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## MERIDIONALIS, A VALID FORMA IN *CLIONE LIMACINA* (PHIPPS, 1774)

(GASTROPODA)

S. van der Spoel

### ABSTRACT

*Clione limacina* (Phipps, 1774) var. *meridionalis* Pruvot-Fol, 1926, is considered to be a forma endemic to the Sargasso Sea.

In the opinion of Tesch (1950): "*C. limacina meridionalis* Pruvot seems ..... as the nomenclature of the author implies a not very important variation, chiefly based on a place of capture remarkably far south (38° - 39°N)". Recently Van der Spoel (1964, 1972), considered the present taxon as a forma of *Clione limacina* showing a clinal variation comparable to that found in *Clio pyramidata* Linné, 1767, and *Limacina helicina* (Phipps, 1774).

Recent findings of *Clione limacina* in material collected by the Ocean Acre Project (\*) supported the opinion that a clearly recognizable forma is concerned, in all probability restricted to the

western North Atlantic, more particular to the Sargasso Sea.

The typical forma of the species, *Clione limacina* forma *limacina* (Phipps, 1774), occurs at the higher arctic latitudes, the forma *minuta* Pruvot-Fol, 1926, occupies a more southern range in boreal waters, while the forma *meridionalis* Pruvot-Fol, 1926, is still more "thermophilous" living in subtropical regions. *Clione gracilis* Massy, 1909, and *Clione filifera* Pruvot-Fol, 1926, do not have a clear place in this cline as both are sympatrical with the forma *minuta*. *C. filifera* seems to represent a monstrosity. However, the discovery of specimens with bifurcated filamentous buccal cones and a radula as described by Pruvot-Fol (1926) prevented me (1972) from synonymizing this taxon. *C. gracilis* was considered a forma of *Clione limacina* (vide Van der Spoel, 1964). Further studies are required to determine

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its real status, which among others is dependent on whether or not it really occurs sympatrically, in a horizontal and a vertical sense and in time, with other formae of the species.

The formae mentioned above belong to the subspecies *limacina* (Phipps, 1774) found in the North Pacific and North Atlantic Oceans. In the Southern Oceans the subspecies *antarctica* Smith, 1902, lives in cold water.

The characters given by Pruvot-Fol (1926) for the forma *meridionalis* (fig. 1) need comments. All distinguishing characters mentioned by the original author are strongly dependent on the state of fixation and preservation. The shape of the buccal cones: "aplatis, le plus dorsal étant plus large que les autres" is subject to contraction, like the body shape: "Non aplatie dorso-ventralement".

The only valid difference between *meridionalis* and the other formae is the strong reduction of

the posterior footlobe. This character is not described, but is clearly pictured by Pruvot-Fol (1926, pl. 3 fig. 57). In most specimens only the basis of the posterior footlobe is visible, while the tongue-shaped distal point is represented by a few cells only. The body is rounded in cross-section and pointed posteriorly. The visceral nucleus does not reach the middle of the body. The wings are moderately long. The radula formula is 7-1-7, and the median plate is sickle-shaped provided with small irregular denticles along its anterior border. The number of hooks on each side varies from 20 to 30, see table I for body sizes. The relatively small size of the buccal mass including the hook sacs is a remarkable character indeed.

In total 13 specimens of this forma have been collected by the Ocean Acre Project near Bermuda (31°N, 64°W approx.).

Table I.

Measurements and collection data of <i>Clione limacina</i> forma <i>meridionalis</i>							
Specimen	Length (in mm)	Width (in mm)	Acre Station	Date (day, month, year)	Depth (in m)	Time (Local)	Remarks
1	20.0	5.8	12-25 <sup>B</sup>	3-9-1971	1131-1146	09 <sup>20</sup> -10 <sup>20</sup>	
2	14.4	2.9	12-25 <sup>B</sup>	3-9-1971	1131-1146	09 <sup>20</sup> -10 <sup>20</sup>	
3	20.0	3.3	12-25 <sup>B</sup>	3-9-1971	1131-1146	09 <sup>20</sup> -10 <sup>20</sup>	
4	11.6	4.2	13-12 <sup>C</sup>	25-2-1972	1051-1068	15 <sup>50</sup> -16 <sup>40</sup>	
5	21.6	5.0	13-16 <sup>M</sup>	26-2-1972	0-1626	14 <sup>00</sup> -18 <sup>00</sup>	non-discrete depth
6	14.3	3.5	13-23 <sup>B</sup>	28-2-1972	1231-1251	14 <sup>46</sup> -15 <sup>45</sup>	
7	16.8	4.2	13-23 <sup>C</sup>	28-2-1972	1251-1274	15 <sup>45</sup> -16 <sup>45</sup>	
8	14.4	4.0	13-23 <sup>C</sup>	28-2-1972	1251-1274	15 <sup>45</sup> -16 <sup>45</sup>	
9	16.6	5.8	13-23 <sup>C</sup>	28-2-1972	1251-1274	15 <sup>45</sup> -16 <sup>45</sup>	
10	14.0	4.0	13-24 <sup>C</sup>	28-2-1972	1205-1300	21 <sup>45</sup> -22 <sup>45</sup>	
11	damaged		13-25 <sup>C</sup>	29-2-1972	1488-1565	04 <sup>00</sup> -05 <sup>10</sup>	
12	17.6	5.8	13-25 <sup>C</sup>	2-3-1972	1504-1536	12 <sup>00</sup> -13 <sup>14</sup>	
13	19.1	4.2	14-11 <sup>M</sup>	7-6-1972	0-1250	17 <sup>45</sup> -22 <sup>45</sup>	non-discrete depth
average	16.6	4.4			max. 1504-1536 min. 1051-1068		

