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AN UPDATED LIST OF Monogenoidea FROM MARINE FISHES OF VIETNAM

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ABSTRACT

In this paper, we updated the list of monogenean species from marine fishes of Vietnam. Taxonomic position of monogenean species were arranged according to the current classification system. A total of 220 monogenean species from 152 marine fish species were listed. Distribution, hosts and references of each species were given. In addition, amendments of taxonomic status of taxa were also updated.

Keywords: Monogenoidea, marine fishes, East Sea, Gulf of Tonkin, Vietnam.

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INTRODUCTION

The study of monogeneans from marine fishes in Vietnam began in the 1950s when few intensive surveys were undertaken by the cooperation between Vietnam and Soviet Union parasitologists (Bychowsky & Nagibina, 1954, 1959). The results of these studies were published by the Soviet helminthologists in Russian between 1961–1989 in a series of more than 30 papers. In addition, a large number of new genera and species were described and constitute much of the basis of our knowledge of monogenean fauna of marine fish in Vietnam and Southeast Asia. In 2006, Arthur & Bui listed 55 monogenetic species from marine fishes. However, the list did not count many species which are present in some documents, such as Bychowsky & Nagibina (1954, 1959, 1967, 1968, 1969a, 1969b, 1971, 1974, 1975a, 1975b, 1976, 1977), Bychowsky et al. (1976), Gusseve (1967, 1973, 1985), Timofeeva (1989), Egorova & Korotaeve (1990), Egorova (2000). Moreover, many publications after 2006, e.g. Vo et al. (2010), Nguyen (2012), Dang et al. (2010, 2013), Dmitrieva et al. (2018), Kritsky et al. (2016) and Nguyen et al. (2016), added 35 species for monogenetic fauna in Vietnam.

This paper updated all monogenean species from marine fishes of Vietnam and arranged them to the current classification system.

MATERIALS AND METHODS

A total of 83 references relating to monogeneans from marine fishes of Vietnam were retrieved for this study. The taxa of monogeneans in the results part below were arranged following the classification system which was proposed by Bychowsky (1937) and revised by Boeger & Kritsky (1993). The scientific name of monogeneans was checked and corrected according to the database of the World register of marine species (WoRMS, 2020). Similarly, the scientific name of marine fish hosts was updated following the database of the FishBase (<https://www.fishbase.in/search.php>). In the list, the taxon levels, i.e.

subfamilies, genera and species, were arranged in alphabetical order.

RESULTS

A total of 220 monogenetic species were found from 152 marine fish species. These monogeneans are belonging to 108 genera, 24 families, 5 orders, and 2 subclasses. The list of monogeneans below contains information about its taxonomical position, host species and distribution, and reference sources.

CLASS MONOGENOIDEA
BYCHOWSKY, 1937

SUBCLASS POLYONCHOINEA
BYCHOWSKY, 1937

Order CAPSALIDEA Lebedev, 1988

Family **Capsalidae Baird, 1853**

Genus *Allobenedenia* Yamaguti, 1963

1. *A. epinepheli* (Bychowsky & Nagibina, 1967) Yang, Kritsky & Sun, 2004

Syn. *Megalocotyloides epinepheli*
Bychowsky & Nagibina, 1967

Bychowsky & Nagibina, 1967: 523; Vo et al., 2010: 39

Host: Malabar grouper *Epinephelus malabaricus*

Distribution: Gulf of Tonkin

2. *A. yamagutii* (Egorova, 1994) Yang, Kritsky & Sun, 2004

Syn. *Megalocotyloides yamagutiii*
Egorova, 1994

Vo et al., 2010: 39; Nguyen, 2012: 34

Host: Warsaw grouper *Hyporthodus nigrurus* (syn. *Epinephelus nigrurus*)*

Distributions: Nha Trang bay; Ha Long bay

Genus **Benedenia** Diesing, 1858

3. *B. epinepheli* (Yamaguti, 1937) Meserve, 1938

Vo et al., 2010: 38

Hosts: Duskytail grouper *Epinephelus bleekeri*, longtooth grouper *E. bruneus*; malabar grouper *E. malabaricus*, sixbar grouper *E. sexfasciatus*, greasy grouper *E.*

- tauvina*, warsaw grouper *Hyporthodus nigrinus**
- Distribution: Gulf of Tonkin
- Genus *Capsala* Bosc, 1811 (Syn. *Caballerocotyla* Price, 1960)
4. *C. affinis* (Mamaev, 1968)
- Syns. *Caballerocotyla manteriaaffinis* Mamaev, 1968; *Capsala manteriaaffinis* Chisholm & Whittington, 2007
- Mamaev, 1968: 9
- Hosts: Kawakawa *Euthynnus affinis*; Atlantic bluefin tuna *Thunnus thynnus*
- Distribution: Gulf of Tonkin
5. *C. notosinense* (Mamaev, 1968) Chisholm & Whittington, 2007
- Syn. *Caballerocotyla notosinense* Mamaev, 1968
- Mamaev, 1968: 10
- Host: Kawakawa *E. affinis*
- Distribution: Gulf of Tonkin
6. *C. paucispinosa* (Mamaev, 1968) Chisholm & Whittington, 2007
- Syn. *Caballerocotyla paucispinosa* Mamaev, 1968
- Mamaev, 1968: 12
- Hosts: Kawakawa *E. affinis*, Atlantic bluefin tuna *T. thynnus*
- Distribution: Gulf of Tonkin
- Genus *Encotyllabe* Diesing, 1850
7. *E. spari* Yamaguti, 1934
- Mamaev, 1970: 139
- Host: Grey large-eye bream *Gymnocranius griseus*
- Distribution: Gulf of Tonkin
- Genus *Megalocotyle* Folda, 1928
8. *M. lutiani* Lebedev, 1970
- Lebedev, 1970: 193
- Host: Bigeye snapper *Lutjanus lutjanus*
- Distribution: Gulf of Tonkin
- Genus *Neobenedenia* Yamaguti, 1963
9. *N. melleni* (MacCallum, 1927) Yamaguti, 1963
- Vo et al., 2010: 41
- Hosts: Duskytail grouper *Epinephelus bleekeri*, malabar grouper *E. malabaricus*, warsaw grouper *Hyporthodus nigrinus**
- Distribution: Nha Trang bay
- Genus *Sessilorbis* Mamaev, 1970
10. *S. limopharynx* Mamaev, 1970
- Mamaev, 1970: 133
- Host: Orbicular batfish *Platax orbicularis*
- Distribution: Gulf of Tonkin
- Genus *Sprostoniella* Bychowsky & Nagibina, 1967
11. *S. multitestis* Bychowsky & Nagibina, 1967
- Bychowsky & Naginina, 1967: 521
- Host: Orbicular batfish *P. orbicularis*
- Distributions: Gulf of Tonkin, South Cental coast
- Genus *Trilobiodiscus* Bychowsky & Nagibina, 1967
12. *T. lutiani* Bychowsky & Nagibina, 1967
- Bychowsky & Naginina, 1967: 525
- Host: Mangrove red snapper *Lutjanus argentimaculatus*
- Distribution: Gulf of Tonkin
- Genus *Trochopus* Diesing, 1850
13. *T. antigoniae* Egorova & Korotaeva, 1990
- Egorova & Korotaeva, 1990: 443
- Host: Indo-Pacific boarfish *Antigonia rubescens*
- Distributions: Gulf of Tonkin, South Cental coast
- Family Dionchidae Johnston & Tiegs, 1922**
- Genus *Dionchus* Goto, 1899
14. *D. bychowskyi* Timofeeva, 1989
- Timofeeva, 1989: 59

