Moray Firth group was recorded here, although in common with all the sites in the group, it was a poor catch in terms of numbers of individuals. Punctum pygmaeum was recorded elsewhere only at Site 74. This is also in the Moray Firth. Euconulus fulvus was recorded elsewhere only at Site 58, on the North Coast. The remaining species are fairly typical of well vegetated dune areas. Candidula intersecta is believed to have been introduced to the British Isles in Roman times, or later.

3.6 Diplopoda

| | JUNE | JN/JL | JULY | TOTAL |
|---|---|---|---|---|
| Julus scandinavius | 2 | 18 | 4 | 24 |
| Cylindroiulus latestriatus | 7 | 18 | 3 | 28 |
| TOTAL | 9 | 36 | 7 | 52 |

Cylindroiulus latestriatus is common on sandy coasts throughout Britain. Julus scandinavius is not infrequently recorded from stabilised areas on sand dunes where accumulations of litter are present.

3.7 Terrestrial Isopoda

| | JUNE | JN/JL | JULY | TOTAL |
|---|---|---|---|---|
| Philoscia muscorum | 1 | 0 | 0 | 1 |
| Porcellio scaber | 1 | 8 | 0 | 9 |
| TOTAL | 2 | 8 | 0 | 10 |

Porcellio scaber is recorded widely on dry sandy soils, but Philoscia muscorum, although common on sand dunes, was not recorded elsewhere at sites in the Moray Firth. P. muscorum appears to be restricted to coastal areas and river valleys in Scotland.

4. ADDITIONAL SPECIES

4.1 Neuroptera : Coniopterygidae

The following species was recorded by R.A. Plant:

Conwentzia psociformis, 18 - 25.6.76, one specimen in pitfall trap 3B

4.2 Lepidoptera

The following species were recorded in the field during the course of the survey:

Lycaenidae

Polyommatus icarus

Nymphalidae

Aglais urticae

Satyridae

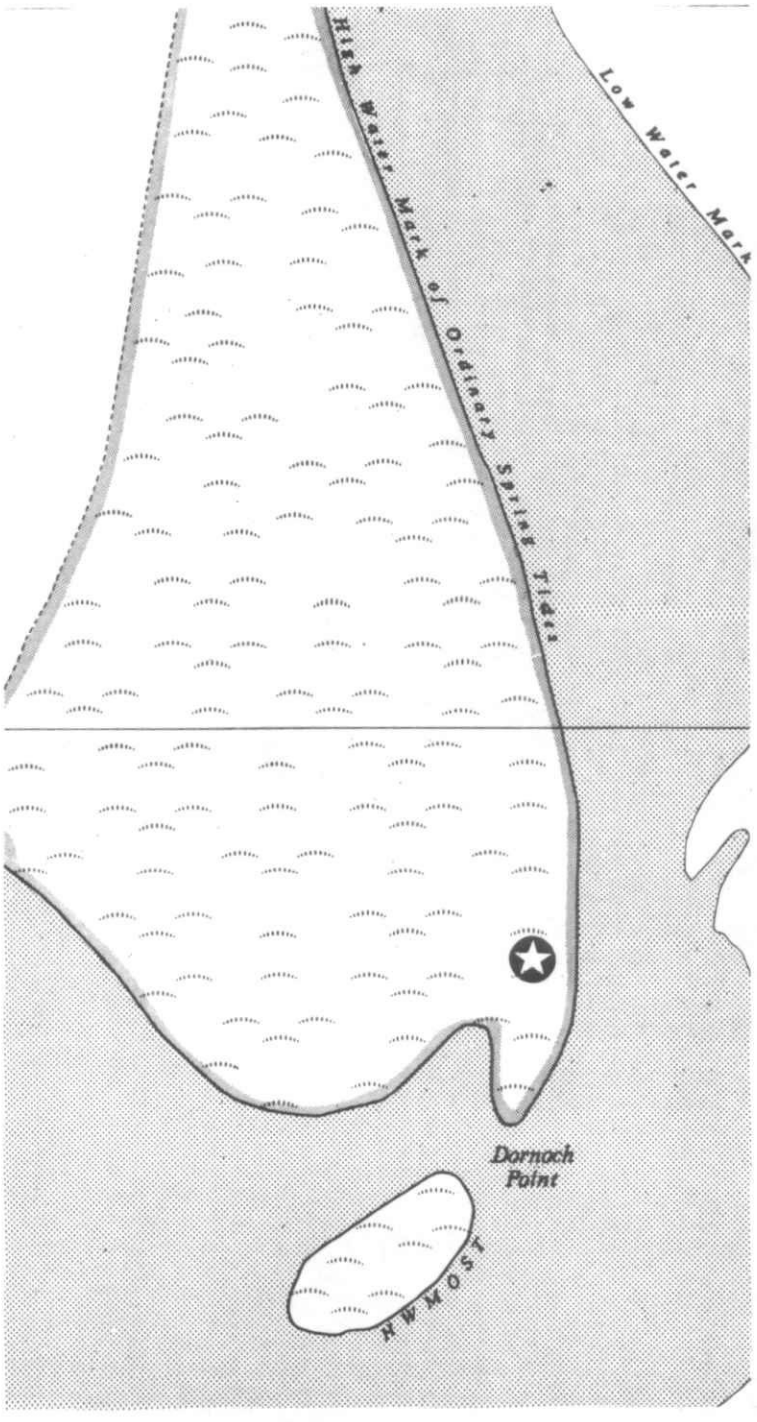
Hipparchia semele

Maniola jurtina

Coenonympha pamphilus

# Site 68 Dornoch

# Site 68 Dornoch




0 500 Metres
0 500 Yards

Light trap & pitfall traps

# SITE 68

## DORNOCH

### 1. DESCRIPTION OF SAMPLED SITE

#### 1.1 Topography

The site consisted of a spit of narrow dune ridges, approximately 5 metres high, with an extensive flat area of salt marsh and meadow on the landward side.

#### 1.2 Vegetation

The vegetation surrounding the traps was predominately grasses (80%) with Ammophila arenaria, Agropyron sp. and Elymus arenarius. There were patches of mosses and 10% bare ground. The height of the marram was 75 cm, with the other vegetation at 10 cm. The following plants were seen near the traps:

Lotus corniculatus
Taraxacum officinale
Cirsium vulgare
Myosotis sp.
Bellis perennis
Festuca sp.
Senecio jacobaea
Astragalus danicus
Cakile maritima
Glaux maritima
Holcus lanatus

#### 1.3 Disturbance

The sampling area was accessible by a little used track, and there was not much evidence of use of the area by the public. There were a few signs of rabbit grazing.

#### 1.4 Distance from sea

The light trap and pitfall traps were placed approximately 50-100 metres from the shore line, along a 30 metres transect at right angles to the shore.

### 2. SITING OF LIGHT TRAP AND PITFALL TRAPS

#### 2.1 Reasons for selection

Having taken advice about the siting of the light trap from Local Authority personnel, the traps were placed in the marram transition zone south of a small airstrip on the salt marsh/meadow area. This area had the advantage of being well away from a large caravan site about

one mile to the north.

2.2 Damage or malfunction

The light trap operated from 17 - 25.6.77 and was still functioning on the last day of the period. It operated from 15 - 23.7.77 and was still functioning on 23rd, but several moth wings were found around the trap suggesting that some moths had been eaten by a predator. The pitfall traps were all functional during the whole of each of the three periods 17 - 25.6.77, 25.6 - 15.7.77 and 15 - 23.7.77. One dead shrew was found in each of pitfall traps 1B and 3A, on 15.7.77.

2.3 Colour slides available

Box 2, 53-58.

3. THE FAUNA

3.1 Lepidoptera

| | JUNE | JULY | TOTAL |
|---|---|---|---|
| Xanthorhoe munitata | 0 | 33 | 33 |
| Xanthorhoe fluctuata | 1 | 0 | 1 |
| Scotopteryx chenopodiata | 0 | 1 | 1 |
| Scotopteryx luridata | 0 | 1 | 1 |
| Epirrhoe alternata | 0 | 1 | 1 |
| Camptogramma bilineata | 0 | 27 | 27 |
| Cosmorhoe ocellata | 0 | 12 | 12 |
| Colostygia pectinataria | 0 | 5 | 5 |
| Perizoma albulata | 0 | 13 | 13 |
| Eupithecia centauriata | 0 | 5 | 5 |
| Eupithecia absinthiata/goossensiata | 0 | 2 | 2 |
| Eupithecia vulgata | 1 | 0 | 1 |
| Bupalus piniaria | 0 | 2 | 2 |
| Deilephila porcellus | 2 | 0 | 2 |
| Eilema lurideola | 0 | 503 | 503 |
| Arctia caja | 0 | 10 | 10 |
| Agrotis vestigialis | 0 | 1 | 1 |
| Agrotis exclamationis | 0 | 4 | 4 |
| Noctua pronuba | 0 | 1 | 1 |
| Noctua comes | 0 | 6 | 6 |
| Lycophotia porphyrea | 0 | 36 | 36 |
| Diarsia rubi | 0 | 7 | 7 |
| Xestia sexstrigata | 0 | 2 | 2 |
| Hada nana | 1 | 0 | 1 |

| | JUNE | JULY | TOTAL |
|---|---|---|---|
| Lacanobia oleracea | 0 | 9 | 9 |
| Ceramica pisi | 0 | 1 | 1 |
| Cerapteryx graminis | 0 | 12 | 12 |
| Mythimna impura | 0 | 77 | 77 |
| Cucullia umbratica | 0 | 1 | 1 |
| Rusina ferruginea | 7 | 0 | 7 |
| Thalpophila matura | 0 | 40 | 40 |
| Apamea monoglypha | 0 | 295 | 295 |
| Apamea crenata | 0 | 3 | 3 |
| Apamea furva | 0 | 1 | 1 |
| Apamea remissa | 0 | 5 | 5 |
| Oligia fasciuncula | 0 | 25 | 25 |
| Mesoligia literosa | 0 | 2 | 2 |
| Mesapamea secalis | 0 | 18 | 18 |
| Hoplodrina alsines/blanda | 0 | 3 | 3 |
| Diachrysia chrysitis | 0 | 1 | 1 |
| Autographa bractea | 0 | 6 | 6 |
| Abrostola triplasia | 0 | 1 | 1 |
| TOTAL | 12 | 1172 | 1184 |

This site produced a good species list and the second highest total catch of the survey. Eilema lurideola, the most abundant species (42%) was collected elsewhere only at Sites 70B, 86 and 87 but in very small numbers. The larvae feed on lichens and algae growing on trees and bushes which were apparently absent from the site. Apamea monoglypha (25%) was also abundant, as in many other places. It was the most widely trapped species of the survey.

Agrotis vestigialis is a sand dune species and was extensively caught and often common at many sites especially on the North Coast.

A few species were absent or scarce elsewhere. Cucullia umbratica was not recorded at other sites; it feeds on Sonchus spp. and Lactuca spp.. Diarsia rubi occurred elsewhere only at Site 71, and Xanthorhoe fluctuata only at Sites 27 and 74.

Several species are restricted to a limited range of larval food plants. Epirrhoe alternata, Cosmorhoe ocellata and Deilephila porcellus feed on Galium spp.; the last species also feeds on Epilobium spp. and Lythrum salicaria. Scotopteryx luridata feeds on Sarothamnus scoparius and Ulex spp., Perizoma albulata feeds on the seeds of Rhinanthus minor, and

Bupalus piniaria on conifers. Abrostola triplasia feeds on Urtica dioica, as does Diachrysia chrysitis which also feeds on a few other common species.

3.2 Coleoptera : Carabidae

| | JUNE | JN/JL | JULY | TOTAL |
|---|---|---|---|---|
| Leistus rufescens | 14 | 30 | 0 | 44 |
| Notiophilus aquaticus | 0 | 1 | 0 | 1 |
| Calathus erratus | 0 | 5 | 2 | 7 |
| Calathus fuscipes | 0 | 31 | 4 | 35 |
| Calathus melanocephalus | 4 | 64 | 16 | 84 |
| Calathus mollis | 3 | 7 | 3 | 13 |
| Amara aenea | 0 | 1 | 0 | 1 |
| Badister bipustulatus | 0 | 1 | 0 | 1 |
| Dromius notatus | 0 | 1 | 0 | 1 |
| TOTAL | 21 | 141 | 25 | 187 |

The presence of Leistus rufescens in such large numbers in the earlier samples is unusual since it is regarded by Lindroth (1974) as the most hygrophilous species of the genus. The later samples show a preponderance of Calathus species with C. melanocephalus the most numerous. Dromius notatus is a mainly coastal species of well vegetated sandy soils and this capture is more northerly than any recorded by Moore (1957).

3.3 Coleoptera : Hydrophilidae to Scolytidae

| | JUNE | JN/JL | JULY | TOTAL |
|---|---|---|---|---|
| Megasternum obscurum | 0 | 1 | 0 | 1 |
| Leiodes dubia/obesa | 0 | 1 | 3 | 4 |
| Agathidium laevigatum | 0 | 7 | 0 | 7 |
| Catops chrysomeloides | 0 | 1 | 0 | 1 |
| Catops fuliginosus | 0 | 4 | 0 | 4 |
| Catops grandicollis | 0 | 2 | 0 | 2 |
| Catops kirbii | 3 | 0 | 0 | 3 |
| Catops morio | 0 | 2 | 0 | 2 |
| Anotylus sculpturatus | 0 | 1 | 0 | 1 |
| Stenus impressus | 0 | 1 | 0 | 1 |
| Xantholinus linearis | 1 | 0 | 0 | 1 |
| Quedius humeralis | 1 | 1 | 0 | 2 |
| Quedius semiobscurus | 0 | 1 | 0 | 1 |

| | JUNE | JN/JL | JULY | TOTAL |
|---|---|---|---|---|
| Quedius tristis | 0 | 0 | 1 | 1 |
| Mycetoporus piceolus | 1 | 2 | 0 | 3 |
| Mycetoporus splendidus | 2 | 5 | 0 | 7 |
| Sepedophilus nigripennis | 9 | 65 | 5 | 79 |
| Tachyporus chrysomelinus | 1 | 7 | 0 | 8 |
| Tachinus corticinus | 1 | 0 | 1 | 2 |
| Amischa analis | 2 | 0 | 0 | 2 |
| Atheta clientula | 0 | 1 | 0 | 1 |
| Atheta fungi | 0 | 4 | 0 | 4 |
| Atheta orbata | 0 | 4 | 0 | 4 |
| Atheta exigua | 1 | 0 | 0 | 1 |
| Oxypoda haemorrhoa | 1 | 0 | 0 | 1 |
| Oxypoda umbrata | 0 | 1 | 0 | 1 |
| Simplocaria semistriata | 3 | 0 | 0 | 3 |
| Meligethes erythropus | 0 | 7 | 0 | 7 |
| Atomaria nitidula | 0 | 2 | 0 | 2 |
| Coccidula rufa | 2 | 2 | 0 | 4 |
| Aridius nodifer | 0 | 0 | 1 | 1 |
| Corticaria crenulata | 22 | 28 | 1 | 51 |
| Corticaria umbilicata | 3 | 11 | 2 | 16 |
| Corticarina fuscula | 6 | 17 | 1 | 24 |
| Longitarsus suturellus | 2 | 4 | 0 | 6 |
| Apion carduorum | 2 | 0 | 0 | 2 |
| Apion loti | 2 | 4 | 3 | 9 |
| Otiorhynchus atroapterus | 5 | 3 | 1 | 9 |
| Sitona lineellus | 2 | 2 | 0 | 4 |
| TOTAL | 72 | 191 | 19 | 282 |

The unusual fauna was dominated by Sepedophilus nigripennis and Corticaria crenulata. The former is widely distributed and more usually found in fairly moist habitats although it is known to be locally common in moss on sand dunes. C. crenulata is primarily a coastal species and it is possible that C. umbilicata is more abundant in such situations, but Corticarina fuscula occurs generally in decaying vegetable material. Psammophile species such as Otiorhynchus atroapterus, Leiodes dubia and Atheta exigua were present in small numbers. The five species of Catops may indicate the presence of carrion although none of the more specific carrion-frequenting Coleoptera were trapped. Two

dead shrews were found in the traps at the end of the second period.

Of the phytophagous species collected Apion loti and Meligethes erythropus feed on Lotus corniculatus, Longitarsus suturellus on Senecio spp., Sitona lineellus on Trifolium spp.; and Apion carduorum on thistles.

3.4 Araneae

| | JUNE | JN/JL | JULY | TOTAL |
|---|---|---|---|---|
| Drassodes cupreus | 2 | 6 | 0 | 8 |
| Haplodrassus signifer | 2 | 1 | 0 | 3 |
| Zelotes pusillus | 10 | 12 | 3 | 25 |
| Clubiona neglecta | 0 | 1 | 0 | 1 |
| Heliophanus flavipes | 1 | 0 | 0 | 1 |
| Pardosa pullata | 17 | 32 | 3 | 52 |
| Pardosa nigriceps | 3 | 8 | 3 | 14 |
| Alopecosa pulverulenta | 7 | 4 | 2 | 13 |
| Arctosa perita | 0 | 2 | 0 | 2 |
| Walckenaera acuminata | 2 | 3 | 1 | 6 |
| Hypomma bituberculatum | 0 | 2 | 0 | 2 |
| Pocadicnemis pumila | 0 | 4 | 0 | 4 |
| Oedothorax retusus | 0 | 2 | 0 | 2 |
| Trichopterna thorelli | 5 | 7 | 1 | 13 |
| Gongylidiellum vivum | 0 | 1 | 0 | 1 |
| Agyneta conigera | 2 | 1 | 0 | 3 |
| Agyneta decora | 3 | 9 | 0 | 12 |
| Microlinyphia pusilla | 0 | 1 | 0 | 1 |
| TOTAL | 54 | 96 | 13 | 163 |

The lycosids made up 49.7% of the catch at this site with Pardosa pullata the most abundant species and P. nigriceps also present in some numbers. The former is a very common spider of grassy habitats with a preference for damper areas; the latter is more characteristic of habitats with longer vegetation. Zelotes pusillus is widespread in dry situations and may be common on heathland. Clubiona neglecta and Hypomma bituberculatum are both widespread although the former is seldom common; both are frequently taken on sand dunes. Arctosa perita is a lycosid which is restricted to sand dunes and dry sandy places such as bare, open heathland. The salticid Heliophanus flavipes which is generally common in grassland, was taken here and at four other sites

as far south as Site 80. Although a widespread species, Trichopterna thorelli is rather local in distribution but may be common on wet heathland further south in Britain. The remaining species all occur commonly in grassland.

3.5 Mollusca (Land snails)

| | JUNE | JN/JL | JULY | TOTAL |
|---|---|---|---|---|
| Vitrina pellucida | 0 | 4 | 9 | 13 |

The catch was very poor. Vitrina pellucida is typically associated with fixed dunes with little bare ground.

3.6 Diplopoda

No Diplopoda were recorded at this site.

3.7 Terrestrial Isopoda

No terrestrial Isopoda were recorded at this site.

4. ADDITIONAL SPECIES

4.1 Lepidoptera

The following species were observed in the field during the course of the survey:

Zygaenidae

Zygaena filipendulae

Lycaenidae

Polyommatus icarus

Satyridae

Hipparchia semele

Maniola jurtina

Coenonympha pamphilus

4.2 Coleoptera : Curculionidae

The following species were recorded under Anthyllis vulneraria by Dr M.G. Morris on 2.8.1975.

