

## A DISCUSSION ON THE TAXONOMY OF THE GENUS *PARADILEPIS* HSÜ, 1935

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### ABSTRACT

The taxonomy of the genus *Paradilepis* Hsü, 1935, has been discussed in the light of our present day knowledge of the different species and it has been redefined. It has been chiefly distinguished from the allied genus *Oligorchis* Fuhrmann, 1906, by the presence of a double crown of rostellar hooks and a spinose cirrus, and absence of a *vesicula seminalis externa*. Utilization of the coiling of the vas deferens, densely or slightly, for generic delineation, to which Freeman (1954) and Huggins (1966) paid undue importance, has been nullified.

Views of different workers regarding the valid species of *Paradilepis* have been discussed. Joyeux and Baer (1950) regarded six species valid under *Paradilepis*. Most of the subsequent workers accepted Joyeux and Baer's species amongst the valid ones under *Paradilepis*. Opinion is divided amongst workers regarding the validity of other species. In the present work, systematic positions of the disputable species have been discussed in the light of the amended definition of *Paradilepis*. The writers regard 17 species valid under *Paradilepis* including the recent ones described by Baer and Bona (1960) and Khalil (1961).

As *Dilepis maxima* Goss, 1940, having uterine capsules, is a misfit in the genus *Paradilepis*, it has been isolated from *Dilepis* Weinland, 1858, and a new genus viz., *Neodilepis* has been proposed for it.

### RESUMEN

Fue discutida, a la luz de nuestro conocimiento actual de las diferentes especies, la taxonomía del género *Paradilepis* Hsü, 1935, y redefinido éste. Fue diferenciado del cercano género *Oligorchis* Fuhrmann, 1906, por la presencia de una doble corona de ganchos rostellares y de un cirro espinoso, así como por la falta de una *vesicula seminalis externa*. Fue eliminado de la caracterización genérica el criterio relativo a la abundancia o escasez de curvaturas del vaso deferente, al cual Freeman (1954) y Huggins (1966) concedieron indebida importancia.

Fueron discutidos los puntos de vista de diferentes autores acerca de las especies válidas de *Paradilepis*.

Joyeux y Baer (1950) consideraron válidas seis especies de *Paradilepis*. La mayoría de los investigadores subsecuentes aceptaron a las especies reconocidas por Joyeux y Baer entre las válidas de *Paradilepis*. Existen diferencias de opinión entre los investigadores acerca de la validez de otras especies. En el presente trabajo se discute, a la luz de la definición enmendada de *Paradilepis*, la posición sistemática de las especies en disputa. Los autores consideran válidas 17 especies de *Paradilepis*, incluyendo las recientemente descritas por Baer y Bona (1960) y Khalil (1961).

Como *Dilepis maxima* Goss, 1940, por tener cápsulas uterinas, se hallaba fuera de sitio en el género *Paradilepis*, fue separada de *Dilepis* Weinland, 1858, y fue propuesto para ella un nuevo género, *Neodilepis*.

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The taxonomy of the genus *Paradilepis* Hsü, 1935, family *Dilepididae* Railliet and Henry, 1909, has been studied by several workers Joyeux and Baer (1935, 1950); Freeman (1954); Mahon (1955); Spassky (1952, 1954, 1959); Mathevossyan (1959, 1963), Spassky and Spasskaya (1960); Baer and Bona (1960), but still it is far from satisfactory.

An attempt has been made here to redefine the genus *Paradilepis* and to discuss the taxonomic position of several species.

As the history of this genus has been dealt with by several workers, lately by Mathevossyan (1963), it is deemed needless to enter into it. This genus closely resembles *Oligorchis* Fuhrmann, 1906, of the family *Hymenolepididae* Railliet and Henry, 1909. Some workers indeed attached, as Freeman (1954) pointed out, undue importance to the number of testes while assigning disputable species to *Oligorchis*.

