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A Revision of the Major Genera of Amphiurid Ophiuroidea

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Abstract

THE major genera of Amphiuridae are reviewed. On the basis of their type species, restricted diagnoses are proposed for *Ophionephthys, Amphiura, Amphiodia, Amphipholis* and *Amphioplus*. To accommodate some of the species excluded from these genera, *Ophiopeltis* Dùben & Koren, and *Hemilepis* Ljungman are removed from the synonymy of *Amphiura* and redefined on the basis of their type species. The remaining species are grouped to form twelve new genera. In all, 344 species are allocated among 19 genera, which are defined and keyed.

HISTORICAL REVIEW

The genus *Amphiura* was established by Forbes in 1842 to accommodate ophiuroids in which the proximal part of the jaw carries a pair of similar infradental oral papillae, one on either side of the midline, beneath the vertical column of teeth at the jaw-apex. During the next 25 years four genera were segregated from *Amphiura* to contain various species with spines on the disc; these genera (*Ophiocentrus, Ophiostigma, Ophiocnida,* and *Ophiophragmus*), and some others subsequently defined, are not discussed in the present paper. For the species of *Amphiura* in which no spines occur on the disc, five genera were differentiated during the period 1842–1871. Two of them were based on forms with a naked disc, and parallel contiguous radial shields; these are *Ophionephthys* and *Ophionema,* the former having well-developed external oral papillae, the latter having only vestigial external papillae. Both genera are regarded as valid. The other three genera were *Amphipholis, Ophiopeltis* and *Hemilepis.* Ljungman (1871) was able to express the differences between these as follows:—

A. Papillae ambulacrales binae vel singulae adsunt.

Squamulae disci spinulis destitutae, nudae .... *Amphiura* s.s.

Discus subtus maxima parte nudus . . . Papillae ambulacrales binae minutissimae (interdum rudimentariae) .... *Hemilepis*

Discus subtus maxima parte nudus . . . Papillae ambulacrales plane desunt .... *Ophiopelte*

(*Amphipholis* had already been differentiated by Ljungman on the basis of the type *Amphiura squamata* D. Chiaje, with 3 oral papallae, the outermost largest, and was not included in the key.)

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Despite the clear distinction drawn by Ljungman between *Amphiura, Amphipholis, Hemilepis* and *Ophiopelte* (laps. cal. for *Ophiopeltis* D & K), Lyman (1882) merged all four genera under *Amphiura,* and employed the distinctions merely to indicate sections of that genus. Verrill (1899) distinguished two other genera, *Amphioplus* and *Amphiodia* for species with 3 or more oral papillae, and revived *Amphipholis*. In his analysis of the species of these genera Verrill indicated the position of *Ophiopeltis* (misquoted as "*Ophiopelte*") and *Hemilepis*, but reduced both to synonymy by including their species in *Amphiura.* Verrill's keys can be briefly summarised as follows:—

Oral papillae 2 on each jaw-plate, with a diastema between them	*Amphiura* (including *Hemilepis* and *Ophiopeltis*)
Oral papillae 3 on each jaw-plate, no diastema—	
Outer papilla broadened	*Amphipholis*
Outer papilla not broadened	*Amphiodia*
Oral papillae 4 or 5 on each jaw-plate, the distal papilla or papillae sometimes placed on the adoral plate	*Amphioplus*

Verrill's classification is the one in use at the present time, and in most respects it has proved workable. Unfortunately, however, the subsequent work on regional faunas (without regard to the genera in their world context) has resulted in the gross overloading of these four genera, over 350 species having been assigned to them. A systematic review of their content, and their relation to *Ophionephthys* is urgently required, and the present contribution indicates a possible subdivision. Whether the divisions proposed here are natural ones is, of course, very uncertain, but it is believed that they have the merit of practical working units, with reasonably well-defined content.

Although the genera are obviously overloaded, and in need of subdivision, it would not be fair to say that the present classification is chaotic. Authors of new species have generally taken care to indicate the affinities of the species on the basis of the disc-clothing and tentacle-scales, and these important details have been utilized in the classification here proposed. However, as will be seen in the course of the discussion, many species have found their way into quite inappropriate association with forms not closely related, and some rearrangement of these is required. Further, a serious error resulted from the suppression of *Ophiopeltis* Düben & Koren in 1882, when Lyman reduced it to a synonym of *Amphiura.* The result of this has been that subsequently, as new species of *Ophiopeltis* have been discovered, some have been assigned to *Amphiura,* and others to the inappropriate genus *Ophionephthys.* This in turn has led to misgivings as to the validity of *Ophionephthys,* which, of course, lost its distinctive features once it began to encompass species unrelated to those originally included.

Some of the genera here proposed will comprise groups of species which other naturalists have no doubt recognized as convenient taxonomic assemblages, but which they have hesitated to erect into genera because a few transitional forms link the assemblages, and make it difficult to draw sharp boundaries between the groups. While such a cautious attitude may be justified so long as the number of species is not great, it becomes highly impracticable when the annual accretion of new forms results in genera achieving the high total of nearly 200 species. This has happened with *Amphiura.* The Linnean system of classification presumes that sharp breaks exist between taxa, whereas the evolution hypothesis implies that such sharp breaks will not occur unless major mutations, or extinctions, have taken place. The evidence suggests that in the Amphiuridae there has been usually a gradual differentiation of species and genera, and intermediate forms still exist. In such circumstances the conservative taxonomist may be inclined

to recognize subgenera between which, by convention, intermediate forms are not regarded as forbidden. In practice, the history of classification usually shows that a succeeding generation of taxonomists discards the inconvenient trinomial nomenclature which subgenera require, and subgenera are soon treated as genera. Thus *Amphioplus, Amphiodia* and *Amphipholis* were all treated by Koehler initially as "sections" of *Amphiura* (Koehler, 1904, 1905); and subsequently he regarded them as genera. For the foregoing reasons, in reviewing some 350 species of amphiurids, it has seemed preferable to propose new genera with full generic status, even where the included species are relatively few; we may be sure that the number of species will increase steadily, despite the elimination from time to time of nominal species which prove to be invalid. Further, by increasing the number of genera in this way we can bring groups of related species into sharper relief, thus facilitating the recognition of synonyms.

One unfortunate result of the great extension of the genera during the past half-century has been that the original concept of a genus has tended to drift. It is recognized that stability of genera is promoted if one of the species first assigned to a genus be kept in view as the so-called type species, and that no species be admitted to a genus if its characters differ markedly from these of the type. In the following review the major genera of Amphiuridae are taken one by one, and the species nominally assigned to them are compared individually with the type species. Only those which agree in the major features of disc-clothing and tentacle-scales are admitted to the genus, which is therefore restricted accordingly, and the other species are regrouped in smaller new genera. In the first part of the paper the major genera are taken in the sense in which they are used in the current literature. In the second part the old genera are redefined and restricted, and new genera proposed. A short key is given to the new genera together with those of the older genera to which they are more directly related. As a key to the other genera of Amphiuridae has recently been published (Fell, 1960), it is not necessary to repeat those parts of it which are unaffected by the present study.

Ophionephthys Lütken, 1869

Twelve species appear in the current literature under this genus, but there is great disagreement as to its validity. Matsumoto (1815, 1917), and Koehler (1922), have rejected it as indistinguishable from *Amphiura*; on the other hand H. L. Clark (1946) and Mortensen (1936, 1940) consider it at least sufficiently well-defined to warrant assigning new species to it, as Balinsky (1957) has recently had occasion to do. The cause of the disagreement between these authors is immediately apparent if a tabulated analysis of the characters of the included species is prepared. It is then evident that the genus at present comprises in fact two quite different assemblages of species, which are probably not even closely related. Both assemblages agree in the severe reduction of calcified structures on the dorsal and ventral surfaces of the disc, the conspicuous areas of unscaled dermis serving to give all the species a marked superficial resemblance. Apart from this, the two groups differ widely. The type of the genus is *Ophionephthys limicola* Lütken, 1869 from the Caribbean region. It has a large infradental papilla, and a series of 3 other, smaller oral papillae, and thus falls in the *Amphioplus* group of Amphiuridae. The tentacle-pores are large, but not naked, for all except the first pair of pores carry a distinct, though small, tentacle-scale on the inner margin. Two other species, *O. stewartensis* of New Zealand, and *O. magellanica* from southern Chile present similar characters. Further, three nominal species of *Amphioplus* (namely, *seminudus* Mrtsn., *cyrtacanthus* H. L. C., and *lucidus* Klr., from Persian Gulf, Philippines and Indonesia respectively), exhibit the same characters and must be considered congeneric. The whole assemblage therefore constitutes *Ophionephthys* sensu stricto.

Six other species which have been referred to the genus constitute a distinct assemblage, differing from *Ophionephthys* s.s. in having two oral papillae separated by a diastema, and having naked tentacle-pores. These evidently represent a separate genus, and the mouth-parts show that it is a member of the *Amphiura* group. A review of species referred to *Amphiura* discloses three more nominal species of that genus which are certainly congeneric with the second group of the species which have been isolated from *Ophionephthys*; these are *Amphiura aestuarii* Matsu., *A. vadicola* Matsu., and *A. securigera* (D & K). As the latter species was the type of Düben & Koren's *Ophiopeltis*, hitherto treated as a synonym of *Amphiura*, it follows that the correct name for the whole assemblage here indicated must, by the rule of priority, be *Ophiopeltis*.

It ought to be stressed that the two divisions which have just been distinguished, *Ophionephthys* s.s. and *Ophiopeltis*, do not represent exactly comparable assemblages of their respective groups (*Amphioplus* group and *Amphiura* group); for whereas *Ophionephthys* possesses tentacle-scales, *Ophiopeltis* lacks them. However, a survey of the nominal species of *Amphiura* discloses that there does exist a third assemblage of species with mouth-parts of the *Amphiura* type, the disc almost completely naked, and tentacle-scales present. This latter group, then, is to be recognized as the real equivalent of *Ophionephthys* among the *Amphiura* group. Consequently it is now desirable to examine the structure of *Amphiura* in its current extended connotation.

