Rep Lundy Fld Soc. **27** (1976)

THE MARINE FAUNA OF LUNDY

ASCIDIACEA (Sea Squirts)

DAVID J. W. LANE

Department of Genetics, University College of Swansea, Singleton Park, Swansea SA2 8PP

INTRODUCTION

The first published records of ascidians on Lundy are provided by Harvey (1950, 1951) who records 8 littoral species. Observations and collections made in a variety of near shore sublittoral habitats, at a total of 20 sites during 1970 to 1975, have extended the list to 25 species. Habitats examined include bedrock surfaces and crevices; rocks and stones; soft sediments; *Laminaria* holdfasts and other algal surfaces; external skeletal surfaces of animals, including the tunic of other ascidians. In addition, three shore locations, The Gates, Quarry Beach and North Rat Island shore, have been re-examined.

GENERAL OBSERVATIONS

The ascidians of Lundy form a diverse component of the marine fauna in terms of numbers of species and the habitats they occupy, but only rarely can certain species be considered abundant. Records for many species consist of single specimens only.

One species that is locally abundant at Lundy is *Stolonica socialis*. This is of particular interest since *Stolonica socialis* is a Southern species, recorded previously from the coast of Brittany and the Channel Islands (Berrill, 1950), the Glenan archipelago (Lafargue, 1970) and the Southern coasts of England and Ireland (Berrill, 1950). It probably reaches the Northern limit of its distribution at Lundy.

Species which would be considered rare in Lundy waters include the Clavelinid, *Distaplia rosea*, and the Molgulids, *Eugyra arenosa* and *Molgula occulta*. The very restricted distribution of the two Molgulids may be related to the limited regions of soft substrata on which they live, coupled with their reproductive behaviour. The eggs undergo direct development without a free swimming tadpole larva, thus dispersal and colonisation from other sources would not take place readily.

DISTRIBUTION AND ABUNDANCE IN RELATION TO WATER MOVEMENT

The range of exposure to tidal or wave generated water movements varies considerably around Lundy and is an important factor influencing the distribution and abundance of ascidians. The comparatively sheltered East coast is found to be richer in species and numbers of individuals or colonies than sites on the exposed West coast. Undoubtedly many species show a preference for situations sheltered from extremes of water movement. The solitary ascidian, *Ascidia mentula*, is found predominantly off the East coast, at depths below 10 m and often in crevices. Wave action is greatly reduced at this depth and the crevice microhabitats provide shelter from water currents. Other conspicuous species found in sheltered situations, mainly off the East coast, are *Diplosoma listerianum*, *Clavelina lepadiformis* and *Ascidia virginea*, the latter also recorded from crevices. Many less common species are recorded only off the East coast. This, in part, may be a consequence of the limited number of West coast sites visited (4). However, these West coast sites are probably typical in their paucity of species and many species must be prevented from becoming established by the violent displacements of water and sediments during the frequent Westerly and South Westerly gales. The Polyclinidae are notably absent from the West coast as are species of Molgulidae which live loosely attached on sand and mud or partially embedded in these mobile substrata.

Some species show a preference for situations exposed to moderate water flow. *Botryllus schlosseri* is recorded intertidally at The Gates, a situation subjected to wave action. It is generally considered to be a shallow water species (Berrill, 1950; Millar, 1970) although at Lundy it has also been recorded in deeper water off the West coast (13–25 m) and the East coast (8–21·5 m). *Stolonica socialis* shows a marked preference for rock surfaces exposed to tidal flow. It is common at several localities off the East coast North of Tibbett's Point and is locally abundant on the tide swept slate ledges off the South coast. Since ascidians are active suspension feeders, capable of creating their own feeding currents, the preference for moving water is not entirely understood. One possibility is that water currents may enhance the efficiency of filtration. An inability to tolerate siltation might be another factor. This has been demonstrated for *Dendrodoa grossularia* (Gulliksen, 1973), a species not observed on Lundy in recent years. Hiscock and Hoare (1975) report that ascidians within Abereiddy Quarry, an extremely sheltered marine basin, occur mainly on silt free surfaces.

