

Checklist of macroinvertebrates in the River Vistula

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Abstract – From the second half of the 19th century up to the present time 600 macroinvertebrate taxa were found in the Vistula. Most data concern Chironomidae (152 taxa), Oligochaeta (64), Trichoptera (57), Ephemeroptera (50), and Mollusca (50). Numerous groups, however, have not been investigated or are known only to a very small degree. Also the degree of determination of the fauna was not the same in various reaches of the river. The collected data document that the pollution of the River Vistula and the construction of dam reservoirs and of a system of cascades brought about a dramatic reduction in the number of species and caused change in the composition of the fauna.

Key words: River Vistula, benthic macroinvertebrates, biodiversity, river pollution.

1. Introduction

The River Vistula is among those Polish rivers which are poorly known in the hydrobiological aspect. So far, apart from the routine controls of the degree of pollution (Florczyk et al. 1971, 1972, Jarmolińska et al. 1975, 1981, Fila et al. 1986, Dojlido and Woyciechowska 1989, Korol et al. 1994) a comprehensive hydrobiological study of this river is still lacking. Great research projects undertaken in the 40's (Staff and Sakowicz 1951) and then in the 80's (the "Vistula Programme") did not contribute any significant results. There are available a fairly large number of fragmentary studies conducted in various reaches of the Vistula, though their results are scattered in numerous Polish and foreign journals (Kownacki et al. 1994). On the basis of the accessible literature a few attempts were made to recapitulate the current hydrobiological knowledge concerning the Vistula and its catchment basin (Kajak 1983, Dynowska and Maciejowski 1991). In some papers the fauna of bottom macroinvertebrates was taken into consideration (Szczęsny 1991), but the fauna of the Vistula was treated as a marginal problem, the investigation being concentrated on its tributaries. Thus, it seemed necessary to recapitulate the scattered information concerning bottom macroinvertebrates of the Vistula.

The aim of the present work was to list all the bottom macroinvertebrate taxa in the Vistula from the second half of the 19th century (Friedel 1885, Wierzejski 1885, 1888) to 1998 and if possible to demonstrate the changes in the fauna of this river under the impact of human activity. The list includes the bottom macrofauna

of the River Vistula from its sources to the Baltic Sea. Also the fauna of ox-bow lakes and river arms directly connected with this river and of reservoirs and water stages constructed on it were taken into consideration. The fauna of dam reservoirs was not separately listed. In the case of all the reservoirs and water stages on the Vistula no investigation had been conducted before their construction or at least no results of such studies were published. Therefore it was not possible to make any reliable comparisons. On the other hand, as far as the available literature permitted, changes in the fauna of macroinvertebrates induced by pollution or other kinds of human activity were stressed.

2. Study area, material, and methods

The greatest Polish River, the Vistula, is 1047 km long and its drainage basin covers $194.4 \cdot 10^3$ km². The river originates from two streams, the Biała Wisielka and Czarna Wisielka, flowing out of sources lying on the slopes of Mount Babia Góra (Beskid Śląski Mts, the Carpathians) at an altitude of about 1100 m.

Already in its initial course the Vistula receives considerable loads of pollution from the localities of Wisła, Ustroń, and Skoczów. Further important sources of pollution are the River Biała (wastes from Bielsko-Biała), River Przemsza (wastes from the Upper Silesian Industrial Region), and also municipal and industrial wastes from Oświęcim, Cracow, Tarnobrzeg, the nitrogen factory in Puławy, chemical plants in Pionki, the city of Warsaw, Płock, Włocławek, Toruń, Matwy, and Bydgoszcz. In 1992 only the source reaches of the Vistula might have been classed as quality class I (Korol et al. 1994), this constituting 3.5% of the entire river course. Waters of quality class II were found in 29.1% of the river, of in quality class III in 14.6%, while those outside quality classification constituted 52.7% of the river course.

A number of dam reservoirs and water stages were constructed on the Vistula: in the upper course the Wisła-Czarne Reservoir, the Goczałkowice Reservoir with a cascade composed of several water stages (Łączany, "Kościuszko", Dąbie, Przewóz) and in the lower river course the Włocławek Reservoir. No hydrotechnical constructions were introduced in the middle reach of the Vistula and it has preserved its natural character to a considerable degree. The entire length of the River Vistula was divided into ten reaches (Fig. 1) which are listed below. The length of the reaches was determined on the basis of data given by Czarnecka et al. (1978), with the source of the Czarna Wisielka stream accepted as kilometre 0.0 (in the paper quoted above the 0.0 km is the confluence of the Rivers Vistula and Przemsza).

1. Czarna Wisielka (9.1 km) and Biała Wisielka (6.2 km), the Wisła-Czarne Reservoir, and the reach above Goczałkowice Reservoir up to the closed river gauge "Strumień" (0.0–50.1 km).
2. The Goczałkowice Reservoir and the reach of the Vistula to the mouth of the River Przemsza (50.1–106.2 km).
3. The reach from the Przemsza outflow to the river gauge "Kraków-Bielany" above the city of Cracow, with the water stages Łączany and "Kościuszko" (106.2–175.4 km).
4. The reach from the river gauge "Kraków-Bielany" to the outflow of the River Dunajec; here belongs the reach within the city of Cracow with water stages Dąbie and Przewóz (175.4–266.8 km).

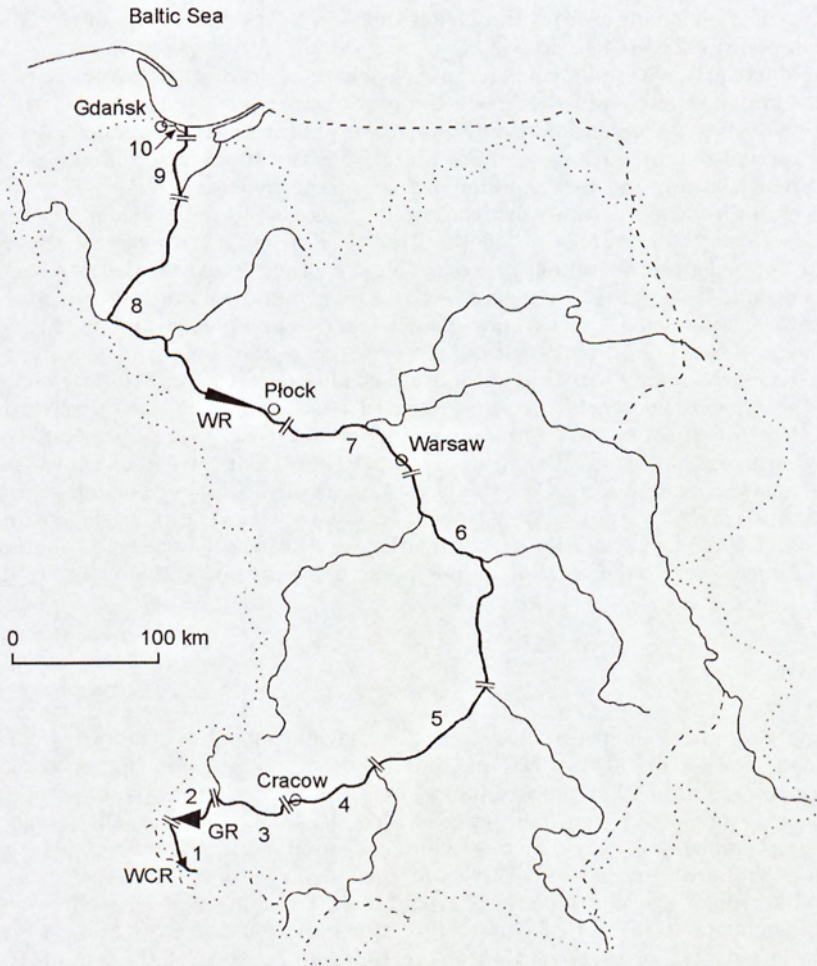


Fig. 1. Division of the River Vistula into reaches (1–10): GR – Goczałkowice Reservoir, WCR – Wisła-Czarne Reservoir, WR – Włocławek Reservoir (dotted line – the Vistula watershed). In the Cracow region the cascade composed of four water stages (Łączany, "Kościuszko", Dąbie, and Przewóz) was not marked.

5. The reach from the outflow of the River Dunajec to that of the River San (266.8–385.9 km).
6. The reach from the outflow of the San to the outflow of the River Jeziorka above the city of Warsaw (385.9–599.9 km).
7. The reach from the mouth of the Jeziorka to the planned water stage Płock lying above the town of Płock; here belongs the reach within the Warsaw agglomeration (599.9–732.2 km).
8. The reach from the Płock water stage to the Nogat arm division (the beginning of the Vistula river delta); this reach includes the Włocławek Reservoir (732.2–992.8 km).

9. The main river channel from the Nogat division to the beginning of the Martwa Wisła channel (992.8–1042.2 km).

10. The Martwa Wisła (the former main river channel flowing out to the Baltic Sea, about 27 km in length) and the Wisła Śmiała (about 3 km).

This division has a conventional and subjective character. It was chiefly based on studies carried out by various authors (data from the literature), on the pollution of the River Vistula, and to a smaller degree on the hydrography.

