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Ciliates in plankton of the Baltic Sea

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Summary

The current knowledge about diversity and ecology of ciliates in the Baltic Sea is reviewed by analyzing the data from nearly 90 studies published since the end of the 18-th century. We revise the previous versions of the ciliate species checklists (Mironova et al., 2009; Telesh et al., 2008, 2009) and present the corrected checklist with the addition of the newly published data. Altogether, 743 species of ciliates are currently known for the Baltic Sea, which is more than in some other brackish-water seas (e.g. the Caspian and the Black Sea). Many species (172; 23% of the total number) were mentioned in the Baltic Sea only once and described in the taxonomic studies before the first half of the 20-th century. Relatively small part of species (76; ca. 10% of the total number) was observed in the most of the Baltic regions, and only 8 ciliate species were registered in all of them. Forty ciliate species were detected in the Baltic Sea for the first time during our 16-months-long investigations in the Neva Estuary in certain seasons of 2007 through 2010. The literature and our own data on composition and structure of ciliate communities, their seasonal dynamics and the role of ciliates in the pelagic ecosystems of different regions of the Baltic Sea are discussed.

Key words: Baltic Sea, ciliates, mixotrophy, plankton, salinity, species diversity

Introduction

Ciliates represent the most completely studied group among the free-living heterotrophic protists (Foissner et al., 2008), mainly due to their relatively large cell sizes, bio-indication value, and importance in aquatic food webs. Generalization of large cumulative data arrays concerning ciliate taxonomy and ecology in various ecosystems has greatly advanced our knowledge of protistan biogeography. Different viewpoints on global distribution of unicellular eukaryotes, e.g. ciliates, from the 'ubiquity model' to the 'moderate endemicity model', have been widely discussed (Fenchel and Finlay, 2004; Finlay et al., 2004; Foissner, 2004, 2008; Doherty et al., 2010). Recent studies of planktonic (the aloricate Oligotrichea) and benthic marine ciliates indicate that they match the moderate endemicity model (Agatha, 2011; Azovsky and Mazei, 2013).

Information about diversity of ciliates in the brackish-water Baltic Sea, which is characterized by the unique environmental conditions (e.g. the permanent large-scale salinity gradient) and relatively young geological age, can shed more light on the evolution of marine and freshwater fauna of protists.

Since the late 1920-s, more than 70 studies of ciliates were performed in the Baltic Sea, including

several fundamental taxonomic investigations (e.g. Kahl, 1930, 1931, 1932, 1935); thus, it is likely to be one of the most intensively studied regions in the world. Our previous reviews of the available data on ciliate diversity in the Baltic Sea indicated that the surprisingly large total species checklist included nearly 800 species (Mironova et al., 2009; Telesh et al., 2009). These results are in accordance with the new findings on biogeography of marine benthic ciliates, which established that the low-saline seas have the richest regional diversity if compared with the fully saline seas, the total species number being affected significantly by the investigation effort and water salinity (Azovsky and Mazei, 2013).

Our data indicate that the number of ciliate species currently known for the Baltic Sea is higher than in others brackish-water seas. For example, about 500 ciliate species are reported for the Black Sea (Kurilov, 2007), and 620 – for the Caspian Sea (Alekperov, 2007). The remarkable diversity of the Baltic ciliates reflects both, high investigation activity in this region and specificity of the Baltic Sea ecosystems. The viewpoint that the brackish-water Baltic Sea is generally poor in species, which was based on macrozoobenthos data (Remane, 1934; Jansson, 1972), has been seriously reconsidered; the novel 'protistan species-maximum concept' for plankton was established (Telesh et al., 2011a) and discussed (Ptacnik et al., 2011; Telesh et al., 2011b; Elliott and Whitfield, 2011; Whitfield et al., 2012). Recently, this discussion was extrapolated to the other groups of aquatic organisms: the bacteria (Herlemann et al., 2011), macrophytes (Schubert et al., 2011), and macrozoobenthos (Filippenko, 2013). These investigations have attracted attention to the differences between biodiversity distribution patterns of planktonic microbes and multicellular, large benthic organisms in the salinity gradient, as well as to the mechanisms behind those differences (Telesh et al., 2013).

In this paper, we review the up-to-date knowledge on diversity and ecology of the Baltic ciliates, present the revised total species checklist with addition of new published data, and discuss our own recent results from the Neva Estuary (the Gulf of Finland, the eastern Baltic Sea).

Material and methods

About 90 taxonomic and ecological studies, which have been performed in the Baltic Sea since the end of the 18-th century, were used for the species list compiling (Müller, 1786; Stein, 1859a, 1859b, 1863, 1864, 1867; Quennerstedt, 1869; Möbius, 1888 (cited after Berger, 2006, 2008); Sauerbrey, 1928; Kahl, 1930, 1931, 1932, 1933, 1934, 1935; Purasjoki, 1947; Gaevskaya, 1948; Biernacka, 1948, 1952, 1962, 1963; Bock, 1952, 1953, 1960; Münch, 1956; Lindquist, 1959; Ax and Ax, 1960; Jaeckel, 1962; Czapik, 1962; Fenchel, 1967, 1968a, 1968b, 1969; Hartwig, 1974; Hirche, 1974; Hedin, 1974, 1975; Czapik and Jordan, 1976, 1977; Mažeikaitė, 1978; Smetacek, 1981; Boikova, 1984a, 1984b, 1989; Kivi, 1986; Andrushaitis, 1987, 1990; Khlebovich, 1987; Mamaeva, 1987; Foissner, 1987; Axelsson and Norrgren, 1991; Arndt, 1991; Czapik and Fyda, 1992; Detmer et al., 1993; Schiewer, 1994; Klinkenberg and Schumann, 1994; Wiktor and Krajewska-Sołtys, 1994; Kivi et al., 1996; Kivi and Setälä, 1995; Uitto et al., 1997; Olli et al., 1998; Wasik et al., 1996; Witek, 1998; Smurov and Fokin, 1999; Jakobsen and Montagnes, 1999; Dietrich and Arndt, 2000; Garstecki et al., 2000; Gerlach, 2000; Dobberstein and Palm, 2000; Schmidt et al., 2002; Setälä and Kivi, 2003; Setälä, 2004; Johansson et al., 2004; Vannini et al., 2005; Granskog et al., 2006; Samuelsson et al., 2006; Aberle et al., 2007; Beusekom et al., 2007; Visse, 2007; Moorthi et al., 2008; Rychert, 2008, 2011; Rychert and Pączkowska, 2012; Rychert et al., 2013; Grinienė et al., 2011; Grinienė, 2012; Anderson et al., 2012, 2013; Majaneva et al., 2012; Majaneva, 2013; Mironova et al., 2012, 2013).

Data on species composition of ciliates obtained by RNA-stable isotope probing (Anderson et al., 2013) and 18S rRNA sequencing (Majaneva et al., 2012) were not included in the checklist, as only the morphological data were used in our study. Taxonomic information about validity and synonymy of the species names was taken from the Internet sources (the Encyclopedia of Life, *http://www.eol.org*; the World Ciliophora Database, accessed through the World Register of Marine Species, *http://www.marinespecies.org/aphia.php*; the World of Protozoa, Rotifera, Nematoda and Oligochaeta, *http://www.nies.go.jp/chiiki1/protoz/index.html*; the Planktonic Ciliate Project on the Internet, *http://www.zooplankton.cn/ciliate/intro.htm*) and checked when possible, considering the recent revisions of some taxonomic groups (Warren and Paynter, 1991; Berger, 1999, 2001, 2006, 2008, 2011; Chen et al., 2008, 2010; Agatha, 2011; Ji et al., 2011; Vďačný and Foissner, 2012).

Available data on the Baltic ciliates were grouped by study area according to classification of the Baltic Sea regions proposed by Ackefors (1969). The following regions were distinguished: the Baltic Proper (the area east of the Belt Sea and

the Sound, limited at the north by the Åland Sea and the Archipelago Sea, at the east – by the Gulf of Finland), the Western Baltic Sea (the Kiel Bight and the Mecklenburg Bight), the Northern Baltic Sea (the Åland Sea, the Archipelago Sea and the Gulf of Bothnia), the Southern Baltic Sea (the area of Gdańsk Basin), the Eastern Baltic Sea (the Gulf of Riga, the Gulf of Finland). The data obtained from the Danish straits are not included in the present species list, as well as the information about ciliate fauna of the Baltic brackish-waters rockpools and lower reaches of the large rivers (e.g. Neva, Daugava, Vistula, Oder, and Neman).

Updated checklist of ciliates of the Baltic Sea

Altogether, 743 species of ciliates are currently known for the Baltic Sea (Appendix). The present species list is slightly shorter if compared with the lists published earlier (Mironova et al., 2009; Telesh et al., 2008, 2009). A number of ciliate species were erroneously included in the previous reviews due to inaccuracy in some of the reference Internet sources (e.g. the World Register of Marine Species, *http://www.marinespecies.org/aphia.php*). After the additional check of the species distribution data against the original papers we deleted certain species from the present version of the checklist of the Baltic ciliates. Some species were also excluded because their exact geographical location was not reported by the authors, although they have been mentioned as "marine", "eurytopic", or "euryhaline".

The greater part of species in the present checklist (415, about 56% of the total ciliate species number) were described in the taxonomic studies which were carried out in the first half of the 20-th century (e.g. Sauerbrey 1928; Kahl, 1930, 1931, 1932, 1935), and for 239 of these species (32% of the total species number) re-descriptions by other authors are not known. Very often such ciliate species were mentioned in the Baltic Sea only once (172; 23% of species number), and for the majority of them the revision is needed (Foissner et al., 2008). Only small part of species (76; nearly 10% of species number) were mentioned for the most of the Baltic regions, and just 8 ciliate species were registered in all of them (*Didinium nasutum, Helicostomella subulata, Mesodinium pulex, Myrionecta rubra, Pelagostrobilidium spirale, Tintinnopsis baltica, T. campanula, T. tubulosa*) (Appendix).

Forty species of ciliates were detected in the Baltic Sea for the first time during our 16-month-long investigations in the Neva Estuary in certain seasons of 2007 through 2010 (Appendix). The detection of such a high number of new records during a rather short study period indicates the insufficiency of our knowledge on ciliate diversity in the Baltic Sea. Many of the newly revealed species are very small (< 25 μm), and probably therefore they were not registered earlier (for example, *Litonotus alpestris, Cinetochilum margaritaceum, Sphaerophrya stentori, Trochilia minuta, Strombidium emergens, Strombidium epidemum, Tintinnidium semiciliatum*). However, according to the prediction based on the analysis of cumulative data from various habitats, the major part of ciliate diversity (> 80% species) may have not been revealed yet (Foissner et al., 2008); similar data are reported for planktonic aloricate Oligotrichea (Agatha, 2011). Application of different research methods (e.g. fine morphological analysis, fluorescent *in situ* hybridization, functional gene screening, environmental RNA technique) should greatly advance our knowledge on the actual protistan diversity and understanding of their peculiar distribution patterns in nature.

Major characteristics of ciliate communities in the Baltic plankton

Brief history of research

Pioneering studies of ciliates in the Baltic Sea dated back to the end of 18-th century (Müller, 1786). Early researches were focused on the benthic, in particular the interstitial ciliates (Stein, 1859a, 1863, 1864, 1867; Quennerstedt, 1869; Möbius, 1888; Sauerbrey, 1928). Investigations of the planktonic ciliates began later, in the 1940-s (Biernacka, 1948). Most of them dealt with the relatively large loricate tintinnids (Biernacka, 1948, 1952; Hedin, 1974, 1975); however, in some papers the information about aloricate ciliates was provided (Bock, 1960; Biernacka, 1963).

At first, researches focused mainly on the ciliate diversity, and several fundamental taxonomic studies were performed (Kahl, 1930, 1931, 1932, 1935). More attention to different aspects of ciliate ecology was given in the 1960-s (Fenchel, 1967, 1968a, 1968b, 1969; Czapik and Jordan, 1976, 1977). Since then, much information about composition, distribution, dynamics and role of ciliate communities was obtained for a variety of benthic (Klinkenberg and Schumann, 1994; Dietrich and Arndt, 2000; Garstecki et al., 2000) and pelagic ecosystems of the Baltic Sea (Mažeikaitė, 1978; Smetacek, 1981; Andrushaitis, 1987; Boikova, 1989; Arndt, 1991; Kivi and Setälä, 1995; Uitto et al.,

1997; Witek, 1998; Setälä and Kivi, 2003; Johansson et al., 2004; Samuelsson et al., 2006; Beusekom et al., 2007; Rychert, 2008, 2011; Anderson et al., 2012; Grinienė, 2012; Mironova et al., 2012, 2013; Mironova, 2013).

To date, the western Baltic Sea is the most extensively studied area: the highest numbers of publications (31) and ciliate species (about 600) are known for this region. Less information is available about ciliates of the eastern and the northern Baltic Sea (Appendix).

Community composition, dominants

In general, composition of dominant groups of ciliates in the Baltic plankton is typical for various pelagic ecosystems (Mironova et al., 2009). The Baltic ciliate communities are mainly composed of different small aloricate oligotrichs (genera *Strombidium, Strobilidium, Lohmaniella*) (Smetacek, 1981; Boikova, 1989; Klinkenberg and Shumann, 1994; Kivi and Setälä, 1995; Garstecki et al., 2000; Setälä and Kivi, 2003; Johansson et al., 2004; Beusekom et al., 2007). The contribution of tintinnids is sometimes also high (Khlebovich, 1987; Boikova, 1989; Kivi and Setälä, 1995; Johansson et al., 2004). Other abundant ciliate groups in the Baltic pelagic ecosystems are hymenostomatids (mainly small scuticociliates *Cyclidium, Cristigera*) and haptorids (genera *Mesodinium, Didinium, Monodinium*) (Garstecki et al., 2000; Johansson et al., 2004; Samuelsson et al., 2006). Almost all these taxa are numerous also in the Baltic Sea ice (Ikävalko and Thomsen, 1997; Granskog et al., 2006; Kaartokallio et al., 2007; Rintala et al., 2010; Majaneva et al., 2012).

Since low-salinity shallow coastal regions occupy vast areas of the Baltic Sea, the significant part of plankton diversity is formed by the freshwater, brackish-water and benthic species. For example, the majority of ciliate species in the Neva Estuary are typical for the habitats with broad spectrum of salinities: from 1 to > 30 PSU, including even the marine ciliates (e.g. *Leegardiella sol, Strombidinopsis marina, Strombidium epidemum, S. wulffi, Pseudokeronopsis multinucleata*) according to literature and the internet sources (Kurilov, 2003; Berger, 2006; the World Ciliophora Database, *http://www.marinespecies.org/aphia.php*; the Planktonic Ciliate Project on the Internet, *http://www.zooplankton.cn/ciliate/intro.htm*). About 12% of ciliate species in the Neva Estuary are strictly freshwater (oligo-stenohalyne) species (Mironova et al., 2012; Mironova, 2013). In the plankton of the Curonian Lagoon, the highest species diversity of ciliates was observed at 0–2 PSU, and it tended to decrease at > 4 PSU (Grinienė, 2012).

As a rule, benthic and pelagic communities of ciliates show little taxonomic overlap (Garstecki et al., 2000); however, even in groups which are known as planktonic (e.g. aloricate Oligotrichea) several species are closely associated with the marine benthal (Agatha, 2011). Typical benthic ciliates (hypotrichs, prostomatids etc.) are occasionally found in plankton due to intensive bottom hashing in many Baltic coastal ecosystems (Khlebovich, 1987; Klinkenberg and Shumann, 1994; Gerlach, 2000; Samuelsson et al., 2006). According to our data, benthic and epiphytic ciliates constitute 64% of ciliate species richness in the plankton of the Neva Estuary, but euplanktonic species prevail numerically. However, local peaks of biomass formed by epiphytic sessilid ciliates (Mamaeva, 1987; Witek, 1998; Johansson et al., 2004; Mironova et al., 2012) and benthic species (*Trithigmostoma* sp., *Lacrymarya* spp.) are often registered in the Baltic plankton, sometimes even in winter (Mironova et al., 2012).

Although ciliate communities in various regions of the Baltic Sea are formed by the same taxonomic groups, composition of dominant species is different. For example, *Rimostrombidium humile* which dominated in the Neva Estuary has never been found in other regions of the Baltic Sea, except for the Tvärminne Storfjärden (Kivi, 1986). Meanwhile, the ciliates *Leegardiella sol* which were also numerous in the Neva Estuary were firstly reported for the Baltic Sea during our recent studies (Mironova et al., 2013).

Composition of pelagic ciliate communities changes significantly with depth; however, such data are still scarce for the Baltic Sea. In the Gdańsk Basin, the deep-water ciliate community (composed of large *Prorodon*-like ciliates and *Metacystis* sp.) differs greatly from the epipelagic layer (Witek, 1998). In the Bornholm Basin, deep-water associations are also formed by the larger-sized ciliate species, if compared with the upper water layers (Setälä and Kivi, 2003). Vertical distribution of some planktonic ciliates can change as a result of their active vertical migrations. For example, mixotrophic ciliate *Myrionecta rubra* moves from the deep layers to the euphotic zone during the vernal bloom in the northern Baltic and thus acts as a peculiar nutrient pump, which makes nutrients available to non-migrating species (Olli et al., 1998).

Species diversity substantially decreases in the anoxic depths (below 120 m) of the central Baltic Sea (Detmer et al., 1993). There are few data about specific ciliate fauna of the Baltic pelagic redoxiclines; however, several ciliates belonging to the genera *Metopus, Metacystis*, cf. *Strombidium*, cf. *Mesodinium*, cf. *Coleps*, closely related to *Euplotes rariseta, Cardiostomatella vermiforme* (98% sequence identity), and *Prostomatea* were recognized in these habitats (Detmer et al., 1993; Anderson et al., 2012, 2013).

Seasonality

The majority of ciliate species in the Baltic plankton is 'seasonal' and only several species occur all year round (Johansson et al., 2004; Mironova, 2013). In the same season, composition of dominants varied between different regions of the Baltic Sea. For example, in the Bornholm Basin the summer peak was formed by *Helicostomella subulata*, *Strombidium* sp. and *Myrionecta rubra* (Beusekom et al., 2007), in the northern Baltic – by oligotrichs from the genera *Strombidium, Strobilidium, Lohmaniella, Tintinnopsis* (Kivi and Setälä, 1995), and in the southern Baltic – by oligotrichs and small scuticociliates (Garstecki et al., 2000).