Freeman (1954) mainly followed Fuhrmann (1932) in defining the genus *Oligorchis* as a hymenolepid cestode having a single row of rostellar hooks, four to eleven testes, both internal and external vesicula seminalis, and genital ducts dorsal to excretory ducts, and consequently he appears to distinguish *Paradilepis* as a dilepid cestode having two rows of rostellar hooks, fewer testes and absence of a vesicula seminalis externa; the genital ducts passing dorsal to excretory ducts here also. Further, Freeman (1954) added the degree of coiling of the vas deferens to the generic definition as a distinguishing feature and characterized *Paradilepis* by a densely coiled vas deferens. Lately, Houghins (1966), too, appears to have laid emphasis on this feature. Surprisingly, Freeman (1954) included *Oligorchis yorkei* (Kotlan, 1923) in *Paradilepis* in spite of a lightly coiled vas deferens found in this species. So is the case with *Oligorchis burmanensis* Johry, 1941 in-

cluded by Freeman (1954) in *Paradilepis*. Obviously, then, the degree of coiling of the vas deferens (densely or lightly) has hardly any significance in distinguishing these genera. In the opinion of the writers, the degree of coiling of the vas deferens is, at the most, of specific diagnostic value. Leaving aside the number of testes which does not sharply distinguish these genera, the writers feel that the rows of rostellar hooks and presence or absence of a vesicula seminalis externa are sufficiently important characters to distinguish these genera; over and above these, the character of the cirrus affords yet another important distinguishing feature. A study of the relevant literature reveals the cirrus to be primarily a spiny structure in *Paradilepis* as is evident from the type species, *P. scolecina* (Rud., 1819). Wardle and McLeod (1952) and Yamaguti (1959) in their treatises on Cestoda have rightly made a reference to this feature of *Paradilepis*. A number of species of *Paradilepis* have been described as having a spiny cirrus; only in a few species, the spinose or aspinose character of the cirrus has not been mentioned apparently because the authors could not detect these structures, which easily escape observation particularly if the cirrus is not everted. Regarding the cirrus in *Oligorchis*, the writers find that *O. strangulatus* Fuhrmann, 1906 the type species, lacks spines on the cirrus. Recently Deblock and Rose (1964) have described a new subspecies of *Oligorchis paucitesticulatus*, and have shown the cirrus in their figure (Fig. 4, b, Deblock & Rose, 1964) to have fine spines, although their account lacks a reference to any kind of armature being present on the cirrus.

Through the courtesy of Professor S. Deblock, the writers had an opportunity to examine the type specimen of *O. paucitesticulatus paucitesticulatus* and

they are convinced that there are no spines on the cirrus, but instead small denticles appear to be present. Evidently, the cirrus in *Oligorchis* is aspinose. The nature of cirrus will, then, go a long way to determine the systematic position of those species which appear

to be between *Paradilepis* and *Oligorchis*. The chief characteristic features of *Paradilepis* and *Oligorchis* are summed up in the appended table.

Table: Chief features of the genera *Oligorchis* Fuhrmann, 1906 and *Paradilepis* Hsü, 1935.

	<i>Paradilepis</i> Hsü, 1935	<i>Oligorchis</i> Fuhrmann, 1906
Family	<i>Dilepididae</i>	<i>Hymenolepididae</i>
Rostellum	Double crown of hooks	Single crown of hooks
Number of testes	3-5	3-7
Vesicula seminalis interna	Sometimes present	Present
Vesicula seminalis externa	Absent	Present
Genital ducts	Dorsal to excretory canals	Dorsal to excretory canals
Genital pore	Unilateral	Unilateral
Cirrus	Armed	Unarmed
Vagina	Ventral to cirrus sac	Ventral to cirrus sac

The genera *Meggittiella* López-Neyra, 1942 and *Skrjabinolepis* Mathevosyan, 1945 are indeed synonyms of *Paradilepis* Joyeux and Baer, (1950); Spassky (1954).

The genus *Paradilepis* Hsü, 1935 is redefined, in the light of the aforesaid discussion, as follows:

*Dilepididae: Dilepidinae:* Rostellum armed with a double row of hooks. Suckers unarmed. Testes three to five, posterior and lateral to ovary, aporal testes partly or entirely pre-ovarian. Vas deferens lightly or densely coiled. Vesicula seminalis externa absent. Cirrus sac large, well-developed, extending beyond the excretory ducts and enclosing a convoluted ejaculatory duct and an armed cirrus. Vesicula seminalis interna may be present. Ovary transversely elongated and bilobed, median in position. Mehlis gland and vitellarium post-ovarian. Receptaculum seminis present. Uterus initially sac-like, but even-

tually becomes bilobed. Vagina runs ventral to cirrus sac. Both vagina and cirrus sac run dorsal to excretory ducts. Genital pore unilateral.

Parasites of birds.