The materials used in the work consisted of accessible publications, typescripts (expertise reports) deposited in the Institute of Freshwater Biology of the Polish Academy of Sciences or rendered accessible by other research centres, and unpublished data from various experts. All the taxa found in the above works were taken into consideration apart from evident errors or previously published revisions questioning the given identification. In this case the taxon in question was regarded as erroneously identified and appropriately marked. An attempt was made to use the current nomenclature, the accepted basis being the works by Razowski (1991a, 1991b, 1997a, 1997b). The only synonyms used were those previously given in the literature concerning the River Vistula. The nomenclature of Chironomidae was particularly troublesome. Most determinations of the *ex grege* or *forma larvalis* type have a generic value today. A few species only can be properly identified on the basis of their larval stages. If within the genus several taxa were quoted, the Roman figures were used, earlier names being given in brackets.

3. Results

Along the entire length of the River Vistula 600 macroinvertebrate taxa have been identified so far (Table I). This number does not include higher taxonomic units (genera, families) if more detailed determinations were given within their limits, or erroneously identified taxa, which are also given in the Table with successive numbers. The synonyms were not numbered. A total of 684 taxa of various systematic grades and correctness of identification are listed. The most numerous groups are Chironomidae (152 taxa), Trichoptera (57), Ephemeroptera (50), Oligochaeta (64), and Mollusca (50). However, most groups are very poorly known. The degree of investigation of the separate reaches of the Vistula is also strongly varied. The fauna of the upper course of the river from its sources to the Goczałkowice Reservoir (reach 1) has been fairly thoroughly investigated. This also concerns the Goczałkowice Reservoir (reach 2), the River Vistula within the Cracow area (reach 4), the Warsaw region (reach 7), the Włocławek Reservoir (reach 8), and the old outflow reach of the Vistula (reach 10). On the other hand, the middle course of the River from the outflow of the Dunajec to the city of Warsaw (reaches 5 and 6) are poorly known. Also the knowledge of the separate groups of the fauna in various reaches of the Vistula is not uniform. For example, the number of taxa of the fairly well investigated group of Ephemeroptera varies in the different reaches from 19 (reach 1) and 22 (reach 9) to 0 (reaches 5 and 10).

5. Discussion

The number of 600 taxa determined in the River Vistula, its arms and dam reservoirs is not large, if the size of the river and variety of habitats are taken into consideration. The comparison of the fauna in the Vistula with the list of animals in Poland (Razowski 1990, 1991a, 1991b, 1997a, 1997b) suggests that the river is poorly known in the faunal aspect. The number of Oligochaeta and Trichoptera found in it only reaches a 50% share in the total number of taxa found in Poland, while Chironomidae do not reach more than 35% and Trichoptera 25%. The degree of knowledge of the remaining groups is even lower. Numerous determinations originated in the 19th century and have not yet been verified, e.g. Porifera (Wierzejski 1885) or Bryozoa (Wierzejski 1888).

The pollution of the river and changes in the character of its hydrology induce significant changes in the composition of fauna in the Vistula. Currently a decline in numerous species is observed in the most polluted reaches of the river. Within the Cracow region all the Ephemeroptera, Plecoptera, and Trichoptera have disappeared although their occurrence was still recorded in the 40's (Starmach 1948). On the other hand, the numbers of Oligochaeta have increased, reaching 63–99% of the entire fauna (Dumnicka and Kownacki 1988). The construction of dam reservoirs has also affected natural zoocoenoses, bringing about the decline of numerous species. In the Wisła-Czarne Reservoir, fed with waters of the Biała Wisetka and Czarna Wisetka, the zoobenthos is chiefly composed of Oligochaeta (*Limnodrilus hoffmeisteri* and *Tubifex tubifex*), and less numerous Chironomidae (*Procladius* spp., *Ablabesmyia* sp., *Prodiamesa olivacea*, *Dicrotendepis* sp., and *Chironomus* sp.) (Krzyżanek 1991). On the other hand, the typical fauna of the streams of the upper Vistula of a great taxonomic diversity with Ephemeroptera, Trichoptera, Chironomidae (chiefly Orthocladinae), and Simuliidae dominating (Mikulski 1950, Szczęsny 1986, 1995, Boklak et al. 1993, Kownacki 1995), does not occur in that reservoir. The construction of cascades has brought about a further impoverishment of the species diversity even in the most polluted reach of the Vistula between Oświęcim and Cracow. In the reservoir at the Łączany water stage (km 144th of the Vistula course) Oligochaeta, chiefly *Limnodrilus hoffmeisteri*, constitute 99.9% of the bottom fauna while in the non-regulated reach above the reservoir (km 159) the diversity of the fauna is much greater in spite of a similar load of pollution (Kownacki 1988). It is true that Oligochaeta still dominate there, but they constitute only 63% of the numbers of the total fauna, Chironomidae are fairly numerous (34%), Hirudinea and Gastropoda occur constantly, and single individuals of Amphipoda, Simuliidae, Chaoboridae, Psychodidae, and Coleoptera may be encountered.

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Table I. The list of benthic macroinvertebrates found in the Vistula: ● – present, + – extinct.

Taxa	Sector									
	1	2	3	4	5	6	7	8	9	10
PORIFERA										
Spongillidae (Wierzejski 1885, Arndt 1965, Krzyżanek and Krzyżanek 1987, Dumnicka and Kownacki 1988)										
1. <i>Spongilla lacustris</i> (L.)			+	+						
2. <i>Ephydatia fluviatilis</i> (L.)	●		+							●
3. <i>Eunapius fragilis</i> (Leidy)			+							
4. <i>Trochospongilla horrida</i> Weltner [= <i>T. erinaceus</i>]				+						
COELENTERATA										
Hydrozoa (Arndt 1965, Krzyżanek and Krzyżanek 1987)										
5. <i>Hydra</i> sp.		●					●	●		
6. - <i>vulgaris</i> Pall.		●								
7. <i>Cordylophora caspia</i> Pall.										●
PLATHELMINTHES										
Turbellaria (Gieysztor 1938, Arndt 1965)										
8. <i>Pseudosyrts fluviatilis</i> (Gieysztor) [= <i>Otoplana fluviatilis</i> Gieysztor]							●			
9. <i>Planaria torva</i> (Müller)										●
10. <i>Dendrocoelum lacteum</i> (Müller)										●
11. <i>Procerodes ulvae</i> ¹										●
NEMATHELMINTHES										
Nematomorpha (Krzyżanek and Krzyżanek 1987)										
12. <i>Gordius aquaticus</i> L.		●								
Nematoda										
13. Nematoda non det.			●				●	●		●
ANNELIDA										
Polychaeta (Arndt 1965, Klekot 1972, Koszteyn 1977)										
14. <i>Alkmarmaria romijni</i> Horst										●
15. <i>Manayunkia aesturina</i> (Bourne)										●
16. <i>Nereis (Hediste) diversicolor</i> O.F. Müller										●
17. <i>Streblospio shrubsolii</i> (Buchanan)										●
18. <i>Pygospio elegans</i> Clap.										●

¹ Old name, the current position of the taxon not established.

Table I. continued

Taxa	Sector									
	1	2	3	4	5	6	7	8	9	10
Oligochaeta (Szarski 1948, Mikulski and Tarwid 1951, Tarwid et al. 1953, Szczepański 1953, Moszyńska 1962, Arndt 1965, Zięba and Zaćwilichowska 1966, Klekot 1972, Dumnicka and Srokosz 1976, Koszteyn 1977, Dumnicka et al. 1988, Dumnicka and Kownacki 1988, Krzyżanek and Krzyżanek 1987, Giziński et al. 1989, Zytkowicz et al. 1990, Dumnicka unpubl., J. Zielonka and I. Jaworowska unpubl.)										
19. <i>Aeolosoma</i> sp.										•
20. <i>Chaetogaster diaphanus</i> (Gruithuisen)	•	•	•		•					•
21. - <i>diastrophus</i> (Gruithuisen)	•	•	•	•	•					
22. - <i>langi</i> Bret.		•								
23. - <i>limnaei</i> V. Bear		•								
24. <i>Amphichaeta leydigi</i> Tauber					•					
25. <i>Stylaria lacustris</i> (L.)	•	•	•		•		•	•	•	•
26. <i>Dero</i> (<i>D.</i>) <i>digitata</i> (O.F. Müller) [= <i>D. limosa</i> Leidy]			•	•	•		•			
27. - (<i>D.</i>) <i>obtusa</i> d'Udekem							•			
28. - (<i>Aulophorus</i>) <i>furcata</i> (O.F. Müller)			•		•					
29. <i>Nais</i> sp.	•							•	•	
30. - <i>alpina</i> Sperber	•	•			•					
31. - <i>barbata</i> O.F. Müller [= <i>N. obtusa</i> Gervais]	•	•	•		•		•			
32. - <i>bretscheri</i> Michaelsen	•	•			•					
33. - <i>communis</i> Piguet	•	•		•	•					
34. - <i>christinae</i> Kasprzak	•	•	•		•					
35. - <i>elinguis</i> O.F. Müller	•	•	•	•	•		•			•
36. - <i>pardalis</i> Piguet	•	•			•					
37. - <i>pseudoobtusa</i> Piguet	•	•								
38. - <i>simplex</i> Piguet	•									
39. - <i>variabilis</i> Piguet	•									
40. <i>Vejdovskyella comata</i> (Vejdovsky)					•					
41. - <i>intermedia</i> (Bretscher)	•	•			•					
42. <i>Ripistes parasita</i> (Schmidt)	•									
43. <i>Ophidonais serpentina</i> (O.F. Müller)	•	•			•		•			
44. <i>Homochaeta naidina</i> Bretscher			•		•					
45. <i>Paranais frici</i> Hrabe			•	•	•					
46. <i>Uncinaiis uncinata</i> (Oersted)		•	•		•					
47. <i>Pristinella idrensis</i> Sperber	•	•								
48. - <i>rosea</i> (Piguet) [= <i>Pristina lutea</i> Grube]					•					•
49. <i>Pristina aequiseta</i> Bourne		•								
50. - <i>foreli</i> (Piguet)	•				•					
51. - <i>longiseta</i> Ehr.		•								
52. <i>Slavina appendiculata</i> (d'Udekem)	•									
53. <i>Psammoryctides albicola</i> (Michaelsen)			•		•					
54. - <i>barbatus</i> (Grube) [= <i>Tubifex barbatus</i> Grube]					•		•	•		

