

# Hartmaniellidae — living fossils among polychaetes

HUBERT SZANIAWSKI and MINORU IMAJIMA



Szaniawski, H. & Imajima, M. 1996. Hartmaniellidae — living fossils among polychaetes. *Acta Palaeontologica Polonica* **41**, 2, 111–125.

The jaw apparatus of the Recent eunicoid polychaete *Hartmaniella erecta* is closely similar to those of the Mesozoic species of *Palurites*. It is concluded that the family Hartmaniellidae originated in the late Palaeozoic from an ancestor close to the Paulinitidae and is closely related to Kielanoprionidae. The lineage shows an extremely slow rate of evolution. Hartmaniellids have been abundant during the whole Mesozoic while its Recent representation is only a relic. *Palurites jurassicus* sp. n. is proposed.

Key words: Polychaeta, Eunicida, scolecodonts, phylogeny, fossil, Recent.

Hubert Szaniawski, Instytut Paleobiologii PAN, Aleja Żwirki i Wigury 93, 02-089 Warszawa, Poland.

Minoru Imajima, National Science Museum, Hyakunin-Cho, Shinjuku-Ku, Tokyo, 169, Japan.

## Introduction

Polychaetes of two orders, Eunicida and Phyllodocida, have a proboscidal armature which preserves well in the fossil state. The detached jaws of eunicoids are common microfossils in Palaeozoic marine deposits. As the structure of the armature is an important diagnostic feature in the polychaetes, the taxonomy of the fossils can be very close to natural systematics of Recent forms. Because of that, scolecodonts, and especially joined jaw apparatuses of eunicoids supply important information that can be used in studies of their phylogeny and evolutionary development.

Numerous post-Palaeozoic scolecodonts are very similar to the jaws of Recent polychaetes. In several cases it is possible to demonstrate that the similarity concerns not only the morphology of particular elements, but also the structure of whole apparatuses. This provided the basis for assigning some extinct species to extant genera and families. Until now six

families of eunicoids (Dorvilleidae, Iphitimidae, Lumbrineridae, Hartmaniellidae, Arabellidae, and Oeononidae) and two families of phyllodocids (Glyceridae and Goniadidae) have been recognized among Mesozoic and Cainozoic scolecodonts (see Szaniawski, in press). All but one of these families are known mainly from their Recent forms. Only the hartmaniellids are very poorly represented today and were discovered not long ago.

The first known species of the family, *Hartmaniella erecta*, was described by Imajima (1977) from Suruga Bay, Japan. Because of its distinctive character, as compared to all earlier known eunicemorph polychaetes, he erected a new genus — the *Hartmaniella* and a new family — the Hartmaniellidae. Orensanz (1990) based on the illustration of its jaw apparatus (Imajima 1977: fig. 2c–e) noted that the species is similar to some Palaeozoic and Mesozoic scolecodonts and Szaniawski (in press) concluded that the family existed since the Triassic.

Another species of the genus *Hartmaniella* (*H.* sp. A) has been reported by Gathof (1984) from the Gulf of Mexico. Orensanz (1990) assigned to the family Hartmaniellidae also the recently discovered extant species *Pseudonoe tulearensis* Amourex 1977 (see p. 122).

The main purpose of our investigations is to clarify the affinities of Recent Hartmaniellidae and some extinct polychaetes known only from their jaws. With this aim we carried out an anatomical comparative study of the jaw apparatus of *Hartmaniella erecta*, similar fossil apparatuses of the Triassic *Palurites raridentatus* (Kozur 1967), hitherto placed in the genus *Delosites*, and of the Jurassic species *Palurites jurassicus* sp. n.

The studied specimens of *H. erecta* are from the type locality. The collection of Triassic scolecodonts is from the Anisian limestone of Silesia. The Jurassic material comes from the calcareous concretions occurring in clay pit of the Bathonian in Zawiercie, and in the Callovian clay of the Baltic origin transported glacially near Łuków. A few are from the Oxfordian coral limestone pierced by deep boring in Tłuszcz (all in Poland). The Triassic material was collected and described by Zawadzka (1971, 1975), whereas some of the Jurassic specimens were illustrated earlier by Szaniawski & Gaździcki (1978) and by Szaniawski (in press) as *Delosites* sp.

The studied material is housed in the Institute of Paleobiology of the Polish Academy of Sciences, for which the abbreviation ZPAL is used.

## Morphological comparisons

Although the jaw apparatus of *P. jurassicus* is known from isolated elements only (maxillae I and II and a single carrier), its reconstruction (Fig. 1B) is rather secure because it is based on a comparison with the previously described (Zawadzka 1971), very similar, articulated Triassic apparatus of *Palurites raridentatus*. Besides that the reconstruction is confirmed by the co-occurrence of left and right MI and MII in similar numeric proportions, similarities of micro-morphological features in differ-

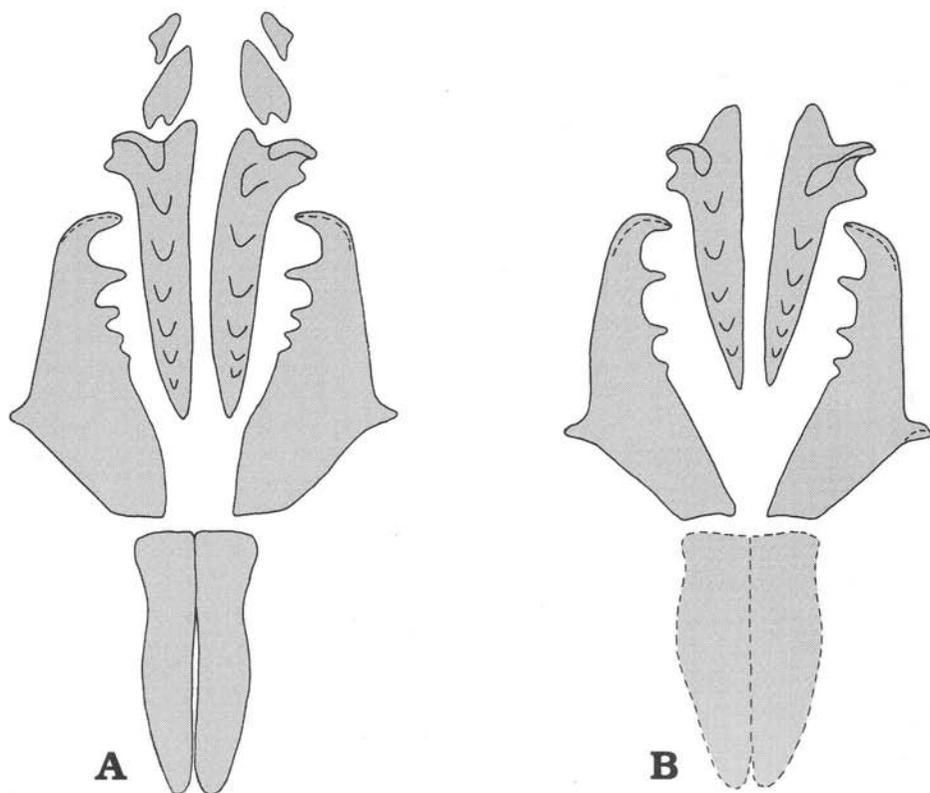


Fig. 1. Diagrams of the jaw apparatuses. □A. Recent *Hartmaniella erecta* Imajima 1977, Suruga Bay, Japan. □B. Reconstructed apparatus of Jurassic *Palurites jurassicus* sp. n. from the Bathonian and Callovian of Poland; anterior jaws unknown.

ent elements, and the exact morphologic fit of all the elements in the apparatus.

