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REVISION OF THE DINOFLAGELLATE SPECIES COMPOSITION OF THE BLACK SEA

Data on the diversity of dinoflagellates of the Black Sea (BS) obtained from all BS countries (Russia, Georgia, Turkey, Bulgaria, Romania and Ukraine) from 1886 to 2018 are critically ummarized. The revised list of the BS *Dinoflagellata* includes 420 species (447 including infraspecific taxa) from 92 genera that belong to 47 families, 16 orders and 4 classes. This significantly exceeds the number of dinoflagellate taxa previously cited for the BS. This is mainly due to an increased interest in phytoplankton in recent decades and to international cooperation. Additionally, climate change and intensification of international shipping have contributed to the appearance of invasive species of dinoflagellates in various areas of the sea. The list also includes freshwater species recorded from the less saline areas of the sea. Recent progress in taxonomy has expanded our knowledge about diversity of the BS dinoflagellates; however, the leading orders remained unchanged. *Peridiniales* (124 species/129 including infraspecific taxa), *Gymnodiniales* (96/96), *Gonyaulacales* (73/91), *Dinophysiales* (40/41), *Prorocentrales* (23/25) and *Amphidiniales* (21/22) include 85% of the species found. Genera with the highest species richness are *Protoperidinium* (59/62), *Gymnodinium* (48/48), *Ceratium* (34/52), *Dinophysis* (33/34), *Prorocentrum* (22/24), *Amphidinium* (21/22), *Gyrodinium* (20/20), *Gonyaulax* (19/19) and *Oxytoxum* (14/14). Fifty-two genera are represented in the BS by one species each, 201 species and infraspecific

taxa were first cited after 1990. A list of the BS dinoflagellates was compiled with currently accepted taxonomic names and their synonyms cited for the BS. References contain 116 literary and unpublished original data sources. Further efforts to study the species diversity of the BS should be aimed at more accurate identification of species using modern methodologies. Continuing to update the BS phytoplankton database, where complete information on each species is freely available, will also contribute to the progress in studying the biodiversity of the BS.

Key words: *Dinoflagellata*, phytoplankton, species composition, taxonomic structure, Black Sea

Introduction

The Black Sea (BS) is an economically important brackish-water basin on the southeastern border of Eastern Europe surrounded by six countries: Russia, Georgia, Turkey, Bulgaria, Romania and Ukraine (Figure). As part of the Mediterranean Basin, this semi-enclosed inland sea, with a volume of 547 thousand km^3, is connected by the Strait of Kerch with the Sea of Azov in the northeast, and through the Bosphorus Strait and the Strait of the Dardanelles with the small Sea of Marmara and the Aegaen Sea in the southwest. It has an area of 436,402 km^2 and a maximum depth of 2,212–2,245 m (average depth 1,350 m).

Figure. Map of the Black Sea with the borders of the maritime countries

In the NW part are the mouths of the largest European rivers: the Danube, the Dnieper, the Dniester and the Southern Bug. Their runoff causes a drop in the salinity of the seawater in the narrow coastal area to 10 from nearly 17 in the surface layer of the sea. The salinity difference on the surface (on average 17) and in the lower layers (about 34) of the sea causes a high

density gradient. As a result, there is a blocking layer that prevents water mixing and the penetration of oxygen into the depths. Near the surface the temperature of the water is determined by the air temperature; in the deeper layers it can be 7–8 °C lower. At a depth 150–200 m below, the water lacks oxygen and instead contains dissolved hydrogen sulfide (Sorokin, 1982; Zaitsev, 1998). In terms of biological diversity, the BS is 1.5–2 times poorer than the neighboring Mediterranean Sea, but its productivity is higher.

Dinoflagellates (*Dinoflagellata*) are one of the two most important taxonomic groups of phytoplankton in the study area playing a significant role in food webs. Along with diatoms, they contribute a major part of the primary production in the sea. They remove nutrients purifying the water and serve as indicators of the ecological state of the marine environment. Approximately 80 dinoflagellate species are toxic, causing human health problems and marine animal intoxications and mortalities (Moestrup et al., 2018); about 23 of them have been recorded in the BS.

In last decades several reports summarizing the species composition of microalgae, including dinoflagellates, have been published for selected regions of the BS (Zaitsev, Alexandrov, 1998; Krakhmalnyi, Panina, 2000; Polikarpov et al., 2003; Gymez, Boicenco, 2004; Terenko, 2005a, b; Krakhmalnyi et al., 2006, 2012; Nesterova et al., 2006; Senicheva, 2008; Krakhmalnyi, 2011; Cărăuş, 2012; Feyzioğlu, Şahin, 2017). In our previous work (Krakhmalnyi et al., 2012) we presented a historic review of the dinoflagellates studied in the BS and analyzed their diversity, but without publication of a species list. Since the mentioned article provides a detailed review of the dinoflagellate studies from the past, here we briefly discuss only the main periods of research.

Research on dinoflagellates of the BS was begun by Pereyaslavtseva (1886), who identified 19 dinoflagellate species in samples collected near Sevastopol (Crimea). Twenty years later Reinhard (1909) compiled both literary and unpublished original data on BS phytoplankton, presenting a list of 44 species and infraspecific taxa (i.s.t.) of dinoflagellates. Research on the BS phytoplankton continued between World War I and World War II. Studies were summarized by Morozova-Vodyanitskaya (1948, 1954) who reported 100 species and i.s.t. that belong to 22 genera and 13 families. The next two decades were marked by a high activity of phytoplankton research in various areas of the sea. As a result, from 1950 to 1969, 177 species and i.s.t. of dinoflagellates from 25 genera and 17 families were identified (Kiselev, 1950; Pitsyk, 1954; Petrova, 1957, 1963 1964, 1965; Valkanov, 1957; Ivanov, 1960, 1964, 1965, 1967; Skolka, 1960, 1963; Georgieva, 1961, 1969; Kuzmenko, 1966; Kovaleva, 1969; Makarova, 1969). In the 1970s–1990s the BS dinoflagellates were mentioned in publications of many authors (Roukhiyajnen, 1975; Gomoiu, 1977; Ivanov, 1977; Bodeanu, Usurelu, 1979; Nesterova, 1979, 1985, 1987; Nezlin, Zernova, 1983; Senicheva, 1983; Senichkina, 1983; Ilyash, 1984; Petrova-Karadjova, 1984, 1990; Ilyash, Fedorov, 1985; Sukhanova et al., 1987, 1991; Bityukov et al., 1993; Bodeanu, 1993). Pitsyk (1979) cited 205 taxa of the BS dinoflagellates but did not list them. In total, 48 taxa new to the BS were published during this period.

In the last decades, the study of the BS plankton, including dinoflagellates, has been intensified, largely due to international support and cooperation. Information appeared about dinoflagellates of the BS coast of Georgia (Gvarishvili, 1998a, b; Komakhidze, Mazmanidi, 1998) and Turkey (Eker, 1998; Öztürk, 1999; Türkoğlu, Koray, 2002; Eker-Develi, Velikova, 2009; Baytut et al., 2010; Özdemyr et al., 2012; Feyzioğlu, Şahin, 2017). Phytoplankton research continued off the coast of Ukraine (Sukhanova, Cheban, 1990; Vinogradova, Velikova, 1992; Krakhmalnyi, 1994a, b, 2001, 2002, 2005, 2014; Bryantseva et al., 1996, 2003, 2008; Bryantseva, 2000, 2008; Senichkina et al., 2001, 2004; Terenko L., 2001, 2002, 2005a, b, 2007, 2010, 2011; Krakhmalnyi, Terenko, 2002a, b; Senicheva, 2002, 2004; Terenko G., 2004; Derezyuk, 2008; Terenko L., Terenko G., 2009; Terenko G. et al., 2011), Bulgaria (Moncheva, Krastev, 1997; Konsulov, 1998; Velikova, 1998; Velikova, Larsen, 1999; Velikova et al., 1999; Moncheva et al., 2001; Moncheva, Kamburska, 2002; Moncheva, Parr, 2010), Romania (Petranu, 1997; Bodeanu, 2002; Cărăuş, 2002; Bodeanu et al., 2004; Boicenco, 2010, 2011) and Russia (Mikaelyan, 1997, 2008; Vershinin, Moruchkov, 2003; Vershinin, Morton, 2005; Vershinin et al., 2005; Vershinin, Orlova, 2008; Vershinin, Velikova, 2008; Yasakova, 2010).

Recently, considerable achievements have been made in the study of dinoflagellates due to the development of new technologies (scanning electron microscopy and molecular methods), resulting in significant changes in taxonomic structure and species number of the BS dinoflagellates. Furthermore, some previously known dinoflagellate species of the BS have been re-described, new records have been reported and revisions of the species composition have been published.

In the present study we aimed to: 1) analyze and review the available literature and original data on the species composition of *Dinoflagellata* of the BS and 2) present a list of the BS dinoflagellates that takes into account the latest taxonomic changes.

Materials and methods

This revision of the dinoflagellate species composition of the BS was based both on an analysis of literature published from 1886 through 2018 and on unpublished original data of the authors of the present study. The original materials were collected in the Ukrainian sector of the BS from 1992 to 2018. They include the results of studies of the coastal and open BS waters (1992–1993), the Strait of Kerch (2003, 2006–2009), the Sevastopol coast (1991, 2008–2016), the Odessa coast (1986, 1998–2002, 20089–2018) and the Zmiinyi Island coast (2003–2018).

Here we present the *Dinoflagellata sensu* Fensome & al. (1993), as revised by Fensome & al. (1998) and updated by Okolodkov (2011). The genera *Tovellia* Moestrup & al. and *Opisthoaulax* Calado (Calado, 2011) have been included in the family *Tovelliaceae* Moestrup & al. (Lindberg et al., 2005). The genera *Nusuttodinium* Takano & Horiguchi and *Karenia* Hansen & Moestrup have been placed in the order *Gymnodiniales* (Takano et al., 2014);

the genus *Akashiwo* Hansen & Moestrup (Daugbjerg et al., 2000) was separated from *Gymnodinium* Stein; the genus *Margalefidinium* Gymez, Richlen & D.M. Anderson was erected for some species of *Cochlodinium* F. Schütt (Gymez et al., 2017); the genus *Prosoaulax* Calado & Moestrup (Calado, Moestrup, 2005) was added to the order Suessiales; the genera *Glochidinium* Boltovskoy (Boltovskoy, 1999), *Palatinus* Craveiro & al. (Craveiro et al., 2009), *Parvodinium* Carty (Carty, 2008), *Bysmatrum* Faust & Steidinger (Faust, Steidinger, 1998), *Lessardia* Saldarriaga & al. (Saldarriaga et al., 2003), *Apocalathium* Craveiro, Daugbjerg, Moestrup & Calado (Craveiro et al., 2016) and Huia H. Gu, K.N. Mertens & T. Liu (H. Gu et al., 2016) were added to the order *Peridiniales*; the genera *Blixaea* Gottschling and *Unruhdinium* Gottschling were added to the reestablished family *Kryptoperidiniaceae* (Gottschling et al., 2017); the family *Amphidomataceae* Tillmann and the genus *Azadinium* Elbrächter & Tillmann (Elbrächter et al., 2009) were ascribed to *incerti ordinis*. *Chimonodinium* gen. nov. was added to the order *Toracosphaerales* Tangen, the family *Toracosphaeraceae* Schiller (Craveiro et al., 2011). Recently, the new order *Torodiniales* Boutrup, Moestrup & Daugbjerg, with the new family *Kapelodiniaceae* Boutrup, Moestrup & Daugbjerg and a new genus *Kapelodinium* Boutrup, Moestrup & Daugbjerg were described (Boutrup et al., 2016). The order *Amphididiales* was erected (Moestrup, Calado, 2018). AlgaeBase (Guiry, Guiry, 2018) was consulted to verify currently accepted taxonomic names (with some exceptions, e.g., *Ceratium/Tripos, Oxytoxum/Corythodinium* and some others). The summary list presented here was compiled using the BSPC database developed under the EU Sixth Framework Programme (2002–2006, project BS SCENE). BSPC was located on the server housed by the Institute of Biology of the Southern Seas, NAS of Ukraine (IBSS). Experts from all BS countries, including the authors of this article, took part in the BSPC updating, contributing both published and unpublished data on the records of microalgal species in the BS. The BS phytoplankton database first appeared online in 2008. In 2014, updating and support of the BSPC on the server of the IBSS was discontinued. Since 2018 it is available at http://phyto.bss.plankton.kiev.ua. The checklist published here* is tied to the list of BSPC references and follows their numbering as it given on the site http://phyto.bss.plankton.kiev.ua/wiki/References.

Results and Discussion

According to generalized literary and unpublished original data, 420 species (447 including i.s.t.) from 92 genera of *Dinoflagellata* are cited for the BS. These significantly exceed the annotated checklist published by Gómez and Boicenko (2004) and Terenko (2007), where 267 and 345 species names are listed respectively. They belong to 47 families, 16 orders and 4 classes (Table).

* See the electronic supplement in the online version of the article: https://algologia.co.ua/archive/28/4/428

The taxonomic structure of dinoflagellates has been substantially expanded in recent years (Table). The increase in the number of taxonomic ranks has been due to the progress in taxonomy of the group in the last decade. A number of new taxa were introduced, including new classes, orders and families; new genera were described using both light and scanning electron microscopy and molecular identification. A number of species were assigned to new taxa of different ranks. At the same time, the leading orders remained unchanged: *Peridiniales* (124 species/129 including i.s.t.), *Gymnodiniales* (96/96), *Gonyaulacales* (73/91), *Dinophysiales* (40/41) *Prorocentrales* (23/25) and *Amphidiniales* (21/22) incorporate 85% of the species found. The *Peridiniales* ranked first in species diversity of the BS dinoflagellates at all stages of the study. The exception is late 1990s-2013, when the *Gymnodiniales* contribution to the taxonomic structure increased due to the studies on the naked *Gymnodiniales* species identified *in vivo*. Recent taxonomic changes dropped their number; in 2018, the *Gymnodiniales* ranks second again.