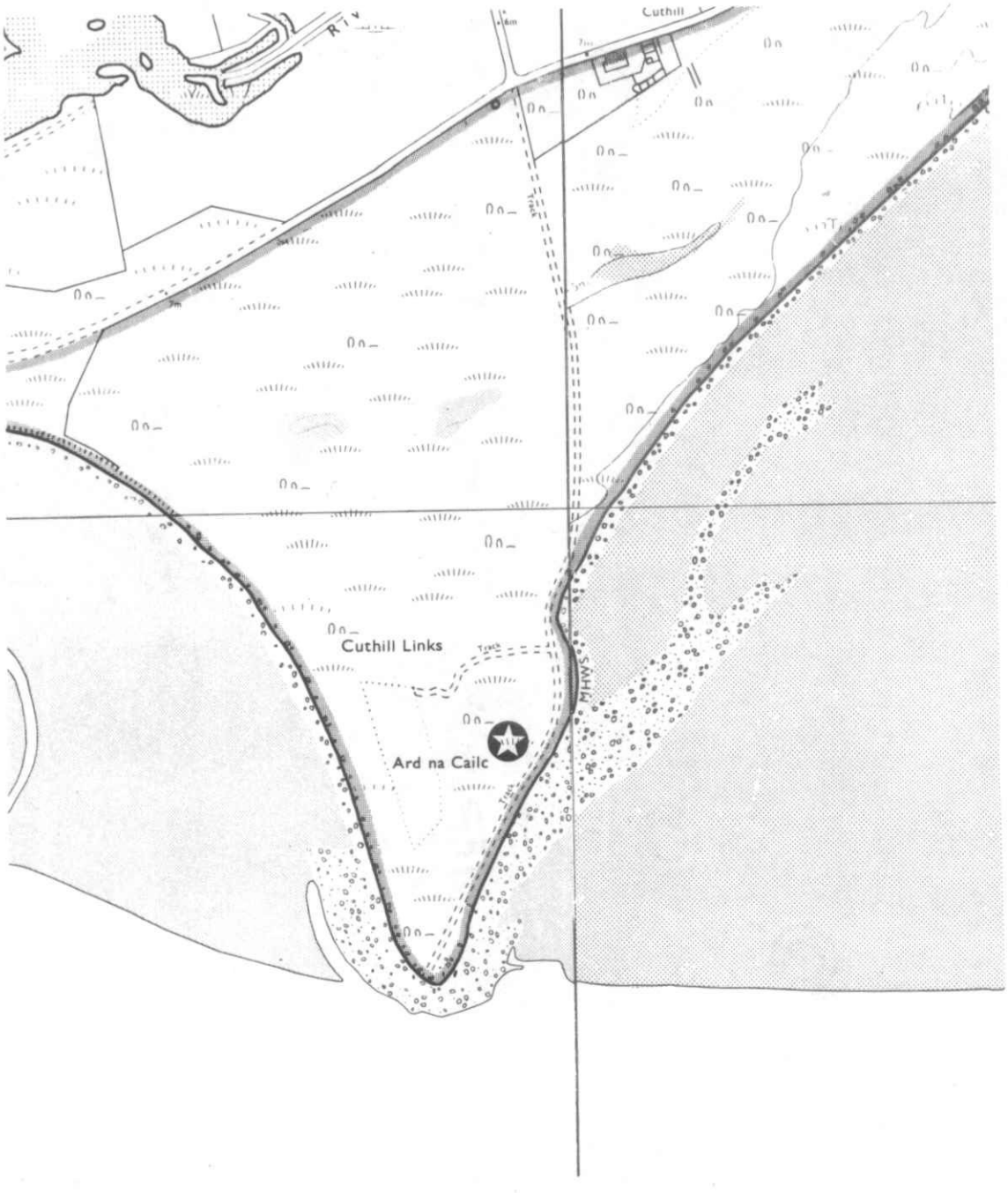
Sitona griseus

S. lepidus

Hypera venusta

# Site 69 Clashmore

# Site 69 Clashmore




0 500 Metres
0 500 Yards

Light trap & pitfall traps

# SITE 69

## CLASHMORE

### 1. DESCRIPTION OF SAMPLED SITE

#### 1.1 Topography

The site consisted of an old dune system of gently undulating ridges and hollows on a shingle base. There were no high dunes.

#### 1.2 Vegetation

Much of the site, as a whole, was covered with scrub of Calluna vulgaris, Ulex sp. and Rosa pimpinellifolia. The vegetation of the sampling area was dominated by Calluna vulgaris and Erica sp. at a height of 30 cm.. Ammophila arenaria made up 10% of the cover and reached 50 cm. in height. Much of the ground was covered with mosses and lichens, and apart from rabbit scrapes, there was no bare ground. Other plants in the sampling area included: Senecio jacobaea, Viola sp., Hieracium sp., Thymus drucei, Galium boreale, Luzula sp., Veronica officinalis, V. chamaedrys, Lotus corniculatus, Achillea millefolium and Ulex sp..

#### 1.3 Disturbance

There were many rabbits in the area. A footpath passed near the sampling site, but it appeared to be little used.

#### 1.4 Distance from sea

The light trap and pitfall traps were placed in a 30 metre transect parallel to, and 50 metres from, the shore.

### 2. SITING OF LIGHT TRAP AND PITFALL TRAPS

#### 2.1 Selection of site

The whole site was covered with scrub. An area with some marram grass and the least amount of Ulex sp. was chosen. A large gull colony and areas of burnt gorse further inland eliminated much of the site as a suitable trapping area.

#### 2.2 Damage or malfunction

The light trap operated from 17 - 25.6.77 and 15 - 23.7.77 and was functional at the end of both periods when tested. The pitfall traps

were all functional during the whole of each of the three sampling periods 17 - 25.6.77, 25.6. - 15.7.77 and 15 - 23.7.77, except trap 2B which, on 15.7.77, was empty, having been dug up, probably by rabbits. A number of traps contained small mammals:

| | | |
|---|---|---|
| 25.6.77 | Trap 1A | 2 Sorex sp.. |
| | Trap 2A | 1 Sorex sp.. |
| | Trap 2B | 1 Sorex sp.. |
| 15.7.77 | Trap 1A | 5 Sorex sp.. |
| | Trap 2A | 1 Sorex sp.. |
| | Trap 3B | 2 Sorex sp.. |

2.3 Colour slides available

Box 2, 59-63.

3. THE FAUNA

| 3.1 Lepidoptera | JUNE | JULY | TOTAL |
|---|---|---|---|
| Scotopteryx luridata | 0 | 2 | 2 |
| Epirrhoe alternata | 0 | 1 | 1 |
| Camptogramma bilineata | 0 | 2 | 2 |
| Pelurga comitata | 0 | 1 | 1 |
| Cosmorhoe ocellata | 0 | 13 | 13 |
| Cidaria fulvata | 0 | 1 | 1 |
| Thera obeliscata | 0 | 2 | 2 |
| Colostygia pectinataria | 0 | 9 | 9 |
| Eupithecia centauriata | 0 | 7 | 7 |
| Eupithecia absinthiata/goossensiata | 0 | 5 | 5 |
| Eupithecia vulgata | 2 | 0 | 2 |
| Eupithecia nanata | 2 | 7 | 9 |
| Gymnoscelis rufifasciata | 1 | 0 | 1 |
| Semiothisa liturata | 0 | 1 | 1 |
| Bupalus piniaria | 0 | 5 | 5 |
| Cabera pusaria | 0 | 1 | 1 |
| Hylaea fasciaria | 0 | 1 | 1 |
| Gnophos obfuscatus | 0 | 10 | 10 |
| Dyscia fagaria | 5 | 1 | 6 |
| Laothoe populi | 0 | 1 | 1 |
| Deilephila porcellus | 1 | 0 | 1 |
| Dasychira fascelina | 0 | 1 | 1 |
| Arctia caja | 0 | 29 | 29 |

| | JUNE | JULY | TOTAL |
|---|---|---|---|
| Agrotis vestigialis | 0 | 10 | 10 |
| Agrotis exclamationis | 2 | 16 | 18 |
| Noctua pronuba | 0 | 1 | 1 |
| Noctua comes | 0 | 5 | 5 |
| Lycophotia porphyrea | 19 | 288 | 307 |
| Diarsia mendica | 0 | 4 | 4 |
| Anarta myrtilli | 1 | 0 | 1 |
| Hada nana | 12 | 3 | 15 |
| Lacanobia oleracea | 0 | 4 | 4 |
| Hadena confusa | 3 | 1 | 4 |
| Cerapteryx graminis | 0 | 1 | 1 |
| Mythimna conigera | 0 | 5 | 5 |
| Mythimna impura | 0 | 6 | 6 |
| Mythimna comma | 0 | 2 | 2 |
| Blepharita adusta | 1 | 1 | 2 |
| Acronicta rumicis | 1 | 0 | 1 |
| Rusina ferruginea | 14 | 0 | 14 |
| Thalpophila matura | 0 | 3 | 3 |
| Apamea monoglypha | 0 | 207 | 207 |
| Apamea lithoxylaea | 0 | 2 | 2 |
| Apamea furva | 0 | 3 | 3 |
| Apamea remissa | 0 | 1 | 1 |
| Photedes minima | 0 | 1 | 1 |
| Hoplodrina alsines/blanda | 0 | 13 | 13 |
| Syngrapha interrogationis | 0 | 1 | 1 |
| TOTAL | 64 | 678 | 742 |

This site produced a good species list and an above average total catch compared with other sites on the Moray Firth and East Coast. The most abundant species was Lycophotia porphyrea (41%), which feeds on Calluna vulgaris and Erica spp.. Apamea monoglypha was also abundant (28%) and was the most widely taken species of the survey.

Three species were not taken at any other site during the survey. Anarta myrtilli is normally encountered flying actively in sunshine and feeds on Calluna vulgaris and Erica spp., Photedes minima feeds on Deschampsia caespitosa. Syngrapha interrogationis is more frequent in the north and feeds on Calluna vulgaris and Vaccinium spp..

Three other species which feed on Calluna vulgaris were taken: These are Eupithecia nanata, Gnophos obfuscatus, (which also feeds on Genista anglica), and Dyscia fagaria, which also feeds on Erica spp. D. fagaria occurred elsewhere only at Sites 58 and 74. According to South (1961) Gnophos obfuscatus is confined to Scotland, in Britain.

Four pine and conifer feeding species were taken: Thera obeliscata, Semiothisa liturata, Bupalus piniaria and Hylaea fascaria. These occurrences were perhaps unusual, as suitable food plants were not seen at this site.

The site was covered by scrub, and a number of associated species were recorded. Scotopteryx luridata feeds on Sarothamnus scoparius and Ulex spp., Cidaria fulvata on Rosa spp.. Cabera pusaria feeds on Betula spp. and Alnus glutinosa, and was collected elsewhere only at Sites 70A and 72A. Gymnoscelis rufifasciata feeds on Ulex spp., Sarothamnus scoparius, Ilex aquilifolium, Crataegus spp. and Clematis vitalba and was collected elsewhere only at Site 52. Laothoe populi feeds on Populus spp. and Salix spp..

Two other species occurred at only one other site: Pelurga comitata which feeds on Chenopodium spp. and Atriplex spp. occurred at Site 70A and Acronicta rumicis was taken at Site 50N. Scotopteryx luridata, Pelurga comitata, Eupithecia vulgata, Cabera pusaria and Dasychira fascelina were trapped elsewhere only at other Moray Firth sites.

A few other species are restricted to a limited range of larval food plants. Epirrhoe alternata, Cosmorhoe ocellata and Deilephila porcellus all feed on Galium spp.. The last species also feeds on Epilobium spp. and Lythrum salicaria. Hadena confusa, feeds on Silene spp..

3.2 Coleoptera : Carabidae

| | JUNE | JN/JL | JULY | TOTAL |
|---|---|---|---|---|
| Carabus nemoralis | 0 | 2 | 1 | 3 |
| Leistus rufescens | 2 | 2 | 0 | 4 |
| Calathus fuscipes | 3 | 50 | 11 | 64 |
| Calathus melanocephalus | 3 | 7 | 2 | 12 |
| Amara aenea | 0 | 1 | 0 | 1 |
| Harpalus latus | 1 | 1 | 0 | 2 |
| TOTAL | 9 | 63 | 14 | 86 |

This comparatively poor catch of carabids was dominated by Calathus fuscipes and C. melanocephalus. This was the only Moray Firth site

at which Carabus nemoralis, a species of both woodland and open country, was taken. A single larva of Dromius sp. was trapped in the second sampling period, but no adults were taken.

3.3 Coleoptera : Hydrophilidae to Scolytidae

| | JUNE | JN/JL | JULY | TOTAL |
|---|---|---|---|---|
| Leiodes dubia/obesa | 0 | 7 | 0 | 7 |
| Agathidium laevigatum | 1 | 1 | 0 | 2 |
| Ptomophagus subvillosus | 0 | 2 | 0 | 2 |
| Catops chrysomeloides | 0 | 4 | 0 | 4 |
| Stenichnus collaris | 6 | 1 | 0 | 7 |
| Stenus brunnipes | 0 | 1 | 0 | 1 |
| Stenus impressus | 1 | 0 | 0 | 1 |
| Platydracus stercorarius | 0 | 4 | 0 | 4 |
| Staphylinus brunnipes | 0 | 1 | 0 | 1 |
| Mycetoporus piceolus | 2 | 0 | 0 | 2 |
| Mycetoporus lepidus | 1 | 0 | 0 | 1 |
| Mycetoporus nigricollis | 1 | 0 | 0 | 1 |
| Mycetoporus rufescens | 0 | 2 | 0 | 2 |
| Mycetoporus splendidus | 0 | 1 | 0 | 1 |
| Tachyporus chrysomelinus | 0 | 1 | 0 | 1 |
| Aloconota gregaria | 1 | 0 | 0 | 1 |
| Amischa analis | 2 | 0 | 0 | 2 |
| Serica brunnea | 0 | 1 | 7 | 8 |
| Byrrhus pustulatus | 1 | 0 | 0 | 1 |
| Cryptophagus setulosus | 3 | 21 | 0 | 24 |
| Atomaria atricapilla | 2 | 1 | 0 | 3 |
| Orthocerus clavicornis | 0 | 1 | 0 | 1 |
| Phyllotreta undulata | 1 | 0 | 0 | 1 |
| Longitarsus succineus | 0 | 0 | 1 | 1 |
| Otiorhynchus ovatus | 1 | 4 | 0 | 5 |
| Micrelus ericae | 0 | 1 | 0 | 1 |
| TOTAL | 23 | 54 | 8 | 85 |

The most numerous species collected, Cryptophagus setulosus, was regarded by Coombes and Woodroffe (1955) as an inhabitant of the nests of humble bees.

Psammophile and coastal species such as Leiodes dubia, Serica brunnea, Otiorhynchus ovatus and Orthocerus clavicornis were taken only in small

numbers. The last species is most commonly found in coastal sand dunes and there are records from Dalmeny, near Edinburgh (Fowler 1889 and Murray 1853) and Aberlady and Luce Bays (Crowson, 1956). During this survey it was taken in larger numbers at Sites 72B and 75 but this site is probably the most northerly locality known for the species.

Another unusual element of the fauna was the presence of five species of Mycetoporus. Members of this genus are thought to feed on moulds and fungal hyphae in decaying vegetable matter, although they are known to occur on sandy and chalky soils. A single Byrrhus pustulatus was taken during the first trapping period. This species was taken elsewhere only at Site 75 during this survey but is known from sandy sites on the east coast of Scotland as far north as the Moray Firth (Fowler, 1889).

Phytophagous species were very poorly represented by only single specimens of Micrelus ericae which feeds on Erica spp. and Calluna vulgaris, Longitarsus succineus which feeds on a wide variety of Compositae, and Phyllotreta undulata off Cruciferae.

3.4 Araneae

| | JUNE | JN/JL | JULY | TOTAL |
|---|---|---|---|---|
| Drassodes cupreus | 1 | 0 | 0 | 1 |
| Haplodrassus signifer | 5 | 5 | 0 | 10 |
| Zelotes pusillus | 5 | 4 | 0 | 9 |
| Micaria pulicaria | 0 | 0 | 1 | 1 |
| Clubiona diversa | 0 | 1 | 0 | 1 |
| Pardosa pullata | 20 | 25 | 1 | 46 |
| Pardosa nigriceps | 5 | 13 | 0 | 18 |
| Alopecosa pulverulenta | 33 | 7 | 0 | 40 |
| Trochosa terricola | 0 | 0 | 2 | 2 |
| Hahnia nava | 0 | 1 | 0 | 1 |
| Walckenaera antica | 1 | 1 | 0 | 2 |
| Gonatium rubens | 4 | 2 | 0 | 6 |
| Pelecopsis parallela | 0 | 1 | 0 | 1 |
| Evansia merens | 1 | 1 | 0 | 2 |
| Tiso vagans | 3 | 0 | 0 | 3 |
| Agyneta subtilis | 7 | 3 | 0 | 10 |
| Agyneta conigera | 0 | 0 | 1 | 1 |
| Agyneta decora | 1 | 1 | 0 | 2 |
| Lepthyphantes mengei | 0 | 1 | 0 | 1 |
| TOTAL | 86 | 66 | 5 | 157 |

Here, as at many of the Moray Firth sites, the lycosids were the most common family and made up 67.5% of the catch.

Pardosa pullata is a very common spider of grassland places and elsewhere and has a preference for damper areas. Drassodes cupreus, Haplodrassus signifer, Zelotes pusillus and Micaria pulicaria, are all species of open situations particularly dry grasslands and heaths. M. pulicaria is rather more common further south. Evansia merens was taken elsewhere only at Site 79. It is an uncommon spider with a northern distribution and is often associated with the nests of the ants Lasius niger and Formica fusca. All the other species are common in grassland.

3.5 Mollusca (Land snails)

No land snails were recorded at this site.

3.6 Diplopoda

| | JUNE | JN/JL | JULY | TOTAL |
|---|---|---|---|---|
| Julus scandinavius | 3 | 4 | 1 | 8 |
| Cylindroiulus latestriatus | 5 | 1 | 0 | 6 |
| Ommatoiulus sabulosus | 33 | 37 | 11 | 81 |
| TOTAL | 41 | 42 | 12 | 95 |

Cylindroiulus latestriatus and Ommatoiulus sabulosus are both common on sandy coasts throughout Britain. Julus scandinavius is not infrequent on stabilised areas of sand dunes where accumulations of litter are present.

3.7 Terrestrial Isopoda

| | JUNE | JN/JL | JULY | TOTAL |
|---|---|---|---|---|
| Porcellio scaber | 3 | 3 | 0 | 6 |

Porcellio scaber is common on light soils throughout Britain.

4. ADDITIONAL SPECIES

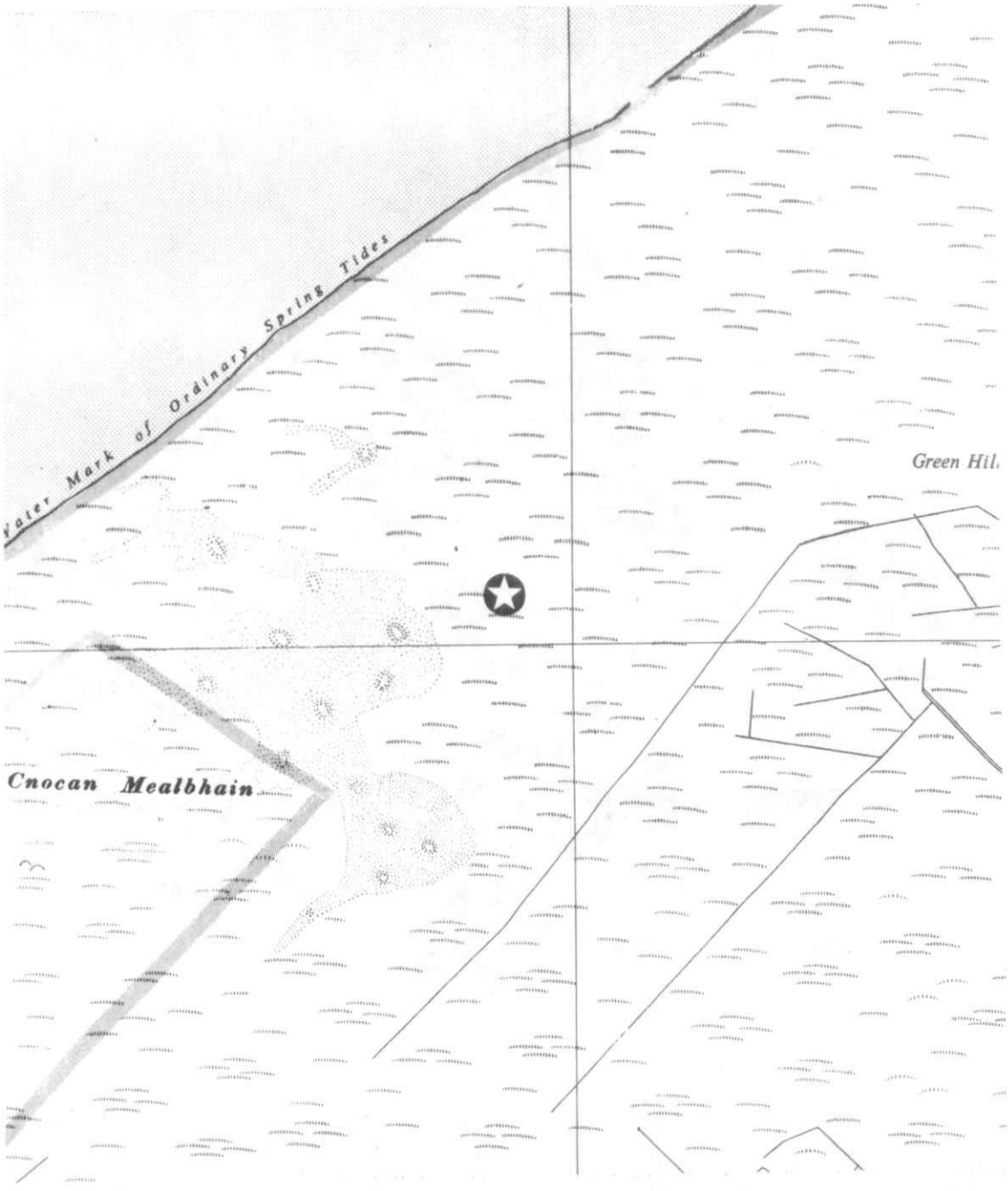
4.1 Lepidoptera : Satyridae

The following species was observed in the field during the course of the survey:

Coenonympha pamphilus

# Site 70A Morrich More 1

# Site 70A Morrich More 1




0 500 Metres
0 500 Yards

Light trap & pitfall traps

# SITE 70A

## MORRICH MORE 1

### 1. DESCRIPTION OF SAMPLED SITE

#### 1.1 Topography

This extensive site consisted of a very large plain of leached sand, mostly covered with dwarf scrub, and a large system of dunes on the western side. The dunes included high, partly mobile, yellow dunes, and rather lower dunes containing the marram transition zone.