- Host: *Cobia Rachycentron canadum*
 Distribution: Gulf of Tonkin
 15. *D. major* Egorova, 2000
 Timofeeva, 2000: 257
 Host: *Cobia R. canadum*
 Distribution: Gulf of Tonkin
 16. *D. minor* Timofeeva, 1989
 Timofeeva, 1989: 62
 Host: Live sharksucker *Echeneis naucrates*
 Distribution: Gulf of Tonkin
 17. *D. nagibinae* Timofeeva, 1989
 Timofeeva, 1989: 64
 Host: *Cobia R. canadum*
 Distributions: Gulf of Tonkin, South Cental coast
 18. *D. orientalis* Timofeeva, 1989
 Timofeeva, 1989: 57
 Host: Live sharksucker *E. naucrates*
 Distribution: Gulf of Tonkin
 19. *D. sinensis* Timofeeva, 1989
 Timofeeva, 1989: 65
 Host: Live sharksucker *E. naucrates*
 Distribution: Gulf of Tonkin
 Order DACTYLOGYRIDEA Bychowsky, 1937
Family Calceostomatidae Parona & Perugia, 1890
 Genus *Bychowskya* Nagibina, 1968
 20. *B. drepanae* Nagibina, 1968
 Nagibina, 1968: 289
 Host: Spotted sicklefish *Drepane punctate*
 Distribution: Gulf of Tonkin
 Genus *Dicrumentia* Mamaev, 1969
 21. *D. bychowskyi* Mamaev, 1969
 Mamaev, 1969: 170
 Host: Saddle grunt *Pomadasys maculatus*
 Distribution: Gulf of Tonkin
Family Dactylogyridae Bychowsky, 1933
 Genus *Ancyrocephaloides* Yamaguti, 1938
 22. *A. chauhani* Bychowsky & Nagibina, 1975
 Bychowsky & Nagibina, 1975a: 70
 Host: Short-nosed tripodfish *Triacanthus brevirostris*
 Distribution: Gulf of Tonkin
 Genus *Ancyrocephalus* Creplin, 1839
 23. *A. macrogaster* Yamaguti, 1953
 Mamaev, 1970: 131
 Host: Whipfin silver-biddy *Gerres filamentosus*
 Distribution: Gulf of Tonkin
 24. *A. parspinicirrus* Mamaev, 1970
 Mamaev, 1970: 129
 Host: Spotted sicklefish *Drepane punctate*
 Distribution: Gulf of Tonkin
 25. *A. unicirrus* Tripathi, 1959
 Mamaev, 1970: 133
 Host: Silver grunt *Pomadasys hasta*
 Distribution: Gulf of Tonkin
 Genus *Atherinicus* Bychowsky & Nagibina, 1969
 26. *A. cornutus* Bychowsky & Nagibina, 1969
 Bychowsky & Nagibina, 1969b: 523
 Host: Red Sea hardyhead silverside *Atherina forskalii*
 Distribution: Gulf of Tonkin
 Genus *Bravohollisia* Bychowsky & Nagibina, 1970
 27. *B. magna* Bychowsky & Nagibina, 1970
 Bychowsky & Nagibina, 1970a: 22
 Host: Silver grunt *Pomadasys hasta*
 Distributions: Gulf of Tonkin, South Cental coast

28. *B. pomadasis* Bychowsky & Nagibina, 1970
 Bychowsky & Nagibina, 1970a: 21
 Hosts: Silver grunt *P. hasta*; saddle grunt *P. maculatus*
 Distribution: Gulf of Tonkin, South Cental coast
29. *B. tecta* Bychowsky & Nagibina, 1970
 Bychowsky & Nagibina, 1970a: 20
 Host: Saddle grunt *P. maculatus*
 Distribution: Gulf of Tonkin, South Cental coast
- Genus ***Caballeria*** Bychowsky & Nagibina, 1970
30. *C. pedunculata* Bychowsky & Nagibina, 1970
 Bychowsky & Nagibina, 1970a: 23
 Host: Silver grunt *P. hasta*
 Distributions: Gulf of Tonkin, South Cental coast
31. *C. robusta* Bychowsky & Nagibina, 1970
 Bychowsky & Nagibina, 1970a: 24
 Host: Saddle grunt *P. maculatus*
 Distributions: Gulf of Tonkin, South Cental coast
- Genus ***Chauhanellus*** Bychowsky & Nagibina, 1969
32. *C. flexiosus* Bychowsky & Nagibina, 1968
 Bychowsky & Nagibina, 1969a: 365
 Host: Smooth-headed catfish *Arius leiotetocephalus*
 Distributions: Gulf of Tonkin, South Cental coast
33. *C. oculatus* Bychowsky & Nagibina, 1968
 Bychowsky & Nagibina, 1969a: 364
 Host: Smooth-headed catfish *A. leiotetocephalus*
- Distributions: Gulf of Tonkin, South Cental coast
- Genus ***Dactylogyrus*** Diesing, 1850
34. *D. gotoi* Gussev, 1965
 Gussev, 1967: 251
 Host: Japanese seabass *Lateolabrax japonicus*
 Distribution: Gulf of Tonkin
35. *D. inversus* Goto & Kikuchi, 1917
 Gussev, 1967: 251
 Host: Japanese seabass *L. japonicus*
 Distribution: Gulf of Tonkin
36. *D. kikuchii* Gussev, 1965
 Gussev, 1967: 252
 Host: Japanese seabass *L. japonicus*
 Distribution: Gulf of Tonkin
- Genus ***Diversohamulus*** Bychowsky & Nagibina, 1969
37. *D. tricuspidatus* Bychowsky & Nagibina, 1969
 Bychowsky & Nagibina, 1969b: 525
 Host: Sumatran silverside *Atherina bleeker*
 Distribution: Gulf of Tonkin
- Genus ***Euryhaliotrema*** Kritsky & Boeger, 2002
38. *E. johni* (Tripathi, 1959) Kritsky & Boeger, 2002
 Kritsky & Boeger, 2002: 30; Nguyen, 2012: 28
 Hosts: Blacktail snapper *L. fulvus*, bigeye snapper *L. lutjanus*, russell's snapper *L. russelli*; blackhead seabream *Acanthopagrus schlegelii*
 Distribution: Ha Long bay
- Genus ***Haliotrema*** Johnston & Tiegs, 1922
39. *H. ampliocuspidis* Bychowsky & Nagibina, 1971
 Bychowsky & Nagibina, 1971: 28

- Host: Common ponyfish *Leiognathus equulus*
 Distribution: Gulf of Tonkin
40. *H. australe* Bychowsky & Naginina, 1970
 Bychowsky & Naginina, 1970b: 1791
 Host: Indian goatfish *Parupeneus indicus*
 Distribution: Gulf of Tonkin
41. *H. bilobatum* (Yamaguti, 1953) Bychowsky & Nagibina, 1970
 Bychowsky & Naginina, 1970b: 1794
 Hosts: Warsaw grouper *Hyporthodus nigrinus**; spotted sicklefish *Drepane punctate*
 Distribution: Gulf of Tonkin
42. *H. cromileptis* Young, 1968
 Vo et al., 2010: 35
 Host: Warsaw grouper *H. nigrinus**
 Distribution: Gulf of Tonkin
43. *H. epinepheli* Young, 1968
 Vo et al., 2010: 34
 Hosts: Areolate grouper *Epinephelus areolatus*, yellow grouper *E. awoara*, duskytail grouper *E. bleekeri*, Hong Kong grouper *E. akaara*, sixbar grouper *E. sexfasciatus*; red seabream *Pagrus major* (Syn. *Pagrosomus major*); goldlined seabream *Rhabdosargus sarba*
 Distribution: Gulf of Tonkin, South Cental coast
44. *H. flagellocirrus* Bychowsky & Nagibina, 1970
 Bychowsky & Naginina, 1970b: 1794
 Host: sweepers *Pempheris molucca*
 Distribution: Gulf of Tonkin
45. *H. geminatomula* Bychowsky & Naginina, 1971
 Bychowsky & Nagibina, 1971: 1796
 Host: Spotnape ponyfish *N. nuchalis*
 Distribution: Gulf of Tonkin
46. *H. holocentri* Young, 1968
 Bychowsky & Nagibina, 1970b: 1793
 Host: Redcoat Redcoat *Sargocentron rubrum* (syn. *Holocentrus ruber*)
 Distribution: Gulf of Tonkin
47. *H. johsntoni* Bychowsky & Nagibina, 1970
 Bychowsky & Nagibina, 1970b: 1798
 Host: Freckled goatfish *Upeneus tragula*
 Distribution: Gulf of Tonkin
48. *H. magnihamus* Bychowsky & Nagibina, 1970
 Bychowsky & Nagibina, 1970b: 1797
 Host: Spotted sicklefish *Drepane punctate*
 Distribution: Gulf of Tonkin
49. *H. neobilobatus* Bychowsky & Nagibina, 1970
 Bychowsky & Nagibina, 1970b: 1795
 Host: Spotted sicklefish *D. punctate*
 Distribution: Gulf of Tonkin
50. *H. spinicirrus* (Yamaguti, 1953) Bychowsky & Nagibina, 1970
 Syn. *Ancyrocephalus spinicirrus* Yamaguti, 1953
 Mamaev, 1970: 129; Nguyen, 2012: 31
 Hosts: Spotted sicklefish *D. punctate*; Japanese scad *Decapterus maruadsi*
 Distribution: Gulf of Tonkin
51. *H. subtilihamula* Bychowsky & Nagibina, 1971
 Bychowsky & Nagibina, 1971: 32
 Host: Toothpony *Gazza minuta*
 Distribution: Gulf of Tonkin
52. *H. surculocirrus* Bychowsky & Nagibina, 1971
 Bychowsky & Nagibina, 1971: 34
 Host: Striped ponyfish *Aurigequula fasciata* (syn. *Leiognathus fasciatus*)
 Distribution: Gulf of Tonkin
53. *H. parvihamus* Bychowsky & Nagibina, 1970
 Bychowsky & Naginina, 1970b: 38