Table I. *continued*

Taxa	Sector									
	1	2	3	4	5	6	7	8	9	10
55. <i>Euiyodrilus hammoniensis</i> (Michaelsen) [= <i>Potamothrix hammoniensis</i> Michaelsen]	●	●					●			●
56. <i>Potamothrix moldaviensis</i> Vejdovsky et Mrazek		●		●						
57. <i>Ilyodrilus</i> sp.								●		
58. - <i>templetoni</i> (Southern)		●					●			
59. <i>Spirosperma ferox</i> Eisen			●		●					
60. <i>Tubificoides heterochaetus</i> (Michaelsen)										●
61. <i>Peloscolex</i> sp.								●		
62. - <i>benedi</i> (d'Udekem)										●
63. - <i>moszynskii</i> Kasprzak			●							
64. <i>Tubifex costatus</i> (Claparede)										●
65. - <i>ignotus</i> (Štolz) [= <i>T. filum</i> Michaelsen]		●						●		
66. - <i>tubifex</i> (O.F. Müller) [= <i>T. rivulorum</i> Lamarck]	●	●	●	●	●		●	●	●	
67. <i>Aulodrilus limnobius</i> Bretscher					●					
68. - <i>pluriseta</i> (Piguet)					●					
69. <i>Limnodrilus claparedeanus</i> Ratzel		●	●	●	●		●		●	
70. - <i>hoffmeisteri</i> Claparede	●	●	●	●	●		●	●	●	●
71. - <i>profundicola</i> (Verrill)		●	●	●	●					
72. - <i>udekemanus</i> Claparede		●	●	●	●		●			
73. <i>Propappus volki</i> Michaelsen	●	●	+	+	●	●	●	●	●	●
74. <i>Cernovitoviella atrata</i> (Bretscher)	●									
75. <i>Cognettia</i> sp.	●									
76. <i>Lumbricillus lineatus</i> (O.F. Müller)										●
77. - <i>rivalis</i> Levinsen			●	●						
78. <i>Marionina riparia</i> Bretscher		●	●		●					
79. <i>Enchytraeus albidus</i> Henle										●
80. - <i>buchholzi</i> Vejdovsky		●	●		●					
81. <i>Eiseniella tetraedra</i> (Savigny)			●		●					
82. <i>Stylodrilus heringianus</i> Clap.								●	●	
83. Lumbricidae non det.								●	●	
Hirudinea (Starmach 1948, Mikulski and Tarwid 1951, Pawłowski 1951, Zięba and Zaćwilichowska 1966, Klekot 1972, Krzyżanek and Krzyżanek 1987, Dumnicka and Kownacki 1988, J. Zielonka and I. Jaworowska unpubl.)										
84. <i>Glossiphonia complanata</i> (L.)		●	●	●			●	●	●	
85. - <i>heteroclita</i> (L.)		●	●	●				●		
86. <i>Boreobdella verrucata</i> (F. Müller)		●								
87. <i>Helobdella stagnalis</i> (L.)		●	●	●			●	●	●	●
88. <i>Hemiclepsis marginata</i> (O.F. Müller)		●						●		
89. <i>Piscicola geometra</i> (L.)		●					●	●		●
90. <i>Cystobranchus fasciatus</i> (Koll.)		●								
91. - <i>mammillatus</i> (Malm.)		●								
92. <i>Haemopsis sanguisuga</i> (L.)							●	●		

Table I. continued

Taxa	Sector									
	1	2	3	4	5	6	7	8	9	10
93. <i>Erpobdella nigricollis</i> (Brandes)							•	•	•	
94. - <i>octooculata</i> (L.)		•	•	•			•	•	•	•
95. - <i>testacea</i> (Savigny)			•	•						
96. <i>Dina lineata</i> (O.F. Müller) [= <i>Erpobdella lineata</i> O.F. Müller]								•		
MOLLUSCA (Friedel 1885, Poliński 1917, Jankowski 1933, Feliksiak 1933, 1959, Mikulski and Tarwid 1951, Cabejszek et al. 1957, Stańczykowska 1960, Arndt 1965, Ławiński 1968, Zięba and Zaéwilichowska 1966, Klekot 1972, Koszteyn 1977, Piechocki 1979, 1987, 1989, Krzyżanek and Krzyżanek 1987, Dumnicka et al. 1988, Dumnicka and Kownacki 1988, Wielkosz and Tadjajewska 1988, Giziński et al. 1989, Żytkowicz et al. 1990, Piechocki and Dyduch-Falniowska 1993, Krzyżanek 1991, 1994, Szczęśny 1995, Zielonka and Jaworowska unpubl.)										
Gastropoda										
97. <i>Theodoxus fluviatilis</i> (L.)							•	•		
98. <i>Viviparus viviparus</i> (L.) [= <i>V. fasciatus</i> O.F. Müller]		•	•	•			•	•	•	•
99. <i>Valvata</i> (V.) <i>crystata</i> O.F. Müller		•								
100. - (<i>Borysthenia</i>) <i>naticina</i> Menke		•					•	•	•	
101. - (<i>Cincinna</i>) <i>piscinalis</i> (O.F. Müller)		•		•			•	•	•	
102. - (<i>C.</i>) <i>pulchella</i> Studer		•								
103. <i>Potamopyrgus jenkinsi</i> (E.A. Smith)										•
104. <i>Hydrobia ulvae</i> Pennant [= <i>H. stagnorum</i> Baster]										•
105. <i>Embletonia pallida</i> Ald. et Hanc										•
106. <i>Lithoglyphus naticoides</i> (Pfeiffer)							•	•		
107. <i>Bithynia</i> sp.			•	•						
108. - <i>tentaculata</i> (L.)		•					•	•	•	•
109. <i>Aplexa hypnorum</i> (L.)		•								
110. <i>Physa acuta</i> Draparnaud			•	•						
111. - <i>fontinalis</i> (L.)		•					•			
112. <i>Lymnaea</i> (L.) <i>stagnalis</i> (L.)		•		•			•			•
113. - (<i>Galba</i>) <i>corvus</i> (Gmelin)		•					•			
114. - (<i>G.</i>) <i>truncatula</i> (O.F. Müller)		•		•			•			
115. - (<i>G.</i>) <i>turricula</i> (Held)		•								
116. - (<i>Myxas</i>) <i>glutinosa</i> (O.F. Müller)							•			
117. - (<i>Radix</i>) <i>auricularia</i> (L.)		•	•	•			•			
118. - (<i>R.</i>) <i>peregra</i> (O.F. Müller)		•	•	•			•			•
119. <i>Planorbis planorbis</i> (L.)		•	•	•						•
120. <i>Anisus</i> (<i>Bathyomphalus</i>) <i>contortus</i> (L.)				•						
121. - (<i>Disculifer</i>) <i>vortex</i> (L.)		•		•			•			
122. <i>Gyraulus albus</i> (O.F. Müller)		•		•						
123. <i>Armiger crista</i> (L.)		•								
124. <i>Planorbarius corneus</i> (L.) [= <i>Coretus corneus</i> L.]		•					•			
125. <i>Ancylus fluviatilis</i> O.F. Müller	•		•	•						
126. <i>Acroloxus lacustris</i> (L.)		•								

Table I. *continued*

Taxa	Sector									
	1	2	3	4	5	6	7	8	9	10
Bivalvia										
127. <i>Mytilus edulis</i> L.										•
128. <i>Unio crassus</i> Philipson				•		•	•	•		
129. - <i>pictorum</i> (L.)	•				•	•	•	•		
130. - <i>tumidus</i> Philipson	•	•					•	•		
131. <i>Anodonta anatina</i> (L.) [= <i>A. piscinalis</i> Nilson]	•					•	•	•	•	•
132. - <i>complanata</i> (Rossmässler)					•		•	•		
133. - <i>cygnea</i> (L.) [= <i>A. cellensis</i> Schröther]		•				•	•			
134. <i>Dreissena polymorpha</i> (Pall.)							•	•	•	•
135. <i>Sphaerium corneum</i> (L.)							•	•	•	•
136. - <i>rivicola</i> (Lamarck)							•		•	•
137. - <i>solidum</i> (Normand)							+	+		+
138. <i>Pisidium</i> sp.	•									
139. - <i>amicum</i> (O.F. Müller)		•					•	•		•
140. - <i>casertanum</i> (Poli)		•								
141. - <i>henslowanum</i> (Sheppard)		•								•
142. - <i>nitidum</i> Jenyns		•								
143. - <i>pulchellum</i> Jenyns		•								
144. - <i>subtruncatum</i> Malm		•								
145. - <i>supinum</i> Schmidt							•	•	•	•
146. <i>Cardium lamarcki</i> Reeve										•
147. <i>Macoma baltica</i> L.										•
148. <i>Mya arenaria</i> L.										•
ARTHROPODA										
Crustacea										
Ostracoda (Krzyżanek and Krzyżanek 1987)										
149. <i>Candona candida</i> (O.F. Müller)		•								
150. - <i>marchica</i> Hartwig		•								
151. - <i>neglecta</i> (Sars)		•								
152. - <i>parallela</i> G. W. Müller		•								
153. <i>Cyclocypris laevis</i> (O.F. Müller)		•								
154. - <i>ovum</i> (Jur.)		•								
155. <i>Cypria ophthalmica</i> (Jurine)		•								
156. <i>Dolerocypris fasciata</i> (O.F. Müller)		•								
157. <i>Eucypris pigra</i> (Fisch.)		•								
158. - <i>virens</i> (Jur.)		•								
159. <i>Herpetocypris reptans</i> (Baird)		•								
160. <i>Heterocypris incongruens</i> (Ramd.)		•								
161. <i>Ilyocypris gibba</i> (Ramd.)		•								
162. Ostracoda non det.	•									•
Cirripedia (Arndt 1965, Klekot 1968, 1972, Koszteyn 1977)										
163. <i>Balanus improvisus</i> Darwin										•

