

## On the studies of Microdrile Oligochaeta and Aeolosomatidae (Annelida) in China: brief history and species checklist

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**Key words:** Microdrile Oligochaeta, Aeolosomatidae, China, research history, species checklist, distributions.

### Abstract

The centurial history of studies on Microdrile Oligochaeta and Aeolosomatidae in China is roughly divided into three stages, with research interests changing from freshwater taxa to all groups including terrestrial and marine forms. A total of 246 species representing 9 families and 77 genera (5 species and 1 genus of these are Aeolosomatidae) have been hitherto recorded from the country, and a checklist of species and distributions is given in Appendix. Although many regions are not yet investigated, the fauna appears to have a general pattern, i.e., it is similar to the Holarctic one in the North, but close to the Oriental one in the South. In the future, studies should focus on faunistics first, and then extend to phylogenetic and biogeographical work on this basis.

### Introduction

Studies of Microdrile Oligochaeta in China have a history of about one hundred years. However, there is no review dealing with all groups including Branchiobdellida and Aeolosomatidae (the latter now regarded as polychaetes, but included here for the traditional reason) having been published. To provide an overview of microdrile knowledge in the country, this paper presents an account of the research history and summarizes the faunal information. In addition, a prospect of future work is discussed at the end.

### Brief history

According to the researchers and their studies, we roughly divide the history into three stages:

The first stage (1900-1950) is characterized by the pioneer work on freshwater oligochaetes by Chen and others. As the earliest record, Stephenson (1909) reported 6 species including one enchytraeid from the specimens collected in Tibet by Stewart in 1907, and which were re-described by Cernosvitov (1941). Later,

Stephenson (1917) recorded one species, *Branchiura sowerbyi*, from Lake Taihu in east China. The most comprehensive work in this period was conducted by Chen (1940). Collecting mainly from waters along the lower Changjiang (Yangtze) River near Nanjing, he gave a detailed account of 40 species and discussed their faunal relations. Meanwhile, Yamaguchi (1940) described 17 species including 5 branchiobdellidans from northeast China.

The second stage (1950-1990) is characterized by Liang's work on freshwater oligochaetes and Liu's work on branchiobdellidans. Under the guidance of Prof. Chen, Liang (1958) published his first paper on oligochaetes. Since then, he reported 55 freshwater species mainly from the basins of the Changjiang, Heilongjiang (Amur) and Tarim Rivers (Liang, 1958, 1962, 1963, 1964, 1979, 1987), and described one glacial enchytraeid from Tibet (Liang et al., 1979). In addition, he estimated the production of one species (Liang, 1984). Other contributions to freshwater fauna include the records of 35 species from the Heilongjiang Basin near the border between China and the former

Soviet Union by Sokol'skaya (1958, 1961) and Timm (1991), the descriptions of two species from the Zhujiang (Pearl) River by Erseus & Qi (1985), and the records of over 20 species from various localities by Brinkhurst et al. (1990). With regard to branchiobdellidans, Liu described 17 species, mainly from northeast China (Liu, 1964, 1984; Liu & Zhang, 1964; Liu & Zhang, 1983), and Liang (1963) reported two aberrant species, which are the only members of the order hosted in shrimps (most other branchiobdellidans are from astacoidean crayfishes).

The third stage (1990-present) is characterized by studies on all groups of microdriles. While continuing work on taxonomy and ecology of freshwater worms (Liang & Xie, 1997; Wang & Liang, 1997; Liang et al., 1998; Wang & Liang, 2001; Cui & Wang, 2005), Chinese researchers started studying terrestrial Enchytraeidae under the supervision of Prof. Liang, and described 41 species mainly from the middle Changjiang Basin, as well as northeast and southwest China (Liang & Xie, 1992; Wang et al., 1999, 2000; Xie et al., 1999 a-b; Xie et al., 2000a-d; Xie & Rota, 2001; Xie et al., 2001; Chen & Xie, 2006; Chen et al., 2006). Additionally, Mezzanotte (in press) investigated freshwater fauna of Guizhou, Xu et al (1989) described one enchytraeid species from a plant (*Angelica sinensis*). In terms of marine oligochaetes, Erséus made great contributions. With collaborators, he described 74 species from Hong Kong (Erséus, 1984, 1990, 1992a-b, 1997; Zhou & Erséus, 2003), 16 species from Jiaozhou Bay (Erséus et al., 1990), 5 species from Taiwan Island (Erséus & Hsieh, 1997), and 25 species from Hainan Island (Wang & Erséus, 2001, 2003, 2004). Besides taxonomy, several papers on food compositions, productions, energetics, and community patterns were also published (Yan, 1998, 1999; Sundberg et al., 1992; Erséus & Diaz, 1997; Gong, 2002; Wang & Liang, 2002; Liu et al., 2006, Liu & Wang, 2007).

### Species and distributions

A total of 246 species, representing 9 families and 77 genera of Microdrile Oligochaeta and Aeolosomatidae, have been hitherto recorded from China (Table 1), and the detailed distributions are listed in Appendix. With

regard to the species abundance in different habitats, freshwater oligochaetes rank first, being 49.6% of the total, marine ones second, being 36.2%, and terrestrial ones least, being 17.9% (Table 1). In terms of the species abundance in different regions, Fig.1 shows that most inland taxa are known from eastern regions, especially central China, but few from western regions such as the Qinghai-Xizang (-Tibet) Plateau, and that marine species are largely known from the South China Sea, especially Hong Kong. Probably, the richness differences among habitat groups and among regions are largely biased by where efforts have been made, yet they may reflect biogeographical patterns to a considerable extent.

The fauna of freshwater oligochaetes in China as a whole is most similar to that of the Holarctic, but the South has more Oriental taxa (Wang & Liang, 1997). It should be noted that a recent study has shown that deep lakes in southwest China are rich in endemic species (Cui & Wang, 2005). Concerning terrestrial enchytraeids, the whole fauna appears closer to that of the Southern Hemisphere, but this is probably due to the fact that our studies were concentrated to the Changjiang Basin. When more localities have become investigated, it is likely that the terrestrial enchytraeid fauna will show the same pattern as freshwater oligochaetes. The marine fauna appears more unique,

Table 1. Number of taxa of Microdrile Oligochaeta and Aeolosomatidae known from China

Higher taxa	Freshwater		Marine		Terrestrial		Total	
	G	S	G	S	G	S	G	S
Oligochaeta								
Haplotaxida								
Haplotaxidae	1	1	-	-	-	-	1	1
Tubificida								
Enchytraeidae	5	6	5	11	12	41	16	54
Naididae	20	58	1	3	1	1	20	59
Tubificidae								
Rhyacodrilinae	4	7	6	18	2	2	9	26
Tubificinae	8	22	1	1	-	-	9	23
Telmatodrilinae	1	1	0	0	-	-	1	1
Phallodrilinae	0	0	8	23	-	-	8	23
Limnodriloidinae	1	1	5	33	-	-	5	33
Lumbriculida								
Lumbriculidae	2	2	-	-	-	-	2	2
Branchiobdellida								
Branchiobdellidae	3	17	-	-	-	-	3	17
Xironodrilidae	1	1	-	-	-	-	1	1
Caridinophilidae	1	1	-	-	-	-	1	1
Polychaeta								
Aeolosomatida								
Aeolosomatidae	1	5	-	-	-	-	1	5
Total	48	122	26	89	15	44	77	246

Abbreviations: G-genera, S-Species. Although Naididae and Tubificidae are now regarded as a single family (Erséus & Gustavsson, 2002), the present paper keeps them separate for the traditional reason.