Amphiura Forbes 1842

Nearly 200 nominal species have been assigned to this unwieldy genus. For most of the species sufficient information is available to permit a dismemberment of the genus along practical lines. The type species is *Amphiura chiajei* Forbes, 1842, from North Atlantic coasts. The characters hitherto regarded as diagnostic of the genus (in the restricted sense of Verrill, 1899) is the presence of a long diastema separating the infradental papilla from the second papilla, and the absence of spines from the disc. In addition, the type species shows a fully scaled disc, both above and below, and two tentacle-scales. All these characters may therefore be used to define *Amphiura* in the more restricted sense that is now required; they are shared by a cluster of about 40 nominal species. The group is well-defined, though a few species (such as *belgicae* and *rosea*) have only one scale on the proximal first or second segments, and thereafter 2 scales. Another large cluster can be segregated in which the scale-covering of the disc is complete, but only 1 tentacle-scale is present throughout the arm. This group is equally well-defined with, however, a few species (such as *proposita* and *bihamula*) where there are 2 scales proximad. A third assemblage has a complete disc-scalation but lacks tentacle-scales, save for an occasional rudiment. This group includes *canadensis*, and several species similar to it. Among them may be ranked *monorima*, a species unique in amphiurids in having only one genital aperture in each interradius; when more is known of this species it might be made the type of a separate genus, though it does not seem desirable to take this step at present. Incidentally, the species *tomentosa*, with which Mortensen compared *monorima*, is not a member of this third assemblage (the figure in the *Challenger* Report is misleading). For each of the three groups indicated generic status is proposed later in this paper.

Three more groups of *Amphiura* species can be isolated on the same principles, by correlating the tentacle-scales with the disc in those forms where there is a partial or complete absence of scales from the ventral surface of the interradii. The group with no tentacle-scales comprises about 19 species, for which a genus may be erected. For the score of species with 2 tentacle-scales the generic name

Hemilepis Ljungman, 1871, is available; it was clearly defined by Ljungman "Discus subtus maxima parte nudus . . . papillae ambulacrales binae . . ." The type was not specified, but *A. semiermis*, which stands first on Ljungman's list may serve. There is also an unnamed group of about 14 species, in which a single tentacle-scale occurs. Of these, 12 species are known only from the Pacific. This group may well constitute a distinct genus. There still remain the four species *polyacantha, crossota, microsoma* and *diacritica* which appear to form a seventh division of generic value; in all four there is considerable reduction in the scalation of the disc, on the dorsal surface as well as the ventral interradii, and 1 or 2 tentacle-scales occur. This seems to be the real equivalent of *Ophionephthys* among the *Amphiura* group of species; H. L. Clark (1946) has drawn attention to the resemblance, and the name proposed later in this paper is intended to indicate the similarity to *Ophionephthys*.

Amphiodia Verrill, 1899

In Verrill's original sense the genus comprise those amphiurids in which there are three oral papillae of similar size and the disc is scaled, but does not bear spines or granulation. At the present time some 60 species are nominally assigned to the genus. There are three well-marked divisions, comparable with three of the divisions recognised for *Amphiura* s.l. The first comprises the species which resemble the type of *Amphiodia, A. pulchella* (Lyman) having the disc scaled above and below, and 1 tentacle-scale. Some transitional species seem best included here, such as *affinis* (where the tentacle-scale is often lacking from the first segment), and *euryaspis* (where 1 or 2 rudimentary scales may occur). This group will constitute *Amphiodia* in a restricted sense. A second group of generic status comprises those species in which 2 well-developed tentacle-scales occur, together with a completely scaled disc. Some members of the group are difficult to distinguish from *Amphipholis*, as the outer oral papilla may be larger than the others. Possibly we have here some species which share a common ancestry with *Amphipholis*. A third group, for which generic status is also to be proposed below, comprises those species in which there is 1 tentacle-scale and the disc is more or less naked below, paralleling a similar section among the *Amphiura* group. Of the remaining species, I think that *ascia* (with the disc naked below, and no tentacle-scales) must be transferred to the corresponding section of the *Amphiura* group—i.e., *Ophiopeltis*, for there is a distinct diastema in the jaw. Mortensen (1936) admits that it could well fall there, and it can be added that the outer oral papilla is sometimes reduplicated in the species *securigera* which, in all other respects, is a typical member of the *Ophiopeltis* group. There remains also *Amphiodia destinata*, with a naked ventral surface, and 2 tentacle-scales. It has recently been recorded (Fell, 1961) that this species is only a variant form of *Amphiura joubini*, where the internal oral papilla is very variable in size, and sometimes lies on the edge of the jaw, so as to form a middle oral papilla. Although the species is referred (in the paper cited) to *Amphiodia*, it could equally well be placed in *Amphiura*. In view of the fact, now apparent, that no other species of *Amphiodia* is known in which 2 tentacle-scales occur together with a naked ventral interradius, it would be unwarranted to erect a genus solely on the basis of this one dubious case. Accordingly the species is here transferred to the appropriate section of the *Amphiura* group—namely, *Hemilepis*.

Amphipholis Ljungman, 1866

The genus, according to Verrill (1899), resembles *Amphiodia* in having three oral papillae, but differs in that the outermost papilla is enlarged, partially closing the oral cleft, but Ljungman's original diagnosis also included the statement that there are 2 flat, tentacle-scales. This condition is true of the type species,

Ophiolepis gracillima Stimpson, and of many of the others, and may therefore be the basis of the genus in a restricted sense. However there still remain some other nominal species of the genus which must be disposed of. Of these, *Amphipholis instructa* Koehler has spines on the disc, and therefore must be transferred to *Ophiostigma* Lütken. Nielsen (1932) who has examined the type specimen of *A. microdiscus* records that it is completely decalcified and the species is unrecognizable. He also considers that *violacea* is better placed in *Amphiodia* (s.l.) than in *Amphipholis*. We are thus left with a few species which fall into two groups according to the presence or absence of a scale at the tentacle-pore. Each of these groups is comparable with corresponding groups in other genera considered, and each is accordingly here raised to generic status. The names proposed (p. —) are intended to indicate their relationship to *Amphipholis* s.s. It is interesting to note that no species of the *Amphipholis* group has any part of the disc naked. The same is true of the *Amphiodia* group, after the exclusion of *ascia* and *joubini* (= *destinata*), as proposed in the foregoing section. Thus *Amphiodia* and *Amphipholis* (both sensu lato) appear to form related categories of taxa, with similar mouth-parts and similar disc-clothing.

Amphioplus Verrill, 1899

This is another major genus requiring dismemberment. At present it comprises about a hundred nominal species. In the sense of Verrill, 1899, the genus is characterized by having 4 or more oral papillae. Those species with spines on the disc, or with the outermost papilla enlarged, have already been removed to form separate genera by Matsumoto (1917) and Mortensen (1940). The type of *Amphioplus* is *Amphiura tumida* Lyman, in which the disc is fully scaled above and below, and 2 tentacle-scales are present. These characters may be taken as diagnostic of *Amphioplus* in a restricted sense. Most of the species fall in this category, and at present it is not apparent how the assemblage can be further subdivided. Of the remaining species, two further categories emerge, containing those which have no tentacle-scale, and those in which a single tentacle-scale occurs; each of these may be raised to generic status. A fourth generic category is represented by species *archeri* A. M. Clark, *personatus* Koehler, *coniortodes* H. L. Clark, and *echinulatus* Mrtsn., in which there are 2 tentacle-scales and the ventral surface of the disc is more or less naked. Of the remaining species for which data are available to me, *Amphiura stearnsi* is based on juvenile *Ophionereis*, and is to be rejected; *spinulosa*, with marginal spines, must be transferred to *Amphicantha*; and *duplicatus* falls in *Ophiactis*.

SYSTEMATICS

The foregoing notes indicate the general plan upon which the dismemberment of the major genera of Amphiuridae could be carried out. It will be noted that to a large extent the subdivision has been based on tentacle-scalation and the scalation of the disc. These characters have been used for a long time as a basis for defining species, as well as groupings of species, and have proved reliable. The same could not be said of the characters of the arm-spines, the radial shields, the primary plates of the disc, viviparity versus oviparity, and various other characters which might seem available. It is now intended to give formal standing to the new genera which seem desirable. Under each is given a list of species included, but the lists are not complete, as not all species have been reviewed. Sufficient information, however, is given to enable the disposition of the remaining species to be determined as occasion arises.

Family AMPHIURIDAE

KEY TO THE GENERA HEREIN PROPOSED

1	(16)	A conspicuous naked diastema separates the infradental papilla from the second oral papilla. Usually only 2 oral papillae, but a third one may occur on or near the adoral plate.	
2	(5)	Disc naked above and below, save for the radial shields and an adjoining narrow zone of scales bordering the radial shields.	
3	(4)	No tentacle-scales	*Ophiopeltis*
4	(3)	One or two tentacle-scales	*Amphinephthys* n.g.
5	(2)	Disc not entirely naked, having at least a continuous clothing of scales on the upper surface.	
6	(11)	Disc scaled above, but partly or entirely naked below	
7	(8)	No tentacle-scales on most pores	*Icalia* n.g.
8	(7)	Tentacle-scales present on all or most pores.	
9	(10)	One tentacle-scale	*Pandelia* n.g.
10	(9)	Two tentacle-scales	*Hemilepis*
11	(6)	Disc scaled completely, above and below.	
12	(13)	No tentacle-scales on most pores, at most only occasional or minute rudimentary scales	*Nullamphiura* n.g.
13	(12)	Well-developed tentacle-scales present on most or all pores.	
14	(15)	One tentacle-scale	*Monamphiura* n.g.
15	(14)	Two tentacle-scales	*Amphiura*
16	(1)	Three or more oral papillae on each side of the jaw, with no conspicuous naked diastema between the first and second papillae.	
17	(32)	Three oral papillae.	
18	(27)	Outermost (i.e., third) oral papilla conspicuously larger than the other two papillae.	
19	(20)	Spines present on disc	*Ophiostigma*
20	(19)	No spines on disc.	
21	(22)	No tentacle-scales	*Nullopholis n.g.*
22	(21)	Tentacle-scales present.	
23	(24)	Arm-spines of distal arm-joints transformed into hooklets	*Amphilycus*
24	(23)	Arm-spines not transformed into hooklets.	
25	(26)	One tentacle-scale	*Monopholis* n.g.
26	(25)	Two tentacle-scales	*Amphipholis*
27	(18)	Three subequal oral papillae on each side of the jaw, the outermost papilla not conspicuously enlarged.	
28	(31)	Disc completely scaled above and below.	
29	(30)	One tentacle-scale	*Amphiodia*
30	(29)	Two tentacle-scales	*Diamphiodia* n.g.
31	(28)	Disc scaled above, but more or less naked below. One tentacle-scale	*Ailsaria* n.g.
32	(17)	Four or five oral papillae on each side of the jaw, often rather irregularly arranged, or overlapping, the outermost usually placed on or near the adoral plate.	
33	(38)	Disc scaled completely above and below.	
34	(35)	No tentacle-scales	*Silax* n.g.
35	(34)	Tentacle-scales present on all or most pores.	
36	(37)	One tentacle-scale	*Unioplus* n.g.

37 (36) Two tentacle-scales .... *Amphioplus*

38 (33) Disc not completely scaled, either above or below.

39 (40) Disc scaled above, but partly or wholly naked below. Tentacle-scales present (two in all known species) ..... *Gymnoplus* n.g.