Table I. continued

Taxa	Sector									
	1	2	3	4	5	6	7	8	9	10
Mysidacea (Arndt 1965, Jażdżewski 1967)										
164. <i>Neomysis integer</i> (Leach)										●
Amphipoda (Seligo 1920, 1926, Jarocki and Demianowicz 1931, Starmach 1948, Pliszka et al. 1951, Mikulski and Tarwid 1951, Cabejszek et al. 1956a, 1956b, 1957, Micherdziński 1959, Arndt 1965, Pautsch 1965, Jażdżewski 1967, 1975a, 1975b, Koszteyn 1977, Dumnicka et al. 1988, Dumnicka and Kownacki 1988, Szczęśny 1995, Jażdżewski and Konopacka 1995)										
165. <i>Corophium curvispinum</i> G.O. Sars						●	●	●	●	●
166. - <i>lacustre</i> Vanhoffen										●
167. - <i>multisetosum</i> Stock										●
168. - <i>volutator</i> (Pall.)										●
169. <i>Gammarus duebeni</i> Liljeborg										●
170. - <i>fossarum</i> Koch	●		●	●						
171. - <i>lacustris</i> G.O. Sars							●			
172. - <i>locusta</i> (L.) ²										?
173. - <i>oceanicus</i> Segerswale										●
174. - <i>pulex</i> (L.) ³						?		?	?	?
175. - <i>salinus</i> Spooner										●
176. - <i>varsoviensis</i> Jażdżewski							●		●	
177. - <i>zaddachi</i> Sexton										●
178. <i>Echinogammarus ischnus</i> (Stebbing) [= <i>Chaetogammarus ischnus sowinskyi</i> (Behning)]							●	●	●	●
179. <i>Leptocheirus pilosus</i> Zaddach										●
180. <i>Orchestia carimana</i> Heller										●
Tanaidacea (Arndt 1965)										
181. <i>Heterotanais oerstedii</i> (Krøyer)										●
Isopoda (Starmach 1948, Pliszka et al. 1951, Arndt 1965, Pautsch 1965, Klekot 1968, 1972, 1973, Koszteyn 1977, Kaniewska-Prus 1983, Krzyżanek and Krzyżanek 1987, Zielonka and Jaworowska unpubl.)										
182. <i>Asellus aquaticus</i> L.		●	●	●			●	●	●	●
183. <i>Jaera albifrons</i> Leach										●
184. - <i>ischioetoza</i> Forsman										●
185. <i>Idotea chelipes</i> (Pall.)										●
186. <i>Cyathura carinata</i> Krøyer										●
187. <i>Sphaeroma hookeri</i> Leach										●
188. - <i>rugicauda</i> Leach										●

² All the information concerning the occurrence of this species reported before 1959 must be regarded as uncertain (Jażdżewski and Konopacka 1995).

³ All the information concerning the occurrence of this species derived before 1959, and even later ones, must be regarded as dubious since its occurrence in the middle course of the Vistula, is highly improbable (Jażdżewski and Konopacka 1995).

Table I. *continued*

Taxa	Sector									
	1	2	3	4	5	6	7	8	9	10
Decapoda (Lucks 1940, Ławiński and Szudarski 1960, Pautsch 1965, Jazdzewski 1967, Michalski 1957, Michalski and Januszkiewicz 1967, Jazdzewski and Konopacka 1995)										
189. <i>Palaemon adspersus</i> Rathke [= <i>P. squilla</i> L.]										●
190. <i>Palaemonetes varians</i> Leach										●
191. <i>Crangon crangon</i> (L.)										●
192. <i>Astacus astacus</i> (L.)								●	●	
193. <i>Orconectes limosus</i> (Raf.)							●	●	●	●
194. <i>Rhitropanopeus harrisii tridentatus</i> (Maitland)										●
195. <i>Eriocheir sinensis</i> H.M. Edwards										●
Insecta										
Collembola (Krzyżanek and Krzyżanek 1987)										
196. <i>Podura aquatica</i> (L.)		●								
Ephemeroptera (Starmach 1948, Mikulski 1950, Mikulski and Tarwid 1951, Tarwid et al. 1953, Cabejszek et al. 1956a, 1957, Sowa 1959, 1962, Wójcik 1963, Krzyżanek and Krzyżanek 1987, Dumnicka et al. 1988, Szczesny 1995)										
197. <i>Siphonurus aestivalis</i> (Eaton)		●								
198. - <i>armatus</i> (Eaton)										●
199. <i>Ametropus fragilis</i> Alb. [= <i>A. eatoni</i> Brodsky]								●	●	
200. <i>Baetis</i> spp.							●	●		
201. - <i>alpinus</i> (Pictet) [= <i>B. carpathica</i> Morton]	●									
202. - <i>buceratus</i> Eaton							●			
203. - <i>fuscatus</i> (L.) [= <i>B. bioculatus</i> L.]	●		+	+			●	●		●
204. - <i>lutheri</i> Müller-Liebenau	●									
205. - <i>muticus</i> (L.)	●	●								
206. - <i>rhodani</i> Pictet	●	●								
207. - <i>scambus</i> Eaton	●									
208. - <i>tricolor</i> Tshernova										●
209. - <i>vernus</i> Curtis		?								●
210. <i>Centroptilum luteolum</i> (Müller)		●	+	+						
211. <i>Cloeon dipterum</i> (L.)		●	+	+						●
212. - <i>inscriptum</i> Bengtsson ⁵			?							?
213. <i>Procleon bifidum</i> (Bengtsson) [= <i>P. pseudorufulum</i> Kimmins]										●
214. <i>Oligoneuriella mikulskii</i> (Sowa)							●			
215. - <i>rhenana</i> (Imhoff)								●	●	●

⁴ The occurrence of this species in headwater streams is unlikely.⁵ Identified on the basis of larvae, therefore the identification of the species is not certain.

Table I. continued

Taxa	Sector									
	1	2	3	4	5	6	7	8	9	10
216. <i>Ameletus inopinatus</i> Eaton ⁶							?	?		
217. <i>Isonychia ignota</i> (Walk.)									●	
218. <i>Epeorus sylvicola</i> Pictet [= <i>E. assimilis</i> Eaton]	●									
219. <i>Rhithrogena iridina</i> (Kolentai)	●									
220. - <i>semicolorata</i> (Curtis) ⁷	●									
221. <i>Ecdyonurus dispar</i> (Curtis) [= <i>E. fluminum</i> (Pictet)]	●		+	+		●				
222. - <i>insignis</i> (Eaton)			+	+						
223. - <i>subalpinus</i> Klapalek	●									
224. - <i>venosus</i> (Fabricius)	●		+	+						
225. <i>Electrogena lateralis</i> (Curtis)	●									
226. <i>Heptagenia</i> sp.		●								
227. - <i>coerulans</i> Rostock			+	+		●			●	
228. - <i>flava</i> Rostock			+	+					●	
229. - <i>fuscogrisea</i> (Retzius)									●	
230. - <i>longicauda</i> (Stephens) [= <i>H. flavipennis</i> Dufour]									●	
231. - <i>sulfurea</i> (Müller)			+	+					●	
232. <i>Ephemerella ignita</i> (Poda)	●	●	+	+					●	
233. - <i>notata</i> Eaton									●	
234. - <i>mesoleuca</i> (Brauer)									●	
235. <i>Caenis horaria</i> (L.)		●					●	●	●	
236. - <i>luctuosa</i> (Burmeister) [= <i>C. moesta</i> Bengtsson]		●				●				
237. - <i>macrura</i> Stephens	●	●	+	+			●	●	●	
238. - <i>pseudorivulorum</i> Keffermuller									●	
239. <i>Brachycercus harrisella</i> (Curtis)									●	
240. - <i>minutus</i> Tshernova									●	
241. <i>Leptophlebia marginata</i> (L.)							●	●		
242. <i>Paraleptophlebia submarginata</i> (Stephens)			+	+						
243. <i>Habroleptoides confusa</i> Sart. et Jacob	●		+	+						
244. <i>Habrophlebia lauta</i> Eaton	●									
245. <i>Behningia ulmeri</i> Lest.								●		
246. <i>Ephoron virgo</i> (Olivier)									●	
247. <i>Ephemera</i> sp.		●								
248. - <i>vulgata</i> L.							●			
249. <i>Potamanthus luteus</i> (L.)									●	
250. <i>Torleya major</i> (Klapalek)	●									

⁶ A species living in high mountain lakes, its occurrence in the lower course of the Vistula seems impossible; probably the identification was mistaken.

