THE FRESHWATER FAUNA OF LUNDY

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INTRODUCTION

Since the early 1800's a considerable amount of research has been carried out on the terrestrial flora and fauna of Lundy, and in recent years organisms of the marine sublittoral zone have received much attention. In comparison the freshwater life has been sadly neglected. The freshwater habitats have been well documented by Langham (1968), but apart from some work on aquatic Hemiptera (Morgan et al. 1947), diatoms (Fraser-Bastow, 1949), Crustacea and Rotifera (Galliford, 1953) and the isopod *Asellus* (Williams, 1962), there has been no comprehensive investigation of the freshwater flora and fauna. Some aquatic organisms have been listed in the mainly terrestrial surveys of specific animal groups (Brendell, 1975; Lane, 1977).

Lundy, a small island lying 18 Km from the nearest mainland, has a reasonable number of freshwater habitats although many are small and dry up during the summer. All or nearly all of the larger ponds are artificial, being formed from dammed-up springs or from flooding of quarries and depressions in the rock. In the U.K., island freshwater ponds have received little investigation and Lundy provides a unique opportunity for a study of such habitats—an opportunity to see if there are any endemic species or varieties present, and to examine colonisation and establishment of organisms from the mainland.

In July 1978 a preliminary investigation of the invertebrate fauna was carried out on six of the Lundy ponds: Pondsbury (1345, 4545), the two main Quarterwall ponds (1361, 4493 and 1363, 4495), Quarterwall Quarry pool (1376, 4503) small pool in quarry near Halfway Wall (1383, 4558) and the Rocket Pole pond (1348, 4366).

The results indicate that the ponds appear to support different faunas and that ponds with no through drainage (Quarterwall, Rocket Pole) appear to be more eutrophic than ponds with drainage outlets (Pondsbury, Quarry pool). Data from the preliminary survey is still being processed, and only results from Pondsbury and the Quarterwall ponds are being presented in this paper. It is intended to carry out a detailed quantitative survey of both the flora and fauna of the main Lundy freshwater habitats (including the streams) in 1979 and 1980.

Pondsbury (1345, 4545)

Pondsbury is the largest of the freshwater ponds on the island, and is probably of natural origin although damming has increased its size and depth. It lies in a *Sphagnum* bog in the centre of the island and the water is peaty with an acid pH. During dry summers it becomes reduced in size and occasionally dries up altogether (e.g. summer of 1976). Pondsbury has continuous through drainage (except of course in abnormally dry weather)—it receives surface runoff from the surrounding land and has a stream flowing from it down Punchbowl Valley.

Quarterwall ponds

Four are marked on the Ordnance Survey map, but only two were in existence in July 1978.

Quarterwall Pond 1 (1361, 4493)

This is the larger of the two ponds and has been formed from an excavation in the rock. It is situated at a fairly high level on the island and probably receives little surface drainage; there is no outlet. In July 1978 species of *Juncus* were situated at the edges of this fairly open pond. There were no macrophytic plants within the pond, although it carried a dense bloom of planktonic algae. The water consequently appeared turbid and had a neutral to alkaline pH.

Quarterwall pond 2 (1363, 4495)

This is a small shallow pond with no through drainage. In July 1978 it had a dense weed cover (mainly *Potamogeton* spp.), and *Juncus* was present at the edges. The water appeared quite clear and it had a neutral pH.

INVERTEBRATE ANIMALS PRESENT IN THE PONDS

Animals were collected using the standard FBA collecting net (aperture 0·96 mm). No attempt was made during this preliminary survey to take quantitative samples but similar collecting times were employed at each pond. The results are shown in Table I where some indication of abundance of organisms is also given.

Table I. Invertebrate fauna of ponds

(P = Present. P* = Present in fairly large numbers). l. = larvae.

Fauna	Pondsbury	Quarterwall 1	Quarterwall 2
Coelenterata:			
Hydra sp.	—	—	P
Platyhelminthes:			
Polycelis nigra (Müller)	P	—	P
Annelida:			
Lumbriculus variegatus (Müller)	—	P*	P*
Crustacea:			
Cladocera:			
Daphnia obtusa Kurz	P	P	P*
Daphnia pulex (de Geer)	P	P	P*
Bosmina longirostris (Müller)	—	—	P
Copepoda			
Cyclops vernalis s. str. (Fischer)	—	—	P
Ostracoda			
Family Cyprididae	—	—	P
Isopoda			
Asellus meridianus Racovitza	P*	P*	P*
Uniramia: Insecta:			
Odonata			
Sympetrum striolatum (Charpentier) 1.	P	—	—
Hemiptera			
Notonecta glauca Linnaeus	P	P	—
Corixa punctata (Illiger)	—	P	—
Sigara limitata (Fieb.)	—	P	—
Coleoptera			
Acilius sulcatus (Linnaeus)	—	adults & larvae P	—
Hydroporus erythrocephalus (Linnaeus)	—	—	adultsP
Hyphydrus ovatus (Linnaeus)	adults & larvae P	—	—
Helochares obscurus (Müller)	adults P	—	—
Helophorus grandis Illiger	—	—	adults P
Bagous limosus (Gyllenhal)	—	—	adults P
Trichoptera			
Limnephilus vittatus (Fabricius) 1.	P	P	P
Diptera			
Chironomid 1.	P	—	—
Chelicerata:			
Argyroneta aquatica Linnaeus	P*	—	—

DISCUSSION

It is obviously not possible to draw any major conclusions from such a preliminary survey, but it does appear that the three ponds have differences in their invertebrate populations. The smaller Quarterwall 2 pond has a more diverse fauna and supports a more prolific zooplankton both in terms of number of species and number of animals present than the other two ponds.

Twenty-two different species of invertebrate were found, and of these, thirteen species were insects, mainly beetles and bugs, all of which are fairly strong flying forms. The complete lack of any molluscs is expected as they mainly occur in more alkaline calcareous waters; however the semi-aquatic gastropod *Lymnaea truncatula* has previously been recorded on the island (Anon, 1950). The presence of the isopod *Asellus meridianus* in all three ponds is interesting and supports the research of Williams (1962). *A. meridianus* and the closely related species, *Asellus aquaticus*, are both widely distributed throughout the U.K. but rarely do they occur together in the same body of water. Freshwater habitats of offshore islands e.g. Isle of Man, Skokholm, the Scilly Isles, appear only to contain *A. meridianus* and this supported by this survey. Pondsbury has a fairly large population of the aquatic spider, *Argyroneta aquatica*, and this animal was recorded also in this pond 25 years ago, by Galliford (1953). *Argyroneta* prefers fairly large bodies of standing water with submerged and floating plants, and this probably explains its absence from Quarterwall pond 1 which lacks this type of vegetation, and from the much smaller Quarterwall pond 2. In this species male spiders are larger than the females and it is one of the few spiders where the two sexes live amicably together; the female does not eat the male after copulation has taken place as she does in most other species.

All three of the ponds dried up during the drought summer of 1976, but it appears that recolonisation has occurred quite rapidly since then. Many freshwater organisms have resistant stages in their life cycles, and it is likely that the crustaceans spent the dry period as "resting eggs" in the bottom mud. Organisms such as flatworms and oligochaete worms can form resistant cysts around themselves to withstand dry conditions. Most of the insects, although some can withstand a certain amount of desiccation by aestivating in the bottom mud, have probably come across from the mainland, many being strong fliers, e.g. *Notonecta*, *Sympetrum*. A considerable number of freshwater organisms are carried by birds from habitat to habitat and it is likely that several species have reached Lundy in this way during the last two years.

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