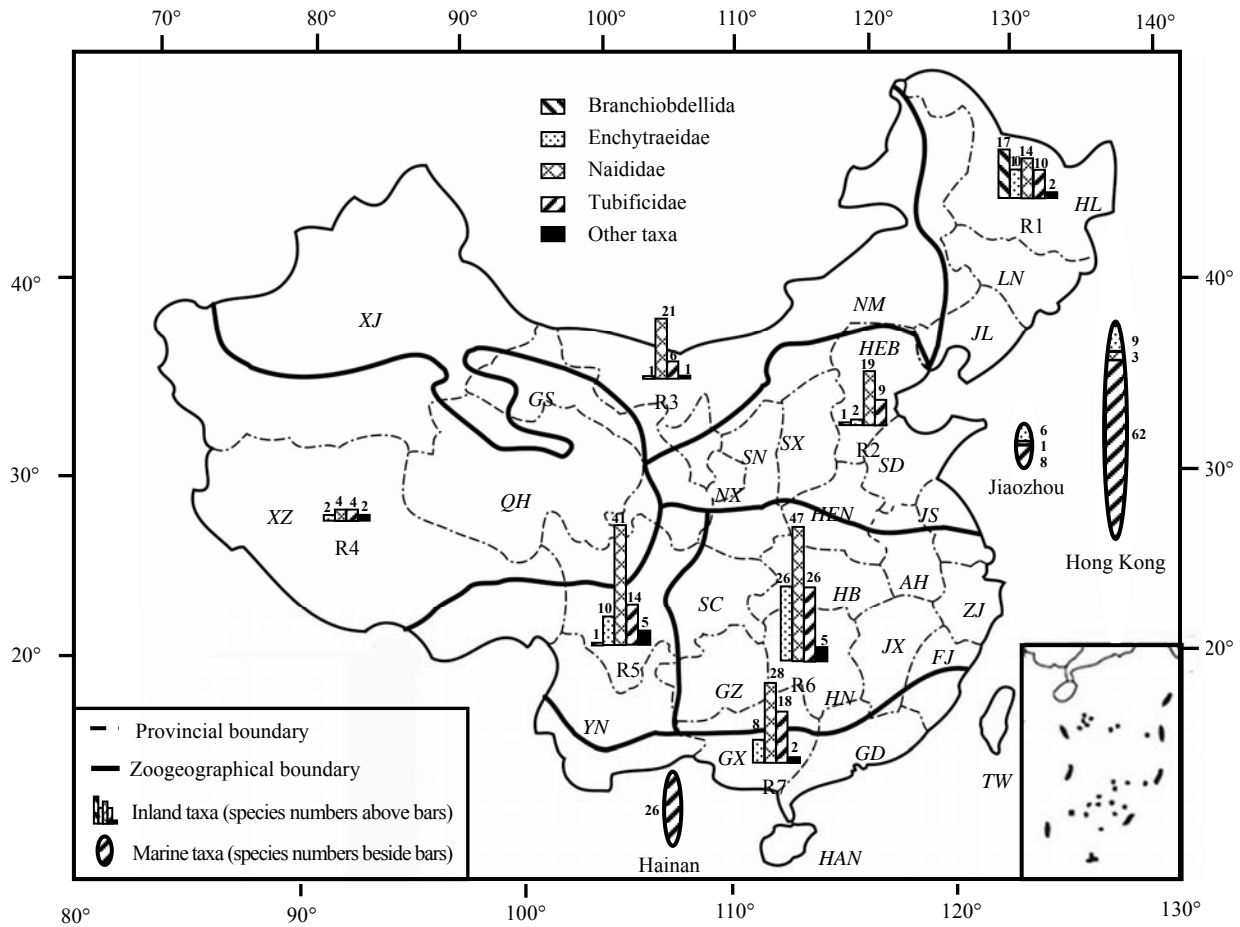


Figure 1. Species numbers of Microdrile Oligochaeta and Aeolosomatidae known from different regions of China. Zoogeographical divisions of the inland sensu Zhang (1999): R1, Northeast China; R2, North China; R3, Meng-Xin; R4, Qinghai-Xizang; R5, Southwest China; R6, Central China; R7, South China. Abbreviations of provinces: AH, Anhui; FJ, Fujian; GD, Guangdong; GS, Gansu; GX, Guangxi; GZ, Guizhou; HAN, Hainan; HB, Hubei; HEB, Hebei; HEN, Henan; HL, Heilongjiang; HN, Hunan; JL, Jilin; JS, Jiangsu; JX, Jiangxi; LN, Liaoning; NM, Neimenggu; NX, Ningxia; QH, Qinghai; SC, Sichuan; SD, Shandong; SN, Shaanxi; SX, Shanxi; TW, Taiwan; XJ, Xinjiang; XZ, Xizang; YN, Yunnan; ZJ, Zhejiang

with nearly half of the species known only from China. Yet, a more general conclusion would be premature, since the marine oligochaetes are still fragmentarily known in the world, also in China as well as its adjacent regions.

**Future work**

Although great progress has been made in faunistics, microdrile research in China still needs to be significantly upgraded. Collections have so far been largely concentrated to the Changjiang Basin and the coast of Hong Kong, and thus the effort should be extended to other areas, especially hotspots of diversity and endemism, e.g. the Qinghai-Xizang Plateau, southwest China, and the tropical seas. Considering that many regions are not yet investigated, we should still focus on taxonomy in the near future,

and then conduct phylogenetic and biogeographical work step by step on this basis.

**Acknowledgements**

We are indebted to Profs. Y. L. Liang, C. Erséus and A. Ohtaka for their inspired comments on the manuscript. Financial support was provided by the National Natural Science Foundation of China (No. 30470205).

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**Appendix: List of Microdrile Oligochaeta and Aeolosomatidae  
hitherto recorded from China**

**OLIGOCHAETA**

**HAPLOTAXIDAE**

**1. *Haplotaxis* Hoffmeister, 1843**

- 1) *Haplotaxis gordioides* (Hartmann, 1821)  
Distribution\*: Freshwater. Guangdong, Hunan, Jiangxi,  
Xinjiang.