#### 1.2 Vegetation

The traps were placed in an area of dwarf scrub/dune heath dominated by Calluna vulgaris and fine grasses. There was only 5% cover of Ammophila arenaria which grew to 50 cm in height. Mosses and lichens were present, but bare ground was absent. The general vegetation height was 10 cm. The following plants were observed in the area of the traps: Trifolium repens, Leontodon sp., Galium verum, G. boreale, Veronica officinalis, Luzula sp., Thymus drucei, Empetrum nigrum, Ulex sp., Hieracium sp., Viola sp. and Koeleria cristata.

#### 1.3 Disturbance

Sheep were free to graze around the sampling area but there was little evidence of grazing near the traps. There was also light grazing by rabbits. The site is used by the R.A.F. as a bombing range and therefore was closed to the general public. The area most frequently visited by the R.A.F. was around the bombing targets.

#### 1.4 Distance from sea

The light trap and pitfall traps were placed along a transect of 30 metres approximately 400 metres from the beach.

### 2. SITING OF LIGHT TRAP AND PITFALL TRAPS

#### 2.1 Selection of site

The choice of site was limited by two main factors. First, the dunes were restricted to the western end of the site and , secondly, the sand plain was used regularly as a bombing range. The dune system was so large that it was decided to put out two sets of traps for comparison.

One set was in the dwarf scrub/dune heath area (Morrich More 1) and the other (Morrich More 2) was in the marram transition zone in the lee of the yellow dunes.

2.2 Damage or malfunction

The light trap operated from 18 - 26.6.77 and 16 - 24.7.77 and was functional at the end of both periods when tested. The pitfall traps were all functional throughout each of the three sampling periods, 18 - 26.6.77, 26.6. - 16.7.77 and 16 - 24.7.77. At the end of the first period (18 - 26.7.77) pitfall trap 2B was found to contain a shrew (Sorex sp.)

2.3 Colour slides available

Box 2, 64-69.

3. THE FAUNA

| 3.1 Lepidoptera | JUNE | JULY | TOTAL |
|---|---|---|---|
| Zygaena filipendulae | 0 | 1 | 1 |
| Macrothylacia rubi | 1 | 0 | 1 |
| Scotopteryx luridata | 0 | 4 | 4 |
| Epirrhoe alternata | 0 | 1 | 1 |
| Pelurga comitata | 0 | 1 | 1 |
| Cosmorhoe ocellata | 0 | 10 | 10 |
| Thera obeliscata | 0 | 1 | 1 |
| Thera cognata | 0 | 3 | 3 |
| Colostygia pectinataria | 0 | 22 | 22 |
| Eupithecia absinthiata/goossensiata | 0 | 5 | 5 |
| Eupithecia nanata | 0 | 3 | 3 |
| Alcis repandata | 0 | 2 | 2 |
| Bupalus piniaria | 0 | 2 | 2 |
| Cabera pusaria | 0 | 1 | 1 |
| Deilephila porcellus | 2 | 0 | 2 |
| Ptilodon capucina | 0 | 2 | 2 |
| Arctia caja | 0 | 15 | 15 |
| Agrotis vestigialis | 0 | 1 | 1 |
| Agrotis clavis | 16 | 23 | 39 |
| Agrotis exclamationis | 0 | 3 | 3 |
| Noctua pronuba | 0 | 2 | 2 |
| Noctua comes | 0 | 3 | 3 |

| | JUNE | JULY | TOTAL |
|---|---|---|---|
| Lycophotia porphyrea | 12 | 282 | 294 |
| Diarsia mendica | 0 | 6 | 6 |
| Xestia c-nigrum | 0 | 1 | 1 |
| Hada nana | 2 | 0 | 2 |
| Cerapteryx graminis | 0 | 9 | 9 |
| Mythimna conigera | 0 | 2 | 2 |
| Mythimna impura | 0 | 6 | 6 |
| Mythimna comma | 0 | 2 | 2 |
| Rusina ferruginea | 8 | 0 | 8 |
| Thalpophila matura | 0 | 37 | 37 |
| Apamea monoglypha | 1 | 52 | 53 |
| Apamea crenata | 0 | 1 | 1 |
| Apamea furva | 0 | 1 | 1 |
| Oligia fasciuncula | 0 | 13 | 13 |
| Mesapamea secalis | 0 | 1 | 1 |
| Hoplodrina alsines/blanda | 0 | 10 | 10 |
| TOTAL | 42 | 528 | 570 |

This site produced an average catch compared with other sites on the Moray Firth and East Coast. The sampling area was further inland than the second site at Morrich More (70B) and was in an area of dwarf scrub and dune heath. Lycophotia porphyrea (51%) was the most abundant species in the catch. It feeds on Calluna vulgaris and Erica spp.. Relatively small numbers were taken at Site 70B where Calluna vulgaris was absent.

One common sand dune species, Agrotis vestigialis, was taken. It was trapped extensively and often commonly at many sites, especially on the North Coast.

Some of the species taken reflect the heath-like nature of the area and also include several species which feed on woody plants. Scotopteryx luridata feeds on Sarothamnus scoparius and Ulex spp.. Eupithecia nanata feeds on Calluna vulgaris. Thera cognata (trapped elsewhere only at Site 70B and Site 57) feeds on Juniperus communis. Alcis repandata, Cabera pusaria and Ptilodon capucina feed on various trees and shrubs. Thera obeliscata and Bupalus piniaria feed on Pinus sylvestris and some other conifers.

Pelurga comitata was taken elsewhere only at Site 69; it feeds on Chenopodium spp. and Atriplex spp.. A few other species are restricted to a limited range of larval food plants. Zygaena filipendulae is a

day flying moth, whose larvae feed on Lotus corniculatus. Epirrhoe alternata, Cosmorhoe ocellata and Deilephila porcellus feed on Galium spp.. D. porcellus also feeds on Epilobium spp. and Lythrum salicaria.

3.2 Coleoptera : Carabidae

| | JUNE | JN/JL | JULY | TOTAL |
|---|---|---|---|---|
| Carabus granulatus | 0 | 1 | 1 | 2 |
| Pterostichus niger | 3 | 11 | 3 | 17 |
| Calathus erratus | 0 | 1 | 1 | 2 |
| Calathus fuscipes | 96 | 1239 | 541 | 1876 |
| Calathus melanocephalus | 6 | 169 | 117 | 292 |
| Amara lunicollis | 2 | 0 | 0 | 2 |
| TOTAL | 107 | 1421 | 663 | 2191 |

. The large number of Calathus fuscipes was exceeded, during this survey, only at the other Morrich More site (70B). C. melanocephalus was also relatively abundant, a larger number having been trapped only at Site 31 on the Hebrides. More specimens of Pterostichus niger, an open country species, were taken here than at any other site during the survey. A single larva of Dromius sp. was taken during the first trapping period.

3.3 Coleoptera : Hydrophilidae to Scolytidae

| | JUNE | JN/JL | JULY | TOTAL |
|---|---|---|---|---|
| Leiodes dubia/obesa | 0 | 1 | 1 | 2 |
| Silpha atrata | 0 | 1 | 0 | 1 |
| Stenichnus collaris | 0 | 1 | 0 | 1 |
| Xantholinus laevigatus | 3 | 0 | 0 | 3 |
| Amischa cavifrons | 0 | 1 | 0 | 1 |
| Atheta melanocera | 0 | 1 | 0 | 1 |
| Oxypoda haemorrhoa | 0 | 1 | 0 | 1 |
| Aphodius rufipes | 0 | 1 | 0 | 1 |
| Serica brunnea | 0 | 0 | 3 | 3 |
| Ctenicera cuprea | 1 | 0 | 0 | 1 |
| Cryptophagus setulosus | 2 | 2 | 0 | 4 |
| Corticaria crenulata | 1 | 0 | 0 | 1 |
| Otiorhynchus arcticus | 1 | 0 | 0 | 1 |
| Philopedon plagiatus | 2 | 1 | 0 | 3 |
| TOTAL | 10 | 10 | 4 | 24 |

This site produced by far the lowest number of species and individuals recorded at any of the Moray Firth sites. The number of specimens collected was the lowest recorded during the survey and the number of species present was less only at Site 50N.

No adult beetles, other than Carabidae, were found in 50% of the pitfall traps. It is just possible that the large numbers of Calathus fuscipes caught could have eaten the smaller species trapped but no fragmentary remains were observed in the samples. The low catch may, on the other hand, reflect a low population density of Coleoptera other than Carabidae. This could have resulted from predation by the high density of Carabidae.

Psammophile species were represented by Leiodes dubia, Serica brunnea, Corticarina crenulata and Philopedon plagiatus. Otiorhynchus arcticus is generally regarded as a sub-arctic species, Cryptophagus setulosus occurs in bee's nests and Aphodius rufipes is a dung beetle but could have been attracted to the area by the florescent tube of the light trap.

3.4 Araneae

| | JUNE | JN/JL | JULY | TOTAL |
|---|---|---|---|---|
| Drassodes cupreus | 2 | 3 | 1 | 6 |
| Haplodrassus signifer | 7 | 14 | 0 | 21 |
| Zelotes pusillus | 8 | 15 | 5 | 28 |
| Gnaphosa leporina | 15 | 12 | 1 | 28 |
| Pardosa monticola | 12 | 9 | 3 | 24 |
| Pardosa pullata | 19 | 26 | 4 | 49 |
| Pardosa nigriceps | 13 | 11 | 1 | 25 |
| Alopecosa pulverulenta | 18 | 8 | 0 | 26 |
| Trochosa terricola | 0 | 0 | 1 | 1 |
| Hahnia nava | 7 | 1 | 0 | 8 |
| Steatoda phalerata | 0 | 1 | 0 | 1 |
| Pelecopsis parallela | 0 | 1 | 0 | 1 |
| Minyriolus pusillus | 0 | 1 | 0 | 1 |
| Agyneta subtilis | 0 | 1 | 0 | 1 |
| Centromerus prudens | 0 | 0 | 1 | 1 |
| TOTAL | 101 | 103 | 17 | 221 |

The catch at this site was remarkable for the small number of linyphiid species, a feature which was most unexpected at a site this far north

in Britain. Of those present, Centromerus prudens is a widely distributed species of moss, grass and heather, and is more common in northern Britain than the south. The lycosids made up 56.6% of the catch. Pardosa pullata is usually found in rather damp areas but P. monticola prefers dry open ground and P. nigriceps is usually found in longer vegetation. Gnaphosa leporina is widespread but local except on certain southern heaths where it may be fairly common. During this survey it occurred only at five Moray Firth sites. All the other species are common in grassland.

3.5 Mollusca (Land snails)

| | JUNE | JN/JL | JULY | TOTAL |
|---|---|---|---|---|
| Nesovitrea hammonis | 0 | 0 | 2 | 2 |

In view of the heathy vegetation this very poor catch was not unexpected. Nesovitrea hammonis is common and widely distributed in a variety of habitat types.

3.6 Diplopoda

| | JUNE | JN/JL | JULY | TOTAL |
|---|---|---|---|---|
| Cylindroiulus latestriatus | 1 | 1 | 0 | 2 |
| Ommatoiulus sabulosus | 87 | 245 | 27 | 359 |
| TOTAL | 88 | 246 | 27 | 361 |

Cylindroiulus latestriatus and Ommatoiulus sabulosus are both common on sandy coasts throughout Britain, although O. sabulosus seems to be less common in north-west Scotland.

3.7 Terrestrial Isopoda

| | JUNE | JN/JL | JULY | TOTAL |
|---|---|---|---|---|
| Porcellio scaber | 1 | 7 | 0 | 8 |

Porcellio scaber is found widely on dry sandy soils.

4. ADDITIONAL SPECIES

These records are for Morrich More as a whole, not the separate sampling sites.

4.1 Lepidoptera

The following species were observed in the field during the course of the survey:

Pieridae

*Pieris napi*

*P. rapae*

Lycaenidae

*Polyommatus icarus*

Nymphalidae

*Aglais urticae*

*Argynnis aglaja*

Satyridae

*Hipparchia semele*

*Maniola jurtina*

*Coenonympha pamphilus*

4.2 Coleoptera

The following species were recorded by Dr M.G. Morris on 3.8.1975.

Apionidae

*Apion marchicum*, at roots of *Rumex acetosella*,

*A. frumentarium*, at roots of *Rumex acetosella*,

*A. carduorum*, sweeping *Cirsium arvense*,

*A. striatum*, on *Sarothamnus scoparius*,

*A. dichroum*, general sweeping,

Curculionidae

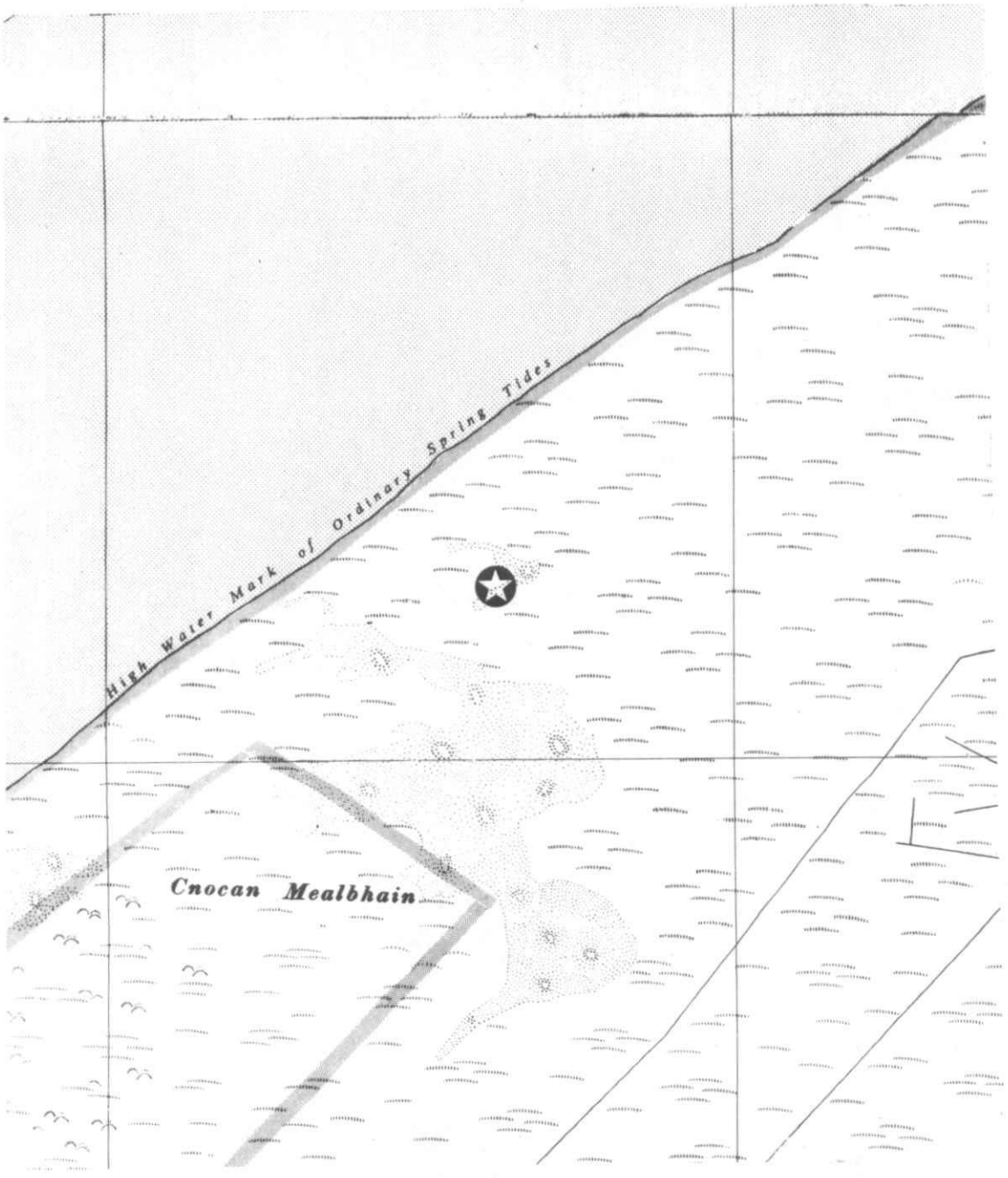
*Otiorhynchus atroapterus*, on dunes,

*O. ovatus*, under wood,

*Sitona griseus*, under *Anthyllis vulneraria*,

# Site 70B Morrich More 2

# Site 70B Morrich More 2




0 500 Metres
0 500 Yards

Light trap & pitfall traps

# SITE 70B

## MORRICH MORE 2

### 1. DESCRIPTION OF SAMPLED SITE

#### 1.1 Topography

This extensive site consisted of a very large plain of leached sand, mostly covered with dwarf scrub, and a large system of dunes on the western side. The dunes included high, partly mobile, yellow dunes, and rather lower dunes containing the marram transition zone.

#### 1.2 Vegetation

The vegetation surrounding the traps was dominated by Ammophila arenaria (60%) with fine grasses and mosses. There was no bare ground. The A. arenaria was 50 cm in height with the other vegetation at about 10 cm. Other species of plants seen in the vicinity of the traps included: Taraxacum officinale agg., Plantago lanceolata, Veronica officinalis, V. arvensis, Cerastium sp., Leontodon sp., Lotus corniculatus, Vicia angustifolia, Salix repens, Galium verum, G. boreale, Thymus drucei, Trifolium sp., Luzula sp., Viola sp. and Koeleria cristata.

#### 1.3 Disturbance

A few sheep and rabbits grazed the area.

#### 1.4 Distance from sea

The light trap and pitfall traps were placed along a 30 metre transect approximately 200 metres from the beach.

### 2. SITING OF LIGHT TRAP AND PITFALL TRAPS

#### 2.1 Selection of site

The choice of site was limited by two main factors. First, the dunes were restricted to the western end of the site and, secondly, the sand plain was used regularly as a bombing range. The dune system was so large that it was decided to put out two sets of traps for comparison. One set was in the dwarf scrub/dune heath area (Morrich More 1) and the other (Morrich More 2) was in the marram transition zone in the lee of the yellow dunes.

2.2 Damage or malfunction

The light trap operated from 18 - 26.6.77 and 16 - 24.7.77 and was functional at the end of both periods when tested. The pitfall traps were all functional during the whole of each of the three periods 18 - 26.6.77, 26.6. - 16.7.77 and 16 - 24.7.77.