Anterior maxillae (MIII and MIV) are not known in any of the fossil species but they are not as diagnostic for eunicemorph polychaetes as the posterior elements. Most probably they have not been found because of very small size. Mandibles are also not known but they are rarely preserved in a fossil state and in effect are not very useful for taxonomical comparisons.

The great similarity in the general construction of the whole maxillary apparatus and shape of the particular elements of Recent *Hartmaniella erecta*, the Triassic *Palurites raridentatus* and the Jurassic *P. jurassicus* can be noticed at first sight on their diagrams (Figs 1, 5B). All the apparatuses are almost ideally bilaterally symmetrical. They do not have a basal plate or any other unpaired elements. The only disturbance to the symmetry concerns small differences in structure of the anterior part of left and right MII, and of the anterior maxillae, which are known only in the Recent form.

The morphologies of homologous elements (Figs 2–4) of all the three apparatuses are very similar. Characteristic features of the MI, except their general shape, are: denticulation, lateral spur, course of the posterior margin and shape of the basal cavity. The denticles are comparatively long and well separated. They occupy only the anterior half, or slightly more, of the inner margin. The spur is spine-shaped and situated at the junction of the posterior and outer margins. It is well developed in all the three species. The posterior margin is very long and composed of two segments. The outer one which begins at the spur, is longer and has a postero-medial direction. The inner, to which carriers are attached, is directed nearly medially. The opening of the pulp cavity on the ventral side has a very similar outline, and is surrounded by a belt in all of the jaws. Interesting micro-morphological feature of MI are sharp margins in form of costae delimiting the inner side of the fang.

The common features of MII are: narrow body, very short ramus having ventro-lateral direction and anterior prolongation of the inner slope forming anterior projection. Their basal cavity is gaping. Carriers of all species have similar outlines but differ slightly in length. Detailed comparison is not possible because carriers of *P. jurassicus* are known from one element only.

Such a great similarity of jaw apparatuses, in the case of eunicemorphs is indicative of a close relationship. Based exclusively on the known separate elements one should even assign the fossil and Recent forms to the same genus. However, because complete apparatuses of the fossil species are not known, and because temporal gap between the fossil and Recent forms is still long, we prefer for the time being not to combine the fossil and Recent species under the same generic name.

## Phylogeny and evolution

Of the extinct polychaetes only the Triassic *Palurites raridentatus* and the Jurassic *P. jurassicus* sp. n. can be assigned without doubt to the family Hartmaniellidae. Other possible Mesozoic members of the family are known from a few isolated elements only, and their jaw apparatuses cannot be reconstructed with certainty. There are two more Triassic species originally assigned to *Delosites*: *D. hungaricus* Kozur 1972 and *D. anterodentatus* Kozur 1972 (Fig. 6B, C). Judging from the shape of MI both of them should be also transferred to *Palurites* as defined here, but because they are illustrated in dorsal view only, and because other elements of the jaw apparatuses are not known, this must remain tentative. Most probably to the Hartmaniellidae belongs also the Cretaceous species *Lysaretides hartmannae* Kozur 1971 and *Lysaretides lata* Kozur 1971 (Fig. 6E–F) both known from isolated MI, and ?*Palurites latidentatus* Kozur 1971 (Fig. 6D) known of isolated MII (probably belonging to the same apparatus as one of the co-occurring MI assigned to *Lysaretides*).

Of the Palaeozoic joined jaw apparatuses only the Late Carboniferous '*Brochosogenys*' *bipunctus* (Colbath 1987) (Figs 5A, 6J) can be tentatively

