

SHORT COMMUNICATION

*Imminent extinction of the Nore freshwater pearl mussel *Margaritifera durrovensis* Phillips: a species unique to Ireland*

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ABSTRACT

1. The last population of the Nore freshwater pearl mussel *Margaritifera durrovensis* was surveyed each year from 1990 to 1994 in the River Nore, southern Ireland.
2. The population has fallen from a 'flourishing colony' in the 1920s to an estimated 2000 in 1990 and 420 in 1994. No juvenile mussels were observed in any of the surveys.
3. If life history data for *Margaritifera margaritifera* are applicable to *M. durrovensis*, the population would need to be 20 times greater for successful recruitment.
4. Although given special mention in the Bern Convention, *M. durrovensis* was omitted from the European Union Habitats Directive, perhaps due to uncertainty regarding its taxonomic status as it shares characteristics with both *M. margaritifera* and *M. auricularia*.
5. Immediate measures are required to prevent the extinction of *M. durrovensis* including, (a) a captive breeding programme, (b) habitat restoration, and (c) formal recognition of its priority status within the Habitats Directive.

INTRODUCTION

The freshwater pearl mussel *Margaritifera durrovensis* was first described by R. A. Phillips (1928) from the River Nore near the town of Durrrow in Ireland. In contrast to the more widespread *M. margaritifera* (L.) which inhabits soft-waters, *M. durrovensis* is confined to hard-water. Although it has sometimes been allocated subspecies status (Haas, 1948; Chesney *et al.*, 1993), there is a good case for retaining its species status based on a thorough comparison of taxonomic characteristics within the whole genus, and differences in reproductive biology (authors, unpublished data). The only known population is confined to the main channel of the River Nore (Moorkens *et al.*, 1992). In this paper, the conservation of the species is considered in relation to recent changes in population size.

MATERIALS AND METHODS

Each year for the last four years, estimates of the population size of *Margaritifera durrovensis* have been made in the River Nore in Counties Laois and Kilkenny, Ireland. Live mussels were counted by pairs of surveyors snorkelling in the river. Preliminary surveys showed the upper and lower limits of the population distribution, and total numbers were estimated by extrapolation of numbers from five 0.5 km lengths surveyed each year.

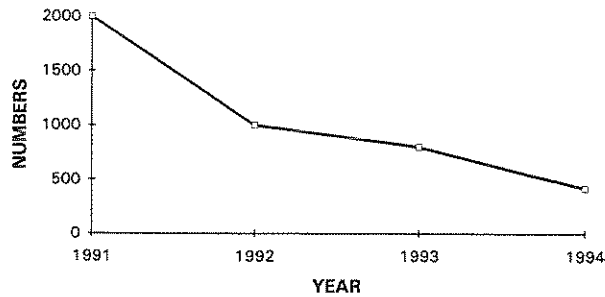


Figure 1. Estimates of total *M. durrovensis* population in the River Nore.

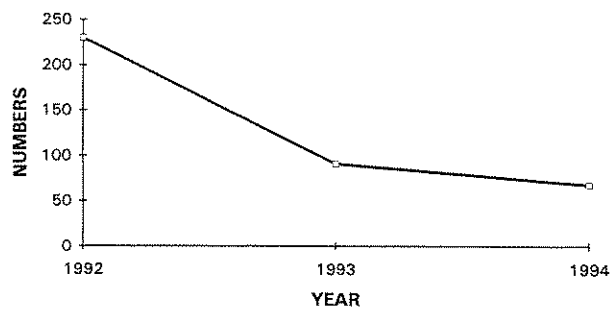


Figure 2. Numbers of live *M. durrovensis* in the same 0.5 km length of the River Nore over 3 years.

RESULTS

By 1990, the 'flourishing colony' where Phillips (1928) described 'numerous adult living specimens' had declined. Intensive counting showed a decrease in numbers of at least 20% per year, with estimates of the total population dropping from 2000 to 420 in 4 years (Figure 1). Concentrated counting in one particular 0.5 km stretch over the past 3 years has seen the numbers drop from 230 to 68 (Figure 2). In conjunction with the adult decline, no live mussels under approximately 15 years of age were found in any of the surveys.

DISCUSSION

The sharp decline of the *M. durrovensis* population in the River Nore suggests that its extinction is imminent. Deterioration of habitat quality has been cited as the main reason for the general decline of *Margaritifera* populations in Europe (Young, 1991; Bauer, 1988). This study indicates that the River Nore is no longer suitable for a healthy population of *M. durrovensis*. The apparent absence of younger mussels is of particular concern as it suggests that no recruitment is occurring within the population.

Studies on *M. margaritifera* have shown 99.99% loss occurs when glochidia are released from the brooding female, and 95% loss occurs while glochidia are on fish gills and again on their release from the fish as young mussels (Young and Williams, 1984). If comparison between *M. margaritifera* and *M. durrovensis* is valid it suggests that numbers of adults would have to improve by a factor of 20 before recruitment would take place to maintain the population. Conservation of *M. durrovensis* thus appears to be no longer possible in the wild. A long term captive breeding programme as well as a commitment to considerable improvement in river quality is essential in saving this taxon from extinction.

Margaritifera durrovensis has been singled out by the Bern Convention as in need of immediate research attention (Bern Convention Invertebrates Group, 1990). It was not listed separately in the Habitats Directive of the European Union (Council of the European Communities, 1992), perhaps due to uncertainty as to whether it was a species or subspecies. Two species of *Margaritifera* are listed in the Directive, *M. margaritifera* and *M. auricularia* (Spengler), but only the latter was identified as a priority for conservation. *Margaritifera auricularia* is a hard-water southern European species which is extinct in Britain and indeed may be totally extinct (Wells *et al.*, 1983). In contrast, *M. margaritifera* is a soft-water species which has become extinct in parts of Europe but retains healthy populations in remote parts of Ireland, Scotland and northern Europe (Wells *et al.*, 1983).

Margaritifera durrovensis is at least as closely related to *M. auricularia* as it is to *M. margaritifera*. Both *M. auricularia* and *M. durrovensis* share common characteristics distinguishing them from *M. margaritifera*. These include their restriction to hard water habitats, lack of erosion of the shell umbone, and diagnostic muscle scars. Whatever their exact taxonomic status, all experts agree that the protection of this species is a priority (Chesney *et al.*, 1993; Woodward, F. R., personal communication; Bern Convention Invertebrates Group, 1990). In view of its taxonomic interest, extreme rarity and sharp decline, *M. durrovensis* should be awarded priority status in the Habitats Directive in conjunction with *M. auricularia*. Without considerable and immediate rehabilitation effort, it will undoubtedly be extinct in a very short time.

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