

CRITICAL REMARKS ON THE SUPPOSED PROTANDRIC HERMAPHRODITISM
IN *SOLENOCERA MEMBRANACEA* (RISSO) (CRUSTACEA, PENAEIDEA).^o

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ABSTRACT - Size frequency distributions obtained sampling *S. membranacea* with a small meshed net are strongly in contrast with former hypothesis of a protandric hermaphroditism.

Examination of immature individuals of both sexes evidenced the small process in first pleopods of female cannot be regarded as a residual of the petasma of former male.

RESUME - Les distributions de fréquence des longueurs de *S. membranacea* obtenues à l'aide d'un chalut pourvu d'une poche à petites mailles ne supportent pas l'hypothèse d'un hermaphroditisme protérandrique. La présence d'un endopodite sur la première paire de pléopodes a été mise en évidence dans toutes les femelles, aussi les plus petites avec une longueur inférieure à celle des plus petits mâles mûrs. Par conséquent cette structure ne peut pas être considérée comme un reste du petasma des mâles chez lesquels il y aurait eu d'inversion sexuelle.

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Sex reversal is known to occur in several species of Decapods, belonging to different families of Caridea. A protandric hermaphroditism was reported by HEEGAARD (1967, 1972) also for two species of Penaeid shrimps: *Solenocera membranacea* (Risso) and *Penaeus kerathurus* (Forskäl).

His conclusions were based on indirect evidences, i.e. length frequency distributions of males and females in samples obtained from commercial trawlers and shape of first pleopods in females.

From what is known to us, sex reversal was never reported in other Penaeid shrimps.

In our fishery investigations in the western Pomo Pit (Central Adriatic), since 1977, catches of *Solenocera membranacea*, mainly obtained by night, were analysed for sex ratios and size frequency distributions, in order to verify HEEGAARD's hypothesis and to study growth of this species. Presence in the catches of very small females pressed us to improve our

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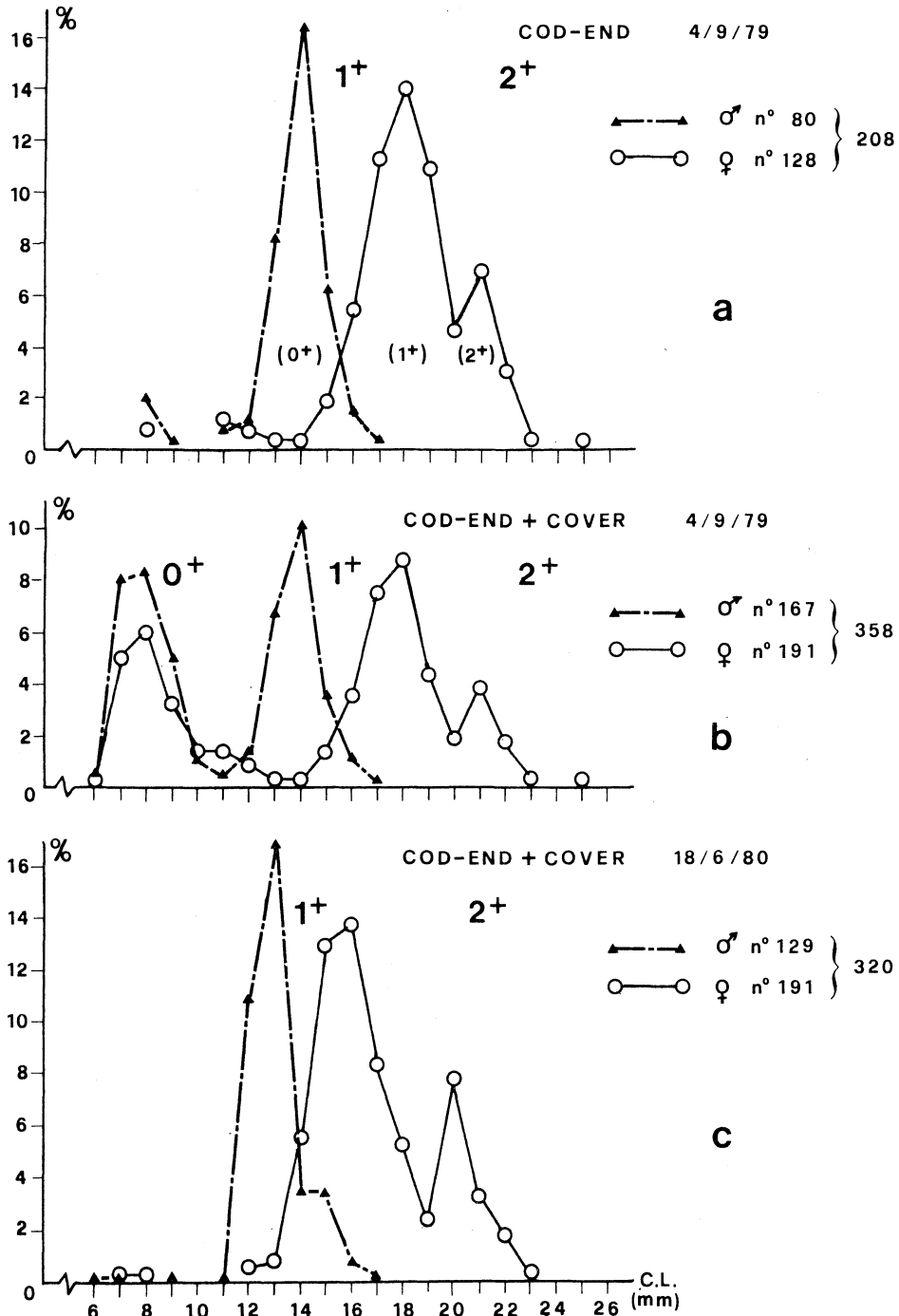