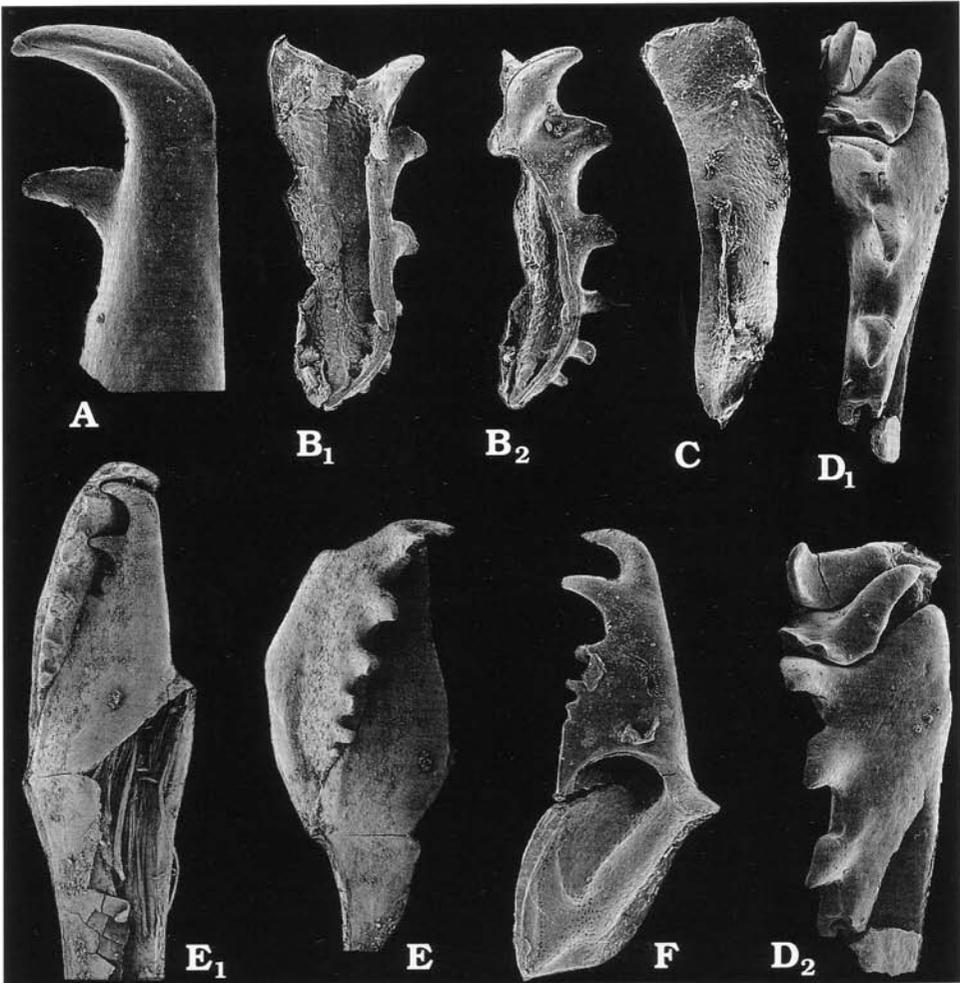


Fig. 2. *Hartmaniella erecta* Imajima 1977, Recent, Suruga Bay, Japan, elements of the jaw apparatuses extracted from two specimens: ZPAL Sc.VI/3/1 (A, D) and ZPAL Sc.VI/3/2 (B-C, E-F). A. Anterior part of right MI showing ridge on the fang;  $\times 320$ . B. Left MII in ventral and left lateral view;  $\times 160$ . C. Left carrier in ventral view;  $\times 160$ . D. Incomplete left MII, MIII, and MIV in dorsal view (posterior part and ramus of MII, and tips of teeth of MIII broken off);  $\times 160$ . E. Anterior part of right carrier, MI, and MII in dorsal and dorso-lateral view (anterior prolongation of the inner slope of MII broken off, on E1 remnants of muscle fibrils attached to the carrier and MI are visible);  $\times 180$  and  $\times 115$ . F. Left MI in ventral view;  $\times 160$ .

placed among the hartmaniellids. The species is known from one incomplete jaw apparatus from Pennsylvania. The type species of *Brochosogenys* is *Langeites siciliensis* Corradini & Olivieri 1974 which according to Catalano *et al.* (1992) should be assigned to *Delosites*. However, '*B. bipunctus*' seems congeneric neither with *Langeites* Kielan-Jaworowska 1966 nor with *Delosites*. It means that the generic assignment of '*B. bipunctus*' needs revision.

Of isolated MI, the Late Permian *Delosites falcatus* (Seidel 1959) (Fig. 6A), from Germany, has a much stronger enclosed basal cavity, similar to the MI of the kielanoprionids. It can be assigned to the hartmaniellids only tentatively. Somewhat similar and possibly congeneric with *D. falcatus*, is '*Arabellites*' *plesiocomis* Tasch & Stude 1966 (Fig. 6K) from the Permian of Kansas.

Cainozoic scolecodonts are poorly known. Only '*Delosites*' *eocaenicus* Eisenack 1975, based on an isolated MI (Eisenack 1975) most probably belongs to the Hartmaniellidae and perhaps to *Hartmaniella*.

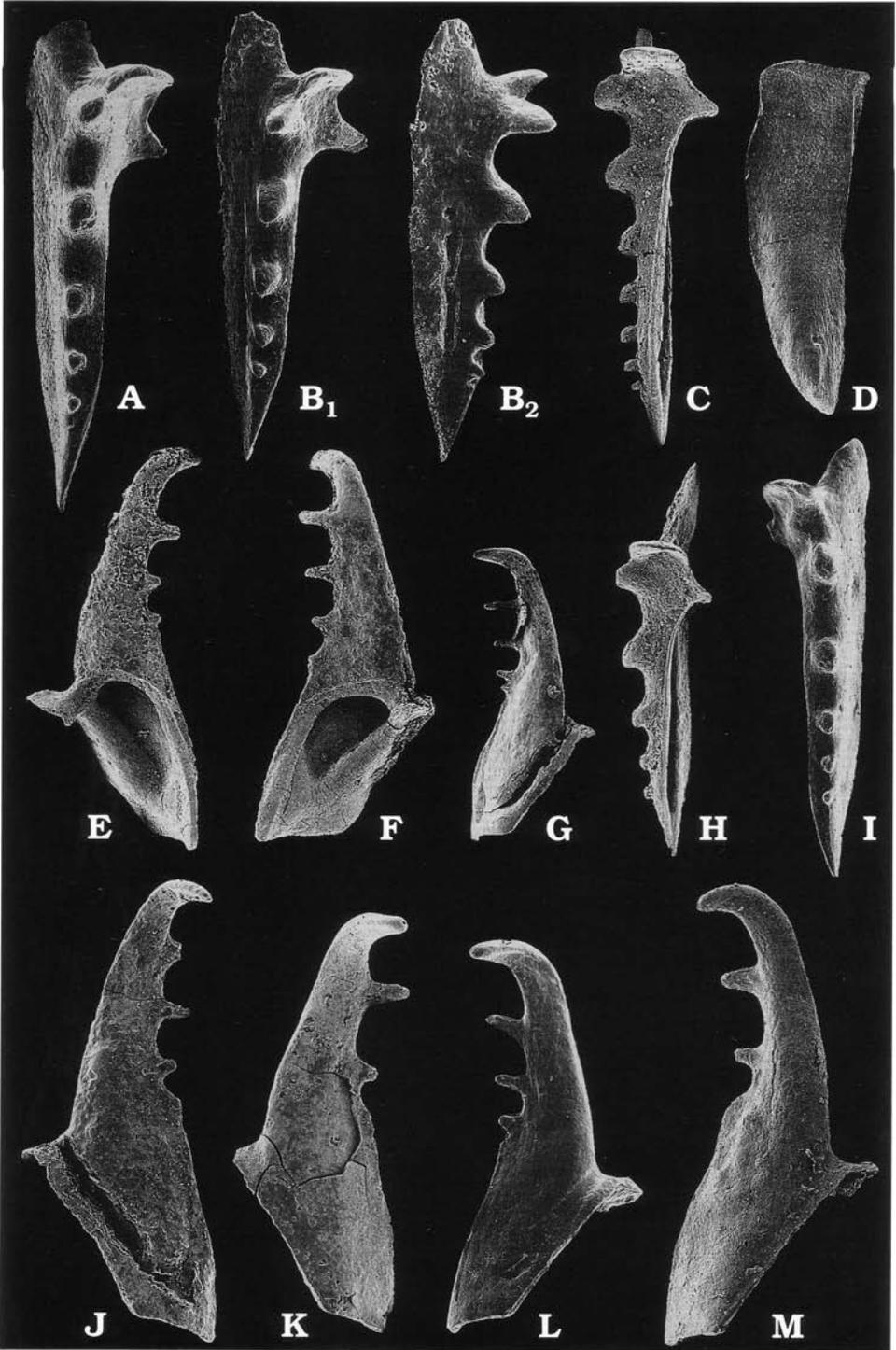
Among recently living polychaetes the closest to hartmaniellids are the Lumbrineridae (*sensu* Orensanz 1990, that means including *Lysarete* Kinberg 1865). This resemblance has been noticed already by Kozur (1970) who included *Delosites* *sensu lato* to the Lysaretidae emend. Kozur 1970. At that time the Recent hartmaniellids were not yet known. Imajima (1977: p. 211), while describing *H. erecta*, noticed also that 'the species resembles the Lumbrineridae' but finally decided not to include it into this family. A similar opinion was expressed by Orensanz (1990) but according to him the resemblance is superficial. He observed also that 'several hartmaniellid characters reflect primitive conditions' and concluded that 'Hartmaniellidae is a rather isolated family among extant eunicemorphs' (Orensanz 1990: p. 9). In our opinion the similarity in structure of maxillary apparatuses of hartmaniellids and *Lysarete* is meaningful and suggests a relationship. The similarity concerns mainly the symmetry and number of elements but, to some extent, also the shape of carriers, MI, and MII.