40 (39) Disc naked above and below, save for the radial shields and an adjoining narrow zone of scales bordering the radial shields. One or two tentacle-scales .... *Ophionephthys*

Amphinephthys n.g.

DIAGNOSIS. Amphiuridae in which the oral papillae do not form a series along the outer side of the jaw, but comprise only an infradental papilla separated by a naked diastema from a distal papilla, with an internal papilla visible within the jaw, above the diastema; the oral cleft gaping widely when the jaws are closed: the disc without spines, naked above and below, save for the radial shields and a narrow zone of scales bordering the shields; 1 or 2 tentacle-scales.

TYPE SPECIES. *Amphiura crossota* Murakami, 1943. Caroline Islands, littoral. The type species, which has two tentacle-scales, is illustrated by Murakami, J. Dept. Agric., Kyusyu Imp. Univ., 7 (4–6), p. 173, Fig. 3 (1943).

At least three Pacific littoral species may be referred to the genus, which is apparently the direct equivalent of *Ophionephthys* among the *Amphiura* group of genera.

INCLUDED SPECIES. *crossota* (Murakami), *diacritica* (H. L. Clark), *microsoma* (H. L. Clark), (?) *polyacantha* (Ltk. & Mrtsn.).

It is possible that *Amphiura simonsi* A. M. Clark, from South Africa, may be a member of the genus; the disc was torn off the type specimen, suggesting that it may have been soft and naked. As stressed by Clark, the mouth-parts are essentially of the *Amphiura* type, despite the presence of a third (external) papilla on the adoral plate. The first two arm-joints lack tentacle-scales, but thereafter a single large scale is developed. *Amphinephthys* is founded on a species in which two tentacle-scales occur, so it may prove desirable to segregate the species with only one scale in a separate genus, but more material is required.

Whether *Amphiura polyacantha* Ltk. & Mrtsn. also falls here is uncertain, as the description of that species (Ltk. & Mrtsn., 1899, p. 146) is at variance with the published figures (*Ibid.*, Pl. 9, fig. 6–8).

Ophiopeltis Düben & Koren, 1846

DIAGNOSIS. Amphiuridae in which the oral papillae do not form a continuous series along the outer margin of the jaw, but comprise only an infradental papilla separated by a naked diastema form a distal papilla, with an internal papilla visible within the jaw, above the diastema; the oral cleft gaping widely when the jaws are shut; the disc without spines, naked above and below, save for the radial shields and a zone of scales adjoining the shields, mainly at their proximal ends; radial shields elongate, parallel, contiguous; no tentacle-scale.

TYPE SPECIES. *Ophiopeltis securigera* Düben & Koren, 1846, north-east Atlantic, 40–400 m. Illustration of type species in Mortensen, Echinoderms of the British Isles, p. 216, fig. 122, d-f (1927).

The genus as here understood comprises 9 species, of which 6 have until now been included in *Ophionephthys*, and 3 in *Amphiura*. *Ophiopeltis* is a cosmopolitan genus of mainly shallow-water species.

INCLUDED SPECIES. *aestuarii* (Matsumoto), *africana* (Balinsky), *decacantha* (H. L. Clark), *ecnomiotata* (H. L. Clark), *heptacantha* (Mortensen), *iranica* (Mortensen), *octacantha* (H. L. Clark), *securigera* Düben & Koren, *vadicola* (Matsumoto).

Ophiopeltis securigera often approaches *Ophionema* in having the distal oral papilla reduced, the radial shields being contiguous throughout their length in

Ophionema, as in *Ophiopeltis*. These two genera are apparently closely related. Mortensen (1940, p. 81) has already pointed out that *Ophionephthys phalerata* Lyman and *Ophionephthys tenuis* H. L. Clark should be referred to *Ophionema*. As noted above (p. 5), the outer papilla is sometimes reduplicated in *securigera*.

Icalia n.g.

DIAGNOSIS. Amphiuridae in which the oral papillae do not form a series along the outer margin of the jaw, but comprise only a infradental papilla separated by a naked diastema from a distal papilla, with an internal papilla visible within the jaw, above the diastema; the oral cleft gaping widely when the jaws are closed; the disc without spines, scaled above but partly or wholly naked below; no tentacle-scales.

TYPE SPECIES. *Amphiura denticulata* Koehler, 1896, North Atlantic, 155–1100 m. The type species is illustrated in Mortensen, Echinoderms of the British Isles, p. 214, fig. 121.

To the genus are referred 18 species, though some of these are perhaps not closely related to the type species. *Icalia* appears to be mainly an Atlantic genus, but some species occur in the Pacific, and if *deficiens* be included, the genus enters the Antarctic.

INCLUDED SPECIES. *abyssorum* (Norman), *ascia* (Mrtsn.), *atlantica* (Ljungman), *borealis* (G. O. Sars), *brevipes* (Ltk. & Mrtsn.) *deficiens* (Koehler), *denticulata* (Koehler), *dilatata* (Lyman), *digna* (Koehler), *exigua* (Verrill), *filiformis* (O. F. Müller), *fragilis* (Verrill), *gaussi* (Hertz), *leptotata* (H. L. Clark), *lepidevaspis* (Djakonov), *perplexa* (Stimpson), *sarsi* (Ljungman), *syntaracha* (H. L. Clark), *tomentosa* (Lyman).

The species *A. deficiens* Koehler, from the Antarctic, might perhaps be better placed in *Nullamphiura*, as the ventral naked area is very restricted, the scales extending nearly to the buccal shields.

The systematic position of the species *borealis* G. O. Sars, where the dorsal interradii are partly naked, is problematic. The mouth-parts and the axe-shaped spines suggest a close relationship with another northern species, *securigera* D. & K. The naked disc and contiguous, parallel radial shields in *securigera*, on the other hand, link *securigera* with the *Ophionephthys*-like species, here referred to *Ophiopeltis* (of which genus *securigera* is the type). To refer *borealis* to *Ophiopeltis* would render the definition of that genus quite nebulous.

For discussion on *I. ascia* (Mortensen), see under *Amphiura*.

Specimens of *Icalia atlantica* (Ljg.) may show distinct traces of a small tentacle-scale over the greater part of the arm (Mortensen, 1933), and this is most marked in the variety found at St. Helena. The scales, however, are quite rudimentary and it would be incongruous to associate the species with those included in the related genus *Pandelia*, where the tentacle-scale is well-developed and conspicuous.

Amphiura abyssorum Norman was originally described from material lacking the disc. Mortensen (1933) has given evidence suggesting that *A. digna* Koehler is closely related, or synonymous; both names have been included in the foregoing list. A conspicuous external (third) oral papilla occurs in the material identified by Mortensen as *abyssorum*, but the large diastema indicates that the mouth-parts are of the *Amphiura* type.

Pandelia n.g.

DIAGNOSIS. Amphiuridae in which the oral papillae do not form a series along the outer margin of the jaw, but comprise only an infradental papilla separated by a naked diastema from a distal papilla, with an internal papilla visible within the jaw, above the diastema; the oral cleft gaping widely when the jaws are closed; the disc without spines, scaled above but wholly or partly naked below; 1 tentacle-scale.

TYPE SPECIES. *Amphiura hinemoae* Mortensen, 1924, New Zealand 7–100 m. The type species is illustrated by Mortensen, Vid. Medd. dansk. naturh. For., 77, p. 149, fig. 24 (1924).

To the genus are assigned 12 species, most of them from the Pacific, where the genus ranges from the Bering Sea to the Antarctic, in shallow and deep water. At least two species enter the tropical Atlantic.

INCLUDED SPECIES. *angularis* (Lyman), *brachyactis* (H. L. Clark), *carchara* (H. L. Clark), *commutata* (Koehler), *concinna* (Koehler), *crispa* (Mrtsn.), *diducta* (Koehler), *glabra* (Lyman), *gonioides* (H. L. Clark), *hinemoae* (Mrtsn.), *leptodoma* (H. L. Clark), *seminuda* (Ltk. & Mrtsn.).

In *P. concinna* (Koehler) a small supernumerary scale occurs in some specimens on the adoral plate; its constancy and smallness led Koehler to regard the species as a member of the *Amphiura* group, in other members of which a minute supernumerary papilla is sometimes found.

Hemilepis Ljungman, 1871 (restricted)

DIAGNOSIS. Amphiuridae in which the oral papillae do not form a series along the outer margin of the jaw, but comprise only an infradental papilla separated by a naked diastema from a distal papilla, whilst an internal papilla is visible at a higher level, within the oral chamber, attached to the inner surface of the jaw above the diastema; the oral cleft gaping widely when the jaws are closed; the disc without spines, scaled above but wholly or partly naked below; 2 tentacle-scales.

TYPE SPECIES. *Amphiura semiermis* Lyman, 1869, Caribbean, 990 m. An illustration of an included species, *Amphiura abernethyae* Fell, is given in Zool. Pub. Victoria Univ. Wellington, 13, p. 2, fig. 1–4 (1951); this species clines with *norae*, of which it may be only a local variant.

As here defined, *Hemilepis* includes only those species in which the mouth-parts are of the *Amphiura* type; the disc and tentacle-scales are as defined by Ljungman.

The genus is cosmopolitan, with 21 species, mainly from the continental shelves.

INCLUDED SPECIES. *abernethyi* (Fell), *albella* (Mrtsn.), *arcystata* (H. L. Clark), *dacunhae* (Mrtsn.), *euopla* (H. L. Clark), *fasciata* (Mrtsn.), *flexuosa* Ljungman, *griegi* (Mrtsn.), *gymnogastra* (Ltk. & Mrtsn.), *instans* (Koehler), *joubini* (Koehler), *kinbergiensis* (Koehler), *lanceolata* (Lyman), *latispina* (Ljungman), *nociva* (Koehler), *norae* (Benham), *polita* (Koehler), *rathbuni* (Koehler), *richardi* (Koehler), *semiermis* (Lyman), *uncinata* (Koehler).

Nullamphiura n.g.

DIAGNOSIS. Amphiuridae in which the oral papillae do not form a series along the outer margin of the jaw, but comprise only an infradental papilla separated by a naked diastema from a distal papilla, with an internal papilla visible within the jaw, above the diastema; the oral cleft gaping widely when the jaws are closed; the disc without spines, completely scaled above and below; no tentacle-scales, or at most, only occasional rudimentary scales.

TYPE SPECIES. *Amphiura psilopora* H. L. Clark, 1911, East Siberia, 15 to 20 fathoms. The type species is illustrated by Clark, Bull. 75, U.S. Nat. Mus., p. 153, fig. 63 (1911).

The genus comprises 8 species, and is apparently cosmopolitan from the Arctic to the Antarctic.

INCLUDED SPECIES. *canadensis* (Verrill), *gymnopora* (Ltk. & Mrtsn.), *lymani* (Studer), *monorima* (Mrtsn.), *psilopora* (H. L. Clark), *retusa* (Djakonov), *serpentina* (Ltk. & Mortensen), *triaina* (Djakonov).