**ENCHYTRAEIDAE**

**2. *Achaeta* Vejdovsky, 1877**

- 2) *Achaeta brevivasa* Graefe, 1980  
Distribution: Terrestrial. Hubei, Hunan.  
3) *Achaeta indica* Prabhoo, 1960  
Distribution: Terrestrial. Hunan, Zhejiang.  
4) *Achaeta parva* Nielsen et Christensen, 1961  
Distribution: Terrestrial. Zhejiang.

**3. *Hemienchytraeus* Cernovsítov, 1935**

- 5) *Hemienchytraeus bifurcatus* Nielsen et Christensen, 1959  
Distribution: Freshwater, terrestrial. Guangxi, Hubei, Hunan,  
Zhejiang.  
6) *Hemienchytraeus planisetosus* Xie, Wang et Liang, 1999  
Distribution: Terrestrial. Hunan.  
7) *Hemienchytraeus stephensoni* (Cognetti, 1927)  
Distribution: Terrestrial. Guangxi, Hunan.  
8) *Hemienchytraeus loksai* Dózsa-Farkas, 1989  
Distribution: Terrestrial. Hunan.  
9) *Hemienchytraeus brachytecus* Xie, Wang et Liang,  
1999  
Distribution: Terrestrial. Henan, Hunan.  
10) *Hemienchytraeus theae* Prabhoo, 1960  
Distribution: Terrestrial. Zhejiang.

**4. *Fridericia* Michaelsen, 1889**

- 11) *Fridericia carmichaeli* Stephenson, 1915  
Distribution: Terrestrial. Zhejiang.  
12) *Fridericia alba* Moore, 1895  
Distribution: Terrestrial. Guangxi, Hunan.  
13) *Fridericia unisetosa* Xie, Liang et Wang, 2000  
Distribution: Terrestrial. Jilin.  
14) *Fridericia multisegmentata* Wang, Xie et Liang, 1999  
Distribution: Terrestrial. Hunan.  
15) *Fridericia paraunisetosa* Xie, Liang et Wang, 2000  
Distribution: Terrestrial. Jilin.  
16) *Fridericia bulboides* Nielsen et Christensen, 1959  
Distribution: Terrestrial. Hunan, Zhejiang.  
17) *Fridericia callosa* (Eisen, 1878)  
Distribution: Terrestrial. Zhejiang.  
18) *Fridericia bulbosa* (Rosa, 1887)  
Distribution: Terrestrial. Sichuan.

- 19) *Fridericia nanningensis* Xie, Liang et Wang, 2001  
Distribution: Terrestrial. Guangxi.

- 20) *Fridericia chongqingensis* Xie, Liang et Wang, 1999  
Distribution: Terrestrial. Guangxi, Sichuan.

- 21) *Fridericia maculata* Issel, 1905  
Distribution: Terrestrial. Sichuan.

- 22) *Fridericia paroniana* Issel, 1904  
Distribution: Terrestrial. Sichuan.

**5. *Isosetosa* Xu, Zhang et Jiang, 1989 [=*Fridericia*? see Schmelz,  
2003]**

- 23) *Isosetosa minxianensis* Xu, Zhang et Jiang, 1989  
Distribution: inhabiting a plant (*Angelica sinensis*). Gansu.

**6. *Enchytraeus* Henle, 1837**

- 24) *Enchytraeus athecatus* Wang, Xie et Liang, 1999  
Distribution: Freshwater, terrestrial. Guangxi, Henan,  
Hunan, Shaanxi.  
25) *Enchytraeus christenseni* Dózsa-Farkas, 1992  
Distribution: Freshwater, terrestrial. Hunan.  
26) *Enchytraeus chaoyangensis* Xie, Liang et Wang, 2000  
Distribution: Terrestrial. Jilin.  
27) *Enchytraeus kincaidi* Eisen, 1904  
Distribution: Marine. Jiaozhou Bay.

**7. *Mesenchytraeus* Eisen, 1878**

- 28) *Mesenchytraeus* sp. (spp. ?)  
Distribution: Freshwater, terrestrial. Hunan, Jiangxi.

**8. *Sinenchytraeus* Liang et Hsu, 1979**

- 29) *Sinenchytraeus glacialis* Liang et Hsu, 1979  
Distribution: Freshwater (glacier). Xizang.

**9. *Bryodrilus* Ude, 1892**

- 30) *Bryodrilus parvus* Nurminen, 1970  
Distribution: Terrestrial. Jilin.  
31) *Bryodrilus macrotheca* Xie, Liang et Wang, 2000  
Distribution: Terrestrial. Jilin.  
32) *Bryodrilus longifistulatus* Xie, Liang et Wang, 2000  
Distribution: Terrestrial. Jilin.  
33) *Bryodrilus fuscistriatus* Chen et Xie, 2006  
Distribution: Terrestrial. Jilin.

**10. *Henlea* Michaelsen, 1889**

- 34) *Henlea perpusilla* Friend, 1911  
Distribution: Freshwater, terrestrial. Guizhou, Hunan.  
35) *Henlea ventriculosa* (d'Udekem, 1854)  
Distribution: Terrestrial. Xizang.

**11. *Lumbricillus* Orsted, 1844**

- 36) *Lumbricillus* sp. (spp.?)  
Distribution: Marine. Jiaozhou Bay.

**12. *Stephensiella* Černovsítov, 1934**

- 37) *Stephensiella marina* (Moore, 1902)  
Distribution: Brackish-water, marine. Hong Kong.  
38) *Stephensiella sterreri* (Lasserre et Erséus, 1976)  
Distribution: Marine. Hong Kong, Jiaozhou Bay.

**13. *Grania* Southern, 1913**

\* Localities given are provincial in general (see Fig.1).

39) *Grania hongkongensis* Erséus, 1990

Distribution: Marine. Hong Kong.

40) *Grania stilifera* Erséus, 1990

Distribution: Marine. Hong Kong.

41) *Grania inermis* Erséus, 1990

Distribution: Marine. Hong Kong.

#### 14. *Hemifridericia* Nielsen et Christensen, 1959

42) *Hemifridericia parva* Nielsen et Christensen, 1959

Distribution: Terrestrial. Hunan.

#### 15. *Marionina* Michaelsen, 1889

43) *Marionina sacculata* Xie et Rota, 2001

Distribution: Terrestrial. Jiangxi, Sichuan.

44) *Marionina sinica* Xie et Rota, 2001

Distribution: Terrestrial. Sichuan.

45) *Marionina riparia* Bretscher, 1899

Distribution: Freshwater. Hunan.

46) *Marionina seminuda* Xie et Rota, 2001

Distribution: Terrestrial. Anhui, Hubei, Jiangxi, Sichuan.

