O. aciculata is characterised by a population decline during the last decades. Franc (1940, 1952) had found numerous specimens including juveniles and egg capsules in the entire investigation area. Today this species occurs only at the Ile Verte and near Roscoff harbour. *N. lapillus* also exhibits symptoms of a population decline at Moguériec and between the Marine Biological Institute of Roscoff and Primel Trégastel : (1) VDS values above 4.0, (2) male-biased sex ratios and (3) poor or no recruitment of juveniles. Between April and August 1989 the population at Primel Trégastel was exterminated due to high TBT pollution. Furthermore TBT causes a reduction of the female pallial glands even in species which are not sterilized by imposex. In *Hinia reticulata* the length of the capsule gland is reduced by 20 % and its volume by 49 % between Méan Mélen (control site) and the highly polluted harbour of Roscoff. Consequently, the reproductive performance is reduced at TBT exposed sites. Although the use of TBT based antifouling paints is restricted in France since 1982, harbours and marinas are still sources of TBT pollution. Even today TBT exposure is high enough to endanger sensitive species (e.g. *Ocinebrina aciculata* and *Nucella lapillus).*

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The morphometric differences in the *Littorina obtusata-mariae* (Gastropoda : Prosobranchia) complex in Ireland

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Since Sacchi & Rastelli (1966) separated the flat winkles into two distinct species, *Littorina obtusata* (Linnaeus) and *Littorina mariae* Sacchi & Rastelli, little work has been done on these species in Ireland. Reimchen (1979) concentrated on shell colour variation while Little & Williams (1989) described the distribution of the two species at Lough Hyne Marine Nature Reserve, west Cork.

In the present study, the morphometric and morphological differences in the *Littorina obtusata-mariae* complex were studied in samples collected from a number of sites around Ireland. It was possible to separate the males based on the shape of the penis, including the number of penial glands (Sacchi & Rastelli, 1966) and the females on the colour of the ovipositor (Goodwin & Fish, 1977). The relative lengths of the bursa copulatrix were not examined (Reid, 1990). In *L. mariae* the penial glands ranged in number from 8-15, while in *L. obtusata* 20-62 glands were present, in two-three irregular rows. In both species the sex ratio was close to 1:1.

With respect to shell characters, canonical variate analysis showed that the two species can be separated by shell shape. The parameters measured were those of Colman (1932). The results agree with the separation of *L. obtusata* and *L. mariae* into 'normal' and 'dwarf' respectively, due to size dimorphism (Sacchi & Rastelli, 1966). Both species showed sexual dimorphism, females being larger than males. Furthermore, in agreement with Goodwin & Fish (1977), there was a clear size gradient with wave exposure : the mean size of *L. obtusata* decreased with increasing exposure, while the opposite occurred in *L. mariae*.

In the present study, there was a significant difference between the species in the frequency of the shell colour morphs. On sheltered shores, the dominant morph of *L. obtusata* was olivacea, while that of *L. mariae* was citrina. On more exposed shores, reticulata *L. obtusata* were found to be common but there was not a significant difference in shell colour with exposure for *L. mariae*. Both species were found on *Fucus serratus* and *Fucus vesiculosus*, but *L. obtusata* also occurred on *Ascophyllum nodosum*.

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Microgeographical differences in the shell morphology and shell strength of *Littorina saxatilis*

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Pettitt (1971) found a highly significant difference in shell thickness between a pair of samples of *Littorina saxatilis* taken from a rockface and a boulder beach very close together at Mumbleshead, South Wales. This finding has now been extended to other sites, using paired rockface and boulder beach samples collected close together at Torteval and Cobo, Guernsey in 1992, and an earlier (1971) pair from Three Cliffs Bay, South Wales ; the Mumbles sample also was re-examined. Linear measurements were taken to the nearest 0.1 mm, and the shells were weighed to the nearest 0,01 mg. Strength was measured using an Instrom 4301 table testing machine ; the following comparisons were used to describe shell morphology and strength : Shell breadth on shell length (Shell Shape) ; Mouth width on mouth height (Aperture Shape) ; Failure load on shell length (Strength/Size) ; Failure load on shell weight (Strength/Mass).

Analysis of variance was performed on the data, and two best-fit lines plotted, one for each microhabitat, and then one for the site as a whole. F values were calculated, testing whether the two separate lines are significantly different from the single line.

Shell Shape : Rockface samples had rounder shells at both the Guernsey sites, and boulder shells were more elongated ; there were no intrasite differences in shell shape at the South Wales sites.

Aperture shape : Rockface samples had rounder apertures than the boulder samples at all the sites.

Strength : All the paired samples had significantly different shell strengths. Shell thickness or volume to weight ratios do not necessarily, as previously assumed, correlate directly to shell strength, for when load against mass was regressed, the resulting F values were still