The internal papilla is sometimes rather conspicuous, as appears in *N. triaina* (Djakonov) (Ofiuri Morei SSSR, p. 84, fig. 26, 1954). The mouth-parts here have something of the appearance of a member of the *Amphiodia* group; but *triaina* would seem nevertheless to fall in *Nullamphiura*.

Monamphiura n.g.

DIAGNOSIS. Amphiuridae in which the oral papillae do not form a series along the outer margin of the jaw, but comprise only an infradental papilla separated by a naked diastema from a distal papilla, with an internal papilla visible within the jaw, above the diastema; the oral cleft gaping widely when the jaws are closed; the disc without spines, completely scaled above and below: 1 tentacle-scale.

TYPE SPECIES. *Amphiura alba* Mortensen, 1924. New Zealand, sublittoral, 10–100 m. The type species is illustrated by Mortensen, Vid. Medd. dansk. naturh. For., 77, p. 147, fig. 23.

Monamphiura is a large, cosmopolitan genus to which 62 species are here referred. The assemblage is still inconveniently large, but it is not immediately apparent how it can be further subdivided.

INCLUDED SPECIES: *abbreviata* (Koehler), *acacia* (Lyman), *adjecta* (Mrtsn.), *agitata* (Koehler), *alba* (Mrtsn.), *algida* (Koehler), *alternans* (Koehler), *annulifera* (Mortensen), *argentea* (Lyman), *aster* (Farquhar), *beringiana* (Baranova), *bihamula* (H. L. Clark), *calbuca* (Mrtsn.), *capensis* (Ljungman), *catephes* (H. L. Clark), *celata* (Koehler), *coacta* (Koehler), *compressa* (Mrtsn.), *constricta* (Lyman), *crypta* (H. L. Clark), *dejecta* (Koehler), *dejectoides* (H. L. Clark), *demissa* (Koehler), *diastata* (McClendon), *dino* (A. H. Clark), *fibulata* (Koehler), *ficta* (Koehler), *grandisquama* (Lyman), *heraldica* (Fell), *immira* (Ely), *inepta* (Djakonov), *inhacensis* (Balinsky), *iridoides* (Matsumoto), *iris* (Lyman), *josephinae* (Ljungman), *leptolepis* (Murakami), *leucaspis* (H. L. Clark), *linearis* (Mrtsn.), *lunaris* (Lyman), *macroscytalia* (Murakami), *magellanica* (Ljungman), *magnisquama* (H. L. Clark), *megalaspis* (H. L. Clark), *micra* (H. L. Clark), *micraspis* (H. L. Clark), *microplax* (Mrtsn.), *phrixa* (H. L. Clark), *praefecta* (Koehler), *proposita* (Koehler), *ptena* (H. L. Clark), *pusilla* (Farquhar), *pycnostoma* (H. L. Clark), *reloncavii* (Mrtsn.), *scripta* (Koehler), *septemspinosa* (H. L. Clark), *sexradiata* (Koehler), *spinipes* (Mrtsn.), *stimpsoni* (Ltk.), *sundevalli* (M & T), *trisacantha* (H. L. Clark), *velox* (Koehler), *vivipara* (H. L. Clark).

Amphiura Forbes, 1842 (restricted)

DIAGNOSIS. Amphiuridae in which the oral papillae do not form a series along the outer margin of the jaw, but comprise only an infradental papilla separated by a naked diastema from a distal papilla, with an internal papilla visible within the jaw, above the diastema; the oral cleft gaping widely when the jaws are closed; the disc without spines, completely scaled above and below; 2 tentacle-scales.

TYPE SPECIES. *Amphiura chiajei* Forbes, 1842, north Atlantic coasts, 10–1200 m. The type species is illustrated by Mortensen in Danmarks Fauna, Pighude, p. 126, fig. 53 (1924).

To the genus, as now restricted, 41 species are referred. *Amphiura* is cosmopolitan, and occurs in shallow and deep water.

INCLUDED SPECIES: *acrisia* H. L. Clark, *acutisquama* A. M. Clark, *ambigua* Koehler, *amokurae* Mortensen, *antarctica* Studer, *belgicae* Koehler, *bidentata* H. L. Clark, *ceramis* H. L. Clark, *chiajei* Forbes, *complanata* Ljungman, *concolor* Lyman, *crassipes* Ljungman, *diomedeae* Ltk. & Mrtsn., *divaricata* Ljungman, *dolia* H. L. Clark, *eugeniae* Ljungman, *eugenioides* H. L. Clark, *grandis* Koehler, *hilaris* Koehler, *incana* Lyman, *kalki* Balinsky, *koreae* Duncan, *kükenthali* Koehler, *leptopholida* H. L. Clark, *mediterranea* Lyman, *morosa* Koehler, *multiremula*

H. L. Clark, *multispina* H. L. Clark, *nannodes* H. L. Clark, *otteri* Ljungman, *palmeri* Lyman, *perita* Koehler, *poecila* H. L. Clark, *princeps* Koehler, *rosea* Farquhar, *sculpta* A. M. Clark, *stepanovi* Djakonov, *stictacantha* H. L. Clark, *tumulosa* Djakonov, *ushakovi* Djakonov, *verticellata* Ljungman.

In *A. eugeniae* a minute additional external oral papilla occurs on the adoral plate, and somewhat larger papilla occurs in the same situation in *A. diomedeae.* In both species, however, there is a conspicuous diastema between the infradental and the second papilla, so that the jaw is essentially that of the *Amphiura* group. The same comment may be made of the species which Mortensen named *Amphiodia ascia,* and I consider that this species, too, is a member of the *Amphiura* group, though its other characters remove it from *Amphiura* s.s., and place it in *Icalia.*

A. ambigua is stated by H. L. Clark (1946, p. 192) to have the "interbrachial areas below naked", a circumstance which, if true, would exclude the species from *Amphiura* s.s. However, the species has been taken in Indonesia on several occasions (*Siboga* Expedition, *Albatross,* Mortensen Expedition), and all material is completely scaled below, as in the original types. The Australian species taken by H. L. Clark may therefore be some other amphiurid, presumably referable to *Hemilepis.*

Amphiura multispina H. L. Clark has some of the characters of *Ctenamphiura* to which genus it might be referred, representing then a Japanese member of the genus, otherwise known from Australia and New Zealand. Dr Lowell P. Thomas, who has kindly made an examination of the mouth-parts and other features of the holotype, and has compared it with a paratype of *Ctenamphiura maxima* (Lyman), informs me that *multispina* does not have the second papilla so broad and flat as is the case in *maxima* (and also *C. dawbini*), and the inner papilla is not so spiniform as in the two latter; also the arm-spines are 7–8, rather than 8–10 as stated by H. L. Clark. He is inclined to think that *multispina* may have some affinity with the two species referred to *Ctenamphiura*; however, considering the very close affinity between *dawbini* and *maxima,* it might weaken the conception of *Ctenamphiura* if *multispina* were to be included in that genus, and for the present it seems wiser to leave the species where H. L. Clark originally placed it. It may well be a transitional form between *Ctenamphiura* and *Amphiura.*

Incertae sedis

The following species, whose descriptions are not at present accessible to me, have not been assigned to their appropriate place in the foregoing classification: *Amphiura accedens* Koehler, *Amphiura anomala* Lyman, *Amphiura apicula* Cherbonnier, *Amphiura brevispina* Marktanner-Turneretscher, *Amphiura correcta* Koehler, *Amphiura elegantissima* Boone, *Amphiura kandai* Murakami, *Amphiura leptobrachia* Murakami, *Amphiura lütkeni* Duncan, *Amphiura macraspis* Murakami, *Amphiura microdiscoida* H. L. Clark, *Amphiura modesta* Studer, *Amphiura mülleri* Marktanner-Turneretscher, *Amphiura pachybactra* Murakami.

Nullopholis n.g.

Diagnosis. Amphiuridae in which 3 oral papillae form a contiguous series along the outer margin of the jaw, the distal papilla conspicuously larger than the other two, and concealing the oral cleft when the jaws are closed; no spines on the disc, which is completely scaled above and below; no tentacle-scale beyond the third arm-joint.

Type Species. *Amphipholis nudipora* Koehler, 1914, West African coasts, 9–70 m. Type species illustrated in A. M. Clark, Jour. W. Afri. Sci. Assoc., 1 (2), p. 39, fig. 15.

Two species may be referred to the genus, which is at present known only from the tropical Atlantic (West Africa, Caribbean, 9–400 m).

Included Species: *nudipora* (Koehler), *pentacantha* (H. L. Clark).

Monopholis n.g.

Diagnosis. Amphiuridae in which 3 oral papillae form a contiguous series along the outer margin of the jaw, the distal papilla conspicuously larger than the other two, and concealing the oral cleft when the jaws are closed; no spines on the disc, which is completely scaled above and below; 1 tentacle-scale, except on the distal immature arm-joints.

Type Species: *Amphiura vitax* Koehler, 1904. Indonesia (Flores, Solor). 250 m. Type illustrated in Siboga-Expeditie, 45a, Ophiures de mers profondes. Pl. 13, figs. 3, 4 (1904).

Three species are referred to the genus, which is represented in Indonesia, Philippine Islands and in Arctic waters, 20–250 m.

Included Species: *loripes* (Koehler), *murmanica* (Djakonov), *vitax* (Koehler).

Amphipholis Ljungman, 1866 (restricted)

Diagnosis. Amphiuridae in which 3 oral papillae form a contuguous series along the outer margin of the jaw, the distal papilla conspicuously larger than the other two, and concealing the oral cleft when the jaws are closed; no spines on the disc, which is completely scaled above and below; 2 tentacle-scales throughout the arm, save for the distal immature arm-joints.

Type Species. *Ophiolepis gracillima* Stimpson, 1852. Caribbean littoral.

An excellent series of illustrations of representative species is given by Nielsen (1932), Vid. Medd. dansk. naturh. For., 91, pp. 283–294. The best known member of the genus is the cosmopolitan species *A. squamata* (Delle Chiaje).

As now restricted, 24 species may be referred to the genus, which ranges the continental shelves and continental slopes of the world.

Included Species: *bananensis* (Koehler), *clypeata* Koehler, *elevata* Nielson, *geminata* (Le Conte), *granulata* (Ltk. & Mrtsn.) *gracillima* (Stimpson), *japonica* Matsumoto, *kochii* Lütken, *laevidisca* H. L. Clark, *misera* Koehler, *oerstedi* (Lütken), *pachybactra* H. L. Clark, *patagonica* Ljungman, *platydisca* Nielsen, *procidens* Koehler, *pugetana* (Lyman), *puntarenae* (Lütken), *similis* Mortensen, *sobrina* Matsumoto, *squamata* (Delle Chiaje), *strata* Mortensen, *subtilis* Ljungman, *tenuispina* Ljungman, *torelli* Ljungman.

