

A STUDY OF THE PYGMY SHREW (*Sorex minutus*) ON LUNDY, 1996

By

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INTRODUCTION

The Pygmy Shrew (*Sorex minutus*) is the smallest native British shrew. It is distributed throughout mainland Britain but is also found on all other British islands longer than 10 km, as well as many of the smaller Scottish islands, Skomer and Lundy. It is absent from the Scillies, the Channel Islands and Shetland and is the only shrew found in Ireland (Churchfield 1988,4).

The Pygmy Shrew is Lundy's only surviving indigenous terrestrial mammal, the other six species present on the island have been introduced. Lundy may have had a more diverse terrestrial mammal fauna just after the last ice age when Lundy was joined to mainland Britain. As the ice retreated and sea levels rose, mammals could have become isolated from the mainland. The small size of Lundy would have made any mammal populations vulnerable to disturbance, particularly from man's activities, perhaps resulting in their extinction. The Pygmy Shrew seems to have been able to withstand these changes (Wilcox 1988).

In 1953 an investigation of the Pygmy Shrew on Lundy was documented in the *Annual Report of the Lundy Field Society*. Sightings of the shrew were recorded in the terraces in Millcombe, St John's Valley, the Hotel Gardens and in the Lighthouse Field. Longworth live mammal traps (Chitty 1949) were used for this survey but there is no mention of any animals being captured (Anon. 1953,28). In 1962, Pearson notes the capture of one Pygmy Shrew in a Longworth trap during a twenty day survey aimed principally to study the status of Black and Brown Rats (Pearson *et al* 1962,20). In another survey, twenty Longworth traps were set for five days and nights aiming to catch juvenile rats; however, no shrews were caught (Perrin and Gurnell 1971,35). Since 1987, sightings of the Pygmy Shrew have been recorded in the *Annual Report of the Lundy Field Society*. Animals were often found dead or seen in low numbers (Appendix 1).

The literature review highlights that there is a lack of detailed information about the Pygmy Shrew on Lundy. The aim of this survey was to gather some baseline data on the Pygmy Shrew, collecting information on individual animals and their distribution in different habitats.

MATERIALS AND METHODS

Four linear transects were established at different sites at the south end of the island (Fig.1). Each transect comprised ten stations with an interstation distance of 10m. Sites were chosen according to habitat suitability and recent sightings of the Pygmy Shrew in that area (Lundy Field Log Book 1996; Lundy Warden, pers comm). Accessibility and travelling time to the sites were also considered. Observations about transect vegetation and weather were made.

Shrews were trapped using Longworth live mammal traps. The nest box of the trap was filled with hay bedding and blow fly pupae for food and the trip weight set at 4g (Gurnell and Flowerdew 1991). A trail of blow fly pupae was placed along the tunnel to encourage shrews to enter the trap. Two traps were placed at each station along a transect line and inspected twice daily at around 10 am and 8 pm.

Trapped shrews were given an individual mark by clipping a small patch of fur from different parts of the animal's body. The marks remain visible for at least two weeks and up to forty animals can be uniquely identified by using a combination of marks (R Temple, pers comm). Trapped shrews were also weighed and the sex and breeding condition determined (Searle 1985). The animals were released at the point of capture.

A licence was obtained from English Nature in accordance with the *Wildlife and Countryside Act 1981* in order to trap and fur clip these animals.

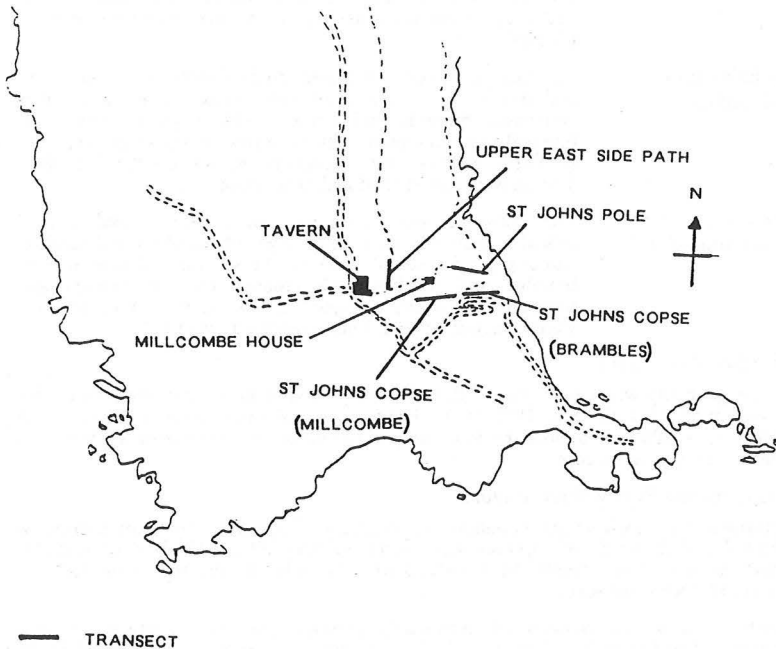


Fig 1: Distribution of trapping sites

RESULTS

Vegetation

Table 1 shows the vegetation found at each of the four transects. The survey highlights the similarity between the vegetation growing on the Upper East Side Path and that at St John's Flagpole; likewise, the similarity between the vegetation at both transects in St John's Valley. The distribution of Pygmy Shrews in each habitat type - scrub and woodland - will be considered.

