Rep. Lundy Fld. Soc. 36

SHIP RATS ON LUNDY, 1983

By
P. A. SMITH
Biology Department, Rugby School Science Laboratory, Barby Road, Rugby.

INTRODUCTION

There are two species of the rodent genus *Rattus* in the British Isles, both introduced. The most common species is the brown rat, *Rattus norvegicus,* which is distributed throughout the United Kingdom. Perhaps surprisingly, the brown rat did not reach our shores until approximately 1720 (G. I. Twigg 1975). In contrast, the ship or black rat, *Rattus rattus,* was well established in the Middle Ages, originating from Asia, probably India. Nowadays its United Kingdom distribution is much restricted, it being found only in a few ports where immigration from ships may help maintain numbers.

The ship rat prefers to live in warm conditions; in temperate climates it tends to inhabit buildings such as warehouses where it is vulnerable to pest control measures. Its decline and apparent ousting by the brown rat probably owes much to the latter's competitive edge in adapting to changing environmental conditions. In particular, the warm squalid housing prevalent in the hey-day of *R. rattus* no longer exists. The brown rat is well able to cope with the rigours of an outdoor life in our climate, it being thought to originate from Siberia.

Where both rat species coexist, spatial separation often occurs — so much so that *R. rattus* is also known as the 'roof rat', indicating its more arboreal habits when found together with *R. norvegicus* in warehouses.

All of this makes the possibility that brown rats and ship rats coexist on Lundy very interesting. This is especially so as the numbers of either are unlikely to be influenced by immigration. If the species are sympatric is spatial segregation operating or could some other factor such as diet be involved?

This paper does not attempt to answer such questions but rather describes the results of an investigation designed to establish whether *R. rattus* was still present on Lundy. This follows the suggestion, made by M. R. Perrin and J. Gurnell in 1971, that the ship rat population on Lundy may be declining.

METHOD

Field observations were made over a four week period from 4th October to 28th October 1983 in an attempt to establish evidence of ship rat activity on Lundy.

The principal means of such detection involves seeking evidence of burrowing activity together with identifying faecal pellets. A major problem arises in discriminating the pellets of the two rat species. There are some publications which attempt to resolve this difficulty (Handbook of British Mammals 1977; L. W. Huson and R. A. Davis 1980), but it is still necessary to confirm the species present by conducting a trapping exercise.

Figure 1 shows those areas in which obvious signs of rat activity were noted. The whole island was explored as evenly as possible and the figure shows that rats appeared restricted to the Southern region.

On the basis of evidence from these preliminary observations a break-back trapping programme was carried out in likely *R. rattus* habitats. The results of this are shown in Table 1.

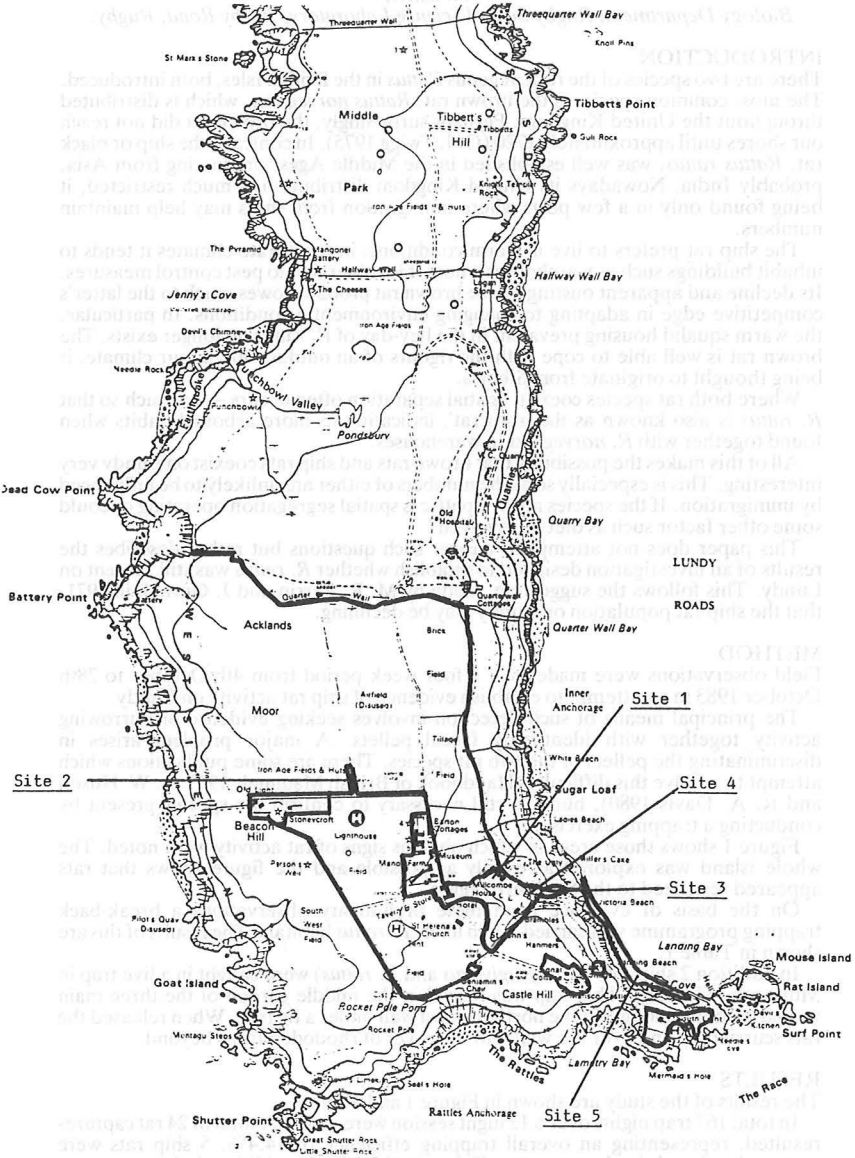
In addition 2 ship rats (*R. r. frugivorus* and *R. rattus*) were caught in a live trap in Millcombe Gardens. This trap was placed in the middle garden of the three main walled gardens, alongside the northernmost wall under a fig tree. When released the rats scurried up and over the wall into the cover of rhododendrons beyond.