Incertae sedis

As descriptions are not at present accessible to me, the following species have not been assigned to their appropriate place in the foregoing classification: *Amphiopholis murex* Koehler, *Amphipholis tetracanthus* Matsumoto.

Amphipholis instructa Koehler, having spines on the disc, should be transferred to *Ophiostigma. Amphipholis kinbergi* and *A. minor* Hertz are believed to be synonyms of *A. squamata.*

Gymnodia n.g.

Diagnosis. Amphiuridae in which 3 subequal oral papillae form a series along the outer margin of the jaw, the papillae either contiguous or separated by intervals, the oral cleft not closed over when the jaws are shut; no spines on the disc, which is scaled above but covered only by soft skin below; 1 tentacle-scale.

Type Species. *Amphiodia tabogae* Nielsen, 1932, Panama, littoral. Clear illustrations of the type species are given by Nielsen, Vid. Medd. dansk. naturh. For., 91, p. 273 (1932).

Four species are referred to the genus, which ranges the north Pacific from Japan to Panama, in littoral and archibenthal waters.

Included Species: *platyspina* (Nielsen), *psilochora* (H. L. Clark), *repens* (Lyman), *tabogae* (Nielsen).

Diamphiodia n.g.

Diagnosis. Amphiuridae in which 3 subequal oral papillae form a series along the outer margin of the jaw, the papillae either contiguous or separated by intervals, the oral cleft not closed over when the jaws are shut; no spines on the disc, which is completely scaled above and below; 2 tentacle-scales.

Type Species. *Amphiura violacea* Lütken, 1856, Panama, sublittoral. For illustration of the neotype of the type species, see Nielsen, Vid. Medd. dansk. naturh. For., 91, p. 269, fig. 9 (1932).

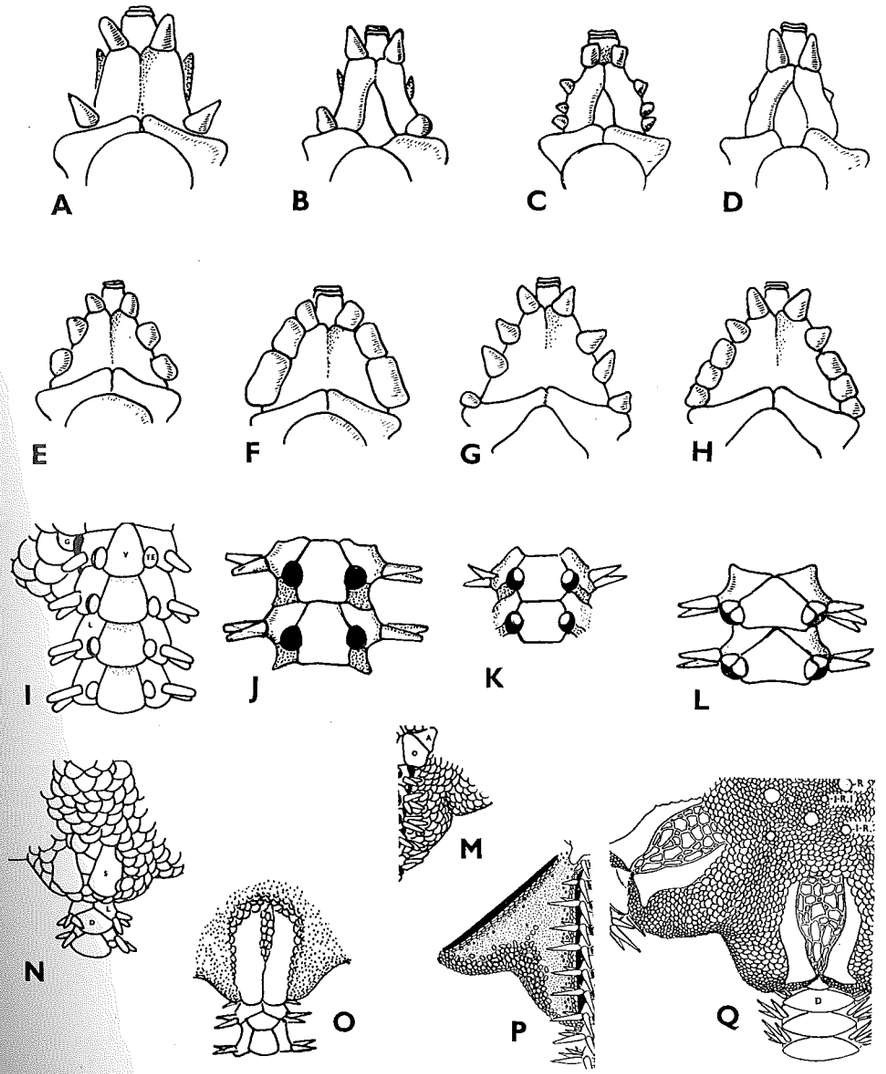
To this genus I refer 31 species. *Diamphiodia* is cosmopolitan and its species are represented in both shallow and deep water.

Included Species: *antarctica* (Ljungman), *assimilis* (Ltk. & Mrtsn.), *atra* (Stimpson), *barbarae* (Lyman), *brachiostictus* (Tortonese), *caulleryi* (Koehler), *craterodmeta* (H. L. Clark), *cyclaspis* (Djakonov), *digitula* (H. L. Clark), *dividua* (Mortensen), *fissa* (Lütken), *frigida* (Koehler), *grata* (Koehler), *grisea* (Ljungman), *gyraspis* (H. L. Clark), *limbata* (Grube), *occidentalis* (Lyman), *ochroleuca* (Brock), *peloria* (Bush), *planispina* (von Martens), *psara* (H. L. Clark), *reposita* (Koehler), *rhabdota* (H. L. Clark), *riisei* (Lütken), *rossica* (Djakonov), *servata* (Koehler), *sinensis* (A. H. Clark), *trychna* (H. L. Clark), *tymbara* (H. L. Clark), *vicina* (H. L. Clark), *violacea* (Lütken).

Amphiura urtica (Lyman), referred by Nielsen (1932) to his genus *Amphispina*, in the *Amphodia* group of genera, is perhaps rather to be placed in *Ophiophragmus* (see Fell, 1960, p. 22); the systematic status of *Amphispina* and *Ophiophragmus* requires further clarification, in view of the conflicting statements in the literature.

EXPLANATION OF KEY CHARACTERS IN PLATE 1

Genus	Jaws	Tentacle-scales and pores	Disc Characters: Above	Disc Characters: Below
Ophiopeltis	B	J	O	naked
Amphinephthys	B	K or L	O	naked
Ophionema	D	J	O	naked
Icalia	A	J	N or Q	P
Pandelia	A	I or K	N or Q	P
Hemilepis	A	L	N or Q	P
Nullamphiura	A	J	N or Q	M
Monamphiura	A	I or K	N or Q	M
Amphiura	A	L	N or Q	M
Nullopholis	F	J	N	M
Monopholis	F	I or K	N	M
Amphipholis	F	L	N	M
Amphiodia	E	I or K	N	M
Diamphiodia	E	L	N	M
Ailsaria	E	I or K	N	P
Silax	G or H	J	N	M
Unioplus	G or H	I or K	N	M
Amphioplus	G or H	L	N	M
Gymnoplus	G or H	L (? or K)	N	P
Ophionephthys	C	L or K	O	naked



Diagrammatic key to the characters of the genera discussed herein. A to H—Representative types of jaw-structure. I to L—Representative types of tentacle-pores. M to Q—Representative types of disc in dorsal aspect (N, O, Q), and ventral aspect (M, P). For detailed explanation, see opposite page.

Amphiodia Verrill, 1899 (restricted)

DIAGNOSIS. Amphiuridae in which 3 subequal oral papillae form a series along the outer margin of the jaw, the papillae being either contiguous or separated by intervals, the oral cleft not closed over when the jaws are shut; no spines on the disc, which is completely scaled above and below; 1 tentacle-scale.

TYPE SPECIES. Amphiura pulchella Lyman, 1869, Caribbean, 70 m. A clear, modern illustration of a representative species, *A. obtecta* Mortensen, 1940, is given in Danish Sci. Invest. Iran, 2, p. 89 (1940).

As here restricted, 9 species are assigned to *Amphiodia.* The genus is essentially Indo-Pacific, but one species enters the Caribbean, and another probably ranges the subantarctic.

INCLUDED SPECIES: *affinis* (Studer), *crassa* Koehler, *euryaspis* H. L. Clark, *microplax* Burfield, *minuta* H. L. Clark, *obtecta* Mortensen, *olivacea* (Brock), *pulchella* (Lyman), *sculptilis* Ziesenhenne.

The species *Amphiodia erecta* Koehler and *Amphiura lütkeni* (Ljungman), both have peripheral spiniform disc-scales, and should evidently be referred to *Ophiophragmus.* H. L. Clark (1918) pointed out that *Amphiodia chilensis* (M & T) also falls in *Ophiophragmus,* for the same reason.

INCERTAE SEDIS

The disc of *Amphiodia debita* Koehler is at present unknown, so that the precise systematic position of the species is uncertain.

The following species have not been assigned to their appropriate position in the above classification as descriptions are not at present available to me: *Amphiodia acutispina* Koehler, *Amphiodia fuscoalba* (Brock).

Ophionephthys Lütken, 1868 (restricted)

DIAGNOSIS. Amphiuridae in which 4 or 5 subequal oral papillae form a series, more or less overlapping, arranged along the outer margin of the jaw, the distalmost papilla (or papillae) placed on or near the inner edge of the adoral plate, the oral cleft not closed over when the jaws are shut; no spines on the disc, which is naked above and below, save for the radial shields and a narrow zone of scales bordering the shields; 1 or 2 tentacle-scales.

TYPE SPECIES. *Ophionephythys limicola* Lütken, 1869, Caribbean, littoral. The type species is illustrated by Nielsen, Vid. Medd. dansk. naturh. For., 91, p. 266, fig. 8 (1932).

Six species are referred to the genus, which is mainly Indo-Pacific, littoral, with one Caribbean species.

INCLUDED SPECIES: *cyrtacantha* (H. L. Clark), *limicola* Lütken, *lucida* (Koehler), *magellanica* Mortensen, *seminuda* (Mortensen), *stewartensis* Mortensen.

It is probable that *Amphioplus luctator* Koehler should also be referred to *Ophionephthys*; the disc is unknown, as it had been torn from the type specimens (Koehler, 1922, p. 178), and further material recorded by Koehler (1930) was in the same condition. This suggests that the disc is probably naked and soft. There are 2 tentacle-scales and the mouth-parts are of the *Amphioplus* type. The same comments apply to the unnamed species described by A. M. Clark (1955, J. W. Afr. Sci. Ass., 1 (2), p. 45, fig. 2); this incompletely known form was recognized by Clark as probably congeneric with *limicola* and *seminuda,* a conclusion which seems well-founded.