Type species: *P. scolecina* (Rud., 1819)  
Hsu, 1935

syn: *Taenia scolecina* Rudolphi, 1819

*Paradilepis duboisi* Hsü  
1935

*Paradilepis brevis* Burt,  
1940

#### DISCUSSIONS ON THE SYSTEMATICA POSITION AND VALIDITY OF SOME SPECIES

Freeman (1954) recognized ten species under the genus *Paradilepis* Hsü, 1935, besides the one described by him. He accepted Joyeux and Baer's (1950) six valid species, revalidated one species



merged by Joyeux and Baer (1950) as a synonym, and transferred three additional species to *Paradilepis*. Thus be included the following species under the genus *Paradilepis*: *P. scolecina* (Rud., 1819) Joyeux and Baer, 1935; *P. delauchauxi* (Fuhrmann, 1909) Joyeux and Baer, 1935; *P. macracantha* Joyeux and Baer, 1935; *P. simoni* Rausch, 1949; *P. urceus* (Wedl, 1855) Joyeux and Baer, 1950; *P. kempi* (Southwell, 1921) Joyeux and Baer, 1950; *P. burmanensis* (Johri, 1941) Freeman, 1954; *P. minima* (Goss, 1940) Freeman, 1954; *P. yorkei* (Kotlan, 1923) Freeman, 1954; *P. longivaginosus* (Mayhew, 1925) Freeman, 1954 and *P. rugovaginosus* Freeman, 1954.

Shortly after the aforementioned publication by Freeman appeared, Mahon's (1955) work incorporating her extensive studies on the genus *Paradilepis* came out wherein she mainly followed Joyeux and Baer (1950) in recognizing only six species as valid, namely, the first six species listed in the preceding paragraph. Of the eleven species recognized by Freeman (1954) under *Paradilepis*, Mahon (1955) regarded *Paradilepis burmanensis* (Johri, 1941) and *P. minima* (Goss, 1940) as synonyms of *P. kempi* (Southwell, 1921) and *P. scolecina* (Rud., 1819) respectively. Mahon (1955), however, did not make any reference to the systematic position of *P. yorkei* (Kotlan, 1923) and *P. longivaginosus* (Mayhew, 1925).

Yamaguti (1959) included, in his monograph "Systema Helminthum; Cestoda", 13 species under the genus *Paradilepis*. His list includes, besides those recognized by Joyeux and Baer (1950), the following seven species, viz., *P. minima* (Goss, 1940), *P. yorkei* (Kotlan, 1923); *P. rugovaginosus* Freeman, 1954; *P. varicanthos* (Southwell and Lake, 1939); *P. ficticia* (Meggett, 1927), *P. lloydi* (Southwell, 1926) and *P. multihamata* (Meggett, 1927). He removed

*P. longivaginosus* (Meyhew, 1925) and *P. burmanensis* (Johri, 1941), placed by Freeman (1954) under *Paradilepis*, to *Oligorchis* Fuhrmann, 1906, but following the synonymization of *Meggittiella* and *Skrjabinolepis* with *Paradilepis* by Joyeux and Baer (1950) and Spassky (1954) respectively, he included four additional species (the last four of the cited) under *Paradilepis*.

In 1959, Mathevosyan, too, presented his work on the genus *Paradilepis* in which he also recognized 13 species as valid. His list, too, includes Joyeux and Baer's six species plus seven additional species, namely, *P. yorkei* (Kotlan, 1923); *P. rugovaginosus* Freeman, 1954; *P. multihamata* (Meggett, 1927); *P. maxima* (Goss, 1940); *P. burmanensis* (Johri, 1941); *P. hierticos* (Johri, 1934), and *P. longivaginosus* (Mayhew, 1925): of these additional species, the last three were placed by Yamaguti (1959) under *Oligorchis*. He did not recognize, unlike Yamaguti (1959), *P. lloydi* (Southwell, 1926); *P. ficticia* (Meggett, 1927); *P. varicanthos* (Southwell and Lake, 1939) and *P. minima* (Goss, 1940) under *Paradilepis*. *P. maxima* (Goss, 1940) was not considered by Yamaguti (1959) under *Paradilepis* but under *Dilepis* Weinland, 1858.

Spassky and Spasskaya (1960) reviewed the genus *Paradilepis* and they recognized ten species under it. Their list also includes the species maintained valid by Joyeux and Baer (1950) and, besides, four more species, viz., *P. yorkei* (Kotlan, 1923); *P. rugovaginosus* Freeman, 1954; *P. lloydi* (Southwell, 1926) and *P. longivaginosus* (Mayhew, 1925).