Table

Taxonomic structure of *Dinoflagellata* of the Black Sea in various periods of study

Taxon	Number of species (including infraspecific taxa)				
	1886-1949	1950-1969	1970-1990	Late 1990s-2013	1886-2018
Class **DINOPHYCEAE** Pascher 1914					
Order **AMPHIDINIALES** Moestrup & Calado 2018	na[1]	na	na	na	21(22)
Family **Amphidiniaceae** Moestrup & Calado 2018					
Amphidinium Clap. & J. Lachm. 1859	-	-	-	-	21(22)
Order **DINOPHYSIALES** Kof. 1926	13 (13)	20 (20)	11 (11)	36 (36)	40 (41)
Family **Amphisoleniaceae** Er. Lindem. 1928					
Amphisolenia F. Stein 1883	-	-	-	1(1)	1(1)
Family **Dinophysiaceae** F. Stein 1883					
Dinophysis Ehrenb. 1839	13(13)	19(19)	11(11)	32(32)	33(34)
Family **Oxyphysiaceae** Sournia 1984					
Phalacroma F. Stein 1883	-	1(1)	-	2(2)	6(6)
Oxyphysis Kof. 1926	-	-	-	1(1)	s
Order **GONYAULACALES** Taylor 1980	21 (21)	40 (42)	28 (31)	87 (107)	73 (91)
Family **Ceratiaceae** Wiley & Hickson 1909					
Ceratium Schrank 1793	6(6)	17(19)	11(14)	34(54)	34(52)
Monaster F. Schütt 1895	-	-	-	-	1(1)
Family **Cladopyxidaceae** F. Stein 1883					
[*Amphidoma*] F. Stein 1883	-	-	-	1(1)	t
Cladopyxis F. Stein 1883	-	1(1)	-	1(1)	1(1)
Micracanthodinium Deflandre 1937	-	-	-	2(2)	2(2)
Palaeophalacroma Schiller 1928	-	-	-	1(1)	1(1)

Family **Goniodomaceae** Er. Lindem. 1928					
[*Alexandrium*] Halim 1960	1(1)	1(1)	-	7(7)	t
[*Goniodoma*] F. Stein 1883	1(1)	2(2)	2(2)	2(2)	t
Family **Gonyaulacaceae** Er. Lindem. 1928					
Amylax Meunier 1909	1(1)	1(1)	1(1)	2(2)	1(1)
Gonyaulax Diesing 1866	7(7)	10(10)	7(7)	19(19)	19(19)
Lingulodinium J.D. Dodge 1989	1(1)	1(1)	1(1)	1(1)	1(1)
Family **Heterodiniaceae** Er. Lindem. 1928					
[*Heterodinium*] Kof. 1906	-	-	1(1)	2(2)	t
Family **Ostreopsidaceae** Er. Lindem. 1928					
Alexandrium Halim 1960	t	t	-	t	7(7)
Centrodinium Kof. 1907	-	-	-	1(1)	1(1)
Family **Protoceratiaceae** Er. Lindem. 1928					
Protoceratium Bergh 1881	-	-	-	2(2)	3(3)
Family **Pyrophacaceae** Er. Lindem. 1928					
Pyrophacus F. Stein 1883	1(1)	3(3)	2(2)	3(3)	2(2)
Order **GYMNODINIALES** Apstein 1909	15 (15)	52 (52)	29 (29)	128 (128)	96 (96)
Family **Amphitholaceae** Poche 1913 ex Fensome, Taylor, Norris, Sarjeant, Wharton & Williams 1993					
Achradina Lochmann 1903	-	-	1(1)	2(2)	s
Family **Brachydiniaceae** Sournia 1972					
Karenia G. Hansen & Moestrup 2000	-	-	-	t	2(2)
Torodinium Kof. & Swezy 1921	-	1(1)	1(1)	2(2)	2(2)
Family **Ceratoperidiniaceae** A.R. Loebl. 1980					
Ceratoperidinium Margalef ex A.R. Loebl. 1980	-	-	-	1(1)	1(1)
Family **Gymnodiniaceae** (Bergh) Lankester 1885					
Akashiwo G. Hansen & Moestrup 2000	-	1(1)	1(1)	1(1)	1(1)
[*Amphidinium*] Clap. & Lachm. 1859	3(3)	10(10)	6(6)	19(19)	t
Cochlodinium F. Schütt 1896	3(3)	8(8)	3(3)	10(10)	8(8)
Gymnodinium F. Stein 1878	6(6)	15(15)	11(11)	51(51)	48(48)
[*Katodinium*] Fott 1957	-	-	-	1(1)	t
Margalefidinium F. Gymez, Richlen & D.M. Anderson 2017	-	-	-	-	2(2)
Nusuttodinium Takano, Yamaguchi, Inouye, Moestrup & Horiguchi 2014	-	-	1(1)	1(1)	2(2)
[*Paulsenella*] Chatton 1920	-	1(1)	-	1(1)	t
Pheopolykrikos Chatton 1933	-	-	-	1(1)	s
Plectodinium Biecheler 1934	-	-	-	1(1)	1(1)
Spiniferodinium T. Horiguchi & M. Chinara 1987	-	-	-	-	1(1)
Polykrikos Bütschli 1873	-	2(2)	-	1(1)	4(4)
[*Woloszynskia*] Thompson 1951	-	-	-	3(3)	t
Family **Gyrodiniaceae** Moestrup & Calado 2018					
Gyrodinium Kof. & Swezy 1921	2(2)	11(11)	6(6)	30(30)	20(20)
Family **Tovelliaceae** Moestrup, Lindberg & Daugbjerg 2005 (t)					
[*Opisthoaulax*] Calado 2011	1(1)	1(1)	-	1(1)	t
[*Tovellia*] Moestrup, Lindberg & Daugbjerg 2005	-	1(1)	-	1(1)	t
Family **Warnowiaceae** Er. Lindem. 1928					

Warnowia Er. Lindem. 1928	-	-	-	2(2)	2(2)
Family **Gymnodiniales familia incertae sedis**					
Lebouridinium Gymez, Takayama, Moreira & Lypez-García 2016	-	-	-	-	1(1)
Order **PERIDINIALES** Haeckel 1894	38 (38)	60 (60)	40 (40)	110 (112)	124 (129)
Family **Diplopsalidaceae** Matsuoka 1988					
Huia H. Gu, K.N. Mertens & T.T. Liu 2016	-	-	-	-	1(1)
Oblea Balech 1964 ex A.R.Jr. Loebl. & A.R. Loebl. 1966	t	t	t	t	1(1)
Preperidinium Mangin 1913	-	t	-	t	1(1)
Family **Glenodiniaceae** Wiley & Hickson 1909 (na)					
[*Glenodiniopsis*] Wołosz. 1916	1(1)	1(1)	-	1(1)	t
[*Glenodinium*] Ehrenb. 1836	3(3)	5(5)	2(2)	5(5)	t
Family **Glenodiniopsidaceae** J. Schiller 1935					
Glenodiniopsis Wołosz. 1916	t	t	-	t	1(1)
Family **Heterocapsaceae** Fensome, Taylor, Norris, Sarjeant, Wharton & Williams 1993					
Heterocapsa F. Stein 1883	1(1)	2(2)	1(1)	3(3)	2(2)
Family **Heterodiniaceae** Er. Lindem. 1928					
Heterodinium Kof. 1906	-	-	-	-	2(2)
Family **Kolkwitziellaceae** Er. Lindem. 1928					
Diplopelta F. Stein ex Jörg. 1912	-	1(1)	-	1(1)	1(1)
Diplopsalis Bergh 1881	2(2)	4(4)	2(2)	4(4)	2(3)
Diplopsalopsis Meunier 1910	1(1)	1(1)	1(1)	2(2)	2(2)
Family **Kryptoperidiniaceae** Er. Lindem. 1924					
Blixaea Gottschling in Gottschling, Žerdoner Čalasan, Kretschmann & Gu 2017	-	-	-	1(1)	1(1)
[*Bysmatrum*] Faust & Steidinger 1998	-	-	-	1(1)	t
Durinskia S. Carty & Cox 1986	1(1)	-	1(1)	1(1)	3(3)
Kryptoperidinium Er. Lindem. 1924	1(1)	1(1)	1(1)	2(2)	1(2)
Unruhdinium Gottschling in Gottschling, Žerdoner Čalasan, Kretschmann & H. Gu 2017	-	-	-	1(1)	1(1)
Family **Oxytoxaceae** Er. Lindem. 1928					
Oxytoxum F. Stein 1883	-	1(1)	4(4)	18(18)	14(14)
Family **Peridiniaceae** Ehrenb. 1828					
Glochidinium Boltovskoy 1999	-	1(1)	1(1)	1(1)	1(1)
[*Palatinus*] Craveiro, Calado, Daugbjerg & Moestrup 2009	-	-	-	1(1)	t
Parvodinium S. Carty 2008	-	2(2)	4(4)	6(6)	4(4)
[*Pentapharsodinium*] Indelicato & A.R. Loebl. 1986	1(1)	-	-	2(2)	t
Peridinium Ehrenb. 1832	1(1)	4(4)	2(2)	5(6)	3(3)
[*Scrippsiella*] Balech 1959 ex A.R. Loebl. 1965	1(1)	1(1)	1(1)	1(1)	t
Family **Peridiniopsidaceae** Gottschling, Kretschmann & Žerdoner Časalan, 2017					
Palatinus Craveiro, Calado, Daugbjerg & Moestrup 2009	-	-	-	t	1(1)
Peridiniopsis Lemmerm. 1904	-	-	-	3(3)	4(4)
Family **Podolampaceae** Er. Lindem. 1928					
Lessardia Saldarriaga & Taylor 2003	-	1(1)	1(1)	1(1)	1(1)
Podolampas F. Stein 1883	-	1(1)	-	4(4)	4(4)
Family **Protoperidiniaceae** Fensome, Taylor, Norris, Sarjeant, Wharton & Williams 1998					
Archaeperidinium Jörg. 1912	-	-	-	1(1)	1(1)
Herdmania J.D. Dodge 1981	-	1(1)	-	1(1)	1(1)
Kolkwetziella Er. Lindem. 1919	-	-	-	1(1)	1(1)
[*Oblea*] Balech 1964 ex A.R.Jr. Loebl. & A.R. Loebl. 1966	1(1)	1(1)	1(1)	1(1)	t

[*Preperidinium*] Mangin 1913	-	1(1)	-	2(2)	t
Protoperidinium Bergh 1881	23 (23)	33 (33)	22 (22)	59 (60)	59 (62)
Family **Thecadiniaceae** Balech 1956					
Thecadinium Kof. & Skogsberg 1928	-	-	-	-	1(1)
Family **Peridiniales familia incertae sedis**					
Bysmatrum Faust & Steidinger 1998	-	-	-	t	1(1)
Glenodinium Ehrenb. 1836	t	t	t	t	6(6)
Peridiniella Kof. & Michener 1911	1(1)	1(1)	1(1)	3(3)	3(3)
Order **PHYTODINIALES** T. Christensen 1962	2(2)	2(2)	1(1)	2(2)	2(2)
Family **Phytodiniaceae** Klebs 1912					
Cystodinium Klebs 1912	1(1)	1(1)	-	1(1)	1(1)
Hypnodinium Klebs 1912	1(1)	1(1)	1(1)	1(1)	1(1)
Order **PROROCENTRALES** Lemmerm. 1910	8(8)	14(14)	8(8)	22(23)	23(25)
Family **Prorocentraceae** F. Stein 1883					
Mesoporos Lillick 1937	1(1)	1(1)	1(1)	1(1)	1(1)
Prorocentrum Ehrenb. 1834	7(7)	13(13)	7(7)	21(22)	22(24)
Order **PTYCHODISCALES** Fensome, Taylor, Norris, Sarjeant, Wharton & Williams 1993	-	-	1(1)	4(4)	na
Family **Amphitholaceae** Poche 1913 ex Fensome, Taylor, Norris, Sarjeant, Wharton & Williams 1993 (t)					
[*Achradina*] Lochmann 1903	-	-	t	t	s
Family **Brachydiniaceae** Sournia 1972					
[*Karenia*] G. Hansen & Moestrup 2000	-	-	-	2(2)	t
Family **Ptychodiscaceae** Willey & Hickson 1909 (t)					
[*Ptychodiscus*] F. Stein 1883	-	-	-	1(1)	t
Order **PYROCYSTALES** Apstein 1909	-	-	-	-	5(5)
Family **Pyrocystaceae** (F. Schütt) Lemmerm. 1899					
Pyrocystis G. Murr. & Haeckel 1890	1(1)	2(2)	2(2)	5(5)	5(5)
Order **SUESSIALES** Fensome, Taylor, Norris, Sarjeant, Wharton & Williams 1993	-	-	-	1(1)	3(3)
Family Hemidiniaceae Bourr. ex P.C. Silva 1980					
Hemidinium F. Stein 1878	-	-	-	-	1(1)
Family **Sphaerodiniaceae** Moestrup & Calado					
Sphaerodinium Wołosz. 1916	-	-	-	-	1(1)
Family **Suessiaceae** Fensome, Taylor, Norris, Sarjeant, Wharton & Williams 1993					
Prosoaulax Calado & Moestrup 2005	-	-	-	1(1)	1(1)
Order **THORACOSPHAERALES** Tangen 1982	-	-	-	1(1)	12(12)
Family **Thoracosphaeraceae** J. Schiller 1930					
Apocalathium Craveiro, Daugbjerg, Moestrup & Calado 2016	-	-	-	-	1(1)
Chimonodinium Craveiro, Calado, Daugbjerg, G. Hansen & Moestrup 2011	-	-	-	1(1)	1(1)
Ensiculifera Balech 1967	1(1)	-	-	1(1)	1(1)
Goniodoma F. Stein 1883	t	t	t	t	3(3)
Paulsenella Chatton 1920	-	t	-	t	1(1)
Pentapharsodinium Indelicato & A.R. Loebl. 1986	t	-	-	t	2(2)
Scrippsiella Balech 1959 ex A.R. Loebl. 1965	1(1)	1(1)	1(1)	1(1)	2(2)
Triadinium J.D. Dodge 1981	-	-	-	-	1(1)
Order **TORODINIALES** Boutrup, Moestrup & Daugbjerg 2016	-	-	-	1(1)	1(1)
Family **Kapelodiniaceae** Boutrup, Moestrup & Daugbjerg 2016					
Kapelodinium Boutrup, Moestrup & Daugbjerg 2016	-	-	-	1(1)	1(1)