- Host: Spotted sicklefish *D. punctate*
 Distribution: Gulf of Tonkin
54. *H. pempherii* Bychowsky & Nagibina, 1970
 Bychowsky & Naginina, 1970b: 36
 Host: Sweepers *Pempheris molucca*
 Distribution: Gulf of Tonkin
55. *H. platycephali* Yin & Sproston, 1948
 Nguyen, 2012: 30
 Host: Bartail flathead *Platycephalus indicus*
 Distribution: Gulf of Tonkin
56. *H. tenuicirrus* Bychowsky & Nagibina, 1971
 Bychowsky & Naginina, 1970b: 37
 Host: Common ponyfish *L. equulus*
 Distribution: Gulf of Tonkin
57. *H. tiegsi* Bychowsky & Nagibina, 1970
 Bychowsky & Naginina, 1970b: 38
 Host: Freckled goatfish *U. tragula*
 Distribution: Gulf of Tonkin
 Genus ***Haliotrematoides*** Kritsky, Yang & Sun, 2009
58. *H. calcaris* (Bychowsky & Nagibina, 1971) Kritsky, Yang & Sun, 2009
 Bychowsky & Nagibina, 1971: 34
 Host: snapper *Lutjanus* sp.
 Distribution: Gulf of Tonkin
59. *H. longitubocirrus* (Bychowsky & Nagibina, 1971) Kritsky, Yang & Sun, 2009
 Bychowsky & Nagibina, 1971: 36
 Hosts: Bigeye snapper *L. lutjanus*, brownstripe red snapper *L. vitta*
 Distribution: Gulf of Tonkin
60. *H. noncalcaris* (Bychowsky & Nagibina, 1971) Kritsky, Yang & Sun, 2009
 Bychowsky & Nagibina, 1971: 35
 Host: Mangrove red snapper *L. argenteimaculatus*
 Distribution: Gulf of Tonkin
61. *H. patellacirrus* (Bychowsky & Nagibina, 1971) Kritsky, Yang & Sun, 2009
 Bychowsky & Nagibina, 1971: 37
 Hosts: Bigeye snapper *L. lutjanus*, dory snapper *L. fulviflammus*
 Distribution: Gulf of Tonkin
 Genus ***Hamatopeduncularia*** Yamaguti, 1953
62. *H. arii* Yamaguti, 1953
 Bychowsky & Nagibina, 1969a: 357
 Host: Smooth-headed catfish *Arius leiototocephalus*
 Distribution: Gulf of Tonkin
63. *H. elegans* Bychowsky & Nagibina, 1968
 Bychowsky & Nagibina, 1969a: 362
 Host: Smooth-headed catfish *A. arius*
 Distribution: Gulf of Tonkin
64. *H. simplex* Bychowsky & Nagibina, 1969
 Bychowsky & Nagibina, 1969a: 361
 Host: Smooth-headed catfish *A. arius*
 Distribution: Gulf of Tonkin
65. *H. thalassini* Bychowsky & Nagibina, 1969
 Bychowsky & Nagibina, 1969a: 361
 Host: Smooth-headed catfish *A. arius*
 Distribution: Gulf of Tonkin
 Genus ***Hemirhamphiculus*** Bychowsky & Nagibina, 1969
66. *H. armatus* Bychowsky & Nagibina, 1969
 Bychowsky & Nagibina, 1969b: 518
 Host: Black-barred halfbeak *Hyporhamphus far* (syn. *Hemiramphus far*)
 Distribution: Gulf of Tonkin
67. *H. similis* Bychowsky & Nagibina, 1969
 Bychowsky & Nagibina, 1969b: 519

- Host: Dussumier's halfbeak
Hyporhamphus dussumieri (syn. *Hemiramphus dussumieri*)
 Distribution: Gulf of Tonkin
 Genus **Ligophorus** Euzet & Suriano, 1977
 68. *L. fenestrum* Soo & Lim, 2012
 Dmitrieva et al., 2018: 72
 Hosts: Bluespot mullet *Crenimugil seheli* (syn. *Moolgarda seheli*), largescale mullet *Planiliza macrolepis*, otomebora mullet *P. melinopterus*, mullet *Valamugil formosae*, speigler's mullet *V. speigleri*
 Distributions: Gulf of Tonkin; South Cental coast
 69. *L. hamulosus* Pan et Zhang, 1999
 Nguyen, 2012: 26
 Hosts: bluespot mullet *Crenimugil seheli*; kanda *Osteomugil engeli* (syn. *Valamugil engeli*)
 Distribution: Gulf of Tonkin
 70. *L. leporinus* (Zhang & Ji, 1981) Gussev, 1985
 Gussev, 1985: 128; Nguyen, 2012: 28
 Hosts: Bluespot mullet *Crenimugil seheli*, squaretail mullet *Ellochelon vaigiensis*, flathead grey mullet *Mugil cephalus*, kanda *Osteomugil engeli*, largescale mullet *Planiliza macrolepis* (syn. *Liza macrolepis*), eastern keelback mullet *P. affinis* (syn. *L. affinis*)
 Distributions: Gulf of Tonkin; South Cental coast
 71. *L. macrocolpos* Euzet & Suriano, 1977
 Te, 1998: 5; Arthur & Bui, 2006: 46
 Host: Flathead grey mullet *Mugil cephalus*
 Distribution: Gulf of Tonkin
 Genus **Lobotrema** Tripathi, 1959
 72. *L. sciaenae* (Bychowsky & Nagibina, 1977) Oliver, 1987
 Syn. *Allomurraytrema sciaenae* Bychowsky & Nagibina, 1977
 Bychowsky & Nagibina, 1977: 14
 Hosts: Sin croaker *Johnius dussumieri* (syn. *Sciaena dussumieri*), belanger's croaker *J. belengri*, yellow drum *Nibea albiflora*
 Distributions: Gulf of Tonkin; South Cental coast
 73. *L. argyrosomi* (Bychowsky & Nagibina, 1977) Oliver, 1987
 Syn. *Allomurraytrema argyrosomi* Bychowsky & Nagibina, 1977
 Bychowsky & Nagibina, 1977: 12
 Host: Amoy croaker *Argyrosomus amoyensis*
 Distributions: Gulf of Tonkin; South Cental coast
 Genus **Metahaliotrema** Yamaguti, 1953
 74. *M. kulkarnii* Venkatanarasaiah, 1981
 Kritsky et al., 2016: 330
 Host: Spotted scat *Scatophagus argus*
 Distributions: Gulf of Tonkin; South Cental coast
 75. *M. mizellei* Venkatanarasaiah, 1981
 Nguyen, 2012: 33; Kritsky et al., 2016: 326
 Host: Spotted scat *S. argus*
 Distributions: Gulf of Tonkin; vịnh Thái Lan
 76. *M. scatophagi* Yamaguti, 1953
 Kritsky et al., 2016: 324
 Host: Spotted scat *S. argus*
 Distributions: Gulf of Tonkin; vịnh Thái Lan
 77. *M. similis* Kritsky, Nguyen, Ha & Heckman, 2016
 Kritsky et al., 2016: 332
 Host: Spotted scat *S. argus*
 Distribution: Gulf of Tonkin
 78. *M. cf. yamagutii* Mizelle & Price, 1964
 Kritsky et al., 2016: 333
 Host: Spotted scat *S. argus*
 Distribution: Gulf of Tonkin

79. *M. ypsilocleithrum* Kritsky, Nguyen, Ha & Heckman, 2016
 Kritsky et al., 2016: 328
 Host: Spotted scat *S. argus*
 Distributions: Gulf of Tonkin; vịnh Thái Lan
 Genus ***Paradiplectanotrema*** Gerasev, Gayevskaya & Kovaleva, 1987
80. *P. trachuri* (Kovaljova, 1970) Gerasev, Gayevskaya & Kovaleva, 1987
 Nguyen, 2012: 34
 Hosts: Japanese meagre *Argyrosomus japonicus*, caroun croaker *Johnius carouna*
 Distribution: Gulf of Tonkin
 Genus ***Parahemirhamphiculus*** Bychowsky & Nagibina, 1969
81. *P. pinguis* Bychowsky & Nagibina, 1969
 Bychowsky & Nagibina, 1969b: 521
 Hosts: Black-barred halfbeak *Hyporhamphus far*
 Distribution: Gulf of Tonkin
 Genus ***Platycephalotrema*** Kritsky & Nitta, 2019
82. *P. macassarensis* (Yamaguti, 1963) Kritsky & Nitta, 2019
 Bychowsky & Nagibina, 1971: 38
 Host: Bartail flathead *Platycephalus indicus*
 Distributions: Gulf of Tonkin
83. *P. thysanophrydis* (Yamaguti, 1937) Kritsky & Nitta, 2019
 Bychowsky & Nagibina, 1971: 39
 Hosts: Japanese flathead *Inegocia japonica* (syn. *Thysanophrys japonicus*)
 Distribution: Gulf of Tonkin
 Genus ***Protogyrodactylus*** Johnston & Tiegs, 1922
84. *P. alienus* Bychowsky & Nagibina, 1974
 Bychowsky & Nagibina, 1974: 477
 Hosts: Whipfin silver-biddy *Gerres filamentosus*; saddleback silver-biddy *G. limbatus* (syn. *G. lucidus*)
 Distribution: Gulf of Tonkin
85. *P. delicatus* Bychowsky & Nagibina, 1974
 Bychowsky & Nagibina, 1974: 478
 Host: Saddleback silver-biddy *G. limbatus*
 Distribution: Gulf of Tonkin
86. *P. gussevi* Bychowsky & Nagibina, 1974
 Bychowsky & Nagibina, 1974: 473
 Host: Jarbua terapon *Terapon jarbua*
 Distribution: Gulf of Tonkin
87. *P. elegantis* Bychowsky & Nagibina, 1974
 Bychowsky & Nagibina, 1974: 481
 Host: Deep-bodied mojarra *G. erythrouros*
 Distribution: Gulf of Tonkin
88. *P. fissilis* Bychowsky & Nagibina, 1974
 Bychowsky & Nagibina, 1974: 481
 Host: Slender silver-biddy *G. oblongus* (syn. *G. macrosoma*)
 Distribution: Gulf of Tonkin
89. *P. marinoides* Bychowsky & Nagibina, 1974
 Bychowsky & Nagibina, 1974: 476
 Host: Jarbua terapon *T. jarbua*
 Distribution: Gulf of Tonkin
90. *P. marinus* Gussev, 1973
 Gussev, 1973: 17
 Host: Jarbua terapon *T. jarbua*
 Distribution: Gulf of Tonkin
91. *P. perforatus* Bychowsky & Nagibina, 1974
 Bychowsky & Nagibina, 1974: 476
 Host: Jarbua terapon *T. jarbua*
 Distribution: Gulf of Tonkin