2.3 Colour slides available

Box 2, 70-72

21840

3. THE FAUNA

3.19 Lepidoptera

| | JUNE | JULY | TOTAL |
|---|---|---|---|
| Zygaena filipendulae | 0 | 1 | 1 |
| Scotopteryx chenopodiata | 0 | 15 | 15 |
| Epirrhoe galiata | 0 | 3 | 3 |
| Camptogramma bilineata | 0 | 1 | 1 |
| Cosmorhoe ocellata | 0 | 6 | 6 |
| Thera cognata | 0 | 4 | 4 |
| Colostygia pectinataria | 0 | 3 | 3 |
| Eupithecia distinctaria | 1 | 1 | 2 |
| Semiothisa liturata | 0 | 1 | 1 |
| Cleorodes lichenaria | 0 | 1 | 1 |
| Bupalus piniaria | 0 | 1 | 1 |
| Gnophos obfuscatus | 0 | 1 | 1 |
| Deilephila porcellus | 11 | 0 | 11 |
| Dasychira fascelina | 0 | 1 | 1 |
| Eilema lurideola | 0 | 3 | 3 |
| Arctia caja | 1 | 5 | 6 |
| Agrotis vestigialis | 0 | 1 | 1 |
| Agrotis clavis | 27 | 15 | 42 |
| Nocuta comes | 0 | 2 | 2 |
| Lycophotia porphyrea | 0 | 21 | 21 |
| Diarsia mendica | 0 | 2 | 2 |
| Hada nana | 2 | 0 | 2 |
| Cerapteryx graminis | 0 | 8 | 8 |
| Mythimna impura | 0 | 24 | 24 |
| Blepharita adusta | 1 | 0 | 1 |
| Rusina ferruginea | 6 | 0 | 6 |
| Thalpophila matura | 0 | 98 | 98 |

32

| | JUNE | JN/JL | TOTAL |
|---|---|---|---|
| Apamea monoglypha | 1 | 47 | 48 |
| Apamea remissa | 1 | 0 | 1 |
| 36 Oligia fasciuncula | 0 | 20 | 20 |
| 38 Hoplodrina alsines/blanda | 0 | 1 | 1 |
| TOTAL | 51 | 286 | 337 |

This trapping site was closer to the sea than Site 70A and was amongst the high yellow dunes and marram transition zone. The difference in the vegetation between the two areas was reflected to some extent in the catch. The species list and total catch were a little below average as compared with other sites on the Moray Firth and East Coast.

One common sand dune species, Agrotis vestigialis, was taken. It was trapped extensively and often commonly at many sites, especially on the North Coast.

Four of the species were not taken outside the Moray Firth. Epirrhoe galiata, which feeds on Galium spp., is often taken on the coast. Eupithecia distinctaria (caught elsewhere only at Site 66) feeds on Thymus drucei, Cleorodes lichenaria (caught elsewhere only at Site 67) feeds on lichens, and Dasychira fascelina feeds on small trees and shrubs.

Two conifer feeding species occurred: Semiothisa liturata, which feeds on Pinus sylvestris and Larix decidua, and Bupalus piniaria. A few other species are restricted to a limited range of larval food plants. Zygaena filipendulae is a day flying species whose larvae feed on Lotus corniculatus. Cosmorhoe ocellata feeds on Galium spp.. Thera cognata, taken elsewhere only at the other Morrich More site and at Site 57, feeds on Juniperus communis. Lycophotia porphyrea feeds on Calluna vulgaris and Erica spp., and Gnophos obfuscatus on Calluna vulgaris and Genista anglica. According to South (1961) this last species is confined, in Britain, to Scotland. There were far fewer specimens of Lycophotia porphyrea taken in this trap than at the other Morrich More site, presumably because of the absence of Calluna vulgaris in the area.

Eleven specimens of Deilephila porcellus were taken, more than on any other site. It feeds on Galium spp., Epilobium spp., and Lythrum salicaria.

3.2 Coleoptera : Carabidae

| | JUNE | JN/JL | JULY | TOTAL |
|---|---|---|---|---|
| Carabus problematicus | 0 | 1 | 0 | 1 |
| Notiophilus aquaticus | 0 | 1 | 0 | 1 |
| Pterostichus niger | 0 | 1 | 0 | 1 |
| Calathus erratus | 0 | 11 | 10 | 21 |
| Calathus fuscipes | 27 | 1337 | 923 | 2287 |
| Calathus melanocephalus | 1 | 33 | 37 | 71 |
| Calathus mollis | 0 | 2 | 1 | 3 |
| Amara aenea | 1 | 1 | 0 | 2 |
| Amara familiaris | 2 | 0 | 0 | 2 |
| TOTAL | 31 | 1387 | 971 | 2389 |

The high number of Calathus fuscipes (98%) totally dominated the catch of carabids at this site. C. melanocephalus was trapped in considerably smaller numbers than at Site 70A which was approximated 200 metres further inland, and there was a significant increase in the numbers of the more coastal species, C. erratus, that were taken. Four larvae of Amara sp. were trapped during the first two sampling periods.

3.3 Coleoptera : Hydrophilidae to Scolytidae

| | JUNE | JN/JL | JULY | TOTAL |
|---|---|---|---|---|
| Leiodes dubia/obesa | 0 | 3 | 0 | 3 |
| Catops chrysomeloides | 1 | 0 | 0 | 1 |
| Catops kirbii | 2 | 0 | 0 | 2 |
| Silpha atrata | 0 | 1 | 0 | 1 |
| Metopsia retusa | 0 | 1 | 0 | 1 |
| Xantholinus linearis | 0 | 1 | 0 | 1 |
| Platydracus stercorarius | 0 | 2 | 1 | 3 |
| Staphylinus aeneocephalus | 1 | 0 | 0 | 1 |
| Quedius tristis | 2 | 1 | 1 | 4 |
| Mycetoporus splendidus | 0 | 1 | 0 | 1 |
| Bolitobius analis | 1 | 0 | 0 | 1 |
| Sepedophilus nigripennis | 0 | 2 | 0 | 2 |
| Tachyporus atriceps | 1 | 0 | 0 | 1 |
| Tachyporus chrysomelinus | 0 | 1 | 0 | 1 |
| Serica brunnea | 0 | 13 | 33 | 46 |
| Ctenicera cuprea | 2 | 0 | 0 | 2 |
| Corticarina fuscula | 2 | 0 | 0 | 2 |
| Apion dichroum | 1 | 0 | 0 | 1 |

| | JUNE | JN/JL | JULY | TOTAL |
|---|---|---|---|---|
| Otiorhynchus arcticus | 1 | 3 | 1 | 5 |
| Otiorhynchus ovatus | 0 | 0 | 2 | 2 |
| TOTAL | 14 | 29 | 38 | 81 |

The small catch at this site was dominated by the common dune species, Serica brunnea. The only other psammophile species taken were Leiodes dubia and Otiorhynchus ovatus. O. arcticus is considered to be a sub-arctic species.

The two Catops spp. and Platydracus stercorarius are indicative of the presence of carrion, but most of the other species are usually found in decaying vegetable matter.

As with Site 70A the low numbers of Coleoptera other than Carabidae that were recorded could be a direct result of the apparent abundance at this site of the predatory species Calathus fuscipes.

3.4 Araneae

| | JUNE | JN/JL | JULY | TOTAL |
|---|---|---|---|---|
| Drassodes cupreus | 5 | 1 | 0 | 6 |
| Haplodrassus signifer | 6 | 4 | 1 | 11 |
| Zelotes pusillus | 8 | 16 | 6 | 30 |
| Gnaphosa leporina | 2 | 5 | 0 | 7 |
| Xysticus erraticus | 0 | 1 | 0 | 1 |
| Pardosa monticola | 6 | 6 | 0 | 12 |
| Pardosa pullata | 19 | 27 | 7 | 53 |
| Pardosa nigriceps | 1 | 0 | 0 | 1 |
| Alopecosa pulverulenta | 4 | 6 | 0 | 10 |
| Alopecosa accentuata | 0 | 1 | 0 | 1 |
| Trochosa terricola | 0 | 1 | 1 | 2 |
| Arctosa perita | 0 | 3 | 0 | 3 |
| Hahnia nava | 1 | 1 | 0 | 2 |
| Steatoda phalerata | 2 | 8 | 1 | 11 |
| Walckenaera antica | 0 | 1 | 0 | 1 |
| Lepthyphantes tenuis | 0 | 1 | 0 | 1 |
| TOTAL | 54 | 82 | 16 | 152 |

The catch at this site was very similar to that at Morrich More 1, with remarkably few linyphiids, a very unusual feature in the north of Britain. The lycosids accounted for 54% of the total catch of spiders. Pardosa pullata is a very common and widespread species but

normally shows a slight preference for more damp areas. P. monticola is usually found in dry, open terrain and P. nigriceps prefers fairly tall vegetation. Arctosa perita is restricted to sand dunes, and bare sandy areas such as heaths in central and southern England. The theridiid, Steatoda phalerata, is widespread but not very common. It is usually found in rather dry grassy or heath habitats. All the other species are common in grassland.

3.5 Mollusca (Land snails)

| | JUNE | JN/JL | JULY | TOTAL |
|---|---|---|---|---|
| Oxyloma pfeifferi | 0 | 1 | 0 | 1 |
| Trichia striolata | 1 | 0 | 0 | 1 |
| TOTAL | 1 | 1 | 0 | 2 |

This was a very poor catch. Oxyloma pfeifferi was recorded elsewhere only at Site 44 in the survey. This species is usually restricted to wet areas. Trichia striolata is also usually associated with damp ground.

3.6 Diplopoda

| | JUNE | JN/JL | JULY | TOTAL |
|---|---|---|---|---|
| Cylindroiulus latestriatus | 3 | 2 | 0 | 5 |
| Ommatoiulus sabulosus | 44 | 113 | 45 | 202 |
| TOTAL | 47 | 115 | 45 | 207 |

Cylindroiulus latestriatus and Ommatoiulus sabulosus are both common on sandy coasts throughout Britain.

3.7 Terrestrial Isopoda

| | JUNE | JN/JL | JULY | TOTAL |
|---|---|---|---|---|
| Porcellio scaber | 1 | 12 | 1 | 14 |

Porcellio scaber is found widely on dry sandy soils.

4. ADDITIONAL SPECIES

These records are for Morrich More as a whole not the separate sites.

4.1 Lepidoptera

The following species were observed in the field during the course of the survey:

Pieridae

Pieris napi

P. rapae

Lycaenidae

Polyommatus icarus

Nymphalidae

Aglais urticae

Argynnis aglaja

Satyridae

Hipparchia semele

Maniola jurtina

Coenonympha pamphilus

4.2 Coleoptera

The following species were recorded by Dr M.G. Morris on 3.8.1975.

Apionidae

Apion marchicum, at roots of Rumex acetosella,

A. frumentarium, at roots of Rumex acetosella,

A. carduorum, sweeping Cirsium arvense,

A. striatum, on Sarothamnus scoparius,

A. dichroum, general sweeping.

Curculionidae

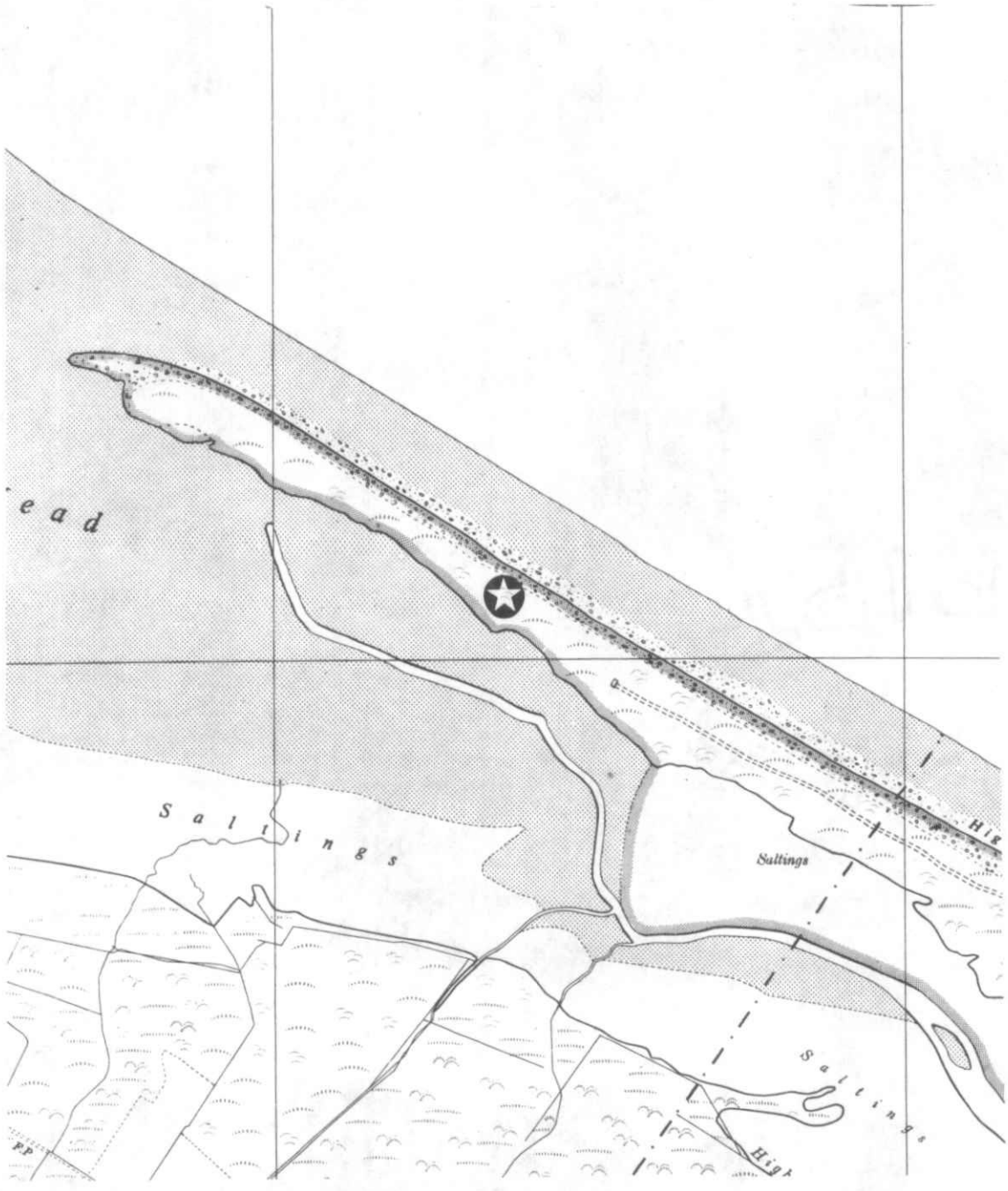
Otiorhynchus atroapterus, on dunes,

O. ovatus, under wood,

Sitona griseus, under Anthyllis vulneraria.

# Site 71 Whiteness

# Site 71 Whiteness




0 500 Metres
0 500 Yards

Light trap & pitfall traps

# SITE 71

## WHITENESS

### 1. DESCRIPTION OF SAMPLED SITE

#### 1.1 Topography

The site consisted of a shingle spit, without dune ridges, and with a flat plain of sand, fixed by vegetation, behind a coastal strip of shingle.

#### 1.2 Vegetation

The vegetation in the area of the traps was composed of Ammophila arenaria (50%) and Lotus corniculatus, with patches of moss and 5-10% bare sand. The height of the A. arenaria was 50 cm, but the other vegetation was only 5 cm high. Other species of plant which were recorded from the sampling area included: Centaurea sp., Leontodon sp., Thymus drucei, Plantago lanceolata, Armeria maritima, Rhinanthus minor, Taraxacum officinale agg., Bellis perennis, Cakile maritima, Elymus arenarius, Senecio jacobaea, Polygala sp., Honkenya peploides, Sedum acre, Epilobium angustifolium, Hieracium sp., Vicia angustifolia and Medicago lupulina.

#### 1.3 Disturbance

The area was moderately grazed by rabbits. An oil rig construction site was nearby, but separated by a channel of water. The only sign of disturbance at the site was quantities of wind-blown litter, presumably from the construction site.

#### 1.4 Distance from sea

The light trap and pitfall traps were placed approximately in the centre of the spit, along a 30 metre transect, about 50 metres from the shore.

### 2. SITING OF LIGHT TRAP AND PITFALL TRAPS

#### 2.1 Selection of site

As the tip of the spit was a nesting area for gulls and terns, and the base of the spit was covered by well established scrub of Ulex sp., the most suitable location for the traps seemed to be the undisturbed section between these two areas.

2.2 Damage or malfunction

The light trap operated from 16 - 24.6.77 and 14 - 22.7.77 and was functional at the end of both periods when tested. The pitfall traps were all functional during the whole of each of the three periods 16 - 24.6.77, 24.6. - 14.7.77 and 14 - 22.7.77.

2.3 Colour slides available

Box 2, 74-79.

3. THE FAUNA

3.1 Lepidoptera

| | JUNE | JULY | TOTAL |
|---|---|---|---|
| Hepialus fusconebulosa | 2 | 0 | 2 |
| Scotopteryx chenopodiata | 0 | 81 | 81 |
| Scotopteryx luridata | 0 | 1 | 1 |
| Camptogramma bilineata | 0 | 1 | 1 |
| Cosmorhoe ocellata | 0 | 2 | 2 |
| Eupithecia vulgata | 1 | 0 | 1 |
| Gnophos obfuscatus | 0 | 1 | 1 |
| Arctia caja | 0 | 17 | 17 |
| Agrotis vestigialis | 0 | 2 | 2 |
| Agrotis exclamationis | 11 | 2 | 13 |
| Noctua comes | 0 | 2 | 2 |
| Diarsia rubi | 0 | 1 | 1 |
| Lacanobia oleracea | 1 | 0 | 1 |
| Hadena confusa | 11 | 0 | 11 |
| Cerapteryx graminis | 0 | 1 | 1 |
| Mythimna ferrago | 0 | 1 | 1 |
| Mythimna impura | 0 | 13 | 13 |
| Mythimna comma | 6 | 0 | 6 |
| Blepharita adusta | 1 | 0 | 1 |
| Rusina ferruginea | 5 | 0 | 5 |
| Thalpophila matura | 0 | 120 | 120 |
| Apamea monoglypha | 0 | 75 | 75 |
| Apamea remissa | 2 | 1 | 3 |
| Oligia fasciuncula | 2 | 1 | 3 |
| Mesoligia literosa | 0 | 1 | 1 |
| TOTAL | 42 | 323 | 365 |

This site produced a fairly poor species list and a below average total catch compared with other sites on the Moray Firth and East Coast. Thalpophila matura (33%) was the most abundant species in the catch. Most of the species caught were trapped widely at other sites during the survey, but Diarsia rubi, although a generally common species, was taken elsewhere only at Site 68.

One common sand dune species, Agrotis vestigialis, was taken. It was trapped extensively and often commonly at many sites, especially on the North Coast.

A few species are restricted to a limited range of larval food plants. Hepialus fusconebulosa which was trapped widely on a number of sites feeds on the roots of Pteridium aquilinum. Scotopteryx luridata feeds on Sarothamnus scoparius and Ulex spp., and Cosmorhoe ocellata on Galium spp. Hadena confusa feeds on Silene spp.. Gnophos obfuscatus feeds on Calluna vulgaris and Genista anglica. According to South (1961) G. obfuscatus is confined to Scotland, in Britain.

3.2 Coleoptera : Carabidae

| | JUNE | JN/JL | JULY | TOTAL |
|---|---|---|---|---|
| Carabus problematicus | 0 | 4 | 1 | 5 |
| Notiophilus aquaticus | 0 | 0 | 1 | 1 |
| Broscus cephalotes | 1 | 1 | 0 | 2 |
| Trechus obtusus | 2 | 0 | 0 | 2 |
| Calathus erratus | 7 | 40 | 21 | 68 |
| Calathus fuscipes | 15 | 374 | 179 | 568 |
| Calathus melanocephalus | 4 | 129 | 49 | 182 |
| Calathus mollis | 3 | 17 | 3 | 23 |
| Amara aenea | 6 | 15 | 1 | 22 |
| Amara tibialis | 5 | 5 | 6 | 16 |
| Harpalus rubripes | 2 | 6 | 0 | 8 |
| TOTAL | 45 | 591 | 261 | 897 |

The four species of Calathus dominated the catch of carabids at this site, with the coastal species, C. erratus, being well represented. In addition to Broscus cephalotes, another species of sandy coasts, the two species of Amara and Harpalus rubripes are usually associated with sparsely vegetated dry, sandy ground. Carabus problematicus frequents dry heathland. The numbers of the xerophilous species, Amara aenea, taken here were exceeded elsewhere only at Site 75. Three larvae of Amara sp. and one larval Notiophilus biguttatus, a

species not taken as an adult, were collected in the first sampling period.