47) *Marionina righiana* Xie et Rota, 2001

Distribution: Terrestrial. Guangxi, Hubei, Hunan, Jiangxi.

48) *Marionina levitheca* Erséus, 1990

Distribution: Marine. Hong Kong, Jiaozhou Bay.

49) *Marionina nevisensis* Righi et Kanner, 1979

Distribution: Marine. Hong Kong, Jiaozhou Bay.

50) *Marionina coatesae* Erséus, 1990

Distribution: Marine. Hong Kong, Jiaozhou Bay.

51) *Marionina vancouverensis* Coates, 1980

Distribution: Brackish-water, marine. Hong Kong.

#### 16. *Cernosvitoviella* Nielsen et Christensen, 1959

52) *Cernosvitoviella atrata* (Bretscher, 1903)

Distribution: Freshwater. Guizhou.

#### 17. *Oconnorella* Rota, 1995

53) *Oconnorella changbaishanensis* (Xie, Liang et Wang, 2000)

Distribution: Terrestrial. Jilin.

54) *Oconnorella cheni* Chen, Xie et He, 2006

Distribution: Terrestrial. Jilin.

55) *Oconnorella globula* Chen, Xie et He, 2006

Distribution: Terrestrial. Jilin.

### NAIDIDAE

#### 18. *Chaetogaster* von Baer, 1827

56) *Chaetogaster diastrophus* (Gruithuisen, 1828)

Distribution: Freshwater. Guangdong, Guangxi, Henan, Hubei, Hunan, Jiangsu, Jilin, Sichuan, Xinjiang,

57) *Chaetogaster langi* Bretscher, 1896

Distribution: Freshwater. Guangdong, Guangxi, Guizhou, Henan, Hubei, Hunan, Jiangsu, Sichuan, Xinjiang.

58) *Chaetogaster diaphanus* (Gruithuisen, 1828)

Distribution: Freshwater. Heilongjiang, Hubei, Hunan, Jiangsu, Sichuan, Xinjiang, Xizang.

59) *Chaetogaster crystallinus* Vejdovsky, 1883

Distribution: Freshwater. Guizhou, Xinjiang.

60) *Chaetogaster limnaei* von Baer, 1827

Distribution: Freshwater. Guizhou, Heilongjiang, Henan, Hubei, Hunan, Jiangsu, Sichuan, Xinjiang.

#### 19. *Aulophorus* Schmarda, 1861

61) *Aulophorus tonkinensis* (Vejdovsky, 1894)

Distribution: Freshwater. Guizhou, Henan, Hubei, Jiangsu, Sichuan.

62) *Aulophorus pectinatus* Stephenson, 1931

Distribution: Freshwater. Guizhou, Jiangsu.

63) *Aulophorus furcatus* (Müller, 1773)

Distribution: Freshwater. Changjiang River, Guangdong, Guangxi, Guizhou, Henan, Hubei, Hunan, Jiangsu, Jiangxi, Shaanxi, Sichuan, Zhejiang.

64) *Aulophorus varians* Liang, 1958

Distribution: Freshwater. Jiangsu.

65) *Aulophorus flabelliger* Stephenson, 1913

Distribution: Freshwater. Guangdong.

66) *Aulophorus heptabanchionus* Liang, 1958 (= *Aulophorus flabelliger*? see Brinkhurst & Jamieson, 1971)

Distribution: Freshwater. Hubei, Jiangsu.

#### 20. *Dero* Oken, 1815

67) *Dero obtusa* d'Udekem, 1855

Distribution: Freshwater. Shaanxi, Sichuan, Jiangsu, Hubei, Hunan, Guangxi, Guangdong.

68) *Dero nivea* Aiyer, 1930

Distribution: Freshwater. Anhui, Hubei, Hunan, Guangdong.

69) *Dero dorsalis* Ferronière, 1899

Distribution: Freshwater. Guangdong, Guizhou, Hubei, Hunan, Jiangsu, Shaanxi, Sichuan, Zhejiang.

70) *Dero digitata* (Müller, 1773)

Distribution: Freshwater. Changjiang River, Guangdong, Guangxi, Henan, Hubei, Hunan, Jiangsu, Jiangxi, Sichuan, Zhejiang.

71) *Dero trifida* Loden, 1979

Distribution: Freshwater. Guangxi, Henan, Hunan.

#### 21. *Branchiodrilus* Michaelsen, 1900

72) *Branchiodrilus semperi* (Bourne, 1890)

Distribution: Freshwater. Guangdong, Guangxi.

73) *Branchiodrilus hortensis* (Stephenson, 1910)

Distribution: Freshwater. Guangdong, Hebei, Hubei, Hunan, Jiangsu, Jiangxi, Sichuan, Zhejiang.

#### 22. *Uncinails* Levinsen, 1884

74) *Uncinails uncinata* (Orsted, 1842)

Distribution: Freshwater, brackish-water. Guizhou, Heilongjiang, Qinghai, Xinjiang.

**23. *Paranais Czerniavsky, 1880***

- 75) *Paranais frici* Hrabě, 1941  
Distribution: Freshwater, brackish-water, marine.  
Guangdong, Guizhou, Hebei, Henan, Hong Kong, Hubei, Hunan, Jiangsu, Jiangxi, Jilin.

- 76) *Paranais litoralis* (Müller, 1784)  
Distribution: Freshwater, brackish-water, marine. Hong Kong, Qinghai.

- 77) *Paranais plenus* Erséus, 1992  
Distribution: Brackish-water. Hong Kong.

**24. *Amphichaeta Tauber, 1879***

- 78) *Amphichaeta asiatica* Liang, 1958  
Distribution: Freshwater. Hubei, Jiangsu, Zhejiang.

**25. *Haemonais Bretscher, 1900***

- 79) *Haemonais waldvogeli* Bretscher, 1900  
Distribution: Freshwater. Hubei, Hunan, Jiangsu, Jiangxi, Zhejiang.

**26. *Stephensoniana Cernovsivov, 1938***

- 80) *Stephensoniana trivandran* (Aiyer, 1926)  
Distribution: Freshwater. Anhui, Guangdong, Guangxi, Guizhou, Henan, Hubei, Hunan, Jiangsu, Zhejiang.

**27. *Bratislavia Košel, 1976***

- 81) *Bratislavia prosetosa* (Liang, 1964)  
Distribution: Freshwater. Xinjiang.
- 82) *Bratislavia unidentata* (Harman, 1973)  
Distribution: Freshwater. Jiangxi.