92. *Protogyrodactylus scapulasser* (Mamaev, 1970) Gussev, 1973
 Syn. *Ancyrocephalus scapulasser* Mamaev, 1970
 Mamaev, 1970: 131; Gussev, 1973: 23
 Host: Whipfin silver-biddy *G. filamentosus*
 Distribution: Gulf of Tonkin
93. *P. solidus* Bychowsky & Nagibina, 1974
 Bychowsky & Nagibina, 1974: 475
 Host: Jarbua terapon *T. jarbua*
 Distribution: Gulf of Tonkin
94. *P. sprostonae* Bychowsky & Nagibina, 1974
 Bychowsky & Nagibina, 1974: 479
 Hosts: Deep-bodied mojarr *G. erythrourus*, slender silver-biddy *G. oblongus* (syn. *G. macrosoma*)
 Distribution: Gulf of Tonkin
95. *P. youngi* Bychowsky & Nagibina, 1974
 Bychowsky & Nagibina, 1974: 480
 Host: Slender silver-biddy *G. oblongus*
 Distribution: Gulf of Tonkin
 Genus ***Triacanthinella*** Bychowsky & Nagibina, 1968
96. *T. principalis* Bychowsky & Nagibina, 1968
 Bychowsky & Nagibina, 1968: 154
 Host: Short-nosed tripodfish *Triacanthus biaculeatus*
 Distribution: Gulf of Tonkin
97. *T. tripathii* Bychowsky & Nagibina, 1968
 Bychowsky & Nagibina, 1968: 157
 Host: Long-spined tripodfish *Pseudotriacanthus strigilifer*
 Distribution: Gulf of Tonkin
Family Diplectanidae Monticelli, 1903
 Genus *Calydiscoides* Young, 1969
98. *C. flexuosus* (Yamaguti, 1953) Young, 1969
 Nguyen, 2012: 36
 Host: Japanese threadfin bream *Nemipterus japonicus*
 Distribution: Ha Long bay
 Genus ***Diplectanum*** Diesing, 1858
99. *D. spiralis* Nagibina, 1976
 Nagibina, 1976: 88
 Host: Dory snapper *Lutjanus fulviflamma*
 Distribution: Gulf of Tonkin
100. *D. stetoxus* Nagibina, 1976
 Nagibina, 1976: 93
 Host: Waigieu seaperch *Psammoperca waigiensis*
 Distribution: Gulf of Tonkin
101. *D. veropolynemi* Nagibina, 1976
 Nagibina, 1976: 89
 Host: Blackspot threadfin *Polydactylus sextarius* (syn. *Polynemus sextarius*)
 Distribution: Gulf of Tonkin
 Genus ***Laticola*** Yang, Kritsky, Sun, Zhang, Shi & Agrawal, 2006
102. *L. paralatesi* (Nagabina, 1976) Yang, Kritsky, Sun, Zhang, Shi & Agrawal, 2006
 Syn. *Diplectanum paralatesi* Nagabina, 1976
 Nagibina, 1976: 91
 Hosts: Barramundi *Lates calcarifer*; blackspot threadfin *Polydactylus sextarius*
 Distribution: Gulf of Tonkin
 Genus ***Murraytrema*** Price, 1937
103. *M. pricei* Bychowsky & Nagibina, 1977
 Nguyen, 2012: 39
 Host: Yellow drum *Nibea albiflora*
 Distribution: Ha Long bay
 Genus ***Murraytrematoides*** Yamaguti, 1958

104. *M. bychowskii* (Nagibina, 1976) Oliver, 1987
 Nagibina, 1976: 94
 Host: Striped threadfin *Polydactylus plebeius* (syn. *Polynemus plebeius*)
 Distribution: Gulf of Tonkin
 Genus ***Paradiplectanum*** Domingues & Boeger, 2008
105. *P. blairense* (Gupta & Khanna, 1974) Domingues & Boeger, 2008
 Syn. *Diplectanum blairense* Gupta & Khanna, 1974
 Nguyen, 2012: 34
 Hosts: Silver sillago *Sillago sihama*; Japanese sillago *S. japonica*
 Distribution: Ha Long bay
 Genus ***Pseudodiplectanum*** Tripathi, 1957
106. *P. bychowskyi* Nagibina, 1977
 Nagibina, 1977: 86
 Host: Fourlined tonguesole *Cynoglossus bilineatus*
 Distribution: Gulf of Tonkin
107. *P. caballeroi* Nagibina, 1977
 Nagibina, 1977: 88
 Host: Tonguefish *Symphurus orientalis*
 Distribution: Gulf of Tonkin
108. *P. cynoglossum* Tripathi, 1955
 Nagibina, 1977: 87
 Host: Fourlined tonguesole *C. bilineatus*
 Distribution: Gulf of Tonkin
 Genus ***Pseudorhabdosynochus*** Yamaguti, 1958
109. *P. brunei* Dang, Bristow, Schander & Berland, 2013**
 Dang et al., 2013: 52
 Host: Longtooth grouper *Epinephelus bruneus*
 Distribution: Nha Trang bay
110. *P. coioidesis* Bu, Leong, Wong, Woo & Foo, 1999
 Hosts: Duskytail grouper *E. bleekeri*, malabar grouper *E. malabaricus*, Greasy grouper *E. tauvina*, warsaw grouper *Hyporthodus nigrinus**
 Vo et al., 2010: 26
 Distributions: Gulf of Tonkin, Nha Trang bay
111. *P. cupatus* (Young, 1969) Kritsky & Beverley-Burton, 1986
 Te, 1998: 7; Arthur & Bui, 2006: 48
 Host: sixbar grouper *E. sexfasciatus*
 Distribution: Gulf of Tonkin
112. *P. epinepheli* (Yamaguti, 1938) Kritsky and Beverley-Burton, 1986
 Te, 1998: 7; Arthur & Bui, 2006: 48; Vo et al., 2010: 27
 Hosts: Duskytail grouper *E. bleekeri*, longtooth grouper *E. bruneus*, malabar grouper *E. malabaricus*, greasy grouper *E. tauvina*, warsaw grouper *Hyporthodus nigrinus**
 Distribution: Gulf of Tonkin
113. *P. grouperi* (Bu, Leong, Wong, Woo & Foo, 1999) Wu, Li, Zhu & Xie, 2005
 Syn. *Diplectanum grouperi* Bu, Leong, Wong, Woo & Foo, 1999
 Vo et al., 2010: 24
 Hosts: Duskytail grouper *E. bleekeri*, longtooth grouper *E. bruneus*, malabar grouper *E. malabaricus*, greasy grouper *E. tauvina*, warsaw grouper *H. nigrinus**
 Distribution: Gulf of Tonkin
114. *P. hargisi* (Oliver & Paperna, 1984) Santos, Buchmann & Gibson, 2000
 Syn. *Diplectanum hargisi* Oliver and Paperna, 1984
 Te, 1998: 8; Arthur & Bui, 2006: 48
 Hosts: Longtooth grouper *E. bruneus*, sixbar grouper *E. sexfasciatus*, greasy grouper *E. tauvina*
 Distribution: Gulf of Tonkin
115. *P. lantauensis* Beverley-Burton and Suriano, 1981