⁷ A species determined in the 30's, when most currently identified species of the genus *Rhithrogena* had not been described.

Table I. *continued*

Taxa	Sector									
	1	2	3	4	5	6	7	8	9	10
Plecoptera (Starmach 1948, Tarwid et al. 1953)										
251. <i>Nemurella picteti</i> Klapalek	●									
252. <i>Nemura</i> sp.	●		+	+						
253. <i>Leuctra</i> sp.	●									
254. <i>Perlodes</i> sp.			+	+						
255. <i>Perla</i> sp.			+	+						
256. Plecoptera non det.							●	●		
Odonata (Starmach 1948, Mikulski and Tarwid 1951, Szczepański 1953, Tarwid et al. 1953, Cabejszak et al. 1956a, Krzyżanek and Krzyżanek 1987)										
257. <i>Lestes sponsa</i> (Hanseemann)		●								
258. <i>Erythromma najas</i> (Hanseemann)		●								
259. <i>Platynemesis</i> sp.		●								
260. <i>Ischnura elegans</i> (Linden)		●								
261. <i>Calopteryx</i> sp.			+	+						
262. <i>Gomphus</i> sp.		●	+	+						
263. - <i>vulgatissimus</i> (L.)						●	●	●		
264. <i>Ophiogomphus</i> sp.			+	+						
265. - <i>cecilia</i> (Fourcroy)								●		
[= <i>O. serpentinus</i> Charpentier]										
266. <i>Somatochlora metallica</i> (Linden)		●								
Heteroptera (Zięba and Zaćwilichowska 1966, Krajewski 1976, Krzyżanek and Krzyżanek 1987)										
267. <i>Corixa</i> sp.			+							
268. <i>Cymatia coleoptrata</i> (Fabricius)									●	
269. <i>Callicorixa praeusta</i> (Fieber)									●	
270. <i>Paracorixa concinna</i> (Fieber)									●	
271. <i>Sigara</i> sp.		●								
272. - <i>felleni</i> (Fieber)									●	
273. - <i>lateralis</i> (Leach)									●	
274. - <i>limitata</i> (Fieber)									●	
275. - <i>semistriata</i> (Fieber)									●	
276. - <i>striata</i> (L.)									●	
277. <i>Ilyocoris cimicoides</i> (L.)									●	
278. <i>Notonecta glauca</i> L.		●								
279. <i>Gerris</i> sp.		●								
280. - <i>lacustris</i> (L.)									●	
Trichoptera (Starmach 1948, Mikulski and Tarwid 1951, Riedel 1961, Szczęsny 1980, 1986, 1995, Krzyżanek and Krzyżanek 1987, Dumnicka et al. 1988, Czachorowski 1996, Zielonka and Jaworowska unpubl.)										
281. <i>Rhyacophila fasciata</i> Hagen		●								
282. - <i>mocsaryi</i> Klapalek		●								
283. - <i>nubila</i> (Zetterstedt)		●								
284. - <i>obliterata</i> McLachlan		●								

Table I. continued

Taxa	Sector									
	1	2	3	4	5	6	7	8	9	10
285. - <i>philopotamoides orientalis</i> Schmid	●									
286. - <i>polonica</i> McLachlan	●									
287. - <i>vulgaris</i> Pictet	●									
288. - <i>tristis</i> Pictet	●									
289. Rhacophilidae non det.			+	+						
290. <i>Glossosoma conformis</i> Neboiss	●									
291. <i>Hydroptila forcipata</i> (Eaton)	●									
292. <i>Orthotrichia</i> sp.		●								
293. <i>Agraylea multipunctata</i> Curtis		●								
294. - <i>sexmaculata</i> Curtis							?			
295. <i>Philopotamus ludificatus</i> McLachlan	●									
296. <i>Neureclipsis bimaculata</i> (L.)							●			
297. <i>Psychomyia pusilla</i> (Fabricius)	●									
298. <i>Hydropsyche</i> sp.								●	●	
299. - <i>angustipennis</i> Curtis	●						●	●		
300. - <i>bulbifera</i> McLachlan	●									
301. - <i>contubernalis mazovica</i> Malicky							●			
302. - <i>instabilis</i> Curtis	●							?		
303. - <i>ornatula</i> McLachlan							●			●
304. - <i>pellucidula</i> Curtis	●	●					●	●		
305. - <i>saxonica</i> McLachlan	●									
306. - <i>siltalai</i> Doehler	●									
307. Hydropsychidae non det.			+	+						
308. <i>Ecnomus tenellus</i> (Rambur)		●								
309. <i>Holocentropus picicornis</i> (Stephens)		●								
310. <i>Plectrocnemia conspersa</i> (Curtis)	●									
311. <i>Polycentropus flavomaculatus</i> (Pictet)	●	●								
312. <i>Holocentropus dubius</i> Rambur		●								
313. <i>Cyrnus flavidus</i> McLachlan		●								
314. - <i>trimaculatus</i> (Curtis)	●									
315. <i>Phryganea bipunctata</i> Retzius		●								
316. - <i>grandis</i> L.		●								
317. <i>Brachycentrus montanus</i> Klapalek	●									
318. - <i>subnubilis</i> Curtis							●			
319. <i>Micrasema minimum</i> McLachlan	●									
320. <i>Drusus annulatus</i> (Stephens)	●									
321. - <i>discolor</i> (Rambur)	●									
322. <i>Ecclisopteryx dalecarlica</i> Kolentai	●									
323. <i>Anabolia laevis</i> (Zetterstedt)							●			
324. <i>Potamophylax latipennis</i> (Curtis)	●									
325. - <i>luctuosus</i> (Piller)	●									
326. <i>Halesus digitatus</i> (Schrank)	●									
327. <i>Allogamus auricollis</i> (Pictet)	●									

⁸ The occurrence in the Vistula is unlikely.⁹ The occurrence in the lower course of the Vistula is unlikely.

Table I. *continued*

Taxa	Sector									
	1	2	3	4	5	6	7	8	9	10
328. <i>Psilopteryx psorosa bohemosaxonica</i> Mey et Botos.	●									
329. <i>Pseudopsilopteryx zimmeri</i> (McLachlan)	●									
330. <i>Litax niger</i> Hagen	●									
331. <i>Silo pallipes</i> (Fabricius)	●									
332. <i>Sericostoma personatum</i> Kirby et Spence	●									
333. <i>Limnophilus flavicornis</i> (Fabricius)								●		
334. <i>Molana</i> sp.								●		
335. - <i>angustata</i> Curtis							●			
336. <i>Triaenodes bicolor</i> (Curtis)		●								
337. <i>Athripsodes aterrimus</i> (Stephens)		●								
338. <i>Mystacides azurea</i> (L.)		●								
339. - <i>longicornis</i> (L.)		●								
340. - <i>nigra</i> (L.)		●								
341. <i>Oecetis furva</i> (Rambur)		●								
342. - <i>lacustris</i> (Pictet)								●		
343. - <i>ochracea</i> (Curtis)		●						●		
344. Leptoceridae non det.				+	+					
Megaloptera (Starmach 1948, Pliszka et al. 1951, Krzyżanek and Krzyżanek 1987)										
345. <i>Sialis</i> sp.		●	+	+				●		
Lepidoptera (Zięba and Zaćwilichowska 1966, Krzyżanek and Krzyżanek 1987)										
346. <i>Elophila nymphaeata</i> (L.) [= <i>Nymphula nymphaeata</i> L.]		●								
347. <i>Acentria ephemerella</i> (Denis et Schiffermüller) [= <i>Acentropus nivea</i> (Olivier)]		●								
348. <i>Paraponyx stratiotata</i> (L.)		●								
349. Pyralididae non det.			●							
Diptera										
Limonidae (Szadziewski 1983, Zielonka and Jaworowska unpubl.)										
350. <i>Dicranomyia sera</i> (Walk.)										●
351. <i>Erioconopa trivialis</i> (Meig.)										●
352. <i>Symplecta stictica</i> (Meig.)										●
353. <i>Molophilus griseus</i> (Meig.)										●
354. Limoniidae non det.								●	●	
Tipulidae (Zięba and Zaćwilichowska 1966, Szadziewski 1983, Krzyżanek and Krzyżanek 1987)										
355. <i>Tipula</i> sp.		●								
356. - <i>paludosa</i> Meig.										●
357. - <i>solstitialis</i> Westh.										●
358. - <i>vernalis</i> Meig.										●
359. Tipulidae non det.				●						