Most studies provide information only about dominant species, whereas the detailed data on seasonal dynamics of the Baltic ciliate communities, concerning also rare and common though not numerous species, are still scarce (Grinienė, 2012; Mironova et al., 2012). During the recent studies, several species associations, which replaced each other during the seasonal succession, were distinguished by the Analysis of Similarity (ANOSIM) of ciliate community structure. Their number and composition varied in the different regions of the Baltic Sea. For example, two seasonal associations of ciliates typical for warm (late April–October) and cold period (October–early April) were revealed in the Neva Estuary (Mironova et al., 2012), while four seasonal associations (winter, early spring, late spring and summer/autumn) were distinguished in the Curonian Lagoon (Grinienė, 2012)

The seasonal shift of ciliate communities from large predatory ciliates in spring to small oligotrichs (pico/nano-filterers) and epiphytic peritrichs (mainly pico-filterers) in summer was reported for various regions of the Baltic Sea (Smetacek, 1981; Witek, 1998; Johansson et al., 2004; Samuelsson et al., 2006; Mironova et al., 2012). Although in general the summer assemblages of ciliates are quite similar in different Baltic areas, during other seasons no such uniformity was discovered. For example, the early spring dominance of large predatory ciliates is often observed in the Baltic ecosystems (e.g. Smetacek, 1981; Setälä and Kivi, 2003), while in the Curonian Lagoon small pico/nano- feeders (40% of the total ciliate abundance) prevailed in this period (Grinienė, 2012).

The late spring peak of the relatively large algivorous oligotrichs (mostly tintinnids) commonly follows the diatom bloom in various ecosystems, e.g. in the Baltic Sea (Smetacek, 1981; Andrushaitis, 1987; Johansson et al., 2004; Grinienė, 2012); however, this peak was not observed in the Neva Estuary (Mironova et al., 2012).

During the winter, when the grazing pressure of mesozooplankton declines, the share of large ciliates in the Baltic plankton can increase. However, in the Curonian Lagoon and the Neva Estuary large ciliates in winter are represented by different taxonomic and ecological groups – the planktonic algivorous tintinnids (Grinienė, 2012), and the benthic predatory and bactivorous ciliates, respectively (Mironova et al., 2012). Such increase in proportions of large ciliates in winter does not support the conventional view on the seasonal succession of ciliates (Montagnes et al., 1988), although it is sometimes observed in various aquatic ecosystems (see Grinienė, 2012 and references therein).

Trophic structure of ciliate communities

Ciliates of various size classes (12–190 μm) and feeding types are present in the Baltic plankton almost all year round; thus, they potentially consume the wide spectrum of food objects: from bacteria to other protists and even small metazoans (e.g. rotifers) (Smetacek, 1981; Jonsson, 1986; Kivi and Setälä, 1995; Johansson et al., 2004; Mironova et al., 2012). Species with both, generalistic and specialistic feeding strategies occur among the Baltic planktonic ciliates (Kivi and Setälä, 1995); however, the majority feed on a wide range of objects (Mironova, 2013).

Typically in ciliate communities, pico- and nano-filterers feeding on bacteria, algae, and heterotrophic flagellates dominate (up to 90% of total abundance, 70% of species richness). They are represented mostly by different oligotrichids, choreotrichids and, to a lesser extent, by peritrichs and scuticociliates (Kivi and Setälä, 1995; Samuelsson et al., 2006; Grinienė, 2012; Mironova et al., 2012, 2013). Predatory ciliates occur in plankton almost throughout the whole year, but in low numbers (up to 11% of average annual abundance), except for

certain seasons (e.g. early spring, mid-summer, winter) when their share increases significantly (Smetacek, 1981; Setälä and Kivi, 2003; Johansson et al., 2004; Mironova et al., 2012). Most of them are large nano/micro-interceptors (feed on other ciliates and metazoans) belonging to haptorids and pleurostomatids, and the minority – small pico/nano-interceptors (order Prorodontida, Cyclotrichida). Sometimes even parasitic species (suctorian ciliate *Sphaerophrya stentori*) are registered in plankton, but their contribution to the ciliate community is negligible (Mironova et al., 2012).

Seasonal changes affect composition and abundance of all trophic groups. The development of pico/nano-filterers (mainly algivorous ciliates) is explicitly timed to the phytoplankton growth period, and epiphytic sessilid ciliates highly depend on the cyanobacteria blooms (Mamaeva, 1987; Witek, 1998; Johansson et al., 2004; Samuelsson et al., 2006; Grinienė, 2012; Mironova et al., 2012). However, the factors controlling seasonal alterations in composition of other groups (for example, predatory ciliates) are not so obvious and require further investigation (Mironova et al., 2012).

Oligotrich ciliates, which dominate in various pelagic ecosystems, are capable of switching from heterotrophic feeding mode (pico/nano-filtration) to mixotrophic, by using kleptoplastids from their algal prey. According to our results (obtained using epifluorescence microscopy), in the Neva Estuary the majority of the observed oligotrich species (75%) can be mixotrophic (genera *Strombidium, Strombidinopsis, Limnostrombidium, Pelagostrombidium, Rimostrombidium, Pelagostrobilidium, Leegardiella, Laboea, Tintinnopsis*). In the coastal waters, their average annual contribution was low (9% of total abundance), while in July mixotrophic ciliates were the most numerous trophic guild, both in the coastal waters and in the open estuary: up to 34% and 67% of total abundance, respectively (Mironova et al., 2012, 2013).

In summer, share of mixotrophs in the open Neva Estuary (28-67% of total abundance) at most stations exceeds the average values of about 30%, reported for various other marine estuarine systems (Dolan and Pérez, 2000; Pitta and Giannakourou, 2000 and references therein). These results indicate that the role of mixotrophic chloroplast-sequestering ciliates in Baltic plankton can be significant; however, the data about their abundance in other Baltic regions are still absent. Quantitative information is provided only about one mixotrophic ciliate with cryptophycean endosymbionts – *Myrionecta rubra*, which is known as the indicator of eutrophication (Smetacek, 1981; Olli et al., 1998; Witek, 1998; Setälä and Kivi, 2003; Johansson et al. 2004; Beusekom et al. 2007; Rychert and Pączkowska, 2012). This mixotrophic ciliate is common in various Baltic pelagic ecosystems and sometimes forms the great part of total primary production (Leppänen and Bruun, 1986; Witek, 1998; Jaanus et al., 2007; Beusekom et al., 2007).

In the last decades, interest to ecology of mixotrophic protists has increased greatly due to their high abundance reported for diverse aquatic environments (Stoecker et al., 1987; Bouvier et al., 1998; Dolan and Pérez, 2000; Pitta and Giannakourou, 2000). However, so far there are no appropriate tools available for the correct estimation of their numbers *in situ*. Epifluorescense microscopy methods can provide the overstated results because not only true mixotrophic organisms with kleptoplastids fluoresce but also some algivorous ciliates, which have recently ingested their algal prey (Sherr et al., 1986). Interestingly, our results showed that even in one sample among ciliates of the same species, the individuals both, with plastids and without them can occur, which possibly reflects intraspecific diversity of trophic strategies realized under similar environmental conditions. Relative abundance of mixotrophic ciliates in the meso-eutrophic Neva Estuary confirms that mixotrophy in marine oligotrichs is not closely linked to the exploitation of oligotrophic environments, but probably serves a variety of purposes (Dolan and Pérez, 2000).

There are many unresolved questions considering the advantages of mixotrophy over strict heterotrophic feeding in the range of environmental conditions (e.g. salinity, nutrient availability, light conditions, turbulence). Further studies of factors, which control the diversity and distribution of mixotrophic ciliates, are necessary for the precise evaluation of their role in production and transfer of organic matter in the pelagic food webs.

Abundance, biomass, distribution

At present, much information about spatial variability of ciliate abundance and biomass in different regions of the Baltic Sea is available, concerning coastal and open waters, surface and deep-water layers (Table 1).

As a rule, abundance and biomass of ciliates in the near-shore waters (maximum 88-92×10^3 ind L^{-1}, 56-220 μg C L^{-1}) (Smetacek, 1981; Garstecki et al., 2000; Grinienė, 2012) is significantly higher than in the offshore zone (maximum 8-28 ×103 ind L^{-1}, 7-63

Table 1. Abundance, biomass and production of planktonic ciliates reported from the various regions of the Baltic Sea in different seasons.

Region	Abundance ($\times 10^3$ ind L^{-1})	Biomass (μg C L^{-1})	Daily production	Source
Neva Estuary (coastal waters)	0.12–10.3	1–53	July: 5.6–16.3 μg C L^{-1} (average 7.8 μg C L^{-1}) 0.05–0.25 mg L^{-1} (average 0.12 mg L^{-1})	Mironova et al., 2012
Neva Estuary (open waters)	0–1.9	0–2.4	July: 0.1–6.2 μg C L^{-1} (average 1.8 μg C L^{-1}) 0–0.05 mg L^{-1} (average 0.03 mg L^{-1})	Mironova et al., 2013
Neva Bay	0.1–8	0.9–63.3[a]	average 0.25 mg L^{-1} [e]	Khlebovich, 1987
Curonian Lagoon (coastal waters)	0.9–91.7	0.9–88.3	0.62–36.8 μg C L^{-1}	Grinienė, 2012
Shallow inlets of the Southern Baltic	0.2–88	0–220	–	Garstecki et al., 2000
Kiel Bight	2–92	0–56[b]	–	Smetacek, 1981
Gdańsk Basin (open waters)	0–28	0–23[b]	22.65–62.55 g C m^{-3} y^{-1} [f]	Witek, 1998
Various regions of the open Baltic Sea[d]	0–20	0–6.7[b,c]	–	Setälä and Kivi, 2003
Central Bornholm Basin	–	130–300	–	Beusekom et al., 2007
Landsort Deep (the northern Baltic Proper)	0–9	0–20[b]	average 3.5 μg C L^{-1}	Johansson et al., 2004

Notes: [a] Carbon mass recalculated from the data on wet mass.

[b] *Myrionecta rubra* Jankowski 1976 [syn. *Mesodinium rubrum* Lohmann 1908] excluded.

[c] Found above the thermocline. At the deep oxic/anoxic water interface, another maximum of ciliate carbon (28.8 μg C L^{-1}) was detected.

[d] Data for July–August.

[e] Data for May-October, calculated by «physiological» method (Khlebovich, 1987).

[f] Annual potential production calculated for 0-30 m layer.

– No data.

μg C L^{-1}) (Khlebovich, 1987; Witek, 1998; Setälä and Kivi 2003; Johansson et al., 2004; Dahlgren et al., 2010). However, some exceptions exist: for example, the surprisingly high biomass of ciliates (130-330 μg C L^{-1}) was observed in the open waters of the Bornholm Basin (Beusekom et al., 2007), while in the shallow mesotrophic Neva Estuary ciliate abundance and biomass were among the lowest in the Baltic Sea (Mironova et al., 2013).

During seasonal succession, 1 or 2 peaks of ciliate abundance usually occur in different Baltic pelagic ecosystems. The first peak is usually registered in spring (Smetacek, 1981; Khlebovich, 1987; Andrushaitis, 1987; Witek, 1998; Johansson et al., 2004; Samuelsson et al., 2006), the second – in summer (Andrushaitis, 1987; Witek, 1998; Grinienė, 2012) or in autumn (Smetacek, 1981; Khlebovich, 1987; Samuelsson et al., 2006).

Data on ciliate abundance and biomass from different regions of the Baltic Sea indicate high spatial variability of these characteristics (Table 1). Abundance and biomass of ciliates positively correlate with the primary production, which increases with eutrophication in many Baltic ecosystems (Arndt, 1991; Garstecki et al., 2000; Samuelsson et al., 2006), and significantly decreases with salinity (Grinienė, 2012). Salinity and latitude factors influence the ciliate biovolume (explaining 12–24% of the variation) in the northern Baltic Sea (Samuelsson et al., 2006). The biomass of ciliates was found to be strongly affected by predation of mesozooplankton, while the production may be bottom-up limited by the resources (Samuelsson et al., 2006).

The majority of studies provide information about ciliate numbers in the upper mixed water layer, while data on vertical distribution of these protists in the Baltic Sea are still scarce. Maximum of ciliate abundance is typically registered in the euphotic zone, while biomass of ciliates in deep-water layers is sometimes comparable to the surface values (Witek, 1998), or even higher (Klinkenberg and Shumann, 1994), due to occurrence of large benthic and particle-associated ciliates in the bottom layer. In addition, peaks of ciliate abundance can be observed in the redoxcline zone (below 100 m) in

the central Baltic Sea; however, their magnitude is much lower (10%) than the surface water maxima (Detmer et al., 1993; Setälä and Kivi, 2003).

Role of ciliates in the Baltic plankton

Due to high growth and reproduction rates of planktonic ciliates (Hansen et al., 1997), their production in the Baltic Sea often exceeds the production of crustacean microzooplankton and rotifers (Andrushaitis, 1987). In some Baltic ecosystems, ciliate biomass is relatively low and forms less than 13% of the total zooplankton biomass in summer (Lohmann, 1908, cited after Arndt, 1991; Witek, 1998), while sometimes protozoan biomass values are similar or even higher than the biomass of mesozooplankton (Arndt, 1991).

According to our calculations using the equation proposed by Müller and Geller (1993), maximal daily growth rates of planktonic ciliates in the Neva Estuary range from 1.2 to 2.5 day^{-1} (average 1.8 ± 0.1 day^{-1}) in summer and do not exceed 0.69 day^{-1} (average 0.2 ± 1 day^{-1}) during the cold period of the year (October-April). These results are similar to maximal growth rates reported for other pelagic environments (Nielsen and Kiørboe, 1994), including the Gulf of Riga (Andrushaitis, 1987), and are much higher than the values obtained in the Neva Estuary earlier (Khlebovich, 1987).

The comparison of ciliate production values in various regions of the Baltic Sea is complicated because different calculation methods were used; however, the available data are summarized in the Table 1. The highest ciliate production (max 36.8 μg C L^{-1} day^{-1}) was reported for the Curonian Lagoon (Grinienė, 2012), while the surprisingly low values were obtained in the shallow meso-eutrophic Neva Estuary (5.6-16.3, average 7.8 μg C L^{-1} day^{-1} in summer), especially in the open part of the estuary (0.1-6.2, average 1.82 μg C L^{-1} day^{-1}). It is the result of relatively low total abundance of ciliates in the Neva Estuary (Mironova et al., 2013), which is atypical for such highly productive ecosystems as estuaries (Urrutxurtu et al., 2003). Low production values are usually more common for the oligotrophic open areas of the Baltic Sea; for example, in the northern Baltic the average ciliate production constitutes 3.5 μg C L^{-1} day^{-1} (Johansson et al., 2004).

Daily average ciliate production values are equal to 20% of primary production and 30% of bacterial production in different regions of the Baltic Sea (Khlebovich, 1987; Witek, 1998). As reported for various aquatic ecosystems, planktonic ciliates are able to consume from 40 to 60% of primary production in summer (Pierce and Turner, 1992), or even more (Maar et al., 2004). In the Baltic Sea, the maximum values are reported for the Curonian Lagoon, where (according to the results of dilution experiments) ciliates potentially consume 76% of daily picophytoplankton production at the freshwater site and 130% of nanophytoplankton production at the brackishwater site (Grinienė, 2012). In other regions, evaluation of the potential carbon consumption of ciliates give lower values - 55% of the summer primary production in the open northern Baltic (Johansson et al., 2004) and 12-15% of the gross primary production in the Gdańsk Basin (Witek, 1998).

Estimation of ciliate filtration rates in the open central Baltic revealed that ciliate communities in summer can be clearing on average close to 50% (up to maximal 125%) of the water volume per day (Setälä and Kivi, 2003). In the coastal part of the Neva Estuary, ciliates also may potentially consume up to 47-70% of pico- and nanoplankton per day, while in the open estuary their grazing role is insignificant and, due to low abundances, ciliates could consume only less than 1% of primary production.

Contribution of ciliates to the decomposition of organic matter constitutes 0.6-20.4% of the total daily destruction performed by zooplankton in various Baltic ecosystems, and often exceeds the overall organic matter decomposition by rotifers and crustaceans (Khlebovich, 1987; Andrushaitis, 1987).

To date, several studies concerning the role of planktonic ciliates as predators in the Baltic ecosystems are available (e.g. Kivi and Setälä, 1995; Kivi et al., 1996; Setälä and Kivi, 2003; Aberle et al., 2007; Moorthi et al., 2008; Grinienė, 2012); however, less is known about their role as the prey. Field studies provide some indirect evidences of top-down control of ciliate communities, for example, the inverse relationships between ciliate and mesozooplankton abundances (Smetacek, 1981; Arndt, 1991; Kivi et al., 1993, 1996; Johansson et al., 2004), and the occurrence of ciliate markers in copepod lipids (Peters et al., 2006). However, experimental data about mesozooplankton grazing on ciliates in the Baltic ecosystems are still scarce (McKellar and Hobro, 1976; Tiselius, 1989; Koski et al., 2002). By these results, contribution of ciliates to the diet of different copepods varies greatly – from negligible values (Tiselius, 1989) to 50% of the total ingested carbon (Koski et al., 2002). As reported for various environments, the share of ciliates in copepod diet

is often higher and constitutes 64-99% (average 81%) of the total ingested carbon (Schnetzer and Caron, 2005). However, it highly depends on the trophic conditions (Saiz and Calbet, 2011) and other factors. More numerical data on the importance of ciliates in copepod nutrition in the Baltic Sea is needed. The grazing impact of other abundant groups of zooplankton (e.g. rotifers, cladocerans, ctenophores) and fish larvae on ciliate communities in the Baltic Sea is still poorly studied (Arndt et al.,1990; Spittler et al., 2007; Dickmann et al., 2007; Majaneva et al., 2013); meanwhile, it can be significant, as reported from different other aquatic ecosystems (Stoecker and Capuzzo, 1990; Gilbert and Jack, 1993).

The importance of data about the role of protists in the Baltic pelagic food webs for understanding of ecosystem functioning is obvious, as pointed out in the review by Arndt (1991) more than 20 years ago. Since then, several studies of trophic interactions within microbial loop and classical grazing food chain have been performed. They provide information about energy flows through the pelagic food webs in relation to different environmental conditions in various regions of the Baltic Sea (Schiewer and Jost, 1991; Lignell et al., 1993; Uitto et al., 1997; Sandberg, 2007), including even the deep-water anoxic environments (Sëtäla, 1991; Detmer et al., 1993; Anderson et al., 2012, 2013).

