PDF - THE POLYCHAETE WORMS: DEFINITIONS AND KEYS TO THE ORDERS, FAMILIES AND GENERA - researchcub.infoA review of theclassification of the Class Polychaeta (Annelida) with comments on thecharacters used to identify the different included taxa has led to therecognition of seventeen orders. All taxa down to the generic level are definedand a phylogenetic sequence suggested. Keys are presented to the families andgenera of the Polychaetes. and the setae, if present, only rarely occur inbundles. These two groups were considered more advanced than the marine,dioecious polychaetes. The polychaetes have been defined for the last seventyyears as dioecious, marine annelids with parapodia bearing numerous setae. Theyalso should have anterior appendages of various sorts (antennae, palps,tentacular cirri) and the gonadal ducts should be simple. These definitionswork if some of the smaller groups are disregarded. If these groups are takeninto account, as they must, the only separation that consistently can be madebetween the oligochaetes/leeches and the polychaetes, is the presence in theformer grouping of hermaphroditic gonads limited to a few segments. Somehermaphroditic polychaetes are known, but these usually have gonads in a largefraction of the total number of segments. It is then difficult to give a good,consistent and practically useful definition of what is meant by a polychaete,but a definition along the lines suggested below, should separate them from theother annelids with reasonable accuracy. The polychaetes are multi-segmentedannelids with parapodia; setae are present in distinct fascicles. They aredioecious and have simple exit ducts from the 1 REVIEW COMMITTEE FOR THISSCIENCE SERIES ROBERT J. LAVENBERG DONALD REISCH ‘Allan Hancock Foundation,University of Southern California, Los Angeles, California, 90007. ContributionNumber 358 of the Allan Hancock Foundation. 2 NATURAL HISTORY MUSEUM OF LOSANGELES COUNTY Science Series 28 gonads. They are usually marine, more rarelyfreshwater and only rarely terrestrial or parasitic in habitat. Any of thesefeatures need not be present and none of them is essential for the recognitionof an animal as a polychaete. This topic has been treated in considerablygreater detail by Clark (1969) and to a lesser extent by Fauchald (1974a). Akey morphological feature and at the same time one of the most importanttaxonomic characters of the polychaetes is the setal (chaetal) construction.The setae are ectodermal derivatives, formed by ectodermal cells that duringthe development have migrated to a position well below the rest of theectodermally derived epidermis. Each seta consists of a bundle of filamentslaid down by a basal chaetoblast and up to several lateral cells. The materialin the setae is a glycoprotein, consisting of chitin (a polysaccharide) and aprotein cross-linked at the time of formation. The formation of structural detailsin the setae is very well controlled, but exactly how this takes place has onlypartially been clarified. The best current review of this topic was made byO’Clair and Cloney (1974) from which most of the above information has beengleaned. Polychaetes traditionally are separated into two large orders,ERRANTIA and SEDENTARIA (Audouin and Milne Edwards 1834, pp. 24-26). Theseparation is based on the development of the anterior end and the life habitsof the included species. The errants are supposed to have a large number ofequal body-segments. The anterior appendages are few in number anddifferentiated into palps, antennae, tentacular cirri, etc. These worms areconsidered

freeliving and, generally, should be rapacious in habits. Allpolychaetes with jaws are included in this order; thus the onuphids, despitetheir tubicolous habits, are considered errants since their large jaw-apparatusresembles the jaw-apparatus in other, non-tubicolous eunicidlike animals. Thesedentaries are supposed to have a limited number of body segments. The bodymay be separated into different regions. Anterior appendages may be absent or afew to many similar appendages may be present. The sedentaries have shortparapodia associated with their tubicolous or burrowing habits and are usuallydepositor filter-feeders. These definitions have not changed much over time(cf. Grube 1850, p. 281 and tables; Fauvel 1923a, pp. 27-29; Hartmann-Schroder1971, p. 29). The advantage of the system is that the bulk of the 8,000+ describedspecies of polychaetes separates into two roughly similar groups in terms ofnumbers of species and genera as well as families. The separation is otherwiseunsatisfactory since neither order can clearly be defined. Several attemptshave been made to subdivide the polychaetes in a more acceptable manner (Dales1 962, pp. 424-425; Clark 1969, p. 47). Polychaete taxonomists have tended todisregard these attempts and have continued to treat the polychaetes as if theclass consisted of two orders (Fauvel 1958, pp. 1661 90; Hartmann-Schroder1971, p. 29) or subclasses (Uschakov 1955a), or have treated the group as if itconsisted of about 75 distinct and unrelated families (Hartman 1968, 1969). Theproblem with all proposed schemes is that they are internally inconsistent.Furthermore, they give no better solutions to classificatory problems than theold, admittedly artificial, separation into two orders. The three mostambitious recent proposals were by Dales (1962), Storch (1968) and Clark(1969). Dales used the variable structures of the eversible stomodeal region(pharynx) to separate different groups. The arrangement of the body-wallmusculature was used by Storch. Clark used a variety of different structures tocharacterize his eight orders. These authors gave no formal definition of anytaxon above the family level (except by inference from contained taxa) and ithas been difficult to evaluate their schemes. CHARACTERS USED TO DEFINE HIGHERTAXA Major anatomical and morphological features were reviewed during a studyof the phylogenesis of the polychaetes (Fauchald 1974a). Below is given asurvey of the findings with an expanded discussion of their taxonomic aspects.A. Prostomium. The prostomium usually is distinct and may have or lackappendages. In several families it is more or less fused with the peristomiumand the first segments. The degree of fusion is difficult to determine even inan examination of the nervous system so the degree of distinctness of theprostomium is a character that can have no great taxonomic value (see Benham1894, 1896). Prostomial appendages include antennae and palps. Antennae areinnervated through single roots directly from the brain; palps always havedouble roots, either from the brain or from the circumesophageal ring (Akesson1963; Orrhage 1966). Antennae are always sensory; palps may be sensory or maybe used as feeding appendages. The presence of either one or both categories ofappendages is considered here of great importance. The position of the palpsvaries from ventral to dorsal, from frontal to occipital. The position andfunction of the palps furnish important taxonomic characters. It is impossibleto distinguish any other classes of prostomial appendages either

onmorphological or anatomical grounds. B. Peristomium.

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