Table I. continued

Taxa	Sector									
	1	2	3	4	5	6	7	8	9	10
Psychodidae (Zięba and Zaćwilichowska 1966, Dumnicka and Srokosz 1976, Szadziewski 1983, Dumnicka and Kownacki 1988)										
360. <i>Psychoda</i> spp.			●							
361. - sp. 1 [= <i>Tinearia alternata</i> Say]					●					
362. - sp. 2 [= <i>P. severini</i> Tonnoir]					●					
363. <i>Panimerus similis</i> (Tonnoir)										●
364. <i>Duckousiella ustulata</i> (Walk.)										●
Chaoboridae (Zięba and Zaćwilichowska 1966, Kaniewska-Prus 1983, Krzyżanek and Krzyżanek 1987)										
365. <i>Chaoborus</i> sp.							●			
366. - <i>crystallinus</i> De Geer		●	●							
Culicidae (Pliszka et al. 1951, Szadziewski 1983, Krzyżanek and Krzyżanek 1987)										
367. <i>Anopheles</i> sp.		●								
368. - <i>atroparvus</i> Van Thiel										●
369. <i>Aedes (Ochlerotatus) caspius</i> (Pall.)										●
370. - (<i>O.</i>) <i>flavescens</i> (Müller)										●
371. <i>Culex pipiens</i> L.										●
372. <i>Culiseta (C.) annulata</i> (Schrank)										●
373. Culicidae non det.							●	●		
Chironomidae (Starmach 1948, Mikulski and Tarwid 1951, Tarwid et al. 1953, Cabejszek et al. 1957, Kajak 1958a, 1958b, 1959, 1960, Zięba and Zaćwilichowska 1966, Klekot 1972, Dumnicka and Srokosz 1976, Kosztyn 1977, Szadziewski 1983, Krzyżanek and Krzyżanek 1987, Dumnicka et al. 1988, Dumnicka and Kownacki 1988, Giziński et al. 1989, Żytkowicz et al. 1990, Kownacki 1995, Zielonka and Jaworowska unpubl.)										
374. <i>Anatopynia</i> sp.		●								
375. <i>Psectrotanypus varius</i> (Fabricius) [= <i>Anatopynia varia</i> Fabricius]		●					●			
376. <i>Procladius</i> spp.		●	●		●		●	●		●
377. - <i>culiciformis</i> (L.)										●
378. - <i>sagittalis</i> (Kieffer)	●									
379. Macropelopiini non det.			●	●						
380. <i>Tanypus</i> spp. [= <i>Pelopia</i> sp.]		●	●	●		●	●			
381. - <i>kraatzi</i> (Kieffer)		●					●			
382. - <i>punctipennis</i> (Meigen)		●					●			
383. - <i>villipennis</i> (Kieffer)		●								
384. <i>Clinotanypus nervosus</i> (Meigen)		●							●	
385. <i>Natarsia</i> sp. [= <i>Ablabesmyia fulva</i> Kieffer]							●	●		
386. <i>Ablabesmyia</i> spp. [= <i>Ablabesmyia</i> ex gr. <i>monilis</i>]		●	●							

Table I. *continued*

Taxa	Sector									
	1	2	3	4	5	6	7	8	9	10
387. <i>Conchapelopia</i> sp.			●							
388. - <i>melanops</i> (Wiedemann)	●									
389. - <i>pallidula</i> (Meigen)	●									
390. <i>Rheopelopia ornata</i> (Meigen)	●									
391. <i>Thienemannimyia carnea</i> (Fabricius)	●									
392. <i>Thienemannimyia</i> -complex ¹⁰ [= <i>Ablabesmyia</i> ex gr. <i>lentiginosa</i>]			●				●			
393. <i>Nilotanypus dubius</i> (Meigen)	●									
394. <i>Boreoheptagia</i> sp.	●									
395. <i>Diamesa</i> sp.		●								
396. - sp. (gr. <i>cinerella</i>)	●				●					
397. - <i>hamaticornis</i> Kieffer	●									
398. <i>Potthastia gaedii</i> (Meigen)	●	●								
399. - <i>longimana</i> (Kieffer)	●									
400. <i>Prodiamesa olivacea</i> (Meigen) [= <i>P. praecox</i> (Kieffer)]	●	●	●	●				●	●	
401. <i>Monodiamesa bathyphila</i> (Kieffer)		●								
402. <i>Brillia flavifrons</i> Johannsen	●									
403. - <i>modesta</i> (Meigen)	●									
404. - <i>pallida</i> Sparck										
405. <i>Trissocladius</i> sp.		●								
406. <i>Zalutschia potamophilus</i> (Tshernovskij) [= <i>Orthocladius potamophilus</i> Tshernovskij]							●			
407. <i>Tvetenia calvescens</i> (Edwards)	●									
408. - <i>discoloripes</i> (Goetghebuer)	●									
409. <i>Eukiefferiella claripennis</i> (Lundbeck)	●				●					
410. - <i>clypeata</i> (Kieffer)	●									
411. - <i>devonica</i> (Edwards)	●									
412. - <i>gracei</i> Edwards	●									
413. - <i>ilkleyensis</i> (Edwards)	●									
414. - <i>minor</i> Edwards	●									
415. <i>Cardiocladius capucinus</i> (Zetterstedt)	●									
416. - <i>fuscus</i> (Kieffer)	●									
417. <i>Synorthocladius semivirens</i> (Kieffer)	●	●			●					
418. <i>Orthocladius</i> (<i>O.</i>) <i>frigidus</i> (Zetterstedt)	●									
419. - (<i>O.</i>) <i>oblidens</i> (Walker)	●									
420. - (<i>O.</i>) <i>pedestris</i> Kieffer	●									
421. - (<i>O.</i>) <i>rivinius</i> Kieffer	●									
422. - (<i>O.</i>) <i>saxicola</i> (Kieffer)	●									
423. - (<i>Eudactylocladius</i>) <i>fuscimanus</i> (K.)	●									
424. - (<i>E.</i>) <i>olivaceus</i> (K.)	●									
425. - (<i>Euorthocladius</i>) <i>ashei</i> Sponis	●									

¹⁰ Larvae of the genera *Thienemannimyia*, *Arctopelopia*, *Rheopelopia*, and *Conchopelopia* cannot be discriminated.

¹¹ Larvae only are known, the determinations from the territory of Poland probably refer to *B. longifurca* Kieffer (Kownacki 1991).

Table I. continued

Taxa	Sector									
	1	2	3	4	5	6	7	8	9	10
426. - (<i>E.</i>) <i>rivicola</i> (K.)	●									
427. - (<i>E.</i>) <i>rivulorum</i> (K.)	●									
428. - (<i>Pogonocladius</i>) <i>consobrinus</i> (Holmgren)			●							
429. - (<i>Symposiocladius</i>) <i>lignicola</i> K.	●									
430. <i>Acricotopus lucens</i> (Zetterstedt)		●								
431. <i>Paratrichiocladus rufiventris</i> (Meigen)	●									
432. - <i>skirwithensis</i> (Edwards)	●									
433. <i>Cricotopus</i> (<i>C.</i>) <i>bicinctus</i> (Meigen)	●		●					?		
434. - (<i>C.</i>) <i>curtus</i> Hirvenoja	●									
435. - (<i>C.</i>) <i>fuscus</i> (Kieffer)	●						?			
436. - (<i>C.</i>) <i>pulchripes</i> Verral	●									
437. - (<i>C.</i>) <i>tibialis</i> (Meigen)	●									
438. - (<i>C.</i>) <i>tremulus</i> (L.)	●									
439. - (<i>C.</i>) <i>triannulatus</i> (Macquart)	●				●					
440. - (<i>C.</i>) <i>tristis</i> Hirvenoja	●									
441. - (<i>C.</i>) <i>vierriensis</i> Goetghebuer	●									
442. - (<i>Isocladus</i>) <i>intersectus</i> (Staeger)								?	●	
443. - (<i>I.</i>) <i>ornatus</i> (Meigen)										●
444. - (<i>I.</i>) <i>sylvestris</i> (Fabricius)	●	●	●							
445. - ? <i>latidentatus</i> Tshernovskij ¹⁵							●			
446. <i>Psectrocladius</i> spp.	●	●					●	●		
447. - (<i>P.</i>) <i>sordidellus</i> (Zetterstedt)										●
448. <i>Rheocricotopus</i> (<i>R.</i>) <i>effusus</i> (Walker)	●									
449. - (<i>R.</i>) <i>fuscipes</i> (Kieffer)	●									
450. - (<i>Psilocricotopus</i>) <i>chalybeatus</i> Edwards	●									
451. <i>Paracricotopus niger</i> (Kieffer)	●									
452. <i>Nanocladus</i> spp. [= <i>Eukiefferiella bicolor</i> (Zetterstedt)]							●			
453. - <i>bicolor</i> (Zetterstedt)	●									
454. - <i>parvulus</i> (Kieffer)	●									
455. - <i>rectinervis</i> (Kieffer)	●									
456. <i>Limnophyes</i> sp.	●	●	●							
457. - <i>pentaplastus</i> (Kieffer) [= <i>L. prolongatus</i> (Kieffer)]										●
458. <i>Parametricnemus</i> sp.	●									
459. <i>Paraphaenocladus impensus</i> (Walker)										●
460. <i>Heleniella ornaticolis</i> (Edwards)	●									
461. <i>Smittia</i> sp.		●								
462. - <i>aterrima</i> (Meigen)										●
463. <i>Pseudosmittia</i> sp.		●							●	
464. <i>Bryophenocladus</i> sp.			●							
465. <i>Thienemanniella</i> sp.	●									

¹² The determination uncertain – larvae were found in the food of fish.¹³ Given by Kajak (1959) as *C. biformis* Edwards.¹⁴ The determination uncertain – larvae were found in the food of fish.¹⁵ The belonging of this species to the genus *Cricotopus* is uncertain.