**28. *Pristina Ehrenberg, 1828***

- 83) *Pristina sima* (Marcus, 1944)  
Distribution: Freshwater. Hubei.
- 84) *Pristina changtuensis* (Liang, 1963)  
Distribution: Freshwater. Hunan, Xizang.
- 85) *Pristina osborni* (Walton, 1906)  
Distribution: Freshwater. Guangxi, Guizhou, Hunan.
- 86) *Pristina acuminata* Liang, 1958  
Distribution: Freshwater. Guangdong, Guangxi, Guizhou, Hubei, Hunan, Jiangsu.
- 87) *Pristina jenkiniae* (Stephenson, 1931)  
Distribution: Freshwater, terrestrial. Guangdong, Guangxi, Guizhou, Hunan, Jiangxi, Xinjiang.
- 88) *Pristina aequidentata* (Liang et Xie, 1997)  
Distribution: Freshwater. Guizhou.
- 89) *Pristina breviseta* Bourne, 1891  
Distribution: Freshwater. Jiangsu.
- 90) *Pristina biserrata* Chen, 1940  
Distribution: Freshwater. Hubei, Jiangsu, Sichuan.
- 91) *Pristina longiseta* Ehrenberg, 1828  
Distribution: Freshwater. Anhui, Guangdong, Guizhou, Henan, Hubei, Hunan, Jiangsu, Jiangxi, Shaanxi, Sichuan, Xinjiang.

- 92) *Pristina aequiseta* Bourne, 1891  
Distribution: Freshwater. Guangxi, Guizhou, Henan, Hubei, Hunan, Jiangsu, Xinjiang.

- 93) *Pristina proboscidea* Beddard, 1896  
Distribution: Freshwater. Guizhou, Hubei, Jiangsu, Sichuan.

- 94) *Pristina synclites* Stephenson, 1925  
Distribution: Freshwater. Guangdong, Guangxi.

**29. *Slavina Vejdovsky, 1883***

- 95) *Slavina appendiculata* (d'Udekem, 1855)  
Distribution: Freshwater. Guangdong, Guangxi, Guizhou, Heilongjiang, Henan, Hubei, Hunan, Jiangsu, Jiangxi, Sichuan, Xinjiang, Zhejiang.

**30. *Ripistes Dujardin, 1842***

- 96) *Ripistes parasita* (Schmidt, 1847)  
Distribution: Freshwater. Jilin, Xinjiang.

**31. *Arcteonais Piguet, 1928***

- 97) *Arcteonais lomondi* (Martin, 1907)  
Distribution: Freshwater. Changjiang River, Heilongjiang, Jiangxi.

**32. *Stylaria Lamarck, 1816***

- 98) *Stylaria fossularis* Leidy, 1852  
Distribution: Freshwater. Guangdong, Guangxi, Guizhou, Heilongjiang, Henan, Hubei, Hunan, Jiangsu, Sichuan.

- 99) *Stylaria lacustris* (Linnaeus, 1767)  
Distribution: Freshwater. Guizhou, Heilongjiang, Xinjiang.

**33. *Piguetiella Sperber, 1939***

- 100) *Piguetiella denticulata* Liang et Xie, 1997  
Distribution: Freshwater. Guizhou, Hunan.

**34. *Specaria Sperber, 1939***

- 101) *Specaria josinae* (Vejdovsky, 1883)  
Distribution: Freshwater. Anhui, Guizhou, Hubei, Hunan, Zhejiang.

**35. *Vejdovskyaella Michaelsen, 1903***

- 102) *Vejdovskyaella simplex* Liang, 1958  
Distribution: Freshwater. Guizhou, Jiangsu.

**36. *Nais Müller, 1773***

- 103) *Nais barbata* Müller, 1773  
Distribution: Freshwater. Xinjiang.
- 104) *Nais simplex* Piguet, 1906  
Distribution: Freshwater. Guangdong, Guizhou, Hubei, Hunan, Jilin, Xinjiang.

- 105) *Nais behningi* Michaelsen, 1923  
Distribution: Freshwater. Guizhou, Xinjiang.

- 106) *Nais variabilis* Piguet, 1906  
Distribution: Freshwater. Guangdong, Guangxi, Guizhou, Heilongjiang, Henan, Hubei, Hunan, Jiangsu, Xinjiang.

- 107) *Nais pardalis* Piguet, 1906  
Distribution: Freshwater. Anhui, Changjiang River,



Guangdong, Guangxi, Guizhou,  
Heilongjiang, Hubei, Hunan, Jiangsu,  
Shaanxi, Xinjiang, Zhejiang.

108) *Nais communis* Piguët, 1906

Distribution: Freshwater. Anhui, Guangdong, Guangxi,  
Guizhou, Hubei, Hunan, Jiangsu,  
Shandong, Sichuan, Xinjiang.

109) *Nais bretscheri* Michaelsen, 1899

Distribution: Freshwater. Guizhou, Hunan, Jilin, Xinjiang.

110) *Nais elinguis* Müller, 1773

Distribution: Freshwater, brackish-water. Guizhou, Hunan,  
Jiangxi, Xinjiang.

111) *Nais inflata* Liang, 1963

Distribution: Freshwater (river). Changjiang River,  
Guizhou, Henan, Hubei, Hunan.

**37. *Allonais* Sperber, 1948**

112) *Allonais pectinata* (Stephenson, 1910)

Distribution: Freshwater. Guangdong, Hubei, Sichuan.

113) *Allonais paraguayensis* (Michaelsen, 1905)

Distribution: Freshwater. Guangdong, Guangxi, Hubei,  
Jiangsu, Sichuan.

114) *Allonais gwaliorensis* (Stephenson, 1920)

Distribution: Freshwater. Guangdong, Guangxi, Hubei,  
Jiangsu, Sichuan.

**TUBIFICIDAE**

**RHYACODRILINAE HRABE, 1963**

**38. *Branchiura* Beddard, 1892**

115) *Branchiura sowerbyi* Beddard, 1892

Distribution: Freshwater. Anhui, Changjiang River,  
Guangdong, Guangxi, Guizhou, Hebei,  
Heilongjiang, Hubei, Hunan, Jiangsu,  
Jiangxi, Sichuan, Taiwan, Zhejiang.

**39. *Bothrioneurum* Stolc, 1888**

116) *Bothrioneurum grandisetosum* Wang, Xie et Liang, 2000

Distribution: Terrestrial. Hunan.

117) *Bothrioneurum vej dovskyanum* Stolc, 1886

Distribution: Freshwater. Guangxi, Guizhou, Hubei,  
Hunan, Jiangsu, Jiangxi, Jiangxi.

118) *Bothrioneurum iris* Beddard, 1901

Distribution: Freshwater. Hainan.

**40. *Paupidrilus* Erséus, 1990**

119) *Paupidrilus breviductus* Erséus, 1990

Distribution: Marine. Hong Kong.

**41. *Monopylephorus* Levinsen, 1884**

120) *Monopylephorus parvus* Ditlevsen, 1904

Distribution: Brackish-water, marine. Hong Kong.