It is obvious from the foregoing account that most of the workers have recognized Joyeux and Baer's species amongst the valid ones under the genus *Paradilepis*. Opinion, however, fluctuates amongst the workers regarding the systematic positions of the other species. In the following deliberations, the sys-



tematic positions of the disputable species are discussed in the light of the present concept of the genera *Paradilepis* and *Oligorchis*.

Freeman (1954) in an attempt to decide the systematic position of *Oligorchis longivaginosus* Mayhew, 1925, re-examined the original specimens of Mayhew, which were, however, not well-fixed, and consequently he failed to ascertain the data required to settle its systematic position. In spite of this, he placed the species under *Paradilepis* — indeed it was an unwarranted step. Strangely, Spassky (1954), too, independently placed it under *Paradilepis*, and subsequently Mathevosyan (1959) and Spassky and Spasskaya (1960) maintained its position under *Paradilepis*. A restudy of this species by Huggins (1966) from fresh material collected from the type host, *Pelecanus erythrorhynchus*, in South Dakota has, however, confirmed its position in the genus *Paradilepis*.

Joyeux and Baer (1950), whom Mahon (1955) followed, treated *Oligorchis burmanensis* Johri, 1941 as a synonym of *P. kempi* (Southwell, 1921), but Freeman (1954) revalidated this species and assigned it to *Paradilepis*. Yamaguti (1959) reinstated this species to its previous position under *Oligorchis*. The writers are in full agreement with Freeman (1954) on this issue. Although the vesicula seminalis externa has not been categorically stated to be absent in *P. burmanensis* by its author (Johri, 1941), yet the presence of two rows of rostellar hooks combined with a spiny cirrus and four testes lends sufficient evidence to its inclusion in the genus *Paradilepis*.

*Dilepis minima* Goss, 1940, was placed by Freeman (1954) under *Paradilepis*, but Mahon (1955) and Spassky (1961) treated it as a synonym of *P. scolecina* (Rud., 1819). Clark (1957) restudied this species from fresh specimens collected from *Microcarbo melanoleucus* (syn.

*Phalacrocorax ater*) and *Phalacrocorax sulcirostris* at Tailem Bend, South Australia and she, too, independently of Freeman's (1954) work, maintained it a valid species under *Paradilepis*. She was able to distinguish it from *P. scolecina* (Rud., 1819) by the arrangement of testes and shape of the cirral spines. She found in her specimens of *P. minima* two testes aporal, one poral, and one median, and the cirral spines to be rose-thorn shaped. She also studied *P. scolecina* from fresh specimens collected from *Phalacrocorax carbo* var. *novae-hollandiae* at Tailem Bend, South Australia, and therein she found three testes aporal and one poral. She recorded no variations in the arrangement of testes in either *P. minima* or *P. scolecina*. Clark (1957) even restudied the original specimens of *P. minima* of Goss (1940) and was able to single out, on the basis of arrangement of testes, specimens of *P. scolecina* from the lot. Surprisingly, Mahon (1955) in her work on the genus *Paradilepis* included, without any account, an illustration (fig. 1, page 64, Mahon, 1955) of a mature proglottis of a dilepid cestode, regarded by her as *P. scolecina*, showing two testes to be aporal, one poral, and one median as it is in *P. minima*. No other author, to the best knowledge of the writers, has described the arrangement of testes in *P. scolecina* as depicted by Mahon in her illustration. This calls for a restudy of Mahon's material designated *P. scolecina*. Clark's studies of *P. minima* and *P. scolecina* show both to have a characteristic distribution of testes. The writers wish to point out here that the distribution of testes, three aporal and one poral, appears to be unique in *P. scolecina* (Rud., 1819). Yamaguti (1940), too, found the same arrangement of testes in his specimens of *P. scolecina* obtained from *Phalacrocorax carbo* in Japan. Further, *P. duboisi* Hsü, 1935 and *P. brevis* Burt, 1940 having a simi-

lar arrangement of testes and 20 to 22 rostellar hooks, are universally regarded as synonyms of *P. scolecina* (Rud., 1819). Evidently *P. minima* was rightly maintained a valid species by Freeman (1954), Clark (1957) and Yamaguti (1959), and the writers, too, concur.