Table I. *continued*

Taxa	Sector									
	1	2	3	4	5	6	7	8	9	10
466. <i>Corynoneura</i> sp.		•								
467. - <i>scutellata</i> Winnertz	•									
468. Orthocladiinae non det.			•				•	•	•	•
469. <i>Chironomus</i> spp.	•		•							
470. - <i>annularius</i> auct. ¹⁶										•
471. - <i>anthracinus</i> Zetterstedt [= <i>C. bathophilus</i> Kieffer]										•
472. - <i>plumosus</i> (L.)										•
473. - <i>pseudothummi</i> Strenzke										•
474. - sp. 1 [= <i>C. f.l. anthracinus</i>]		•	•	•				•		
475. - sp. 2 [= <i>C. f.l. thummi</i>]		•	•	•	•		•	•	•	
476. - sp. 3 [= <i>C. f.l. reductus</i>]							•	•	•	
477. - sp. 4 [= <i>C. f.l. plumosus</i>]		•	•				•	•	•	•
478. - sp. 5 [= <i>C. f.l. semireductus</i>]								•	•	
479. <i>Camptochironomus pallidivittatus</i> (Maloch)										•
480. - <i>tentans</i> (Fabricius)										•
481. <i>Beckidia zabolotzkyi</i> (Goetghebuer)							•			
482. <i>Cryptochironomus</i> spp. [= <i>C. ex gr. defectus</i>]						•	•			
483. - <i>obrepans</i> (Walker)	•									
484. - <i>supplicans</i> (Meigen)										•
485. <i>Cladopelma</i> spp. [= <i>Cryptochironomus ex gr. viridulus</i>]	•					•		•		
486. - <i>virescens</i> (Meigen)										•
487. <i>Microchironomus</i> spp. [= <i>Cryptochironomus ex gr. conjugens</i>]		•					•			
488. <i>Paracladopelma</i> spp. [= <i>Cryptochironomus ex gr. camptolabis</i>]			•							
489. <i>Parachironomus arcuatus</i> (Goetghebuer)			•							
490. - sp. 1 [= <i>Cryptochironomus ex gr. pararostratus</i>]			•		•		•			
491. - sp. 2 [= <i>Cryptochironomus ex gr. vitiosus</i>]		•								
492. <i>Demicryptochironomus</i> sp.		•								
493. - <i>vulneratus</i> Zetterstedt	•									
494. <i>Harnischia</i> spp. [= <i>Cryptochironomus fuscimanus</i> Kieffer]		•			•		•			

¹⁶ The taxonomic position is not clear, probably a synonym of *Chironomus plumosus* (L.) (Kownacki 1991).

Table I. continued

Taxa	Sector									
	1	2	3	4	5	6	7	8	9	10
495. <i>Harnischia</i> -complex ¹⁷ [= <i>Cryptochironomus</i> sp.]			●	●			●	●	●	
496. <i>Chernovskiiia</i> ra Ulomsky [= <i>Cryptochironomus monstrosus</i> Tschernovskij]							●			
497. <i>Dicrotendipes nervosus</i> (Staeger)			●							●
498. - sp. 1 [= <i>Limnochironomus</i> ex gr. <i>nervosus</i>]		●			●		●			
499. - sp. 2 [= <i>Limnochironomus tritomus</i> (Kieffer)]		●								
500. <i>Endochironomus</i> spp.									●	
501. - <i>albipennis</i> (Meigen)	●	●								
502. - sp. 1 [= <i>E.</i> ex gr. <i>dispar</i>]										●
503. - sp. 2 [= <i>E.</i> ex gr. <i>tendens</i>]							●			●
504. - sp. 3 [= <i>E. impar</i> (Walker)]		●								
505. <i>Glyptotendipes barbipes</i> (Staeger)										●
506. - <i>lobiferus</i> (Say)										●
507. - <i>pallens</i> (Meigen)	●									
508. - <i>paripes</i> (Edwards)	●									
509. - sp. 1 [= <i>G. polytomus</i> (Kieffer)]								●	●	
510. - sp. 2 [= <i>G.</i> ex gr. <i>gripekoveni</i>]	●					●			●	
511. <i>Polypedilum</i> spp.			●				●	●		
512. - <i>aberrans</i> Tschernovskij		●								
513. - (<i>Pentapedilum</i>) sp.		●								
514. - (<i>P.</i>) <i>convictum</i> (Walker)	●	●	●	●	●					
515. - (<i>P.</i>) sp. 1 [= <i>P.</i> ex gr. <i>nubeculosum</i>]		●					●			
516. - (<i>P.</i>) sp. 2 [= <i>P.</i> ex gr. <i>pedestre</i>]		●								
517. - (<i>Tripodura</i>) sp. 1 [= <i>P. breviantennatum</i> Tschernovskij]					●		●			
518. - (<i>T.</i>) sp. 2 [= <i>P.</i> ex gr. <i>scalaenum</i>]					●					
519. <i>Demeijerea rufipes</i> (L.)		●	●							
520. <i>Xenochironomus xenolabis</i> (Kieffer)		●	●							
521. <i>Lipiniella arenicola</i> Shilova [= <i>Tendipedidae</i> gen. Nr 1]							●			
522. <i>Sergentia</i> sp. 1 [= <i>S. coracina</i> (Zetterstedt)]		●								

¹⁷ In the 70's the genus *Cryptochironomus* was divided into several genera, therefore the earlier generic names do not permit their identification.

Table I. *continued*

Taxa	Sector									
	1	2	3	4	5	6	7	8	9	10
523. - sp. 2 [= <i>S. longiventris</i> Kieffer]		●								
524. <i>Stictochironomus</i> spp.							●	●		
525. - sp. 1 [= <i>S. ex gr. histrio</i>]		●	●				●			
526. - sp. 2 [= <i>S. psammophilus</i> Tschernovskij]							●			
527. - sp. 3 [= <i>S. "connectens</i> Nr 2"]							●			
528. <i>Phaenopsectra flavipes</i> (Meigen)	●									
529. <i>Microtendipes</i> sp.		●								
530. - <i>chloris</i> (Meigen)	●									
531. <i>Paratendipes albimanus</i> (Meigen)	●									
532. - sp. 1 [= <i>P. ex gr. albimanus</i>]			●				●			
533. - sp. 2 [= <i>P. ex gr. intermedius</i>]							●			
534. - sp. 3 [= <i>P. "connectens</i> Nr 3"]							●			
535. <i>Rheotanytarsus</i> spp. [= <i>Tanytarsus ex gr. exiguus</i>]			●	●			●			
536. - <i>pentapoda</i> Kieffer	●									
537. <i>Tanytarsus</i> spp. [= <i>T. ex gr. gregarius</i>]	●	●	●	●		●	●			
538. - <i>brundini</i> Lindenberg	●									
539. - <i>ejuncidus</i> (Walker)	●									
540. - <i>eminulus</i> (Walker)	●									
541. - <i>gracilentus</i> (Holmgren)										●
542. - <i>pallidicornis</i> (Walker)	●									
543. <i>Cladotanytarsus</i> spp. [= <i>Tanytarsus ex gr. mancus</i>]		●					●			●
544. <i>Paratanytarsus</i> sp. [= <i>Tanytarsus ex gr. lauterborni</i>]		●	●							
545. - sp. (cf <i>dimorphis</i> Reiss)	●									
546. - <i>dissimilis</i> Johannse	●									
547. - <i>inopertus</i> (Walker)										●
548. <i>Microsectra</i> spp.		●								
549. - <i>atrofasciata</i> (Kieffer)	●									
Ceratopogonidae (Szadziewski 1983, Krzyżanek and Krzyżanek 1987)										
550. <i>Culicoides</i> sp.		●								
551. - (<i>C.</i>) <i>punctatus</i> (Meigen)										●
552. - (<i>Beltranmyia</i>) <i>manchuriensis</i> Tokunaga										●
553. - (<i>B.</i>) <i>salinarius</i> Kieffer										●
554. - (<i>Oecacta</i>) <i>fascipennis</i> (Staeger)										●
555. - (<i>O.</i>) <i>maritimus</i> Kieffer										●