- Vo et al., 2010: 28
 Hosts: Duskytail grouper *E. bleekeri*, malabar grouper *E. malabaricus*, warsaw grouper *Hyporthodus nigrinus**
 Distributions: Gulf of Tonkin, Nha Trang bay
116. *P. nhatrangensis* Dang, Bristow, Schander & Berland, 2013**
 Dang et al., 2013: 46
 Hosts: Duskytail grouper *E. bleekeri*, Orange-spotted grouper *E. coioides*
 Distribution: Nha Trang bay
117. *P. serrani* (Yamaguti, 1953) Kritsky & Beverley-Burton, 1986
 Vo et al., 2010: 32
 Hosts: duskytail grouper *E. bleekeri*, malabar grouper *E. malabaricus*, greasy grouper *E. tauvina*, warsaw grouper *Hyporthodus nigrinus**
 Distribution: Nha Trang bay
118. *P. summanae* (Young, 1969) Kritsky & Beverley-Burton, 1986
 Vo et al., 2010: 31
 Hosts: duskytail grouper *E. bleekeri*, warsaw grouper *Hyporthodus nigrinus**
 Distribution: Nha Trang bay
119. *P. summanoides* Yang, Gibson & Zeng, 2005
 Vo et al., 2010: 30
 Hosts: Duskytail grouper *E. bleekeri*, malabar grouper *E. malabaricus*, warsaw grouper *Hyporthodus nigrinus**
 Distribution: Nha Trang bay
120. *P. vagamipullum* (Young, 1969) Kritsky & Beverley-Burton, 1986
 Vo et al., 2010: 31
 Host: Longspine grouper *E. longispinis* (syn. *E. fario*)
 Distribution: Nha Trang bay
121. *P. vietnamensis* Dang, Bristow, Schander & Berland, 2013**
 Dang et al., 2013: 49
 Hosts: Duskytail grouper *E. bleekeri*, orange-spotted grouper *E. coioides*
 Distribution: Nha Trang bay
 Genus ***Telegamatrix*** Ramalingum, 1955
122. *T. elegans* Bychowsky & Nagibina, 1976
 Bychowsky & Nagibina, 1976: 9
 Host: Pugnose ponyfish *Secutor insidiator* (syn. *Leiognathus insidiator*)
 Distribution: Gulf of Tonkin
123. *T. grandis* Bychowsky & Nagibina, 1976
 Bychowsky & Nagibina, 1976: 10
 Host: Pugnose ponyfish *S. insidiator*
 Distribution: Gulf of Tonkin
124. *T. ramalingami* Bychowsky & Nagibina, 1976
 Bychowsky & Nagibina, 1976: 12
 Host: Pugnose ponyfish *S. insidiator*
 Distribution: Gulf of Tonkin
 Order GYRODACTYLIDEA Bychowsky, 1937
- Family Tetraonchoididae Bychowsky, 1951**
 Genus ***Paratetraonchoides*** Bychowsky, Gussev & Nagibina, 1965
125. *P. inermis* Bychowsky, Gussev & Nagibina, 1965
 Bychowsky et al., 1965: 144
 Host: Longnosed stargazer *Ichthyoscopus lebeck*
 Distribution: Gulf of Tonkin
 Genus ***Pavlovskioides*** Bychowsky, Gussev & Nagibina, 1965
126. *P. ichthyoscopi* Bychowsky, Gussev & Nagibina, 1965
 Bychowsky et al., 1965: 146
 Host: Longnosed stargazer *Ichthyoscopus lebeck*
 Distribution: Gulf of Tonkin

127. *P. litoralis* Bykhovsky, Gussev and Nagibina, 1965
 Bychowsky et al., 1965: 148
 Host: Snakefish *Trachinocephalus myops*
 Distribution: Gulf of Tonkin
 Genus *Pseudotetraonchoides* Bychowsky, Gussev & Nagibina, 1965
128. *P. bleekeriae* Bychowsky, Gussev & Nagibina, 1965
 Bychowsky et al., 1965: 152
 Host: sand lance *Bleekeria viridianguilla*
 Distribution: Gulf of Tonkin
 Order MONOCOTYLIDEA Lebedev, 1988
Family Monocotylidae Taschenberg, 1879
 Genus *Monocotyle* Taschenberg, 1878
129. *M. ancylostomae* Timofeeva, 1984
 Timofeeva, 1984: 299
 Host: Bowmouth guitarfish *Rhina ancylostoma*
 Distribution: Gulf of Tonkin
130. *M. undosocirrus* Timofeeva, 1984
 Timofeeva, 1984: 297
 Host: Twin-spot butterfly ray *Gymnura bimaculata*
 Distribution: Gulf of Tonkin
 Genus *Heterocotyle* Scott, 1904
131. *H. armata* Timofeeva, 1983
 Timofeeva, 1983: 39
 Host: Honeycomb stingray *Dasyatis uarnak*
 Distribution: Gulf of Tonkin
132. *H. confusa* Timofeeva, 1983
 Timofeeva, 1983: 37
 Host: Honeycomb stingray *D. uarnak*
 Distribution: Gulf of Tonkin
 Genus *Neoheterocotyle* Hargis, 1955
133. *N. bychowskyi* (Timofeeva, 1981) Chisholm, 1994
 Timofeeva, 1981: 400
 Host: Giant guitarfish *Rhynchobatus djiddensis* (syn. *Rhinobatus djiddensis*)
 Distribution: Gulf of Tonkin
134. *N. nagibinae* (Timofeeva, 1981) Chisholm, 1994
 Timofeeva, 1981: 401
 Host: Giant guitarfish *R. djiddensis*
 Distribution: Gulf of Tonkin
135. *N. rhinobatis* (Pillai & Pillai, 1976) Chisholm & Whittington, 1997
 Timofeeva, 1981: 402
 Host: Giant guitarfish *R. djiddensis*
 Distribution: Gulf of Tonkin
 Genus *Dasybatotrema* Price, 1936
136. *D. spinosum* Timofeeva, 1983
 Timofeeva, 1983: 42
 Host: Round ribbontail ray *Taeniurops meyeri* (Sny. *Taeniura melanospilos*)
 Distribution: Gulf of Tonkin
 Genus *Timofeevia* Chisholm, Wheeler & Beverley-Burton, 1995
137. *T. rajae* (Timofeeva, 1983) Chisholm, Wheeler & Beverley-Burton, 1995
 Syn. *Dasybatotrema rajae* Timofeeva, 1983
 Timofeeva, 1983: 44
 Host: ray *Dasyatis* sp.
 Distribution: Gulf of Tonkin
- SUBCLASS OLIGONCHOINEA
 BYCHOWSKY, 1937
 Order MAZOCRAEIDEA Bychowsky, 1937
Family Allodiscocotylidae Tripathi, 1959
 Genus *Allodiscocotyla* Yamaguti, 1953
138. *A. chorinemi* Yamaguti, 1953
 Lebedev, 1970a: 193; Lebedev et al., 1970: 193; Parukhin, 1976: 98

Hosts: Doublespotted queenfish *Scomberoides lysan*; scad *Caranx* sp.; scad *Decapterus* sp.

Distribution: Gulf of Tonkin

139. *A. diacanthi* Unnithan, 1962

Lebedev et al., 1970a: 193

Host: Scad *Decapterus* sp.

Distribution: Gulf of Tonkin

Genus *Camopia* Lebedev, 1970

140. *C. rachycentri* Lebedev, 1970

Lebedev, 1970b: 666, 1986: 151

Host: Cobia *Rachycentron canadum*

Distribution: Gulf of Tonkin

Genus *Metacamopia* (Unnithan, 1962) Lebedev, 1972

141. *M. indica* (Unnithan, 1962) Lebedev, 1972

Host: Doublespotted queenfish *Scomberoides lysan*

Lebedev, 1972b: 128; Lebedev, 1986: 153

Distribution: Gulf of Tonkin

142. *M. chormemi* (Yamaguti, 1953) Lebedev, 1984

Lebedev et al., 1970: 194; Lebedev, 1986: 153

Hosts: Doublespotted queenfish *S. lysan*; bigeye scad *Selar crumenophthalmus*

Distribution: Gulf of Tonkin

Family Axinidae Monticelli, 1903

Genus *Loxuroides* Price, 1962

143. *L. pricei* Nguyen, Nguyen, Bui & Ha, 2016

Nguyen et al., 2016: 391

Host: Pharaoh flyingfish *Cypselurus naresii*

Distributions: Gulf of Tonkin; South Central coast

Genus *Unnithanaxine* Price, 1962

144. *U. naresii* Nguyen, Nguyen, Bui & Ha, 2016

Nguyen et al., 2016: 388

Host: Pharaoh flyingfish *Cypselurus naresii*
Distributions: Gulf of Tonkin; South Central coast