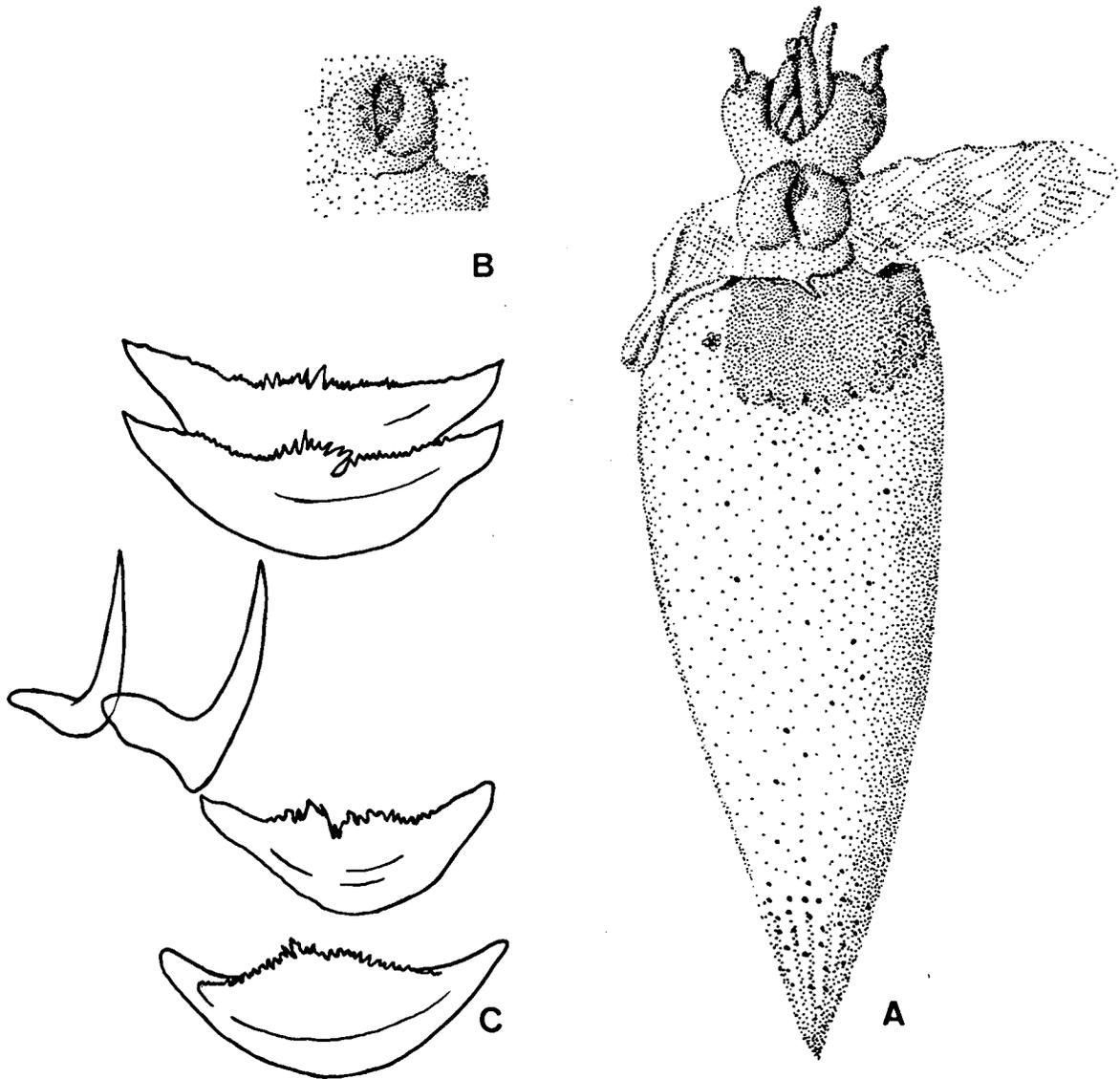


Fig. 1 A-C: *Clione limacina* forma *meridionalis*.

A, specimen (No. 1) of 20.0 mm in length in ventral view.

B, footlobes of another specimen.

C, four median and two lateral radula teeth.

From table I it is clear that the forma is restricted to the deeper layers of the ocean as it occurs exclusively in samples taken at depths exceeding 1051 meters; no specimen was found so far in samples taken less deep. The original material, collected at 38° 58' N 44° 55' W and at 38° 30' N 34° 40' W, in all probability lived in deep waters as well, as it was caught in open net hauls from 2000 meters to the surface.

The considerable depth at which the population lives, may be explained by a preference for lower temperatures. This type of distribution implies that the food for this forma cannot be identical with that in the forma *limacina* or in the forma *minuta* (cf. Lalli, 1970; Conover & Lalli, 1972). The rather small buccal mass may constitute an adaptation to the particular food habits. It is presumed that morphological as well as ecological characters distinguish this forma from its more northern relatives.

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Dr. S. VAN DER SPOEL  
 Institute of Taxonomic Zoology (Zoölogisch Museum)  
 University of Amsterdam  
 Plantage Middenlaan 53  
 Amsterdam - C, The Netherlands

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