3.3 Coleoptera : Hydrophilidae to Scolytidae

| | JUNE | JN/JL | JULY | TOTAL |
|---|---|---|---|---|
| Catops chrysomeloides | 0 | 1 | 0 | 1 |
| Thanatophilus rugosus | 1 | 0 | 0 | 1 |
| Micropeplus staphylinoides | 0 | 0 | 1 | 1 |
| Stenus clavicornis | 1 | 0 | 0 | 1 |
| Stenus impressus | 0 | 1 | 0 | 1 |
| Othius angustus | 1 | 0 | 0 | 1 |
| Xantholinus laevigatus | 1 | 2 | 0 | 3 |
| Xantholinus linearis | 1 | 0 | 0 | 1 |
| Platydracus stercorarius | 1 | 0 | 1 | 2 |
| Quedius molochinus | 0 | 0 | 1 | 1 |
| Quedius semiaeneus | 1 | 0 | 0 | 1 |
| Bolitobius analis | 1 | 1 | 0 | 2 |
| Sepedophilus nigripennis | 1 | 1 | 0 | 2 |
| Tachyporus atriceps | 0 | 1 | 0 | 1 |
| Tachyporus chrysomelinus | 1 | 0 | 0 | 1 |
| Tachyporus obtusus | 1 | 0 | 0 | 1 |
| Tachyporus pusillus | 0 | 1 | 0 | 1 |
| Amischa cavifrons | 0 | 1 | 0 | 1 |
| Oxypoda haemorrhoa | 0 | 1 | 0 | 1 |
| Serica brunnea | 1 | 0 | 2 | 3 |
| Agriotes acuminatus | 1 | 0 | 0 | 1 |
| Meligethes erythropus | 0 | 1 | 0 | 1 |
| Coccidula rufa | 1 | 1 | 1 | 3 |
| Nephus redtenbacheri | 0 | 1 | 0 | 1 |
| Coccinella septempunctata | 1 | 3 | 0 | 4 |
| Coccinella undecimpunctata | 0 | 2 | 0 | 2 |
| Corticaria crenulata | 3 | 2 | 1 | 6 |
| Corticaria umbilicata | 8 | 9 | 1 | 18 |
| Corticarina fuscula | 47 | 35 | 1 | 83 |
| Chaetocnema concinna | 1 | 0 | 0 | 1 |
| Apion loti | 11 | 10 | 3 | 24 |
| Otiorhynchus atroapterus | 8 | 11 | 1 | 20 |
| Otiorhynchus ovatus | 15 | 20 | 4 | 39 |
| Philopedon plagiatus | 7 | 10 | 0 | 17 |
| Sitona griseus | 0 | 1 | 0 | 1 |

| | JUNE | JN/JL | JULY | TOTAL |
|---|---|---|---|---|
| Sitona lineellus | 4 | 2 | 1 | 7 |
| TOTAL | 119 | 118 | 18 | 255 |

The most abundant species, Corticarina fuscula, was virtually restricted to the first two samples. This species occurs in decaying vegetable matter in a wide variety of habitat types.

Coastal and psammophile species were well represented with Otiorhynchus ovatus, O. atroapterus, Philopedon plagiatus and Corticaria umbilicata being the most abundant, and with smaller numbers of C. crenulata, Serica brunnea, Sitona griseus, Coccinella undecimpunctata and Quedius semiaeneus.

Phytophagous species were trapped in small numbers and included Apion loti and Meligethes erythropus both of which feed on Lotus corniculatus, Sitona lineellus which feeds on Trifolium spp. and Chaetocnema concinna which feeds on Rumex spp., Chaenopodium spp. and Polygonum spp..

Thanatophilus rugosus, Catops chrysomeloides and Platydracus stercorarius are indicative of the presence of carrion.

Small numbers of Coccinella septempunctata larvae were collected in all three sampling periods.

3.4 Araneae

| | JUNE | JN/JL | JULY | TOTAL |
|---|---|---|---|---|
| Drassodes cupreus | 6 | 3 | 0 | 9 |
| Haplodrassus signifer | 3 | 6 | 1 | 10 |
| Zelotes pusillus | 8 | 32 | 5 | 45 |
| Micaria pulicaria | 0 | 5 | 1 | 6 |
| Clubiona neglecta | 0 | 1 | 0 | 1 |
| Clubiona diversa | 0 | 1 | 0 | 1 |
| Xysticus cristatus | 1 | 0 | 1 | 2 |
| Euophrys aequipes | 1 | 1 | 0 | 2 |
| Pardosa agricola | 0 | 0 | 2 | 2 |
| Pardosa palustris | 2 | 1 | 0 | 3 |
| Pardosa pullata | 31 | 38 | 9 | 78 |
| Pardosa nigriceps | 6 | 0 | 1 | 7 |
| Arctosa perita | 0 | 6 | 0 | 6 |
| Hahnia nava | 3 | 4 | 0 | 7 |
| Enoplognatha thoracica | 1 | 0 | 0 | 1 |

| | JUNE | JN/JL | JULY | TOTAL |
|---|---|---|---|---|
| Pachygnatha degeeri | 7 | 2 | 0 | 9 |
| Walckenaera acuminata | 0 | 1 | 0 | 1 |
| Trichopterna thorelli | 1 | 2 | 0 | 3 |
| Pelecopsis parallela | 0 | 2 | 1 | 3 |
| Typhocrestus digitatus | 1 | 0 | 0 | 1 |
| Erigone dentipalpis | 0 | 1 | 2 | 3 |
| Bathyphantes parvulus | 0 | 1 | 0 | 1 |
| Lepthyphantes mengei | 1 | 3 | 0 | 4 |
| TOTAL | 72 | 110 | 23 | 205 |

Drassodes cupreus, Haplodrassus signifer, Zelotes pusillus and Micaria pulicaria are widespread species, usually taken in dry open areas and are rather more common in the south of Britain than the north. Clubiona neglecta and Typhocrestus digitatus are both common in Britain and occur in a variety of habitat types, the latter mostly in dry places, but both are often associated with sand dunes.

Pardosa pullata, a very common and widespread spider with a preference for slightly damp areas, was the most abundant lycosid. Of greater interest was the presence of P. agricola both here and at Culbin Bar I, Site 72. This was the dark coastal form var. maritima which probably came from the nearby shingle area. The sand dune and sandy heath lycosid Arctosa perita was present only in small numbers.

The salticid Euophrys aequipes, a spider of dry sandy places and which is widespread in the southern half of England, has been taken only rarely in Scotland and there are no previous records from north of the Firth of Tay. Enoplognatha thoracica was also taken here considerably further north than previous records. It is usually fairly common in grass and under stones in many parts of England. Trichopterna thorelli is a widespread but rather local species in Britain but is common on wet heathland in parts of southern England. All the other species are common in grassland.

3.5 Mollusca (Land snails)

| | JUNE | JN/JL | JULY | TOTAL |
|---|---|---|---|---|
| Lauria cylindracea | 0 | 1 | 0 | 1 |
| Vitrina pellucida | 0 | 0 | 1 | 1 |
| Candidula intersecta | 0 | 0 | 1 | 1 |
| TOTAL | 0 | 1 | 2 | 3 |

This was a very poor catch, composed of species commonly found in fixed dune areas. Candidula intersecta is believed to have been introduced to the British Isles in Roman times, or later.

3.6 Diplopoda

| | JUNE | JN/JL | JULY | TOTAL |
|---|---|---|---|---|
| Cylindroiulus latestriatus | 8 | 1 | 0 | 9 |

Cylindroiulus latestriatus is common on sandy coasts throughout Britain.

3.7 Terrestrial Isopoda

| | JUNE | JN/JL | JULY | TOTAL |
|---|---|---|---|---|
| Porcellio scaber | 26 | 50 | 7 | 83 |

Porcellio scaber is found widely on dry sandy soils.

4. ADDITIONAL SPECIES

4.1 Lepidoptera

The following species were observed in the field during the course of the survey:

Lycaenidae

Polyommatus icarus

Satyridae

Maniola jurtina

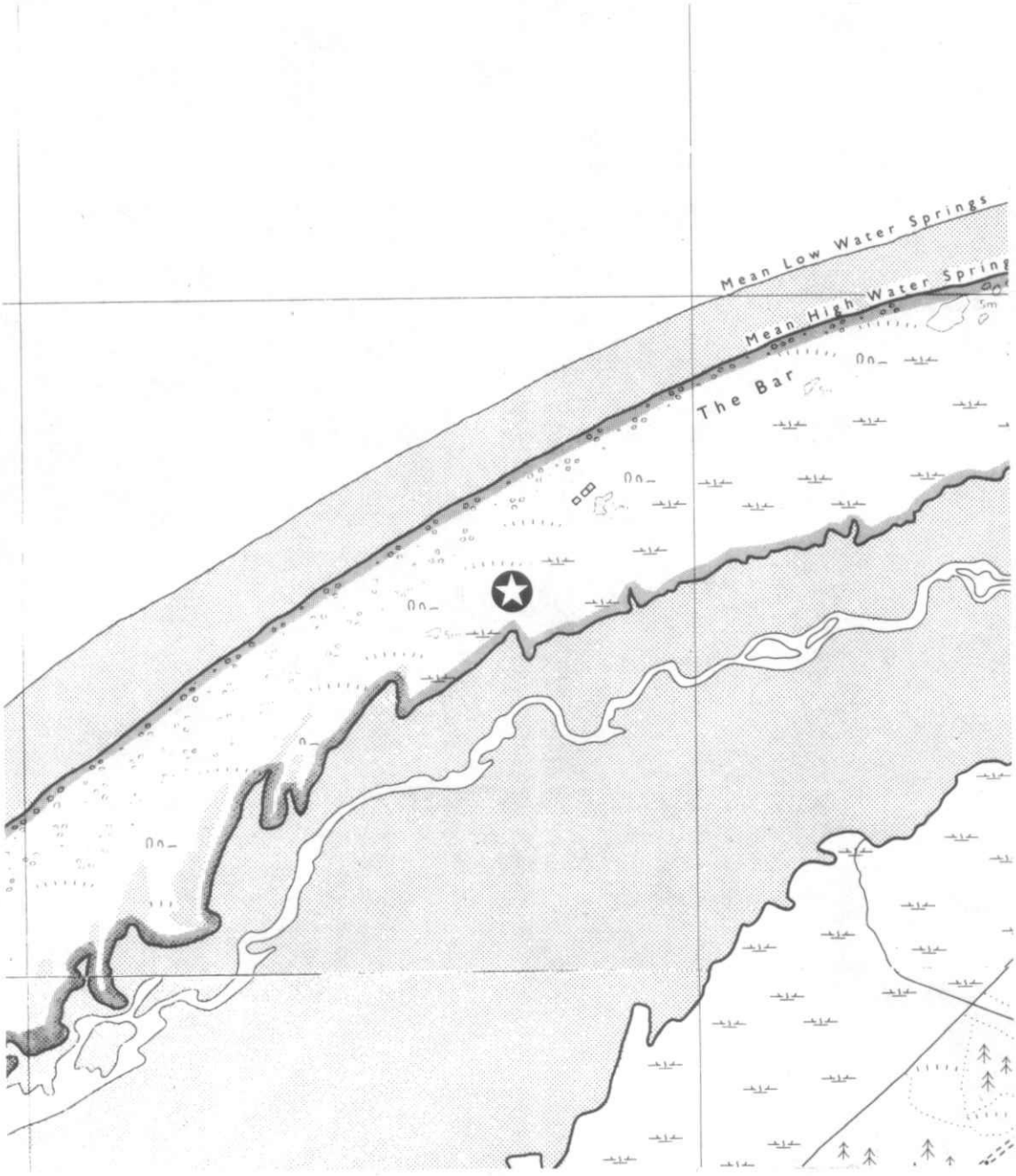
Coenonympha pamphilus

Geometridae

Ematurga atomaria

# Site 72A Culbin Bar 1

# Site 72A Culbin Bar 1




0 500 Metres
0 500 Yards

Light trap & pitfall traps

# SITE 72A

## CULBIN BAR 1

### 1. DESCRIPTION OF SAMPLED SITE

#### 1.1 Topography

Culbin Bar was sampled at two sites. The Bar consisted of two differing areas. The eastern section was narrow, with a series of dune ridges which became progressively reduced in height towards its centre. The Culbin Bar 2 sampling site was in this area. The western section, where the Culbin Bar 1 sampling site was established, was larger, with a series of recurved, sand covered, shingle ridges. The Bar, as a whole, enclosed large areas of sand flats and salt marsh.

#### 1.2 Vegetation

The vegetation consisted of well established scrub of Rubus spp., Ulex sp., Sarothamnus scoparius and Calluna vulgaris, with fine grasses, lichens and mosses, and no bare ground. There was little Ammophila arenaria. The vegetation height (excluding the scrub species) was 30 cm. Other species of plant seen near the traps included: Galium verum, G. boreale, Lotus corniculatus, Cerastium sp., Rosa sp., Holcus lanatus, Veronica officinalis, Hieracium sp., Viola sp., Festuca sp., Agropyron junceiforme, Taraxacum officinale agg., Rumex acetosella, Senecio jacobaea, Carex sp., Rhinanthus minor, Leontodon sp., Cirsium vulgare and Agrostis sp.

#### 1.3 Disturbance

The area was lightly grazed by rabbits. At the time that the sampling site was chosen, it was thought that the area was isolated and not visited by people other, possibly, than by salmon fishermen who worked at least 250 metres further east. However damage to the light trap was the result of human interference (see 2.2 below).

#### 1.4 Distance from sea

The light trap and pitfall traps were placed between 30 and 60 metres from the shore, along a transect of 30 metres at right angles to the shore line.

## 2. SITING OF LIGHT TRAP AND PITFALL TRAP

### 2.1 Selection of site

The general sampling area was chosen after consultation with local NCC regional staff and the actual trapping site was selected at one of the widest parts of the bar which was reasonably sheltered. It was a considerable distance from the Culbin Bar 2 sampling site.

### 2.2 Damage or malfunction

The light trap operated from 16 - 24.6.77 an 14 - 22.7.77. The trap was functional at the end of the first period when tested. On 22.7.77 the trap was found to have been pushed over, the light was smashed and the baffles had been holed by air-gun pellets. However the trap contained several moths. The pitfall traps were all functional throughout each of the three periods 16 - 24.6.77, 24.6. - 14.7.77 and 14 - 22.7.77.

### 2.3 Colour slides available

Box 2, 80-83

## 3. THE FAUNA

### 3.1 Lepidoptera

| | JUNE | JULY | TOTAL |
|---|---|---|---|
| Hepialus fusconebulosa | 3 | 1 | 4 |
| Zygaena filipendulae | 1 | 4 | 5 |
| Scotopteryx chenopodiata | 0 | 1 | 1 |
| Scotopteryx luridata | 0 | 2 | 2 |
| Epirrhoe galiata | 1 | 2 | 3 |
| Camptogramma bilineata | 0 | 4 | 4 |
| Thera obeliscata | 2 | 0 | 2 |
| Colostygia pectinataria | 0 | 14 | 14 |
| Eupithecia absinthiata/goossensiata | 1 | 0 | 1 |
| Eupithecia vulgata | 2 | 0 | 2 |
| Eupithecia subfuscata | 2 | 0 | 2 |
| Eupithecia nanata | 0 | 1 | 1 |
| Chesias rufata | 0 | 4 | 4 |
| Alcis repandata | 0 | 3 | 3 |
| Cabera pusaria | 0 | 1 | 1 |
| Gnophos obfuscatus | 0 | 4 | 4 |

| | JUNE | JULY | TOTAL |
|---|---|---|---|
| Perconia strigillaria | 1 | 0 | 1 |
| Deilephila porcellus | 1 | 0 | 1 |
| Dasychira fascelina | 1 | 1 | 2 |
| Arctia caja | 0 | 1 | 1 |
| Agrotis exclamationis | 2 | 0 | 2 |
| Noctua comes | 0 | 1 | 1 |
| Lycophotia porphyrea | 2 | 29 | 31 |
| Hada nana | 9 | 1 | 10 |
| Hadena confusa | 11 | 0 | 11 |
| Mythimna impura | 0 | 2 | 2 |
| Mythimna comma | 2 | 0 | 2 |
| Blepharita adusta | 1 | 0 | 1 |
| Rusina ferruginea | 19 | 0 | 19 |
| Thalpophila matura | 0 | 6 | 6 |
| Apamea monoglypha | 0 | 3 | 3 |
| Apamea furva | 0 | 2 | 2 |
| Apamea remissa | 2 | 0 | 2 |
| Oligia fasciuncula | 0 | 2 | 2 |
| TOTAL | 63 | 89 | 152 |

The trap was vandalised during the second trapping period and the resulting catch was low compared with other Moray Firth and East Coast sites. The catch reflected the scrub-like nature of the site.

Two of the species occurred nowhere else in the survey, Chesias rufata which feeds on Sarothamnus scoparius, and Perconia strigillaria which feeds on Sarothamnus scoparius, Calluna vulgaris, Erica spp. and the flowers of Ulex spp.. Five species were not trapped outside the Moray Firth, including Alcis repandata which feeds on woody plants such as Calluna vulgaris and Vaccinium spp., Epirrhoe galiata which feeds on Galium spp. and is frequently found in coastal localities, Eupithecia vulgata, Cabera pusaria and Dasychira fascelina.

Three other species which feed on Calluna vulgaris were collected. Eupithecia nanata, Lycophotia porphyrea which also feeds on Erica spp., and Gnophos obfuscatus which also feeds on Genista anglica. According to South (1961) the last species is confined to Scotland, in Britain. Various other species are restricted to a limited range of larval food plants. Hepialus fusconebulosa feeds on the roots of Pteridium aquilinum and was trapped widely at many sites. Zygaena filipendulae,

is a day flying species whose larvae feed on Lotus corniculatus. Scotopteryx luridata feeds on Sarothamnus scoparius and Ulex spp., Epirrhoe galiata (see above) and Deilephila porcellus feed on Galium spp.; the latter species also feeds on Epilobium spp. and Lythrum salicaria. Thera obeliscata feeds on Pinus sylvestris and some other conifers. The nearest conifers were in Culbin Forest, over a mile away. Hadena confusa, feeds on Silene spp. and was only taken at a few other sites.

A day flying species, Ematurga atomaria, was plentiful on the wing when the site was visited in June, but none were caught in the light trap. Only a single specimen of this species was trapped during the survey, at Site 83.

3.2 Coleoptera : Carabidae

| | JUNE | JN/JL | JULY | TOTAL |
|---|---|---|---|---|
| Carabus problematicus | 3 | 9 | 4 | 16 |
| Leistus rufescens | 0 | 2 | 0 | 2 |
| Notiophilus aquaticus | 0 | 1 | 0 | 1 |
| Calathus fuscipes | 0 | 82 | 43 | 125 |
| Calathus melanocephalus | 3 | 32 | 29 | 64 |
| Synuchus nivalis | 0 | 0 | 2 | 2 |
| Amara aenea | 0 | 0 | 3 | 3 |
| Amara communis | 1 | 0 | 0 | 1 |
| Amara lunicollis | 1 | 0 | 0 | 1 |
| Harpalus latus | 2 | 0 | 1 | 3 |
| Harpalus rubripes | 1 | 0 | 0 | 1 |
| Dromius linearis | 1 | 0 | 0 | 1 |
| Dromius notatus | 1 | 0 | 0 | 1 |
| TOTAL | 13 | 126 | 82 | 221 |

The catch included a varied carabid fauna with only the two species of open grassland, Calathus fuscipes and C. melanocephalus, and Carabus problematicus, a species of dry open heathland, being at all numerous. It is perhaps unusual for the last species to be relatively common on an isolated sand bar. The presence of Dromius notatus, a chiefly coastal species of well vegetated sandy or gravelly soils, is noteworthy, as is the record of Synuchus nivalis, a local species often recorded from sandy or gravelly areas, a habitat also favoured by Harpalus rubripes. A single larva of Notiophilus biguttatus was collected during the middle sampling period. This species was not taken as an adult at the site.