However, our knowledge about the organization of the microbial loop in the Baltic Sea is rather schematic yet, mainly due to the lack of detailed information about the taxonomic, size and trophic structure of protistan communities. For example, the assumption that all small ciliates, especially nanociliates (< 20 μm) are bactivorous, can result in serious mistakes in the ecosystem modelling, because this abundant size group is functionally diverse and includes bactivorous, algivorous, mixotrophic, omnivorous and predatory species (Mironova et al., 2012). In spite of this, rough separation of size categories is often carried out without the taxonomic analyses of ciliates (and, consequently, without the correct trophic grouping). This approach is commonly used when calculating the productivity of plankton, and it leads to certain inaccuracy in evaluation of the grazing impact of ciliate communities. Moreover, the intraspecific ecophysiological diversity of ciliates should be taken into account. For example, mixotrophic ciliates at certain environmental conditions can switch their feeding mode and alternately act as either producers or strict consumers of pico- and nano - plankton. Ignoring planktonic oligotrichs, which dominate in various pelagic environments, can lead to incorrect estimation of primary pro-duction, growth rates and top-down control of ciliate communities. Further development of specific research methods (e.g. for mixotrophy detection in the environmental samples) and their adequate combination with the taxonomic species identification and trophic analysis of the planktonic food webs can provide new essential information about the structure of ciliate communities and the functional role of these protists in the Baltic pelagic ecosystems.

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Appendix

CHECKLIST OF CILIATES OF THE BALTIC SEA

Species composition of planktonic and benthic ciliates in the Baltic Sea (**BP** – Baltic Proper; **WBS** – Western Baltic Sea; **NBS** – Northern Baltic Sea, **SBS** – Southern Baltic Sea; **EBS** – Eastern Baltic Sea; "+" present; no sign = species not found; species in bold are the first records of the authors).
Molecular data on species composition of the Baltic ciliates (e.g. *Euplotes rariseta* Curds, West and Dorahy, 1974, *Euplotopsis muscicola* (Kahl, 1932) Borror and Hill, 1995, *Moneuplotes crassus* Dujardin, 1841, *Euplotoides daidaleos* (Diller and Kounaris, 1966) Borror and Hill, 1995) available from Majaneva et al. (2012) and Anderson et al. (2013) are not included; only morphological data were used in this study.

No	Taxa	BP[1]	WBS[2]	NBS[3]	SBS[4]	EBS[5]
1	*Acaryophrya collaris* (Kahl, 1926) Dingfelder, 1962 (Syn.*: *A. mamillata* Kahl, 1927; *Balanophrya collaris* Kahl, 1926; *Holophrya collaris* Kahl, 1926)		+		+	
2	*Acineria incurvata* Augustin, Foissner & Adam, 1987 (Syn.: *Litonotus binucleatus* Kahl, 1933; *L. pictus* f. *binucleatus* Kahl, 1933)		+			
3	*Acineta sp.*		+			
4	*Acineta amphiasci* Precht, 1935		+			
5	*Acineta compressa* Claparède & Lachmann, 1859 (Syn.: *A. cucullus* Claparè`de & Lachmann, 1860; A. papillifera Keppen, 1888)				+	
6	*Acineta flava* Kellicott, 1885 (Syn.: *A. papillifera* Keppen, 1888)				+	
7	*Acineta foetida* Maupas, 1881		+		+	
8	*Acineta laomedeae* Precht, 1935		+			
9	*Acineta pyriformis* Stokes, 1891				+	
10	*Acineta schulzi* Kahl, 1934		+			
11	*Acineta sulcata* Dons, 1927 (Syn.: *A. benesaepta* Schulz, 1933)		+			
12	*Acineta tuberosa* Ehrenberg, 1834		+	+	+	
13	*Actinobolina vorax* Wenrich, 1929 (Syn.: *Actinobolus vorax* Wenrich, 1929)				+	
14	*Amphileptus agilis* Penard, 1922 (Syn.: *Hemiophrys agilis* Penard, 1922; *Litonotus agilis* Penard, 1922)		+		+	
15	*Amphileptus filum* Gruber, 1884 (Syn.: *Hemiophrys filum* Gruber, 1884; *Litonotus filum* Gruber, 1884)		+		+	
16	*Amphileptus marinus* (Kahl, 1931) Song, Wilbert & Hu, 2004 (Syn.: *Hemiophrys marina* Kahl, 1930)		+		+	
17	*Amphileptus inquieta* Biernacka, 1963				+	
18	*Amphileptus pleurosigma* (Stokes, 1884) Foissner, 1984 (Syn.: *Hemiophrys pleurosigma* (Stokes, 1884) Kahl, 1931; *Litonotus pleurosigma* Stokes, 1884)					? +
19	*Amphisiella annulata* (Kahl, 1932) Borror, 1972 (Syn.: *Holosticha annulata* Kahl, 1932)		+		+	
20	*Amphisiella capitata* (Perejaslawzewa, 1886) Borror, 1972 (Syn.: *Oxytricha capitata* Perejaslawzewa, 1886; *A. marioni* Gourret & Roeser, 1888)		+			
21	*Amphisiella milnei* (Kahl, 1932) Horváth, 1950		+		+	
22	*Amphorella* sp.		+			
23	*Amphorides quadrilineata* Claparède & Lachmann, 1858 (Syn.: *Tintinnus quadrilineatus* Claparède & Lachmann, 1858)		+			

CHECKLIST OF CILIATES OF THE BALTIC SEA

(Continuation)

No	Taxa	BP[1]	WBS[2]	NBS[3]	SBS[4]	EBS[5]
24	*Anigsteinia clarissima* (Anigstein, 1912) Isquith, 1968 (Syn.: *Blepharisma clarissimum* Kahl, 1928; *A. clarissimum* Kahl, 1928)		+		+	
25	*Anigsteinia longissima* Kahl, 1928		+			
26	*Anigsteinia salinarum* (Florentin, 1899) Isquith, I968 (Syn.: *Blepharisma salinarum* Florentin, 1899; *A. salinaria* Kahl, 1928)		+		+	
27	*Anophrys sarcophaga* Cohn, 1866		+			
28	*Anteholosticha arenicola* (Kahl, 1932) Berger, 2003 (Syn.: *Holosticha arenicola* Kahl, 1932)		+			
29	***Anteholosticha brevis*** (Kahl, 1932) Berger, 2003 (Syn.: *Holosticha brevis* Kahl, 1932; *Keronopsis longicirrata* Gelei & Szabados, 1950; *Holosticha rostrata* Vuxanovici, 1963)					+
30	*Anteholosticha extensa* (Kahl, 1932) Berger, 2003 (Syn.: *Holosticha extensa* Kahl, 1932)		+			
31	*Anteholosticha grisea* (Kahl, 1932) Berger, 2003 (Syn.: *Holosticha grisea* Kahl, 1932)		+			
32	*Anteholosticha monilata* (Kahl, 1928) Berger, 2003 (Syn.: *H. monilata* Kahl, 1928; *Keronopsis monilata* Kahl, 1928)		+			+
33	*Anteholosticha multistilata* (Kahl, 1932) Berger, 2003 (Syn.: *Keronopsis multistilata* Kahl, 1928; *Holosticha multistilata* Kahl, 1932)		+			
34	*Anteholosticha pulchra* (Kahl, 1932) Berger, 2003 (Syn.: *Keronopsis pulchra* Kahl, 1932)		+		+	
35	*Apiosoma* sp.	+				
36	*Apotrachelocerca arenicola* Xu et al., 2012 (Syn.: *Tracheloraphis arenicola* (Sauerbrey, 1928) Dragesco, 1960; *Trachelocerca arenicola* Kahl, 1933)		+			
37	*Arcuseries scutellum* (Cohn, 1866) Huang, Chen, Song & Berger, 2014 (Syn.: *Anteholosticha scutellum* (Cohn, 1866) Berger, 2003; *Oxytricha scutellum* Cohn, 1866)		+		+	
38	*Aristerostoma marinum* Kahl, 1931		+			
39	*Ascobius simplex* Dons, 1918 (Syn.: *Semifolliculina simplex* Dons, 1918)		+			
40	*Askenasia* sp.		+		+	+
41	*Askenasia stellaris* (Leegaard, 1920) Kahl, 1930 (Syn.: *Lohmanniella stellaris* Leegaard, 1920)	+	+			+
42	*Askenasia volvox* (Eichwald, 1852) Kahl, 1930 (Syn.: *A. elegans* Blochmann, 1895; *Halteria volvox* Claparède & Lachmann, 1858; *Trichodina volvox* Eichward, 1852)				+	
43	*Aspidisca* sp.		+		+	+
44	*Aspidisca aculeata* (Ehrenberg, 1838) Mansfeld, 1926		+			
45	*Aspidisca angulata* Bock, 1952		+			
46	*Aspidisca binucleata* Kahl, 1932		+			
47	*Aspidisca cicada (*Müller, 1786) Claparède & Lachmann, 1858 (Syn.: *A. costata* (Dujardin, 1842) Stein, 1859; *A. sulcata* Kahl, 1932; *Coccudina costata* Dujardin, 1841; *Trichoda cicada* Müller, 1786)		+		+	

CHECKLIST OF CILIATES OF THE BALTIC SEA

(Continuation)

No	Taxa	BP[1]	WBS[2]	NBS[3]	SBS[4]	EBS[5]
48	*Aspidisca dentata* Kahl, 1928		+			
49	*Aspidisca fusca* Kahl, 1928		+			
50	*Aspidisca leptaspis* Fresenius, 1865 (Syn.: *A. tridentata* Dragesco, 1963; *A. baltica* Borror, 1968; *A. caspica* Agamaliev, 1967; *A. crenata* Fabre-Domergue, 1885; *A. hexeris* Quennerstedt, 1869; *A. lyncaster* Fleury et al., 1986; *A. orthopogon* Deroux & Tuffrau, 1965; *A. psammobiotica* Burkovsky, 1970; *A. pulcherrima* Kahl, 1932; *A. pulcherrima* f. *baltica* Kahl, 1932; *A. sedigita* Quennerstedt, 1867)		+		+	
51	*Aspidisca lyncaster* (Müller, 1773) Stein, 1859 (Syn.: *Trichoda lyncaster* Müller, 1773; *Kerona lyncaster* (Müller, 1776) Müller, 1786)		+			
52	***Aspidisca lynceus*** (Müller, 1773) Ehrenberg, 1830 (Syn.: *Trichoda lynceus* Müller, 1773)					+
53	*Aspidisca major* f. *faurei* Dragesco, 1960		+			
54	*Aspidisca mutans* Kahl, 1932		+			
55	*Aspidisca polystyla* Stein, 1859 (Syn.: *A. plana* Perejaslawzeva, 1886)		+			
56	*Aspidisca robusta* Kahl, 1932		+			
57	*Aspidisca steini* Buddenbrock, 1920 (Syn.: *A. aculeata* Agamaliev, 1974; *A. aculeata* Borror, 1965; *A. glabra* Kahl, 1928; *A. hyalina* Dragesco, 1960)		+		+	
58	*Aspidisca turrita* (Ehrenberg, 1831) Claparède & Lachmann, 1858 (Syn.: *Euplotes turritus* Ehrenberg, 1831)		+			+
59	*Atopochilodon distichum* Deroux, 1976		+			
60	*Australothrix gibba* (Claparède & Lachmann, 1858) Blatterer & Foissner, 1988 (Syn.: *Holosticha gibba* (Müller, 1786) Stein, 1859; *Oxytricha gibba* Claparède & Lachmann, 1858; *Paraurostyla gibba* (Müller, 1786) Borror, 1972)		+			
61	*Australothrix zignis* (Entz, 1884) Blatterer & Foissner, 1988 (Syn.: *Uroleptus zignis* Entz, 1884)		+		+	
62	*Avelia gigas* Dragesco, 1960		+			
63	*Balanion* sp.			+	+	
64	*Balanion comatum* Wulff, 1922	+	+		+	+
65	*Balladyna elongata* Roux, 1901		+			
66	*Biholosticha discocephalus* (Kahl, 1932) Berger, 2003 (Syn.: *Holosticha discocephalus* Kahl, 1932)		+			
67	*Blepharisma* sp.		+		+	
68	*Blepharisma dileptus* Kahl, 1928		+			
69	*Blepharisma hyalinum* Perty, 1852 (Syn.: *B. lateritium* f. *minima* Roux, 1902)		+			
70	*Blepharisma steini* Kahl, 1932 (Syn.: *B. lateritium* Claparède & Lachmann, 1858)		+			
71	*Blepharisma tardum* Kahl, 1928		+			

CHECKLIST OF CILIATES OF THE BALTIC SEA

(Continuation)

No	Taxa	BP[1]	WBS[2]	NBS[3]	SBS[4]	EBS[5]
72	*Blepharisma undulans* Stein, 1868					+
73	*Blepharisma vestitum* Kahl, 1928		+			
74	*Brachonella spiralis* (Smith, 1894) Jankowski, 1964 (Syn.: *Metopus spiralis S*mith, 1897; *M. contortus* Levander, 1894)				+	
75	*Bursaria* sp.			+		
76	*Bursaria truncatella* Müller, 1773				+	
77	*Bursaridium pseudobursaria* (Fauré-Fremiet, 1924) Kahl, 1927 (Syn.: *B. difficile* Kahl, 1927; *Thylakidium pseudobursaria* Fauré-Fremiet, 1924)				+	
78	*Bursella spumosa* Schmidt, 1921				+	+
79	*Bursellopsis nigricans* (Lauterborn, 1894) Foissner, Berger & Schaumburg, 1999 (Syn.: *Holophrya nigricans* Lauterborn, 1894)				+	+
80	*Caenomorpha* sp.				+	
81	*Caenomorpha levanderi* Kahl, 1927		+			
82	*Calyptotricha lanuginosa* (Penard, 1922) Wilbert & Foissner, 1980		+			
83	*Carchesium gammari* Precht, 1935		+			
84	*Carchesium jaerae* Precht, 1935		+			
85	***Carchesium polypinum*** (Linnaeus, 1758) Ehrenberg, 1830 (Syn.: *C. corymbosum* Penard, 1922; *Sertularia polypina* Linnaeus, 1758)					+
86	*Carchesium steinii* Wrzesniowski, 1877 (Syn.: *Epistylis steinii* Wrzesniowski, 1877)		+			
87	*Cardiostomatella mononucleata* Dragesco, 1960		+			
88	*Cardiostomatella vermiforme* (Kahl, 1928) Corliss, 1960		+		+	
89	*Caudiholosticha setifera* (Kahl, 1932) Berger, 2003 (Syn.: *Holosticha setifera* Kahl, 1932; *H. obliqua* Kahl, 1928)		+			+
90	*Caudiholosticha viridis* (Kahl, 1932) Berger, 2003 (Syn.: *Holosticha viridis* Kahl, 1932)		+			
91	*Certesia quadrinucleata* Fabre-Domergue, 1885 (Syn.: *C. ovata* Vacelet, 1960)		+			
92	*Chaenea gigas* Kahl, 1933		+			
93	*Chaenea teres* (Dujardin, 1841) Kent, 1881 (Syn.: *C. elongata* Kahl, 1926; *C. limicola* Kahl, 1928)		+		+	
94	*Chaenea vorax* Quennerstedt, 1867 (Syn.: *Lagynus elongatus* Maupas, 1883)		+			
95	*Chilodonella calkinsi* Kahl, 1928 (Syn.: *C. pediculatus* Kahl, 1928; *Chlamydonellopsis calkinsi* Kahl, 1928)		+		+	+
96	*Chilodonella cyprini* (Moroff, 1902) Strand, 1928					+
97	*Chilodonella helgolandica* Kahl, 1935		+		+	
98	*Chilodonella nana* Kahl, 1928					+
99	***Chilodonella uncinata*** Ehrenberg, 1838 (Syn.: *Chilodon uncinatus* Ehrenberg, 1838; *Chilodonella dentata* Fouque, 1876)					+

CHECKLIST OF CILIATES OF THE BALTIC SEA

(Continuation)

No	Taxa	BP[1]	WBS[2]	NBS[3]	SBS[4]	EBS[5]
100	*Chilodontopsis caudata* Kahl, 1933		+			
101	***Chilodontopsis depressa*** (Perty, 1852) Blochmann, 1895 (Syn.: *Chilodon depressus* Perty, 1852)					+
102	*Chilodontopsis elongata* (Kahl, 1928) Corliss, 1960		+		+	
103	*Chilodontopsis oblonga* Maupas, 1883 (Syn.: *Nassula oblonga* Maupas, 1883)		+			
104	*Chilodontopsis ovalis* Biernacka, 1963				+	
105	*Chlamydodon cyclops* Entzsen, 1884		+			
106	*Chlamydodon major* (Kahl, 1931) Carey, 1994		+			
107	*Chlamydodon mnemosyne* Ehrenberg, 1838 (Syn.: *C. apsheronica* Aliev, 1987; *C. pedarius* Kaneda, 1953)		+			
108	*Ciliofaurea arenicola* Dragesco, 1960		+			
109	*Ciliofaurea mirabilis* Dragesco, 1960		+			
110	***Cinetochilum margaritaceum*** Perty, 1852 (Syn.: *Cyclidium margaritaceum* Ehrenberg, 1830; *Glaucoma margaritaceum* Claparède & Lachmann, 1858)					+
111	*Climacostomum gigas* Meunier, 1907		+			
112	*Climacostomum virens* Ehrenberg, 1833 (Syn.: *Bursaria virens* Ehrenberg, 1833; *Leucophrys curvilata* Stokes, 1886; *Spirostomum virens* Ehrenberg, 1838)				+	
113	*Codonella* sp.				+	
114	*Codonella cratera* Leidy, 1877 (Syn.: *C. lacustris* Entz, 1885; *Difflugia cratera* Leidy, 1879; *Tintinnopsis lacustris* Brandt, 1906)	+			+	+
115	*Codonella lagenula* Claparède & Lachmann, 1858			+	+	
116	*Codonella orthoceras* (Haeckel, 1873) Jörgensen, 1924 (Syn.: *C. orthoceras* (Haeckel, 1873) Kofoid & Campbell, 1929)		+			
117	*Codonella relicta* Minkiewich, 1905			+	+	
118	*Codonellopsis* sp.				+	
119	*Codonellopsis contracta* Kofoid & Campbell, 1929			+	+	
120	*Codonellopsis orthoceros* Haeckel, 1873	+				
121	*Cohnilembus* sp.		+			
122	*Cohnilembus vermiformis* Kahl, 1931		+			
123	*Cohnilembus verminus* (Müller, 1786) Kahl, 1933		+			
124	*Coleps* sp.	+	+		+	+
125	*Coleps amphacanthus* Ehrenberg, 1833 (Syn.: *C. uncinatus* Roux, 1889)				+	
126	***Coleps elongatus*** Ehrenberg, 1830				+	+
127	*Coleps hirtus* (Müller, 1786) Nitzsch, 1827 (Syn.: *Cercaria hirta* Nitsch, 1817; *C. hirta* Müller, 1786; *Coleps incurvus* Ehrenberg, 1841; *C. viridis* Ehrenberg, 1838; *Dictiocoleps hirtus* Diesign, 1866; *Vorticella punctata* Abildgaard, 1793)				+	+
128	*Coleps spetai* Foissner, 1984				+	
129	*Colpidium* sp.					+
130	***Colpidium kleini*** Foissner, 1969					+