Family Bychowskicotylidae Lebedev, 1969

Genus *Bychowskicotyle* Lebedev, 1969

145. *B. plectorhynchi* Lebedev, 1969

Lebedev, 1986: 99

Host: Crescent sweetlips *Plectorhynchus cinctus*

Distribution: Gulf of Tonkin

Genus *Tonkinopsis* Lebedev, 1972

146. *T. transfretanus* Lebedev, 1972

Lebedev, 1972a: 151

Host: Crescent sweetlips *P. cinctus*

Distribution: Gulf of Tonkin

Family Diclidophoridae Cerfontaine, 1895

Genus *Choricotyle* van Beneden & Hesse, 1863

147. *C. pellonae* Kritsky & Bilgee, 1973

Mamaev, 1975: 108

Host: Elongate ilisha *Ilisha elongata*

Distribution: Gulf of Tonkin

148. *C. polynemi* Mamaev, 1972

Mamaev, 1972a: 158

Hosts: Blackspot threadfin *Polynemus sextarius*; fourfinger threadfin *Eleutheronema tetradactylum*

Distribution: Gulf of Tonkin

Genus *Helciferus* Mamaev, 1972

149. *H. tenuis* Mamaev, 1972

Mamaev, 1973: 1236

Host: Osbeck's grenadier anchovy *Coilia mystus*

Distribution: Gulf of Tonkin

Genus *Heterobothrium* Cerfontaine, 1895

150. *H. tonkinensis* Bychowsky & Nagibina, 1976

Bychowsky et al., 1976: 31

- Hosts: Silver-cheeked toadfish
Lagocephalus sceleratus; *Takifugu* sp.
Distribution: Gulf of Tonkin
Genus *Osphyobothrus* Yamaguti, 1958
151. *O. bychowskyi* Khoche & Chauhan, 1969
Mamaev & Parukhin, 1970: 305; Parukhin, 1976: 112
Host: Greater lizardfish *Saurida tumbil*
Distributions: Gulf of Tonkin; South Cental coast
152. *O. multivitellatus* Mamaev & Parukhin, 1970
Mamaev & Parukhin, 1970: 308
Host: Greater lizardfish *S. tumbil*
Distribution: vịnh Thái Lan
Genus *Papillochoricotyle* Mamaev, 1975
153. *P. ilishae* Mamaev, 1975
Mamaev, 1975: 110
Hosts: Elongate ilisha *Ilisha elongata*, *Ilisha* sp.
Distribution: Gulf of Tonkin
Genus *Upenicola* Unnithan, 1966
154. *U. capheni* Mamaev, 1972
Mamaev, 1972b: 166
Hosts: Sulphur goatfish *Upeneus sulphureus*; goatfish *Parupeneus* sp.
Distribution: Gulf of Tonkin
155. *U. digitata* Mamaev, 1972
Mamaev, 1972b: 164
Hosts: Sulphur goatfish *U. sulphureus*; goatfish *Parupeneus* sp.
Distribution: Gulf of Tonkin
156. *U. upeneoides* Unnithan, 1966
Mamaev, 1972b: 165
Host: Sulphur goatfish *U. sulphureus*; goatfish *Parupeneus* sp.
Distribution: Gulf of Tonkin
Genus *Urocotyle* Unnithan, 1966
157. *U. anellus* Mamaev, 1972
Mamaev, 1972b: 167
Host: Sin croaker *Johnius dussumieri*
Distribution: Gulf of Tonkin
Family Gastrocotylidae Price, 1943
Genus *Alloposeudaxine* Yamaguti, 1943
158. *A. macrova* (Unnithan, 1957) Yamaguti, 1963
Lebedev, 1968a: 49
Host: scad *Caranx* sp.
Distribution: Gulf of Tonkin
Genus *Churavera* Unnithan, 1968
159. *C. triangula* (Mamaev, 1967) Lebedev, 1986
Lebedev, 1986: 65
Host: Frigate tuna *Auxis thazard*
Distribution: Gulf of Tonkin
Genus *Gastrocotyle* Beneden & Hesse, 1863
160. *G. indica* Subhpradha, 1951
Lebedev, 1986: 52
Host: Shrimp scad *Alepes djedaba* (syn. *Caranx kalla*)
Distribution: Gulf of Tonkin
161. *G. kalla* Unnithan, 1968
Lebedev, 1986: 52
Hosts: Shrimp scad *A. djedaba*, Blackfin scad *A. melanoptera* (syn. *Caranx malam*)
Distribution: Gulf of Tonkin
162. *G. trachuri* Van Beneden & Hesse, 1863
Lebedev, 1968a: 49
Hosts: Bigeye scad *Selar crumenophthalmus*; scad *Decapterus* sp.
Distribution: Gulf of Tonkin
Genus *Pseudaxine* Parona & Perugia, 1890
163. *P. bivaginalis* Dillon & Hargis, 1965
Lebedev, 1986: 54
Host: Yellowstripe scad *Selaroides leptolepis*

- Distribution: Gulf of Tonkin
 164. *P. kurra* Unnithan, 1968
 Lebedev 1986: 54
 Hosts: Torpedo scad *Megalaspis cordyla*;
 yellowtail scad *Atule mate*
 Distribution: Gulf of Tonkin
 165. *P. trachuri* Parona & Perugia, 1889
 Lebedev, 1986: 53
 Hosts: Malabar trevally *Caranoides malabaricus* (syn. *Caranx malabaricus*); scad *Caranx* sp.; scad *Decapterus* sp.
 Distribution: Gulf of Tonkin
 Genus *Pseudaxinoides* Lebedev, 1968
 166. *P. bychowski* Lebedev, 1977
 Lebedev, 1986: 56
 Host: Shrimp scad *Alepes djedaba*
 Distribution: Gulf of Tonkin
 167. *P. caballeri* Lebedev, 1977
 Lebedev, 1986: 56
 Host: Shrimp scad *A. djedaba*
 Distribution: Gulf of Tonkin
 168. *P. decapteri* (Yamaguti, 1968)
 Lebedev, 1977
 Lebedev, 1986: 57
 Host: Japanese scad *Decapterus maruadsi*
 Distribution: Gulf of Tonkin
 169. *P. vietnamensis* Lebedev, Parukhin & Roitman, 1970
 Lebedev, 1986: 56; Lebedev et al., 1970: 198; Parukhin, 1976: 92
 Hosts: Bigeye scad *Selar crumenophthalmus*; yellowstripe scad *Selaroides leptolepis*; greater amberjack *Seriola dumerili*; trevally *Caranx* sp.; scad *Decapterus* sp.
 Distribution: Gulf of Tonkin
 Genus *Sibitrema* Yamaguti, 1966
 170. *S. poonui* Yamaguti, 1966
 Mamaev, 1967: 994; Lebedev, 1986: 60
 Hosts: Kawakawa *Euthynnus affinis*;
 frigate tuna *Auxis thazard*; Atlantic bluefin tuna *Thunnus thynnus*
 Distribution: Gulf of Tonkin
Family Gotocotylidae Yamaguti, 1963
 Genus *Cathucotyle* Lebedev, 1968
 171. *C. cathuauui* Lebedev, 1968
 Lebedev, 1968a: 46, 1970a, 1986: 143
 Hosts: Narrow-barred Spanish mackerel *Scomberomorus commerson*, Indo-Pacific king mackerel *S. guttatus*
 Distribution: Gulf of Tonkin
 Genus *Gotocotyla* Ishii, 1936
 172. *G. acanthura* (Parona & Perugia, 1896) Meserve, 1938
 Syn. *G. secunda* (Tripathi, 1954)
 Lebedev, 1970a: 201
 Host: Narrow-barred Spanish mackerel *S. commerson*
 Distribution: Gulf of Tonkin
 173. *G. bivaginalis* (Ramalingam, 1961) Rohde, 1976
 Syn. *G. laticauda* Lebedev, 1970
 Lebedev, 1970a: 202; Lebedev, 1986: 141
 Host: Narrow-barred Spanish mackerel *S. commerson*
 Distribution: Gulf of Tonkin
Family Heteraxinidae Unnithan, 1957
 Genus *Bicotyle* Tripathi, 1956
 174. *B. perpolita* Lebedev, 1968
 Lebedev, 1968b : 48
 Hosts: Silver pomfret *Pampus argenteus*;
 black pomfret *Parastromateus niger*
 Distribution: Gulf of Tonkin
 Genus *Heteraxine* Yamaguti, 1938
 175. *H. heterocerca* (Goto, 1894) Yamaguti, 1938
 Lebedev, 1968a: 82, 1970a: 206
 Host: Bigeye scad *Selar crumenophthalmus*