Comparisons with maxillary apparatuses of extinct eunicemorphs shows that hartmaniellids are most closely related to the Kielanoprionidae (Fig. 5D), known from the Devonian to Triassic. Their carriers, MI and, to a lesser degree, MII are similar. The differences in structure of the apparatuses are, however, definitively diagnostic at the family level. The apparatuses of Kielanoprionidae are asymmetric, and have a comparatively large, unpaired MIII. Moreover, their MI are wider, have a stronger enclosed pulp cavity and more numerous, shorter denticles without a well differentiated fang. Their MII have a longer ramus and their carriers are shorter and wider.

Most probably the two families evolved from a common ancestor and begun to diverge in the late Silurian or Devonian (Fig. 7). Some of the

---

Fig. 3. *Palurites jurassicus* sp. n., Bathonian of Zawiercie (A-B, D, L) and Callovian of Łuków (C, E-K, M), Poland. A. Right MII ZPAL Sc.VI/4/11 in dorsal view. B. Right MII ZPAL Sc. VI/4/3 in dorsal and left lateral view. C. Right MII ZPAL Sc./VI/2/10 in right lateral view. D. Right carrier ZPAL Sc. /VI/3/23 in ventral view. E. Right MI ZPAL Sc./VI/2/2 in ventral view. F. Left MI ZPAL Sc./2/2 in ventral view. G. Right MI ZPAL Sc.IV/2/5 in dorsal view. H. Right MII ZPAL Sc./VI/2/12 in right lateral view. I. Left MII ZPAL Sc.VI/2/12 in dorsal view (tip of ramus broken off). J-K. Left MI ZPAL Sc.VI/2/1 and 2/3 in dorsal views. L. Holotype, right MI ZPAL Sc.VI/4/2 in dorsal view. M. Right MI ZPAL Sc.VI/2/4 in dorsal view. All but A and I  $\times 95$ , A  $\times 85$ , I  $\times 65$ .



earlier representatives of the Kielanoprionidae, e.g. the Devonian *Elleriprion demissicius* (Eller 1963) and *Albertaprion comis* (Eller 1938) (Fig. 6G, H), are more similar to the Hartmaniellidae than the Permian species, e.g. *Kielanoprion pomeranensis* Szaniawski 1968 (Fig. 5B). *Delosites*, here restricted to its Permian type species *D. falcatus*, unfortunately known only after a right MI, bears features intermediate between the Kielanoprionidae and the Hartmaniellidae. The general shape of the jaw is similar to those of the hartmaniellids, but the comparatively short opening of its basal cavity is characteristic of the kielanoprionids.

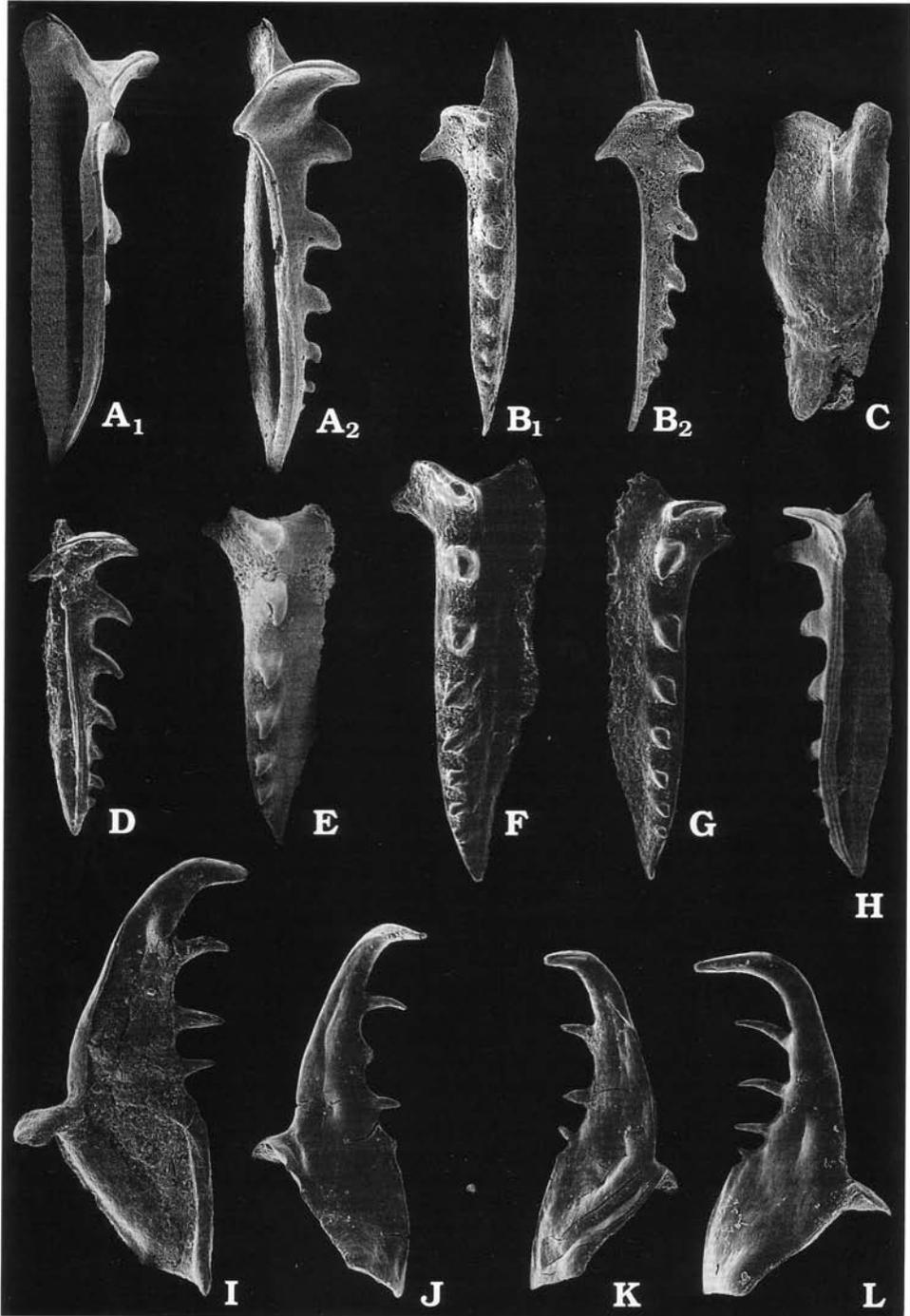
The common stock of Kielanoprionidae and Hartmaniellidae was probably close to the Paulinitidae. The Carboniferous '*Brochosogenys*' *bipunctus* (Figs 5A, 6J) is closest to the *Hartmaniella*, but also exhibits features characteristic of the Kielanoprionidae (Fig. 6B) (carriers broadly rounded, outer portion of posterior margin of MI short) and of Paulinitidae (general shape of MI and MII similar in many respects to early Permian '*Langeites*' *siciliensis*) (Fig. 5C). Also, *Oblongiprion coalitus* Männil & Zaslavskaya 1985, based on a Devonian apparatus reconstructed from isolated elements, seems to be an intermediate form between the Paulinitidae and Kielanoprionidae, while its maxillae I (Fig. 6I) have also features characteristic of the Hartmaniellidae.