Order **TOVELLIALES** Moestrup & Calado 2018	na	na	na	na	5(5)
Family **Tovelliaceae** Moestrup, Lindberg & Daugbjerg 2005					
Katodinium Fott 1957	-	-	-	t	1(1)
Opisthoaulax Calado 2011	1(1)	1(1)	-	1(1)	1(1)
Tovellia Moestrup, Lindberg & Daugbjerg 2005	-	1(1)	-	1(1)	1(1)
Woloszynskia Thompson 1951	-	-	-	t	2(2)
Order **DINOPHYCEAE ORDO INCERTAE SEDIS** Chatton ex A.R. Loebl. III	-	-	-	-	4(4)
Family **Amphidomataceae** Sournia 1984	na	na	na	na	
Amphidoma F. Stein 1883	-	-	-	-	1(1)
Azadinium Elbrächter & Tillmann 2009	-	-	-	1(1)	1(1)
Family **Ptychodiscaceae** Willey & Hickson 1909					
Ptychodiscus F. Stein 1883	-	-	-	1(1)	1(1)
Family **Dinophyceae familia incertae sedis**					
Levanderina Moestrup, Hakanen, G. Hansen, Daugbjerg & Ellegaard 2014	-	-	-	-	1(1)
Class **NOCTILUCOPHYCEAE** Fensome, Taeilor, Norris, Sarjeant, Wharton & Williams 1993	-	-	-	-	9(9)
Order **NOCTILUCALES** Haeckel 1894	1(1)	1(1)		5(5)	9(9)
Family **Kofoidiniaceae** Taylor 1976					
Kofoidinium Pavill. 1928	-	-	-	1(1)	2(2)
Family **Leptodiscaceae** Taylor 1976					
Petalodinium J. Cachon & M. Cachon 1996	-	-	-	1(1)	1(1)
Scaphodinium Margalef 1963	-	-	-	1(1)	1(1)
Family **Noctilucaceae** Saville-Kent 1881					
Noctiluca Suriray in Lamarck 1816	1(1)	1(1)	-	1(1)	1(1)
Spatulodinium J. Cachon & M. Cachon 1968	-	-	-	1(1)	1(1)
Family **Protodinisphaeraceae** Kof. & Swezy 1921					
Pronoctiluca Fabre-Domergue 1889	-	-	-	-	3(3)
Class **OXYRRHIDOPHYCEAE** Cavalier-Smith 1998	-	-	-	-	1(1)
Order **OXYRRHINALES** Sournia 1993	-	-	-	-	1(1)
Family **Oxyrrhinaceae** Sournia 1984					
Oxyrrhis Dujardin 1841	-	-	-	-	1(1)
Class **SYNDINIOPHYCEAE** A.R. Loebl. 1976	-	-	-	-	1(1)
Order **SYNDINIALES** A.R. Loebl. 1976	-	-	-	-	1(1)
Family **Syndiniaceae** Chatton 1920					
Syndinium Chatton 1910	-	-	-	-	1(1)
In total	98 (98)	189 (191)	122 (125)	419 (442)	420 (447)

Note: na – not accepted: the taxon was not accepted or recognized in the analyzed period of study; s – taxon (the genus or one of its species previously cited for the BS) currently regarded as a synonym; [ ] – a genus in square brackets means that now its taxonomic position has changed; t – taxon was transferred to another family.

The generic spectrum of the BS dinoflagellates includes 92 taxonomically accepted genera. Among them *Protoperidinium* (59 species), *Gymnodinium* (48), *Ceratium* (34), *Dinophysis* (33), *Prorocentrum* (22), *Gyrodinium* (20), *Amphidinium* (21), *Gonyaulax* (19) and *Oxytoxum* (14) lead in species number. They incorporate 65% of the revealed species diversity, while 52 genera are represented in the BS by one species each. From the point of view of the

reliability of their records in the BS, their composition is heterogeneous. Among them are several recent records including the newly described genus *Azadinium*, which is a producer of azaspiracid toxins causing shellfish poisoning in mussels (Elbrächter et al., 2009; Salas et al., 2011). It has been cited for Bulgarian coast (Moncheva, 2010; see references in the supplement). Some of abovementioned genera are represented by species that are widely distributed in the BS and are a common component of phytoplankton. These are *Monaster rete* (= *Achradina pulchra, A. sulcata), Levanderina fissa, Kapelodinium vestifici* (= *Amphidinium extensum, Gyrodinium glaucum*), *Spatulodinium pseudonoctiluca* (= *Gymnodinium pseudonoctiluca, G. conicum, G. viride)* and others; some of them are often developed in mass: *Akasiwo sanguinea, Lessardia elongata* and *Noctiluca scintillans.*

According to analyzed data, the composition of dinoflagellate dominating species varied in various periods of study. In the period before 1950, *Ceratium furca, C. fusus, C. tripos, Prorocentrum micans, Protoperidinium divergens, Dinophysis caudata, Diplopsalis lenticula* and *Protoperidinium steinii* were the most common. Later, *Protoperidinium conicum, Pyrophacus horologium, Dinophysis rotundata, Prorocentrum micans, P. cordatum, P. compressum, Ceratium furca* and *C. tripos* formed the dominating complex of phytoplankton. In the 1970−1990s, *Ceratium furca, C. fusus, C. tripos, Dinophysis caudata, Phalacroma rotundatum* and *Diplopsalis lenticula* led in abundance. At present, dominating dinoflagellates include *Prorocentrum cordatum, P. micans, P. compressum, Scrippsiella acuminata, Heterocapsa triquetra* and *Lingulodinium polyedra*; they are likely to be more resistant to anthropogenic contamination.

According to our data, 201 taxa were first found after the 1990s. Three species − *Dinophysis mucronata* (Ivanov, 1965), *Gymnodinium dissimile* and *G. paulseinii* (Denisenko, 1965), were cited only once more than half a century ago and have been never found again. These are probably misidentifications (in the list they are marked with an asterisk). The sharp (almost threefold) increase in the number of species after 1990 is due to a number of reasons. They include development of new technologies promoting microalgae research and international cooperation in marine phytoplankton studies; the climate change causing "mediterranization" of the BS (Kuzmenko, 1966; Andrusovich et al., 1994; Bryantsev, 1994) and intensification of cross-border shipping have also contributed to the appearance of invasive species of dinoflagellates in the various areas of the sea (Alexandrov, 2004; Shiganova et al., 2012). A number of freshwater species recorded in the desalinated areas of the sea have also been added to the list.

The number of citations of a particular species may be an additional marker of its reliable identification. 116 species were mentioned only in one or two sources. All of them, except for *Prorocentrum cordatum* var. *aralensis*, until the 1970s, were not indicated for the BS. 229 taxa have been cited in more than six sources and 167 − in ten or more ones.

Conclusions

The present article can be considered as a summary of the studies of the BS dinoflagellates. An annotated list is far from being perfect. It may contain the names of erroneously identified species, given that most experts deal with the routine processing of phytoplankton samples without access to high-precision optics. Microalgae sample processing protocols are virtually unavailable to other users, many institutions do not store collected samples, and most of the identified species were not documented with illustrations in scientific publications. In addition, our knowledge of the epibenthic, symbiotic and parasitic dinoflagellate species remains negligeable. With the ongoing discovery of new species and new groups of cryptic species based on molecular phylogenetic analyses, it is clear that species diversity is presently underestimated. Further efforts to study the species diversity of the BS should be aimed at more accurate identification of species using modern methodologies. To continue updating the BS phytoplankton database, where complete information on each species is freely available, will also contribute to the progress in studying the biodiversity of the BS.

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REFERENCES

Alexandrov B.G. Problem of aquatic organisms transportation by ships and some approaches for risk assessment of the new invasions. *Mar. Ecol. J.* 2004. 3(1): 5–17.

Andrusovich A.I., Mikhaylova E.N., Shapiro N.V. Numerical model and calculation of water circulation of the northwestern Black Sea. *Morsk. Gidrofiz. Zhurn.* 1994. 5: 28-42.

Baytut Ö., Gönülol A., Koray T. Temporal variations of phytoplankton in relation to eutrophication in Samsun Bay, southern Black Sea. *Turkish J. Fisher. Aquat. Sci.* 2010. 10: 363–372.

Bityukov E.P., Evstigneev P.V., Tokarev Y.N. Luminescent *Dinoflagellata* of the Black Sea impacted by anthropogenic factors. *Gidrobiol. Zhurn.* 1993. 29: 27–34.

Bodeanu N. Microalgal blooms in the Romanian area of the Black Sea and contemporary eutrophication conditions. In: *Toxic phytoplankton blooms in the sea*. T.J. Smayda, Y. Shimizu (Ed.). Amsterdam: Elsevier Sci. Publ., 1993. Pp. 203–209.

Bodeanu N. Algal blooms in Romanian Black Sea waters in the last two decades of the XXth century. *Cercet. Mar.* 2002. 34: 7–22.

Bodeanu N., Usurelu M. Dinoflagellate blooms in Romanian Black sea coastal waters. In: *Toxic dinoflagellate blooms*. D.J. Taylor, H.H. Seliger (Eds). Amsterdam: Elsevier Sci. Publ., 1979. Pp. 151–154.

Bodeanu N., Andrei C., Boicenco L., Popa L., Sburlea A. A new trend in the phytoplankton structure and dynamics in the Romanian marine waters. *Cercet. Mar.* 2004. 35: 77–86.

Boicenco L. Spatio-temporal dynamics of phytoplankton composition and abundance from the Romanian Black Sea coast. *Ovidius Univ. Annals Nat. Sci.,* Biol.-Ecol. Ser. 2010. 14: 163–169.

Boicenco L. Phytoplankton and algal blooms. Report on the state of the marine and coastal environment in 2010. *Cercet. Mar.* 2011. 41: 69–73.

Boltovskoy A. The genus *Glochidinium* gen. nov., with two species: *G. penardiforme* comb. nov. and *G. platygaster* sp. nov. (*Peridiniaceae*). *Grana*. 1999. 38: 98–107.

Boutrup P., Moestrup Ш., Tillmann, Daugbjerg M. *Katodinium glaucum* (*Dinophyceae*) revisited: proposal of new genus, family and order based on ultrastructure and phylogeny. *Phycologia*. 2016. 55(2): 147–164.

Bryantsev V.A. Anthropogenic transformation of hydrostructure of the Black Sea hydrogen sulphide zone. Diagnosis of the state of marine environment of the Azov-Black Sea Basin. Sevastopol: MGI-NANU. 1994. Pp. 61-68.

Bryantseva Yu.V. *Variability of the Black Sea phytoplankton structural characteristics*: Ph.D. (Biol.) Thesis. Sevastopol, 2000. 21 p.

Bryantseva Yu.V. Peculiarities of seasonal phytocenosis succession in Sevastopol Bay in 2004–2006. In: *Microalgae of the Black Sea: problems of biodiversity, preservation and use for biotechnology*. Y.N. Tokarev, Z.Z. Finenko, N.V. Shadrin (Eds). Sevastopol: EKOSI-Gidrofizika, 2008. 1(2). Pp. 20–31.

Bryantseva Yu.V., Bryantsev V.A., Kovalchuk L.A., Samyshev E.Z. Long-term changes of Diatomea and Peridinea biomass in the Black Sea in relaton to atmospheric transport. *Ecol. Mor.* 1996. 45: 18–25.

Bryantseva Yu.V. et al. Seasonal succession of phytoplankton in Sevastopol Bay (2000–2001). *Ryb. Khoz. Ukr.* (Spec. issue). 2003. 7: 37–41.

Bryantseva Yu.V. et al. State of the phytoplankton community in the area of the Kerch Strait man-made accident in 2007. In: *Proceedings of the IV International Conference "Modern problems of the Azov-Black Sea Region"*. Kerch, Ukraine, 2008. Pp. 76–81.

Calado A.J. On the identity of the freshwater dinoflagellate *Glenodinium edax*, with a discussion on the genera *Tyrannodinium* and *Katodinium*, and the description of *Opisthoaulax* gen. nov. *Phycologia*. 2011. 50(6): 641–649.

Calado A.J., Moestrup Ø. On the freshwater dinoflagelllates presently included in the genus *Amphidinium*, with a description of *Prosoaulax* gen. nov. *Phycologia*. 2005. 44(1): 112–119.

Cărăuş I. *Algae of Romania. A distributional checklist of actual algae. Studii şi Cercetări (Biologie)*. 7. Univ. Bacău, 2002. 3rd rev. 2012. 809 p.

Carty S. *Parvodinium* gen. nov. for the *Umbonatum* Group of *Peridinium* (*Dinophyceae*). *Ohio J. Sci*. 2008. 108(5): 103–107.

Craveiro S.C., Calado A.J., Daugbjerg N., Moestrup Ø. Ultrastructure and LSU *r*DNA-based revision of *Peridinium* group *Palatinum* (*Dinophyceae*) with the description of *Palatinus* gen. nov. *J. Phycol.* 2009. 45: 1175–1194.

Craveiro S.C., Calado A.J., Daugbjerg N., Hansen G., Moestrup Ø. Ultrastructure and LSU *r*DNA-based phylogeny of *Peridinium lomnickii* and description of *Chimonodinium* gen. nov. (*Dinophyceae*). *Protist.* 2011. 162: 590–615.

Daugbjerg N., Hansen G., Larsen J., Moestrup Ø. Phylogeny of some of the major genera of dinoflagellates based on ultrastructure and partial LSU *r*DNA sequence data, including the erection of three new genera of unarmoured dinoflagellates. *Phycologia.* 2000. 39: 302–317.

Denisenko V.V. About phytoplankton of the Adriatic, Ionian, Aegean and Black seas in August 1958. *Proc. Sevastop. Biol. St.* 1964. 17: 13–20.

Derezyuk N.V. List of phytoplankton species observed in the water area near Zmiinyi Island in 2004–2007. In: *Zmiinyi Island. Ecosystem of coastal waters.* V.A. Smyntyna, V.I. Medinets, I.O. Suchkov (Eds). Odessa: Astroprint, 2008. Pp. 208–218.

Eker E. *Abundance and biomass of micro and nanophytoplankton in the northwestern and southern Black Sea in 1995*: MSc Thesis. Erdemli, Icel: Middle East Techn. Univ. IMS (Turkey), 1998.

