STRUCTURE OF INTEGUMENTAL PERFORATIONS
IN THE EUCHIRELLA MESSINENSIS FEMALE (CRUSTACEA, COPEPODA, CALANOIDA)

by

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SUMMARY

An inventory has been made of the various integumental organs found in the female of Euchirella messinensis (Claus, 1863). The structure of the rigid parts of each type of organ is described and possible functions are discussed with reference to similar structures reported from other Crustacea. A definition of the term “integumental organs” is included.

INTRODUCTION

“Integumental organs” have been described for representatives of various groups of arthropods, the most extensive studies concerning insects (see, e.g., Grasse, 1975, for a comprehensive review), acariform arachnids (e.g., reviewed by Grasse, 1949), and decapod crustaceans (e.g., Laverack, 1962, 1964; Shelton & Laverack, 1968, 1970; Mauchline et al., 1977). In free-living Copepoda, these structures have been neglected for a long time. Some of the older authors like Gieb-Brecht (e.g., 1892) and Sewell (1929, 1932, 1947), noted the presence of pores and hair-sensilla on body and appendages in rather casual remarks, scattered among their descriptions. With (1915) gave the most complete account of “glandular” pores on the natatory legs and stressed the probable taxonomic value of their patterns. The above authors already mentioned internal “droplets of oil” underlying the pores in many instances. More recently, the subcuticular soft tissues associated with several types of integumental organs were reported upon by Fahrenbach (1962), Park (1966), and Ong (1969), which provided a basis for a functional approach as well.

Despite the above, it was not until Fleminger’s (1973) pioneer work on Eucalanus that the study of integumental organs of copepods was taken up seriously. This author mapped and coded perforation sites of
the dorsal and lateral body sclerites, and demonstrated the taxonomic relevance of pore signatures. Fleminger also described the external appearance of various organs and since his 1973 paper, others have also contributed to the knowledge of pores and sensilla and to the recognition of the significance of perforation signatures (e.g., Strickler, 1975; Fleminger & Hulsemann, 1977; Mauchline, 1977; Mauchline & Nemoto, 1977; Ferrari & Bowman, 1980; Saraswathy & Bradford, 1980). However, the morphology of the perforation proper has never been adequately described in copepods. The present paper, then, provides a detailed account of integumental perforations in the calanoid, Euchirella messinensis (Claus, 1863), a study undertaken as part of an extensive description of the female of this species (Von Vaupel Klein, in press b). Since the results are of more general importance than in mere relevance to this copepod, they are dealt with separately in the paper at hand.

MATERIAL AND METHODS

The descriptions of integumental organs are based upon observations made on ten adult females of Euchirella messinensis, family Aetideidae, from “Dana” Expedition sta. 4119* (40°13′N, 12°06′E) in the Mediterranean, collected 30-v-1930. Observations were made by compound microscope and by scanning electron microscope (S.E.M.); procedures have been outlined by Von Vaupel Klein (in press a). The compound microscope was equipped with differential interference contrast according to Nomarski. Observations were made almost exclusively with a 40 × objective lens which, in combination with a 10 × eyepiece and two intermediate stages of 1.25 × (viz., the Wollaston-prism holder and the drawing attachment) yielded a total, dry magnification of 625 ×. Combination of microscope images with S.E.-micrographs allowed reconstruction of size and structure of the chitinous components of the organs.

DEFINITIONS

Many anatomical structures in arthropods are in some way related to the rigid integument. However, the author has never met with a specific definition of the general term “integumental organs”. As a steadily increasing number of such organs is being included into scientific knowledge, the term becomes less distinct and setting discrete limits to its use is necessary by now. The following definitions have been designed to be applied to non-parasitic Copepoda, but might be relevant to other arthropods as well: