

A checklist of fish monogeneans from Poland¹

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ABSTRACT. This paper lists 127 monogenean species belonging to 2 subclasses, 3 orders, 6 families and 13 genera reported from Polish freshwater and marine fishes. This checklist provides information also on the hosts, distribution in Poland and respective literature sources.

Key words: checklist, Monogenea, fish, Poland

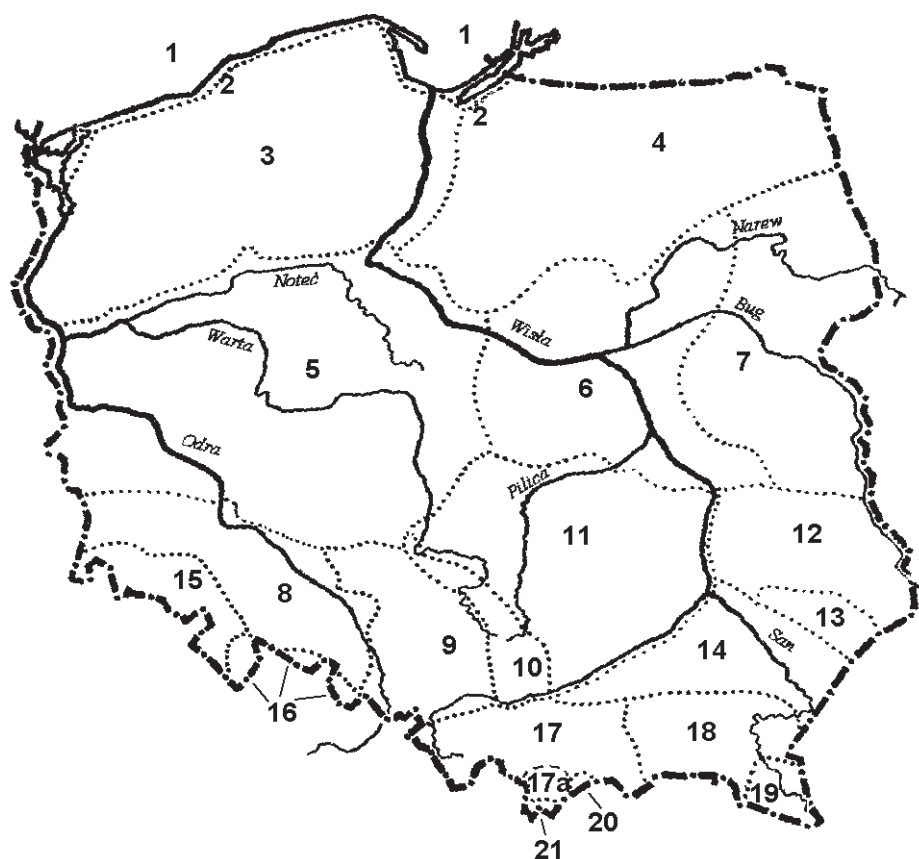


Fig. 1. Division of Poland into regions according Prost (1966) [4]

1–Baltic Sea; 2–Baltic Coast; 3–Pomeranian Lakeland; 4–Masurian Lakeland; 5–Wielkopolska-Kujawy Lowland; 6–Masovian Lowland; 7–Podlasie; 8–Lower Silesia; 9–Upper Silesia; 10–Kraków-Wieluń Upland; 11–Małopolska Upland; 12–Lubelska Upland; 13–Roztocze; 14–Sandomierz Lowland; 15–Western Sudetes; 16–Eastern Sudetes; 17–Western Beskids; 17a–Nowy Targ Valley; 18–Eastern Beskids; 19–Bieszczady Mountains; 20–Pieniny Mountains; 21–Tatry Mountains

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Table 1. List of fish monogenean species of Poland

Monogenea	Host	Locality	References
MONOPISTHOCOTYLEA Odhner, 1912			
DACTYLOGYRIDEA Bykhovsky, 1937			
Ancyrocephalidae, Bykhovsky, 1937			
<i>Ancyrocephalus</i> Creplin, 1839			
<i>A. cruciatus</i> (Wedl, 1857)	<i>Misgurnus fossilis</i>	ML, LS, KWU	72, 41, 53
<i>A. paradoxus</i> Creplin, 1839	<i>Sander lucioperca</i> , <i>Perca fluviatilis</i>	BC, PL, ML	62, 1, 85, 4, 86, 72, 27, 37
<i>A. percae</i> Ergens, 1966	<i>Perca fluviatilis</i>	ML	22, 33
<i>Cleidodiscus</i> Müller, 1934			
<i>C. monticelli</i> (Cognetti de Martiis, 1924)	<i>Ameiurus nebulosus</i>	LU	49
<i>C. pricei</i> Müller, 1936	<i>Ameiurus nebulosus</i>	LU	49
<i>Mymarothecium</i> Kritsky, Boeger et Jögu, 1966	<i>Piaractus brachypomus</i>	PL	8
<i>M. viatorum</i> Boeger, Piasecki et Sobecka, 2002			
<i>Pseudodactylogyryus</i> Gusev, 1965			
<i>P. anguillae</i> (Yin et Sproston, 1948)	<i>Anguilla anguilla</i>	BC, PL, WKL	9, 67, 13
<i>P. bini</i> Kikuchi, 1929	<i>Anguilla anguilla</i>	BC, PL, WKL	9, 67, 13
<i>Thaparocleidus</i> Yamaguti, 1937			
<i>Th. magnus</i> (Bykhovsky et Nagibina 1957)	<i>Silurus glanis</i>	MLD	64
<i>Th. siluri</i> (Zandt, 1924)	<i>Silurus glanis</i>	ML, MLD	20
<i>Th. vistulensis</i> (Siwak, 1932)	<i>Silurus glanis</i>	ML, MLD	20, 64
Dactylogyridae Bykhovsky, 1933			
<i>Dactylogyryus</i> Diesing, 1850			
<i>D. alatus</i> von Linstow, 1878	<i>Alburnus alburnus</i> , <i>Abramis bjoerkna</i> , <i>Abramis brama</i> (hybrids), <i>Rutilus rutilus</i>	PL, ML, MLD	25, 1, 48, 10
<i>D. amphibothrium</i> Wagener, 1857	<i>Gymnocephalus cernuus</i> , <i>Leuciscus leuciscus</i>	BC, ML, WKL, MLD, LU	62, 87, 22, 1, 43, 10, 43
<i>D. anchoratus</i> (Dujardin, 1845)	<i>Cyprinus carpio</i> , <i>Carassius carassius</i> , <i>Tinca tinca</i>	BC, ML, WKL, MLD, LS, US, MU, LU	85, 72, 1, 4, 28, 29, 75, 76, 77, 23, 69, 66, 43, 47
<i>D. aristichthys</i> Long et Yu, 1958	<i>Hypophthalmichthys (Aristichthys) nobilis</i>	MLD	39
<i>D. auriculatus</i> (von Nordmann, 1832)	<i>Abramis brama</i> , <i>Abramis bjoerkna</i> , <i>Rutilus rutilus</i> , <i>Scardinius erythrophthalmus</i>	PL, ML, WKL, BC, WKL, LU, MLD	73, 25, 17, 22, 14, 18, 37, 11, 12, 40, 43, 43, 43, 43, 60
<i>D. borealis</i> Nybelin, 1936	<i>Phoxinus phoxinus</i>	B	50
<i>D. caballeri</i> Prost, 1960	<i>Rutilus rutilus</i>	BC, ML, MLD, WKL	46, 15, 18, 37, 43, 43
<i>D. carpathicus</i> Zachvatkin, 1951	<i>Barbus barbus</i> , <i>Barbus peloponnesius</i>	MLD, NTV	21, 55
<i>D. chraniilovi</i> Bykhovsky, 1931	<i>Abramis ballerus</i>	PL	73
<i>D. cornoides</i> Gläser et Gusev, 1967	<i>Abramis bjoerkna</i> , <i>Vimba vimba</i>	PL, ML, MLD	73, 22, 18, 58
<i>D. cornu</i> von Linstow, 1878	<i>Abramis bjoerkna</i> , <i>Vimba vimba</i> , <i>Abramis brama</i> , <i>Rutilus rutilus</i>	BC, PL, ML, WKL, MLD, LU	43, 25, 73, 1, 22, 18, 25, 40, 43, 43, 43

- D. crassus* Kulwieć, 1927
D. crucifer Wagener, 1857
D. difformis Wagener, 1857
D. difformoides Gläser et Gusev, 1967
D. distinguendus Nybelin, 1937
D. ergensi Molnar, 1964
D. ersinensis Spassky et Roytman, 1960
D. extensus Müller et Van Cleave, 1932
D. falcatus (Wedl, 1857)
D. fallax Wagner, 1857
D. formosus Kulwieć, 1927
D. fraternus Wegner, 1910
D. frissi Bykhovsky, 1933
D. hypophthalmichthys Achmerov, 1952
D. intermedius Wegner, 1909
D. izjumovae Gussev, 1966
D. lamellatus Achmerov, 1952
D. macracanthus Wegener, 1910
D. malleus von Linstov, 1877
D. micracanthus Nybelin, 1937
D. minor Wagner, 1857
D. minutus Kulwieć, 1927
D. nanus Dogiel et Bykhovsky, 1934
D. nobilis Long et Yu, 1958
D. parvus Wegener, 1910
D. phoximi Malevitzkaya, 1949
D. rarissimus Gusev, 1966
D. rutili Gläser, 1965
D. similis Wegener, 1909
D. sphyrna von Linstow, 1878
- Carassius carassius*
Rutilus rutilus, *Abramis brama*,
Scardinius erythrophthalmus
Scardinius erythrophthalmus, *Leuciscus leuciscus*
Abramis bjoerkna, *Rutilus rutilus*
Scardinius erythrophthalmus
Abramis bjoerkna, *Vimba vimba*, *Abramis brama*,
Scardinius erythrophthalmus
Freshwater fish
Eupallasea perenurus
Cyprinus carpio
Abramis brama, *Abramis bjoerkna*
Leuciscus cephalus, *Rutilus rutilus*, *Abramis brama*, *Abramis bjoerkna*, *Scardinius erythrophthalmus*, *Alburnus alburnus*
Carassius carassius
Alburnus alburnus
Rutilus rutilus
Hypophthalmichthys molitrix
Carassius carassius, *Cyprinus carpio*
Scardinius erythrophthalmus
Cteropharyngodon idella
Tinca tinca
Barbus barbus
Leuciscus cephalus, *Rutilus rutilus*
Alburnus alburnus, *Abramis bjoerkna*,
Leucaspis delineatus
Cyprinus carpio
Rutilus rutilus, *Abramis bjoerkna*, *Abramis brama*,
Leuciscus cephalus
Hypophthalmichthys (Aristichthys) nobilis
Alburnus alburnus
Eupallasea perenurus (former name)
Phoxinus phoxinus
Rutilus rutilus
Rutilus rutilus
Rutilus rutilus
Abramis brama, *Vimba vimba*, *Abramis bjoerkna*,
Rutilus rutilus
- ML, MLD, LU, LS
BC, PL, ML, WKL
MLD, US, LU, MU
ML, MLD, LU
ML
PL, ML, WKL, MLD
MLD
LU
BC, PL, ML, MU, LU
PL, ML, WKL, BC, LU
PL, ML, WKL, MLD, US
73 17, 1 16 18 22, 43 40,
25, 24
MLD, LU, US
ML
ML
MLD
ML, LU, LS, US
WKL
MLD
PL, ML
MLD
ML, WKL
ML, MLD
ML, MLD, US, LS,
MU, LU
BC, ML, WKL, MLD,
MU, LU
ML, MLD
ML
LU
ML, MLD
ML
ML, WKL, LU
BC, PL, ML, WKL,
MLD, LU
1 72, 29, 5, 23 31
43, 62, 25 1, 22 15 18 37,
40, 10 25, 24, 43, 43
1 22 16 18 37 1, 43 25, 43
22 16
73 25, 22 18 37, 40, 58
58
51
62, 45, 22, 47, 88
73 25, 18 25 22 14 37, 11
12 40, 43, 43
73 17, 1 16 18 22, 43 40,
25, 24
29, 43, 31
48 18
1
39
20 37, 43, 23, 31
40
39
20, 72
10 21
15, 40
48 54 18, 10
22, 29, 69, 23, 66, 4
43, 22 15 18 37, 40, 43,
43, 43
22, 39
48 18
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15, 59
22 15
22 15 18, 40, 43
43, 73, 22 15 18 37
25, 40, 43, 43

Monogenea	Host	Locality	References
<i>D. suchengtai</i> Gusev, 1962	<i>Hypophthalmichthys molitrix</i>	MLD	39
<i>D. suecicus</i> Nybelin, 1937	<i>Rutilus rutilus</i>	ML, MLD	15 18, 59
<i>D. tincae</i> Gusev, 1966	<i>Tinca tinca</i>	ML, MLD	37, 58
<i>D. triappendix</i> Wierzbicka et Gronet, 1997	<i>Tinca tinca</i>	PL	74
<i>D. tuba</i> von Linstow, 1878	<i>Leuciscus idus</i> , <i>Aspius aspius</i>	PL, MLD, BC, WKL, LU	68, 21 43, 43, 43, 43
<i>D. vastator</i> Nybelin, 1924	<i>Cyprinus carpio</i> , <i>Carassius carassius</i> , <i>Carassius auratus gibelio</i> , <i>Tinca tinca</i> , <i>Misgurnus fossilis</i>	BC, ML, MLD, LS, US, MU, LU	62, 20, 29, 75 76 77 78 23, 69 7, 4, 43
<i>D. vistulae</i> Prost, 1957	<i>Leuciscus cephalus</i> , <i>Vimba vimba</i> , <i>Rutilus rutilus</i> <i>Chondrostoma nasus</i>	BC, WKL, MU, LU	62, 43, 43, 43 44
<i>D. wegneri</i> Kulwiec, 1927	<i>Carassius carassius</i>	ML, MLD, LU	1, 29, 43
<i>D. wunderi</i> Bykhovsky, 1931	<i>Abramis brama</i> , <i>Abramis bjoerkna</i> , <i>Scardinius erythrophthalmus</i>	BC, PL, ML, WKL, MLD	43 62, 25 73 17, 22 14 18 37, 40 11 12, 25 43
<i>D. zandti</i> Bykhovsky, 1933	<i>Abramis brama</i>	BC, PL, ML, WKL, MLD, LU	43, 25 73 17, 22 14 18 37 25, 40 11 12, 43, 43
<i>Pseudocolpenteron</i> Bykhovsky et Gusev, 1955	<i>Cyprinus carpio</i>	WS	52
<i>Pseudocolpenteron pavlovskii</i> Bykhovsky et Gusev, 1955			
Tetraonchidae Bykhovsky, 1937			
<i>Tetraonchus</i> Diesing, 1850			
<i>T. monenteron</i> (Wagener, 1857)	<i>Esox lucius</i>	PL, ML, WKL, MLD, LU, WB	20, 72 1 26 27 37 14, 42, 43, 40, 43
Gyrodactylidae Bykhovsky, 1937			
Gyrodactylidae van Beneden et Hesse, 1863			
<i>Gyrodactylus</i> von Nordmann, 1832			
<i>G. alburnensis</i> Prost, 1972	<i>Alburnus alburnus</i>	ML	48
<i>G. alburnoidesi</i> Chiriac, 1969	<i>Alburnoides bipunctatus</i>	B	57
<i>G. aphya</i> Malmberg, 1957	<i>Phoxinus phoxinus</i>	B	50
<i>G. arcuatus</i> Bykhovsky, 1933	<i>Gasterosteus aculeatus</i> , <i>Pungitius pungitius</i> , <i>Alburnus alburnus</i>	BC, ML	38 80 82 70, 18
<i>G. barbattuli</i> Achmerov, 1952	<i>Barbatula barbatula</i>	NTV, R	53
<i>G. barbi</i> Ergens, 1976	<i>Barbus peloponnesius</i>	NTV	55
<i>G. cobitis</i> Bykhovsky, 1933	<i>Cobitis taenia</i> , <i>Misgurnus fossilis</i>	KWU	53
<i>G. cyprini</i> Diarova, 1964	<i>Cyprinus carpio</i>	WS	52
<i>G. decorus</i> Malmberg, 1957	<i>Abramis bjoerkna</i> , <i>Rutilus rutilus</i> , <i>Alburnus alburnus</i>	WKL, ML	40, 14
<i>G. derjavinoidea</i> Malmberg, Collins, Cunningham, Jajali, 2007; syn: <i>G. derjavini</i> Mikhailov, 1975	<i>Salmo trutta m. fario</i> , <i>Oncorhynchus mykiss</i> , <i>Salvelinus fontinalis</i> , <i>Salmo trutta m. trutta</i>	NTV, BC, WB	56, 61, 35
<i>G. elegans</i> von Nordmann, 1832	<i>Cyprinus carpio</i> , <i>Abramis brama</i> , <i>Abramis bjoerkna</i> , <i>Abramis ballerus</i>	PL, ML, US	73 17, 65 22 18 37, 24
<i>G. euzeti</i> Prost, 1993	<i>Alburnoides bipunctatus</i>	R	57

<i>G. fairporti</i> Van Cleave, 1921	<i>Ameiurus nebulosus</i>	LU	49
<i>G. flesi</i> Malmberg, 1952	<i>Platichthys flesus</i>	BS	79 81
<i>G. gobiensis</i> Gläser, 1974	<i>Gobio gobio</i>	ML	54
<i>G. gobii</i> Schulman, 1953	<i>Gobio gobio</i>	ML	54
<i>G. gracilithamatus</i> Malmberg, 1964	<i>Alburnoides bipunctatus</i>	B	57
<i>G. hronosus</i> Žitnan, 1964	<i>Alburnoides bipunctatus</i>	R	57
<i>G. jiroveci</i> Ergens et Bykhovskiy, 1967	<i>Barbatula barbatula</i>	EB, NTV	53, 53
<i>G. katharineri</i> Malmberg, 1964	<i>Barbus peloponnesius</i> , <i>Cyprinus carpio</i>	WKL, WS, LU, NTV	52, 52, 55, 55
<i>G. laevis</i> Malmberg, 1957	<i>Abramis bjoerkna</i> , <i>Abramis brama</i> , <i>Rutilus rutilus</i> , <i>Abramis ballerus</i> , <i>Phoxinus phoxinus</i>	PL, ML, B	73, 22 15 18, 50
<i>G. limnaeus</i> Malmberg, 1964	<i>Eupallasella perenurus</i> (former name <i>Phoxinus percnurus</i>)	LU	51
<i>G. llewellyni</i> Ergens et Dulmaa, 1967	<i>Phoxinus phoxinus</i> , <i>Eupallasella perenurus</i> (former name <i>Phoxinus percnurus</i>)	LU	51
<i>G. luckiensis</i> Prost, 1981; syn: <i>G. misgurni</i> Ling, 1952	<i>Misgurnus fossilis</i>	KWU	53 19
<i>G. macronychus</i> Malmberg, 1957	<i>Phoxinus phoxinu</i>	B	50
<i>G. magnificus</i> Malmberg, 1957	<i>Eupallasella perenurus</i> (former name <i>Phoxinus percnurus</i>)	LU	51
<i>G. malmbergensis</i> Prost, 1974	<i>Phoxinus phoxinus</i>	B	50
<i>G. malmbergi</i> Ergens, 1961	<i>Barbus peloponnesius</i>	NTV	55
<i>G. markakalensis</i> Gvosdev, 1950	<i>Gobio gobio</i>	ML	54
<i>G. markewitschi</i> Kulakovskaya, 1951	<i>Barbus peloponnesius</i>	NTV	55
<i>G. medius</i> Kathariner, 1895	<i>Pungitius pungitius</i> , <i>Cyprinus carpio</i> , <i>Zoarces viviparus</i>	BS, ML	36 80, 1 22
<i>G. menschikowi</i> Gvosdev, 1950	<i>Barbatula barbatula</i>	R, NTV, B	53
<i>G. minimus</i> Malmberg, 1957	<i>Phoxinus phoxinus</i>	B	50
<i>G. nemachili</i> Bykhovskiy, 1936	<i>Carassius auratus gibelio</i>	LU	6
<i>G. pannonicus</i> Molnar, 1968	<i>Phoxinus phoxinus</i>	B	50
<i>G. parvicopula</i> Bykhovskiy, 1933	<i>Abramis brama</i> , <i>Abramis bjoerkna</i>	BC, MLD, WKL	43, 43, 40
<i>G. pavlovskiy</i> Ergens et Bykhovskiy, 1967	<i>Barbatula barbatula</i>	EB	53
<i>G. percnuri</i> Prost, 1975	<i>Eupallasella perenurus</i> (former name <i>Phoxinus percnurus</i>)	LU	51
<i>G. phoxini</i> Malmberg, 1957	<i>Eupallasella perenurus</i> , <i>Phoxinus phoxinus</i>	LU, B	50, 51
<i>G. pomeraniae</i> Kussela, Ziętara et Lumme, 2008	<i>Rutilus rutilus</i>	BC	30
<i>G. prostaе</i> Ergens, 1957	<i>Leuciscus idus</i>	PL	68
<i>G. pseudonemachili</i> Ergens et Bykhovskiy, 1967	<i>Barbatula barbatula</i>	NTV, R, EB	53, 53, 53
<i>G. raabei</i> Prost, 1957; syn: <i>G. cernuae</i> , Malmberg, 1956	<i>Gymnocephalus cernuus</i>	LU	43 44
<i>G. sedelnikovi</i> Gvosdev, 1950	<i>Barbatula barbatula</i>	NTV, R	52
<i>G. shulmani</i> Ling, 1962	<i>Cyprinus carpio</i>	LU	52

Monogenea	Host	Locality	References
<i>G. sprostonae</i> Ling, 1962	<i>Cyprinus carpio</i>	WKL	52
<i>G. stankovici</i> Ergens, 1970	<i>Cyprinus carpio</i>	S	52
<i>G. teuchis</i> Lautreite, Blanc, Triery, Daniel et Vigneulle, 1999	<i>Salmo trutta m. fario</i> , <i>Oncorhynchus mykiss</i> , <i>Salmo trutta lacustris</i>	BC, WB	61
<i>G. truttae</i> Gläser, 1974	<i>Salmo trutta m. fario</i> , <i>Oncorhynchus mykiss</i> , <i>Salmo trutta lacustris</i>	NTV, EB, BC	56, 61, 61
<i>Gyrodactylus unicopula</i> Glukhova, 1955	<i>Platichthys flesus</i>	BS	79 81
<i>Gyrodactylus turbulli</i> Harris, 1986	<i>Poecilia reticulata</i>	MLD	32
POLYOPISTHOCOTYLEA Odhner, 1912			
MAZOCRAEIDEA Bykhovskiy, 1957			
Diplozooidae Palombi, 1949			
<i>Diplozoon</i> von Nordmann, 1832			
<i>Diplozoon paradoxum</i> von Nordmann, 1832	* <i>Abramis brama</i> , <i>Aspius aspius</i> , <i>Barbus barbus</i> , <i>Vimba vimba</i> , <i>Gymocephalus ceruus</i> , <i>Leuciscus idus</i> , <i>Leuciscus leuciscus</i> , <i>Cyprinus carpio</i> , <i>Carassius carassius</i> , <i>Leuciscus cephalus</i> , <i>Rutilus rutilus</i> , <i>Chondrostoma nasus</i> , <i>Abramis bjoerkna</i> , <i>Alburnoides bipunctatus</i> , <i>Alburnus alburnus</i> , <i>Scardinius erythrophthalmus</i>	BC, PL, ML, WKL, MLD, MU, LU	43, 62 83 84, 20 73 17 73 25, 72 1 26 22 14 15, 40 43 63 34 10, 43 71, 43
<i>Eudiplozoon</i> Khotenovsky, 1984	<i>Cyprinus carpio</i>	MLD	39
<i>E. nipponicum</i> (Goto, 1891)			
<i>Paradiplozoon</i> Achmerov, 1974	<i>Alburnoides bipunctatus</i>	B	57
<i>P. alburni</i> Khotenovsky, 1982	<i>Abramis bjoerkna</i> , <i>Leuciscus idus</i> , <i>Vimba vimba</i>	BC, PL, ML	62, 68 73, 14 18
<i>P. bliccae</i> (Reichenbach-Klinke, 1961); syn: <i>Diplozoon gusevi</i> Khotenovsky, 1981			
<i>P. homoion gracile</i> (Oliver et Reichenbach-Klinke, 1961)	<i>Gobio gobio</i> , <i>Leucaspis delineates</i>	ML	54
<i>P. homoion homoion</i> (Bykhovskiy et Nagibina, 1959)	<i>Rutilus rutilus</i> , <i>Gobio gobio</i> , <i>Alburnus alburnus</i> , <i>Phoxinus phoxinus</i> , <i>Barbus peloponnesius</i> , <i>Scardinius erythrophthalmus</i>	ML, WKL, NTV, B	14 18 15 16, 40, 55, 57
<i>P. marinae</i> (Achmerov, 1974)	<i>Hypophthalmichthys molitrix</i>	MLD	39
<i>P. megan</i> (Bykhovskiy et Nagibina, 1959)	<i>Leuciscus idus</i> , <i>Gobio gobio</i> , <i>Rutilus rutilus</i> , <i>Alburnus alburnus</i>	PL, ML, MLD	68, 14 15 18 37, 21
<i>P. nagibinae</i> (Gläser, 1965)	<i>Abramis ballerus</i>	PL	73
<i>P. pavlovskii</i> (Bykhovskiy et Nagibina, 1959)	<i>Aspius aspius</i>	MLD	21
<i>P. rutili</i> (Gläser, 1967)	<i>Alburnus alburnus</i> , <i>Rutilus rutilus</i>	BC	62
Octomacridae Yamaguti, 1963			
<i>Octomacrum</i> Müller, 1934			
<i>O. europeum</i> Roman et Bykhovskiy, 1956	<i>Alburnoides bipunctatus</i>	B	57

*Comments: The species belonging to genus *Diplozoon* sensu lato are now assigned to *Diplozoon* sensu stricto, *Eudiplozoon* Khotenovsky, 1982 and *Paradiplozoon* Achmerov, 1974. A number of new species appeared ever since and it seem to be evident that the host range of *Diplozoon paradoxum* is more narrow that previously thought. Wierzbicka (1974) [73] believed that *D. paradoxum* parasitized primarily common bream. Future molecular study should be support host specificity of *Diplozoon paradoxum*.

Monogenea comprises some 2 000 species of which 297 are known from Europe. A total of 127 infect fishes in Poland. Our checklist (Table 1) does not cover only one nominal species. This species, *Gyrodactylus gracilis*, described by Milicer [1] from German material was not included, because both the figure and the description were substandard and potentially misleading. Malmberg [2], following Gusev [3] suggested, that this species should be considered „*species inquirenda*”

The checklist of fish monogenean species of Poland (Table 1) was compiled based on literature sources and it covers: the parasite species, the host, geographic locality (in Poland), and the author of the publication. I referred to the zoogeographic regions of Poland earlier proposed by Prost [4], and presented in Fig. 1. It should be emphasized, however, that this system has not been fully supported by faunistic research. The presently used systematic arrangement of Monogenea is consistent with the system proposed by the Fauna Europaea database.

In the Table 1 the following geographical abbreviations are used:

B–Bieszczady; BC–Baltic Coast; BS–Baltic Sea; EB–Eastern Beskids; ES–Eastern Sudetes; KWU – Kraków-Wieluń Upland; LS–Lower Silesia; LU – Lubelska Upland; ML–Masurian Lakeland; MLD – Masovian Lowland; MU–Małopolska Upland; NTV–Nowy Targ Valley; P–Podlasie; PL–Pomeranian Lakeland; R–Roztocze; SU–Sandomierz Upland; US–Upper Silesia; WB–Western Beskids; WKL–Wielkopolska-Kujawy Lowland; WS–Western Sudetes.

The references are arranged following the sequences of geographical regions; those concerning the same region are not separate by comma.

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