Eker-Develi E., Velikova V. New record of a dinoflagellate species, *Lessardia elongata* in the Black Sea. *Mar. Biodivers. Records.* 2009. 2(104): 1–3.

Elbrächter U., Tillmann U., Krock B., Uwe J., Cembella A. *Azadinium spinosum* gen. et sp. nov. (*Dinophyceae*) identified as a primary producer of azaspiracid toxins. *Europ. J. Phycol.* 2009. 44(1): 63–79.

Faust M.A., Steidinger K. *Bysmatrum* gen. nov. (*Dinophyceae*) and three new combinations for benthic scrippsielloid species. *Phycologia.* 1998. 37(1): 47–52.

Feyzioğlu A.M., Şahin F. Phytoplankton in the Black Sea. In: *Black Sea Marine Environment: The Turkish Shelf.* M. Sezgin, L. Bat, D. Ürkmez, E. Arici, B. Öztürk (Eds). *Turkish Mar. Res. Found.* 2017. 46: 148–167.

Fensome R.A., Taylor F.J.R., Norris G., Sarjeant W.A.S., Wharton D.I. et al. *A classification of living and fossil dinoflagellates.* Hanover: Sheridan Press, 1993. 351 p.

Fensome R.A., Bujak J., Dale B. et al. Proposal to conserve the name *Protoperidiniaceae* against *Congruentidiaceae*, *Diplopsalaceae* and *Kolkwitziellaceae* (*Dinophyceae*). *Taxon.* 1998. 47: 727–730.

Georgieva L.V. Composition and quantitative development of phytoplankton of Bosporus region of the Black Sea. In: *Problems of marine biology.* Kiev: Nauk. Dumka Press, 1961. Pp. 24–25.

Georgieva L.V. Phytoplankton of Bosporus region of the Black Sea: qualitative composition and quantitative development of phytoplankton. In: *Water exchange through Bosphorus and its influence on hydrology and biology of the Black Sea.* Kiev: Nauk. Dumka Press, 1969. Pp. 184–195.

Gómez F., Boicenco L. An annotated checklist of dinoflagellates in the Black Sea. *Hydrobiologia.* 2004. 517: 43–59.

Gómez F., Richlen M.L., Anderson D.M. Molecular characterization and morphology of *Cochlodinium strangulatum*, the type species of *Cochlodinium*, and *Margalefidinium* gen. nov. for *C. polykrikoides* and allied species (*Gymnodiniales*, *Dinophyceae*). *Harmful Algae.* 2017. 63: 32–44.

Gomoiu M.T. Les conséquences négatives de la "floraison" des eaux a *Exuviella cordata* Ostenf. du littoral de la mer Noir. *Rapp. et Procus-verbaux des Réunions Conseil Int. pour l'Explorat. de la Mer. Méditer.* 1977. 24: 121–124.

Gottschling M., Žerdoner, Čalasan A., Kretschmann J., Gu H. Two new generic names for dinophytes harbouring a diatom as an endosymbiont, *Blixaea* and *Unruhdinium* (*Kryptoperidiniaceae*, *Peridiniales*). *Phytotaxa*. 2017. 306(4): 296–300.

Guiry M.D., Guiry G.M. *AlgaeBase*. World-wide electronic publication. Nat. Univ. Ireland, Galway, 2018. http://www.algaebase.org

Gvarishvili T. Biodiversity of Lake Paliastomi. In: *Black Sea biological diversity, Georgia*. A. Komakhidze, N. Mazmanidi (Eds). New York: Unit. Nat. Publ., 1998a. Pp. 51–63.

Gvarishvili T. Species composition and biodiversity of Georgian Black Sea phytoplankton. In: *Conservation of the biological diversity as a prerequisite for sustainable development in the Black Sea Region*. V.M. Kotliakov, M. Uppenbrink, V. Metreveli (Eds). Dordrecht: Kluwer Acad. Publ., 1998b. Pp. 95–100.

Ilyash L.V. *Interaction of three Black Sea dinoflagellate species in the mixed cultures:* Synopsis Ph.D. Thesis. Moscow, 1984. 18 p.

Ilyasch L.V., Fedorov V.D. Abundance dynamics of three Black Sea dinoflagellate species in the mixed cultures. *Nauch. Dokl. Vysshey Shkoly*. Biol. Nauki. 1985. 11: 67–74.

Ivanov A.I. Peculiarities of the taxonomic composition and quantitative distribution of the phytoplankton of the northwestern Black Sea. *Trudy Vsesoyuz. Gidrobiol. Obshch*. 1960. 10: 182–196.

Ivanov A.I. Notes on phytoplankton taxonomic composition in the northwestern Black Sea. *Nauch. Zap. Odes. Biol. St*. 1964. 5: 51–54.

Ivanov A.I. Characteristics of the qualitative composition of Black Sea phytoplankton. In: *The study of plankton of the Black Sea and the Sea of Azov*. Kiev: Naukova Dumka Press, 1965. Pp. 17–35.

Ivanov A.I. Phytoplankton of the northwestern Black Sea. In: *Biology of the northwestern Black Sea*. Kiev: Naukova Dumka Press, 1967. Pp. 59–75.

Ivanov A.I. Plankton algae as an indicator of eutrophication and salinization of brackish waters (in the northwestern Black Sea). In: *Scientific bases of the control of the quality of the surface waters based on the hydrobiological indicators* (12–14 July, 1976). *Trudy Sov.-angl. Seminara*. Moscow: Gidrometeoizdat, 1977. Pp. 221–229.

Kiselev I.A. *Thecate flagellates (Dinoflagellata) of the seas and freshwater bodies of the USSR*. Moscow; Leningrad: Izd-vo AN SSSR, 1950. 280 p.

Komakhidze A., Mazmanidi N. *Black Sea biological diversity, Georgia. Black Sea Environ.* Ser. 8. New York: Unit. Nat. Publ., 1998. 167 p.

Konsulov A. *Black Sea biological diversity, Bulgaria. Black Sea Environ*. Ser. 5. York: Unit. Nat. Publ., 1998. 131 p.

Kovaleva T.M. Seasonal changes of phytoplankton in neritic zone of the Black Sea near Sevastopol. *Biol. Morya*. 1969. 17: 18–31.

Krakhmalnyi A.F. Annotated checklist of the *Dinophyta* algae from the continental basins and seas of Ukraine. Kiev: *Deposited in VINITI*, 1994a. 48 p.

Krakhmalnyi A.F. *Dinophyta* of the Black Sea (brief history of investigation and species diversity). *Algologia*. 1994b. 4(3): 99–108.

Krakhmalnyi A.F. *Gymnodinium radiatum* Kofoid et Swezy (*Gymnodiniales, Dinophyta*): new species for Black Sea flora. *Ukr. Bot. J*. 2001. 58(5): 593–595.

Krakhmalnyi A.F. Dinoflagellates of the Black Sea ecosystems. In: *XXI International Conference organized by the Phycological Section of the Polish Botanical Society, Algae of*

various ecosystems – problems of protection, ecology and taxonomy. Sosnywka Gyrna (Poland): Kaf. Bot. i Fiziol. Roslin AR, 2002. 40 p.

Krakhmalnyi A.F. *Prorocentrum dentatum* (*Dinoflagellata*) Stein – new for the Black Sea species of *Dinoflagellata*. *Vestn. Zool.* 2005. 39(6): 61–64.

Krakhmalnyi A.F. *Dinophyta of Ukraine (illustrated book for identification)*. P.M. Tsarenko (Ed.). Kiev: Alterpress, 2011. 444 p.

Krakhmalnyi A.F. *Peridiniopsis cunningtonii* Lemmerm. – a new for the Black Sea species of dinoflagellates (*Dinoflagellata*). *Mar. Ecol. J.* 2014. 13(3): 43–46.

Krakhmalnyi A.F., Panina Z.A. *Dinophyta*. Algal biodiversity of Ukraine. *Algologia*. 2000. 10(4): 68–83.

Krakhmalnyi A.F., Terenko G.V. *Prorocentrum ponticus* Krachmalnyi & Terenko sp. nov., a new species of *Dinophyta* from the Black Sea. *Algologia*. 2002a. 12(3): 371–375.

Krakhmalnyi A.F., Terenko G.V. New form of *Prorocentrum micans* Ehr. (*Prorocentrales, Dinophyta*) from the plankton of the Black Sea. *Algologia*. 2002b. 12(4): 476–480.

Krakhmalnyi A.F., Panina Z.A., Krakhmalnyi M.A. *Dinophyta*. In: *Algae of Ukraine: diversity, nomenclature, taxonomy, ecology and geography*. P.M. Tsarenko, Wasser S.P., Nevo E. (Eds). Rugell: A.R.G. Gantner Verlag K.-G., 2006. Vol. 1. Pp. 470–532.

Krakhmalnyi A.F., Bryantseva Yu.V., Velikova V.N., Sergeeva O.V., Skuratova K., Dereziuk N.V. Black Sea *Dinoflagellata* (history of the research and current biodiversity). *Turkish J. Fisher. Aquat. Sci.* 2012. 12: 539–546.

Kuzmenko L.V. Two new *Dinoflagellata* species new for the Black Sea. *Novosti Sistemat. Nizsh. Rast.* Moscow; Leningrad: AN USSR Press, 1966. Pp. 51–54.

Lindberg K., Moestrup Ø., Daugbjerg N. Studies on woloszynskioid dinoflagellates: Woloszynskia coronata re–examined using light and electron microscopy and partial LSU *r*DNA sequences, with description of *Tovellia* gen. nov. and *Jadwigia* gen nov. (*Tovelliaceae* fam. nov.). *Phycologia*. 2005. 44(4): 416–440.

Makarova I.V. Development and relationship of phytoplankton from the Black Sea, the Sea of Azov and the Caspian Sea. *Bot. J.* 1969. 54(3): 389–398.

Mikaelyan A.S. Long-tern variability of phytoplankton communities in open Black Sea in relation to environmental changes. In: *Sensitivity to change: Black Sea, Baltic Sea and North Sea*. E. Ozsoy, A. Mikaelyan (Eds). Ser. 2. London, UK: Kluwer Acad. Publ., 1997. Pp. 105–116.

Mikaelyan A.S. Long-term changes in taxonomic structure of phytoplankton communities in the northern part of the Black Sea. In: *2nd Biannual and Black Sea Scene EC Project Joint Conference on Climate Change in the Black Sea – Hypothesis, Observations, Trends, Scenarios and Mitigation Strategy for the Ecosystem* (6–9 Oct., 2008), Sofia, Bulgaria, 2008. P. 30.

Moestrup Ш., Akselmann R., Fraga S., Hoppenrath M., Iwataki M., Комбrek J., Larsen J., Lundholm N., Zingone A. IOC-UNESCO taxonomic reference list of harmful microalgae. (2018-04-04).

Moncheva S., Kamburska L. Plankton stowaways in the Black Sea – impacts on biodiversity and ecosystem health. In: *Alien marine organisms introduced by ships in the Mediterranean and Black seas*. Workshop Monographs. F. Briand (Ed.). Monaco, CIESM Publ., 2002. Pp. 47–51.

Moncheva S., Krastev A. Some aspect of phytoplankton long-term alterations off Bulgarian Black Sea shelf. In: *Sensitivity to change: Black Sea, Baltic Sea and North Sea*. E. Oszoy, A. Mikhaelian (Eds). London, UK: Kluwer Acad. Publ., 1997. Pp. 79–94.

Moncheva S., Parr B. *Manual for phytoplankton sampling and analysis in the Black Sea*. 2010. 68 p. http://documents.blacksea–commission.org

Moncheva S., Doncheva V., Kamburska L. On the long-term response of harmful algal blooms to the evolution of eutrophication off the Bulgarian Black Sea coast: Are the recent changes a sign of recovery of the ecosystem – the uncertainties. In: *Proceedings of the Ninth International Conference on Harmful Algal Blooms* (Hobart, Australia, 7–l1 Febr., 2000). Paris: UNESCO, 2001. Pp. 177–182.

Morozova-Vodyanitskaya N.V. Phytoplankton of the Black Sea. Pt I. *Trudy Sevastop. Biol. St.* 1948. 6: 39–72.

Morozova-Vodyanitskaya N.V. Phytoplankton of the Black Sea. Pt 2. *Trudy Sevastop. Biol. St.* 1954. 8: 11–99.

Moestrup Ø., Calado A.J. Freshwater Flora of Central Europe. Vol. 6. *Dinophyceae*. In: *Süßwasserflora von Mitteleuropa*. Berlin, Heidelberg: Springer Spektrum, 2018. xii+560 p.

Nesterova D.A. Development of *Exuviaella cordata* Ostenfeld and «red tide» phenomenon in the northwestern in the North-Western part of the Black Sea. *Biol. Mor.* 1979. 5: 24–29.

Nesterova D.A. Mass development of *Exuviaella cordata* Ostf. and *Cerataulina bergonii* Perag. in the western Black Sea. *Gidrobiol. Zhurn*. 1985. 21(4): 44–65.

Nesterova D.A. Peculiarities of phytoplankton succession in the northwestern Black Sea. *Gidrobiol. Zhurn*. 1987. 23(1): 16–21.

Nesterova D.A., Terenko L.M., Terenko G.V. Phytoplankton species list. In: *The northwestern Black Sea*: Biology and ecology. Y.P. Zaytsev, B.G. Alexandrov (Eds). Kiev: Naukova Dumka Press, 2006. Pp. 557–576.

Nezlin N.P., Zernova V.V. Phytoplankton species composition in the northeastern Black Sea and size characteristic of some representatives. In: *Seasonal variations in plankton of the Black Sea*. Y. Sorokin, V. Vedernikov (Eds). Moscow: Nauka, 1983. Pp. 6–12.

Okolodkov Y.B. *Dinoflagellata* (Bütschli) Fensome, Taylor, Norris, Sarjeant, Wharton et Williams, 1993. In: *Guidebook on zoology*. S.A. Karpov (Ed.). St. Petersburg; Moscow, KMK Sci. Press, 2011. Pp. 7–119.

Цzdemyr G., Ak O. Qualitative and quantitative changes of phytoplankton in the South East Black Sea (Trabzon coasts). *Aquacult. Stud*. 2012. 12(4): 13–25.

