

## Limpets

Limpets are slow moving molluscs characteristic of rocky shores throughout the world. They are superbly adapted to life on the seashore. They have a hard shell to protect themselves against predators and damage from moving rocks and sand, and a large muscular foot that enables them to clamp firmly on to rocks to conserve water and maintain their position during rough weather.

On the Isle of Wight, three species of limpets may be found, although by far the most common is *Patella vulgata*. The other two, *P. depressa* and *P. ulysiponensis* are warm-water species that are more at home in southern Europe. All species are proterandrous hermaphrodites that shed gametes into the water where there is external fertilisation. The larvae live as plankton for about two weeks. In *P. vulgata* this happens during the autumn and winter months and the larvae live in the plankton for about two weeks. Young limpets 2-3mm in length may be found on the shore during the winter and early spring. On the middle shore at Bembridge their shell length increases by about 8mm per year.

They feed mainly at high tide and at night on young seaweeds and detritus. Sometimes they can be seen grazing during the daytime at low tide, especially on exposed shores and in humid conditions. On each grazing excursion limpets will move up to about 50cm before returning to their 'home scar', where the limpet has ground down the rock with its shell over several years. Feeding is achieved by rasping off algae with its long radula situated in the mouth region.

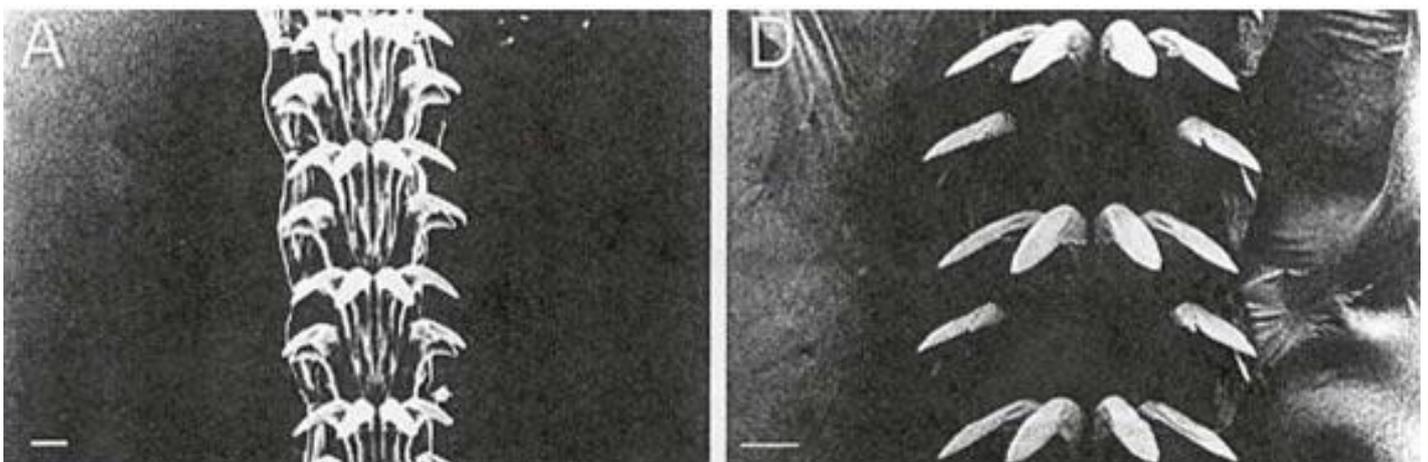


### Experiments

Limpet grazing activity has been intensely studied elsewhere in the UK and in Europe, but not previously on the Island. At the limestone ledge on the middle shore at Bembridge there is a distinct 'bare edge' where seaweed, so prolific elsewhere, has failed to establish. This is an intriguing area and various hypotheses have been suggested to explain why this should be, including:

- The seaweed cannot grow there because wave breaking over the edge rips it off.
- The edge of the ledge is slightly higher and therefore drier, preventing successful survival of seaweed.
- The limpets graze the seaweed.

An experiment was carried out to investigate the effect of limpet grazing pressure on the ledge by creating 'Limpet exclusion areas' using plastic coated wire fencing. Each area was 0.25 m<sup>2</sup>. The limpets (*Patella vulgata*) were carefully removed in January 1997 and thereafter the total % cover of each species of algae and number of colonising animals within the quadrats were measured monthly. Control areas were also established by fencing corners of the quadrats only. This was done to determine the effects of the wire fences. Measurements and counts were also made within marked unfenced areas of the shore. Each treatment was replicated three times on the ledge and was monitored for two years.



Limpet Radula

**Results**

The changes within single quadrats of each treatment over the two year study period are shown below.