3.3 Coleoptera : Hydrophilidae to Scolytidae

| | JUNE | JN/JL | JULY | TOTAL |
|---|---|---|---|---|
| Leiodes dubia/obesa | 0 | 1 | 2 | 3 |
| Nargus velox | 1 | 1 | 0 | 2 |
| Choleva fragniezi | 1 | 0 | 0 | 1 |
| Choleva oblonga | 0 | 0 | 1 | 1 |
| Micropeplus staphylinoides | 0 | 1 | 0 | 1 |
| Stenus impressus | 0 | 1 | 0 | 1 |
| Xantholinus linearis | 6 | 2 | 0 | 8 |
| Platydracus stercorarius | 0 | 1 | 0 | 1 |
| Quedius molochinus | 2 | 0 | 1 | 3 |
| Sepedophilus nigripennis | 5 | 28 | 2 | 35 |
| Tachyporus chrysomelinus | 1 | 2 | 0 | 3 |
| Tachyporus nitidulus | 0 | 2 | 0 | 2 |
| Geostiba circellaris | 0 | 2 | 0 | 2 |
| Drusilla canaliculata | 8 | 10 | 0 | 18 |
| Byrrhus fasciatus | 0 | 2 | 0 | 2 |
| Agriotes acuminatus | 0 | 1 | 0 | 1 |
| Corticaria crenulata | 0 | 1 | 0 | 1 |
| Corticaria umbilicata | 1 | 2 | 0 | 3 |
| Corticarina fuscula | 0 | 1 | 0 | 1 |
| Otiorhynchus arcticus | 2 | 1 | 1 | 4 |
| Otiorhynchus ovatus | 1 | 0 | 0 | 1 |
| Strophosomus melanogrammus | 3 | 6 | 0 | 9 |
| Philopedon plagiatus | 3 | 0 | 0 | 3 |
| TOTAL | 34 | 65 | 7 | 106 |

The catch at this site was dominated by Sepedophilus nigripennis, a eurytopic species which is occasionally locally abundant in moss on sand dunes; and by Drusilla canaliculata, which has a non-obligate association with several species of ant. These two species comprised 50% of the specimens trapped and larvae of the latter species were taken in the second sampling period.

Coastal and psammophile species were poorly represented in the catch, with only a few specimens of Philopedon plagiatus, Otiorhynchus ovatus, Leiodes dubia and Corticaria crenulata.

The two Choleva spp. and Nargus velox may be associated with the runs of small mammals or carrion, and Platydracus stercorarius is associated

with carrion. Otiorhynchus arcticus is regarded as a sub-arctic species. Strophosomus melanogrammus adults are common in woodlands especially on Corylus avellana but the larvae are soil dwelling and feed on the roots of a variety of low plants such as Rumex spp..

3.4 Araneae

| | JUNE | JN/JL | JULY | TOTAL |
|---|---|---|---|---|
| Drassodes cupreus | 2 | 1 | 0 | 3 |
| Haplodrassus signifer | 11 | 24 | 2 | 37 |
| Zelotes pusillus | 6 | 6 | 1 | 13 |
| Zelotes latreillei | 2 | 0 | 1 | 3 |
| Gnaphosa leporina | 2 | 0 | 1 | 3 |
| Micaria pulicaria | 1 | 0 | 3 | 4 |
| Clubiona diversa | 0 | 1 | 0 | 1 |
| Xysticus cristatus | 1 | 1 | 0 | 2 |
| Pardosa agricola | 0 | 0 | 2 | 2 |
| Pardosa pullata | 67 | 45 | 19 | 131 |
| Pardosa nigriceps | 1 | 1 | 1 | 3 |
| Alopecosa pulverulenta | 20 | 10 | 2 | 32 |
| Trochosa terricola | 4 | 0 | 1 | 5 |
| Steatoda phalerata | 0 | 5 | 2 | 7 |
| Walckenaera antica | 0 | 2 | 0 | 2 |
| Tiso vagans | 1 | 3 | 1 | 5 |
| Minyriolus pusillus | 0 | 6 | 0 | 6 |
| Tapinocyba praecox | 0 | 1 | 0 | 1 |
| Agyneta subtilis | 5 | 7 | 1 | 13 |
| Agyneta decora | 1 | 0 | 1 | 2 |
| Maro minutus | 1 | 0 | 0 | 1 |
| Centromerus prudens | 0 | 1 | 0 | 1 |
| Lepthyphantes mengei | 1 | 0 | 1 | 2 |
| TOTAL | 126 | 114 | 39 | 279 |

Drassodes cupreus, Haplodrassus signifer, Zelotes pusillus and Micaria pulicaria are all associated with dry grasslands and heathlands; the last is much more common in the south of Britain than the north. Zelotes latreillei is a very common spider in open stony places but in this survey it was taken only at the two Culbin Bar sites. Gnaphosa leporina is widespread but local in heathland biotopes and was taken

at several of the Moray Firth sites, but not elsewhere.

The most abundant spider was Pardosa pullata (47%) a very common and widespread species of open situations with a slight preference for damp areas. P. agricola var. maritima, is confined to coastal shingle in the north. This form taken at the two Culbin Bar sites, probably due to the proximity of large shingle bars, but was not recorded elsewhere.

Steatoda phalerata, a widespread species of dry, open areas, is rarely common. Maro minutus is a tiny linyphiine found in a variety of situations such as, under stones, in detritus and pine litter. It has been taken throughout Britain but is rather uncommon. This is the furthest north that it has been recorded although there is an earlier record for central Scotland. All the other species are common in grassland.

3.5 Mollusca (Land snails)

| | JUNE | JN/JL | JULY | TOTAL |
|---|---|---|---|---|
| Cochlicopa lubricella | 0 | 1 | 0 | 1 |
| Aegopinella pura | 0 | 2 | 0 | 2 |
| Oxychilus alliarius | 0 | 0 | 1 | 1 |
| TOTAL | 0 | 3 | 1 | 4 |

The very poor catch consisted of species which are commonly found in fixed dune areas.

3.6 Diplopoda

| | JUNE | JN/JL | JULY | TOTAL |
|---|---|---|---|---|
| Cylindroiulus latestriatus | 2 | 3 | 1 | 6 |

Cylindroiulus latestriatus is common on sandy coasts throughout Britain.

3.7 Terrestrial Isopoda

| | JUNE | JN/JL | JULY | TOTAL |
|---|---|---|---|---|
| Porcellio scaber | 3 | 18 | 1 | 22 |

Porcellio scaber is found widely on dry sand soils.

4. ADDITIONAL SPECIES

4.1 Lepidoptera

The following species were observed in the field during the course of the survey. The butterfly records are for Culbin Bar as a whole, not

the separate sampling sites.

Hesperidae

Erynnis tages

Lycaenidae

Polyommatus icarus

Nymphalidae

? Argynnis aglaja (seen on the wing, record not confirmed)

Satyridae

Erebia aethiups, flies in Culbin Forest (Dr M.G. Morris)

Hipparchia semele

Maniola jurtina

Coenonympha pamphilus

Geometridae

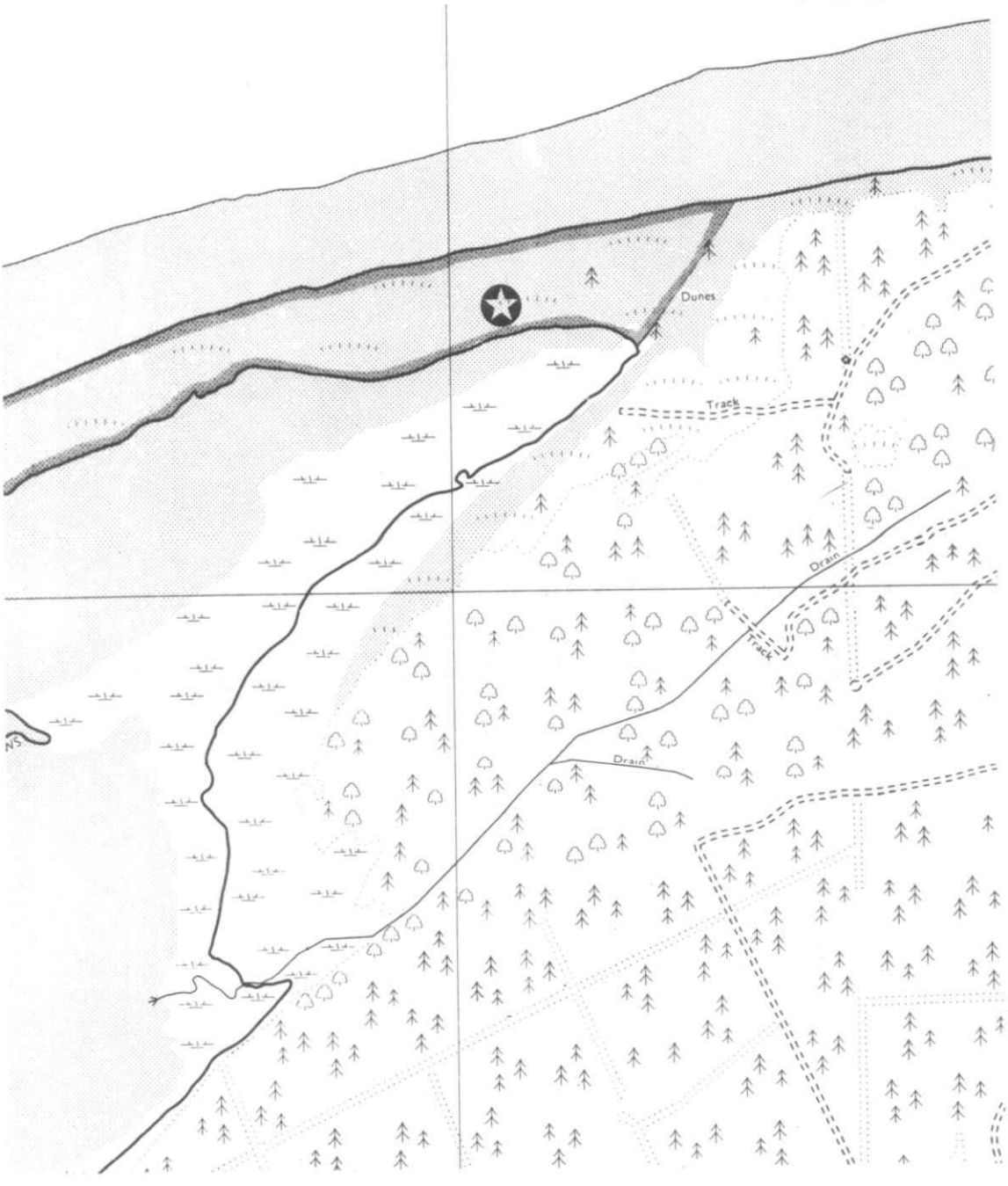
Ematurga atomaria 22.6.77, many flying on bar when disturbed.

Noctuidae

Cerapteryx graminis 22.6.77, 2 pupae under old tyre on salt marsh.

# Site 72B Culbin Bar 2

# Site 72B Culbin Bar 2




0 500 Metres
0 500 Yards

Light trap & pitfall traps

# SITE 72B

## CULBIN BAR 2

### 1. DESCRIPTION OF SAMPLED SITE

#### 1.1 Topography

Culbin Bar was sampled at two sites. The Bar consisted of two differing areas. The eastern section was narrow, with a series of dune ridges which became progressively reduced in height towards its centre. The Culbin Bar 2 sampling site was in this area. The western section, where the Culbin Bar 1 sampling site was established, was larger, with a series of recurved, sand covered, shingle ridges. The Bar, as a whole, enclosed large areas of sand flats and salt marsh.

#### 1.2 Vegetation

The vegetation in the area of the traps was dominated by Ammophila arenaria (70%) and Lotus corniculatus, with no bare ground. The height of the A. arenaria was 50 cm and the other vegetation reached a height of 10 cm. Also in the area were several young pine (Pinus sp.) trees, presumably self-sown from seed from the nearby Forestry Commission plantation. There were also several patches of Empetrum nigrum. Other species of plant seen in the area of the traps included: Senecio jacobaea, Myosotis sp., Leontodon sp., Centaurea sp., Polygala vulgaris, Hieracium sp., Luzula sp., Agropyron junceiforme, Rhinanthus minor, Cirsium vulgaris, Veronica officinalis, Heracleum mantegazzianum, Vicia angustifolia, Epilobium angustifolium, Cerastium sp. and Elymus arenarius.

#### 1.3 Disturbance

There was evidence of light grazing by rabbits.

#### 1.4 Distance from sea

The light trap and pitfall traps in pairs were placed along a transect of 30 metres approximately 50-100 metres from the shore.

### 2. SITING OF LIGHT TRAP AND PITFALL TRAP

#### 2.1 Selection of site

Most of the spit of land consisted of fairly high, undulating dunes covered with A. arenaria, and with little variation in the vegetation

or topography. The traps were placed in one of many sheltered hollows.

2.2 Damage or malfunction

The light trap operated from 16 - 24.6.77 and 14 - 22.7.77. It operated satisfactorily at the end of the first period when tested, but at the end of the last period, the trap was found not to be functional although it contained a good number of moths. This suggests that the light or battery failed only towards the end of the period. The pitfall traps were all functional throughout each of the three periods 16 - 24.6.77, 24.6. - 14.7.77 and 14 - 22.7.77.

2.3 Colour slides available

Box 2, 84-87.

3. THE FAUNA

3.1 Lepidoptera

| | JUNE | JULY | TOTAL |
|---|---|---|---|
| Hepialus fusconebulosa | 17 | 0 | 17 |
| Zygaena filipendulae | 1 | 5 | 6 |
| Scotopteryx chenopodiata | 0 | 14 | 14 |
| Camptogramma bilineata | 0 | 2 | 2 |
| Thera obeliscata | 2 | 4 | 6 |
| Colostygia pectinataria | 0 | 1 | 1 |
| Eupithecia subfuscata | 1 | 0 | 1 |
| Dasychira fascelina | 0 | 1 | 1 |
| Arctia caja | 0 | 2 | 2 |
| Agrotis vestigialis | 0 | 1 | 1 |
| Agrotis exclamationis | 0 | 4 | 4 |
| Noctua comes | 0 | 1 | 1 |
| Lycophotia porphyrea | 0 | 11 | 11 |
| Hada nana | 2 | 0 | 2 |
| Mythimna ferrago | 0 | 1 | 1 |
| Mythimna impura | 0 | 21 | 21 |
| Mythimna comma | 2 | 1 | 3 |
| Blepharita adusta | 1 | 0 | 1 |
| Rusina ferruginea | 9 | 2 | 11 |
| Thalpophila matura | 0 | 33 | 33 |
| Apamea monoglypha | 0 | 8 | 8 |
| Oligia fasciuncula | 0 | 3 | 3 |
| Hoplodrina alsines/blanda | 0 | 2 | 2 |
| TOTAL | 35 | 117 | 152 |

This site produced a relatively small species list and total catch compared other Moray Firth and East Coast sites. Nearly all of the species are common and were trapped widely at a number of other sites during the survey, although Dasychira fascelina was not taken at sites outside the Moray Firth.

One common sand dune species, Agrotis vestigialis, was taken. It was trapped extensively and often commonly at many sites, especially on the North Coast.

A few species are restricted to a limited range of larval food plants. Hepialus fusconebulosa, feeds on the roots of Pteridium aquilinum and was trapped widely at a number of sites. No bracken was seen growing in the area at this site. Zygaena filipendulae is a day flying moth whose larvae feed on Lotus corniculatus. Thera obeliscata feeds on Pinus sylvestris and some other conifers, and Lycophotia porphyrea feeds on Calluna vulgaris and Erica spp..

3.2 Coleoptera : Carabidae

| | JUNE | JN/JL | JULY | TOTAL |
|---|---|---|---|---|
| Carabus problematicus | 6 | 8 | 0 | 14 |
| Leistus rufescens | 0 | 1 | 0 | 1 |
| Notiophilus aquaticus | 0 | 1 | 0 | 1 |
| Broscus cephalotes | 0 | 0 | 1 | 1 |
| Pterostichus niger | 5 | 1 | 5 | 11 |
| Calathus erratus | 0 | 9 | 7 | 16 |
| Calathus fuscipes | 2 | 60 | 29 | 91 |
| Calathus melanocephalus | 1 | 4 | 8 | 13 |
| Amara aenea | 11 | 7 | 2 | 20 |
| Amara lunicollis | 3 | 0 | 0 | 3 |
| Harpalus rubripes | 16 | 12 | 9 | 37 |
| Badister bipustulatus | 3 | 0 | 0 | 3 |
| TOTAL | 47 | 103 | 61 | 211 |

The three Calathus species made up 56.9% of the varied catch of carabids at this site. Harpalus rubripes, a species of sparsely vegetated sandy soil, was trapped in far larger numbers than at any other site during this survey. Another xerophilous species, Amara aenea, was also relatively numerous, as was Pterostichus niger a species of open, but not excessively dry, country. A single larval Amara sp. was trapped in the third period.

3.3 Coleoptera : Hydrophilidae to Scolytidae

| | JUNE | JN/JL | JULY | TOTAL |
|---|---|---|---|---|
| Cercyon melanocephalus | 0 | 0 | 1 | 1 |
| Leiodes dubia/obesa | 0 | 1 | 1 | 2 |
| Agathidium laevigatum | 0 | 0 | 1 | 1 |
| Nargus velox | 1 | 0 | 0 | 1 |
| Micropeplus staphylinoides | 0 | 5 | 6 | 11 |
| Metopsia retusa | 0 | 1 | 0 | 1 |
| Stenus clavicornis | 0 | 0 | 1 | 1 |
| Othius punctulatus | 2 | 0 | 0 | 2 |
| Xantholinus laevigatus | 1 | 0 | 0 | 1 |
| Xantholinus linearis | 1 | 3 | 0 | 4 |
| Staphylinus brunnipes | 3 | 7 | 2 | 12 |
| Staphylinus melanarius | 0 | 1 | 0 | 1 |
| Mycetoporus rufescens | 0 | 1 | 0 | 1 |
| Mycetoporus splendidus | 1 | 1 | 0 | 2 |
| Sepedophilus nigripennis | 5 | 1 | 2 | 8 |
| Tachyporus atriceps | 0 | 1 | 0 | 1 |
| Tachyporus chrysomelinus | 1 | 1 | 0 | 2 |
| Tachyporus nitidulus | 0 | 1 | 0 | 1 |
| Amischa analis | 3 | 2 | 0 | 5 |
| Atheta fungi | 0 | 1 | 0 | 1 |
| Drusilla canaliculata | 17 | 59 | 30 | 106 |
| Oxypoda haemorrhoa | 1 | 0 | 0 | 1 |
| Meligethes erythropus | 0 | 2 | 1 | 3 |
| Atomaria atricapilla | 0 | 1 | 0 | 1 |
| Corticaria umbilicata | 0 | 1 | 0 | 1 |
| Orthocerus clavicornis | 5 | 1 | 0 | 6 |
| Lagria hirta | 0 | 1 | 1 | 2 |
| Longitarsus suturellus | 0 | 1 | 0 | 1 |
| Apion loti | 2 | 3 | 5 | 10 |
| Otiorhynchus ovatus | 23 | 12 | 11 | 46 |
| Sitona griseus | 1 | 1 | 0 | 2 |
| Sitona lineellus | 6 | 9 | 2 | 17 |
| Rhinoncus pericarpius | 1 | 0 | 0 | 1 |
| TOTAL | 74 | 118 | 64 | 256 |

The non-obligate myrmecophile Drusilla canaliculata dominated the catch although Otiorhynchus ovatus, a predominantly coastal species, was abundant, especially during June. The only other coastal/psammophile

species, Leiodes dubia and Sitona griseus, were trapped in very small numbers.

The most notable species, and another which is virtually confined to sandy coasts, is Orthocerus clavicornis, taken elsewhere during this survey only at Sites 75 and 69. These records greatly extend northwards the known range of this species, and may be the only recent records for Scotland. Lagria hirta, trapped elsewhere only at Sites 74 and 75, was previously known only from the Moray district and the southwest region of Scotland (Fowler, 1891 and Buck 1954). The biology of this species is poorly known but it is attracted to light although no specimens were caught in the light traps at these three sites.