Цztьrk B. *Black Sea biological diversity, Turkey. Black Sea Environ*. Ser. 9. New York: Unit. Nat. Publ., 1999. 144 p.

Pereyaslavtseva S.M. Black Sea Protozoa. *Zap. Novoross. Obshch. Estestvoispyt*. 1886. 10(2): 79–114.

Petranu A. *Black Sea biological diversity, Romania. Black Sea Environ*. Ser. 4. New York: Unit. Nat. Publ., 1997. 314 p.

Petrova V.J. Dinoflagellate species from the Bulgarian Black Sea coastal waters. *Sci. Works Res. Inst. Fisher. Fish Indust*. 1957. 1: 113–124.

Petrova V.J. The phytoplankton along the Bulgarian coast of the Black Sea during the 1954–1957 period. *Bull. de l'Inst. Central de Recher. Sci. de Piscicult. et de Pêcher*. (Bulgaria). 1963. 3: 31–60.

Petrova V.J. Black Sea phytoplankton in Bulgarian coastal waters in 1958–1960. *Bull. de l'Inst. Central de Recher. Sci. de Piscicult. et de Pêcher*. (Bulgaria). 1964. 5: 5–32.

Petrova V.J. Characteristics of phytoplankton development in the Black Sea Bulgarian coastal waters in 1961–1963. *Proc. Res. Inst. Fisher. Oceanography* (Bulgaria). 1965. 6: 63–74.

Petrova-Karadjova V.J. Changes in planktonic flora in Bulgarian Black Sea waters under the influence of eutrophication. *Proc. Res. Inst. Fisher. Oceanography* (Bulgaria). 1984. 21: 105–112.

Petrova-Karadjova V.J. Monitoring of the blooms along the Bulgarian Black Sea coast. Rapports et Procès-verbaux des Réunions. *Commis. Int. l'Explorat. Sci. de la Mer Méditer.* 1990. 31(1): 209.

Pitsyk G.K. About quantitative development and distribution of phytoplankton in the Black Sea. *Trudy AzCherNIRO.* 1954. 28: 224–238.

Pitsyk G.K. Taxonomic composition of phytoplankton. In: *Bases for biological production of the Black Sea.* Kiev: Naukova Dumka Press, 1979. Pp. 63–69.

Polikarpov I.G., Saburova M.A., Manzhos T.V., Pavlovskaya T.V., Gavrilova N.A. Microplankton biological diversity in the Black Sea coastal zone near Sevastopol (2001–2003). In: *Modern condition of biological diversity in near-shore zone of Crimea (the Black Sea sector).* Sevastopol: EKOSI-Gidrofizika, 2003. Pp. 16–42.

Reinhard L.V. Phytoplankton of the Black Sea, Kerch Strait, Bosphorus Strait and the Sea of Marmara. *Trudy Obshch. Ispyt. Prirody pri Khark. Univ.* 1909. 18: 295–323.

Roukhiyajnen M.I. Daily dynamics and production of small flagellates in Sevastopol Bay. In: *Self-purification, biological productivity and protection of water bodies and water courses in Ukraine.* Kiev: Naukova Dumka Press, 1975. Pp. 51–52.

Salas R., Tillmann U., Uwe J., Kilcoyne J., Burson A., Cantwell C., Hess F., Jauffrais T., Silke J. The role of *Azadinium spinosum* (*Dinophyceae*) in the production of azaspiracid shellfish poisoning in mussels. *Harmful Algae.* 2011. 10 (6): 774–783.

Saldarriaga J.F., Leander B.S., Taylor F.J.R., Keeling P.J. *Lessardia elongata* gen. et sp. nov. (*Dinoflagellata*, *Peridinales*), *Podolampaceae* and the taxonomic position of the genus *Roscoffia. J. Phycol.* 2003. 39: 368–378.

Senicheva M.I. *Long-term dynamics of Exuviella cordata Ost. in Sevastopol Bay. Condition, perspectives of improvement and usage of marine ecological system of Crimean coastal zone.* Sevastopol, 1983: 26–28.

Senicheva M.I. New and rare for the Black Sea diatom and dinophyceae species. *Ekol. Mor.* 2002. 62: 25–29.

Senicheva M.I. Phytoplankton seasonal dynamics near Karadag. In: *Collection of scientific works, dedicated to 90 years of the Karadag Scientific Station and 25 years of the Karadag Nature Reserve.* Simferopol, 2004. Pp. 58–65.

Senicheva M.I. Species diversity, seasonal and annual variability of planktonic microalgae near Crimea coast. In: *The Black Sea microalgae: problems of biodiversity conservation and biotechnological applications.* Sevastopol, ECOSI-Gidrophyzika, 2008. Pp. 5–18.

Senichkina L.G. Phytoplankton of the northwestern Black Sea in winter. In: *Seasonal dynamics of Black Sea phytoplankton.* Moscow: Nauka, 1983. Pp. 55–65.

Senichkina L.G., Altukhov D.A., Kuzmenko L.V., Georgieva L.V., Kovaleva T.M., Senicheva M.I. Species diversity of the Black Sea phytoplankton in the southeastern coast of Crimea. In: *Karadag: History, biology, archaeology. Collection of papers dedicated to the 85th anniversary of the Karadag Scientific Station.* Simferopol: Sonat, 2001. Pp. 119–125.

Senichkina L.G. et al. *Dinophyta algae*. In: *Karadag. Hydrobiological studies. Collection of scientific works dedicated to 90 years of the Karadag Scientific Station and 25 years of the Karadag Nature Reserve*. Simferopol, 2004. Pp. 235–244.

Shiganova T.A., Musaeva E.I., Lukasheva T.A., Stupnikova A.N., Zas'ko D.N., Anokhina L.L., Sivkovich A.E., Gagarin V.I., Bulgakova Y.V. Increase in findings of Mediterranean nonnative species in the Black Sea. *Russ. J. Biol. Invas.* 2012. 3(4): 255–280.

Skolka H.V. *Cateva date asupra compozitiei calitative si cantitative fitoplanctonului din dreptul litoralului romanesc al Marri Negre. Communicarile Acad. R.P.R.*, 1960. 10(12): 117–121.

Skolka H.V. Phytoplankton dynamics in the Romanian Black Sea coastal zone in 1961. *Rapports et Procus-Verbaux des Réunions Conseil Int. pour l'Exploration de la Mer Méditer.* (Monaco). 1963. 17: 467–477.

Sorokin Y.I. *The Black Sea*. Moscow: Nauka, 1982. 217 p.

Sukhanova I.N., Georgieva L.V., Mikaelyan A.S., Sergeeva O.M. Phytoplankton of the Black Sea open waters in late spring. In: *Modern state of the Black Sea ecosystem*. Moscow, 1987. Pp. 86–97.

Sukhanova I.N., Cheban A.E. Heterotrophic phytoplankton of the Black Sea in the early spring development of the phytocenosis. *Oceanology*. 1990. 30: 724–792.

Sukhanova I.N., Mikaelyan A.S., Georgieva L.V. Spatial distribution and temporal variations of the Black Sea phytoplankton during the period of spring blooming. In: *Phytoplankton studies in the system of monitoring of the Baltic Sea and other seas of Russia*. Moscow: Gidrometeoizdat, 1991. Pp. 135–151.

Takano Y., Yamaguchi H., Inouye I., Moestrup Ш., Horiguchi T. Phylogeny of five species of *Nusuttodinium* gen. nov. (*Dinophyceae*), a genus of unarmoured kleptoplastidic dinoflagellates. *Protist*. 2014. 165: 759–778.

Terenko G.V. *Contemporary state of the northwestern Black Sea coastal phytoplankton and the role of dinophyte algae in it*. Abstr. Ph.D. (Biol.) Thesis. Sevastopol, 2004. Pp. 192–197.

Terenko G.V., Kovalyshyna S., Grandova M. Long-term structural changes in the phytoplankton community of the northwestern Black Sea. In: *The 3rd Biannual Black Sea Scientific Conference and the UP-GRADE BS-SCENE Project Joint Conference*. Abstracts (Odessa, 1–4 Nov., 2011). Odessa, 2011. P. 192.

Terenko L.M. Exotic species in the Aegean, Marmara, Black, Azov and Caspian seas. In: *Turkish Marine Research Foundation*. Y. Zaitsev, B. Ozturk (Eds). Istanbul, 2001. Pp. 82–83.

Terenko L.M. *Gymnodinium uberrimum* (Allaman) Kof. et. Sw. (*Dinophyta*) from the littoral of the Black Sea (Ukraine). *Algologia*. 2002. 12(1): 142–146.

Terenko L.M. New dinoflagellate (*Dinoflagellata*) species from Odessa Bay of the Black Sea. *Oceanol. Hydrobiol. Stud*. 2005a. 34 (Suppl. 3): 205–216.

Terenko L.M. New *Dinophyta* species from the Black Sea. *Algologia*. 2005b. 15(2): 236–244.

Terenko L.M. Species composition and distribution of *Dinophyta*. *Algologia*. 2007. 17(1): 53–70.

Terenko L.M. Benthic dinoflagellates of Odessa Bay of the Black Sea. *Nauk. Zap. Ternop. Nats. Ped. Univ*. 2010: 277–279.

Terenko L.M. The genus *Dinophysis* Ehrenb. in Ukrainian coastal Black Sea waters: species composition, distribution, dynamics. *Algologia*. 2011. 21(3): 346–356.

Terenko L.M., Terenko G.V. Littoral phytoplankton and periphyton of the northwestern Black Sea (Ukraine). In: *II Russian scientific-practical conference «The Algae: problems of taxonomy, ecology and use in the monitoring»* (5–9 Oct., 2009). Syktyvkar, 2009. Pp. 145–147.

Tillmann U., Elbrдchter M., Krock B., John U., Cembella A. *Azadinium spinosum* gen. et sp. nov. (*Dinophyceae*) identified as a primary producer of azaspiracid toxins. *Eur. J. Phycol.* 2009. 44(1): 63–79.

Türkoğlu M., Koray T. Phytoplankton species succession and nutrients in the southern Black Sea (Bay Sinop). *Turkish J. Bot.* 2002. 26: 235–252.

Valkanov A. Catalogue of our Black Sea fauna. *Proc. Mar. Biol. St. in Varna* (Bulgaria). 1957. 19: 1–62.

Velikova V.N. Long-term study of red tides in the western part of the Black Sea and their ecological modeling. In: *Proceedings of the 8th International Conference on Harmful Algae*. B. Reguera, J. Blanco, M.L. Fernández, T. Wyatt (Eds). Paris, 1998. Pp. 261–265.

Velikova V., Larsen J. The *Prorocentrum cordatum/Prorocentrum minimum* taxonomic problem. *Grana*. 1999. 38: 108–112.

Velikova V., Moncheva S., Petrova D. Phytoplankton dynamics and red tides (1987–1997) in the Bulgarian Black Sea. *Water Sci. and Technol.* 1999. 39(8): 27–36.

Vershinin A.O., Morton S.L. *Protoperidinium ponticum* sp. nov. (*Dinophyceae*) from the northeastern Black Sea coast of Russia. *Bot. Mar.* 2005. 48: 244–247.

Vershinin A.O., Moruchkov A.A. Toxic microalgae in the Black Sea phytoplankton. *Ekol. Morya*. 2003. 64: 45–50.

Vershinin A.O., Orlova T.Y. Toxic and harmful algae in coastal waters of the Russian federation. *Oceanology*. 2008. 48(4): 568–582.

Vershinin A.O., Velikova V. New records and commonly misidentified dinoflagellates from the Black Sea. In: *Modern problems of algology*: Abstr. of the Int. Sci. Conf. and the VII Workshop on Marine Biology (9–13 June 2008, Rostov-on-Don). Rostov-on-Don, 2008. 448 p.

Vershinin A.O., Moruchkov A.A., Leighfield T., Sukhanova I.N., Pankov S.L., Morton S.L., Ramsdell J.S. Potentially toxic algae in the coastal phytoplankton of the northeastern Black Sea in 2001–2002. *Oceanology*. 2005. 5(2): 224–232.

Vinogradova L.A., Velikova V.N. *Long-term dynamics and modeling the ecosystem of coastal waters of the northwestern Black Sea*. St. Petersburg, 1992. 108 p.

Yasakova O.N. The new species of phytoplankton in the northeastern part of the Black Sea. *Rus. J. Biol. Invas.* 2010. 4: 90–97.

Zaitsev Y.P. *The most blue in the world*. New York: Unit. Nat. Publ., 1998. 142 p.

Zaitsev Y.P., Alexandrov B.G. *Black Sea biological diversity, Ukraine. Black Sea Environ.* Ser. 7. New York: Unit. Nat. Publ., 1998. 351 p.

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РЕВИЗИЯ ВИДОВОГО СОСТАВА ДИНОФЛАГЕЛЛЯТ ЧЕРНОГО МОРЯ

Критически обобщены данные о разнообразии динофлагеллят Черного моря (ЧМ) авторов всех причерноморских стран (России, Грузии, Турции, Болгарии, Румынии и Украины) за период с 1886 по 2018 гг. Проверенный список динофлагеллят включает 420 видов (447, включая внутривидовые таксоны – ввт) из 92-х родов, которые относятся к 47 семействам, 16 порядкам и 4 классам. Это значительно превышает количество таксонов динофлагеллят, ранее указанных для ЧМ, что обусловлено повышенным интересом к этой группе водорослей в последние десятилетия, а таже благодаря международной кооперации исследований. Изменение климата и интенсификация международного судоходства способствовали проникновению в ЧМ инвазивных видов. Список также дополнен пресноводными видами, зарегистрированными в опресненных районах моря. Имеющиеся данные о таксономии существенно расширили наши представления о разнообразии динофлагеллят ЧМ, однако состав ведущих порядков не изменился: *Peridiniales* (124 видов/129 ввт), *Gymnodiniales* (96/96), *Gonyaulacales* (73/91), *Dinophysiales* (40/41), *Prorocentrales* (23/25) и *Amphidiniales* (21/22) составляют 85% найденных видов. По количеству таксонов самыми богатыми оказались роды: *Protoperidinium* (59/62), *Gymnodinium* (48/48), *Ceratium* (34/51), *Dinophysis* (33/34), *Prorocentrum* (22/24), *Gyrodinium* (20/20), *Amphidinium* (21/22), *Gonyaulax* (19/19) и *Oxytoxum* (14/14). Единственным видом были представлены 52 рода, 201 таксон видового и внутривидового ранга был впервые приведен после 1990 г. Чек-лист черноморских динофлагеллят приведен с принятыми в настоящее время таксономи-ческими названиями и их синонимами, указанными для Черного моря. Ссылки содержат 116 литературных источников и неопубликованных оригинальных данных. Дальнейшее изучение видового разнообразия Черного моря должно быть направлено на более точную идентификацию видов согласно современной методологии. Продолжение формирования базы данных по фитопланктону ЧМ с доступной полной информацией о каждом виде, также будет способствовать прогрессу в изучении биоразнообразия Черного моря.