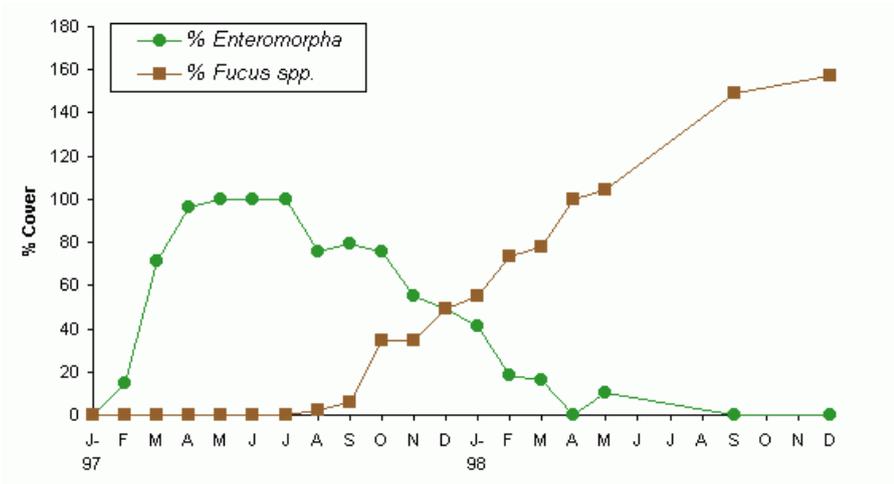


Fig.4 Fenced Quadrat (Limpets and all other biota were removed in January 1997)

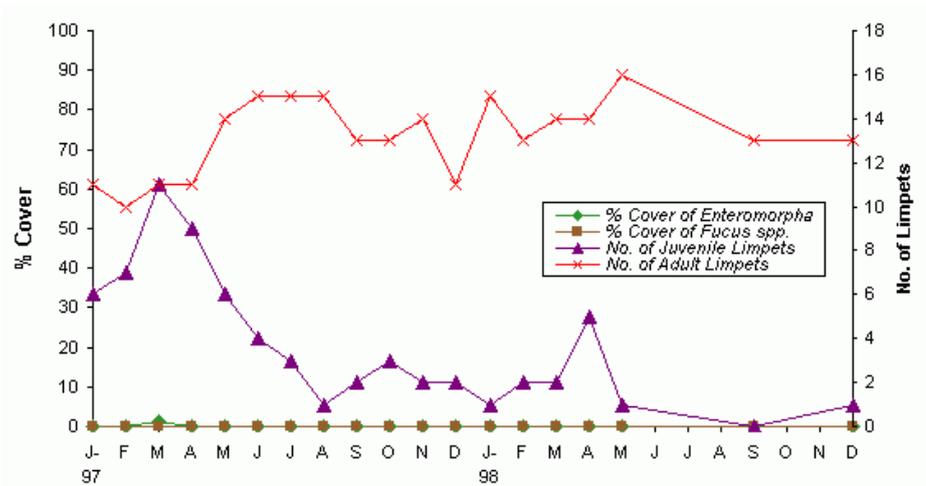


Fig 5. Half-Fenced Quadrat

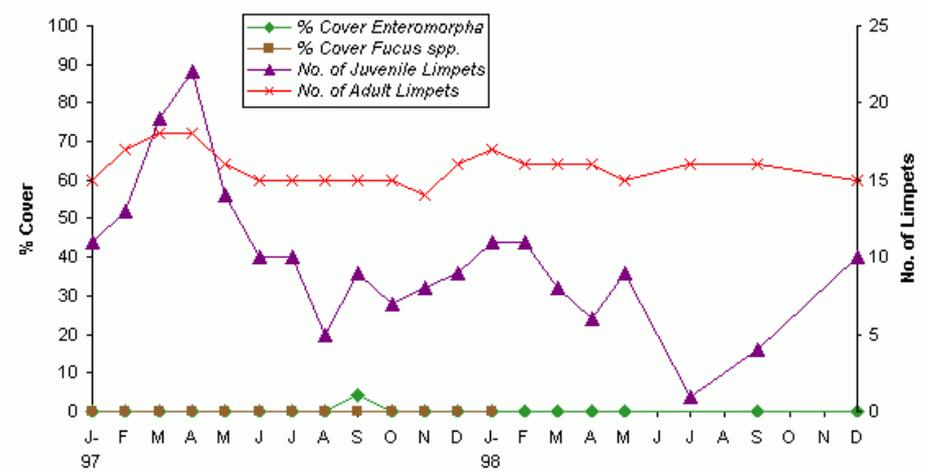


Fig 6. Unfenced Quadrat



Limpets and barnacles may be observed within the quadrat. Note algae growing on limpet shells, but not on rock.



Six months after removal of limpets. The quadrat has 100% cover of the green seaweed *Enteromorpha intestinalis*



Eighteen months after removal of limpets. The *Enteromorpha* has been replaced by a canopy of brown seaweeds *Fucus vesiculosus* and *F. serratus*.

As can be seen from the graphs and photographs above, limpets have an extraordinary influence on the structure of communities on rocky shores, being important grazing organisms. Their grazing activity will be determined by the size of populations but even at low densities, they can create large areas of space on the shore that is available for settlement of sessile species, such as barnacles. Their absence, will lead to considerable algal growth, as has been evident after recent oil pollution from the Sea Empress off the Pembrokeshire Coast when there was catastrophic mortality of limpets.

The number of limpets per square metre on the middle ledge has been counted over a number of years and recorded. Similarly, the density of limpets has been measured on an equivalent area of bare rock on the upper shore to allow comparison.

## References

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