SPECIES LIST

This list of ascidians includes species recorded by Harvey (1950) from the shores of Lundy, together with records of observations and collections made in near shore sublittoral habitats during the years 1970 to 1975. The names of people who have made observations or collected material are abbreviated as follows: L. A. Harvey (LAH), K. Hiscock (KH), Dr. R. Hoare (RH), Dr. D. Irvine (DI), D. J. W. Lane (DL), J. B. Markham (JBM), Dr. P. G. Moore (PGM), D. Tierney (DT), J. Wilson (JW). Their assistance is gratefully acknowledged. Identification of all collected material has been carried out or checked by the author, the principal works used being those of Millar (1970) and Berrill (1950). The system of classification and nomenclature follows that used in the Plymouth Marine Fauna (Marine Biological Association, 1957). Synonyms are not given here but can be found in Berrill (1950).

Phylum	**CHORDATA**
Sub-Phylum	**UROCHORDATA (TUNICATA)**
Class	ASCIDIACEA
Order	ENTEROGONA
Sub-Order	APLOUSOBRANCHIATA
Family	CLAVELINIDAE
Sub-Family	CLAVELININAE

Clavelina lepadiformis (Müller, 1776)

Recorded in 1950 (LAH). Subsequently recorded off the East coast at the following sites: Seals Rock, 9.7.75 and 11.7.75, occasional colonies between and on the sides of boulders, and on the vertical cliff face (DL); Gannets Rock Pinnacle (N. facing cliff), ca. 15 m, 30.7.74 (JBM), 17.7.75 (DL), a few small colonies; Brazen Ward, 1 m, 29.7.74, rare in shallow water (KH); Knoll Pins, ca. 20 m, 3.6.72, occasional colonies (KH); Knoll Pins South, 23 m, 9.7.75, occasional (KH); Knoll Pin Point, 15 m, 15.7.75, occasional on stones, mud bottom, collected specimens contained eggs and developing larvae in the atrial cavity (DL); Quarry Bay, 13 m, 14.8.72, one patch seen (KH); Quarter Wall Bay, 14.7.75, occasional (DL); Landing Bay, ca. 10 m, 12.7.75, on slate rock outcrops (DL); N. Rat Island, 3–10 m, July 1971 and 1975, occasional to rare (KH & DL), 10 m on a kelp holdfast (DL); S. Rat Island, ca. 3m, June 1972 and 1973, occasional (KH); recorded also from the West coast at Battery Point, 20 m, 16.8.72 (KH) and N.W. Needle Rock, 9 m and deeper, 3.8.74 (KH).

Sub-Family HOLOZOINAE

Distalpia rosea Della Valle, 1881

Brazen Ward, 14 m, 29.7.74, rare, on stones, muddy gravel (KH), eggs present (DL); Gannets Rock, 18.7.75, infrequent, attached to a stone, gravel slope at base of N. facing cliff (RH), with larvae (DL).

Family POLYCLINIDAE

Morchellium argus (Milne-Edwards, 1841)

Ladies Beach, littoral, 1950, undersides of rocks (LAH); Rat Island, LWN, 1951, undersides of overhangs and arches (LAH); N. Rat Island, 6–10 m, occasional, 24.7.71 specimens fertile, with larvae, 8.7.75 eggs and embryos present, 12.7.75 eggs and larvae present (DL); Knoll Pins South, 21·5 m, 10.7.75, one small specimen (3 mm) from a 0·3125 m^2 quadrat, horizontal granite (KH), eggs and larvae present (DL).

Sidnyum turbinatum Savigny, 1816

The Gates, LWN, 7.7.75, occasional, larvae in atrial cavity (DL); N. Rat Island, 7 m, 8.7.75, occasional, larvae in atrial cavity (DL).

Sidnyum elegans (Giard, 1872)

Recorded in 1950 (LAH); N. Rat Island, LWN, 24.7.71, common under overhangs, eggs and larvae present (DL).

Aplidium punctum (Giard, 1873)

Ladies Beach, littoral, 1950, undersides of rocks (LAH); Rat Island, LWN, 1951, undersides of overhangs and arches (LAH); N. Rat Island, 7 m, 8.7.75, common on vertical and overhanging rock surfaces, larvae and eggs in atrial cavity (DL), 10 m, 12.7.75, on slate, larvae present (DL).

Family DIDEMNIDAE

Tridemnum tenerum (Verrill, 1871)

N. Rat Island, 7 m, 8.7.75, infrequent (DL).

Didemnum candidum Savigny, 1816

Knoll Pin Point, 15 m, 15.7.75, one small colony on fragment of oyster shell, larvae present (DL).