К л ю ч е в ы е с л о в а: *Dinoflagellata*, Черное море, микроводоросли, фитопланктон, видовой состав

Supplement

A checklist of dinoflagellates of the Black Sea (1886–2018)

The species are arranged alphabetically. Synonyms (which are found in references used to create checklist) are given below the corresponding valid name after the "=" sign. The numbers following a species name in the checklist refer to the list of references. References where the valid name was found are given in bold. References to the synonyms are given in parentheses (semicolon delimited if several synonyms are used). References 1-124 were numbered according in the database on the website http://phyto.bss.plankton.kiev.ua/wiki, 125-144 were added by the authors of the article and not included in the database.

	Taxa	References
1	***Akashiwo sanguinea*** (K. Hirasaka) G. Hansen & Moestrup = *Gymnodinium sanguineum* K. Hirasaka; *Gymnodinium splendens* M. Lebour	**9, 10, 11, 19, 20, 27, 57, 68, 81, 82, 83, 99, 126, 129, 130, 131, 136, 138, 142, 144** (2, 3, 12, 14, 25, 27, 33, 36, 42, 100, 108, 125, 132; 1, 4, 6, 7, 8, 21, 23, 24, 34, 49, 74, 85, 86, 89, 92, 94, 107)
2	***Alexandrium affine*** (Inoue & Fukuyo) Balech	**11, 131, 135**
3	***Alexandrium catenella*** (Whedon & Kof.) Balech	**131, 135**
4	***Alexandrium minutum*** Halim	**11, 19, 77, 99, 111, 130, 131**
5	***Alexandrium monilatum*** (J.F. Howell) Balech = *Gessnerium mochimaense* Halim ex Halim	**9, 11, 82, 107, 142** (6)
6	***Alexandrium ostenfeldii*** (Paulsen) Balech & Tangen = *Goniodoma ostenfeldii* Paulsen	**9, 11, 12, 19, 20, 27, 36, 79, 126, 129, 132, 136, 138, 142** (1, 4, 14, 15, 18)
7	***Alexandrium pseudogonyaulax*** (Biecheler) Horiguchi ex K. Yuki & Fukuyo	**27, 47, 131, 132, 135, 142**
8	***Alexandrium tamarense*** (M. Lebour) Balech	**2, 11, 12, 27, 33, 125, 127, 131, 132, 135, 142**
9	***Amphidinium aculeatum*** Schröd.	**1, 18, 129**
10	***Amphidinium acutissimum*** J. Schiller	**2, 8, 9, 10, 14, 24, 27, 67, 126, 129, 132, 140, 142**
11	***Amphidinium conradii*** J. Schiller	**9, 27, 38, 47, 131, 132, 142**
12	***Amphidinium crassum*** Lohmann = *Amphidinium phaeocysticola* M. Lebour	**1, 2, 6, 8, 11, 12, 14, 20, 21, 23, 27, 93, 126, 132, 142** (1, 2, 8, 23)
13	***Amphidinium cucurbita*** Kof. & Swezy	**1, 9, 14, 23, 126, 142**
14	***Amphidinium curvatum*** J. Schiller	**1, 2, 9, 14, 23, 126, 142**
15	***Amphidinium flagellans*** J. Schiller	**1, 9, 14, 23, 126, 142**
16	***Amphidinium fusiforme*** G.W. Martin	**27, 132, 142**
17	***Amphidinium globosum*** Schröd.	**1, 9, 11, 14, 23, 126, 136, 142**
18	***Amphidinium inflatum*** Kof.	**11, 27, 47, 132, 142**
19	***Amphidinium klebsii*** Kof. & Swezy	**10, 14, 126**
20	***Amphidinium klebsii* f. *ponticum*** Roukh.	**69, 126**
21	***Amphidinium lanceolatum*** Schröd.	**5, 9, 14, 27, 38, 47, 126, 132, 140, 142**
22	***Amphidinium longum*** Lohmann	**1, 2, 6, 8, 9, 10, 11, 12, 14, 21, 23, 24, 27, 109, 126, 129, 132, 136, 142**
23	***Amphidinium mananninii*** Herdman	**38, 131**
24	***Amphidinium operculatum*** Clap. & J. Lachm.	**1, 2, 6, 8, 9, 10, 11, 13, 14, 18, 19, 24, 27, 36, 126, 129, 132, 142**
25	***Amphidinium ovum*** Herdman	**1, 3, 5, 9, 11, 14, 15, 18, 19, 23, 126, 129, 142**
26	***Amphidinium rhynchocephalum*** Anissimowa	**6, 14, 126, 142**
27	***Amphidinium sphenoides*** A. Wulff	**2, 10, 11, 12, 142**

continued on the next page

A checklist of dinoflagellates of the Black Sea - continued from the previous page

	Taxa	References
28	***Amphidinium stigmatum*** J. Schiller	**2, 21**
29	***Amphidinium turbo*** Kof. & Swezy	**14, 27, 126, 132, 142**
30	***Amphidinium wigrense*** Wołosz.	**27, 38, 47, 131, 132, 140**
31	***Amphidoma languida*** Tillmann, Salas & Elbrächter	V. Velikova (pers. obs.)*
32	***Amphisolenia bidentata*** Schröd.	**7, 9, 142**
33	***Amylax triacantha*** (Jörg.) Sournia = *Gonyaulax triacantha* Jörg.	**9, 11, 27, 99, 129, 132, 142** (1, 8, 14, 15, 18, 126)
34	***Apocalathium aciculiferum*** (Lemmerm.) Craveiro, Daugbjerg, Moestrup & Calado = *Peridinium aciculiferum* Lemmerm.	**144** (1, 8, 9, 10, 11, 12, 14, 27, 93, 89, 92, 126, 129, 132, 137, 142)
35	***Archaeperidinium minutum*** (Kof.) Jörg. = *Peridinium minutum* Kof.; *Protoperidinium minutum* (Kof.) A.R. Loebl.	(1, 4, 8, 94; 2, 9, 11, 14, 19, 27, 111, 126, 132, 136, 142)
36	***Azadinium spinosum*** Elbrächter & Tillmann	**11**
37	***Blixaea quinquecornis*** (T.H. Abé) Gottschling = *Peridinium quinquecorne* T.H. Abé; *Protoperidinium quinquecorne* (T.H. Abé) Balech	(12, 33; 11, 127, 142)
38	***Bysmatrum subsalsum*** (Ostenf.) M.A. Faust & Steidinger = *Peridinium subsalsum* Ostenf.; *Scrippsiella subsalsa* (Ostenf.) Steidinger & Balech	(14, 126; 27, 132, 142)
39	***Centrodinium intermedium*** Pavill.	**9**
40	***Ceratium arietinum*** Cleve = *Ceratium arietinium* var. *bucephalum* (Cleve) Sournia; *Ceratium bucephalum* (Cleve) Cleve;	**108, 142** (14; 15)
41	***Ceratium belone*** Cleve	**9, 25**
42	***Ceratium biceps*** Clap. & J. Lachm.	**25**
43	***Ceratium candelabrum*** (Ehrenb.) F. Stein = *Neoceratium candelabrum* (Ehrenb.) Gómez, Moreira & López-García	**1, 7, 9, 10, 14, 23, 38, 51, 108, 142** (126)
44	***Ceratium carriense*** Gourret	**9, 142**
45	***Ceratium carriense* var. *volans*** (Cleve) Jörg.	**25**
46	***Ceratium compressum*** Gran	**9, 25, 38**
47	***Ceratium contrarium*** (Gourret) Pavill.	**34**
48	***Ceratium dalmaticum*** Schröder = *Ceratium pulchellum* f. *dalmaticum* (Schröd.) J. Schiller	(142)
49	***Ceratium declinatum*** (Karsten) Jörg.	**9, 19, 142**
50	***Ceratium declinatum* f. *majus*** Jörg. = *Neoceratium declinatum* f. *majus* Krachm.	**25** (115)
51	***Ceratium declinatum* f. *normale*** Jörg. = *Neoceratium declinatum* f. *normale* Krachm.	**25** (115)
52	***Ceratium dens*** Ostenf. & Schmidt	**27, 132, 142**
53	***Ceratium extensum*** (Gourret) Cleve = *Neoceratium extensum* (Gourret) Gómez, Moreira & López-García; *Ceratium strictum* Kof.	**1, 2, 4, 9, 14, 15, 18, 26, 51, 74, 94, 129, 136, 142** (126; 2, 25, 27, 47, 68, 132, 142)
54	***Ceratium falcatum*** (Kof.) Jörg.	**9, 7, 10, 67, 142**

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	Taxa	References
55	***Ceratium furca*** (Ehrenb.) Clap. & J. Lachm. = *Neoceratium furca* (Ehrenb.) Gómez, Moreira & López-García	**130, 137, 139** (as *Tripos furca*); **1-4, 6-14, 18-22, 25-27, 33-35, 38, 49, 51, 54-59, 63, 67, 68, 72-75, 78, 84-87, 89, 92, 94, 99, 103, 105, 108-110, 116, 117, 119, 123, 125, 127, 129, 132, 136, 142, 144** (126)
56	***Ceratium furca* var. *berghii*** Jörg. = *Neoceratium furca* var. *berghii* (Jörg.) Krachm.	**1, 6, 11, 14, 27, 72, 73, 132, 142** (115, 126)
57	***Ceratium furca* var. *eugrammum*** (Ehrenb.) J. Schiller = *Neoceratium furca* var. *eugrammum* (Ehrenb.) Krachm.	**7, 10, 11, 14, 15, 19, 24, 25, 27, 38, 47, 99, 117, 129, 131, 132, 136, 140, 142** (115, 126)
58	***Ceratium fusus*** (Ehrenb.) Dujardin = *Neoceratium fusus* (Ehrenb.) Gómez, Moreira & López-García	**130** (as *Tripos fusus*); **1-4, 6-14, 18, 20-22, 26, 27, 33-36, 49, 51, 54, 55-59, 63, 67, 68, 72-75, 78, 85-87, 89, 92, 94, 99, 103, 105, 108-110, 116-119, 123, 125, 127, 129, 132, 136, 139, 142, 144** (126)
59	***Ceratium fusus* var. *schuettii*** Lemmerm.	**132, 142**
60	***Ceratium fusus* var. *seta*** (Ehrenb.) Sournia	**7, 11, 14, 25, 27, 38, 84, 131, 132, 142**
61	***Ceratium hexacanthum*** Gourret = *Neoceratium hexacanthum* (Gourret) Gómez, Moreira & López-García	**2, 7, 9, 14, 142** (126)
62	***Ceratium hexacanthum* var. *aestuarium*** (Schröd.) J. Schiller	**38, 131**
63	***Ceratium hexacanthum* var. *contortum*** (Lemmerm.) Jörg.	**38, 131**
64	***Ceratium hircus*** Schröd.	**10, 142**
65	***Ceratium hirundinella*** (O. Müll.) Dujardin	**1, 6, 14, 18, 19, 56, 99, 108, 126, 136, 142, 144**
66	***Ceratium horridum*** Gran = *Ceratium tenue* Ostenf. & Schmidt; *Ceratium tenue* var. *buceros* (Zacharias) Balech	**7, 9, 25, 125, 142** (142; 142)
67	***Ceratium horridum* f. *denticulatum*** Jörg.	**25**
68	***Ceratium horridum* var. *buceros*** (Zacharias) Sournia = *Ceratium buceros* (Zacharias) J. Schiller	**7** (9)
69	***Ceratium incisum*** (Karsten) Jörg.	**9, 25, 142**
70	***Ceratium inflatum*** (Kof.) Jörg. = *Neoceratium inflatum* (Kof.) Gómez, Moreira & López-García	**1, 7, 9, 10, 14, 23, 25, 38, 51, 68, 74, 99, 142** (126)
71	***Ceratium kofoidii*** Jörg.	**9, 25, 142**
72	***Ceratium lineatum*** (Ehrenb.) Cleve = *Neoceratium lineatu*m (Ehrenb.) Gómez, Moreira & López-García	**1, 2, 9-11, 14, 19, 25, 38, 125, 129, 136, 142** (126)
73	***Ceratium longipes*** (Bailey) Gran = *Neoceratium longipes* (Bailey) Gómez, Moreira & López-García	**2, 7, 9, 11, 14, 142** (126)
74	***Ceratium longirostrum*** Gourret = *Neoceratium longirostrum* (Gourret) Gómez, Moreira & López-García	**7, 9, 14, 25, 27, 47, 132, 140, 142** (126)
75	***Ceratium macroceros*** (Ehrenb.) Vanhöffen = *Neoceratium macroceros* (Ehrenb.) Gómez, Moreira & López-García	**1, 7, 9, 10, 14, 51, 74, 142** (126, 131)
76	***Ceratium massiliense*** (Gourret) O. Jörg. = *Neoceratium massiliense* (Gourret) Gómez, Moreira & López-Garcia	**9, 38, 142** (131)