Among the phytophagous species Apion loti and Meligethes erythropus feed on Lotus corniculatus, Longitarsus suturellus on Senecio spp., Rhinoncus pericarpius on Rumex spp. and Sitona lineellus on Trifolium spp..

Staphylinus brunnipes, a predatory species, was common only here and at Site 93.

3.4 Araneae

| | JUNE | JN/JL | JULY | TOTAL |
|---|---|---|---|---|
| Drassodes cupreus | 1 | 1 | 0 | 2 |
| Haplodrassus signifer | 11 | 5 | 1 | 17 |
| Zelotes pusillus | 12 | 8 | 5 | 25 |
| Zelotes latreillei | 3 | 1 | 0 | 4 |
| Micaria pulicaria | 4 | 10 | 5 | 19 |
| Clubiona neglecta | 1 | 1 | 0 | 2 |
| Scotina gracilipes | 0 | 0 | 1 | 1 |
| Xysticus cristatus | 0 | 1 | 1 | 2 |
| Tibellus oblongus | 0 | 0 | 1 | 1 |
| Heliophanus flavipes | 1 | 0 | 0 | 1 |
| Pardosa monticola | 0 | 1 | 0 | 1 |
| Pardosa pullata | 92 | 89 | 36 | 217 |
| Pardosa nigriceps | 3 | 4 | 1 | 8 |
| Alopecosa pulverulenta | 2 | 2 | 0 | 4 |
| Alopecosa accentuata | 0 | 1 | 0 | 1 |
| Arctosa perita | 0 | 1 | 0 | 1 |
| Walckenaera acuminata | 1 | 0 | 0 | 1 |
| Walckenaera antica | 0 | 1 | 0 | 1 |

| | JUNE | JN/JL | JULY | TOTAL |
|---|---|---|---|---|
| Peponocranium ludicrum | 0 | 1 | 0 | 1 |
| Pocadicnemis pumila | 4 | 1 | 0 | 5 |
| Pelecopsis parallela | 0 | 2 | 6 | 8 |
| Minyriolus pusillus | 1 | 0 | 0 | 1 |
| Gongylidiellum vivum | 1 | 0 | 0 | 1 |
| Typhocrestus digitatus | 1 | 0 | 0 | 1 |
| Erigone dentipalpis | 0 | 0 | 1 | 1 |
| Agyneta subtilis | 13 | 14 | 0 | 27 |
| Agyneta decora | 4 | 2 | 0 | 6 |
| Stemonyphantes lineatus | 0 | 1 | 0 | 1 |
| Lepthyphantes obscurus | 0 | 1 | 0 | 1 |
| TOTAL | 155 | 148 | 58 | 361 |

The most abundant species in the catch at this site was Pardosa pullata (60.1%). This is a very common and widespread spider of open grassland and has a slight preference for damp areas. Arctosa perita is a lycosid which is restricted to sand dunes and dry sandy heathland.

There were two clubionids present. Clubiona neglecta is a widespread but infrequent species, recorded from a variety of biotopes including sand dunes. Scotina gracilipes is widespread but local although commonly occurring on some heathlands in central and southern England. It was present at only two other sites, both on the East Coast. Tibellus oblongus, a common thomisid of long grassland on lowland sites, was taken elsewhere only at Tentsmuir (Site 90); the closely related T. maritimus is the typical species of sand dunes.

Zelotes latreillei is a very widespread and common species in dry, stony places in England but was taken only at the two Culbin Bar sites and appears to be scarce in Scotland. Typhocrestus digitatus, although taken inland in dry sandy places and moorlands is very often associated with sand dunes. Lepthyphantes obscurus is widespread in Britain but is rarely common. It is usually taken on tall vegetation such as scrub and gorse on heathland. The remaining species are common in grassland.

3.5 Mollusca (Land snails)

| | JUNE | JN/JL | JULY | TOTAL |
|---|---|---|---|---|
| Columella edentula | 0 | 0 | 1 | 1 |
| Vitrina pellucida | 0 | 2 | 2 | 4 |
| TOTAL | 0 | 2 | 3 | 5 |

The catch was very poor. Columella edentula was recorded elsewhere only at Site 95, on the East Coast. It is usually associated with woodland.

3.6 Diplopoda

| | JUNE | JN/JL | JULY | TOTAL |
|---|---|---|---|---|
| Cylindroiulus latestriatus | 1 | 0 | 0 | 1 |
| Ommatoiulus sabulosus | 366 | 153 | 16 | 535 |
| TOTAL | 367 | 153 | 16 | 536 |

Ommatoiulus sabulosus was abundant in the catch here, but was not recorded at Site 72A. Both Cylindroiulus latestriatus and O. sabulosus are common on sandy coasts throughout Britain. The large numbers of O. sabulosus taken in the first period may have been the result of migratory movements, for which this species is well known.

3.7 Terrestrial Isopoda

| | JUNE | JN/JL | JULY | TOTAL |
|---|---|---|---|---|
| Porcellio scaber | 504 | 1968 | 374 | 2846 |

The catch at this site was distinguished from all others by the vary large numbers of Porcellio scaber, with 35.5% of the total catch coming from one trap, 3A, in the middle period. P. scaber is not known to undertake horizontal migration similar to that observed with some species of Diplopoda. It is common species which is found widely in dry sandy soils.

4. ADDITIONAL SPECIES

4.1 Lepidoptera

The following species were observed in the field during the course of the survey. The butterfly records are for Culbin Bar as a whole, not the separate sampling sites.

Hesperidae

Erynnis tages

Lycaenidae

Polyommatus icarus

Nymphalidae

? Argynnis aglaja (seen on the wing, record not confirmed)

Satyridae

Erebia aethiops, flies in Bulbin Forest (Dr M.G. Morris).

Hipparchia semele

Maniola jurtina

Coenonympha pamphilus

Lasiocampidae

Lasiocampa quercus

Geometridae

Pseudopanthera macularia

4.2 Coleoptera : Curculionidae

The following species were recorded by Dr M.G. Morris on 1.8.1975.

Strophosomus melanogrammus, beating Betula spp.,

Pissodes pini, on cut pine logs,

Anoplus plantaris, beating Betula spp.,

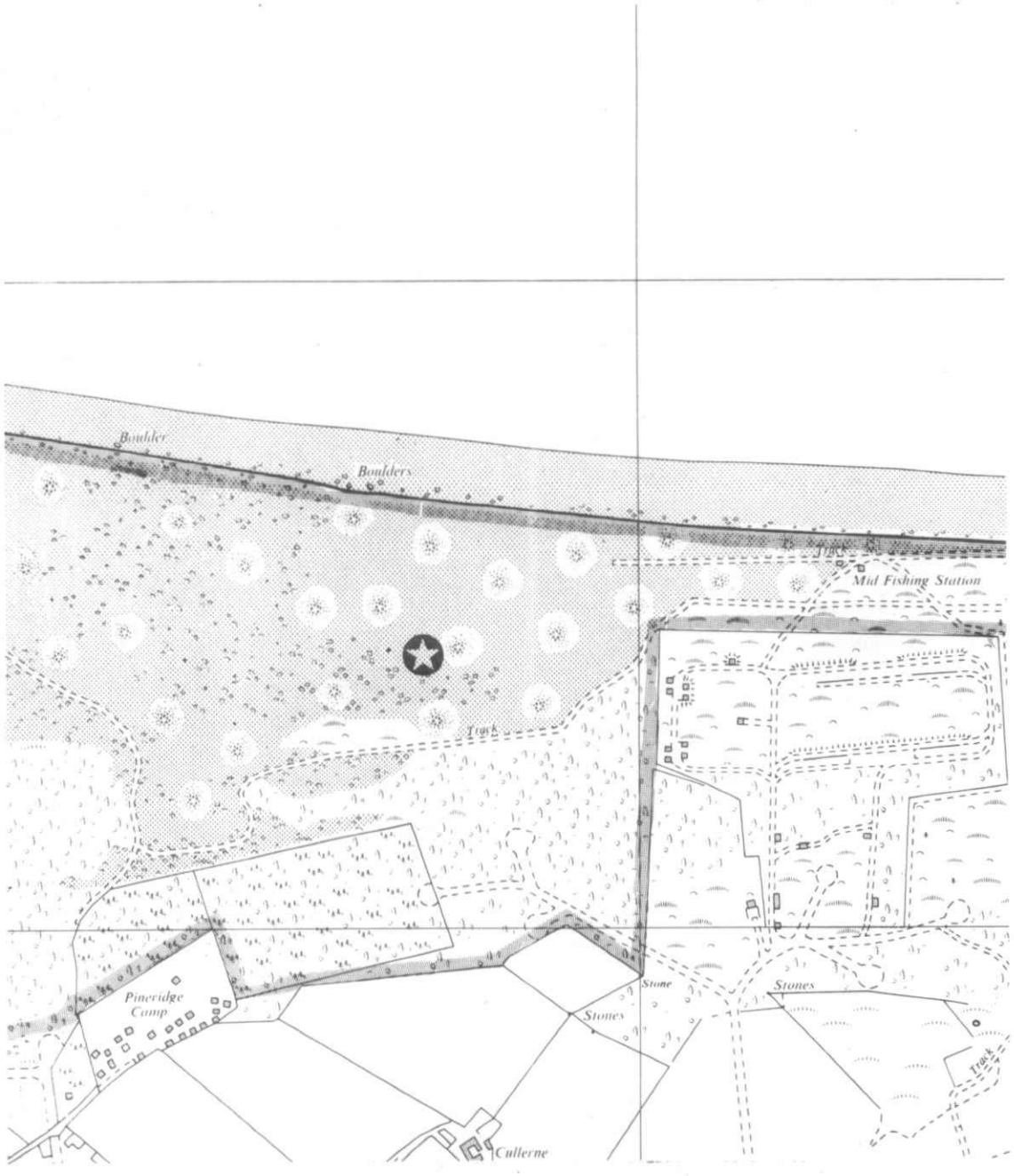
Rhynchaenus rusci, beating Betula spp..

4.3 Pseudoscorpiones : Neobisiidae

Neobisium muscorum : 1♀ in pitfall trap 3B on 14.7.77 det. P.E. Jones.

# Site 74 Findhorn

# Site 74 Findhorn




0 500 Metres
0 500 Yards

Light trap & pitfall traps

# SITE 74

## FINDHORN

### 1. DESCRIPTION OF SAMPLED SITE

#### 1.1 Topography

The site consisted of large flat areas of shingle and mobile sand between high mobile dunes with blow-outs, and areas of fixed dunes covered by scrub of Ulex sp. and Calluna vulgaris.

#### 1.2 Vegetation

The vegetation in the area of the traps was dominated by Ammophila arenaria (70%) with fine grasses and some moss, and with no bare ground. There was a large patch of Ulex sp. nearby. The height of the A. arenaria was 50 cm with the other vegetation at 20 cm. Other species of plant seen near the traps included: Lotus corniculatus, Viola sp., Achillea millefolium, Erica tetralix, Calluna vulgaris, Rumex acetosella, Luzula campestris, Senecio jacobaea, Filago vulgaris, Anthoxanthum odoratum, Agrostis sp., Epilobium angustifolium, Cerastium sp., Polygala vulgaris, Galium boreale, Veronica officinalis and Campanula rotundifolia.

#### 1.3 Disturbance

There was evidence of light grazing by rabbits. Much use of the site was made by the public, with easy access on foot from a car park at the western end. The site was also used for pony trecking. There were caravan and camping sites nearby, and the whole area was clearly popular with holiday makers, especially near the beach.

#### 1.4 Distance from sea

The light trap and pitfall traps were placed approximately 400 metres from the shore along a transect of 30 metres.

### 2. SITING OF LIGHT TRAP AND PITFALL TRAPS

#### 2.1 Selection of site

This was a popular holiday area with much public use, especially near the beach. The dunes near the sea appeared to be mobile and it was decided to place the traps in a hollow some distance inland, in a better vegetated area and where it was hoped that there would be

less likelihood of disturbance by people.

2.2 Damage or malfunction

The light trap operated from 15 - 23.6.77 and 13 - 21.7.77. At the end of the first period the trap was functional when tested, but two of the supporting lanyards had been pulled out. On 21.7.77 the trap was not functional when tested, but it contained a good number of moths and may have failed only towards the end of the period. A number of pitfall traps were apparently vandalised and were either missing or empty, but the remaining traps were functional during each of the three periods 15 - 23.6.77, 23 - 13.7.77 and 13 - 21.7.77. The vandalised traps were: 15 - 23.6.77 - trap 2B, 13 - 21.7.77 - traps 1B, 2B, 3B and 4A. People were observed leaving the area of the traps, in some haste, when the field team arrived at the site on 21.7.77.

2.3 Colour slides available

Box 2, 88-93.

3. THE FAUNA

3.1 Lepidoptera

| | JUNE | JULY | TOTAL |
|---|---|---|---|
| Hepialus fusconebulosa | 1 | 0 | 1 |
| Idaea aversata | 0 | 1 | 1 |
| Xanthorhoe fluctuata | 1 | 0 | 1 |
| Scotopteryx chenopodiata | 0 | 1 | 1 |
| Scotopteryx luridata | 0 | 12 | 12 |
| Epirrhoe alternata | 0 | 1 | 1 |
| Camptogramma bilineata | 0 | 2 | 2 |
| Cosmorhoe ocellata | 0 | 7 | 7 |
| Thera obeliscata | 0 | 2 | 2 |
| Colostygia pectinataria | 1 | 7 | 8 |
| Eupithecia centauriata | 0 | 1 | 1 |
| Eupithecia vulgata | 3 | 0 | 3 |
| Eupithecia tripunctaria | 1 | 0 | 1 |
| Eupithecia subfuscata | 1 | 0 | 1 |
| Alcis repandata | 0 | 4 | 4 |
| Bupalus piniaria | 1 | 2 | 3 |
| Gnophos obfuscatus | 0 | 21 | 21 |
| Dyscia fagaria | 0 | 1 | 1 |
| Dasychira fascelina | 0 | 5 | 5 |

| | JUNE | JULY | TOTAL |
|---|---|---|---|
| Arctia caja | 0 | 34 | 34 |
| Agrotis vestigialis | 0 | 13 | 13 |
| Agrotis clavis | 0 | 1 | 1 |
| Agrotis exclamationis | 4 | 18 | 22 |
| Ochropleura plecta | 1 | 1 | 2 |
| Standfussiana lucernea | 0 | 1 | 1 |
| Noctua comes | 0 | 3 | 3 |
| Lycophotia porphyrea | 5 | 77 | 82 |
| Hada nana | 1 | 1 | 2 |
| Mythimna conigera | 0 | 8 | 8 |
| Mythimna ferrago | 0 | 5 | 5 |
| Mythimna impura | 0 | 78 | 78 |
| Mythimna comma | 1 | 7 | 8 |
| Rusina ferruginea | 1 | 0 | 1 |
| Thalpophila matura | 0 | 18 | 18 |
| Apamea monoglypha | 0 | 44 | 44 |
| Apamea furva | 0 | 7 | 7 |
| Oligia versicolor | 0 | 1 | 1 |
| Oligia fasciuncula | 0 | 1 | 1 |
| Mesapamea secalis | 0 | 1 | 1 |
| Hoplodrina alsines/blanda | 0 | 3 | 3 |
| Autographa bractea | 0 | 1 | 1 |
| TOTAL | 22 | 390 | 412 |

This site produced an above average species list and total catch compared with other Moray Firth and East Coast sites. Two species which did not occur at any other site during the survey were Eupithecia tripunctaria, which is not usually found this far north and feeds on Angelica sylvestris, Heracleum sphondylium and other Umbelliferae, and Oligia versicolor, a widely distributed species thought to feed on grasses. Eupithecia vulgata, Alcis repandata and Dasychira fascelina were not taken outside the Moray Firth area.

One common sand dune species, Agrotis vestigialis, was taken. It was trapped extensively and often commonly at many sites, especially on the North Coast.

Several species are restricted to a limited range of larval food plants. Thera obeliscata and Bupalus pinaria feed on Pinus sylvestris

and various other conifers. Epirrhoe alternata and Cosmorhoe ocellata feed on Galium spp.. Hepialus fusconebulosa feeds on Pteridium aquilinum and was trapped widely at a number of sites. Scotopteryx luridata feeds on Sarothamnus scoparius and Ulex spp.. Gnophos obfuscatus feeds on Calluna vulgaris and Genista anglica. According to South (1961) this species is confined to Scotland, in Britain. Lycophotia porphyrea and Dyscia fagaria feed on Calluna vulgaris and Erica spp.. D. fagaria was taken elsewhere only at Sites 58 and 69.

3.2 Coleoptera : Carabidae

| | JUNE | JN/JL | JULY | TOTAL |
|---|---|---|---|---|
| Carabus problematicus | 0 | 1 | 0 | 1 |
| Leistus rufescens | 3 | 1 | 0 | 4 |
| Nebria salina | 2 | 0 | 0 | 2 |
| Notiophilus aquaticus | 0 | 2 | 1 | 3 |
| Pterostichus niger | 1 | 1 | 1 | 3 |
| Calathus erratus | 2 | 3 | 0 | 5 |
| Calathus fuscipes | 0 | 84 | 2 | 86 |
| Amara aenea | 1 | 0 | 0 | 1 |
| Amara lunicollis | 1 | 0 | 1 | 2 |
| Bradycellus harpalinus | 1 | 0 | 0 | 1 |
| Dromius linearis | 0 | 3 | 0 | 3 |
| TOTAL | 11 | 95 | 5 | 111 |

Calathus fuscipes dominated the small, but varied, collection of Carabidae from this site. Brachycellus harpalinus, a species usually found on sandy soils, and one which regularly flies to light, was taken here, and at Sites 75 and 95, as single specimens. A single larva of Dromius sp. was taken during the first sampling period.

3.3 Coleoptera : Hydrophilidae to Scolytidae

| | JUNE | JN/JL | JULY | TOTAL |
|---|---|---|---|---|
| Catops chrysomeloides | 0 | 1 | 0 | 1 |
| Anthobium atrocephalum | 1 | 0 | 0 | 1 |
| Othius angustus | 0 | 1 | 1 | 2 |
| Staphylinus melanarius | 1 | 1 | 0 | 2 |
| Quedius boops | 0 | 2 | 1 | 3 |
| Bolitobius analis | 1 | 1 | 0 | 2 |
| Sepedophilus marshami | 0 | 1 | 0 | 1 |
| Tachyporus chrysomelinus | 0 | 1 | 0 | 1 |
| Amischa analis | 1 | 0 | 0 | 1 |
| Drusilla canaliculata | 2 | 1 | 0 | 3 |

| | JUNE | JN/JL | JULY | TOTAL |
|---|---|---|---|---|
| Geotrupes vernalis | 2 | 6 | 1 | 9 |
| Athous haemorrhoidalis | 1 | 1 | 1 | 3 |
| Agriotes acuminatus | 4 | 2 | 0 | 6 |
| Cantharis nigricans | 1 | 0 | 0 | 1 |
| Cryptophagus setulosus | 1 | 2 | 0 | 3 |
| Corticarina fuscula | 0 | 1 | 0 | 1 |
| Lagria hirta | 0 | 1 | 0 | 1 |
| Longitarsus succineus | 0 | 1 | 0 | 1 |
| Longitarsus suturellus | 3 | 1 | 0 | 4 |
| Otiorhynchus ovatus | 0 | 2 | 0 | 2 |
| Strophosomus melanogrammus | 7 | 5 | 0 | 12 |
| Rhinoncus pericarpius | 1 | 0 | 0 | 1 |
| TOTAL | 26 | 31 | 4 | 61 |

A varied fauna but with very low numbers of specimens was trapped. The catch was particularly small during the third sampling period because four traps were vandalised. Strophosomus melanogrammus, the most numerous species, is more usually found in woodlands, particularly on hazel, but the larvae may be associated with herbaceous plants such as Rumex spp., also the host-plant for Rhinoncus pericarpius. Other phytophagous species included Longitarsus suturellus which feeds on Senecio spp., and L. succineus which feeds on various Compositae.

Lagria hirta was recorded elsewhere only from Sites 72B and 75 and is known in Scotland only from the southwest and Moray districts (Fowler, 1891 and Buck, 1954). This is the most northerly site at which Sepedophilus marshami was trapped; it also occurred at Sites 93 and 95. Hammond (1973) had not seen any specimens from Scotland but expected it to occur, at least in the south.