121) *Monopylephorus rubroniveus* Levinsen, 1884

Distribution: Brackish-water. Jiaozhou Bay, Taiwan.

122) *Monopylephorus limosus* (Hatai, 1898)

Distribution: Freshwater, brackish-water. Changjiang  
River, Guangdong, Hubei, Jiangsu,

Jiangxi, Shaanxi, Taiwan, Zhejiang.

**42. *Heronidrilus* Erséus et Jamieson, 1981**

123) *Heronidrilus hutchingsae* Erséus, 1990

Distribution: Marine. Hong Kong.

124) *Heronidrilus bihamis* Erséus et Jamieson, 1981

Distribution: Marine. Hong Kong, Jiaozhou Bay.

125) *Heronidrilus fastigatus* Erséus et Jamieson, 1981

Distribution: Marine. Hong Kong.

**43. *Heterodrilus* Pierantoni, 1902**

126) *Heterodrilus uniformis* Wang et Erséus, 2003

Distribution: Marine. Hainan.

127) *Heterodrilus virilis* Erséus, 1992

Distribution: Marine. Hong Kong.

128) *Heterodrilus chenianus* Wang et Erséus, 2003

Distribution: Marine. Hainan.

129) *Heterodrilus nudus* Wang et Erséus, 2003

Distribution: Marine. Hainan.

130) *Heterodrilus keenani* Erséus, 1981

Distribution: Marine. Hainan, Hong Kong.

**44. *Ainudrilus* Finogenova, 1982**

131) *Ainudrilus pauciseta* Wang et Erséus, 2003

Distribution: Marine. Hainan, Hong Kong (?).

132) *Ainudrilus geminus* Erséus, 1990

Distribution: Marine. Hong Kong.

133) *Ainudrilus taitamensis* Erséus, 1990

Distribution: Marine. Hong Kong.

134) *Ainudrilus lutulentus* (Erséus, 1984)

Distribution: Marine, brackish-water. Hainan, Hong Kong,  
Jiaozhou Bay.

135) *Ainudrilus gibsoni* Erséus, 1990

Distribution: Marine. Hong Kong.

136) *Ainudrilus semicapillatus* Zhou et Erséus, 2003

Distribution: Marine. Hong Kong.

**45. *Rhyacodrilus* Bretscher, 1901**

137) *Rhyacodrilus sinicus* (Chen, 1940)

Distribution: Freshwater. Changjiang River,  
Guangdong, Hubei, Hunan, Jiangsu,  
Zhejiang.

138) *Rhyacodrilus stephesoni* Cernosvitov, 1941

Distribution: Freshwater (?), terrestrial. Xizang, Zhejiang.

139) *Rhyacodrilus riabuschinskii* Michaelsen, 1929

Distribution: Freshwater. Changjiang River.

**46. *Rhizodrilus* Smith, 1900**

140) *Rhizodrilus russus* Erséus, 1990

Distribution: Marine. Hong Kong.

**TUBIFICINAE EISEN, 1885**

**47. *Tubifex* Lamarck, 1816**

141) *Tubifex tubifex* (Müller, 1774)

Distribution: Freshwater. Anhui, Changjiang River,  
Guizhou, Heilongjiang, Hubei, Hunan,  
Jiangxi, Jilin, Shaanxi, Shanxi, Taiwan,  
Xinjiang.

**48. Spirosperma Eisen, 1879**

- 142) *Spirosperma ferox* (Eisen, 1879)  
Distribution: Freshwater. Jilin.
- 143) *Spirosperma nikolskyi* (Lastockin et Sokolskaya, 1953)  
Distribution: Freshwater. Changjiang River,  
Guangdong, Guangxi, Heilongjiang,  
Hubei, Hunan, Jiangxi.
- 144) *Spirosperma apapillatus* (Lastockin et Sokolskaya, 1953)  
Distribution: Freshwater. Heilongjiang.

**49. Chenidrilus Liang et Xie, 1997**

- 145) *Chenidrilus asiaticus* (Chen, 1940)  
Distribution: Freshwater. Guangxi, Guizhou, Henan,  
Hubei, Hunan, Jiangsu.

**50. Limnodrilus Claparède, 1862**

- 146) *Limnodrilus amblysetus* Brinkhurst, Qi et Liang, 1990  
Distribution: Freshwater. Changjiang River, Xiangjiang  
River (Changsha).
- 147) *Limnodrilus hoffmeisteri* Claparède, 1862  
Distribution: Freshwater. Anhui, Changjiang River,  
Guangdong, Guangxi, Guizhou,  
Heilongjiang, Henan, Hubei, Hunan,  
Jiangsu, Jiangxi, Jilin, Shaanxi, Sichuan,  
Xinjiang, Zhejiang.
- 148) *Limnodrilus grandisetosus* Nomura, 1932  
Distribution: Freshwater. Anhui, Guangdong, Guangxi,  
Guizhou, Hubei, Hunan, Jiangsu, Jiangxi,  
Liaoning, Zhejiang.
- 149) *Limnodrilus udekemianus* Claparède, 1862  
Distribution: Freshwater. Guangdong, Guangxi,  
Guizhou, Heilongjiang, Henan, Hubei,  
Hunan, Jiangxi, Xinjiang, Xizang,  
Zhejiang.
- 150) *Limnodrilus helveticus* Piguët, 1913  
Distribution: Freshwater. Heilongjiang, Qinghai, Xinjiang.
- 151) *Limnodrilus paramblysetus* Wang et Liang, 2001  
Distribution: Freshwater. Mid-lower Changjiang River.
- 152) *Limnodrilus claparedeianus* Ratzel, 1868  
Distribution: Freshwater. Anhui, Changjiang River,  
Guangdong, Guangxi, Hebei, Henan,  
Jiangsu, Jiangxi.

**51. Ilyodrilus Eisen, 1879**

- 153) *Ilyodrilus templetoni* (Southern, 1909)  
Distribution: Freshwater. Hubei, Hunan.

**52. Tubificoides Lastockin, 1937**

- 154) *Tubificoides imajimai* Brinkhurst, 1985  
Distribution: Marine. Hong Kong.

**53. Teneridrilus Holmquist, 1985**

- 155) *Teneridrilus mastix* (Brinkhurst, 1978)  
Distribution: Freshwater. Guangdong, Guangxi, Guizhou,  
Hubei, Hunan, Jiangxi.