Ailsaria n.g.

DIAGNOSIS. Amphiuridae in which 4 or 5 subequal or dissimilar oral papillae form a series along the outer margin of the jaw, the distalmost papilla (or papillae) placed on

the inner edge of the adoral plate, the oral cleft not closed over when the jaws are shut; no spines on the disc, which is fully scaled above, but partly or wholly naked below; 2 tentacle-scales.

TYPE SPECIES. *Amphioplus echinulatus* Mortensen, 1940, Iranian Gulf, sublittoral (40–60 m). The type species is illustrated in Danish Sci. Invest. Iran, 2 p. 98, fig. 19.

The genus ranges the tropical Indo-Pacific and tropical Atlantic (Caribbean and West Africa), always in shallow water, 1–60 m.

INCLUDED SPECIES: *archeri* (A. M. Clark), *coniortodes* (H. L. Clark), *echinulatus* (Mortensen), *personatus* (Koehler).

Minute thorns occur at the distal ends of the radial shields in the type species, and a transverse row of papillae occurs in a corresponding position in *Ailsaria archeri*..

Silax n.g.

DIAGNOSIS. Amphiuridae in which 4 or 5 subequal or dissimilar oral papillae form a series along the outer margin of the jaw, the distalmost papilla (or papillae) placed on the inner edge of the adoral plate, the oral cleft not closed over when the jaws are shut; no spines on the disc, which is scaled completely above and below; no tentacle-scales.

TYPE SPECIES. *Amphiura verrilli* Lyman, 1879, Caribbean, 424 fathoms. Illustration of type species, Bull. Mus. Comp. Zool., 6, Pl. 12, fig. 329–331.

A second species, *Amphioplus trepidus* Koehler, 1904, from Indodesia, would seem to fall in this genus; however, Koehler (Siboga-Expeditie, 45a, Pl. 14) gives a figure in which the disc does not have the usual amphiurid characters, but is produced upon the basal arm-joints.

INCLUDED SPECIES: (?) *trepidus* (Koehler), *verrilli* (Lyman).

Unioplus n.g.

DIAGNOSIS. Amphiuridae in which 4 or 5 subequal or dissimilar oral papillae form a series along the outer margin of the jaw, the distalmost papilla (or papillae) placed on the inner edge of the adoral plate, the oral cleft not closed over when the jaws are shut; no spines on the disc, which is scaled completely above and below; 1 tentacle-scale.

TYPE SPECIES. *Amphioplus falcatus* Mortensen, 1933, South Africa, 225 fathoms. For illustration of type species, see Mortensen, Vid. Medd. dansk. naturh. For., 93, p. 366, fig. 70, 71 (1933).

Twelve species are referred to the genus, which is mainly distributed through the warmer Indo-Pacific, though a few species enter the Atlantic.

INCLUDED SPECIES: *aciculatus* (Mrtsn.), *capax* (Koehler), *cernuus* (Lyman), *dispar* (Koehler), *falcatus* (Mrtsn.), *formatus* (Koehler), *glaucus* (Lyman), *macraspis* (H. L. Clark), *patulus* (Lyman), *philhelminthius* (Ziesenhenne), *strongyloplax* (H. L. Clark), *thrombodes* (H. L. Clark).

Amphioplus Verrill, 1899 (restricted)

DIAGNOSIS. Amphiuridae in which 4 or 5 subequal or dissimilar oral papillae form a series along the outer margin of the jaw, the distalmost papilla (or papillae) placed on the inner edge of the adoral plate, the oral cleft not closed over when the jaws are shut; no spines on the disc, which is scaled completely above and below; 2 tentacle-scales.

TYPE SPECIES. *Amphiura tumida* Lyman 1878, Caribbean, 170–590 m. A clear modern illustration of an included species, *A. laevis* (Lyman) is given by Mortensen, Danish. Sci. Invest. Iran, 2, p. 94, fig. 18.

As restricted, 60 nominal species are referred to *Amphioplus*, but it is probable that some of these are synonyms. The genus is virtually cosmopolitan, though apparently not recorded from the north-east Atlantic. Its species occur mainly at moderate depths and are most abundant in the warm Indo-Pacific.

INCLUDED SPECIES: *abditus* (Verrill), *acutus* Mrtsn., *agassizii* Verrill, *ancistrotus* (H. L. Clark), *andreae* (Ltk.), *asterictus* H. L. Clark, *aurensis* A. M. Clark, *basilicus* Koehler, *bocki* Koehler, *caelatus* Ely, *caesareus* Koehler, *causatus* Koehler, *cinctus* (Koehler), *conditus* Koehler, *conductus* Koehler, *confinis* Koehler, *congensis* (Studer), *cuneatus* (Lyman), *cythera* A. H. Clark, *delibis* Koehler, *depressus* (Ljungman), *diacritus* Murakami, *didymus* H. L. Clark, *exsecratus* Koehler, *firmus* Koehler, *furcatus* Mrtsn., *gentilis* Koehler, *gibbosus* (Ljungman), *hastatus* (Lyman), *hexacanthus* H. L. Clark, *impressus* (Ljungman), *incisus* (Lyman), *integer* (Ljungman), *iuxtus* Murakami, *japonicus* Matsumoto, *laevis* (Lyman), *legatus Koehler, lobatodes* H. L. Clark, *lobatus* (Ljungman), *longirima* Fell, *lorioli* (Koehler), *megapomus* H. L .Clark, *miyadii* Murakami, *nereis* (Lyman), *occidentalis* Koehler, *partita* (Koehler), *parviclypeus* H. L. Clark, *pectinatus* Mrtsn., *peregrinator* Koehler, *platyacanthus* Murakami, *potens* Koehler, *praestans* Koehler, *refectus* Koehler, *relictus* (Koehler), *rhadinobrachius* H. L. Clark, *signalis* Koehler, *stenaspis* H. L. Clark, *tessellatus* Koehler, *textilis* (Koehler), *timsae* Mrtsn., *tumidus* (Lyman).

INCERTAE SEDIS

Amphiura papillatus Ltk. & Mrtsn., 1899, is evidently not a member of the *Amphioplus group* (where it has usually been classified in subsequent literature); the spines on the disc, and the three tentacle-scales indicate that it is possibly not an amphiurid. The following species have not been assigned to their correct place in the foregoing classification as descriptions are not at present accessible to me: *Amphioplus ailsaclarki* Cherbonnier, *Amphioplus consors* Koehler, *Amphioplus difficilis* (Duncan), *Amphioplus famula* Koehler, *Amphioplus magnificus* Koehler, *Amphioplus modestus* (Koehler).

Amphiura notacanthus Ltk. & Mrtsn., 1899, has usually been placed in *Amphioplus* in subsequent lists. As, however, there are dorsal spinules on the disc. it would seem to fall rather in *Amphiacantha.*

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INDEX OF SPECIES

In the following catalogue of species, the first column lists the specific names in alphabetical order, the second column (*italics*) gives the genus in which each species was originally placed, and the third column (**bold**) gives the genus to which each species is referred herein.

	SPECIES	ORIGINAL GENUS	PROPOSED GENUS
1	abbreviata Klr.	*Amphiura*	**Monamphiura**
2	abditus Ver.	*Amphipholis*	**Amphioplus**
3	abernethyae Fell	*Amphiura*	**Hemilepis**
4	abyssorum Norman	*Amphiura*	**Icalia**
5	acacia Lym.	*Amphiura*	**Monamphiura**
6	aciculatus Mrtsn.	*Amphioplus*	**Unioplus**
7	acrisia H.L.C.	*Amphiura*	**Amphiura**
8	acutisquama A.M.C.	*Amphiura*	**Amphiura**
9	acutus Mrtsn.	*Amphioplus*	**Amphioplus**
10	adjecta Mrtsn.	*Amphiura*	**Monamphiura**
11	aestuarii Matsu.	*Amphiura*	**Ophiopeltis**
12	affinis Std.	*Amphiura*	**Amphiodia**
13	africana Bal.	*Ophionephthys*	**Ophiopeltis**
14	agassizii Ver.	*Amphioplus*	**Amphioplus**
15	agitata Klr.	*Amphiura*	**Monamphiura**
16	alba Mrtsn.	*Amphiura*	**Monamphiura**

	SPECIES	ORIGINAL GENUS	PROPOSED GENUS
17	albella Mrtsn.	*Amphiura*	**Hemilepis**
18	algida Klr.	*Amphiura*	**Monamphiura**
19	alternans Klr.	*Amphiura*	**Monamphiura**
20	ambigua Klr.	*Amphiura*	**Amphiura**
21	amokurae Mrtsn.	*Amphiura*	**Amphiura**
22	ancistrotus H.L.C.	*Amphiodia*	**Amphioplus**
23	andreae Ltk.	*Amphipholis*	**Amphioplus**
24	angularis Lym.	*Amphiura*	**Pandelia**
25	annulifera Mrtsn.	*Amphiura*	**Monamphiura**
26	antarctica Ljg.	*Ophiophragmus*	**Diamphiodia**
27	antarctica Std.	*Amphiura*	**Amphiura**
28	archeri A.M.C.	*Amphioplus*	**Ailsaria**
29	arcystata H.L.C.	*Amphiura*	**Hemilepis**
30	argentea Lym.	*Amphiura*	**Monamphiura**
31	ascia Mrtsn.	*Amphiodia*	**Icalia**
32	assimilis Ltk. & Mrtsn.	*Amphiura*	**Diamphiodia**
33	aster Farq.	*Amphiura*	**Monamphiura**
34	asterictus H.L.C.	*Amphioplus*	**Amphioplus**
35	atlantica Ljg.	*Amphiura*	**Icalia**
36	atra Simp.	*Ophiolepis*	**Diamphiodia**
37	aurensis A.M.C.	*Amphioplus*	**Amphioplus**
38	bananensis Klr.	*Amphiura*	**Amphipholis**
39	barbarae Lym.	*Amphiura*	**Diamphiodia**
40	basilicus Klr.	*Amphioplus*	**Amphioplus**
41	belgicae Klr.	*Amphiura*	**Amphiura**
42	beringiana Baran.	*Amphiura*	**Monamphiura**
43	bidentata H.L.C.	*Amphiura*	**Amphiura**
44	bihamula H.L.C.	*Amphiura*	**Monamphiura**
45	bocki Klr.	*Amphioplus*	**Amphioplus**
46	borealis G. O. Sars	*Ophiopeltis*	**Icalia**
47	brachiostictus Tort.	*Amphiodia*	**Diamphiodia**
48	brachyactis H.L.C.	*Amphiura*	**Pandelia**
49	brevipes Ltk. & Mrtsn.	*Amphiura*	**Icalia**
50	calbuca Mrtsn.	*Amphiura*	**Monamphiura**
51	caelatus Ely	*Amphioplus*	**Amphioplus**
52	caesareus Klr.	*Amphioplus*	**Amphioplus**
53	canadensis Ver.	*Amphiura*	**Nullamphiura**
54	capax Klr.	*Amphioplus*	**Unioplus**
55	capensis Ljg.	*Amphiura*	**Monamphiura**
56	carchara H.L.C.	*Amphiura*	**Pandelia**
57	catephes H.L.C.	*Amphiura*	**Monamphiura**
58	caulleryi Klr.	*Amphiura*	**Diamphiodia**
59	causatus Klr.	*Amphioplus*	**Amphioplus**