Table 1. Vegetation survey

Transect	Description
Upper East Side Path	The transect ran alongside a path. The vegetation was fairly dense with a shrub layer of: blackthorn, brambles, gorse, bracken and nettles and a ground cover of: grasses, red campion, cleavers, dock, wood sage and liverwort.
St John's Flagpole	The transect ran across a knoll with a patchy shrub layer of: blackthorn, brambles, gorse and bracken. Ground cover was also patchy comprising: grasses, red campion, ground ivy, buttercup, liverwort, stonecrop, wood sage, wild primrose and bluebell.
St John's Copse (Millcombe)	An area of mixed woodland; predominantly sycamore, oak and beech with some coniferous species. The shrub layer comprised bramble and bracken with a ground cover of: bluebell, red campion, nettle, sorrel, grasses, ground ivy, liverwort, cowslip, lesser celandine and some fallen branches. The transect was shaded and fairly damp.
St John's Copse (Lower Brambles)	The transect crossed two areas. The first was a small area of mixed woodland with a shrub layer of brambles and bracken and a ground layer of grasses. The second a shrubby area of bramble and bracken with ground cover of grasses and bluebells. A stream separated the two areas but no stations were near wet ground. The transect was shaded.

Weather observations

It was generally warm and sunny with light winds throughout the trapping period with the exception of 11th June 1996 when heavy rain and high winds prevailed. The stability of weather throughout the trapping period enables us to discount weather as a variable of trapping success.

Trap sites and Pygmy Shrew captures

Information on each animal captured is provided in Appendix 2 and summarised in Tables 2 and 3. 86 % of captures were adult animals, all of which were sexually mature; 68% of these adults were male. Juveniles make up the remaining 14% of captures and were not sexed.

Table 3 shows the number of individuals captured per unit of effort, i.e. trap efficiency. The Upper East Side Path had the highest capture success followed by St John's Copse (Lower Brambles), St John's Flagpole and St John's Copse (Millcombe) respectively. When tested pairwise by the method of Linn and Downton (1975, 1976) the catch rates on the four traplines proved to show no statistically significant differences between the scrub and woodland habitats at the 5% level.

Some 41% of individuals were captured more than once during the study, often at the same trapping station and all except one remained in good health. A greater number of shrews were captured during the night than in the day, however traps were open for longer during this period.

Table 2. A summary of Pygmy Shrew captures.

Number of individual Pygmy Shrews captured	22
Number of adults	19
Number of males	13
Number of females	6
Number of juveniles	3

Average weight 5g Range 5 - 6g
Average weight 6g Range 5 - 7g
Average weight 3g Range 3 - 4g

Table 3. Pygmy Shrew captures according to transect.

Site and habitat type	No individuals	trap effort (No trap nights x No traps)	trap efficiency (No individuals ÷ trap effort)
Upper East Side Path Scrub	9	160 (8 x 20)	0.056 %
St John's Flagpole Scrub	5	160 (8 x 20)	0.031 %
St John's Copse (Millcombe) Woodland	3	160 (8 x 20)	0.019 %
St John's Copse (Lower Bramble) Woodland	5	100 (5 x 20)	0.050 %

Finally, during the study we noticed that food in the tunnel and the nest box of many traps had been eaten but the traps had not been set off. We attributed this to shrews weighing less than the trip weight (4g). However we then observed that Pygmy Shrews were able to pass beneath the trap mechanism and thus enter the nest box without triggering the trap (Fig.2). The problem of small mammals being able to enter and leave the Longworth trap without triggering the door release mechanism has been commented upon by numerous authors. (Shillito 1960, Perrin 1971, and Gurnell 1972, 1978.)



Fig. 2 - Pygmy shrew passing underneath the treadle of a Longworth live mammal trap.

DISCUSSION

Pygmy Shrews live in many different types of habitat although they often show preference for areas where there is plenty of ground cover (Churchfield 1991,62). In Britain they are found mostly in deciduous woodland, hedgerows, grassland and scrubland (Churchfield 1988,6). There does not appear to be any difference in capture success between the two habitat types investigated (scrub and woodland), even though ground cover at St. John's flagpole was patchy. However the data set was limited and the results should be interpreted with caution.