Mathevosyan (1959) placed *Oligorchis hierticos* Johri, 1934 as a valid species under *Paradilepis*, but Yamaguti (1959) maintained its original assignment under *Oligorchis*. One of the writers (Saxena, 1970) restudied this species from fresh material collected from the type host, *Milvus migrans* (Boddaert) at Lucknow (type locality). This form, having a double row of rostellar hooks and a spiny cirrus but lacking a vesicula seminalis externa, appropriately comes under the genus *Paradilepis*. Hence, it has been treated by one of the writers (*op. cit.*) as *P. hierticos* (Johri, 1934). \*

Several workers, as mentioned before, placed *Dilepis yorkei* Kotlan, 1923 under *Paradilepis*, but recently Baer and Bona (1960) expressed their view to retain it under *Dilepis* Weinland, 1858. Strangely, the ovary in this species has been described as four oval bodies. Further, the number of testes (*viz.* four) described in this species does not at all justify its inclusion under *Dilepis*. Leaving apart the ovarian character, which needs confirmation, the presence of two rows of rostellar hooks, four testes, spiny cirrus and absence of a vesicula seminalis externa point to its inclusion under *Paradilepis*. The writers, therefore, concur with Freeman (1954), Spassky (1954), Yamaguti (1959), Mathevosyan (1959) and Spassky and Spasskaya (1960) on this issue.

Mahon (1955) treated *Dilepis maxi-*

*ma* Goss, 1940, as a synonym of *P. kempi*, while Mathevosyan (1959) recognized it as a valid species under *Paradilepis*. The writers do not agree with either. Production of egg capsules by this species, which has been confirmed by Clark (1957) from her study of fresh material, totally rules out the possibility of its inclusion in either *Paradilepis* or *Dilepis*. The writers also feel, as Clark (1957) aptly stated, that this species appropriately comes in the subfamily *Dipylidiinae* Stiles, 1896, and must be assigned to a genus characterized by having two rows of rostellar hooks, unarmed suckers, limited number of testes and genital ducts passing dorsal to excretory ducts. To the best knowledge of the writers, no genus exists with these characters in the subfamily *Dipylidiinae*, hence a new genus, *viz.*, *Neodilepis*, with *Neodilepis maxima* (Goss, 1940) as genotype, is proposed herein for it.

The proposed genus is defined as follows:

*Neodilepis* gen. nov.

*Dilepididae: Dipylidiinae:* Medium size worms. Rostellum armed with a double row of hooks. Suckers unarmed. Proglottides broader than long. Testes around four, located posterior and lateral to the female genital complex. Cirrus sac long, extending aporally much beyond the excretory ducts. Vesicula seminalis interna present, but externa absent. Cirrus armed. Genital pores unilateral, situated in the anterior third of the proglottis. Ovary bilobed, median. Vitellarium post-ovarian. Receptaculum seminis present. \*\* Vagina runs poste-

\* The type host of *Oligorchis hierticos*, as given by Johri (1934), is *Milvus govinda* this is, in fact, only a subspecies of *Milvus migrans* which is the common Indian kite found in the Uttar Pradesh.

\*\* Goss (1940) did not state the course of the vagina in relation to the male genital duct. Regarding it, Clark (1957) states "it runs parallel with the cirrus sac". Their figures, however, show the vagina as running posterior to the cirrus sac.

rior to the cirrus sac. Genital ducts run dorsal to excretory ducts. Uterus initially bilobed, later becomes branched, and finally breaks down into egg capsules, each containing 1-20 eggs. Parasites of aquatic birds.

Type species: *Neodilepis maxima* (Goss, 1940) Syn. *Dilepis maxima* Goss, 1940

Type host: *Microcarbo melanoleucus*

Type locality: Swan River, West Australia

Distribution: West Australia (Swan River), South Australia (Adelaide)

*Hymenolepis ficticia* Meggitt, 1927 having two rows of rostellar hooks and three testes, gives a fairly good evidence for its inclusion in *Paradilepis*, and hence the writers fully agree with Spassky (1954) and Yamaguti (1959) on its assignment to the genus *Paradilepis*.

Spassky (1954) placed *Hymenolepis lloydi* Southwell, 1926 under *Paradilepis* and Yamaguti (1959) appears to have followed him in this assignment. But subsequently, Spassky and Spasskaya (1960) doubted its validity, and Spassky (1961) went to the extent of regarding *H. lloydi*, along with *P. multihamata* and *P. varicanthos*, as synonyms of *P. urceus*. In writers' judgement, it would be an unwarranted step, in the present state of our knowledge, either to regard *H. lloydi* as a synonym of *P. urceus* or to assign it to *Paradilepis*, as the account of this species makes no reference to the rows of the rostellar hooks—a feature of prime importance for generic assignment. Southwell's statement runs as follows "The rostellum, when protruded, measures 0.18 mm. in length and 0.16 mm. in breadth. It is armed with twenty sickle-shaped hooks..." His figure (Fig. 4: Southwell, 1926) of the scolex, however, shows the rostellum in a retracted condition on which the hooks appear as being arranged in a single row, and