CHECKLIST OF CILIATES OF THE BALTIC SEA

(Continuation)

No	Taxa	BP[1]	WBS[2]	NBS[3]	SBS[4]	EBS[5]
131	*Colpoda cucullus* (Müller, 1786) Gmelin, 1790 (Syn.: *C. lucida* Greeff, 1883; *Kolpoda cucullus* Müller, 1773; *Tillina flavicans* Stokes, 1885)					+
132	*Colpoda steini* Maupas, 1883 (Syn.: *Tillina saprophila* Stokes, 1884)				+	
133	*Conchostoma longissimum* Fauré-Fremiet, 1963		+			
134	*Condylostentor auricularis* (Kahl, 1932) Jankowski, 1978 (Syn.: *Stentor auricula* Kent, 1881; *S. auriculatus* Kahl, 1932)		+		+	
135	*Condylostoma magnum* Spiegel, 1926				+	
136	*Condylostoma minima* Dragesco, 1960				+	
137	*Condylostoma patens* Müller, 1786 (Syn.: *Trichoda patens* Müller, 1786)		+			
138	*Condylostoma patulum* Claparède & Lachmann, 1858		+		+	
139	*Condylostoma remanei* Spiegel, 1928 (Syn.: *C. caudatum* Spiegel, 1926; *C. longissima* Kahl, 1928)		+		+	
140	*Condylostoma rugosum* Kahl, 1928		+			
141	*Condylostoma tenuis* Faure-Fremiet, 1958		+			
142	*Condylostomides tardus* Penard, 1922 (Syn.: *Condylostoma tardum* Penard, 1922)				+	
143	*Copemetopus subsalsus* Villeneuve-Brachon, 1940	+				
144	*Corynophrya campanula* Kahl, 1934		+		+	
145	*Corynophrya marina* Kahl, 1934		+		+	
146	*Cossothigma dubium* (Dragesco, 1954) Jankowski, 1978 (Syn.: *Trachelostyla dubia* Dragesco, 1954; *Gastrostyla dubia* Dragesco, 1954)		+			
147	*Cothurnia arcuata* Mereschkowsky, 1879	+		+		
148	***Cothurnia annulata*** Stokes, 1885					+
149	*Cothurnia borealis* (Hensen, 1890) Ostenfeld, 1916 (Syn.: *Amphorides borealis* Hensen,1890; *Tintinnus borealis* Hensen, 1890)			+		+
150	*Cothurnia ceramicola* Kahl, 1933		+			
151	*Cothurnia cypridicola* Kahl, 1933		+		+	
152	*Cothurnia gammari* Precht, 1935		+			
153	*Cothurnia harpactici* Kahl, 1933		+			
154	***Cothurnia imberbis*** Ehrenberg, 1831					+
155	*Cothurnia maritima* Ehrenberg, 1838		+		+	
156	*Cothurnia ovalis* (Wailes, 1928) Kahl, 1935		+		+	
157	*Cothurnia pedunculata* Dons, 1918 (Syn.: *C. trophoniae* Dons, 1918)		+			
158	*Cothurnia recurva* Claparède & Lachmann, 1858		+			
159	*Coxliella helix* Claparède & Lachmann, 1858		+		+	+
160	*Coxliella helix* f. *cochleata* Brandt, 1907		+	+	+	
161	*Craspedomyoschiston sphaeromae* Precht, 1935		+			
162	*Cristigera cirrifera* Kahl, 1928 (Syn.: *C. vestita K*ahl, 1928)		+			+
163	*Cristigera penardi* Kahl, 1935 (Syn.: *C. pleuronemoides* Penard, 1922)		+			

CHECKLIST OF CILIATES OF THE BALTIC SEA

(Continuation)

No	Taxa	BP[1]	WBS[2]	NBS[3]	SBS[4]	EBS[5]
164	*Cristigera phoenix* Penard, 1922		+			
165	*Cristigera setosa* Kahl, 1928		+		+	+
166	*Cristigera sulcata* Kahl, 1928		+			
167	*Cryptopharynx* sp.			+		
168	*Ctedoctema acanthocryptum* Stokes, 1884 (Syn.: *C. acanthocrypta* Stokes, 1884)		+			+
169	*Cyclidium* sp.		+			+
170	*Cyclidium candens* Kahl, 1928		+		+	+
171	*Cyclidium elongatum* Schewiakoff, 1896 (Syn.: *C. glaucoma* f. *elongatum* Schewiakoff, 1896)				+	
172	*Cyclidium flagellatum* Kahl, 1926		+			
173	*Cyclidium glaucoma* Müller, 1773		+			+
174	*Cyclidium plouneouri* Dragesco, 1963		+			
175	*Cyclidium veliferum* Kahl, 1933		+			
176	*Cyclidium xenium* Fenchel et.al, 1995		+			
177	*Cyclotrichium faurei* Krainer & Foissner, 1990 (Syn.: *Askenasia faurei* Kahl, 1930; *A. elegans* Faure, 1924)				+	
178	*Cyclotrichium gigas* Fauré-Fremiet, 1924				+	
179	*Cyclotrichium ovatum* Fauré-Fremiet, 1924		+			
180	*Cyclotrichium viride* Gajewskaja, 1933 (Syn.: *Cyclotrichium limneticum* Kahl, 1932)				+	
181	***Cyrtolophosis mucicola*** Stokes, 1885 (Syn.: *Balantiophorus minutus* Schewiakoff, 1889)					+
182	***Dexiostoma campylum*** Ganner & Foissner, 1989 (Syn.: *Colpidium campylum* (Stokes, 1886-Bresslau, 1922) Kahl, 1931; *Dexiostoma campyla* (Stokes, 1886) Jankowski, 1967; *Cryptochilum griseolum* f. *marium* Gourret & Roeser, 1866; *Glaucoma colpidium* Schewiakoff, 1896; *Tillina campyla* Stokes, 1886)				+	+
183	*Dictyocysta elegans* Ehrenberg, 1854	+				
184	*Dicyclotrichium sphaericum* (Fauré-Frémiet, 1924*)* Xu, Song & Hu, 2005 (Syn.: *Cyclotrichium sphaericum* Fauré-Frémiet, 1924*)*				+	
185	*Didinium* sp.				+	
186	*Didinium balbiani* f. *rostratum* Kahl, 1926 (Syn.: *D. nasutum* f. *rostratum* Kahl, 1926)					+
187	*Didinium gargantua* Meunier, 1907	+	+		+	+
188	*Didinium nasutum* (Müller, 1773) Stein, 1859 (Syn.: *Chytridium steini* Eberhard, 1862; *Vorticella nasuta* Müller, 1773)	+	+	+	+	+
189	*Dileptus* sp.				+	
190	*Dileptus estuarinus* Dragesco, 1960		+			
191	*Diophrys* sp.		+			
192	*Diophrys appendiculata* (Ehrenberg, 1838) Kahl, 1932 (Syn.: *D. hystrix* Buddenbrock, 1920; *D. multicirratus* Alekperov, 1984; *D. pentacirratus* Alekperov, 1984; *Stylonychia appendiculata* Ehrenberg, 1838)	+	+		+	
193	*Diophrys scutum* (Dujardin, 1841) Kahl, 1932 (Syn.: *D. peloetes* Borror, 1963; *D. quadricaudatus* Agamaliev, 1967; *D. scutoides* Agamaliev, 1967)		+		+	

CHECKLIST OF CILIATES OF THE BALTIC SEA

(Continuation)

No	Taxa	BP[1]	WBS[2]	NBS[3]	SBS[4]	EBS[5]
194	*Discocephalus ehrenbergi* Dragesco, 1960		+			
195	*Discocephalus rotatorius* Ehrenberg, 1828		+		+	
196	*Discotricha papillifera* Tuffrau, 1954		+			
197	*Disematostoma butschlii* Lauterborn, 1894 (Syn.: *Leucophrys ovum* Fauré-Frémiet, 1924)					+
198	*Dysteria marioni* Gourret & Roeser, 1887		+			
199	*Dysteria monostyla* (Ehrenberg, 1838) Kahl, 1931 (Syn.: *Ervilia legumen* Dujardin, 1841; *Trochilia legumen* (Dujardin, 1841) Diesing, 1866; *Aegyria monostyla* Lepsi, 1926; *A. legumen* (Dujardin, 1841) Claparède & Lachmann, 1859)		+		+	
200	*Dysteria navicula* Kahl, 1928		+			
201	*Dysteria procera* Kahl, 1931		+			
202	*Dysteria sulcata* Claparède & Lachmann, 1858 (Syn.: *Trochilia sulcata* Claparède & Lachmann, 1858)		+			
203	*Enchelyodon elegans* Kahl, 1926 (Syn.: *Spathidium elegans* Kahl, 1926)		+		+	
204	*Enchelyodon elongatus* Claparède & Lachmann, 1859		+			
205	*Enchelyodon fascinucleatus* Kahl, 1933		+			
206	*Enchelyodon laevis* Quennerstedt, 1869		+			
207	*Enchelyodon sulcatus* Kahl, 1930		+		+	
208	*Enchelyodon trepida* (Kahl, 1928) Borror, 1965 (Syn.: *Trachelocerca trepida* Kahl, 1928; *Pseudotrachelocerca trepida* (Kahl, 1928) Song, 1990)		+			
209	*Enchelys marina* Meunier, 1907				+	
210	*Enchelys pupa* (Müller, 1786) Schewiakoff, 1893				+	
211	*Enchelys tarda* Quennerstedt, 1869		+			
212	*Epaxiella* sp.				+	
213	*Ephelota gemmipara* (Hertwig, 1876) Bütschli, 1889 (Syn.: *Podophrya gemmipara* Hertwig, 1876; *Hemiophrya gemmipara* Kent, 1880–1882; *H. microsoma* Maupas, 1881; *Dendrophrya gemmipara* Sand, 1895)		+			
214	*Epicarchesium pectinatum* (Zacharias, 1897) Foissner, Berger & Schaumburg, 1999 (Syn.: *Carchesium pectinatum* (Zacharias, 1897) Kahl, 1935; *Zoothamnium limneticum* Svec, 1897; *Z. pectinatum* Zacharias, 1897)				+	+
215	*Epiclintes auricularis* (Claparède & Lachmann, 1858) Stein, 1864 (Syn.*: Epiclintes ambiguus* Müller, 1786; *E. felis* (Müller, 1786) Carey & Tatchell, 1983; *Oxytricha auricularis* Claparède & Lachmann, 1858)		+		+	+
216	*Epimecophrya ambiguus* Kahl, 1933		+			
217	*Epistylis* sp.		+			+
218	*Epistylis anastatica* (Linnaeus, 1767) Ehrenberg, 1830 (Syn.: *Epistylis lacustris* Imhoff, 1884; *Vorticella anastatica* Linnaeus, 1967)				+	

CHECKLIST OF CILIATES OF THE BALTIC SEA

(Continuation)

No	Taxa	BP[1]	WBS[2]	NBS[3]	SBS[4]	EBS[5]
219	*Epistylis caliciformis* Kahl, 1933		+			
220	*Epistylis carcini* Precht, 1935		+			
221	*Epistylis gammari* Precht, 1935		+			
222	*Epistylis gasterostei* Faure-Fremiet, 1905 (Syn.: *Scyphidia gasterostei* Faure-Fremiet, 1905; *Apiosoma gasterostei* (Faure-Fremiet, 1905) Jankowski, 2007)		+			
223	*Epistylis harpacticola* Kahl, 1933		+			
224	*Epistylis nitocrae* Precht, 1935		+			
225	*Epistylis plicatilis* Ehrenberg, 1838				+	+
226	*Epistylis procumbens* Zacharias, 1897 (Syn.: *Epistylis rotans* Svec, 1897)			+	+	+
227	*Espejoia mucicola* Penard, 1922				+	
228	*Euplotes* sp.		+	+	+	+
229	*Euplotes balteatus* (Dujardin, 1841) Kahl, 1932 (Syn.: *Ploesconia balteata* Dujardin, 1841; *E. quinquecarinatus* Gelei, 1950; *E. alatus* Kahl, 1932)		+			
230	*Euplotes balticus* (Kahl, 1932) Dragesco, 1966		+		+	
231	*Euplotes harpa* Stein, 1859 (Syn.: *Ploesconia cithara* Dujardin, 1842)		+		+	
232	*Euplotes moebiusi* Kahl, 1932		+		+	
233	*Euplotes trisulcatus* Kahl, 1932		+		+	
234	*Euplotes vannus* (Müller, 1786) Minkjewicz, 1901 (Syn.: *Kerona vannus* Müller, 1786; *E. caudatus* Meunier, 1907; *E. crassus* Tuffrau, 1960; *E. longipes* Claparède & Lachmann, 1859; *E. marioni* Gourret & Roeser, 1886; *E. minuta* Agamaliev, 1971; *E. mutabilis* Tuffrau, 1960; *E. roscoffensis* Dragesco, 1966; *E. sharuri* Aliev, 1986; *E. worcesteri* Griffin, 1910; *Moneuplotes vannus* (Müller, 1786) Borror & Hill, 1995)		+		+	
235	*Euplotoides patella* (Müller, 1773) Borror & Hill, 1995 (Syn.: *Coccudina keromina* Bory, 1824; *Euplotes patella* (Müller, 1773) Ehrenberg, 1838; *E. carinatus* Stokes, 1885; *E. leticiensis* Bovee, 1957; *E. paradoxa* Kent, 1880; *E. patella* f. *lemani* Dragesco, 1960; *E. viridis* Ehrenberg, 1838; *Trichoda patella* Müller, 1773)		+		+	+
236	***Euplotopsis apsheronica*** (Agamaliev, 1966) Borror & Hill, 1995 (Syn.: *E. apsheronicus* Agamaliev, 1966)					+
237	*Euplotopsis affinis* (Dujardin, 1841) Borror & Hill, 1995 (Syn.: *Euplotes affinis* (Dujardin, 1841) Kahl, 1932; *E. charon* Müller, 1786; *Ploesconia affinis* Dujardin, 1841)	+	+		+	+
238	*Euplotopsis bisulcata* (Kahl, 1932) Borror & Hill, 1995 (Syn.: *Euplotes bisulcatus* Kahl, 1932)		+			
239	*Eutintinnus apertus* Kofoid & Campbell, 1929 (Syn.: *Tintinnus inquillinum* Müller, 1776)	+				
240	*Fabrea salina* Henneguy, 1890		+			
241	*Favella ehrenbergii* (Claparède & Lachmann, 1858) Jörgensen, 1924 (Syn.: *Favella ehrenbergi* Claparède & Lachmann, 1858)			+	+	

CHECKLIST OF CILIATES OF THE BALTIC SEA

(Continuation)

No	Taxa	BP[1]	WBS[2]	NBS[3]	SBS[4]	EBS[5]
242	*Folliculina ampulla* (Müller, 1786) Lamarck, 1816 (Syn.: *Vorticella ampulla* Müller, 1786; *Ascobius lentus* Henneguy, 1884; *F. moebiusi* Hadzi, 1951)	+	+		+	
243	*Frontonia algivora* Kahl, 1931		+			
244	*Frontonia arenaria* Kahl, 1933		+			
245	*Frontonia atra* (Ehrenberg, 1834) Bütschli, 1889 (Syn.: *Ophryoglena atra* Ehrenberg, 1834)		+		+	
246	*Frontonia elliptica* Beardsley, 1902		+			+
247	*Frontonia fusca* (Quennerstedt, 1869) Kahl, 1931	+	+			
248	*Frontonia leucas* (Ehrenberg, 1833) Ehrenberg, 1838 (Syn.: *Bursaria leucas* Ehrenberg, 1833; *F. vermalis* Ehrenberg, 1883; *Ophryoglena magna* Maupas, 1883; *O. vorax* Smith, 1897; *Plagiopyla hatchi* Stokes, 1891)		+		+	
249	*Frontonia macrostoma* Dragesco, 1960		+			
250	*Frontonia marina* Fabre-Domergue, 1891 (Syn.: *F. leucas* f. *marina* Florentin, 1899)		+		+	
251	*Frontonia microstoma* Kahl, 1935		+			
252	*Frontonia vacuolata* Dragesco, 1960		+			
253	*Geleia decolor* Kahl, 1933		+		+	
254	*Geleia fossata* (Kahl, 1933) Foissner, 1998		+		+	
255	*Geleia nigriceps* Kahl, 1933		+			
256	*Glaucoma scintillans* Ehrenberg, 1830					+
257	*Gruberia* sp.		+			
258	*Gruberia uninucleata* Kahl, 1932		+			
259	*Halteria grandinella* (Müller, 1773) Dujardin, 1841 (Syn.: *H. chlorelligera* f. *grandinelloides* Margalef-Lopez, 1945; *Trichoda grandinella* Müller, 1773; *T. grandinella* (Müller, 1773) Ehrenberg, 1830)	+	+		+	+
260	*Haplocaulus furcellariae* (Precht, 1935) Warren, 1988		+			
261	*Haplocaulus sertulariarum* (Entz, 1884) Banina, 1982 (Syn.: *Opisthostyla sertularium* Kent, 1881; *Erythropsis agilis* Hertwig, 1884; *Rhabdostyla sertularium* Kent, 1881; *Spastostyla sertulariarum* Entz, 1884)		+			
262	*Helicoprorodon gigas* (Kahl, 1933) Fauré-Fremiet, 1950		+			
263	*Helicoprorodon minutus* Bock, 1952		+			
264	*Helicostoma buddenbrocki* Kahl, 1931		+		+	
265	*Helicostoma notatum* Kahl, 1931 (Syn.: *Porpostoma notatum* Möbius, 1888)		+		+	
266	*Helicostoma oblongum* Cohn, 1866	+				
267	*Helicostomella subulata* (Ehrenberg, 1833) Jörgensen, 1924 (Syn.: *H. kiliensis* Laackmann, 1906; *H. edentata* Fauré-Fremiet, 1924; *H. longa* Brandt, 1906; *Amphorella subulata* Daday, 1887; *Tintinnus subulatus* Ehrenberg, 1833; *T. ussowi* Mereschkowsky, 1879)	+	+	+	+	+
268	*Heliochona scheuteni* Stein, 1854 (Syn.: *Spirochona scheuteni* Stein, 1854)		+			