Diplosoma listerianum (Milne-Edwards, 1841)

Gannets Rock South, 13 m, 8.8.74, occasional, base of boulder slope (KH); Gannets Bay, 12 m, 16.7.75, common on rock (DL); Brazen Ward, 14 m, 29.7.74, frequent (KH); Knoll Pins South, 21·5 m, 10.7.75, small colony (a few sq. cm) from 0·3125 m^2 quadrat, horizontal granite (KH); Quarry Bay, LWN, 10.7.75, underside of stone (DL), 13 m and 13·5 m August 1971 and 1972 (DL and KH), 13 m, 2.8.71, on *Alcyonium digitatum*, rare, fertile (DL); Quarter Wall Bay, 10 m, 14.7.75, common on vertical and overhanging surfaces of boulders (KH and DL) and on *Laminaria* holdfasts (PGM); N. Rat Island, 10 m, 12.7.75, recorded on *Laminaria* holdfasts and on Axinellid sponge (DL); Needle Rock, 0·3–3·2 m, 3.8.74, frequent at 0·3 m (KH).

Sub-Order PHLEBOBRANCHIATA

Family ASCIDIIDAE

Ascidiella aspersa (Müller, 1776)

Knoll Pins, 16 m, 11.9.72, one small specimen on leg of *Maia squinado* collected N.E. of outer Pin (DL).

Ascidia mentula Müller, 1776

Widely distributed in small numbers at many sites off the East coast: Seals Rock, Gannets Rock, Gannets Rock Pinnacle, Gannets Bay, Knoll Pins, Knoll Pins South, Quarry Bay, Quarter Wall Bay, N. Rat Island: recorded depth range 9–23 m, July/August 1971–1975, usually in crevices or similar microhabitats sheltered from strong water movements (DL, KH and JW); recorded off the West coast at Battery Point, 20–23 m, 16.8.72, two specimens, base of gullies (KH); copepod, *Doropygus psyllus* Thorell, 1860 (one individual, female), present in the branchial chamber of a specimen from Seals Rock, 15 m, 13.7.75.

Ascidia virginea Müller, 1776

Seals Rock, 15 m, 13.7.75, one specimen (DL); Gannets Rock, 11 m, 18.7.75, one specimen (RH); Knoll Pins, 12–14 m, 24.7.71 and 2.8.71, occasional specimen in crevice (DL); Knoll Pins South, 21·5 m, 10.7.75, one small specimen from 0·25 m² quadrat, horizontal granite (KH); N. Rat Island, 3·6 m, 7.7.75, one specimen (KH).

Order PLEUROGONA
Sub-Order STOLIDOBRANCHIATA
Family STYELIDAE

Polycarpa pomaria (Savigny, 1816)

Knoll Pins South, 21·5 m, 10.7.75, one specimen from 0·0625 m² quadrat and one specimen from 0·25 m² quadrat, horizontal granite (KH).

Polycarpa rustica (Linnaeus, 1767)

N. Rat Island, 7 m, 8.7.75, one specimen on *Laminaria* stipe (DL).

Polycarpa fibrosa (Stimpson, 1852)

Knoll Pins South, 21·5 m, 10.7.75, four specimens from 0·125 m² quadrat and four specimens from 0·25 m² quadrat, one specimen on *Cellaria* from 0·3125 m² quadrat, quadrat samples taken from horizontal granite (KH).

Dendrodoa grossularia (Van Beneden, 1846)

Ladies Beach, littoral, 1950, undersides of rocks (LAH).