Table I. continued

Taxa	Sector									
	1	2	3	4	5	6	7	8	9	10
556. <i>Stilobezzia</i> sp.		●								
557. <i>Schizohalea leucopeza</i> (Meigen) [= <i>Monohelea leucopeza</i> (Meig)]										●
558. <i>Serromyia morio</i> (Fabricius)										●
559. <i>Bezzia</i> sp.		●								
560. - (<i>B.</i>) <i>coracina</i> (Zetterstedt) [= <i>B. albipes</i> (Winn.)]										●
561. - (<i>B.</i>) <i>elongata</i> Zilahi-Sebess										●
562. - (<i>B.</i>) <i>nobilis</i> (Winnertz)										●
563. - (<i>B.</i>) <i>ornata</i> (Meigen)										●
564. - (<i>Pygobezzia</i>) <i>albicornis</i> (Meigen)										●
565. <i>Palpomyia</i> sp.		●								
566. <i>Forcipomyia</i> (<i>Synthyridomyia</i>) <i>knockensis</i> Goetghebuer										●
567. <i>Dasyhelea</i> (<i>D.</i>) <i>pallidiventris</i> (Goetghebuer) [= <i>Dasyhelea olivacea</i> Remm]										●
568. - (<i>Dicryptoscena</i>) <i>modesta</i> (Winnertz)										●
569. - (<i>Pseudoculicoides</i>) <i>flavoscutellata</i> (Zetterstedt)										●
570. - (<i>P.</i>) <i>leptocladus</i> Remm										●
571. - (<i>P.</i>) <i>neobifurcata</i> Wirth										●
572. - (<i>P.</i>) <i>turficola</i> Kieffer										●
573. Ceratopogonidae non det.			●	●			●	●	●	
Simuliidae (Pliszka et al. 1951, Zięba and Zaćwilichowska 1966, Boklák et al. 1993)										
574. <i>Prosimulium tomosvaryi</i> (Enderlein)		●								
575. <i>Boophthora erythrocephala</i> (De Gerr)		●								
576. <i>Wilhelmia equina</i> (L.)		●								
577. <i>Odagmia ornata</i> (Meigen)		●								
578. - <i>variegata</i> (Meigen)		●								
579. <i>Simulium</i> spp.		●	●				●	●		
580. - <i>morsitans</i> Edwards		●								
581. - <i>noelleri</i> Friederichs		●								
582. - <i>reptans</i> (L.)		●								
583. - <i>verecundum</i> Stone et Jamnback		●								
Rhagionidae (Zięba and Zaćwilichowska 1966)										
584. Rhagionidae non det.			●							
Stratiomyidae (Szadziewski 1983)										
585. <i>Chloromyia formosa</i> (Scopoli)										●
586. <i>Oplodontha viridula</i> (Fabricius)										●
587. <i>Nemotelus notatus</i> Zetterstedt										●
588. - <i>uliginosus</i> (L.)										●

Table I. *continued*

Taxa	Sector										
	1	2	3	4	5	6	7	8	9	10	
Tabanidae (Szadziewski 1983)											
589. <i>Haematopoda pluvialis</i> (L.)											●
Dolichophodidae (Szadziewski 1983)											
590. <i>Hydroporus bipunctatus</i> (Lehmann)											●
591. - <i>litoreus</i> Fallen											●
592. - <i>praecox</i> (Lehmann)											●
593. <i>Thinophilus ruficornis</i> (Haliday)											●
594. <i>Dolichopus latipennis</i> Fallen [= <i>Hygroceleuthus latipennis</i> Fallen]											●
Syrphidae (Zięba and Zaćwilichowska 1966, Szadziewski 1983)											
595. <i>Eristalis arbustorum</i> (L.)											●
596. - <i>tenax</i> (L.)											●
597. <i>Lathyrrophthalmus aeneus</i> (Scopoli)											●
598. <i>Eristalinus sepulchralis</i> (L.)											●
599. <i>Helophilus pendulus</i> (L.)											●
600. Syrphidae non det.											●
Ephydrinae (Szadziewski 1983)											
601. <i>Hydrellia griseola</i> (Fallen)											●
602. <i>Dichaeta caudata</i> (Fallen)											●
603. <i>Notiphila riparia</i> Meigen											●
604. - <i>uliginosa</i> Haliday											●
605. <i>Ephydra riparia</i> Fallen											●
606. <i>Coenia palustris</i> (Fallen)											●
607. <i>Paracoenia fumosa</i> (Stenhammar)											●
608. <i>Scatella paludum</i> (Meigen)											●
609. - <i>stagnalis</i> (Fallen)											●
610. - <i>subguttata</i> (Meigen)											●
Muscidae (Zięba and Zaćwilichowska 1966, Szadziewski 1983)											
611. <i>Lispe consanguinea</i> Loew											●
612. - <i>hydromyzina</i> Fallen											●
613. - <i>tentaculata</i> (De Geer)											●
614. - <i>uliginosa</i> Fallen											●
615. <i>Limnophora</i> sp.											● ●
Coleoptera (Hilt 1907, 1914, Kinel 1949, Zięba and Zaćwilichowska 1966, Krzyżanek and Krzyżanek 1987, Galewski 1990)											
616. <i>Gyrinus</i> sp.											●
617. - <i>aeratus</i> Steph. ¹⁸ [= <i>G. opacus</i> Brit.]											●

¹⁸ The specimens were found in fine debris left on river banks after the flood.

Table I. continued

Taxa	Sector									
	1	2	3	4	5	6	7	8	9	10
618. <i>Orectochilus villosus</i> (O.F. Müller) ¹⁸							●			
619. <i>Haliplus</i> sp.		●								
620. - <i>lineatocollis</i> (Marsh.) ¹⁸							●			
621. <i>Coelambus polonicus</i> (Aubé) ¹⁸							●			
622. <i>Hygrotus</i> sp.		●								
623. <i>Potamonectes depressus</i> (Fabricius) ¹⁸ [= <i>Deronectes elegans</i> Panzer]								●		
624. <i>Deronectes</i> sp.		●								
625. <i>Hyphydrus ovatus</i> (L.)		●								
626. <i>Platambus maculatus</i> (L.)		●								
627. <i>Agabus</i> sp.		●								
628. <i>Ilybius</i> sp.		●								
629. <i>Rhantus</i> sp.		●								
630. <i>Colymbetes fuscus</i> L.		●								
631. <i>Dytiscus latissimus</i> L. ¹⁸							●			
632. <i>Graphoderus bilineatus</i> (De Geer) ¹⁸							●			
633. - <i>zonatus</i> (Hoppe) ¹⁸							●			
634. <i>Peltodytes caesus</i> (Duft.)		●								
635. <i>Cybister lateralimarginalis</i> (De Geer) ¹⁸							●			
636. <i>Ochthebius</i> sp.		?								
637. - <i>bicolon</i> Germar ¹⁸							●			
638. <i>Crenitis punctatostriata</i> (Letzner)		●								
639. <i>Laccobius</i> sp.		●								
640. <i>Berosus</i> sp.		●								
641. <i>Elophorus asperatus</i> (Rey) ¹⁸ [= <i>Helophorus crenatus</i> Rey]							●			
642. - <i>dorsalis</i> (Marsham) ¹⁸							●			
643. <i>Chaetarthria seminulum</i> (Herbst) ¹⁸							●			
644. <i>Limnebius nitidus</i> (Marsham) ¹⁸							●			
645. - <i>truncatulus</i> Thomson ¹⁸							●			
646. <i>Helophorus redtenbacheri</i> Kuwert ¹⁸			●							
647. <i>Dryops ernesti</i> Gozis ¹⁸ [= <i>Parnus auriculayus</i> (Panzer)]							●			
648. - <i>luridus</i> (Erichson) [= <i>Parnus luridus</i> Erichson]							●			
649. - <i>lutulentus</i> (Erichson) ¹⁸							●			
650. - <i>viennensis</i> (Castelnau) ¹⁸ [= <i>Parnus obscurus</i> Duft.]							●			
651. <i>Potamophilus acuminatus</i> (Fabricius) ¹⁸							●			
652. Coleoptera non det.	●						●			

¹⁸ The specimens were found in fine debris left on river banks after the flood.¹⁹ The identification is uncertain (S. Mielewczyk, personal communication).

Table I. *continued*

Taxa	Sector									
	1	2	3	4	5	6	7	8	9	10
Arachnoidea										
Acarina										
Hydracarina (Szczepeński 1953, Zięba and Zaćwilichowska 1966, Krzyżanek and Krzyżanek 1987, E. Biesiadka unpubl.)										
653. <i>Hydrachna globosa</i> (De Geer)										●
654. <i>Eylais infundibulifera</i> Koenike										●
655. - <i>undulosa</i> Koenike.										●
656. <i>Hydrodroma despiciens</i> (O.F. Müller)										●
657. <i>Lebertia porosa</i> Thor										●
658. <i>Hygrobates fluviatilis</i> Ström										●
659. - <i>longipalpis</i> Hermann										●
660. - <i>trigonicus</i> Koenike										●
661. <i>Piona coccinea</i> (Koch)		●								
662. - <i>conglobata</i> (Koch)										●
663. - <i>nodata</i> (O.F. Müller)		●								
664. - <i>paucipora</i> (Thor)		●								
665. - <i>pusilla</i> (Neuman)										●
666. - <i>stjoerdalensis</i> (Thor)										●
667. <i>Forelia liliacea</i> (O.F. Müller)										●
668. - <i>variegator</i> (Koch)										●
669. <i>Neumania deltoides</i> (Piersig)										●
670. <i>Limnesia maculata</i> (O.F. Müller)				●						●
671. - <i>undulata</i> (O.F. Müller)										●
672. <i>Brachypoda versicolor</i> (O.F. Müller)										●
673. <i>Midea orbiculata</i> (O.F. Müller)										●
674. <i>Mideopsis orbicularis</i> (O.F. Müller)										●
675. <i>Krendowskia latissima</i> Piersig										●
676. <i>Arrenurus</i> sp.		●								
677. - <i>albator</i> (O.F. Müller)										●
678. - <i>crassicaudatus</i> Kramer										●
679. - <i>sinuator</i> (Müll.)										●
680. Hydracarina non det.									●	
TENTACULATA										
Bryozoa (Wierzejski 1888, Arndt 1965, Krzyżanek and Krzyżanek 1987)										
681. <i>Victorella pavid</i> a Saville et Kant										●
682. ? <i>Peludicella ehrenbergi</i> Bened. ²⁰				●						
683. <i>Cristatella mucedo</i> Cuv.		●								

²⁰ Current taxonomic position uncertain, probably an old synonym.

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