CHECKLIST OF CILIATES OF THE BALTIC SEA

(Continuation)

No	Taxa	BP[1]	WBS[2]	NBS[3]	SBS[4]	EBS[5]
269	*Heliochona sessilis* Plate, 1888		+			
270	*Heminotus caudatus* (Kahl, 1933) Dragesco, 1960		+		+	
271	*Hemiophrys* sp.				+	
272	*Hemisincirra wenzeli* Foissner, 1987			+		
273	*Heterostrombidium calkinsi* (Fauré-Fremiet, 1932) Song, 1999 (Syn.: *Strombidium calkinsi* Fauré-Fremiet, 1932; *S. caudatum* Fromentel-Calkins, 1902)		+		+	
274	*Hippocomos loricatus* Czapik & Jordan, 1977				+	
275	*Histiobalantium majus* Kahl, 1931		+			
276	*Histiobalantium marinum* Kahl, 1933		+			
277	*Histiobalantium natans* Claparède & Lachmann, 1858 (Syn.: *Pleuronema inflatum* Lauterborn, 1915)				+	
278	*Histriculus similis* (Quennerstedt, 1867) Corlis, 1960 (Syn.: *Stylonychia similis* Quennerstedt, 1867; *Histrio similis* (Quennerstedt, 1867) Kahl, 1932				+	
279	***Histriculus vorax*** (Stokes, 1891) Corliss, 1960 (Syn.: *Histrio vorax* Stokes, 1891)					+
280	*Holophrya* sp.		+			+
281	*Holophrya biconica* Sauerbrey, 1928 (Syn.: *Urotricha biconica* Sauerbrey, 1928)		+			
282	*Holophrya coronata* Morgan, 1925 (Syn.: *Trachelocerca coronata* Morgan, 1925)		+			
283	*Holophrya hexatricha* Savi, 1913				+	
284	*Holophrya lemani* (Dragesco, 1960) Dragesco, 1965 (Syn.: *Prorodon teres* f. *lemani* Dragesco, 1960)		+			
285	*Holophrya simplex* Schewiakoff, 1893				+	+
286	*Holophrya sulcata* Penard, 1922				+	
287	*Holophrya teres* (Ehrenberg, 1834) Foissner, Berger & Kohmann, 1994 (Syn.: *Prorodon teres* (Ehrenberg, 1834) Foissner, Berger & Kohmann, 1994; *P. griseus* Claparède & Lachmann, 1858; *P. limnetis* Stokes, 1886)				+	
288	*Holosticha diademata* (Rees, 1884) Kahl, 1932 (Syn.: *Amphisia diademata* Rees, 1883; *Amphisiella thiophaga* Kahl, 1928; *Holosticha teredorum* Tucolesco, 1962; *H. thiophaga* Kahl, 1928; *H. teredorum* Tucolesco, 1962; *H. coronata* Vuxanovici, 1963)		+			
289	*Holosticha gibba* (Müller, 1786) Wrzesniowski, 1877 (Syn.: *H. kessleri* Wrzesniowski, 1877; *Amphisia kessleri* (Wrzesniowski, 1877) Kent, 1882; *A. gibba* (Müller, 1786) Sterki, 1878; *Oxytricha kessleri* Wrzesniowski, 1877; *O. gibba* (Müller, 1786) Ehrenberg, 1838)		+		+	
290	*Holosticha holomilnei* (Kahl, 1932) Berger, 2001 (Syn.: *Holosticha milnei* Kahl, 1932)		+		+	
291	***Holosticha pullaster*** (Müller, 1773) Foissner, Blatterer, Berger & Kohmann, 1991 (Syn.: *H. danubialis* Kaltenbach, 1960; *H. kessleri* f. *aquae-dulcis* Buchar, 1957; *H. retrovacuolata* Tucolesco, 1962; *H. rhomboedrica* Vuxanovici, 1963; *H. simplicis* Wang & Nie, 1932; *Oxytricha alba* Fromental, 1876; *Trichoda pullaster* Müller, 1773)					+
292	*Homalozoon caudatum* Kahl, 1935		+			

CHECKLIST OF CILIATES OF THE BALTIC SEA

(Continuation)

No	Taxa	BP[1]	WBS[2]	NBS[3]	SBS[4]	EBS[5]
293	*Homalozoon vermiculare* (Stokes, 1887) Stokes, 1890 (Syn.: *Craspedonotus vermicularis* (Stokes, 1887) Kahl, 1926; *Leptodesmus tenellus* Zacharias, 1888; *Litonotus vermicularis* Stokes, 1887)				+	+
294	*Hypotrichidium conicum* Ilowaisky, 1921 (Syn.: *H. tisiae* (Gelei, 1929) Gelei, 1944; *Pelagotrichidium tisiae* (Gelei, 1929) Jankowski, 1978)				+	
295	*Intranstylum brachymyon* Precht, 1935		+			
296	*Intranstylum coniferum* Precht, 1935		+			
297	*Kentrophoros* sp.			+		
298	*Kentrophoros fasciolatus* (Sauerbrey, 1928) Dragesco, 1962 (Syn.: *Centrophorella fasciolata* Sauerbrey, 1928)		+			
299	*Kentrophoros fistulosus* (Fauré-Fremient, 1950) Foissner, 1995 (Syn.: *K. longissimus* Dragesco, 1954; *K. tubiformis* Raikov & Kovaleva, 1966)		+			
300	*Kentrophoros lanceolatum* Fauré-Fremiet, 1951 (Syn.: *Centrophorella lanceolata* Fauré-Fremiet, 1951)				+	
301	*Kentrophoros latus* Raikov, 1962					+
302	*Kentrophyllum setigerum* (Quennerstedt, 1867) Petz, Song & Wilbert, 1995 (Syn.: *Loxophyllum setigerum* Quennerstedt, 1867; *Litosolenus armatus* Stokes, 1893)		+		+	
303	*Kovalevia sulcata* (Kovaleva, 1966) Foissner, 1997 (Syn.: *Trachelocerca sulcata* Kahl, 1927; *T. laevis* Quennerstedt, 1867; *Enchelyodon striatus* Gourret & Roeser, 1886; *Lagynus crassicollis* Maupas, 1883; *L. ornatus* Stokes, 1893; *L. sulcatus* Gruber, 1884)		+			
304	*Laboea strobila* Lohmann, 1908 (Syn.: *Strombidium strobilus* Lochmann, 1908)	+	+			+
305	*Lacrymaria* sp.		+		+	+
306	*Lacrymaria affinis* Bock, 1952		+		+	
307	*Lacrymaria binucleata* Song & Wilbert, 1989		+			
308	*Lacrymaria caudata* (Kahl, 1933) Dragesco, 1960		+		+	+
309	*Lacrymaria cohni* Kent, 1881		+		+	
310	*Lacrymaria delamarei* Dragesco, 1954		+			
311	*Lacrymaria marina* (Müller, 1786) Kahl, 1933		+		+	
312	*Lacrymaria olor* (Müller, 1776) Kahl, 1930 (Syn.: *L. proteus; Trachelocerca filiformis* Maskell, 1886; *Vibrio olor* Müller, 1786)		+			+
313	*Lacrymaria robusta* Vuxanovici, 1959 (Syn.: *Lacrymaria acuta* Kahl, 1933)		+			
314	*Lacrymaria saprorelica* Kahl, 1927		+			
315	*Lagynophrya contractilis* Kahl, 1928		+		+	+
316	*Lagynophrya halophila* Kahl, 1928		+		+	
317	*Lagynus elegans* (Engelmann, 1862) Quennerstedt, 1867 (Syn.: *Lacrymaria elegans* Engelmann, 1862)				+	
318	*Lagynus cucumis* (Penard, 1922) Buitkamp, 1977 (Syn.: *Lacrymaria cucumis* Penard, 1922; *L. putrina* Kahl, 1926)		+			

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(Continuation)

No	Taxa	BP[1]	WBS[2]	NBS[3]	SBS[4]	EBS[5]
319	***Leegardiella sol*** Lynn & Montagnes, 1988					+
320	*Lembadion bullinum* (Müller, 1786)) Perty, 1849 (Syn.: *Bursaria bullina* Müller, 1786)				+	
321	***Lembadion lucens*** (Maskell, 1887) Kahl, 1931 (Syn.: *Thurophora lucens* Maskell, 1887)				+	+
322	*Leprotintinnus* sp.					+
323	*Leprotintinnus bottnicus* (Nordqvist, 1890) Jorgensen, 1912 (Syn.: *Tintinnus bottnicus* Nordqvist, 1890; *Codonella bottnica* Levander, 1895)	+		+	+	+
324	*Leprotintinnus pellucidus* Jörgensen, 1924			+	+	
325	*Limnostrombidium pelagicum* (Kahl, 1932) Krainer, 1995 (Syn.: *Strombidium viride* f. *pelagica* Kahl, 1932; *S. pelagoviride* (Krainer, 1991) Krainer, 1993)		+			+
326	*Limnostrombidium viride* (Stein, 1867) Krainer, 1995 (Syn.: *Strombidium viride* Stein, 1859; *S. nasutum* Smith, 1897)				+	+
327	*Linostomella vorticella* (Ehrenberg, 1833) Aescht in Foissner, Berger & Schaumburg, 1999 (Syn.: *Linostoma vorticella* (Ehrenberg, 1833) Jankowski, 1978; *Condylostoma vorticella* Ehrenberg, 1833; *C. stagnale* Wrzesniowski, 1870; *Bursaria vorticella* Ehrenberg, 1833)				+	+
328	*Litonotus* sp.		+		+	+
329	***Litonotus alpestris*** Foissner, 1978 (Syn.: *Litonotus mononucleatus* Song & Wilbert, 1989; *Litonotus uninucleatus* (Kahl, 1931) Song & Wilbert, 1989)					+
330	*Litonotus anguilla* (Kahl, 1931) Carey, 1991		+		+	
331	***Litonotus crystallinus*** (Vuxanovici, 1960) Foissner, Berger, Blatterer & Kohmann, 1995					+
332	*Litonotus cygnus* (Müller, 1776) Foissner, Berger, Blatterer & Kohmann, 1995 (Syn.: *Gastrotricha folium* Wrzesniowski, 1866; *Lionotus anas* Levander, 1894; *L. anser* Butschli, 1889; *Litonotus wrzesniowskii* Kent, 1882; *Vibrio cygnus* Müller, 1773)		+		+	+
333	*Litonotus fasciola* (Ehrenberg, 1838) Wrzesniowski, 1870 (Syn.: *Amphileptus fasciola* Ehrenberg, 1838; *Dileptus fasciola* Fromentel, 1874; *Litonotus fasciola* Carey, 1992; *Loxophyllum fasciola* Claparede & Lachmann, 1981; *Vibrio fasciola* Müller, 1786)				+	+
334	*Litonotus lamella* (Müller, 1773) Foissner, Berger, Blatterer & Kohmann, 1995 (Syn.: *Loxophyllum lamella* Claparède & Lachmann, 1861; *Trachelius lamella* (Müller, 1773) Ehrenberg, 1829; *Acineria incurvata* Dujardin, 1841)		+		+	+
335	*Litonotus loxophylliforme* (Dragesco, 1960) Carey, 1991		+			
336	***Litonotus varsaviensis*** Wrzesniowski, 1870 (Syn.: *Gastrotricha varsaviensis* Wrzesniowski, 1866)				+	+
337	*Lohmaniella* sp.		+		+	
338	*Lohmaniella oviformis* Leegard, 1915 (Syn.: *L. elegans* (Wulff, 1919) Kahl, 1932; *Strobilidium elegans* (Wulff, 1919) Maeda, 1986)	+	+		+	+

CHECKLIST OF CILIATES OF THE BALTIC SEA

(Continuation)

No	Taxa	BP[1]	WBS[2]	NBS[3]	SBS[4]	EBS[5]
339	*Lopezoterenia torpens* (Kahl, 1931) Foissner, 1997 (Syn.: *Trichopelma torpens* Kahl, 1931)		+			
340	*Loxocephalus lucidus* Smith, 1897 (Syn.: *L. annulatus* Kahl, 1926)				+	
341	*Loxodes* sp.				+	
342	***Loxodes rostrum*** (Müller, 1773) Ehrenberg, 1830 (Syn.: *Kolpoda rostrum* Müller, 1773*)*					+
343	*Loxophyllum* sp.				+	
344	*Loxophyllum dragescoi* Carey, 1992 (Syn.: *L. variabilis* Dragesco, 1960; *L. soliforme* Fauré-Fremiet, 1908)		+			
345	*Loxophyllum fasciolatum* Kahl, 1933		+		+	
346	*Loxophyllum helus* (Stokes, 1884) Kahl, 1931 (Syn.: *L. verrucosum* Florentin, 1889; *Litonotus helus* Stokes, 1884; *L. verrucosum* Florentin, 1889)		+		+	
347	*Loxophyllum kahli* Dragesco, 1960		+			
348	*Loxophyllum levigatum* (Sauerbrey, 1928) Dragesco, 1960		+			
349	*Loxophyllum meleagris* (Müller, 1773) Dujardin, 1841 (Syn.: *Kolpoda meleagris* Müller, 1773; *K. assimilis* Müller, 1786; *Amphileptus meleagris* (Müller, 1773) Ehrenberg, 1830)		+		+	+
350	*Loxophyllum multinucleatum* Kahl, 1928		+		+	
351	*Loxophyllum multiplicatum* Kahl, 1928		+			
352	*Loxophyllum multiverrucosum* (Kahl, 1933) Carey, 1991 (Syn.: *L. helus* f. *rotundatum* Kahl, 1933)		+			
353	*Loxophyllum serratum* Kahl, 1933		+		+	
354	*Loxophyllum trinucleatum* Mansfeld, 1923				+	
355	*Loxophyllum undulatum* Sauerbrey, 1928				+	
356	*Loxophyllum vermiforme* Sauerbrey, 1928 (Syn.: *Lentophyllum vermiforme* (Sauerbrey, 1928) Jankowski, 2007)		+			
357	*Lynchella gradata* (Kahl, 1933) Jankowski, 1968		+			
358	*Magnifolliculina binalata* Uhlig, 1964		+			
359	*Marituja pelagica* Gajewskaja, 1928				+	
360	***Meseres cordiformes*** Schewiakoff, 1892					+
361	*Mesodinium* sp.	+				
362	*Mesodinium acarus* Stein, 1862 (Syn.: *M. fimbriatum* Stokes, 1887; *M. phialinum* Maskell, 1887)				+	
363	*Mesodinium cinctum* Calkins, 1902		+			
364	*Mesodinium pulex* (Claparède & Lachmann, 1859) Stein, 1867 (Syn.: *Halteria pulex* Claparède & Lachmann, 1858; *H. rubra* Lachmann, 1908; *Mesodinium pulex* f. *striata* Gourret & Roeser, 1886)	+	+	+	+	+
365	*Mesodinium pupula* (Kahl, 1933) Dragesco, 1963		+			
366	***Metacineta mystacina*** (Ehrenberg, 1831) Butschli, 1889 (Syn.: *Acineta mystacina* Ehrenberg, 1831; *Cothurnia mystacina* Ehrenberg, 1831)					+
367	*Metacystis* sp.	+				
368	*Metacystis elongata* Kahl, 1928				+	

CHECKLIST OF CILIATES OF THE BALTIC SEA

(Continuation)

No	Taxa	BP[1]	WBS[2]	NBS[3]	SBS[4]	EBS[5]
369	*Metacystis striata* Stokes, 1893		+			
370	*Metacystis truncata* Cohn, 1866				+	
371	*Metanophrys durchoni* Puytorac et al., 1974		+			
372	*Metaurostylopsis marina* (Kahl, 1932) Song, Petz and Warren, 2001 (Syn.: *Urostyla marina* Kahl, 1932; *U. thompsoni* Jankowski, 1979)		+		+	
373	*Metopus* sp.	+			+	
374	*Metopus contortus* (Quennerstedt, 1867) Kahl, 1932 (Syn.: *Metopides contortus* Quennerstedt, 1867; *Metopus bivillus* Tucolesco, 1962; *M. sapropelicus* Tucolesco, 1962)		+		+	
375	*Metopus es* (Müller, 1786) Kahl, 1932 (Syn.: *M. sigmoides* Claparède & Lachmann, 1858)				+	+
376	*Metopus major* Kahl, 1932		+			
377	*Metopus nivaaensis* Esteban, Fenchel & Finlay, 1995		+			
378	*Metopus palaeformis* (Kahl, 1935) Esteban et al., 1995 (Syn.: *M. hyalinus* (Kahl, 1927) Kahl, 1935; *M. laminarius* f. *hyalinus* Kahl, 1927)		+			
379	*Metopus pellitus* (Kahl, 1932) Carey, 1994		+			
380	*Metopus setosus* Kahl, 1927 (Syn.: *M. setifer* Kahl, 1935)		+			
381	*Metopus striatus* McMurrich, 1884 (Syn. : *M. acuminatus* Stokes, 1886; *M. acutus* Kahl, 1927; *M. bacillatus* Levander, 1894; *M. denarius* Kahl, 1927; *M. dentatus* Kahl, 1927; *M. fastigatus* Kahl, 1927; *M. gibbus* Kahl, 1927; *M. minimus* Kahl, 1927; *M. pulcher* Kahl, 1927; *M. pullus* Kahl, 1927; *M. recurvatus* Vuxanovici, 1962; *M. violaceus* Kahl, 1927				+	
382	*Metopus vestitus* Kahl, 1932 (Syn.: M. caudatus Cunha, 1915)		+			
383	*Mirodysteria aplanata* Kahl, 1933		+			
384	*Microthorax* sp.		+			+
385	*Moneuplotes crassus* Dujardin, 1841 (Syn.: *Euplotes crassus* Dujardin, 1841; *E. crassus* f. *minor* Kahl, 1932; *E. vannus* f. balticus Kahl, 1932; *E. taylori* Garnjobst, 1928)			+	+	
386	*Moneuplotes cristatus* (Kahl, 1932) Borror & Hill, 1995 (Syn.: *Euplotes cristatus* Kahl, 1932)		+		+	
387	*Monodinium armatum* (Penard, 1922) Foissner, Berger & Schaumbuerg, 1999				+	
388	*Monodinium balbianii* Fabre-Domergue, 1888 (Syn.: *Didinium balbianii* Fabre-Domergue, 1888)		+		+	+
389	*Mylestoma bipartitum* (Gourret & Roeser, 1886) Kahl, 1928 (Syn.: *Aspidisca bipartitum* Gourret & Roeser, 1886)		+			
390	*Myoschiston carcini* Precht, 1935		+			
391	*Myoschiston centropagidarum* Precht, 1935		+			
392	*Myoschiston duplicatum* Precht, 1935		+			
393	*Myriokaryon lieberkuhnii* Jankowski, 1973 (Syn.: *Pseudoprorodon lieberkuhni* Butschli, 1889; *Cranotheridium elongatus* Penard, 1922)					+