RESULTS

The results of the study are shown in Figure 1 and Table 1.

In total 167 trap nights over a 12 night session were made. A total of 24 rat captures resulted, representing an overall trapping efficiency of 14.4%. 5 ship rats were captured in break-back traps, an efficiency of 3.0%. In addition 2 ship rats were caught in live traps.

Figure 1. Diagram to show regions in which rat activity was evident.
Key: ——— = Regions in which rat burrows and/or faecal pellets were found.
Sites in which traps were positioned are numbered 1 to 5.



Map reproduced by kind permission of C. G. Taylor. Crown copyright reserved.

TABLE 1. Trap Sites and Captures

SITE No.	LOCALITY	SPECIES	SEX	WEIGHT (g.)	TRAP TYPE
1	Millcombe shed	*R. norvegicus*	♀ perf	220	Victor
1	Millcombe shed	*R. norvegicus*	♀ perf	248	Victor
1	Millcombe shed	*R. norvegicus*	♂ s	276	Nipper
1	Millcombe shed	*R. norvegicus*	♂ s	293	Nipper
2	Storage tanks	*R. norvegicus*	♀ perf	96	Unseen
3	Millcombe valley	*R. norvegicus*	♂ a	54	Nipper
3	Millcombe valley	*R. norvegicus*	♂ a	77	Self-set
3	Millcombe valley	*R. norvegicus*	♀ perf	83	Unseen
3	Millcombe valley	*R. norvegicus*	♀ perf	83	Self-set
3	Millcombe valley	*R. norvegicus*	♀ perf	73	Victor
3	Millcombe valley	*R. norvegicus*	♀ perf	70	Victor
3	Millcombe valley	*R. norvegicus*	♀ perf	183	Nipper
3	Millcombe valley	*R. norvegicus*	♀ perf	202	Nipper
3	Millcombe valley	*R. norvegicus*	♀ perf 1	276	Self-set
3	Millcombe valley	*R. r. frugivorus*	♀ perf	113	Nipper
4	Millcombe gardens	*R. norvegicus*	♂ a	186	Self-set
4	Millcombe gardens	*R. norvegicus*	♂ s	261	Victor
4	Millcombe gardens	*R. norvegicus*	♀ perf	178	Nipper
4	Millcombe gardens	*R. norvegicus*	♀ perf	157	Self-set
4	Millcombe gardens	*R. rattus* sp.	?	?	Nipper*
4	Millcombe gardens	*R. rattus rattus*	?	?	Victor*
5	Landing beach cave	*R. norvegicus*	♀ perf	200	Victor
5	Landing beach cave	*R. r. frugivorus*	♂ s/a	233	Unseen
5	Landing beach	*R. rattus rattus*	♂ a	210	Victor

*These rats were partially eaten, presumably by other rats, and hence were difficult to identify completely.

KEY TO TABLE 1.

All trap types refer to different makes of break-back traps.

Sexual status of males is designated as:

♂ a — Testes abdominal
♂ s — Testes scrotal
♂ s/a — Testes not fully scrotal

Sexual status of females is designated as:

♀ perf — Vagina perforate
♀ perf 1 — Vagina perforate and female lactating.