Fig. 1 - a) Size frequency distribution of *S. membranacea* sampling with a standard bottom trawl (cod-end meshes 27 mm opening); under brackets age classes according to HEEGAARD's hypothesis.

b) Size frequency distribution sampling with a standard bottom trawl equipped with a cover cod-end (meshes 17 mm opening).

c) Same as (b), nine months later.

sampling technique and since September 1979 the bottom trawl (26 mm mesh opening in the cod-end) was equipped, during the night hauls, with a small meshed (17 mm mesh opening) cover cod-end in order to collect the smallest specimens too.

The analysis of 11 samples, about 4200 specimens, collected in different months of the year, made possible to follow the growth of this species, to evidence differences in growth rate of two sexes, and a longer life of females.

In our samples the smallest recorded size (Carapace Length) was 6 mm for both males and females, the biggest 17 mm for males and 25 mm for females.

It is noteworthy to remark that in samples obtained with the small meshed net females, in the 0^+ age class, slightly outnumber males ($\frac{\sigma}{\phi} = 0.9$).

Finally from our data comes out that, as a result of mesh selectivity, in catches of commercial trawlers, using a standard trawl (cod-end meshes 25-30 mm opening) only second and third age classes of *Solenocera membranacea* are represented.

For this reason data obtained by HEEGAARD was affected by a sampling bias.

He supposed that the observed size frequency distributions were a consequence of a sex reversal from male to female in the second year of life of the individuals, but actually his samples contained females of the second and third age classes and males of the second age class. HEEGAARD's misinterpretation of data can be very well understood from Fig. 1(a and b) where size frequency distributions obtained in September 1979 towing a trawl with and without cover cod-end are compared. From comparison of these size frequency distributions and those obtained nine months later (Fig. 1c) results also a faster growth rhythm in females.

Finally, HEEGAARD regarded the endopod in the first pleopods of females as a residual of the petasma of former males and considered that as another evidence of sex reversal.

We found that such structure is present in all females, also those of the 0^+ age class with a Carapace Length of 7 mm (Fig. 2a). In males of the same size, petasma is not yet completely developed (Fig. 2c).

Adult, completely developed petasma (Fig. 2d) were found only in males with a Carapace Length bigger than 10 mm, i.e. about one year old.

Also females of the same age, Carapace Length bigger than 12 mm, were sexually mature and, in winter months, presented ripe ovaries.

We could not undertake an histological research to follow gonads development in this species, but we think there are no data to support the hypothesis of sex reversal in *Solenocera membranacea*.

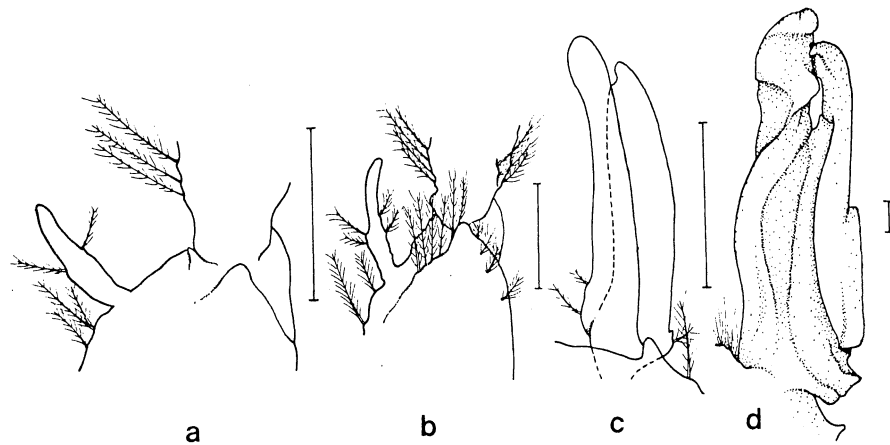


Fig. 2 - Endopod of first pleopod in female: a) juvenile C.L. 7.5 mm, b) adult C.L. 12 mm. Petasma of male: c) juvenile C.L. 7 mm, d) adult C.L. 14 mm.

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