CHECKLIST OF CILIATES OF THE BALTIC SEA

(Continuation)

No	Taxa	BP[1]	WBS[2]	NBS[3]	SBS[4]	EBS[5]
394	*Myrionecta rubra* (Lohmann, 1908) Jankowski, 1976 (Syn.: *Halteria rubra* Lohmann, 1908; *Mesodinium rubrum* Lohmann, 1908)	+	+	+	+	+
395	*Nassula argentula* Kahl, 1930		+			
396	*Nassula aurea* Ehrenberg, 1833		+		+	+
397	*Nassula ornata* Ehrenberg, 1833 (Syn.: *Chilodon ornatus* Ehrenberg, 1835)		+			
398	*Nassula tumida* Maskell, 1887 (Syn.: *N. ambigua* f. *tumida* Maskell, 1887)				+	
399	*Nassulides labiatus* (Kahl, 1933) Foissner, Agatha & Berger, 2002 (Syn.: *Nassula labiata* Kahl, 1933)		+			
400	*Omegastrombidium elegans* Florentin, 1901) Agatha, 2004 (Syn.: *Strombidium elegans* Florentin, 1899)	+	+		+	
401	*Opercularia nutans* (Ehrenberg, 1831) Stein, 1854 (Syn.: *O. allensi* Stokes, 1887; *Epistylis nutans* Ehrenberg, 1831)				+	
402	*Ophryoglena* sp.		+			
403	*Ophryoglena flava* Ehrenberg, 1834 (Syn.: *Bursaria flava* Ehrenberg, 1834; *Enchelis gemmata* Müller, 1786; *Panophrys flava* Dujardin, 1841; *Raphanella gemmata* (Müller) Bory, 1824; *Trachelius gemmata* (Müller, 1786) Ehrenberg, 1833)				+	
404	*Opisthotricha* sp.		+			
405	*Orthodon gutta* Cohn, 1866		+			
406	*Oxytricha* sp.		+		+	+
407	*Oxytricha chlorelligera* Kahl, 1932		+			
408	*Oxytricha discifera* Kahl, 1932		+			
409	*Oxytricha fromenteli* Foissner, 1987 (Syn.: *Oxytricha ovalis* Fromentel, 1876)				+	
410	*Oxytricha halophila* Kahl, 1932 (Syn.: *Opisthotricha halophila* Kahl, 1932)		+		+	
411	*Oxytricha oxymarina* Berger, 1999 (Syn.: *Cyrtohymena marina* (Kahl, 1932) Foissner, 1989; *Oxytricha marina* Kahl, 1932; *Steinia marina* Kahl, 1932)		+		+	
412	***Oxytricha setigera*** Stokes, 1891 (Syn.: *Steinia balladynula* Kahl, 1932)					+
413	*Parablepharisma bacteriophora* Kahl, 1935		+			
414	*Parablepharisma collare* Kahl, 1935		+			
415	*Parablepharisma pellitum* (Kahl, 1932) Jankowski, 2007		+			
416	*Paracineta divisa* Fraipont, 1878		+			
417	*Paradileptus elephantinus* (Svec, 1897) Kahl, 1931 (Syn.: *P. conicus* Wenrich, 1929; *P. estensis Canella, 1951; P. minutus* Dragesco, 1972; *P. ovalis* Huber-Pestalozzi, 1945; *Amphileptus flagellates* Rousselet, 1890; *A. moniliger* Ehrenberg, 1835)				+	+
418	*Paradiophrys irmgard* (Mansfeld, 1923) Jankowski, 1978 (Syn.: *Diophrys irmgard* Mansfeld, 1923)		+			
419	*Paradiophrys kahli* (Dragesco, 1963) Foissner, 1996 (Syn.: *Diophrys kahli* Dragesco, 1963)		+			

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(Continuation)

No	Taxa	BP[1]	WBS[2]	NBS[3]	SBS[4]	EBS[5]
420	*Parafavella* sp.			+	+	
421	*Parafavella cylindrica (*Jörgensen, 1899) Kofoid & Campbell, 1929 (Syn.: *Cyttarocylis denticulata* f. *cylindrica* Jörgensen, 1899)	+				
422	*Parafavella lachmanni* Daday, 1887	+				
423	*Parafavella media* Brandt, 1896	+				
424	*Parafrontonia pallida* Czapik, 1979 (Syn.: *Frontonia pallida* Czapik, 1979)				+	
425	*Paramecium* sp.		+		+	
426	*Paramecium aurelia*-complex		+		+	+
427	*Paramecium bursaria* (Ehrenberg, 1831) Focker, 1836 (Syn.: *Loxodes bursaria* Ehrenberg, 1831)					+
428	*Paramecium calkinsi* Woodruff, 1921		+		+	
429	*Paramecium caudatum* Ehrenberg, 1833 (Syn.: *P. aurelia* Müller, 1786)		+		+	+
430	*Paramecium duboscqui* Chatton & Brachon, 1933					+
431	*Paramecium putrinum* Claparede & Lachmann, 1858 (Syn.: *P. trichium* Stokes, 1885)				+	+
432	*Paramecium woodruffi* Wenrich, 1928		+		+	
433	*Paranophrys marina* Thompson & Berger, 1965		+			
434	*Paraprorodon raabei* (Czapik, 1965) Foissner, 1983				+	
435	*Paraspathidium fuscum* (Kahl, 1928) Dragesco, 1960 (Syn.: *Trachelocerca fusca* Kahl, 1928)		+		+	
436	*Paraspathidium longinucleatum* Czapik & Jordan, 1976				+	
437	*Paraspathidium obliquum* Dragesco, 1963				+	
438	*Paraurostyla dispar* (Kahl, 1932) Borror, 1972 (Syn.: *Urostyla dispar* Kahl, 1932)		+			
439	*Parduczia orbis* (Fauré-Fremiet, 1950) *Dragesco, 1999* (Syn.: *Geleia orbis* Fauré-Fremiet, 1951)		+			
440	*Pelagodileptus trachelioides* Foissner, Berger, Schaumburg, 1999 (Syn.: *Dileptus trachelioides* Zacharias, 1894)				+	+
441	*Pelagolacrymaria rostrata (Kahl, 1935) Foissner, Berger & Schaumburg, 1999 (Syn.: Lacrymaria rostrata Kahl, 1935)*			+		
442	*Pelagostrobilidium spirale* Petz et al, 1995 (Syn.: *Lohmanniella spiralis* Leegaard, 1915; *Strobilidium spiralis* (Leegaard, 1915) Petz et al., 1995)	+	+	+	+	+
443	*Pelagostrombidium mirabile* (Penard, 1916) Krainer, 1991 (Syn.: *Strombidium mirabile* Penard, 1916; *Psilotricha fallax* Zacharias, 1895; *Strombidium fallax* (Zacharias, 1895) Kahl, 1932)				+	+
444	*Pelagovorticella mayeri* (Fauré-Fremiet, 1920) Jankowski, 1980 (Syn.: *Vorticella mayeri* Fauré-Fremiet, 1920)				+	+
445	*Pelagovorticella natans* (Fauré-Fremiet, 1924) Jankowski, 1985 (Syn.: *Vorticella natans* Fauré-Fremiet, 1924; *V. convallaria* f. *natans* Fauré-Fremiet, 1924)				+	
446	*Peritromus faurei* Kahl, 1932 (Syn.: *Kerona ciliata* Gourret & Roeser, 1888)		+			
447	*Peritromus montanus* Kahl, 1932 (Syn.: *P. emmae* Kahl, 1928)		+			

CHECKLIST OF CILIATES OF THE BALTIC SEA

(Continuation)

No	Taxa	BP[1]	WBS[2]	NBS[3]	SBS[4]	EBS[5]
448	*Phascolodon contractilis* Kahl, 1926				+	
449	*Phascolodon vorticella* Stein, 1859				+	
450	*Phialina coronata* (Claparède & Lachmann, 1858) Kahl, 1930 (Syn.: *Lacrymaria coronata* Claparède & Lachmann, 1858; *L. caspia* Grimm, 1876)		+		+	+
451	*Phialina salinarum* Kahl, 1928 (Syn.: *Lacrymaria salinarum* Kahl, 1928)		+		+	
452	*Phialina vermicularis* (Müller, 1786) Bory, 1824 (Syn.: *Lacrymaria vermicularis* Müller, 1786; *L. metabolica* Burger, 1908; *L. phialina* Svec, 1897; *L. spiralis* Kahl, 1926; *P. viridis* Ehrenberg-Claparède, 1858)		+			
453	*Pinacocoleps arenarius* (Bock, 1952) Chen et al., 2010 (Syn.: *Coleps arenarius* Bock, 1952)		+			
454	*Pinacocoleps similis* (Kahl, 1933) Chen et al., 2010 (Syn.: *Coleps similis* Kahl, 1933)		+		+	
455	*Pinacocoleps spiralis* (Noland, 1937) Chen et al., 2010 (Syn.: *Coleps spiralis* Noland, 1937)		+			
456	*Plagiocampa* sp.		+			
457	*Plagiocampa incisa* Kahl, 1933		+			
458	*Plagiocampa margaritata* Kahl, 1930		+			
459	*Plagiocampa rouxi* Kahl, 1932 (Syn.: *P. metabolica* Kahl, 1930)		+			
460	*Plagiopogon loricatus* Kahl, 1931		+		+	
461	*Plagiopyla nasuta* Stein, 1860 (Syn.: *Parameicum cucullio* Quenn, 1867)		+		+	+
462	*Platyfolliculina sahrhageana* Hadzi, 1938		+			
463	*Platynematum denticulatum* (Kahl, 1933) Foissner, Berger & Kohmann, 1994 (Syn.: *Platynema denticulatum* Kahl, 1933)		+			
464	*Platynematum hyalinum* (Kahl, 1931) Foissner, Berger & Kohmann, 1994 (Syn.: *Platynema hyalinum* Kahl, 1931)		+			
465	*Platynematum sociale* (Penard, 1922) Foissner, Berger & Kohmann, 1994 (Syn.: *Platynema sociale* Penard, 1922)		+			
466	*Pleuronema coronatum* Kent, 1881		+	+	+	+
467	*Pleuronema crassa* Dujardin, 1841 (Syn.: *P. chrysalis* Perty, 1836)		+			+
468	*Pleuronema marinum* Dujardin, 1841		+		+	
469	*Pleuronema smalli* Dragesco, 1968		+			
470	*Podophrya halophila* Kahl, 1934		+		+	
471	*Podophrya fixa (*Müller, 1786) Ehrenberg, 1833 (Syn.: *Actinophrys pedicellata* Dujardin, 1841; *Trichoda fixa* Müller, 1786)				+	
472	*Predurostyla arenaria* (Spiegel, 1926) Jankowski, 1978 (Syn.: *Condylostoma arenarium* Spiegel, 1926)		+		+	
473	*Proboscidium armatum* Meunier, 1907				+	
474	*Prorodon* sp.		+		+	
475	*Prorodon arenicola* (Kahl, 1933) Dragesco, 2002 (Syn.: *Pseudo-prorodon arenicola* Kahl, 1933)		+			
476	*Prorodon binucleatus* Buddenbrock, 1920		+			

CHECKLIST OF CILIATES OF THE BALTIC SEA

(Continuation)

No	Taxa	BP[1]	WBS[2]	NBS[3]	SBS[4]	EBS[5]
477	*Prorodon brachyodon* Kahl, 1927		+		+	
478	*Prorodon marinus* Claparède & Lachmann, 1858				+	
479	*Prorodon moebiusi* Kahl, 1930		+			
480	*Prorodon ovum* (Ehrenberg, 1833) Kahl, 1930 (Syn.: *Encheyls ovum* Dies, 1866; *Holophrya atra* Svec, 1897; *H. discolor* Ehrenberg, 1833; *H. ovum* Ehrenberg, 1831; *Prorodon nucleatus* Svec, 1897; *P. rigidus* Burger, 1908)		+		+	
481	*Prorodon platyodon* Blochmann, 1895				+	
482	*Protocruzia granulosa* (Kahl, 1932) Faria, Cunha & Pinto, 1922		+			
483	*Protocruzia labiata* Kahl, 1932		+			
484	*Protocyclidium cittrulus* (Cohn, 1866) Foissner, Agatha & Berger, 2002 (Syn.: *Cyclidium citrullus* Cohn, 1866)		+			+
485	*Protogastrostyla pulchra* (Perejaslawzewa, 1885) Gong et al., 2007 (Syn.*: Gastrostyla pulchra* (Perejaslawzewa, 1885) Kahl, 1932; *Maregastrostyla pulchra* (Pereyaslawzewa, 1886) Berger, 2008; *Holosticha coronata* Gourret & Roeser, 1887; *Keronopsis coronata* Gourret & Roeser, 1887)		+			
486	*Protrachelocerca fasciolata* (Sauerbrey, 1928) Foissner, 1996 (Syn.: *Tracheloraphis fasciolatus* Sauerbrey, 1928; *Trachelocerca fasciolata* Sauerbrey, 1928; *Tracheloraphis flexuosus* Raikov & Kovaleva, 1968)				+	
487	*Psammomitra brevicauda* (Kahl, 1933) Borror, 1972 (Syn.: *Micromitra brevicauda* Kahl, 1933)		+		+	
488	*Psammomitra retractilis* (Claparède & Lachmann, 1858) Borror, 1972 (Syn.: *Uroleptus retractilis* (Claparède & Lachmann, 1858) Song & Warren, 1996; *Oxytricha retractilis* Claparède & Lachmann, 1858; *Claparedia retractilis* (Claparède & Lachmann, 1858) Diesing, 1866)		+			
489	*Pseudoamphisiella alveolata* (Kahl, 1932) Song & Warren, 2000 (Syn.: *Holosticha alveolata* Kahl, 1932)		+		+	
490	*Pseudoamphisiella lacazei* (Kahl, 1932) Song & Warren, 2000 (Syn.: *Holosticha lacazei* Kahl, 1932)		+			
491	*Pseudoblepharisma tenue* (Kahl, 1926) Kahl, 1927 (Syn.: *Dileptus cylindricus* Fromentel, 1876; *Blepharisma tenue* Kahl, 1926)		+			
492	*Pseudocohnilembus pussilus* (Quennerstedt, 1869) Foissner & Wilbert, 1981 (Syn.: *Cohnilembus pussillus* (Quennerstedt, 1869) Kahl, 1931)		+			
493	*Pseudohaplocaulus nicoleae* (Precht, 1935) Warren, 1988 (Syn.: *Haplocaulus nicoleae* Precht, 1935)		+			
494	*Pseudokeronopsis carnea* (Cohn, 1866) Wirnsberger, Larsen & Uhlig, 1987 (Syn.: *Oxytricha flava* f*. carnea* Cohn, 1866)		+			
495	*Pseudokeronopsis decolor* Wallengren, 1900 (Syn.: *Keronopsis decolor* Wallengren, 1900; *Holosticha wrzesniowskii* f*. punctata* Rees, 1884; *H. decolor* Wallengren, 1900)		+			
496	*Pseudokeronopsis flava* (Cohn, 1866) Wirnsberger et al., 1987 (Syn.: *Oxytricha flava* Cohn, 1866)		+			

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(Continuation)