	Species	Original Genus	Proposed Genus
60	celata Klr.	*Amphiura*	Monamphiura
61	ceramis H.L.C.	*Amphiura*	Amphiura
62	cernuus Lym.	*Amphiura*	Unioplus
63	chiajei Forbes	*Amphiura*	Amphiura
64	chilensis M & T	*Ophiolepis*	Ophiophragmus
65	cincta Klr.	*Amphiodia*	Amphioplus
66	clypeata Klr.	*Amphipholis*	Amphipholis
67	coacta Klr.	*Amphiura*	Monamphiura
68	commutata Klr.	*Amphiura*	Pandelia
69	complanata Ljg.	*Amphiura*	Amphiura
70	compressa Mrtsn.	*Amphiura*	Monamphiura
71	concinna Klr.	*Amphiura*	Pandelia
72	concolor Lym.	*Amphiura*	Amphiura
73	conditus Klr.	*Amphioplus*	Amphioplus
74	conductus Klr.	*Amphioplus*	Amphioplus
75	confinis Klr.	*Amphioplus*	Amphioplus
76	congensis Studer	*Amphiura*	Amphioplus
77	coniortodes H.L.C.	*Amphioplus*	Ailsaria
78	constricta Lym.	*Amphiura*	Monamphiura
79	crassa Klr.	*Amphiodia*	Amphiodia
80	crassipes Ljg.	*Amphiura*	Amphiura
81	craterodmeta H.L.C.	*Amphiodia*	Diamphiodia
82	crispa Mrtsn.	*Amphiura*	Pandelia
83	crossota Mura.	*Amphiura*	Amphinephthys
84	crypta H.L.C.	*Amphiura*	Monamphiura
85	cuneatus Lym.	*Amphiura*	Amphioplus
86	cyclaspis Djk.	*Amphiodia*	Diamphiodia
87	cyrtacantha H.L.C.	*Amphioplus*	Ophionephthys
88	cythera H.L.C.	*Amphioplus*	Amphioplus
89	dacunhae Mrtsn.	*Amphiura*	Hemilepis
90	debilis Klr.	*Amphioplus*	Amphioplus
91	decacantha H.L.C.	*Ophionephthys*	Ophiopeltis
92	deficiens Klr.	*Amphiura*	Icalia
93	dejecta Klr.	*Amphiura*	Monamphiura
94	dejectoides H.L.C.	*Amphiura*	Monamphiura
95	demissa Klr.	*Amphiura*	Monamphiura
96	denticulata Klr.	*Amphiura*	Icalia
97	depressus Ljg.	*Amphipholis*	Amphioplus
98	diacritica H.L.C.	*Amphiura*	Amphinephthys
99	diacritus Mura.	*Amphioplus*	Amphioplus
100	diastata McClend.	*Amphiura*	Monamphiura
101	diducta Klr.	*Amphiura*	Pandelia
102	didymus H.L.C.	*Amphioplus*	Amphioplus

	Species	Original Genus	Proposed Genus
103	digitula H.L.C.	*Amphiodia*	Diamphiodia
104	digna Klr.	*Amphiura*	Icalia
105	dilatata Lym.	*Amphiura*	Icalia
106	dino A.H.C.	*Amphiura*	Monamphiura
107	diomedeae Ltk. & Mrtsn.	*Amphiura*	Amphiura
108	dispar Klr.	*Amphiura*	Unioplus
109	divaricata Ljg.	*Amphiura*	Amphiura
110	dividua Mrtsn.	*Amphiodia*	Diamphiodia
111	dolia H.L.C.	*Amphiura*	Amphiura
112	echinulatus Mrtsn.	*Amphioplus*	Ailsaria
113	ecnomiotata H.L.C.	*Ophionephthys*	Ophiopeltis
114	elevata Niel.	*Amphipholis*	Amphipholis
115	erecta Klr.	*Amphiodia*	Ophiophragmus
116	eugeniae Ljg.	*Amphiura*	Amphiura
117	eugenioides H.L.C.	*Amphiura*	Amphiura
118	euopla H.L.C.	*Amphiura*	Hemilepis
119	euryaspis H.L.C.	*Amphiodia*	Amphiodia
120	exigua Ver.	*Amphiura*	Icalia
121	exsecratus Klr.	*Amphioplus*	Amphioplus
122	falcatus Mrtsn.	*Amphioplus*	Unioplus
123	fasciata Mrtsn.	*Amphiura*	Hemilepis
124	fibulata Klr.	*Amphiura*	Monamphiura
125	ficta Klr.	*Amphiura*	Monamphiura
126	filiformis O.F.M.	*Asterias*	Icalia
127	firmus Klr.	*Amphioplus*	Amphioplus
128	fissa Ltk.	*Amphipholis*	Diamphiodia
129	flexuosa Ljg.	*Hemilepis*	Hemilepis
130	formatus Klr.	*Amphioplus*	Unioplus
131	fragilis Ver.	*Amphiura*	Icalia
132	frigida Klr.	*Amphiura*	Diamphiodia
133	furcatus Mrtsn.	*Amphioplus*	Amphioplus
134	gaussi Hertz.	*Amphiura*	Icalia
135	geminata Le Conte	*Ophiolepis*	Amphipholis
136	gentilis Klr.	*Amphioplus*	Amphioplus
137	glabra Lym.	*Amphiura*	Pandelia
138	glaucus Klr.	*Amphiura*	Unioplus
139	gonioides H.L.C.	*Amphiura*	Pandelia
140	gracillima Stim.	*Ophiolepis*	Amphipholis
141	grandis Klr.	*Amphiura*	Amphiura
142	grandisquama Lym.	*Amphiura*	Monamphiura
143	granulata Ltk. & Mrtsn.	*Amphiura*	Amphipholis
144	grata Klr.	*Amphiodia*	Diamphiodia

	Species	Original Genus	Proposed Genus
145	griegi Mrtsn.	*Amphiura*	**Hemilepis**
146	grisea Ljg.	*Amphipholis*	**Diamphiodia**
147	gymnogastra L & M	*Amphiura*	**Hemilepis**
148	gymnopora Ltk. & Mrtsn.	*Amphiura*	**Nullamphiura**
149	gyraspis H.L.C.	*Amphiodia*	**Diamphiodia**
150	hastatus Lym.	*Amphipholis*	**Amphioplus**
151	heptacantha Mrtsn.	*Ophionephthys*	**Ophiopeltis**
152	heraldica Fell	*Amphiura*	**Monamphiura**
153	hexacanthus H.L.C.	*Amphioplus*	**Amphioplus**
154	hilaris Klr.	*Amphiura*	**Amphiura**
155	hinemoae Mrtsn.	*Amphiura*	**Pandelia**
156	immira Ely	*Amphiura*	**Monamphiura**
157	impressus Ljg.	*Amphipholis*	**Amphioplus**
158	incana Lym.	*Amphiura*	**Amphiura**
159	incisus Lym.	*Amphiura*	**Amphioplus**
160	inepta Djk.	*Amphiura*	**Monamphiura**
161	inhacensis Bal.	*Amphiura*	**Monamphiura**
162	instans Klr.	*Amphiura*	**Hemilepis**
163	instructa	*Amphipholis*	**Ophiostigma**
164	integer Ljg.	*Amphipholis*	**Amphioplus**
165	iranica Mrtsn.	*Ophionephthys*	**Ophiopeltis**
166	iridoides Matsu.	*Amphiura*	**Monamphiura**
167	iris Lym.	*Amphiura*	**Monamphiura**
168	iuxtus Mura.	*Amphioplus*	**Amphioplus**
169	japonicus Matsu.	*Ophiophragmus*	**Amphioplus**
170	japonica Matsu.	*Amphipholis*	**Amphipholis**
171	josephinae Ljg.	*Amphiura*	**Monamphiura**
172	joubini Klr.	*Amphiura*	**Hemilepis**
173	kalki Bal.	*Amphiura*	**Amphiura**
174	kinbergiensis Klr.	*Amphiura*	**Hemilepis**
175	kochii Ltk.	*Amphipholis*	**Amphipholis**
176	koreae Dunc.	*Amphiura*	**Amphiura**
177	kükenthali Klr.	*Amphiura*	**Amphiura**
178	laevidisca H.L.C.	*Amphipholis*	**Amphipholis**
179	laevis Lym.	*Amphiura*	**Amphioplus**
180	lanceolata Lym.	*Amphiura*	**Hemilepis**
181	latispina Ljg.	*Amphiura*	**Hemilepis**
182	legatus Klr.	*Amphioplus*	**Amphioplus**
183	leptodoma H.L.C.	*Amphiura*	**Pandelia**
184	leptolepis Mura.	*Amphiura*	**Monamphiura**
185	leptopholida H.L.C.	*Amphiura*	**Amphiura**
186	leptotata H.L.C.	*Amphiura*	**Icalia**
187	leucaspis H.L.C.	*Amphiura*	**Monamphiura**