Orensanz (1990) pointed out the similarity of the maxillary apparatus of *Hartmaniella erecta* and *Synclinophora synclinalis* Eisenack 1975 emend. Mierzejewski 1984. However, the apparatus of *Synclinophora* differs significantly from that of *Hartmaniella* by having long, filiform carriers, a large ramus of MII, and comparatively large MIII, similar in shape to the MII.

To summarize, the earliest polychaete related to Recent hartmaniellids is Carboniferous '*Brochosogenys*' *bipunctus*. The family probably evolved from an ancestor close to the Paulinitidae and it is most closely related to the Kielanoprionidae (Fig. 7). Their possible Permian representatives, '*Arabellites*' *plesicomis* and *Delosites falcatus*, are known only from isolated maxillae I. In the middle Triassic, forms so similar to the recently living *Hartmaniella erecta* appeared (*Palurites raridentatus*) that they possibly could be assigned to the same genus. The hartmaniellids were common in the Mesozoic. In many samples of the Triassic and Jurassic rocks their jaws are the most abundant of all eunicemorphs. They were rare in the Cainozoic, and are relic in Recent fauna. Their closest relatives among Recent polychaetes are lumbrinereids and among them *Lysarete*.

The early evolution of the jaw apparatus of hartmaniellids is obscure. From the Triassic to Recent it has changed only insignificantly. Its carriers

Fig. 4. □A–B. *Palurites jurassicus* sp. n., Callovian, Łuków, Poland; both  $\times 95$ . A. Left MII ZPAL Sc.VI/2/9 in ventral and left lateral view. B. Left MII ZPAL Sc. VI/2/11 in dorsal and left lateral view. □C–L. *Palurites raridentatus* (Kozur 1967), Anisian, borehole Jemielnica, Opole, southern Poland; all  $\times 115$ ; C. Carriers Sc.VI/1/23 in ventral view. D. Left MII ZPAL Sc.VI/1/18 in left lateral view. E–F. Left MII ZPAL Sc.VI/1/14 and 1/15 in dorsal view. G–H.



Right MII ZPAL Sc.VI/1/16 and 1/19 in dorsal and right ventro-lateral view. I. Right MI ZPAL Sc.VI/1/6 in ventral view. J. Left MI ZPAL Sc.VI/1/1 in dorsal view. K-L. Right MI ZPAL Sc.VI/1/7 and 1/5 in dorsal view.

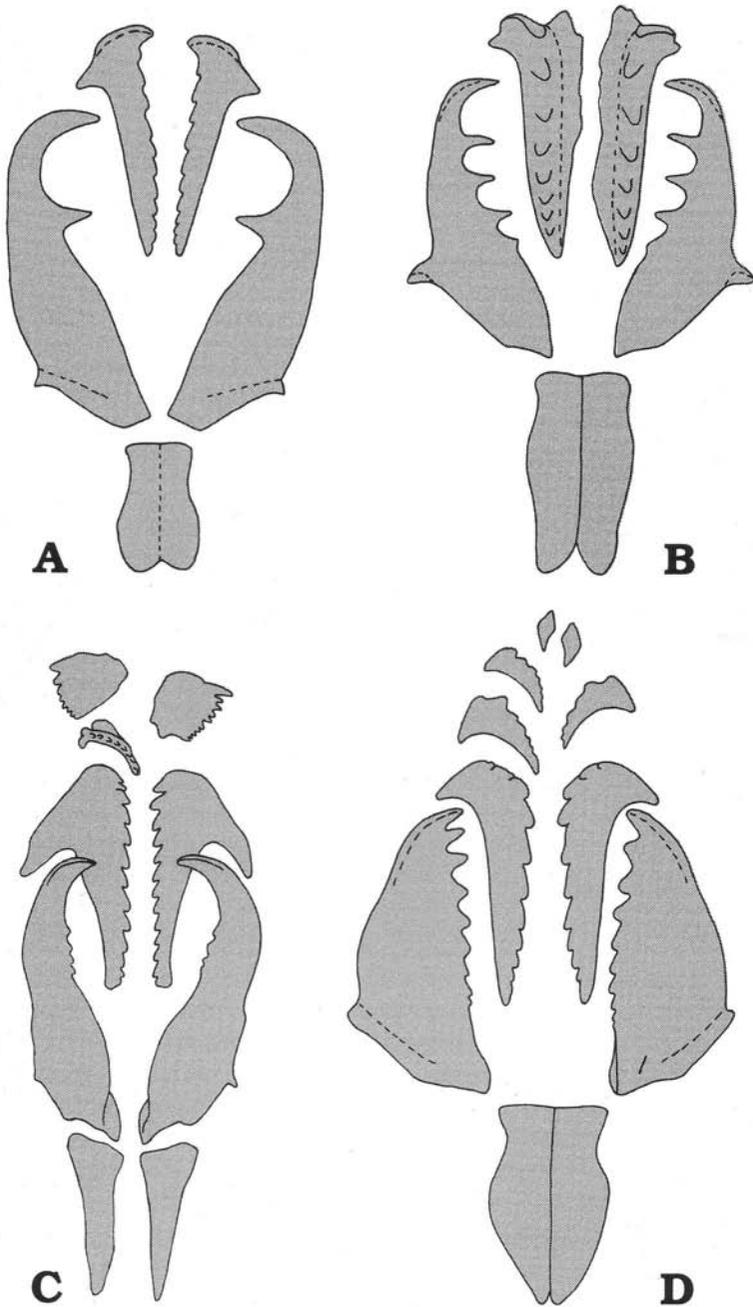


Fig. 5. Diagrams of the jaw apparatuses of fossil hartmaniellids (A, B; both without anterior jaws) and forms related to them (C, D). □A. *'Brochosogenys' bipunctus* Colbath 1987, Late Carboniferous (after photographs in Colbath 1987: fig. 1). □B. *Palurites raridentatus* (Kozur 1967), Middle Triassic. □C. *Langeites sicliensis* Corradini & Olivieri 1974, Early Permian (after Corradini & Olivieri 1974: fig. 2). □D. *Kielanoprion pomeranensis* Szaniawski 1968, Late Permian (after Szaniawski 1968: text-fig. 2).