**54. Aulodrilus Bretscher, 1899**

- 156) *Aulodrilus americanus* Brinkhurst et Cook, 1966  
Distribution: Freshwater. Hunan.
- 157) *Aulodrilus pectinatus* Aiyer, 1928  
Distribution: Freshwater. Guizhou, Hunan, Jiangxi.
- 158) *Aulodrilus pigueti* Kowalevski, 1914  
Distribution: Freshwater. Anhui, Guangdong,  
Guangxi, Guizhou, Hebei, Henan, Hubei,  
Hunan, Jiangsu, Jiangxi, Xinjiang,  
Zhejiang.
- 159) *Aulodrilus plurisetata* (Piguët, 1906)  
Distribution: Freshwater. Changjiang River,  
Guangdong, Guangxi, Hubei, Hunan,  
Jiangxi, Xinjiang, Zhejiang.
- 160) *Aulodrilus japonicus* Yamaguchi, 1953  
Distribution: Freshwater. Guangdong, Guizhou, Hunan.
- 161) *Aulodrilus limnobius* Bretscher, 1899  
Distribution: Freshwater. Guangdong, Guizhou,  
Heilongjiang, Henan, Hunan, Jiangxi,  
Xizang.

**55. Potamothenrix Vejdovsky et Marzek, 1902**

- 162) *Potamothenrix bedoti* (Piguët, 1913)  
Distribution: Freshwater. Hubei, Yunnan.
- 163) *Potamothenrix scleropenis* Cui et Wang, 2005  
Distribution: Freshwater. Yunnan (Fuxian Lake).

**TELMATODRILINAE EISEN, 1885****56. Telmatodrilus Eisen, 1879**

- 164) *Telmatodrilus vejdvovskyi* Eisen, 1879  
Distribution: Freshwater. Changjiang River (Jiangsu),  
Hubei.

**PHALLODRILINAE BRINKHURST, 1971****57. Bathydrius Cook, 1970**

- 165) *Bathydrius edwardsi* Erséus, 1984  
Distribution: Marine. Hong Kong.
- 166) *Bathydrius ampliductus* Erséus, 1997  
Distribution: Marine. Hainan.

**58. Aktedrilus Knöllner, 1935**

- 167) *Aktedrilus sinensis* Erséus, 1984  
Distribution: Marine. Hong Kong.
- 168) *Aktedrilus cuneus* Erséus, 1984  
Distribution: Marine. Hong Kong.
- 169) *Aktedrilus parvithecatus* (Erséus, 1978)  
Distribution: Marine. Hainan, Hong Kong.
- 170) *Aktedrilus floridensis* Erséus, 1980  
Distribution: Marine. Hong Kong.
- 171) *Aktedrilus yiboi* Wang et Erséus, 2001  
Distribution: Marine. Hainan.
- 172) *Aktedrilus cavus* Erséus, 1990  
Distribution: Marine. Hong Kong.
- 173) *Aktedrilus parviprostatus* Erséus, 1980  
Distribution: Marine. Hong Kong.
- 174) *Aktedrilus locyi* Erséus, 1980

- Distribution: Marine. Hong Kong.
- 175) *Akteredrilus mortoni* Erséus, 1984  
Distribution: Marine. Hong Kong.
- 176) *Akteredrilus longitubularis* Finogenova et Shurova, 1980  
Distribution: Marine. Hong Kong.
- 59. Jamiesoniella Erséus, 1981**
- 177) *Jamiesoniella enigmatica* Erséus, 1990  
Distribution: Marine. Hainan, Hong Kong.
- 178) *Jamiesoniella athecata* Erséus, 1981  
Distribution: Marine. Hainan, Hong Kong.
- 60. Gianius Erséus, 1992**
- 179) *Gianius eximius* Erséus, 1997  
Distribution: Marine. Hong Kong.
- 61. Pacifidrilus Pierantoni, 1902**
- 180) *Pacifidrilus vanus* (Erséus, 1984)  
Distribution: Marine. Hong Kong.
- 181) *Pacifidrilus darvelli* (Erséus, 1984)  
Distribution: Marine. Hong Kong.
- 62. Pectinodrilus Erséus, 1992**
- 182) *Pectinodrilus molestus* (Erséus, 1988)  
Distribution: Marine. Hainan, Hong Kong.
- 183) *Pectinodrilus disparatus* Erséus, 1992  
Distribution: Marine. Hong Kong.
- 184) *Pectinodrilus hoihaensis* Erséus, 1992  
Distribution: Marine. Hong Kong.
- 63. Uniporodrilus Erséus, 1979**
- 185) *Uniporodrilus furcatus* Erséus, 1992  
Distribution: Marine. Hong Kong.
- 64. Duridrilus Erséus, 1983**
- 186) *Duridrilus piger* Erséus, 1984  
Distribution: Marine. Hong Kong.
- 187) *Duridrilus tardus* Erséus, 1983  
Distribution: Marine. Hong Kong.
- LIMNODRILOIDINAE ERSÉUS, 1982**
- 65. Doliodrillus Erséus, 1984**
- 188) *Doliodrillus tener* Erséus, 1984  
Distribution: Brackish-water. Hainan, Hong Kong, Jiaozhou Bay, Taiwan.
- 189) *Doliodrillus bisaccus* Wang et Erséus, 2004  
Distribution: Brackish-water. Hainan.
- 190) *Doliodrillus longidentatus* Wang et Erséus, 2004  
Distribution: Marine. Hong Kong, Hainan.
- 191) *Doliodrillus ciliatus* Wang et Erséus, 2004  
Distribution: Marine. Hainan.
- 192) *Doliodrillus adiacens* Wang et Erséus, 2004  
Distribution: Brackish-water. Hainan.
- 193) *Doliodrillus diverticulatus* Erséus, 1985  
Distribution: Brackish-water, marine. Hainan.
- 194) *Doliodrillus fibrissaccus* Wang et Erséus, 2004  
Distribution: Brackish-water. Hainan.
- 195) *Doliodrillus brachyductus* Wang et Erséus, 2004  
Distribution: Brackish-water. Hainan.
- 196) *Doliodrillus bidolium* Wang et Erséus, 2004  
Distribution: Brackish-water. Hainan.
- 197) *Doliodrillus chinensis* Wang et Erséus, 2004  
Distribution: Brackish-water. Hainan.
- 66. Thalassodrilides Brinkhurst et Baker, 1979**
- 198) *Thalassodrilides gurwitschi* (Hrabě, 1971)  
Distribution: Brackish-water, marine. Hong Kong.
- 199) *Thalassodrilides briani* Erséus, 1992  
Distribution: Marine. Hong Kong.
- 67. Smithsonianidrilus Brinkhurst, 1966**
- 200) *Smithsonianidrilus irregularis* (Erséus, 1983)  
Distribution: Brackish-water, marine. Hong Kong.
- 201) *Smithsonianidrilus tenuiculus* (Erséus, 1984)  
Distribution: Marine. Hong Kong.
- 202) *Smithsonianidrilus tuber* (Erséus, 1983)  
Distribution: Marine. Hong Kong.
- 203) *Smithsonianidrilus minusculus* (Erséus, 1983)  
Distribution: Marine. Hong Kong.
- 204) *Smithsonianidrilus vesiculatus* (Erséus, 1984)  
Distribution: Marine. Hong Kong.
- 68. Limnodriloides Pierantoni, 1903**
- 205) *Limnodriloides macinnesi* Erséus, 1990  
Distribution: Marine. Hainan, Hong Kong.
- 206) *Limnodriloides toloensis* Erséus, 1984  
Distribution: Marine. Hong Kong.
- 207) *Limnodriloides fraternus* Erséus, 1990  
Distribution: Marine. Hong Kong.
- 208) *Limnodriloides fuscus* Erséus, 1984  
Distribution: Marine. Hong Kong.
- 209) *Limnodriloides biforis* Erséus, 1990  
Distribution: Brackish-water. Hong Kong.
- 210) *Limnodriloides parahastatus* Erséus, 1985  
Distribution: Marine. Hainan, Hong Kong.
- 211) *Limnodriloides agnes* Hrabě, 1967  
Distribution: Marine. Hong Kong, Jiaozhou Bay.
- 212) *Limnodriloides virginiae* Erséus, 1982  
Distribution: Marine. Hong Kong.
- 213) *Limnodriloides tenuiductus* Erséus, 1982  
Distribution: Marine. Hong Kong.
- 214) *Limnodriloides uniampullatus* Erséus, 1982  
Distribution: Marine. Hong Kong.
- 215) *Limnodriloides victoriensis* Brinkhurst et Baker, 1979  
Distribution: Brackish-water, marine. Jiaozhou Bay.
- 216) *Limnodriloides rubicundus* Erséus, 1982  
Distribution: Marine. Hong Kong.
- 217) *Limnodriloides pierantonii* (Hrabe, 1971)  
Distribution: Marine. Hong Kong.
- 218) *Limnodriloides lateroporus* Erséus, 1997  
Distribution: Marine. Hong Kong.
- 69. Tectidrilus Erséus, 1982**
- 219) *Tectidrilus pictoni* (Erséus, 1984)  
Distribution: Marine. Hong Kong, Jiaozhou Bay.