Distomus variolosus Gaertner, 1744

N. Rat Island, 7 m, 8.7.75, Developing eggs and larvae in atrial cavity (DL).

Stolonica socialis Hartmeyer, 1903

Gannets Rock, 20 m, 30.7.71, no eggs or larvae (DL), 17 m 1.8.71, no eggs or larvae (DL), 15 m 8.8.74 (KH), 22 m 17.7.75, on N. facing cliff, some with developing eggs, bivalve *Musculus marmoratus* embedded in tunic (DL); Brazen Ward, 14 m, 29.7.74, two groups observed (KH); Outer Knoll Pin, 17–20 m, 12.9.72, larvae present (DL); Knoll Pins, 25 m, 27.7.74, no eggs or larvae, *Musculus marmoratus* occasionally in tunic (KH/DL); Knoll Pins South, 23 m, 10.8.74, frequent (KH), 21·5 m 10.7.75, horizontal granite, several specimens from 0·125 m² quadrat (KH); Tibbett's Point, 18 m, 21.8.70, gonads producing eggs (KH/DL); Lee Rocks, 20 m, 26.7.71, locally abundant, no eggs or larvae (KH/DL); Rattles Anchorage, 20 m, 15.8.72, occasional patches on horizontal slate, eggs present (KH/DL); St. James's Stone, 30 m, 9.9.73 (KH).

Examination of the limited reproductive data above indicates that eggs develop during late July and August and that fully developed larvae are present in the atrial cavity in early September.

Botryllus schlosseri (Pallas, 1766)

STAR ASCIDIAN

Ladies Beach, 1950, undersides of rocks (LAH); Knoll Pins, 8 m, 24.7.71, attached to *Halidrys* (KH); Knoll Pins South, 21·5 m, 10.7.75, small colony from 0·25 m² quadrat, horizontal granite (KH); N. Rat Island, 4·5 and 5 m, 24.7.71, on *Laminaria* holdfast (DL and KH); 7 m, 8.7.75, developing larvae in atrial cavity (DL); The Gates, (MTL), 27.7.71, encrusting a limpet shell in a rock pool (DI); Battery Point, 20 m, 16.8.72, rare, on vertical rock (KH); Needle Rock, 13 m, 3.8.74, (DT); N. Jenny's Cove, 27.7.71, on *Laminaria* stipes (KH); 25 m, encrusting a polychaete tube (DL).

Botrylloides leachi (Savigny, 1816)

Ladies Beach, 1950, undersides of rocks (LAH); Quarry Bay, LWN, 10.7.75, uncommon, underside of stone (DL).

Family PYURIDAE

Pyura tessellata (Forbes, 1848)

Seal Rock, 15 m, 13.7.75, specimens in rock crevice (DL).

Family MOLGULIDAE

Molgula manhattensis (De Kay, 1843)

Knoll Pins South, 21·5 m, 10.7.75, horizontal granite, one specimen from 0·3125 m² quadrat and one specimen from 0·125 m² quadrat (KH); N. Rat Island, 10 m, 12.7.75, one individual with a female specimen of *Doropygus pulex* Thorell, 1860 (Copepoda) present in the branchial chamber.

Molgula occulta Kupffer, 1875

Landing Bay, 4 m, 17.7.75, rare, one specimen on sand (DL).

Molgula citrina Alder and Hancock, 1848

Knoll Pins South, 21·5 m, 10.7.75, horizontal granite, one specimen from 0·3125 m² quadrat and one specimen from 0·125 m² quadrat (KH).

Eugyra arenosa (Alder and Hancock, 1848)

Knoll Pin Point, 15 m, 15.7.75, single group in mud/sand, base of boulder slope, several collected (DL).

REFERENCES

Berrill, N. J. (1950). *The Tunicata.* The Ray Society, London, 354 pp.

Gulliksen, B. (1973). The vertical distribution and habitat of the ascidians in Borgenfjorden, North Trondelag, Norway. *Sarsia*, **52**, 21–8.

Harvey, L. A. H. (1950). The granite shores of Lundy. *Rep. Lundy Fld Soc.*, **4**, 34–44.

Harvey, L. A. H. (1951). The slate shores of Lundy. *Rep. Lundy Fld Soc.*, **5**, 25–33.

Hiscock, K. and Hoare, R. (1975). The ecology of sublittoral communities at Abereiddy Quarry, Pembrokeshire. *J. mar. biol. Ass. U.K.*, **55**, 833–864.

Lafargue, F. (1970). Peuplement sessiles de l'archipel de Glenan. I–Inventaire Ascidies. *Vie et Milieu* (Ser. B), **21**, 729–42.

Millar, R. H. (1970). *British Ascidians.* The Linnean Society, Academic Press, London and New York, 88 pp.

Marine Biological Association (1957). *Plymouth Marine Fauna. Third Edition.* Marine Biological Association of the United Kingdom, Plymouth, 457 pp.