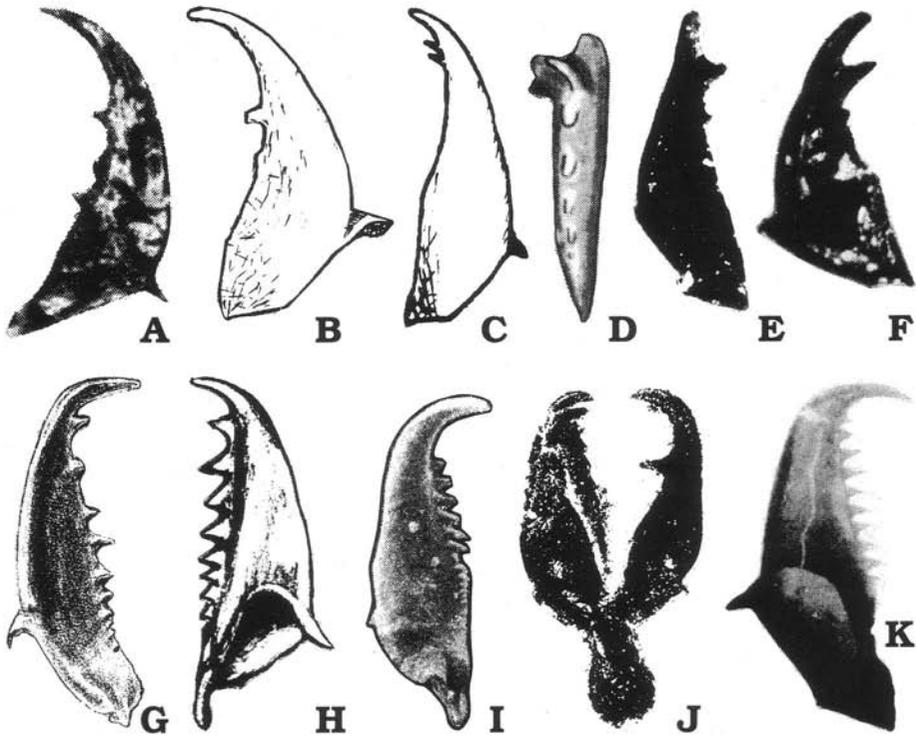


Fig. 6. Reproductions of original figures of the holotypes of extinct Hartmaniellidae and related forms. □A. *Delosites falcatus* (Seidel 1959), right MI in dorsal view, Zechstein, Germany;  $\times 15$ . □B. *Palurites hungaricus* (Kozur 1972), right MI in dorsal view, Carnian, Hungary;  $\times 80$ . □C. *Palurites anterodentatus* (Kozur 1972), right MI in dorsal view, Anisian, Austria;  $\times 125$ . □D. ?*Palurites latidentatus* Kozur 1971, left MII in dorsal view, Late Cretaceous, Germany;  $\times 75$ . □E. *Lysaretides hartmannae* Kozur 1971, left MI in dorsal view, Late Cretaceous, Germany;  $\times 75$ . □F. *Lysaretides lata* Kozur 1971, left MI in dorsal view, Late Cretaceous, Germany;  $\times 100$ . □G. *Ellertripton demissicium* (Eller 1963), left MI in dorsal view, Late Devonian, Iowa;  $\times 40$ . □H. *Albertaprtion comis* (Eller 1938), left MI in ventral view, Devonian, Michigan;  $\times 40$ . □I. *Oblongtripton coalitus* Männil & Zaslavskaya 1985, left MI in dorsal view, Middle Devonian, western Siberia;  $\times 50$ . □J. '*Brochosogenys*' *bipunctus* Colbath 1987, carriers, left and right MI and left MII in dorsal view, Late Carboniferous, Pennsylvania;  $\times 13$ . □K. '*Arabellites*' *pleiocomis* Tasch & Stude 1966, right MI in ventral view, Wolfcampian, Kansas;  $\times 100$ .

became slightly longer, MI a little wider, fang and denticles of MI shorter and less separated, pulp cavity slightly less enclosed.

Strong evolutionary conservatism has been already noticed in some other families of polychaetes: Dorvilleidae, Iphitimidae, Arabellidae, Glyceridae, and Goniadidae (see Szaniawski 1974 and Szaniawski & Gaździcki 1978). Until now the most stable morphology of polychaete jaws has been observed in the Phyllodocida. The Hartmaniellidae is the most extreme example of evolutionary stasis known among the eunicemorphs. This is an example of a faunistic group which flourished in the geological past being today close to extinction.

## Systematic descriptions

### Family Hartmaniellidae Imajima 1977

Genera assigned: ?*Delosites* Kozur 1967, *Palurites* Kozur 1967, ?*Lysaretides* Kozur 1971, *Hartmaniella* Imajima 1977, ?*Brochosogenys* Colbath 1987.

**Remarks.** — The family Hartmaniellidae and the genus *Hartmaniella* were erected (Imajima 1977) to include the unique living species *H. erecta*. Only one more species belonging beyond any doubt to the family, *Hartmaniella* sp. A, was reported later (Gathof 1984). *Pseudoninoe tulearensis* assigned by Orensanz (1990) to the family is known from one incomplete specimen (Amoureux 1977), and Orensanz's opinion is based mainly on its soft parts anatomy. Jaw apparatus of the species is not sufficiently well described and illustrated to enable detailed comparisons and is not discussed here.

The genera *Delosites*, *Palurites* and *Lysaretides* were originally erected for isolated fossil maxillae found in the Permian, Triassic, and Cretaceous rocks in Germany (Kozur 1967, 1971, 1972) (Fig. 7A–F). In this paper *Delosites* is restricted to its Permian type species *D. falcatus* and for the *Palurites* an emended diagnosis is proposed. To the *Lysaretides*, which is still known of the Cretaceous, isolated MI only, probably also the MII described (Kozur 1971) as *Palurites latidentatus* should be additionally transferred.

### Genus *Palurites* Kozur 1967

Type species: *Palurites raridentatus* Kozur 1967.