Geotrupes vernalis indicates that dung was present in the area; Drusilla canaliculata is a non-obligate myrmecophile and Cryptophagus setulosus frequents the nests of humble bees.

3.4 Araneae

| | JUNE | JN/JL | JULY | TOTAL |
|---|---|---|---|---|
| Drassodes cupreus | 0 | 3 | 0 | 3 |
| Haplodrassus signifer | 5 | 1 | 0 | 6 |
| Zelotes pusillus | 3 | 1 | 1 | 5 |
| Micaria pulicaria | 1 | 1 | 1 | 3 |

| | JUNE | JN/JL | JULY | TOTAL |
|---|---|---|---|---|
| Clubiona trivialis | 1 | 0 | 0 | 1 |
| Clubiona diversa | 0 | 1 | 0 | 1 |
| Heliophanus flavipes | 0 | 2 | 0 | 2 |
| Pardosa palustris | 1 | 0 | 0 | 1 |
| Pardosa pullata | 6 | 7 | 0 | 13 |
| Pardosa nigriceps | 1 | 0 | 0 | 1 |
| Alopecosa pulverulenta | 7 | 0 | 0 | 7 |
| Alopecosa accentuata | 1 | 2 | 0 | 3 |
| Trochosa terricola | 0 | 2 | 0 | 2 |
| Steatoda phalerata | 1 | 1 | 1 | 3 |
| Walckenaera acuminata | 0 | 0 | 1 | 1 |
| Tiso vagans | 2 | 1 | 0 | 3 |
| Tapinocyba praecox | 1 | 0 | 0 | 1 |
| Gongylidiellum vivum | 0 | 1 | 1 | 2 |
| Centrometrita concinna | 0 | 1 | 0 | 1 |
| Stemonyphantes lineatus | 0 | 1 | 0 | 1 |
| Lepthyphantes mengei | 2 | 11 | 2 | 15 |
| Lepthyphantes ericaeus | 1 | 0 | 0 | 1 |
| TOTAL | 33 | 36 | 7 | 76 |

The four gnaphosid spiders which occurred commonly at the Moray Firth and the northern East Coast sites were again present: Drassodes cupreus, Haplodrassus signifer, Zelotes pusillus and Micaria pulicaria are all fairly common on dry grassland and were formerly thought to have rather southern distributions. Clubiona trivialis is common in grass and heather and tends to be more frequent in the north of Britain than the south. It was taken elsewhere only at Sites 50N and 60, both on the North Coast.

Six species of lycosid were taken but only in small numbers, and all are common grassland species. The common dune lycosid, Arctosa perita, was not recorded, possibly due to the absence of bare sand in the sampling area. Steatoda phalerata, although widespread in Britain, is rarely common. It is usually associated with dry grass or heather. The remaining species are all common in grassland.

3.5 Mollusca (Land snails)

| | JUNE | JN/JL | JULY | TOTAL |
|---|---|---|---|---|
| Punctum pygmaeum | 0 | 0 | 1 | 1 |
| Aegopinella pura | 0 | 1 | 0 | 1 |
| TOTAL | 0 | 1 | 1 | 2 |

This was a very poor catch. Punctum pygmaeum was recorded elsewhere only at Site 67, also in the Moray Firth.

3.6 Diplopoda

| | JUNE | JN/JL | JULY | TOTAL |
|---|---|---|---|---|
| Ommatoiulus sabulosus | 0 | 0 | 2 | 2 |

Ommatoiulus sabulosus is common on sandy soils throughout much of Britain.

3.7 Terrestrial Isopoda

| | JUNE | JN/JL | JULY | TOTAL |
|---|---|---|---|---|
| Porcellio scaber | 2 | 9 | 0 | 11 |

Porcellio scaber is widely recorded on sandy soils.

4. ADDITIONAL SPECIES

4.1 Lepidoptera

The following species were observed in the field during the course of the survey:

Pieridae

- Pieris brassicae
- P. napi

Lycaenidae

- Lycaena phaeas
- Polyommatus icarus

Nymphalidae

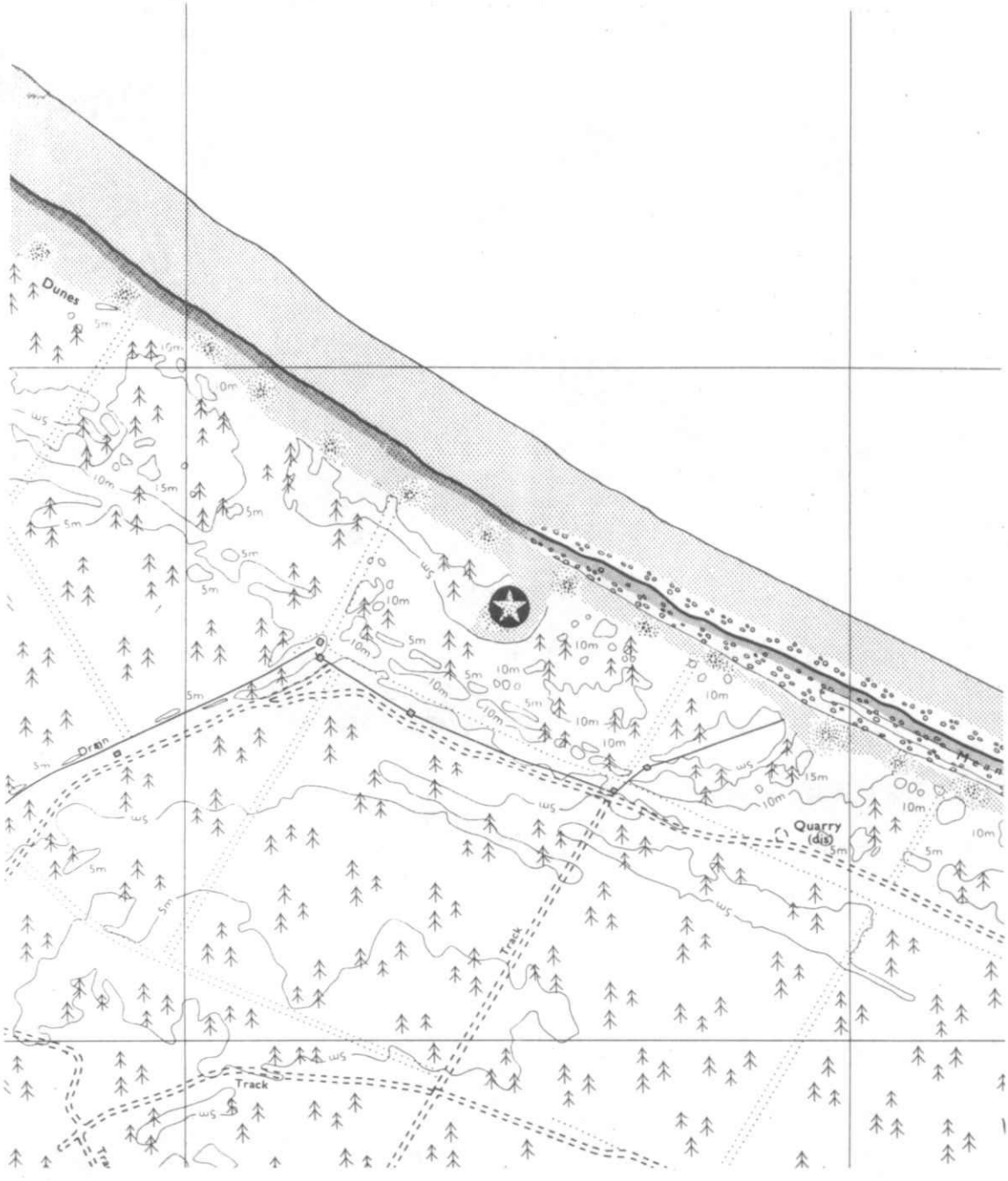
- Aglais urticae
- Argynnis aglaja

Satyridae

- Hipparchia semele
- Maniola jurtina
- Coenonympha pamphilus

# Site 75 Lossiemouth

# Site 75 Lossiemouth




0 500Metres
0 500Yards

Light trap & pitfall traps

# SITE 75

## LOSSIEMOUTH

### 1. DESCRIPTION OF SAMPLED SITE

#### 1.1 Topography

The dunes at Lossiemouth extend for at least 7 kilometres along the coast. Most of the area is afforested leaving a narrow band of marram covered dunes on the northern (coastal) edge. The area of dunes widens at the western end near the estuary of the River Lossie.

#### 1.2 Vegetation

The vegetation surrounding the traps was dominated by moss with some clumps of Ammophila arenaria and 15% bare ground. The A. arenaria reached 50 cm in height, but the remaining vegetation was very short, little more than 1 cm in most places. There were several young pines (Pinus sp.) in the area which were presumably self sown from seed from the Forestry Commission plantations nearby. Other species of plant noted in the area of the traps included: Epilobium angustifolium, Cirsium arvense, Senecio jacobaea, Ranunculus repens, Hieracium sp., Lotus corniculatus, Holcus lanatus, Festuca sp., Agropyron junceiforme, Elymus arenarius, Taraxacum officinale, Thymus drucei, Viola sp., Lactuca sp., Cerastium sp., Galium verum, Sedum acre, Stellaria media and Ononis repens.

#### 1.3 Disturbance

There was evidence of moderate grazing by rabbits.

#### 1.4 Distance from sea

The light trap and pitfall traps were placed in a 30 metre transect approximately 50 metres from the shore.

### 2. SITING OF LIGHT TRAP AND PITFALL TRAPS

#### 2.1 Selection of site

The traps were placed in a sheltered hollow in the marram transition zone, in an area typical of the rest of the site.

#### 2.2 Damage or malfunction

The light trap operated from 15 - 23.6.77 and 13 - 21.7.77, but was

not functional at the end of either period when tested. The pitfall traps were all functional during each of the three periods 15 - 23.6.77, 23.6. - 13.7.77 and 13 - 21.7.77.

2.3 Colour slides available

Box 2, 94-96.

3. THE FAUNA

3.1 Lepidoptera

| | JUNE | JULY | TOTAL |
|---|---|---|---|
| Zygaena filipendulae | 0 | 14 | 14 |
| Idaea aversata | 0 | 1 | 1 |
| Camptogramma bilineata | 0 | 1 | 1 |
| Thera obeliscata | 0 | 22 | 22 |
| Colostygia pectinataria | 0 | 1 | 1 |
| Semiothisa liturata | 0 | 2 | 2 |
| Alcis repandata | 0 | 1 | 1 |
| Bupalus piniaria | 0 | 16 | 16 |
| Arctia caja | 0 | 1 | 1 |
| Agrotis vestigialis | 0 | 4 | 4 |
| Agrotis clavis | 0 | 1 | 1 |
| Agrotis exclamationis | 0 | 11 | 11 |
| Standfussiana lucernea | 0 | 1 | 1 |
| Noctua comes | 0 | 1 | 1 |
| Lycophotia porphyrea | 0 | 17 | 17 |
| Mythimna ferrago | 0 | 2 | 2 |
| Mythimna impura | 0 | 5 | 5 |
| Mythimna comma | 0 | 1 | 1 |
| Acronicta euphorbiae | 1 | 0 | 1 |
| Rusina ferruginea | 0 | 2 | 2 |
| Thalpophila matura | 0 | 4 | 4 |
| Apamea monoglypha | 0 | 13 | 13 |
| Apamea lithoxylaea | 0 | 1 | 1 |
| Mesapamea secalis | 0 | 1 | 1 |
| Photedes elymi | 0 | 2 | 2 |
| Hoplodrina alsines/blanda | 0 | 1 | 1 |
| TOTAL | 1 | 126 | 127 |

The number of species caught and size of total catch was low compared with other Moray Firth and East Coast sites but the trap was not fully functional during either trapping period. The only moth collected during the first trapping period was a single specimen of Apatele euphorbiae, the only example of this species collected during the survey. In Britain it is found only in Scotland where it was first recorded in 1846 in Perthshire. Its larvae feed on Myrica gale, Calluna vulgaris, Betula spp. and Salix spp..

Two sand dune species occurred. Photedes elymi has a scattered distribution in Britain and is restricted to the east coast. This and previous records from Findhorn (Site 74) are the most northerly known localities for this species in Britain. It was also taken at several East Coast sites. The larvae feed on Elymus arenarius, which is not restricted to the east coast in Britain. Agrotis vestigialis was trapped extensively and often commonly at many sites, especially on the North Coast.

A number of species are restricted to a limited range of larval food plants. Alcis repandata which feeds on various woody plants including Calluna vulgaris and Vaccinium spp. only occurred in the Moray Firth. Semiothisa liturata feeds on Pinus sylvestris and Larix decidua, and Thera obeliscata and Bupalus piniaria feed on Pinus sylvestris and other conifers. Zygaena filipendulae is a day flying moth whose larvae feed on Lotus corniculatus. Lycophotia porphyrea feeds on Calluna vulgaris and Erica spp..

3.2 Coleoptera : Carabidae

| | JUNE | JN/JL | JULY | TOTAL |
|---|---|---|---|---|
| Pterostichus adstrictus | 0 | 1 | 0 | 1 |
| Calathus erratus | 11 | 123 | 83 | 217 |
| Calathus fuscipes | 3 | 18 | 63 | 84 |
| Calathus melanocephalus | 0 | 4 | 6 | 10 |
| Calathus mollis | 0 | 1 | 1 | 2 |
| Amara aenea | 8 | 19 | 0 | 27 |
| Bradycellus harpalinus | 0 | 1 | 0 | 1 |
| TOTAL | 22 | 167 | 153 | 342 |

The catch of carabids at this site was dominated by the four species of Calathus. The two xerophilous species, C. erratus and Amara aenea, were more numerous here than at any other site. Pterostichus adstrictus is a species of open, usually mountainous country. This was

the only specimen of this species trapped during the survey. Bradycellus harpalinus, which was taken here and also at Site 74 and 95 as single specimens usually frequents sandy soils and regularly flies to light.

3.3 Coleoptera : Hydrophilidae to Scolytidae

| | JUNE | JN/JL | JULY | TOTAL |
|---|---|---|---|---|
| Leiodes dubia/obesa | 0 | 1 | 0 | 1 |
| Omalium caesum | 1 | 0 | 0 | 1 |
| Xantholinus linearis | 0 | 1 | 0 | 1 |
| Staphylinus brunnipes | 1 | 0 | 0 | 1 |
| Tachyporus hypnorum | 0 | 2 | 0 | 2 |
| Aloconota gregaria | 0 | 1 | 1 | 2 |
| Atheta exigua | 0 | 2 | 0 | 2 |
| Atheta atramentaria | 0 | 1 | 0 | 1 |
| Aleochara bipustulata | 0 | 1 | 0 | 1 |
| Serica brunnea | 0 | 6 | 6 | 12 |
| Byrrhus pustulatus | 13 | 43 | 0 | 56 |
| Orthocerus clavicornis | 3 | 8 | 2 | 13 |
| Lagria hirta | 1 | 22 | 11 | 34 |
| Cassida rubiginosa | 0 | 1 | 0 | 1 |
| Apion loti | 3 | 1 | 0 | 4 |
| Otiorhynchus atroapterus | 76 | 120 | 13 | 209 |
| Otiorhynchus ovatus | 4 | 8 | 3 | 15 |
| Philopedon plagiatus | 89 | 64 | 8 | 161 |
| Sitona griseus | 2 | 6 | 0 | 8 |
| Sitona lineellus | 1 | 4 | 2 | 7 |
| Hypera postica | 2 | 6 | 0 | 8 |
| TOTAL | 196 | 298 | 46 | 540 |

The unusual assemblage of species caught at this site was dominated by two weevils which are characteristic of sandy coasts, Otiorhynchus atroapterus and Philopedon plagiatus. Both species were caught in larger numbers here than at any other site. Other coastal/psammophile species include O. ovatus, Orthocerus clavicornis, Serica brunnea, Sitona griseus, Leiodes dubia and Atheta exgua. O. clavicornis was more numerous here than at the other two sites (69 and 72B) at which it was collected. This species had not previously been known from this region or indeed this far north. The only published records for Scotland are from Balmeny near Edinburgh, in the middle of the last century (Murray 1853), and from Aberlady and Luce Bays (Crowson, 1956).

The relatively large numbers of Byrrhus pustulatus and Lagria hirta trapped at this site were not exceeded elsewhere in the survey. B. pustulatus is more commonly found on sandy sites and is known from from localities on the Scottish east coast as far north as the Moray Firth (Fowler, 1889). It was taken elsewhere only at Site 69 as a single specimen. The distribution of L. hirta in Scotland is apparently restricted to the southwest and the Moray district (Fowler, 1891 and Buck, 1954). Small numbers were taken nearby at Sites 72B and 74, and three larvae were caught at this site during the first sampling period.

Phytophagous species include Sitona lineellus and Hypera postica which feed on Trifolium spp., Apion loti which feeds on Lotus corniculatus, and Cassida rubiginosa on thistles. Atheta atramentaria and Aleochara bipustulata indicate the presence of dung on the site.

3.4 Araneae

| | JUNE | JN/JL | JULY | TOTAL |
|---|---|---|---|---|
| Drassodes cupreus | 2 | 1 | 0 | 3 |
| Haplodrassus signifer | 1 | 0 | 0 | 1 |
| Zelotes pusillus | 4 | 1 | 0 | 5 |
| Micaria pulicaria | 7 | 20 | 8 | 35 |
| Clubiona neglecta | 1 | 2 | 0 | 3 |
| Scotina gracilipes | 0 | 0 | 1 | 1 |
| Xysticus cristatus | 1 | 0 | 0 | 1 |
| Pardosa pullata | 1 | 2 | 0 | 3 |
| Pardosa nigriceps | 1 | 1 | 0 | 2 |
| Alopecosa pulverulenta | 2 | 6 | 1 | 9 |
| Arctosa perita | 1 | 8 | 1 | 10 |
| Hahnia nava | 1 | 0 | 0 | 1 |
| Tiso vagans | 0 | 2 | 0 | 2 |
| Troxochrus cirrifrons | 1 | 0 | 0 | 1 |
| Erigone atra | 0 | 0 | 1 | 1 |
| TOTAL | 23 | 43 | 12 | 78 |

Drassodes cupreus, Haplodrassus signifer, Zelotes pusillus and Micaria pulicaria, form a combination of gnaphosid spiders which was very common on the Moray Firth and the more northern of the East Coast sites. All are quite common in dry grassland and were formerly thought to have rather southern distributions. Clubiona neglecta is widespread in many different biotopes including sand dunes. Scotina gracilipes

is widespread but local in Britain and is usually found in heather. The lycosid Arctosa perita is restricted to dry sandy places such as bare heathland, and is very common on sand dunes. Troxochrus cirrifrons is very scarce in Britain but has been taken on dunes and in chalk grassland. The three records of this species made during the survey (also at Site 59 and 82) are the first for northern Scotland. All the other species are common in grassland.

3.5 Mollusca (Land snails)

| | JUNE | JN/JL | JULY | TOTAL |
|---|---|---|---|---|
| Candidula intersecta | 0 | 8 | 3 | 11 |

This was a very poor catch. Candidula intersecta is believed to have been introduced to the British Isles in Roman times, or later.

3.6 Diplopoda

| | JUNE | JN/JL | JULY | TOTAL |
|---|---|---|---|---|
| Cylindroiulus latestriatus | 1 | 2 | 0 | 3 |
| Ommatoiulus sabulosus | 0 | 7 | 2 | 9 |
| TOTAL | 1 | 9 | 2 | 12 |

Cylindroiulus latestriatus and Ommatoiulus sabulosus are both common on sandy coasts throughout most of Britain.

3.7 Terrestrial Isopoda

| | JUNE | JN/JL | JULY | TOTAL |
|---|---|---|---|---|
| Porcellio scaber | 1 | 1 | 0 | 2 |

Porcellio scaber is found widely on dry sandy soils.

4. ADDITIONAL SPECIES

4.1 Lepidoptera

The following species were observed in the field during the course of the survey:

Hesperidae

Erynnis tages

Pieridae

Pieris napi

Lycaenidae

Polyommatus icarus

Nymphalidae

Aglais urticae

Argynnis aglaja

Satyridae

Erebia aethiops

Hipparchia semele

Maniola jurtina

Coenonympha pamphilus

Geometridae

Ematurga atomaria

Arctiidae

Parasemia plantaginis 22.6.77 common, especially towards western end.