Within each site traps were placed at roughly equal intervals but the distance between traps varied from site to site. More emphasis was placed on positioning of traps in areas where captures were considered likely, e.g. in runways or near burrows. In addition care was taken to place traps so as to avoid capturing birds.

A bait of peanut butter mixed with oatmeal and crushed apple was used. This held together well and had a strong fermenting odour. Traps were checked once a day. Captured rats were skinned and their alimentary canals preserved for further study.

Millcombe shed refers to an outhouse behind Millcombe Hotel.

Millcombe valley refers to a steep sided gulley through which runs a small stream.

Landing beach cave refers to a small cave on the landing beach, close to the 'Cove'.

DISCUSSION

As can be seen from Table 1 at least two morphs of the ship rat are still present on Lundy, *R. r. rattus* and *R. r. frugivorus*. *R. r. rattus* has not been recorded here for 21 years whilst the third morph, *R. r. alexandrinus* was not caught during this investigation.

In this study an overall trapping efficiency of 14.4% was recorded, this compares with 1.54% in 1971 (Perrin and Gurnell) and 3.2% in 1962 (the Oxford Lundy

Expedition). The present study trapped ship rats with an efficiency of 3.0% whilst Perrin and Gurnell's data shows that ship rats were trapped with an efficiency of only 0.44%. However, unless the trapping regimes adopted by different studies are identical then useful comparisons are difficult to make. Trapping efficiency can be influenced by seasonal changes in rat numbers and behaviour, by the positioning and location of traps and by the length of time the traps are laid. In fact, on these grounds, the evidence of a possible decline in ship rat numbers as mentioned in the Handbook of British Mammals (1977) cannot really be considered anything more than speculation.

What would appear more obvious is that the status of the brown rat has changed over the last 20 years. It was reported by the Oxford Lundy Expedition that:

'The black rat is present in larger numbers over a wider territory than the brown rat — thus dispelling the widely held view of the dominance of brown rat (*R. norvegicus*). This may well be accounted for by the presence of two brown-grey forms of the black rat (*R. r. alexandrinus* and *R. r. frugivorus*).'

(It is worth mentioning that this statement is based on 30 rat captures in 1770 trap nights over 21 days, of which 719 were break-back trap nights resulting in 24 of the captures).

Clearly this is no longer the case, *R. norvegicus* appears widely distributed over the southern region of the island and is present in high numbers. Figure 1 shows the regions in which rat activity was observed and it is clear that most of this could be attributed to *R. norvegicus;* brown rats were often seen in these areas.

Possibly the most dramatic change since the studies of 1962 and 1971 is the recent appearance of Myxomatosis on Lundy. Rabbit numbers were clearly reduced and it will be interesting to note whether this will affect rat numbers in any way. For example, will rats increase in numbers if they utilise the empty rabbit burrows?

SUMMARY

(1) Ship rats were still present on Lundy in 1983. The morph *R. r. alexandrinus* was not recorded.
(2) *R. norvegicus* is abundant in the Southern region of the island.
(3) It is suggested that past statements concerning the decline of ship rats are merely speculative as hard statistical evidence is not available.
(4) Myxomatosis is now present on Lundy and this may influence rat numbers.

ACKNOWLEDGEMENTS

I should like to thank the Lundy Field Society for funding this study, Dr. G. I. Twigg, Professor D. M. Stoddart, Mr. R. Redfern, Dr. G. Greaves and all the Islanders for their help and support. I am also grateful to Dr. J. Smith for commenting on and typing the manuscript.

REFERENCES

HUSON, L. W. and DAVIS, R. A. (1980). Discriminant functions to aid identification of faecal pellets of *Rattus norvegicus* and *Rattus rattus*. J. Stored Prod. Res. *16,* 103.

MATHESON C. (1958). The black rat at British seaports. Pest Technol. *1,* 47.

OXFORD LUNDY EXPEDITION REPORT, 1962. (1963). The Mammal Society of the British Isles. Bulletin No. 20.

PEARSON, A.D. (1964). Distribution of black and brown rats on Lundy. The Mammal Society of the British Isles. Bulletin No. 21.

PERRIN, M. R. and GURNELL, J. (1971). Rats on Lundy. Lundy Field Society 22nd Annual Report. 1971.

TAYLOR, K. D. (1977). Ship rat *Rattus rattus*. p.235-240. Common rat *Rattus norvegicus*. p.240-247. In 'The Handbook of British Mammals', 2nd Edition (Edited by Corbet, G. B. and Southern, H. N.). Blackwell, Oxford.

TWIGG, G. (1975). 'The Brown Rat'. David and Charles, Newton Abbot.