that of the hooks (Fig. 5: Southwell, 1926) gives an impression that they are of two sizes: this may mislead workers to presume the hooks as being arranged in two rows in this species. The nature of the cirrus, spinose or aspinose, too, is not recorded in this species. Number of testes alone is not sufficient to assign it to *Paradilepis*. The writers feel that since the account of this species does not provide the essential taxonomic features, it should be considered a species *inquirenda* until it is restudied from fresh material.

*Hymenolepis multihamata* Meggitt, 1927 has been described as having two rows of rostellar hooks and a spiny cirrus, but it is rather astonishing to find the account lacking a reference to the number of testes and even an illustration of the mature proglottis. As important morphological details of this species are not recorded, the writers are firmly opposed to its being synonymized with *P. urceus* as some workers (Joyeux and Baer, 1950; Mahon, 1955; Spassky, 1961) have done. The crown of a double row of rostellar hooks, however, calls for its isolation from the genus *Hymenolepis*. Hence, in the opinion of the writers, it may be only tentatively retained, in the present state of our knowledge, in the genus *Paradilepis* under which it was placed by Mathevosyan (1959).

Freeman (1954) characterized *P. rugovaginosus* chiefly by the rugate vagina. Spassky (1961) synonymized it with *P. longivaginosus*. Since Huggins (1966) has recently discovered a rugate vagina in his specimens of *Paradilepis longivaginosus*, the writers are in full agreement with Spassky (1961) in regarding *P. rugovaginosus* as a synonym of *P. longivaginosus*.

Spassky (1954) placed *Hymenolepis varicanthos* Southwell and Lake, 1939, under *Paradilepis*. Yamaguti (1959) apparently followed Spassky (1954) and



retained it under *Paradilepis*. Subsequently Spassky (1961) synonymized this species with *P. urceus*. The writers, however, disagree with Spassky (1961), but agree with Yamaguti (1959) in maintaining it a valid species, chiefly because it is a larger species having larger rostellar hooks. The account of this species, however, lacks details and measurements of several structures.

Spassky (1961) treated *Paradilepis simoni* as a synonym of *P. scolecina*. The writers, however, differ from him inasmuch as they regard *P. simoni* Rausch, 1949 as a valid species on account of the following facts: in size, *P. simoni* is much larger (about 10 times) than *P. scolecina*; external segmentation is absent in *P. simoni*, but well-marked in *P. scolecina*; rostellar hooks of *P. simoni* are smaller than those of *P. scolecina*; testes 5 in *P. simoni*, but 4 in *P. scolecina*; ovary tetralobed in *P. simoni* are smaller than those of *P. scolecina*, but transversely elongated in *P. scolecina* (vide Yamaguti, 1940); lastly eggs are said to be arranged in rows within the uterus in *P. simoni*, but not so in *P. scolecina*.

The writers, therefore, recognize the following species under the genus *Paradilepis* Hsü, 1935, including those recently added by Baer and Bona (1960) and Khalil (1961).

1. *P. scolecina* (Rud., 1819) Joyeux and Baer, 1935

2. *P. delachauxi* (Fuhrmann, 1909) Joyeux and Baer, 1935
3. *P. macracantha* Joyeux and Baer, 1935
4. *P. simoni* Rausch, 1949
5. *P. kempfi* (Southwell, 1921) Joyeux and Baer, 1950
6. *P. urceus* (Wedl, 1855) Joyeux and Baer, 1950
7. *P. minima* (Goss, 1940) Freeman, 1954
8. *P. yorkei* (Kotlan, 1923) Freeman, 1954
9. *P. longivaginosus* (Mayhew, 1925) Freeman, 1954
10. *P. burmanensis* (Johri, 1941) Freeman, 1954
11. *P. varicanthos* (Southwell and Lake, 1939) Spassky, 1954
12. *P. ficticia* (Meggett, 1927) Spassky, 1954
13. *P. multihamata* (Meggett, 1927) Mathevosyan, 1959
14. *P. hierticos* (Johri, 1934) Mathevosyan, 1959
15. *P. transfuga* (Krabbe, 1869) Baer and Bona, 1960
16. *P. patriciae* Baer and Bona, 1960
17. *P. maleki* Khalil, 1961

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## LITERATURE

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