No	Taxa	BP[1]	WBS[2]	NBS[3]	SBS[4]	EBS[5]
497	*Pseudokeronopsis flavicans* (Kahl, 1932) Borror & Wicklow, 1983 (Syn.: *Holosticha flavicans* Kahl, 1932)		+		+	
498	*Pseudokeronopsis multinucleata* (Maupas, 1883) Borror & Wicklow, 1983 (Syn.: *Holosticha multinucleata* Maupas, 1883)					+
499	*Pseudokeronopsis ovalis* f. *arenivora* (Kahl, 1932) Borror & Wicklow, 1983 (Syn.: *Keronopsis arenivorus* Dragesco, 1954; *K. ovalis* Kahl, 1932; *Holosticha arenivorus* (Dragesco, 1954) Jankowski, 1979)		+		+	
500	*Pseudokeronopsis pernix* Wrzesniowski, 1877 (Syn.: *Keronopsis pernix* (Wrzesniowski, 1877) Kahl, 1932; *Holosticha pernix* (Wrzesniowski, 1877) Jankowski, 1979; *Oxyticha pernix* Wrzesniowski, 1877)		+			
501	*Pseudokeronopsis rubra* (Ehrenberg, 1835) Borror & Wicklow, 1983 (Syn.: *Holosticha flavorubra* Entz, 1884; *H. rubra* (Ehrenberg, 1835) Kahl, 1932; *Keronopsis rubra* (Ehrenberg, 1835) Borror, 1972; *Oxytricha rubra* Ehrenberg, 1835)		+			
502	*Pseudomonilicaryon anser* (Müller, 1773) Vďačný & Foissner, 2012 (Syn.: *Dileptus anser* (Müller, 1786) Dujardin, 1841; *D.gigas* f. *grojecensis* Wrzesniowsky, 1870; *Amphileptus anser* Ehrenberg, 1838; *A. longicollis* Ehrenberg, 1831; *A. cygnus* Claparède & Lachmann, 1859; *Vibrio anser* Müller, 1786)				+	+
503	*Pseudomonilicaryon marinum* f. *marinum* (Kahl, 1933) Vďačný & Foissner, 2011 (Syn.: *Dileptus marinus* Kahl, 1933)		+		+	
504	*Pseudoplatynematum loricatum* Bock, 1952				+	
505	*Pseudoplatynematum parvum* Bock, 1952				+	
506	*Pseudoprorodon incisus* Bock, 1952				+	
507	*Pseudoprorodon mononucleatus* Bock, 1952				+	
508	*Pseudovorticella difficilis* Kahl, 1933 (Syn.: *Vorticella difficilis* Kahl, 1933)		+			
509	*Pseudovorticella marina* (Greeff, 1870) Ji, Sun, Song & Warren, 2009 (Syn.: *Vorticella marina* Greeff, 1870; *V. constricta* Kahl, 1933)		+		+	
510	*Pseudovorticella patellina* (Müller, 1776) Song & Warren, 2000 (Syn.: *Vorticella patellina* Müller, 1776)		+		+	
511	*Ptychocylis urnula* (Claparède & Lachmann, 1858) Brandt, 1896 (Syn.: *Tintinnus urnula* Claparède & Lachmann, 1858)		+			
512	*Ptychocylis minor* Jörgensen, 1899		+		+	
513	*Remanella* sp.				+	
514	*Remanella brunnea* (Kahl, 1933) Foissner, 1996	+	+		+	
515	*Remanella caudata* (Dragesco, 1954) Foissner, 1996		+			
516	*Remanella granulosa* (Kahl, 1933) Xu et al., 2012 (Syn.: *R. granulosa* Kahl, 1933; *R. trichocysta* Dragesco, 1953)		+		+	
517	*Remanella margaritifera* (Kahl, 1933) Dragesco, 1960		+		+	
518	*Remanella minuta* (Dragesco, 1954) Foissner, 1996		+			
519	*Remanella multinucleata* (Kahl, 1933) Foissner, 1996 (Syn.: *R. multinucleata* Kahl, 1933; *R.gigas* Dragesco, 1954)		+			

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(Continuation)

No	Taxa	BP[1]	WBS[2]	NBS[3]	SBS[4]	EBS[5]
520	*Remanella rugosa* Kahl, 1933		+			
521	*Remanella rugosa* f. *unicorpusculata* Kahl, 1933				+	
522	*Remanella swedmarki* (Dragesco, 1954) Foissner, 1996 (Syn.: *Tracheloraphis swedmarki* Dragesco, 1960)		+			
523	*Reticoleps remanei* (Kahl, 1933) Foissner, Kusuoka & Shimano, 2008 (Syn: *Coleps remanei* Kahl, 1933)		+		+	
524	*Rhabdostyla arenaria* Cuenot, 1891		+		+	
525	*Rhabdostyla cyclopis* Kahl, 1935				+	
526	*Rhabdostyla commensalis* Möbius, 1888		+			
527	*Rhabdostyla inclinans* (Müller, 1773) Roux, 1901 (Syn.: *R. chaeticola* Stokes, 1887; *R. lumbriculi* Penard, 1922; *Vorticella inclinans* Müller, 1773)				+	
528	*Rhabdostyla nereicola* Precht, 1935		+			
529	*Rhabdostyla pyriformis* Perty, 1852 (Syn.: *R. ovum* Kent, 1882)				+	
530	*Rhabdostyla putrina* (Müller, 1776) Warren, 1986 (Syn.: *Vorticella putrina* Müller, 1776)		+			
531	*Rimostrombidium caudatum* (Kahl, 1932) Agatha & Riedel-Lorjé, 1998 (Syn.: *Strobilidium caudatum* (Fromental, 1874) Foissner, 1987; *S. kahli* Petz & Foissner, 1992; *S. adhaerens* Schewiakoff, 1892; *S. caudatum* Kahl, 1932; *S. cometa* (Müller, 1786) Dingfelder, 1962; *S. gyrans* Schewiakoff, 1893 – Deroux, 1974; *Strombidion caudatum* Fromentel, 1876; *Strombidium claparedi* Kent, 1881; *S. gyrans* Stokes f. *transsylvanicum* Lepsi, 1926; *S. intermedium* Maskell, 1887; *S. velox* Beardsley, 1902; *Strombilidium gyrans* Schewiakoff, 1893 – Fernandez-Leborans, 1983; *Turbilina instabilis* Enriques, 1908)		+		+	+
532	*Rimostrombidium conicum* (Kahl, 1932) Petz & Foissner, 1992 (Syn.: *Strobilidium conicum* Kahl, 1932)		+		+	
533	***Rimostrombidium humile*** (Penard, 1922) Petz & Foissner, 1992				+	+
534	*Rimostrombidium sphaericum* (Lynn & Montagnes, 1988) (Syn.: *Strobilidium sphaericum* Lynn & Montagnes, 1988)				+	
535	*Rimostrombidium velox* (Fauré-Fremiet, 1924) Jankowski, 1978 (Syn.: *Strobilidium velox* Fauré-Fremiet, 1924)				+	+
536	*Salpingella acuminata* (Claparède & Lachmann, 1858) Jörgensen, 1924		+		+	
537	*Saprodinium dentatum* (Lauterborn, 1901) Lauterborn, 1908 (Syn.: *Discomorpha dentate* Lauterborn, 1901)				+	
538	*Saprodinium halophilum* Kahl, 1935		+			
539	*Scaphidiodon navicula* (Müller, 1786) Stein, 1859 (Syn.: *Trichoda navicula* Müller, 1786)		+			
540	*Schistophrya aplanata* Kahl, 1933				+	
541	*Schmidingerella serrata* (Möbius, 1887) Agatha & Strüder-Kypke, 2012 (Syn.: *Favella serrata* Möbius, 1887)		+			
542	*Scyphidia hydrobiae* Kahl, 1933		+			
543	*Scyphidia physarum* Lachmann, 1856		+			
544	*Siroloxophyllum utricularium* (Penard, 1922) Foissner & Leipe, 1995 (Syn.: *Loxophyllum utriculariae* (Penard, 1922) Kahl, 1926; *Amphileptus utriculariae* Penard, 1922)				+	

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(Continuation)

No	Taxa	BP[1]	WBS[2]	NBS[3]	SBS[4]	EBS[5]
545	*Sonderia cyclostoma* Kahl, 1930		+		+	
546	*Sonderia pharyngea* Kirby, 1934		+			
547	*Sphaerophrya magna* Maupas, 1881				+	
548	***Sphaerophrya stentori*** Maupas, 1881					+
549	*Spathidiopsis buddenbrocki* Lipscomb & Riordan, 2012 (Syn.: *Placus buddenbrocki* Sauerbrey, 1928)		+			
550	*Spathidiopsis luciae* Lipscomb & Riordan, 2012 (Syn.: *Placus luciae* Kahl, 1926; *Thoracophrya luciae* Kahl, 1926)					+
551	*Spathidiopsis socialis* Lipscomb & Riordan, 2012 (Syn.: *Placus socialis* Fabre-Domergue, 1889)	+				
552	*Spathidiopsis striatus* Lipscomb & Riordan, 2012 (Syn.: *Placus striatus* Cohn, 1866)		+		+	
553	*Spirostomum ambiguum* (Müller, 1786) Ehrenberg, 1834 (Syn.: *Trichoda ambigua* Müller, 1786)		+			+
554	*Spirostomum loxodes* Stokes, 1885		+			
555	*Spirostomum minus* Roux, 1901 (Syn.: *S. ambiguum* f. *minor* Roux, 1901; *S. intermedium* Kahl, 1932)		+		+	
556	*Spirostomum teres* Claparède & Lachmann, 1859		+		+	+
557	*Spirostrombidium cinctum* (Kahl, 1932) Petz et al., 1995 (Syn.: *Strombidium cinctum* Kahl, 1932)		+			
558	*Spirostrombidium sauerbreyae* (Kahl, 1932) Petz et al., 1995 (Syn.: *Strombidium sauerbreyae* (Sauerbrey, 1928) Kahl, 1932)		+		+	
559	*Spirostrombidium oblongum* (Entz, 1884) Petz et al., 1995 (Syn.: *Strombidium oblongum* (Entz, 1884) Kahl, 1932; *S. corsicum* Gourret & Roeser, 1888; *S. sulcatum* f. *oblongum* Entz, 1884; *Clypeolum corsicum* Gourret & Roeser, 1888)		+		+	
560	*Spirotrachelostyla simplex* (Kahl, 1932) Gong, Song, Li, Shao & Chen, 2006 (Syn.: *Trachelostyla simplex* (Kahl, 1932) Borror, 1972)		+			
561	*Staurophrya elegans* Zacharias, 1893				+	
562	*Stenosemella nucula* (Fol, 1884) Jörgensen, 1927 (Syn.: *Codonella ventricosa* Entz, 1884; *Tintinnopsis nivalis* Meunier, 1910; *T. nucula* Laackmann, 1906; *T. ventricosa* Daday, 1887)		+			
563	*Stenosemella steinii* Jörgensen, 1912		+			+
564	*Stenosemella ventricosa* (Claparède & Lachmann, 1858) Jörgensen, 1924 (Syn.: *Codonella ventricosa* Jörgensen, 1899; *Tintinnopsis ventricosa* Cleve, 1900; *T. ventricosoides* Meunier, 1910; *Tintinnus ventricosus* Claparède & Lachmann, 1858)		+	+	+	
565	*Stentor coeruleus* (Pallas, 1766) Ehrenberg, 1830 (Syn.: *Brachionus stentoreus* f. *coerulei* Pallas, 1766; *Stentor attenuatus* Maskell, 1888; *S. striatus* Barraud-Maskell, 1886)				+	+
566	*Stentor muelleri* Ehrenberg, 1832 (Syn.: *Stentorina stentorea* (Linnaeus, 1767) Bory, 1824; *Vorticella stentorea* (Linnaeus, 1767) Müller, 1773; *Stentor solitarius* Oken, 1815; *Hydra stentorea* Linnaeus, 1767)				+	+
567	*Stentor multiformis* (Müller, 1786) Ehrenberg, 1838 (Syn.: *Vorticella multiformis* Müller, 1786; *Stentor nanus* Fromentel, 1876; *S. gallinulus* Penard, 1922)		+		+	

CHECKLIST OF CILIATES OF THE BALTIC SEA

(Continuation)

No	Taxa	BP[1]	WBS[2]	NBS[3]	SBS[4]	EBS[5]
568	*Stentor niger* (Müller, 1773) Ehrenberg, 1831 (Syn.: *S. pediculatus* Fromentel, 1876; *S. castaneus* Wright, 1859; *Vorticella nigra* Müller, 1773)		+		+	+
569	*Stentor polymorphus* (Müller, 1773) Ehrenberg, 1830 (Syn.: *Vorticella polymorpha* Müller, 1773; *Stentorina polymorpha* (Müller) Bory, 1824; *Leucophra cornuta* Müller, 1786)					+
570	*Stentor roeselii* Ehrenberg, 1835 (Syn.: *S. gracilis* Maskell, 1886; *S. viridis* Ghosh, 1921; *S. magnus* Kumazawa, 1973; *S. fimbriatus* Fromentel, 1876)		+		+	+
571	***Sterkiella histriomuscorum*** Foissner, Blatterer, Berger & Kohmann, 1991 (Syn.: *Histriculus muscorum* (Kahl, 1932) Corliss, 1960; *Histrio muscorum* Kahl, 1932; *Opistotricha terrestris* Horvath, 1956; *Oxytricha histrioides* Gellert, 1957; *Stylonychia curvata* Giese & Alden, 1938)		+			+
572	*Stichotricha aculeata* Wrzesniowski, 1866 (Syn.: *Schizosiphon aculeata* (Wrzesniowski, 1866) Kent, 1882)		+		+	
573	*Stichotricha gracilis* Möbius, 1888		+			
574	*Stichotricha marina* Stein, 1867 (Syn.: *S. horrida* Möbius, 1888; *S. inquilinus* Entz, 1884)		+			
575	*Stichotricha merschkowski* Kahl, 1932		+			
576	***Stichotricha secunda*** Perty-Stein, 1859 (Syn.: *S. cornuta* Claparède & Lachmann, 1858; *Stichochaeta cornuta* Claparède & Lachmann, 1858)					+
577	*Stokesia vernalis* Wenrich, 1929 (Syn.: *Cyclotrichium vernalis* Wenrich, 1929)				+	+
578	*Stomatophrya aplanata* Kahl, 1933		+			
579	*Stomatophrya singularis* Kahl, 1933		+			
580	*Strobilidium* sp.	+	+	+		+
581	*Strombidinopsis acuminatum* Fauré-Fremiet, 1924 (Syn.: *Strobilidium acuminatum* (Fauré-Fremiet, 1924) Kahl, 1932; *Strombidium typicum* (Lankester, 1874) Butschli, 1889; *S. tintinnodes* Entz, 1884; *S. acuminatum* (Leegaard, 1915) Kahl, 1932; *Laboea acuminata* Leegaard, 1915)	+	+			+
582	***Strombidinopsis marina*** (Fauré-Fremiet, 1910) Alekperov, 2005 (Syn.: *Strobilidium marinum* (Fauré-Fremiet, 1910) Fauré-Fremiet, 1924; *Strombidium marinum* Fauré-Fremiet, 1910)					+
583	*Strombidinopsis minima* (Gruber, 1884) Kahl, 1932 (Syn.: *Arachnidium becheri* Buddenbrock, 1920; *Strombidium minimum* Gruber, 1884)		+		+	
584	*Strombidium* sp.	+	+	+	+	+
585	***Strombidium compressum*** (Leegaard, 1915) Kahl, 1932 (Syn.: *Laboea compressa* Leegaard, 1915)					+
586	*Strombidium conicum* (Lohmann, 1908) Wulff, 1919 (Syn.: *Laboea acuminata* Leegaard, 1915; *L. conica* Lohmann, 1908; *Strombidium acuminatum* (Leegaard, 1915) Kahl, 1932)	+	+		+	+
587	*Strombidium crassulum* (Leegaard, 1915) Kahl, 1932 (Syn.: *Laboea crassula* Leegaard, 1915)	+	+			+

CHECKLIST OF CILIATES OF THE BALTIC SEA

(Continuation)

No	Taxa	BP[1]	WBS[2]	NBS[3]	SBS[4]	EBS[5]
588	***Strombidium emergens*** (Leegaard, 1915) Kahl, 1932 (Syn.: *Laboea emergens* Leegaard, 1915; *S. petzi* Song, 2005)					+
589	***Strombidium epidemum*** Lynn, Montagnes & Small, 1988					+
590	*Strombidium kahli* Bock, 1952		+		+	
591	*Strombidium latum* Kahl, 1932		+		+	
592	*Strombidium purpureum* Kahl, 1932		+			
593	*Strombidium stylifer* Levander, 1894		+		+	
594	*Strombidium sulcatum* Claparède & Lachmann, 1858 (Syn.: S. minutum Wulff, 1919)	+	+		+	+
595	*Strombidium tintinnodes* Entz, 1884 (Syn.: *S. oculatum* (Gruber, 1884) Kahl, 1932; *S. hadai* (Hada, 1970) Maeda & Carey, 1985; *S. typicum* (Lankester, 1874) Bütschli, 1889)		+			
596	*Strombidium vestitum* (Leegaard, 1915) Kahl, 1932 (Syn.: *Laboea delicatissima* Leegaard, 1915; *L. vestita* Leegaard, 1915; *Strombidium delicatissimum* (Leegaard, 1915) Kahl, 1932)	+				+
597	***Strombidium wulffi*** (Wulff, 1919) Kahl, 1932					+
598	*Stylonychia* sp.		+			+
599	*Stylonychia mytilus* (Müller, 1773) Ehrenberg, 1830 (Syn.: *Ceratidium cuneatum* Ehrenberg, 1838; *Trichoda mytilus* Müller, 1773; *Oxytricha mytilus* (Ehrenberg, 1830) Kahl, 1932; *Kerona mytilus* (Müller, 1773) Müller, 1786)				+	+
600	*Swedmarkia arenicola* Dragesco, 1954		+			
601	*Tachysoma parvistylum* Stokes, 1887 (Syn.: *Oxytricha parvistyla* (Stokes, 1987) Kahl, 1932)		+			
602	*Tachysoma pellionellum* (Müller, 1773) Borror, 1972 (Syn.: *Oxytricha pellionella* (Müller, 1773) Ehrenberg, 1931; *O. pellionella* (Müller, 1773) Bory, 1824; *Histrio pelionella* (Müller, 1773) Lackey, 1936; *T. echinata* Claparède & Lachmann, 1858)		+			+
603	*Tachysoma saltans* (Cohn, 1866) Borror, 1972 (Syn.: *Oxytricha saltans* (Cohn, 1866) Kahl, 1932; *Actinotricha saltans* Cohn, 1866)		+			
604	***Tetrastyla oblonga*** (Schewiakoff, 1892) Berger, 2001 (Syn.: *Amphisiella oblonga* (Schewiakoff, 1892) Dragesco, 1960; *A. oblonga* (Schewiakoff, 1893) Kahl, 1932)					+
605	*Teuthophrys trisulcata* Chatton & de Beauchamp, 1923				+	
606	*Thecacineta* sp.				+	
607	*Thecacineta halacari* Shulz, 1933		+			
608	*Thigmokeronopsis crassa* (Claparède & Lachmann, 1858) Berger, 2006 (Syn.: *Trichotaxis crassa* Claparède & Lachmann, 1858; *Oxytricha crassa* Claparède & Lachmann, 1858)		+			
609	*Thuricola* sp.				+	
610	*Thuricola elegans* Biernacka, 1963				+	
611	*Thuricola obconica* Kahl, 1933				+	
612	*Thuricola valvata* (Wright, 1858) Kent, 1881 (Syn.: *Vaginicola valvata* Wright, 1858)		+			
613	*Tiarina* sp.		+			

CHECKLIST OF CILIATES OF THE BALTIC SEA

(Continuation)