**Emended diagnosis.** — Jaw apparatus of *Hartmaniella* type. MI triangular in outline, symmetrical, with characteristic outer spur, small but clearly differentiated fang, and some well separated denticles. MII nearly symmetrical, long, narrow, with very short ramus directed latero-ventrally and anterior prolongation of inner slope. Carriers longer than half of MI.

Species assigned: *Palurites raridentatus* Kozur 1967, ?*Palurites anterodentatus* Kozur 1972, ?*Palurites hungaricus* Kozur 1972, *Palurites jurassicus* sp. n.

**Discussion.** — Hitherto known elements of jaw apparatuses are very similar to *Hartmaniella erecta*. The differences seems to be of specific rank only. It is better however not to combine as yet the fossil and Recent species into one genus because the fossil forms are known mainly of isolated jaws, and because there is a long time gap in their knowledge, between the Jurassic *Palurites* and the Recent *Hartmaniella* (the Cretaceous apparatuses of *Lysaretides* and/or *Palurites* can not be reconstructed as yet).

Zawidzka (1971) reported a joined jaw apparatus from the Anisian limestones of Poland which enabled her to state that the maxillae I described earlier (Kozur 1967) as *Delosites raridentatus* and the maxilla II — as *Palurites separatus* are different elements of the same apparatus. She included *Palurites* in the synonymy of *Delosites*, and the species *P. separatus* into synonymy of *D. raridentatus*. Kozur (1967), however, designated the earlier described, late Permian *D. falcatus* as the type species of *Delosites*. The species (Fig. 6A) is known only from two specimens of right MI which differ significantly from the elements of the Mesozoic species of

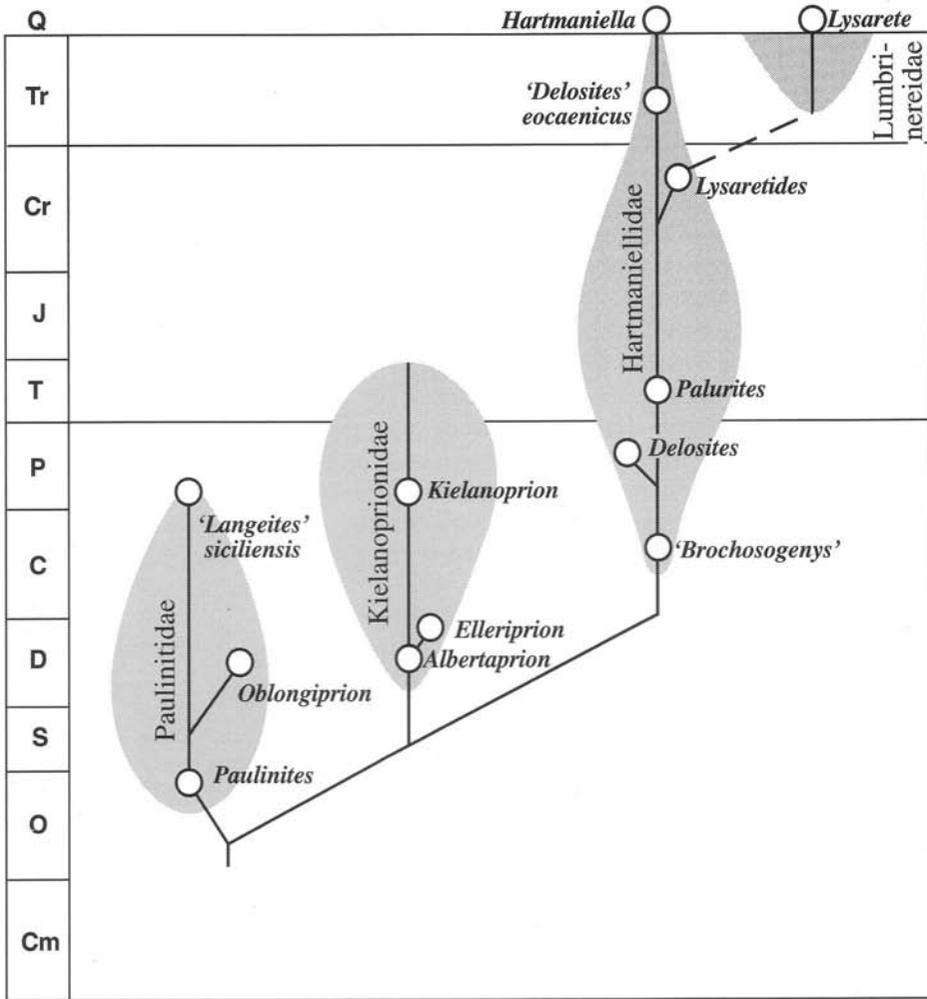


Fig. 7. Phylogenetic position of the family Hartmaniellidae.

*'Delosites'* (here transferred to *Palurites*) by the straight course of posterior margin, the stronger enclosed basal cavity, the shorter denticles and a longer falx. No other similar maxilla I is known. Therefore the range of *Delosites* should be restricted to its type species.

### *Palurites jurassicus* sp. n.

Figs 1B, 3, 4A-B.

Holotype: Right MI illustrated on Fig. 3L.

Type horizon and locality: Bathonian, Zawiercie, southern Poland.

Derivation of name: Jurassic — found in Jurassic rocks.

**Diagnosis.** — Comparatively large jaw apparatuses with MI strongly elongated, sub-triangular in outline. Fang clearly, but not much, bigger than the first denticle. Anterior half of inner margin scarcely denticulate,

posterior smooth, straight. Outer margin slightly arched. Outer portion of posterior margin long and straight, directed postero-medially. MII slightly asymmetrical; on the right jaw, the first denticle strongly prolonged laterally in the form of a ridge. Ramus comparatively large, triangular in outline. Anterior prolongation of inner slope long.

Denticle formula: MI 2-5 2-5  
MII 5-7 5-7

Measurements: Length of MI 0.4-0.8 mm, width equal about 0.33 of the length (width measured without the spur), length of MII 0.45-0.9 mm.

**Material.** — 12 left MI, 10 right MI, 11 left MII, 9 right MII, and single right carrier from the Bathonian in Zawiercie, 10 left MI, 13 right MI, 9 left MII, and 8 right MII from the Callovian in Łuków, 1 left MI, 1 left MII, and 2 right MII from Oxfordian coral limestones pierced by the Tuszcz borehole.

**Comparison.** — The new species differs from *Palurites raridentatus* by the larger size of all known elements. Besides, its MI have shorter denticles, less developed fang, and longer outer portion of the posterior margin, its MII are more asymmetrical, what is effected by stronger lateral prolongation of the first denticle in the right jaw and stronger tapering posterior portion of the left jaw.