	Species	Original Genus	Proposed Genus
188	levidevaspis Djk.	*Amphiura*	**Icalia**
189	limbata Grube	*Ophiolepis*	**Diamphiodia**
190	limicola Ltk.	*Ophionephthys*	**Ophionephthys**
191	linearis Mrtsn.	*Amphiura*	**Monamphiura**
192	lobatodes H.L.C.	*Amphioplus*	**Amphioplus**
193	lobatus Ljg.	*Amphipholis*	**Amphioplus**
194	longirima Fell	*Amphioplus*	**Amphioplus**
195	lorioli Klr.	*Ophiactis*	**Amphioplus**
196	loripes Klr.	*Amphipholis*	**Monopholis**
197	lucida Klr.	*Amphioplus*	**Ophionephthys**
198	luctator Klr.	*Amphioplus*	**Ophionephthys**
199	lunaris Lym.	*Amphiura*	**Monamphiura**
200	lütkeni **Ljg.**	*Amphipholis*	**Ophiophragmus**
201	lymani Std.	*Amphiura*	**Nullamphiura**
202	macraspis H.L.C.	*Amphiodia*	**Unioplus**
203	macroscytalia Mura.	*Amphiura*	**Monamphiura**
204	magellanica Ljg.	*Amphiura*	**Monamphiura**
205	magellanica Mrtsn.	*Ophionephthys*	**Ophionephthys**
206	magnisquama H.L.C.	*Amphiura*	**Monamphiura**
207	mediterranea Lym.	*Amphiura*	**Amphiura**
208	megalaspis H.L.C.	*Amphiura*	**Monamphiura**
209	megapomus H.L.C.	*Amphioplus*	**Amphioplus**
210	micra H.L.C.	*Amphiura*	**Monamphiura**
211	micraspis H.L.C.	*Amphiura*	**Monamphiura**
212	microplax Bur.	*Amphiodia*	**Amphiodia**
213	microplax Mrtsn.	*Amphiura*	**Monamphiura**
214	microsoma H.L.C.	*Amphiura*	**Amphinephthys**
215	minuta H.L.C.	*Amphiodia*	**Amphiodia**
216	misera Klr.	*Amphiura*	**Amphipholis**
217	miyadii Mura.	*Amphioplus*	**Amphioplus**
218	monorima Mrtsn.	*Amphiura*	**Nullamphiura**
219	morosa Klr.	*Amphiura*	**Amphiura**
220	multiremula H.L.C.	*Amphiura*	**Amphiura**
221	multispina H.L.C.	*Amphiura*	**Amphiura (? Ctenamphiura)**
222	murmanica Djk.	*Amphipholis*	**Monopholis**
223	nannodes H.L.C.	*Amphiura*	**Amphiura**
224	nereis Lym.	*Amphiura*	**Amphioplus**
225	nociva Klr.	*Amphiura*	**Hemilepis**
226	norae Benh.	*Amphiura*	**Hemilepis**
227	notacanthus L & M	*Amphiura*	**Amphiacantha**
228	nudipora Klr.	*Amphipholis*	**Nullopholis**
229	obtecta Mrtsn.	*Amphiodia*	**Amphiodia**
230	occidentalis Lym.	*Amphiura*	**Diamphiodia**

	Species	Original Genus	Proposed Genus
231	occidentalis Klr.	*Amphioplus*	Amphioplus
232	ochroleuca Brk.	*Amphiura*	Diamphiodia
233	octacantha H.L.C.	*Ophionephthys*	Ophiopeltis
234	oerstedi Ltk.	*Amphiura*	Amphipholis
235	olivacea Brk.	*Amphiura*	Amphiodia
236	otteri Ljg.	*Amphiura*	Amphiura
237	pachybactra H.L.C.	*Amphipholis*	Amphipholis
238	palmeri Lym.	*Amphiura*	Amphiura
239	papillatus Ltk. & Mrtsn.	*Amphiura*	?
240	partita Klr.	*Amphiura*	Amphioplus
241	parviclypeus H.L.C.	*Amphioplus*	Amphioplus
242	patagonica Ljg.	*Amphipholis*	Amphipholis
243	patulus Lym.	*Amphiura*	Unioplus
244	pectinatus Mrtsn.	*Amphioplus*	Amphioplus
245	peloria Bush	*Amphiodia*	Diamphiodia
246	pentacantha H.L.C.	*Amphipholis*	Nullopholis
247	peregrinator Klr.	*Amphioplus*	Amphioplus
248	perita Klr.	*Amphiura*	Amphiura
249	perplexa Stim.	*Amphiura*	Icalia
250	personatus Klr.	*Amphioplus*	Ailsaria
251	phalerata Lym.	*Ophionephthys*	Ophionema
252	philhelminthius Zies.	*Amphioplus*	Unioplus
253	phrixa H.L.C.	*Amphiura*	Monamphiura
254	planispina v. Mrt.	*Amphiura*	Diamphiodia
255	platyacanthus Mura.	*Amphioplus*	Amphioplus
256	platydisca Niel.	*Amphipholis*	Amphipholis
257	platyspina Niel.	*Amphiodia*	Gymnodia
258	poecila H.L.C.	*Amphiura*	Amphiura
259	polita Klr.	*Amphiura*	Hemilepis
260	polyacantha Ltk. & Mrtsn.	*Amphiura*	Amphinephthys
261	potens Klr.	*Amphioplus*	Amphioplus
262	praefecta Klr.	*Amphiura*	Monamphiura
263	praestans Klr.	*Amphioplus*	Amphioplus
264	princeps Klr.	*Amphiura*	Amphiura
265	procidens Klr.	*Amphipholis*	Amphipholis
266	proposita Klr.	*Amphiura*	Monamphiura
267	psara H.L.C.	*Amphiodia*	Diamphiodia
268	psilochora H.L.C.	*Amphiodia*	Gymnodia
269	psilopora H.L.C.	*Amphiura*	Nullamphiura
270	ptena H.L.C.	*Amphiura*	Monamphiura
271	pugetana Lym.	*Amphiura*	Amphipholis
272	pulchella Lym.	*Amphiura*	Amphiodia
273	puntarenae Ltk.	*Amphiura*	Amphipholis

	Species	Original Genus	Proposed Genus
274	pusilla Farq.	*Amphiura*	Monamphiura
275	pycnostoma H.L.C.	*Amphiura*	Monamphiura
276	rathbuni Klr.	*Amphiura*	Hemilepis
277	refectus Klr.	*Amphioplus*	Amphioplus
278	relictus Klr.	*Amphiura*	Amphioplus
279	reloncavii Mrtsn.	*Amphiura*	Monamphiura
280	repens Lym.	*Amphiura*	Gymnodia
281	reposita Klr.	*Amphiodia*	Diamphiodia
282	retusa Djk.	*Amphiura*	Nullamphiura
283	rhabdota H.L.C.	*Amphiodia*	Diamphiodia
284	rhadinobranchius H.L.C.	*Amphioplus*	Amphioplus
285	richardi Klr.	*Amphiura*	Hemilepis
286	riisei Ltk.	*Amphiura*	Diamphiodia
287	rosea Farq.	*Amphiura*	Amphiura
288	rossica Ltk.	*Amphiura*	Diamphiodia
289	sarsi Ljg.	*Amphiura*	Icalia
290	scripta Klr.	*Amphiura*	Monamphiura
291	sculpta A.M.C.	*Amphiura*	Amphiura
292	sculptilis Zies.	*Amphiodia*	Amphiodia
293	securigera D & K	*Ophiopeltis*	Ophiopeltis
294	semiermis Lym.	*Amphiura*	Hemilepis
295	seminuda Ltk. & Mrtsn.	*Amphiura*	Pandelia
296	seminuda Mrtsn.	*Amphioplus*	Ophionephthys
297	septemspinosa H.L.C.	*Amphiura*	Monamphiura
298	serpentina Ltk. & Mrtsn.	*Amphiura*	Nullamphiura
299	servata Klr.	*Amphiura*	Diamphiodia
300	sexradiata Klr.	*Amphiura*	Monamphiura
301	signalis Klr.	*Amphioplus*	Amphioplus
302	similis Mrtsn.	*Amphipholis*	Amphipholis
303	simonsi A.M.C.	*Amphiura*	? Amphinephthys
304	sinensis A.H.C.	*Ctenamphiura*	Diamphiodia
305	sobrina Matsu.	*Amphipholis*	Amphipholis
306	spinipes Mrtsn.	*Amphiura*	Monamphiura
307	squamata D. Chiaje	*Asterias*	Amphipholis
308	stenaspis H.L.C.	*Amphioplus*	Amphioplus
309	stepanovi Djk.	*Amphiura*	Amphiura
310	stewartensis Mrtsn.	*Ophionephthys*	Ophionephthys
311	stictacantha H.L.C.	*Amphiura*	Amphiura
312	stimpsoni Ltk.	*Amphiura*	Monamphiura
313	strata Mrtsn.	*Amphipholis*	Amphipholis
314	strongyoplax H.L.C.	*Amphiodia*	Unioplus
315	subtilis Ljg.	*Amphipholis*	Amphipholis
316	sundevalli M & T	*Ophiolepis*	Monamphiura

	Species	Original Genus	Proposed Genus
317	syntaracha H.L.C.	*Amphiura*	Icalia
318	tabogae Niel.	*Amphiodia*	Gymnodia
319	tenuis H.L.C.	*Ophionephthys*	Ophionema
320	tenuispina Ljg.	*Amphiura*	Amphipholis
321	tessellatus Klr.	*Amphioplus*	Amphioplus
322	textilis Klr.	*Amphiura*	Amphioplus
323	thrombodes H.L.C.	*Amphioplus*	Unioplus
324	timsae Mrtsn.	*Amphioplus*	Amphioplus
325	tomentosa Lym.	*Amphiura*	Icalia
326	torelli Ljg.	*Amphipholis*	Amphipholis
327	trepidus Klr.	*Amphioplus*	Silax
328	triaina Djk.	*Amphiura*	Nullamphiura
329	trisacantha H.L.C.	*Amphiura*	Monamphiura
330	trychna H.L.C.	*Amphiodia*	Diamphiodia
331	tumidus Lym.	*Amphiura*	Amphioplus
332	tumulosa Djk.	*Amphiura*	Amphiura
333	tymbara H.L.C.	*Amphiodia*	Diamphodia
334	uncinata Klr.	*Amphiura*	Hemilepis
335	urtica Lym.	*Amphiura*	? Ophiophragmus
336	ushakovi Djk.	*Amphiura*	Amphiura
337	vadicola Matsu.	*Amphiura*	Ophiopeltis
338	velox Klr.	*Amphiura*	Monamphiura
339	verrilli Lym.	*Amphiura*	Silax
340	verticellata Ljg.	*Amphiura*	Amphiura
341	vicina A.H.C.	*Amphiodia*	Diamphiodia
342	violacea Ltk.	*Amphiura*	Diamphiodia
343	vitax Klr.	*Amphipholis*	Monopholis
344	vivipara H.L.C.	*Amphiura*	Monamphiura

Note.—In the *Siboga Rpts.* (1904, 1905), and certain other publications, Koehler assigned species to *Amphiura* sensu lato, at the same time clearly indicating their subgeneric status (*Amphiodia, Amphioplus, Amphipholis* or *Amphiura* sensu stricto). Under the international rules, when a subgenus is subsequently treated as a genus, the author of a species should be cited without the use of parentheses, provided no other systematic change is involved. This rule was not followed by H. L. Clark (1915), in his *Catalogue of Recent Ophiurans,* with the result that most subsequent authors have cited the *Siboga* species incorrectly. The foregoing index clarifies the situation. Thus No. 59 is to be cited as *Amphioplus causatus* Koehler, 1905 and No. 60 as *Monamphiura celata* (Koehler, 1905).

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