No	Taxa	BP[1]	WBS[2]	NBS[3]	SBS[4]	EBS[5]
614	*Tiarina borealis* (Dogiel, 1940) Shulman &. Shulman-Albova, 1953	+				
615	*Tiarina fusus* (Claparède & Lachmann, 1858) Bergh, 1881 (Syn.: *Dictyocoleps fusus* (Claparède & Lachmann, 1859) Diesing, 1866		+		+	
616	***Tintinnidium balechi*** Barría de Cao, 1981					+
617	*Tintinnidium fluviatile* (Stein, 1863) Kent, 1881 (Syn.: *Tintinnus fluviatile* Stein, 1863)		+	+	+	+
618	*Tintinnidium mucicola* (Claparède & Lachmann, 1858) Daday, 1887 (Syn.: *Tintinnus mucicola* Claparède & Lachmann, 1858)	+	+			
619	***Tintinnidium semiciliatum*** Sterki, 1879 (Syn.: *Strombidinopsis gyrans* Kent, 1881; *Tintinnidium fluviatile* f. *emarginatum* Maskell, 1887; *T. ranunculi* Penard, 1922; *Tintinnus semiciliatus* Sterki, 1879)					+
620	*Tintinnidium pusillum* Entz, 1909				+	
621	*Tintinnopsis* sp.	+			+	
622	*Tintinnopsis acuminata* Daday, 1887	+				
623	*Tintinnopsis baltica* Brandt, 1896 (Syn.: *T. vasculum* Meunier, 1919; *T. strigosa* Meunier, 1919)	+	+	+	+	+
624	*Tintinnopsis beroidea* Stein, 1867 (Syn.: *Codonella beroidea* Entz, 1884; *Tintinnopsis beroidea* f. *acuminata* Daday, 1887)		+	+	+	+
625	*Tintinnopsis brandti* Nordqvist, 1890 (Syn.: *Codonella brandti* Nordqvist, 1890)	+		+		+
626	*Tintinnopsis campanula* Ehrenberg, 1840	+	+	+	+	+
627	*Tintinnopsis cochleata* Brandt, 1906	+				
628	*Tintinnopsis compressa* Daday, 1887			+	+	
629	*Tintinnopsis cylindrata* Kofoid & Campbell, 1892 (Syn.: *T. fusiformis* (Daday, 1892) Entz, 1909)			+	+	+
630	*Tintinnopsis fennica* Kofoid & Campbell, 1929	+				
631	*Tintinnopsis fimbriata* Meunier, 1919 (Syn.: *T. ventricosa* Levander, 1900)		+	+	+	+
632	*Tintinnopsis karajacensis* Brandt, 1896		+	+	+	
633	*Tintinnopsis kofoidi* Hada, 1932				+	
634	*Tintinnopsis lobiancoi* Daday, 1887 (Syn.: *T. brasiliensis* Kofoid & Campbell, 1929)	+		+	+	+
635	*Tintinnopsis lohmanni* Laackmann, 1906 (Syn.: *T. tubulosa* f. *lohmanni* Jörgensen, 1927)		+			
636	*Tintinnopsis major* Meunier, 1910	+				
637	*Tintinnopsis meunieri* Kofoid & Campbell, 1929			+	+	
638	*Tintinnopsis minuta* Wailes, 1925		+	+	+	+
639	*Tintinnopsis nana* Lohmann, 1908		+			+
640	*Tintinnopsis nitida* Brandt, 1986	+				
641	*Tintinnopsis parvula* Jörgensen, 1912	+			+	+
642	*Tintinnopsis pistillum* Kofoid & Campbell, 1929	+			+	
643	*Tintinnopsis rapa* Meunier, 1910	+				
644	*Tintinnopsis rotundata* Jörgensen, 1912	+				

CHECKLIST OF CILIATES OF THE BALTIC SEA

(Continuation)

No	Taxa	BP[1]	WBS[2]	NBS[3]	SBS[4]	EBS[5]
645	*Tintinnopsis sacculus* Brandt, 1896	+				
646	*Tintinnopsis subacuta* Jörgensen, 1899		+			
647	*Tintinnopsis tubulosa* Levander, 1900	+	+	+	+	+
648	*Tintinnopsis turbo* Meunier 1919				+	
649	*Tintinnopsis urnula* Meunier, 1910			+	+	
650	*Tokophrya* sp.		+		+	
651	*Tontonia appendiculariformis* Fauré-Fremiet, 1914		+			
652	*Trachelius gutta* Sahrhage, 1915		+		+	
653	*Trachelius ovum* (Ehrenberg, 1831) Ehrenberg, 1838 (Syn.: *Amphileptus ovum* Dujardin, 1841; *A. rotundus* Maskell, 1887; *Harmodirus ovum* Perty, 1852; *Ophryocerca ovum* Ehrenberg, 1831; *Trachelius leidyi* Foulke, 1884)		+		+	+
654	*Trachelocerca* sp.				+	
655	*Trachelocerca coluber* Kahl, 1933		+		+	
656	*Trachelocerca incaudata* (Kahl, 1933) Foissner, 1996 (Syn.: *Tracheloraphis incaudatus* Kahl, 1930)		+		+	
657	*Trachelocerca longissima* Kahl, 1928 (Syn.: *Gruvelina longissima* Delphy, 1939)		+			
658	*Trachelocerca subviridis* Sauerbrey, 1928				+	
659	*Trachelocerca tenuicolis* Quennerstedt, 1867		+			
660	*Trachelophyllum apiculatum* (Perty, 1852) Claparède & Lachmann, 1859 (Syn.: *T. tachyblastum* Stokes, 1884; *Trachelius apiculatus* Perty, 1852)				+	+
661	*Trachelophyllum brachypharynx* Levander, 1894		+			
662	*Trachelophyllum sigmoides* Kahl, 1926				+	
663	*Tracheloraphis bimicronucleata* (Raikov, 1969) Carey, 1991					+
664	*Tracheloraphis drachi* Dragesco, 1960 (Syn.: *Trachelocerca drachi* Dragesco, 1954)				+	
665	*Tracheloraphis grassei* (Dragesco, 1960) Foissner & Dragesco, 1996 (Syn.: *Trachelonema grassei* Dragesco, 1960)		+			
666	*Tracheloraphis grisea* (Kahl, 1933) Dragesco, 1960 (Syn.: *Trachelocerca grisea* Kahl, 1933)		+			
667	*Tracheloraphis indistincta* Kahl, 1930		+			
668	*Tracheloraphis kahli* Raikov, 1962				+	
669	*Tracheloraphis margaritatus* (Kahl, 1930) Dragesco, 1963 (Syn.: *Trachelocerca phoenicopterus* f. *margaritata* Kahl, 1930)		+		+	
670	*Tracheloraphis oligostriatum* (Raikov, 1962) Foissner & Dragesco, 1996 (Syn.: *Trachelonema oligostriata* Raikov, 1962)				+	
671	*Tracheloraphis phoenicopterus* (Cohn, 1866) Dragesco, 1960 (Syn.: *Trachelocerca phoenicopterus* Cohn, 1866)				+	
672	*Trachelostyla caudata* (Kahl, 1935) Maeda & Carey, 1984		+			
673	*Trachelostyla pediculiformis* (Cohn, 1866) Borror, 1972 (Syn.: *T. pediculiformis* Kahl, 1932; *Gonostomum pediculiformis* Maupas, 1883; *Stichochaeta corsica* Gourret & Roeser, 1887; *S. pediculiformis* Cohn, 1866)		+		+	
674	*Trachelotractus entzi* (Kahl, 1927) Foissner, 1997 (Syn.: *Trachelocerca entzi* Kahl, 1927)		+		+	

CHECKLIST OF CILIATES OF THE BALTIC SEA

(Continuation)

No	Taxa	BP[1]	WBS[2]	NBS[3]	SBS[4]	EBS[5]
675	*Trichodina claviformis* Dobberstein & Palm, 2000			+		
676	*Trichodina domerguei* Wallengren, 1897	+	+			
677	*Trichodina jadranica* Raabe, 1958	+	+			
678	*Trichodina pediculus* Ehrenberg, 1831 (Syn.: *T. baltica* Quennerstedt, 1869; *Urceolaria stellina* (Müller, 1786) Dujardin, 1841; *Vorticella stellina* Müller, 1786)		+			
679	*Trichodina raabei* Lohmann, 1962	+	+			
680	*Trichodina scoloplontis* (Precht, 1935) Laird, 1953 (Syn.: *Urceolaria scoloplontis* Precht, 1935)		+			
681	*Trichodina serpularum* Fabre-Domergue, 1888 (Syn.: *Cyclochaeta serpularum* Fabre-Domergue, 1888)		+			
682	*Trichophrya piscium* Butschli, 1889 (Syn.: *Capriniana aurantiaca* (Mazzarelli, 1906) Strand, 1928; *C. piscium* (Bütschli, 1889) Dovgal, 2002)					+
683	***Trithigmostoma bavariensis*** Foissner, 1988 (Syn.: *Chilodonella bavariensis* Kahl, 1931)					+
684	*Trithigmostoma cucullulus* (Müller, 1786) Jankowski, 1967 (Syn.: *Chilodonella cucullulus* (Müller, 1786) Kahl, 1931; *Chilodon cucullulus* Ehrenberg-Kelin, 1927; *Kolpoda cucullio* Müller, 1786; *K. cucullulus* Müller, 1786)		+		+	+
685	***Trithigmostoma srameki*** (Sramek-Husek, 1952) Foissner, 1987 (Syn.: *Chilodonella hyalina* Sramek-Husek, 1952; *Trithigmostoma hyalina* (Sramek-Husek, 1952) Foissner, 1987)					+
686	***Trochilia minuta*** (Roux, 1901) Kahl, 1931 (Syn.: *Dysteropsis minuta* Roux, 1899)					+
687	*Trochilia sigmoides* Dujardin, 1841				+	
688	*Trochilioides oculata* Kahl, 1933		+			
689	*Urocentrum turbo* (Müller, 1786) Kahl, 1931 (Syn.: *Calceolus cypripedium* Diesing, 1866; *Cercaria turbo* Müller, 1786; *Peridinopsis cyripedium* Clark, 1866; *Urocentrum trichocystus* Smith, 1897)		+			+
690	*Uroleptopsis citrina* Kahl, 1932		+			
691	*Uroleptopsis viridis* (Perejaslawzewa, 1886) Kahl, 1932				+	
692	*Uroleptus* sp.				+	
693	*Uroleptus musculus* (Kahl, 1932) Foissner, Blatterer, Berger & Kohmann, 1991 (Syn.: *Holosticha musculus* Kahl, 1932; *Paruroleptus musculus* (Kahl, 1932) Wang & Nie, 1935)		+			
694	*Uroleptus piscis* (Müller, 1773) Ehrenberg, 1831 (Syn.: *Trichoda piscis* Müller, 1773; *Amphisia piscis* (Müller, 1773) Kowalewski, 1882; *Holosticha (Paruroleptus) piscis* (Müller, 1773) Kahl, 1932)		+		+	
695	*Uronema* sp.		+			
696	*Uronema marinum* Dugardin, 1841 (Syn.: *Loxocephalus putrinus* Kahl, 1926)		+		+	+
697	*Uronychia* sp.		+			
698	*Uronychia heinrothi* Buddenbrock, 1920		+			

CHECKLIST OF CILIATES OF THE BALTIC SEA

(Continuation)

No	Taxa	BP[1]	WBS[2]	NBS[3]	SBS[4]	EBS[5]
699	*Uronychia setigera* Calkins, 1902 (Syn.: *U. transfuga* Curds & Wu, 1983; *U. transfuga* Petz, Song & Wilbert, 1995; *U. uncinata* Kahl, 1932; *U. uncinata* Taylor, 1928)		+			
700	*Uronychia transfuga* (Müller, 1786) Stein, 1859 (Syn.: *Trichoda transfuga* Müller, 1786; *Oxytricha transfuga* (Müller, 1786) Bory & Deslongchamps, 1824)		+		+	
701	*Urostrongylum* sp.				+	
702	*Urostrongylum caudatum* Kahl, 1932		+		+	
703	*Urostrongylum lentum* Biernacka, 1963		+			
704	*Urostyla grandis* Ehrenberg, 1830 (Syn.: *U. trichogaster* Stokes, 1885)				+	+
705	*Urotricha* sp.	+				+
706	*Urotricha baltica* Czapik & Jordan, 1977				+	
707	*Urotricha farcta* Claparède & Lachmann, 1859 (Syn.: *Balanitozoon gyrans* Stokes, 1887; *U. minkewickzi* Schouteden, 1906; *U. parvula* Penard, 1922)				+	+
708	*Urotricha pelagica* Kahl, 1935		+		+	+
709	*Urotricha platystoma* Stokes, 1886 (Syn.: *U. corlissiana* Song Weibo & Wilbert, 1989; *U. armata* Kahl, 1927)		+		+	+
710	*Vaginicola crystallina* (Ehrenberg, 1830) Ehrenberg, 1838 (Syn.: *Trichoda crystallina* Müller, 1786; *T. ingenita* Müller, 1786; *V. ingenita* (Müller, 1786) Kent, 1881)		+		+	
711	*Vaginicola sulcata* Kahl, 1928		+			
712	*Vaginicola wangi* (Wang & Nie, 1933) Kahl, 1935 (Syn.: *Cothurnia acuta* Wang & Nie, 1933)	+	+			
713	*Vorticella* sp.	+	+	+	+	+
714	*Vorticella anabaena* Stiller, 1940 (Syn.: *V. chlorellata* Stiller, 1940)				+	+
715	*Vorticella annulata* Gourret & Roeser, 1888		+		+	
716	*Vorticella campanula* Ehrenberg, 1831 (Syn.: *V. aperta* Fromentel, 1874)		+		+	+
717	*Vorticella convallaria* (Linnaeus, 1758) Linnaeus, 1767 (Syn.: *Hydra convallaria* Linnaeus, 1758)					+
718	*Vorticella fromenteli* Kahl, 1935		+		+	
719	*Vorticella fusca* Precht, 1935		+		+	
720	*Vorticella jaerae* Precht, 1935		+			
721	*Vorticella longifilum* Kent, 1881				+	
722	*Vorticella microstoma* Ehrenberg, 1830 (Syn.: *V. infusionum* Dujardin, 1841)		+		+	
723	*Vorticella nebulifera* Müller, 1786		+		+	
724	*Vorticella octava-komplex* Stokes, 1885 (Syn.: *V. hamata* Müller, 1786; *V. hamatella* Foissner, 1987)		+			
725	*Vorticella ovum* Dons, 1917				+	
726	***Vorticella picta*** (Ehrenberg, 1831) Ehrenberg, 1838 (Syn.: *Carchesium pictum* Ehrenberg, 1831; *V. appunctata* Fromentel, 1876)					+

CHECKLIST OF CILIATES OF THE BALTIC SEA

(Continuation)

No	Taxa	BP[1]	WBS[2]	NBS[3]	SBS[4]	EBS[5]
727	*Vorticella subsphaerica* (D'Udekem, 1864) Dons, 1915 (Syn.: *V. sphaerica* D'Udekem, 1864)				+	
728	*Vorticella striata* Dujardin, 1841		+		+	
729	*Vorticella striatula* Dons, 1915				+	
730	*Vorticella urceolaris* Linnaeus, 1767				+	
731	*Vorticella verrucosa* Dons, 1915				+	
732	*Zoothamnium* sp.		+	+	+	+
733	*Zoothamnium arbuscula* Ehrenberg, 1839 (Syn.: *Z. geniculatum* Ayrton, 1902; *Vorticella racemosa* Müller, 1773)				+	
734	*Zoothamnium commune* Kahl, 1933		+		+	
735	*Zoothamnium hentscheli* Kahl, 1935 (Syn.: *Z. kentii* Grenfell, 1884; *Epistylis hentscheli* Kahl, 1935)				+	+
736	*Zoothamnium hiketes* Precht, 1935		+			
737	*Zoothamnium intermedium* Precht, 1935		+			
738	*Zoothamnium nanum* Kahl, 1933		+			
739	*Zoothamnium nii* Ji et al., 2005 (Syn.: *Z. duplicatum* Kahl, 1933; *Z. kahli* Caspers, 1949)		+		+	
740	*Zoothamnium nutans* Claparède & Lachmann, 1858				+	
741	*Zoothamnium rigidum* Precht, 1935		+			
742	*Zoothamnium simplex* Kent, 1881				+	
743	*Zoothamnium vermicola* Precht, 1935		+			

Notes: [1] BP, Baltic Proper: after Quennerstedt (1869)**; Gaevskaya (1948), Mamaeva (1987), Axelsson and Norrgren (1991), Arndt (1991), Detmer et al. (1993), Wasik et al. (1996), Sëtäla and Kivi (2003), Johansson et al. (2004), Vannini et al. (2005), Granskog et al. (2006), Beusekom van et al. (2007), Anderson et al. (2012);

[2] WBS, Western Baltic Sea (Kieler Bight): after Müller (1786)**, Stein (1859a, 1859b, 1863, 1864, 1867)**, Möbius (1888)**, Sauerbrey (1928), Kahl (1930-1935, 1933), Münch (1956)**; Bock (1952, 1953, 1960), Ax and Ax (1960)**, Jaeckel (1962)**, Fenchel (1967, 1968a, 1968b, 1969), Hirche (1974), Hartwig (1974)**, Smetacek (1981), Klinkeberg and Shuman (1994), Schiewer (1994), Palm and Dobberstein (2000), Gerlach (2000), Aberle et al. (2007), Moorthi et al. (2008);

[3] NBS, Northern Baltic Sea (Archipelago Sea, Bothnian Sea): after Lindquist (1959), Hedin (1974, 1975), Foissner (1987); Kivi and Sëtäla (1995), Uitto et al. (1997), Olli et al. (1998), Garstecki et al. (2000), Schmidt et al. (2002), Sëtäla (2004), Samuelsson et al. (2006), Rintala et al. (2010);

[4] SBS, Southern Baltic Sea (Gdansk Basin and North-Rugian Bodden): after Biernacka (1948, 1952, 1962, 1963), Czapik (1962)**, Czapik and Jordan (1976, 1977), Mažeikaitė (1978), Boikova (1984, 1989), Andrushaitis (1990), Czapik and Fida (1992)**, Wiktor and Krajewska-Sołtys (1994), Witek (1998), Jakobsen and Montagnes (1999), Dietrich and Arndt (2000), Rychert (2008, 2011), Rychert et al. (2013), Grinienė et al. (2011), Grinienė (2012);

[5] EBS, Eastern Baltic Sea (Gulf of Finland, including the freshwater Neva Bay): after Purasjoki (1947), Kivi (1986), Khlebovich (1987), Kivi and Sëtäla (1995), Smurov and Fokin (1999), Sëtäla (2004), Visse (2007), Mironova et al. (2012, 2013).

[*] Synonims;

[**] cited after Berger (2006, 2008).