- 220) *Tectidrilus achaetus* Erséus et Qi, 1985  
Distribution: Freshwater, brackish-water. Hong Kong,  
Zhujiang River.

**LUMBRICULIDAE****70. Lumbriculus Grube, 1844**

- 221) *Lumbriculus variegatus* (Müller, 1774)  
Distribution: Freshwater. Guangdong, Guangxi,  
Heilongjiang, Hunan, Jiangsu, Jiangxi,  
Xizang.

**71. Styloscolex Michaelsen, 1901**

- 222) *Styloscolex tetrathecus* Bürow, 1931  
Distribution: Freshwater. Jilin.

**BRANCHIOBELLELLIDAE****72. Branchiobdella Odier, 1823**

- 223) *Branchiobdella orientalis* Yamaguchi, 1934  
Distribution: Hosted in *Cambaroides similis*. Heilongjiang,  
Liaoning.
- 224) *Branchiobdella kobayashii* Yamaguchi, 1934  
Distribution: Hosted in *Cambaroides similis*.  
Heilongjiang, Liaoning.
- 225) *Branchiobdella cheni* Liu, 1964  
Distribution: Hosted in *Cambaroides dauricus*. Liaoning.
- 226) *Branchiobdella macroperistomium* Liu et Zhang, 1983  
Distribution: Hosted in *Cambaroides dauricus*, *C. similis*  
and *C. schrenckii*. Heilongjiang, Jilin,  
Liaoning.

**73. Cirrodriilus Pierantoni, 1905**

- 228) *Cirrodriilus peristomialis* (Liu et Chang, 1964)  
Distribution: Hosted in *Cambaroides dauricus*. Liaoning.
- 229) *Cirrodriilus heteroglandularis* (Liu et Chang, 1964)  
Distribution: Hosted in *Cambaroides dauricus*. Liaoning.
- 230) *Cirrodriilus breviformis* (Liu et Chang, 1964)  
Distribution: Hosted in *Cambaroides dauricus*. Liaoning.
- 231) *Cirrodriilus liaoningensis* (Liu et Chang, 1964)  
Distribution: Hosted in *Cambaroides dauricus*. Liaoning.
- 232) *Cirrodriilus anodontus* (Liu, 1964)  
Distribution: Hosted in *Cambaroides dauricus*. Liaoning.
- 233) *Cirrodriilus minimus* (Liu, 1964)

Distribution: Hosted in *Cambaroides dauricus*. Liaoning.

- 234) *Cirrodriilus kawamurae* (Yamaguchi, 1934)  
Distribution: Hosted in *Cambaroides dauricus*. Liaoning.
- 235) *Cirrodriilus suzuki* (Yamaguchi, 1934)  
Distribution: Hosted in *Cambaroides similis*. Liaoning.
- 236) *Cirrodriilus chosen* (Yamaguchi, 1934)  
Distribution: Hosted in *Cambaroides similis*. Liaoning.
- 237) *Cirrodriilus quadritentacularis* (Liu, 1984)  
Distribution: Hosted in *Cambaroides schrenckii*.  
Heilongjiang.
- 238) *Cirrodriilus aequiannulus* (Liu, 1984)  
Distribution: Hosted in *Cambaroides dauricus*. Liaoning.

**74. Sinodrilus Gelder & Brinkhurst, 1990**

- 239) *Sinodrilus heterorchis* (Liu et Zhang, 1983)  
Distribution: Hosted in *Cambaroides dauricus*. Liaoning.

**XIRONODRILIDAE****75. Holtodrilus Gelder & Brinkhurst, 1990**

- 240) *Holtodrilus truncatus* Liang, 1963  
Distribution: Hosted in *Neocaridina denticulate sinensis*.  
Guangdong (Shaoguan), Henan (Xichuan).

**CARIDINOPHILIDAE****76. Caridinophila Liang, 1963**

- 241) *Caridinophila unidens* Liang, 1963  
Distribution: Hosted in *Caridina yunnanensis*. Yunnan  
(Erhai Lake).

**POLYCHAETA****AEOLOSOMATIDAE****77. Aeolosoma Ehrenberg 1831**

- 242) *Aeolosoma headleyi* Beddard, 1888  
Distribution: Freshwater. Hubei, Jiangsu, Sichuan.
- 243) *Aeolosoma hemprichii* Ehrenberg, 1828  
Distribution: Freshwater. Hubei, Jiangsu, Sichuan,  
Xizang.
- 244) *Aeolosoma lucidum* Chen, 1940  
Distribution: Freshwater. Jiangsu, Sichuan.
- 245) *Aeolosoma hyalinum* Bunke, 1967  
Distribution: Freshwater. Guizhou.
- 246) *Aeolosoma travancorense* Aiyer, 1926  
Distribution: Freshwater. Guizhou.