- Distributions: Gulf of Tonkin, South Cental coast
 Genus ***Kannaphallus*** Unnithan, 1957
 176. *K. virilis* Unnithan, 1957
 Lebedev, et al. 1970a: 198; Mamaev, 1990: 226
 Host: Indian threadfish *Alectis indica*
 Distribution: Gulf of Tonkin
 Genus ***Lethrinaxine*** Mamaev, 1970
 177. *L. parva* Mamaev, 1970
 Mamaev, 1970: 146
 Host: Grey large-eye bream *Gymnocranius griseus*
 Distribution: Gulf of Tonkin
 Genus ***Monaxine*** Unnithan, 1957
 178. *M. formionis* Unnithan, 1957
 Mamaev, 1970: 143
 Hosts: Black pomfret *Parastromateus niger*
 Distribution: Gulf of Tonkin
Family Heteromicrocotylidae Unnithan, 1961
 Genus ***Heteromicrocotyla*** Yamaguti, 1953
 179. *H. carangis* Yamaguti, 1953
 Lebedev, 1970a: 197; Mamaev, 1988a: 37
 Host: Black pomfret *Parastromateus niger*
 Distribution: Gulf of Tonkin
 180. *H. paruchini* Mamaev, 1968
 Mamaev, 1988a: 42
 Hosts: Malabar trevally *C. malabaricus*, *Carangoides* sp.
 Distribution: Gulf of Tonkin
 181. *H. polyorchis* Unnithan, 1961
 Lebedev, 1970a: 197
 Hosts: Shadow trevally *C. dinema*; Bigeye trevally *C. sexfasciatus*
 Distribution: Gulf of Tonkin
 182. *H. vaginispina* Unnithan, 1961
 Lebedev, 1970a: 197; Mamaev, 1988a: 43
 Host: Malabar trevally *C. malabaricus*
 Distribution: Gulf of Tonkin
Family Hexostomatidae Price, 1936
 Genus ***Hexostoma*** Rafinesque, 1815
 183. *H. thynni* (Delaroche, 1811) Rafinesque, 1815
 Syn. *H. auxisi* Palombi, 1943
 Mamaev, 1968: 18
 Host: Frigate tuna *Auxis thazard*
 Distribution: Gulf of Tonkin
 Genus ***Neohexostoma*** Price, 1961
 184. *N. euthynni* (Meserve, 1938) Price, 1961
 Mamaev, 1968: 21
 Hosts: Frigate tuna *Auxis thazard*; kawakawa *Euthynnus affinis*
 Distribution: Gulf of Tonkin
Family Mazocraeidae Price, 1936
 Genus ***Engraulicola*** George, 1960
 185. *E. thrissocles* (Tripathi, 1959) Lebedev, 1971
 Syn. *Paramazocraes thrissocles* Tripathi, 1959
 Mamaev, 1975: 111
 Host: Anchovy *Thrissocles* sp.
 Distribution: Gulf of Tonkin
 Genus ***Heteromazocraes*** Mamaev, 1981
 186. *H. coiliae* Mamaev, 1981
 Mamaev, 1981: 174
 Host: Gray's grenadier anchovy *Coilia grayii*
 Distribution: Gulf of Tonkin
 187. *H. dodecacantha* Mamaev, 1981
 Mamaev, 1981: 176
 Host: Anchovy *Thrissocles* sp.
 Distribution: Gulf of Tonkin
 188. *H. vicinus* (Mamaev, 1975) Mamaev, 1981

- Mamaev, 1975: 112, 1981: 177
 Hosts: Anchovy *Thrissocles* sp.; hamilton's thryssa *T. hamiltonii*
 Distribution: Gulf of Tonkin
 Genus **Leptomazocraes** Mamaev, 1975
 189. *L. orientalis* (Chauhan, 1950) Mamaev, 1975
 Mamaev, 1975: 103
 Host: Slender rainbow sardine *Dussumieria elopsoides*
 Distribution: Gulf of Tonkin
 190. *L. trispina* (Unnithan, 1964) Mamaev, 1981
 Mamaev, 1981: 179
 Host: Slender rainbow sardine *D. elopsoides*
 Distribution: Gulf of Tonkin
 Genus **Mazocraeoides** Price, 1936
 191. *M. dussumieri* Mamaev, 1975
 Mamaev, 1975: 104
 Host: Slender rainbow sardine *D. elopsoides*
 Distribution: Gulf of Tonkin
 192. *M. prashadi* Chauhan, 1950
 Mamaev, 1975: 105
 Hosts: Sardinella *Amblygaster* sp.
 Distribution: Gulf of Tonkin
 Genus **Neomazocraes** Price, 1943
 193. *N. dorosomatis* (Yamaguti, 1938) Price, 1943
 Nguyen, 2012: 40
 Host: Chinese gizzard shad *Clupanodon thrissa*
 Distribution: Ha Long bay
 Genus **Pseudoanthocotyle** Bychowsky & Nagibina, 1954
 194. *P. pavlovskiy* Bychowsky & Nagibina, 1954
 Bychowsky & Nagibina, 1954: 32
 Host: Indian mackerel *Rastrelliger kanagurta*
 Distribution: Gulf of Tonkin
 Genus **Pseudomazocraes** Price, 1961
 195. *P. longicauda* (Mamaev, 1975) Mamaev, 1984
 Mamaev, 1975: 113
 Host: Slender rainbow sardine *Dussumieria elopsoides*
 Distribution: Gulf of Tonkin
Family Microcotylidae Taschenberg, 1879
 Genus **Caballeraxine** Lebedev, 1972
 196. *C. chainanica* (Lebedev, Parukhin & Roitman, 1970) Lebedev, 1972
 Lebedev, et al. 1970: 198; Mamaev & Kurochin, 1976: 18
 Host: Malabar trevally *Caranx malabaricus*
 Distribution: Gulf of Tonkin
 Genus **Diplostamenides** Unnithan, 1971
 197. *D. sciaenae* (Goto, 1894) Mamaev, 1986
 Syn. *Microcotyle hemiatriospinalis* Lebedev, Parukhin and Roitman, 1970
 Lebedev, 1970a: 196; Lebedev, et al. 1970: 171; Parukhin, 1976: 122; Mamaev, 1986: 201
 Host: Amberjacks *Seriola* sp.
 Distribution: Gulf of Tonkin
 Genus **Intracotyle** Mamaev, 1970
 198. *I. orientalis* Mamaev, 1970
 Mamaev, 1970: 184
 Host: Saddle grunt *Pomadasyss maculatus*
 Distribution: Gulf of Tonkin
 Genus **Lutianicola** Lebedev, 1970
 199. *L. haifonensis* Lebedev, 1970
 Lebedev, 1970a: 194
 Host: Emperor red snapper *Lutjanus sebae*, russell's snapper *L. russellii*

- Distribution: Gulf of Tonkin
 Genus *Microcotyle* Van Beneden & Hesse, 1863
 200. *M. arrips* Sandars, 1945
 Bychowsky & Nagibina, 1975b: 215
 Hosts: Whitecheek monocle bream *Scolopsis vosmeri*, lattice monocle bream *S. taeniopterus*; yellowtail amberjack *Seriola lalandi* (syn. *S. aureovittata*)
 Distribution: Gulf of Tonkin
 201. *M. fistulariae* Mamaev, 1989
 Mamaev, 1989: 143
 Host: Red cornetfish *Fistularia petimba*
 Distribution: Gulf of Tonkin
 Genus *Monomacracanthus* Mamaev, 1976
 202. *M. cadodai* Mamaev, 1976
 Mamaev, 1976: 31
 Hosts: Large yellow croaker *Larimichthys crocea* (syn. *Pseudosciaena crocea*); sin croaker *Johnius dussumieri*
 Distribution: Gulf of Tonkin
 Genus *Polylabris* Euzet & Cauwet, 1967
 203. *P. gerres* (Sandars, 1944) Mamaev & Parukhin, 1976
 Mamaev & Parukhin, 1976: 250
 Hosts: Saddleback silver-biddy *Gerres lucidus*; whipfin silver-biddy *G. filamentosus*
 Distribution: Gulf of Tonkin
 204. *P. tubicirrus* (Paperna & Kohn, 1964) Mamaev & Parukhin, 1976
 Mamaev & Parukhin, 1976: 247
 Hosts: Toothpony *G. minuta*; pugnose ponyfish *L. insidiator*
 Distribution: Gulf of Tonkin
 Genus *Polylabroides* Mamaev & Parukhin, 1976
 205. *P. zini* Mamaev, 1987
 Mamaev, 1988b: 196
 Hosts: Goldsilk seabream *A. berda*, Yellowfin seabream *A. latus*
 Distribution: Gulf of Tonkin
 Genus *Polynemicola* Unnithan, 1971
 206. *P. ambigua* Mamaev, 1977
 Mamaev, 1977: 94
 Hosts: Blackspot threadfin *Polynemus sextarius*, *Eleutheronema* sp.
 Distribution: Gulf of Tonkin
 207. *P. sciaenae* Mamaev, 1977
 Mamaev, 1977: 96
 Host: Sin croaker *Johnius dussumieri*
 Distribution: Gulf of Tonkin
 Genus *Tonkinaxine* Lebedev, Parukhin & Roitman, 1970
 208. *T. homocerca* Lebedev, Parukhin and Roitman, 1970
 Lebedev, 1970a: 197; Lebedev et al., 1970a: 175; Parukhin, 1976: 86
 Hosts: Blackbanded trevally *Seriolina nigrofasciata*; greater amberjack *Seriola dumerili*, *Seriola* sp.
 Distributions: Gulf of Tonkin, South Cental coast
Family Paramonaxinidae Mamaev, 1990
 Genus *Incisaxine* Mamaev, 1970
 209. *I. dubia* Mamaev, 1970
 Mamaev, 1970: 149
 Host: Whipfin silver-biddy *Gerres filamentosus*
 Distribution: Gulf of Tonkin
Family Plectanocotyliidae Monticelli, 1903
 Genus *Triglicola* Mamaev & Parukhin, 1972
 210. *T. tonkinensis* Mamaev & Parukhin, 1972
 Mamaev & Parukhin, 1972: 66; Parukhin, 1989: 121
 Host: Gurnard *Lepidotrygla* sp.
 Distribution: Gulf of Tonkin