## Acknowledgments

Thanks are due to Dr. Krystyna Zawidzka (Pol-Geol, Warsaw) for making available her collection of Triassic scolecodonts for comparative studies, as well as to Dr. Jose M. Orensanz (University of Washington), and Dr. Kent G. Colbath (Norwalk, USA) for helpful comments on the manuscript and linguistic improvements. A thorough reviews by Dr. Heinz Kozur (Budapest) and Dr. Claes Bergman (University of Land) are deeply appreciated.

## References

- Amoureux, L. 1977. Annélides Polychaetes de Madagascar. Description de deux nouvelles espèces (collections Crosnier et Jouannie). *Bulletin du Museum National d'Histoire Naturelle 3 serie* **495** (*Zoologie* **344**), 1097-1100.
- Colbath, G.K. 1987. An articulated polychaete jaw apparatus from the Carboniferous Kittanning Formation, western Pennsylvania, U.S.A. *Paläontologische Zeitschrift* **61**, 81-86.
- Catalano, R., Di Stefano, P., & Kozur, H. 1992. New data on the Permian and Triassic stratigraphy of western Sicily. *Neues Jahrbuch für Geologie und Paläontologie, Abhandlungen* **184**, 25-61.
- Corradini, D. & Olivieri, R. 1974. *Langettes siciliensis* n. sp. A polychaete jaw apparatus from the Permo-Carboniferous of northwestern Sicily. *Bollettino della Società Paleontologica Italiana* **13**, 156-163.
- Eisenack, H. 1975. Beiträge zur Anneliden Forschung, I. *Neues Jahrbuch für Geologie und Paläontologie Abhandlungen* **150**, 227-252.
- Eller, E.R. 1938. Scolecodonts from the Potter Farm Formation of the Devonian of Michigan. *Annals of the Carnegie Museum* **37**, 275-287.
- Eller, E.R. 1963. Scolecodonts from the Sheffield Shale, Upper Devonian of Iowa. *Annals of the Carnegie Museum* **36**, 159-171.
- Gathof, J.M. 1984. Chapter 57: Hartmaniellidae. In: J.M. Uebelacker & P.G. Johnson (eds) *Polychaetes of the northern Gulf of Mexico*. Vol. **7**, 1-3. Vittor, Mobile, Alabama.
- Imajima, M. 1977. A new polychaete family, Hartmaniellidae, from Japan. In: D.J. Reish & K. Fauchald (eds) *Essays on polychaetous annelids in memory of Dr. Olga Hartman*, 211-216. Allan Hancock Foundation, Los Angeles.

- Kozur, H. 1967. Scolecodonten aus dem Muschelkalk des germanischen Binnenbeckens. *Monatsberichte der Deutschen Akademie der Wissenschaften zu Berlin* **9**, 842–886.
- Kozur, H. 1970. Zur Klassifikation und phylogenetischen Entwicklung der fossilen Phyllococida und Eunicida (Polychaeta). *Freiberger Forschungshefte* **260 C**, 35–81.
- Kozur, H. 1971. Die Eunicida und Phyllococida des Mesozoikums. *Freiberger Forschungshefte* **267 C**, 73–111.
- Kozur, H. 1972. Die Bedeutung der triassischen Scolecodonten insbesondere für die Taxonomie und Phylogenie der fossilen Eunicida. Hat sich die Synthese vom 'orthotaxonomischen' und 'parataxonomischen' system in der Praxis bewährt? *Mitteilungen der Gesellschaft der Geologie- und Bergbaustudenten* **21**, 745–776.
- Männil, R.M. & Zaslavskaya, N.M. (Мяньиль, Р.М., Заславская, Н.М.) 1985. Находки среднепалеозойских полихет в юго-восточной части Западно-Сибирской Плиты. In: В.Н. Дубатов, А.В. Каныгин (ed.) Биостратиграфия палеозоя западной Сибири. *Труды Института Геологии и Геофизики СО АН СССР* **619**, 69–72, 199–200, and 213. Наука, Новосибирск.
- Orensanz, J.M. 1990. The eunicemorph polychaete annelids from Antarctic and Subantarctic seas. *Antarctic Research Series* **52**, 1–183.
- Seidel, S. 1959. Scolecodonten aus dem Zechstein Thüringens. *Freiberger Forschungshefte* **76 C**, 7–31.
- Szaniawski, H. 1968. Three new polychaete jaw apparatuses from the Upper Permian of Poland. *Acta Palaeontologica Polonica* **13**, 255–281.
- Szaniawski, H. 1974. Some Mesozoic scolecodonts congeneric with Recent forms. *Acta Palaeontologica Polonica* **19**, 179–199.
- Szaniawski, H. (in press) Scolecodonts. In: R.T. Clarke & J. Jansonius (eds) *Palyynology: Principles and Applications*. AASP Silver Jubilee Book.
- Szaniawski, H. & Gaździcki, A. 1978. A reconstruction of three Jurassic polychaete jaw apparatuses. *Acta Palaeontologica Polonica* **23**, 3–29.
- Tasch, P. & Stude, J.R. 1966. Permian Scolecodonts from the Fort Riley Limestone of Southeastern Kansas. *Wichita State University Bulletin* **68**, 3–33.
- Zawidzka, K. 1971. A polychaete jaw apparatus and some scolecodonts from the Polish Middle Triassic. *Acta Geologica Polonica* **21**, 361–377.
- Zawidzka, K. 1975. Polychaete remains and their stratigraphic distribution in the Muschelkalk of southern Poland. *Acta Geologica Polonica* **25**, 257–274.

## Streszczenie

W oparciu o badania porównawcze wykazano, że stosunkowo niedawno poznana rodzina wieloszczetów współczesnych *Hartmaniellidae* (Imajima 1977) posiada aparat szczękowy o bardzo podobnej budowie do wcześniej już znanego gatunku triasowego *Palurites raridentatus* (Kozur 1967) oraz do opisanego w niniejszej pracy gatunku jurajskiego *Palurites jurassicus* sp. n. Podobieństwo to dotyczy zarówno budowy całych aparatów jak i poszczególnych ich elementów (Figs 1–4, 5B) i wskazuje na bliskie pokrewieństwo. Do rodzaju *Palurites* należy ponadto kilka innych gatunków mezozoicznych, znanych dotychczas wyłącznie na podstawie izolowanych szczęk.

Porównania z wcześniej opisanymi skolekodontami (Figs 5A, C–D, 6) pozwalają na stwierdzenie, że hartmaniellidy wyodrębniły się już w górnym paleozoiku, pochodzą od przodków bliskich paulinitidom i są najbliższymi spokrewnionymi z kielanoprionidami. Wśród form współczesnych najbardziej do nich zbliżona jest rodzina Lumbrinereidae (Fig. 7).

Hartmaniellidy były bardzo liczne w mezozoiku, a współcześnie żyją zaledwie dwa ich gatunki o bardzo ograniczonym zasięgu występowania. Uważać je więc można za formy reliktowe.