Some 14% of Pygmy Shrew captures were juveniles. This is probably an underestimate of the percentage of juveniles in the population, as young animals weighing less than the trigger weight of the trap may have entered without being captured. In total, 68% of adult captures were males. However, there is a bias towards males in trapped samples, especially during the breeding season when they are searching for mates (Churchfield 1991,56). The percentage of males to females in the population is more likely to be around 45% (Churchfield 1991,63). The average weight of Pygmy Shrews captured on Lundy falls within the range for this species; 2.4 - 6.1g (Churchfield 1991, 51).

Lundy is an ideal location in which to study the Pygmy Shrew, as they are the only small mammals present on the island. In comparison, on the mainland, only 10-35% of shrews caught in Longworth traps are Pygmy Shrews (Churchfield 1991,62). These animals are probably the only indigenous terrestrial mammal on the island and have been isolated for a long time. Thus, they may show different physical or behavioural characteristics to other pygmy shrew populations, although none were noted in this study. Before future work is undertaken, it may be beneficial to modify the Longworth trap to prevent animals passing underneath the treadle, avoiding capture. Future work could build upon this data set and in particular establish the distribution of the Pygmy Shrew across the island.

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APPENDIX 1. RECORDED SIGHTINGS OF THE PYGMY SHREW ON LUNDY ISLAND FROM 1987 TO MAY 1996.

Year	Source	Information
1987	38th Annual Report of the Lundy Field Society pg 56	2 recently dead shrews sighted on the 28th Aug 87; 1 shrew sighted on the 25th Sep 87.
1988	39th Annual Report of the Lundy Field Society pg 72	Sightings of a maximum of 3 shrews on 10th Apr 88, 16th Apr 88, 14th May 88 and 30th Aug 88.
1989	40th Annual Report of the Lundy Field Society	2 dead shrews sighted in Jun 89; 3 shrews sighted 7th Sep 89.
1990	41st Annual Report of the Lundy Field Society pg 75	2 live, 1 dead shrew sighted on 4th Mar 90; 1 live shrew sighted on 1st Jun 90; 1 dead shrew on 24th Jul 90 and 20th Aug 90.
1991	42nd Annual Report of the Lundy Field Society pg 106	Sightings of a maximum of 3 shrews on dates between 24th Feb 91 and 15th Oct 91.
1992	43rd Annual Report of the Lundy Field Society pg 117	Sightings of a maximum of 1 shrew on dates between 9th Feb 92 and 4th Oct 92.
1993	44th Annual Report of the Lundy Field Society pg 87	Sightings of a maximum of 3 shrews on dates between 20th Jul 93 and 26th Oct 93.
1994	45th Annual Report of the Lundy Field Society pg 89	Sightings of a maximum of 2 shrews on dates between 5th May 94 and 20th Nov 94.
1995	46th Annual Report of the Lundy Field Society pg. 94	Sightings on 10 days from 20th March 95 to 2nd Oct 95. (Max =2).
1996	Lundy field log book, observations from Jan to May 96.	1 shrew sighted at Quarter Wall on 5th May 96; many shrews heard around Millcombe on 5th and 7th May 96; 1 shrew sighted in Brambles on 9th May 96; 1 shrew sighted in heathland near Jenny's Cove on 30th May 96.

APPENDIX 2. INFORMATION ON EACH INDIVIDUAL PYGMY SHREW CAPTURED

Trap site	Trap effort (No traps x No nights)	Age	Weight (g)	Sex	Visible signs of maturity	Comments
Upper East Side Path	160	adult	6	male	inguinal bulges and scent gland	dead in trap
		adult	5	male	inguinal bulges and scent gland	captured twice
		adult	5	male	inguinal bulges	captured twice
		adult	6	female	nipples	captured twice
		adult	6	female	nipples	captured six times, finally died in trap
		adult	5	male	inguinal bulges	captured once
		adult	7	female	nipples	captured once
		juvenile	3	?		captured once
St Johns Flagpole	160	adult	7	female	nipples	captured four times
		adult	6	male	inguinal bulges and scent gland	captured once
		adult	5	male	inguinal bulges and scent gland	captured once
		adult	5	male	inguinal bulges and scent gland	captured three times
		adult	5	male	inguinal bulges and scent gland	captured once
		adult	5	male	inguinal bulges and scent gland	captured once
St Johns Valley Copse (Milloombe)	160	adult	5	female	nipples	captured once
		adult	5	male	inguinal bulges and scent gland	captured twice
		adult	5	male	inguinal bulges and scent gland	captured once but also captured at lower brambles
St Johns Valley Copse (Lower Brambles)	100	adult	6	male	inguinal bulges and scent gland	captured twice
		adult	6	female	nipples	captured twice
		juvenile	4	?		captured once
		adult	6	male	scent gland	captured once
		juvenile	3	?		captured once

Explanation of terms

Inguinal bulges contain the testes.

The scent gland is found in adult males between the fore limbs and the hind limbs on the side of the body. It produces a sticky secretion often used for marking territories.