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	Taxa	References
77	***Ceratium massiliense* f. *armatum*** (Karsten) J. Schiller = *Ceratium massiliense* var. *armatum* (G. Karst.) Jörg.; *Neoceratium massiliense* var. *armatum* (G. Karst.) Krachm.	(25, 142; 115, 126)
78	***Ceratium massiliense* f. *protuberans*** (G. Karst.) Jörg. = *Ceratium massiliense* var. *protuberans* (G. Karst.) Jörg.	**14**
79	***Ceratium minutum*** Jörg. = *Neoceratium minutum* (Jörg.) Gómez, Moreira & López-García	**1, 6, 9, 10, 14, 15, 23, 72, 129, 142** (126)
80	***Ceratium pavillardii*** Jörg.	**142**
81	***Ceratium pentagonum*** Gourret = *Neoceratium pentagonum* (Gourret) Gómez, Moreira & López-García	**1, 2, 7, 9, 10, 14, 23, 24, 38, 67, 108, 129, 136, 142** (126)
82	***Ceratium protuberans*** (G. Karst.) Paulsen	**1, 23**
83	***Ceratium pulchellum*** Schröd. = *Ceratium tripos* var. *pulchellum* (Schröd.) Lopez ex Sournia	**2, 7, 9, 11, 27, 142** (7, 25)
84	***Ceratium teres*** Kof. = *Neoceratium teres* (Kof.) Gómez, Moreira & López-García	**9, 14, 25, 34, 38, 142** (126, 131)
85	***Ceratium trichoceros*** (Ehrenb.) Kof. = *Neoceratium trichoceros* (Ehrenb.) Gómez, Moreira & López-García	**38** (131)
86	***Ceratium tripos*** (O. Müll.) Nitzsch = *Neoceratium tripos* (O. Müll.) Gómez, Moreira & López-García	**130** (as *Tripos muelleri*); **1-14, 18-22, 26, 27, 33-36, 38, 47, 49, 51, 54-59, 63, 67, 72-75, 78, 84-87, 89, 92, 94, 103-105, 108, 109, 116, 117, 123, 125, 127, 129, 132, 142, 144** (126, 136)
87	***Ceratium tripos* f. *ponticum*** Jörg. = *Ceratium tripos* var. *ponticum* Jörg.; *Neoceratium tripos* f. *ponticum* (Jörg.) Krachm.	**132, 142** (19, 27; 115)
88	***Ceratium tripos* f. *subsalsum*** Ostenf. = *Neoceratium tripos* f. *subsalsum* (Ostenf.) Krachm.	**14, 15** (115, 126)
89	***Ceratium tripos* var. *atlanticum*** Ostenf. = *Neoceratium tripos* var. *atlanticum* (Ostenf.) Krachm.	**25, 38, 131** (115)
90	***Ceratium tripos* var. *neglectum*** (Ostenf.) Paulsen	**142**
91	***Ceratium volans*** Cleve	**9**
92	***Chimonodinium lomnickii*** (Wołosz.) Craveiro, Calado, Daugbjerg, G. Hansen & Moestrup = *Peridinium lomnickii* Wołosz.	**144** (19)
93	***Cladopyxis brachiolata*** F. Stein	**1, 9, 10, 14, 126**
94	***Cochlodinium adriaticum*** (J. Schiller) J. Schiller = *Gyrodinium adriaticum* J. Schiller	**9, 10, 11, 14, 35, 100, 126, 129** (1, 8, 23, 27, 38, 68, 78, 132, 142)
95	***Cochlodinium archimedes*** (C.H.G. Pouchet) Lemmerm.	**1, 10, 11, 14, 15, 18, 21, 24, 126, 129, 142**
96	***Cochlodinium brandtii*** A. Wulff	**2, 3, 9, 10, 14, 15, 19, 126, 129**
97	***Cochlodinium helicoides*** M. Lebour = *Cochlodinium helix* Kof. & Swezy	**9, 14, 27, 47, 126, 132, 142** (12, 23, 27, 50, 132)
98	***Cochlodinium lebouriae*** Kof. & Swezy	**1, 9, 14, 23, 126, 142**

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	Taxa	References
99	***Cochlodinium pirum*** (F. Schütt) Lemmerm. = *Gymnodinium pirum* F. Schütt	**1, 3, 9, 14, 15, 27, 126, 129, 132, 142** (18, 101)
100	***Cochlodinium pupa*** M. Lebour	**11, 27, 85, 132, 142**
101	***Cochlodinium schuettii*** Kof. & Swezy	**142**
102	***Cystodinium bataviense*** G.A. Klebs	**1, 10, 14, 23, 27, 126, 129, 132, 142**
103	***Dinophysis acuminata*** Clap. & J. Lachm. = *Dinophysis baltica* (Paulsen) Kof. & Skogsb.; *Dinophysis baltica* (Paulsen) Wołosz.; *Dinophysis levanderi* Wołosz.; *Dinophysis paulsenii* Wołosz.; *Dinophysis ventricosa* Clap. & J. Lachm.; *Dinophysis cassubica* Wołosz.	**1, 2 , 4, 6-11, 14, 15, 18, 19, 21, 25, 27, 33, 34, 36, 38, 58, 63, 67, 72, 73, 75, 77, 85, 89, 92, 94, 99, 109, 116, 125, 126, 129, 130, 132, 136, 141, 142, 144** (1, 2, 6, 8, 14, 20, 21, 23, 27, 72, 73, 77, 89, 92, 100, 109, 126, 132, 141, 142; 1, 2, 8, 14, 21, 23, 77, 126, 141, 142; 1, 12, 14, 23, 77, 126, 129, 141, 142; 13, 129; 21)
104	***Dinophysis acuta*** Ehrenb. = *Dinophysis dens* Pavill.	**1, 2, 3, 6-12, 14, 15, 18, 20, 21, 25-27, 33, 34, 36, 54-56, 58, 67, 72, 73, 77, 85, 89, 92, 100, 105, 108, 109, 125, 126, 129, 130, 132, 141, 142** (142)
105	***Dinophysis amandula*** Sournia	**2, 14, 27, 126, 132, 142**
106	***Dinophysis apiculata*** Meunier	**1, 9, 10, 14, 23, 77, 126, 141, 142**
107	***Dinophysis arctica*** Mereschk.	**1, 9, 13, 14, 15, 18, 27, 67, 77, 126, 129, 132, 141, 14**2
108	***Dinophysis caudata*** W.S. Kent = *Dinophysis diegensis* Kof.; *Dinophysis homuncula* F. Stein;	**1-4, 6-12, 14, 15, 18-21, 25, 26, 27, 33, 34, 36, 38, 45, 49, 54, 58, 63, 67, 72, 73, 75, 77, 78, 85, 89, 92, 94, 99, 105, 108, 109, 117, 123, 125, 126, 127, 129, 130, 132, 136, 141, 142, 144** (25; 7, 22, 55, 56, 87, 101, 105)
109	***Dinophysis caudata* f. *acutiformis*** Kof. & Skogsb.	**14, 15**
110	***Dinophysis dentata*** J. Schiller	**7, 9, 67, 77, 142**
111	***Dinophysis fortii*** Pavill.	**1, 2, 7-10, 12, 14, 15, 18, 21, 24-27, 33, 34, 36, 38, 45, 49, 57, 58, 67, 74, 77, 78, 86, 89, 92, 126, 127, 129, 130, 132, 136, 141, 142, 144**
112	***Dinophysis hastata*** F. Stein	**1, 2, 4, 6, 7, 9, 10, 12, 14, 15, 18, 20, 25, 26, 33, 54, 58, 67, 72-74, 77, 85, 94, 105, 109, 125, 126, 129, 130, 136, 141, 142, 144**
113	***Dinophysis infundibulum*** J. Schiller	**25, 142**
114	***Dinophysis irregularis*** (M. Lebour) Balech = *Phalacroma irregulare* M. Lebour	(2, 21)
115	***Dinophysis islandica*** Paulsen	**27, 132, 141, 142**
116	***Dinophysis laevis*** Clap. & J. Lachm.	**142**
117	***Dinophysis meunieri*** J. Schiller	**9, 136**
118	***Dinophysis minuta*** (Cleve) Balech	**9, 14, 27, 77, 126, 132, 141, 142**
119	***Dinophysis mucronata*** (Kof. & Skogsb.) Sournia	**1**
120	***Dinophysis nasuta*** (F. Stein) Parke & Dixon	**141**
121	***Dinophysis norvegica*** Clap. & J. Lachm.	**1, 2, 8, 9, 11, 14, 15, 27, 33, 36, 56, 67, 77, 126, 130, 132, 136, 141, 142**
122	***Dinophysis odiosa*** (Pavill.) L.S. Tai & Skogsb.	**10, 42, 79, 129, 131, 141**
123	***Dinophysis ovata*** Clap. & J. Lachm. = *Phalacroma ovatum* (Clap. & J. Lachm.) Jörg.	**7, 13, 14, 18, 20, 77, 126, 129, 141, 142** (1, 9, 15, 21, 67, 123)
124	***Dinophysis ovum*** F. Schütt	**1-10, 14, 15, 18, 19, 21, 24, 27, 34, 36, 38, 57, 67, 72, 73, 74, 77, 78, 85, 89, 92, 94, 109, 116, 117, 123, 126, 129, 132, 136, 141, 142**
125	***Dinophysis parva*** J. Schiller	**7, 9**

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	Taxa	References
126	***Dinophysis parvula*** (F. Schütt) Balech = *Phalacroma parvulum* (F. Schütt) Jörg.	**25, 142** (2, 7, 9)
127	***Dinophysis pulchella*** (M. Lebour) Balech = *Phalacroma pulchellum* M. Lebour	**2, 10, 11, 14, 77, 126, 129, 136, 141, 142** (1, 4, 9, 10, 15, 18, 21, 24, 58, 94, 116)
128	***Dinophysis punctata*** Jörg.	**7, 9, 25, 142**
129	***Dinophysis recurva*** Kof. & Skogsb.	**21, 27, 132, 141, 142**
130	***Dinophysis rudgei*** G. Murr. & Whitting = *Phalacroma rudgei* G. Murr. & Whitting	**19, 25, 126, 141, 142** (1, 6, 15, 18, 72, 74, 75, 129, 136)
131	***Dinophysis sacculus*** F. Stein	**1-4, 6-12, 14, 15, 18-22, 24, 25, 27, 33, 35, 36, 38, 49, 58, 67, 72, 73, 74, 77, 84, 85, 86, 89, 92, 94, 100, 109, 117, 123, 126, 129, 130, 132, 136, 141, 142, 144**
132	***Dinophysis schuettii*** G. Murr. & Whitting	**9, 14, 39, 126, 131**
133	***Dinophysis similis*** Kof. & Skogsb.	**7, 9, 77**
134	***Dinophysis sphaerica*** F. Stein	**1, 2, 7-10, 14, 15, 21, 27, 38, 89, 92, 100, 126, 132, 141, 142**
135	***Dinophysis sphaeroidea*** (J. Schiller) Balech = *Phalacroma sphaeroideum* J. Schiller; *Dinophysis schilleri* Sournia	**77** (1, 4, 6, 10, 15, 18, 21, 38, 129, 136; 4, 6, 9, 10, 14, 126, 141;142)
136	***Dinophysis tripos*** Gourret	**1, 9, 14, 15, 18, 19, 33, 36, 45, 77, 126, 129, 141, 142**
137	***Diplopelta asymmetrica*** (Mangin) Balech = *Peridiniopsis asymmetrica* Mangin	**126, 142** (14)
138	***Diplopsalis lenticula*** Bergh = *Glenodinium lenticula* (Bergh) J. Schiller	**2, 3, 9-12, 14, 19-22, 25-27, 33, 38, 50, 56, 57, 63, 68, 78, 83, 99, 100, 101, 108, 111, 116, 125-127, 129, 130, 132, 136, 137, 139, 142, 144** (1, 4, 6, 8, 18, 21, 34, 49, 51, 54, 55, 58, 72, 73, 74, 84, 85, 86, 89, 92, 94, 105, 109, 110, 117, 123, 125)
139	***Diplopsalis lenticula* var. *globularis*** Kisselev	**10, 12, 26, 129, 142**
140	***Diplopsalis orbicularis* var. *temaris*** (T.H. Abé) Krachm.	**14**
141	***Diplopsalopsis bomba*** (F. Stein) J.D. Dodge & S. Toriumi = *Dissodium asymmetricum* (Mangin) A.R. Loebl.; *Peridiniopsis asymmetrica* M. Lebour	(7; 14)
142	***Diplopsalopsis orbicularis*** (Paulsen) Meunier = *Peridinium orbiculare* Paulsen	**9, 14, 111, 126, 129, 132, 136, 142, 144** (1, 4, 8, 15, 18, 21, 27, 50, 89, 92, 94)
143	***Durinskia agilis*** (Kof. & Swezy) Saburova, Chomérat & Hoppenrath = *Gymnodinium agile* Kof. & Swezy	**144** (1, 2, 4, 6, 8, 9, 12, 14, 15, 18, 20, 21, 27, 68, 74, 94, 126, 129, 132, 136, 142)
144	***Durinskia dybowskii*** (Wołosz.) S. Carty = *Durinskia baltica* (Levander) S. Carty & Cox; *Peridinium balticum* (Levander) Lemmerm.	**144** (126; 2)
145	***Durinskia oculata*** (F. Stein) G. Hansen & Flaim = *Glenodinium oculatum* F. Stein; *Peridiniopsis oculata* (F. Stein) Bourr.	**126, 134** (1, 8-10, 20, 24, 101; 14, 27, 129, 132, 142)
146	***Ensiculifera carinata*** Matsuoka, Kobayashi & Gains	**111**
147	***Glenodiniopsis steinii*** Wołosz. = *Glenodinium cinctum* Ehrenb.; *Sphaerodinium cinctum* (Ehrenb.) Wołosz.	**14, 129** (11, 18, 101; 1, 14, 27, 126, 132, 142)
148	***Glenodinium behningii*** (Er. Lindem.) Kisselev	**1, 8, 9, 14, 27, 89, 92, 132, 142**
149	***Glenodinium inflatum*** Meunier	**1, 4, 9, 11, 14, 23, 27, 94, 126, 132, 136, 142**
150	***Glenodinium obliquum*** C.H.G. Pouchet	**1, 2, 9, 14, 15, 18, 27, 126, 129, 132, 142**

