Theme Session on Advances in Reproductive Biology: Methodology and Applications for Fisheries Science (Q)

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Sexual maturity of male *Nephrops norvegicus* (L.) in the Irish Sea

[1]Nuala McQuaid [2]Richard Briggs and [1]Dai Roberts

The age or size at onset of sexual maturity contributes to the understanding of reproductive strategies and fitness of a species as a determinant of reproductive output. Benefits of earlier maturation for example, include shorter generation times and higher survival to maturity as a result of shorter juvenile periods. Although studies of sexual maturity in female *Nephrops* are well documented very little has been published on male maturity. In male *Nephrops* the only maturity diagnostic comparable to the presence of eggs in females, is the presence of spermatophores in the vasa deferentia. Male *Nephrops* down to 6mm carapace length were captured in small mesh beam trawl. These data provided a male maturity ogive with an L_{50} of 15.1mm CL which is much lower than the value of 23.5mm CL published for Irish Sea female *Nephrops* (Briggs, 1988; McQuaid, 2002). Earlier studies (Farmer, 1974 c; Hillis, 1981; O'Neill, 1992, and Tuck *et al*., 2000) noted a change in allometry of cheliped and appendix masculina at sexual maturity. This is demonstrated by a change in the slope of the regression of cheliped and appendix masculina length in relation to carapace length. The inflexion point in the regression (referred to in this work) was identified in cheliped and appendix masculina length data using the computer-based regression programs MATURE and Reduced Major Axis regression (RMA). These data which were for *Nephrops* from two different areas of the Irish Sea showed a change in cheliped allometry at 25.9-31.0 mm CL and in appendix masculina allometry at 24.0-26.3 mm CL.

Although it appears that male *Nephrops* are physiologically capable of reproduction at a smaller size than females it is likely that morphological changes are necessary for successful copulation. Maturity can therefore be divided into three stages, (a) physiological maturity in which males are capable of producing spermatophores in the vasa deferentia, estimated here at 15.1mm CL. (b) morphometric maturity, where males are physically able to copulate, characterised by the appendix masculina reaching an optimal length (24.3-26.9mm CL). (c) functional maturity represented by a relative increase in claw growth with the onset of maturity. Until the relationship between claw size and maturity is more fully understood the change in allometry of the appendix masculina (Figure 1) appears to be the most appropriate measure of sexual maturity in male *Nephrops.* This method was adopted by WGNEPH04 as a standard procedure for meeting EU Data Regulation requirements for Male *Nephrops* maturity.

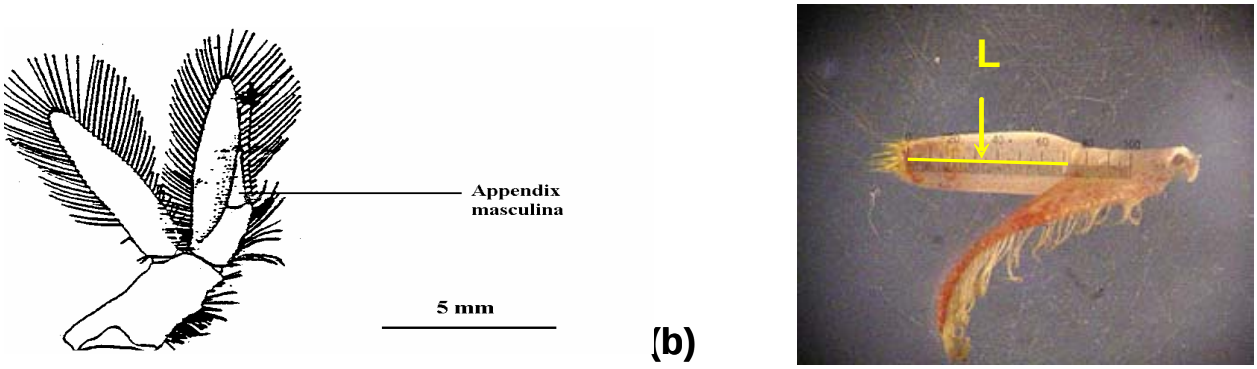

Figure 1 (a) The appendix masculina on the second pleopod and (b) length measured [L].

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[1]*Nuala McQuaid and Dai Roberts : Department of Biology and Biochemistry, The Queen's University of Belfast.* [2]*Richard Briggs: Agriculture, Food and Environmental Science Division, Department of Agriculture and Rural Development for Northern Ireland. [tel: +4428 255503 ,fax: +4428 90255004 email: richard.briggs@dardni.gov.uk]*