Family Protomicrocotylidae Johnston & Tiegs, 1922

Genus *Bilaterocotyloides* Ramalingam, 1961

211. *B. carangis* Ramalingam, 1961

Lebedev et al., 1970: 194; Parukhin, 1989: 124

Host: Torpedo scad *Megalaspis cordyla*

Distribution: Gulf of Tonkin

212. *B. madrasensis* Radha, 1966

Lebedev, 1986: 115

Host: Torpedo scad *M. cordyla*

Distribution: Gulf of Tonkin

Genus *Neomicrocotyle* Ramalingam, 1960

213. *N. indica* Ramalingam, 1960

Bychowsky & Nagibina, 1975b: 216

Host: Bigeye trevally *Caranx sexfasciatus*

Distribution: Gulf of Tonkin

Genus *Vallisiopsis* Subhadrappa, 1951

214. *V. contorta* Subhadrappa, 1951

Lebedev, 1986: 118

Host: False trevally *Lactarius lactarius*

Distribution: Gulf of Tonkin

215. *V. sphyraenae* Yamaguti, 1968

Lebedev, 1986: 118

Host: Yellowtail barracuda *Sphyraena flavicauda* (syn. *S. langsar*)

Distribution: Gulf of Tonkin

Genus *Youngiopsis* Lebedev, 1972

216. *Y. australis* (Young, 1968) Lebedev, 1972

Lebedev, 1972b: 132

Host: Obtuse barracuda *S. obtusata*

Distribution: Gulf of Tonkin

Family Pseudoclitidophoridae Yamaguti, 1965

Genus *Quillonella* Lebedev & Parukhin, 1970

217. *Q. ventrosa* Lebedev & Parukhin, 1970

Lebedev & Parukhin, 1970: 458

Hosts: Cobia *Rachycentron canadum*; Japanese scad *Decapterus maruadsi*

Distributions: Gulf of Tonkin, South Cental coast

Family Pterinotrematidae Caballero & Bravo-Hollis, 1955

Genus *Pterinotrema* Caballero, Bravo-Hollis & Grocott, 1954

218. *P. mirabile* Bychowsky & Nagibina, 1959

Bychowsky & Nagibina, 1959: 218

Host: Bonefish *Albula vulpes*

Distributions: Gulf of Tonkin, South Cental coast

Family Thoracocotylidae Price, 1936

Genus *Pricea* Chauhan, 1945

219. *P. multae* Chauhan, 1945

Lebedev, 1970: 201

Hosts: Narrow-barred Spanish mackerel *Scomberomorus commerson*, Indo-Pacific king mackerel *S. guttatus*

Distributions: Gulf of Tonkin, South Cental coast

Genus *Pseudothoracocotyla* Yamaguti, 1963

220. *P. ovalis* (Tripathi, 1956) Yamaguti, 1963

Lebedev, 1970: 204

Hosts: Narrow-barred Spanish mackerel *Scomberomorus commerson*, Indo-Pacific king mackerel *S. guttatus*

Distributions: Gulf of Tonkin, South Cental coast

Notes: “*”: The distribution of the warsaw grouper *Hyporthodus nigrinus* is mainly in the western of Atlantic Ocean, so all records of warsaw grouper *Hyporthodus nigrinus* in the off Vietnam could be misidentified. The correct species, for instance, is generally considered to a tenspine grouper *Epinephelus*

exsul, which is distributed in Indo-Pacific region; “***”: Not accepted yet by WoRMS (2020).

DISCUSSION

In this paper, we updated the list of monogenea fauna from marine fishes of Vietnam. The list includes 220 species, this number is greater comparing with 135 species in the list of Arthur & Bui (2006). In addition, the modification of contemporary classifications of several taxa also was updated.

At higher taxonomic levels, i.e. subclass, there are two classification systems which are bilateral used at the present (Wheeler & Chisholm, 1995), including (1) the system was proposed by Llewellyn (1970) and revised by Beverley-Burton (1984) and (2) the system was proposed by Bychowsky (1937) and revised by Boeger & Kritsky (1993). The classification system of Llewellyn (1970) and Beverley-Burton (1984) is divided the class of Monogenea into two subclasses, Monopisthocotylea and Polyopisthocotylea, based on several morphological characters of fluke, e.g. the structure, shape and size of opisthaptor and parasitic position on its hosts. This system is simple and is used by WoRMS (2020) for updating data. The system of Bychowsky (1937) and Boeger & Kritsky (1993) divides the class of Monogenoidea into three subclasses, Polyonchoinea, Polystomatoinea and Oligonchoinea. This system is more complicated to compare to the system of Llewellyn (1970) and Beverley-Burton (1984), but it has more comprehensive views, and was revised basing on 141 character states in 47 homologous series and employing phylogenetic systematics (Boeger & Kritsky, 1993). Therefore we used the classification system of Bychowsky (1937) and Boeger & Kritsky (1993), and updated data of lower taxa by using WoRMS (2020). The bilateral using two classification systems are not contradiction, because almost taxonomic levels at family and under family are the same. Monogenean fauna in Vietnam is belonging to two subclasses Polyonchoinea and Oligonchoinea.

At the level of genus, *Alloipseudaxine* was moved to Axinidae from Gastrocotylidae (Hayward & Rohde, 1999a), *Tonkinaxine* was moved to Microcotylidae from Heteraxinidae (Mamaev, 1986). Mamaev (1990) transferred some genera from Microcotylidae to other families, e.g. *Incisaxine* was moved to Paramonaxinidae, *Kannaphallus* and *Lethrinaxine* were moved to Heteraxinidae.

At the level of species, Arthur & Bui (2006) arranged two species, *Vallisia chorinemi* and *Triglicola tonkinensis*, in Anthocotylidae, however, they are belonging to Allodiscocotylidae (Lebedev, 1984) and Plectanocotylidae (Parukhin 1989), separately. In addition, Lebedev (1984) also transferred *V. chorinemi* to *Metacamopia*. Bychowsky & Nagibina (1970) moved *Ancyrocephalus bilobatus* and *A. spinicirrus* to *Haliotrema*; similarly, *A. scapulasser* was transferred to *Protogyrodactylus* (Gussev, 1973), and *Diplectanum hargisi* was moved to *Pseudorhabdosynochus* (Santos et al., 2000). Moreover, the name of four species, *Dawesia incise*, *Microcotyle hemiatriospinalis*, *Gotocotyla laticaudata* và *G. secunda* were changed in succession to *Pseudothoracocotyla ovalis*, *Diplostamenides sciaenae*, *Gotocotyla bivaginalis* and *G. Acanthura* (Hayward & Rohde, 1999b; Mamaev, 1986; Rohde, 1976).

Three species, *Pseudorhabdosynochus brunneus*, *P. nhatrangensis* and *P. vietnamensis* which were found from grouper by Dang et al. (2013), are unaccepted because the publication is not compliant with Article 8.5 (2012) of the International Commission on Zoological Nomenclature WoRMS (2020). In this paper, however, we listed all three mentioned species because of theirs exist.

In addition, there are 23 monogenean species, which were identified at genus level, including: 17 species of *Ligophorus* (Garasev et al., 2011a, b; Dmitrieva et al., 2013); 1 species of *Diplectanum* (Mamaev, 1970); 1 species of *Gastrocotyle* (Lebedev, 1970a); 1 species of *Microcotyle* (Lebedev et al., 1970); 1 species of *Pseudaxine* (Parukhin, 1976); 1 species of *Benedenia* (Te, 1998); 1 species of *Haliotrema* (Vo et al., 2010). All of them did

not count in the list above but the future studies should clarify the taxonomic position of these species.

Relating to the host-parasite relationships, the great majority of monogeneans (70,9%, 156/220 species) use just only one host species, it shows the specialization of monogeneans to choose their host. Other monogenea species were found on two or even seven host species, e.g. *Haliotrema epinepheli* has been found on the gills of 7 marine fish species. About fish hosts, some species are only infected by only one monogenean species while other species are infected by many congeneric monogenean species, e.g. Spotted scat *Scatophagus argus*, or by monogeneans of different genera, e.g. groupers *Epinephelus* spp., snapper *Lutjanus* spp.

In conclusion, the monogenean fauna from marine fish of Vietnam is quite diverse, with 220 recorded species. However, almost period studies have only focused to discover the biodiversity of these flukes. There are currently no studies on genetic, biological, ecological characters of monogeneans in the off Vietnam. In addition, the pathogens, which caused by monogeneans, also need to further study for reducing the damage to aquaculture.

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