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	Taxa	References
151	***Glenodinium paululum*** Er. Lindem.	**1-4, 6, 8-11, 14, 15, 18, 20, 21, 24, 26, 27, 34, 38, 49, 57, 74, 84, 85, 89, 92, 94, 110, 117, 118, 119, 123, 126, 129, 132, 136, 142**
152	***Glenodinium pilula*** (Ostenf.) J. Schiller = *Diplopsalis pilula* Ostenf.	**1, 2, 4-6, 8-12, 14, 15, 18, 20, 21, 26, 27, 74, 84, 89, 92, 94, 129, 132, 142** (126)
153	***Glenodinium pulvisculus*** (Ehrenb.) F. Stein	**1, 8, 9, 14, 18, 27, 101, 126, 129, 132, 14**2
154	***Glochidinium penardiforme*** (Er. Lindem.) Boltovskoy = *Glenodinium penardiforme* (Er. Lindem.) J. Schiller; *Peridiniopsis penardiformis* (Er. Lindem.) Bourr.	**126, 134, 137, 144** (8, 132;14, 27;142)
155	***Goniodoma orientale*** (Er. Lindem.) Balech = *Gonyaulax orientalis* Er. Lindem.	(1, 2, 6, 8-11, 14, 23, 126, 132, 142, 144)
156	***Goniodoma sphaericum*** G. Murr. & Whitting	**85, 142**
157	***Goniodoma striatum*** Mangin	**132, 142**
158	***Gonyaulax africana*** J. Schiller	**7, 9, 130, 142**
159	***Gonyaulax apiculata*** (Penard) Entz	**2, 6, 9, 11, 14, 19, 20, 51, 126, 129, 136, 142**
160	***Gonyaulax birostris*** F. Stein	**9, 25**
161	***Gonyaulax cochlea*** Meunier	**1, 4-6, 8, 9, 11, 14, 19, 20, 23, 26, 27, 68, 94, 126, 129, 132, 136, 142, 144**
162	***Gonyaulax diegensis*** Kof.	**1, 2, 4, 6-11, 14, 15, 18, 25, 27, 34, 49, 58, 67, 72, 89, 92, 94, 100, 126, 129, 132, 136, 142**
163	***Gonyaulax digitalis*** (C.H.G. Pouchet) Kof.	**1, 2, 4, 6-12, 14, 15, 18, 20, 21, 26, 27, 49, 51, 54, 55, 58, 67, 68, 74, 93, 94, 99, 100, 105, 116, 125, 126, 127, 129, 130, 132, 136, 142, 144**
164	***Gonyaulax elegans*** Rampi	**7, 9, 142**
165	***Gonyaulax fragilis*** (F. Schütt) Kof.	**1, 9, 14, 23, 126, 142**
166	***Gonyaulax gracilis*** J. Schiller	**9, 10, 14, 126, 142**
167	***Gonyaulax lebouriae*** Balech	**132, 142**
168	***Gonyaulax minima*** Matzen.	**1, 2, 5, 6, 8, 10, 14, 15, 18-21, 26, 27, 34, 35, 38, 58, 67, 72, 78, 100, 110, 123, 126, 129, 132, 142, 144**
169	***Gonyaulax minuta*** Kof. & Michener	**9, 11**
170	***Gonyaulax monacantha*** Pavill.	**7, 9, 11, 25, 142**
171	***Gonyaulax monospina*** Rampi	**7, 9, 142**
172	***Gonyaulax polygramma*** F. Stein	**1-4, 6-12, 14, 15, 18-21, 25-27, 33, 34, 36, 38, 49, 51, 54, 58, 63, 67, 72, 73, 85, 86, 89, 92, 94, 99, 101, 105, 109, 111, 126, 127, 129, 132, 136, 142**
173	***Gonyaulax scrippsae*** Kof.	**1, 2, 5, 6, 8-11, 14, 15, 18-21, 26, 27, 33, 54, 55, 58, 68, 89, 92, 99, 105, 126, 129, 132, 142, 144**
174	***Gonyaulax spinifera*** (Clap. & J. Lachm.) Diesing = *Peridinium spiniferum* Clap. & J. Lachm.	**1, 2, 4, 6-15, 18-21, 25-27, 33, 35, 38, 49, 51, 54, 55, 58, 67, 74, 77, 84, 85, 89, 92, 94, 100, 105, 108, 116, 117, 123, 125, 126, 127, 129, 130, 132, 136, 142, 144** (1, 4, 8, 13, 15, 18, 51, 58, 94)
175	***Gonyaulax turbynei*** G. Murr. & Whitting	**34**
176	***Gonyaulax verior*** Sournia = *Gonyaulax diacantha* (Meunier) J. Schiller; *Gonyaulax longispina* M. Lebour	**7, 9, 11, 14, 27, 126, 132, 142** (1, 6-8, 25, 93; 6)
177	***Gymnodinium agiliforme*** J. Schiller	**1-5, 8-12, 14, 15, 18-21, 24, 27, 84, 126, 129, 132, 136, 142, 144**

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178	***Gymnodinium albulum*** Er. Lindem.	**19, 21, 132, 142**
179	***Gymnodinium antarcticum*** A.E. Thessen, D.J. Patterson & S.A. Murray = *Gymnodinium frigidum* Balech	(2, 27, 132, 142)
180	***Gymnodinium arcticum*** A. Wulff	**2, 10, 12, 27, 129, 132, 142**
181	***Gymnodinium arcuatum*** Kof.	**14, 27, 126, 132, 142**
182	***Gymnodinium auratum*** Kof. & Swezy	**9, 49, 136**
183	***Gymnodinium aureolum*** (Hulburt) G. Hansen = *Gyrodinium aureolum* Hulbert	**136, 142** (12, 27, 68, 132, 135)
184	***Gymnodinium biconicum*** J. Schiller	**2, 7, 9, 142**
185	***Gymnodinium cnecoides*** T.M. Harris	**144**
186	***Gymnodinium dissimile*** Kof. & Swezy	**84**
187	***Gymnodinium excavatum*** Van Meel	**27, 132, 142**
188	***Gymnodinium eurytopum*** Skuja	**142**
189	***Gymnodinium flavum*** Kof. & Swezy	**6, 9, 11, 21, 142**
190	***Gymnodinium fuscum*** (Ehrenb.) F. Stein	**3, 4, 8, 9, 11, 14, 27, 38, 49, 94, 126, 129, 132, 136, 142**
191	***Gymnodinium fusiforme*** Kof. & Swezy	**136**
192	***Gymnodinium galeiforme*** Matzen.	**6, 9**
193	***Gymnodinium gibbera*** J. Schiller	**9, 49, 136**
194	***Gymnodinium gracile*** Bergh = *Gymnodinium abbreviatum* Kof. & Swezy	**11, 142** (9)
195	***Gymnodinium grammaticum*** (C.H.G. Pouchet) Kof. & Swezy = *Gymnodinium grammaticum* C.H.G. Pouchet	**1, 9, 14, 23, 27, 84, 126, 132, 142** (21)
196	***Gymnodinium hamulus*** Kof. & Swezy	**6, 11, 142**
197	***Gymnodinium heterostriatum*** Kof. & Swezy	**2, 11, 19, 27, 47, 132, 142**
198	***Gymnodinium impudicum*** (S. Fraga & I. Bravo) G. Hansen & Moestrup = *Gyrodinium impudicum* S. Fraga & I. Bravo	(14, 27, 126, 132, 142)
199	***Gymnodinium inversum*** Nygaard	**27, 132, 142**
200	***Gymnodinium kowalevskii*** Pitzik	**10, 12, 21, 24, 38, 129**
201	***Gymnodinium lachmannii*** W.S. Kent	**6, 9**
202	***Gymnodinium lacustre*** J. Schiller	**11, 14, 21, 27, 47, 126, 129, 132, 140, 142, 144**
203	***Gymnodinium lanskoi*** Roukh.	**10, 129**
204	***Gymnodinium lantzschii*** Utermöhl	**11, 144**
205	***Gymnodinium latum*** Skuja	**142**
206	***Gymnodinium marinum*** W.S. Kent	**1, 9, 11, 14, 23, 27, 126, 132, 142**
207	***Gymnodinium minor*** M. Lebour	**1, 8, 10, 14, 23, 27, 126, 132, 142**
208	***Gymnodinium mirabile*** Penard	**27**
209	***Gymnodinium najadeum*** J. Schiller	**1-6, 8-12, 14, 15, 18-21, 24, 27, 34, 49, 57, 68, 84, 89, 92, 100, 126, 129, 132, 136, 142, 144**
210	***Gymnodinium neapolitanum*** J. Schiller	**1, 3, 4, 8, 9, 11, 14, 15, 18, 20, 27, 84, 89, 92, 100, 126, 129, 132, 136, 142**
211	***Gymnodinium paradoxum*** J. Schiller	**4, 9, 14, 27, 38, 126, 131, 132, 136, 142**
212	***Gymnodinium paulseinii*** J. Schiller	**84**
213	***Gymnodinium punctatum*** C.H.G. Pouchet	**5, 11, 21**

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214	***Gymnodinium pygmaeum*** M. Lebour	**9, 14, 27, 38, 47, 126, 131, 132, 142**
215	***Gymnodinium radiatum*** Kof. & Swezy	**9, 14, 48, 126, 142**
216	***Gymnodinium rhomboides*** F. Schütt	**1, 4-6, 8-11, 14, 15, 18, 21, 24, 27, 49, 67, 74, 86, 89, 92, 94, 100, 126, 129, 136**
217	***Gymnodinium semidivisum*** J. Schiller	**1, 9, 14, 23, 84, 126, 142**
218	***Gymnodinium simplex*** (Lohmann) Kof. & Swezy	**2, 3, 7-12, 14, 19, 20, 21, 23, 24, 26, 27, 36, 38, 84, 99, 126, 127, 129, 132, 142, 144**
219	***Gymnodinium sphaericum*** (Calkins) Kof. & Swezy	**9, 27, 132, 136, 142**
220	***Gymnodinium stellatum*** Hulburt	**12, 19, 27, 47, 79, 132, 142**
221	***Gymnodinium sulcatum*** Kof. & Swezy	**1, 8, 9, 11, 14, 23, 27, 126, 132, 142**
222	***Gymnodinium uberrimum*** (G.J. Allman) Kof. & Swezy = *Gymnodinium rotundatum* G.A. Klebs; *Gymnodinium uberrimum* var. *rotundatum* (G.J. Allman) Kof. & Swezy	**2, 9, 11, 14, 27, 36, 47, 82, 106, 107, 126, 132, 135, 140, 142, 144** (2, 7, 9, 21, 49, 85; 136)
223	***Gymnodinium variabile*** Herdman	**9-11, 14, 21, 27, 35, 84, 126, 129, 132, 142**
224	***Gymnodinium wulffii*** J. Schiller	**1, 2, 3, 5, 6, 8-10, 12, 14, 19-21, 23, 24, 26, 27, 35, 110, 117, 119, 120, 123, 126, 129, 132, 136, 137, 139, 142, 144**
225	***Gyrodinium britannia*** Kof. & Swezy	**1, 2, 8, 9, 14, 23, 126, 132, 142**
226	***Gyrodinium capsulatum*** Kof. & Swezy	**1, 9, 14, 23, 126, 142**
227	***Gyrodinium cornutum*** (C.H.G. Pouchet) Kof. & Swezy	**8, 9, 14, 27, 68, 100, 126, 129, 132, 140, 142**
228	***Gyrodinium dorsum*** Kof. & Swezy	**1, 9, 14, 23, 126, 142**
229	***Gyrodinium estuariale*** Hulburt	**19**
230	***Gyrodinium flagellare*** J. Schiller	**11, 12**
231	***Gyrodinium flavum*** Kof.	**85**
232	***Gyrodinium fusiforme*** Kof. & Swezy	**2-4, 6-8, 10, 12, 14, 19-21, 23, 24, 26, 27, 33-36, 38, 49, 50, 57, 72, 74, 84-86, 89, 92, 94, 117, 123, 126, 127, 129, 132, 136, 142, 144**
233	***Gyrodinium fusus*** (Meunier) Akselman	**1, 2, 9, 11, 129**
234	***Gyrodinium helveticum*** (Penard) Y. Takano & T. Horiguchi = *Gymnodinium helveticum* Penard; *Gymnodinium helveticum* var. *apiculatum* Utermöhl; *Glenodinium apiculatum* Zacharias	(9, 14, 126, 129, 142; 136; 1, 4, 6, 8, 10, 11, 15, 18, 20, 24, 49, 74, 86, 132)
235	***Gyrodinium hyalinum*** (A.J. Schill.) Kof. & Swezy	**6, 142**
236	***Gyrodinium lacryma*** (Meunier) Kof. & Swezy	**1, 2, 4, 6-11, 14, 20, 21, 23, 24, 26, 27, 34, 49, 50, 74, 84, 86, 89, 92, 94, 118, 126, 129, 132, 136, 139, 142, 144**
237	***Gyrodinium nasutum*** (A. Wulff) J. Schiller	**1, 2, 4, 6, 8, 9, 11, 14, 27, 34, 50, 85, 93, 126, 132, 136, 142, 144**
238	***Gyrodinium ovum*** (F. Schütt) Kof. & Swezy	**11, 27, 47, 132, 142**
239	***Gyrodinium pellucidum*** (A. Wulff) J. Schiller	**7, 9, 20, 136, 142**
240	***Gyrodinium pingue*** (F. Schütt) Kof. & Swezy	**1-4, 6, 9-12, 14, 19, 21, 23, 24, 27, 34, 38, 57, 74, 84, 94, 116, 117, 126, 129, 132, 136, 142, 144**
241	***Gyrodinium prunus*** (A. Wulff) M. Lebour	**9, 14, 23, 126**
242	***Gyrodinium pusillum*** (A.J. Schill.) Kof. & Swezy = *Gymnodinium pusillum* A.J. Schill.	**7, 9-11, 24, 142** (2)
243	***Gyrodinium spirale*** (Bergh) Kof. & Swezy = *Spirodinium spirale* Entz	**1, 2, 6, 8, 9, 11, 12, 14, 15, 18, 19, 20, 27, 33, 34, 50, 72, 73, 85, 126, 127, 129, 130, 132, 142, 144** (18)

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	Taxa	References
244	***Gyrodinium wulffii*** J. Schiller	**11, 38**
245	***Hemidinium nasutum*** F. Stein	**144**
246	***Herdmania litoralis*** J.D. Dodge	**1, 2, 3, 11, 129**
247	***Heterocapsa rotundata*** (Lohmann) G. Hansen = *Katodinium rotundatum* (Lohmann) A.R. Loebl.; *Massartia rotundata* (Lohmann) J. Schiller	**9, 11, 113, 129** (2, 10, 12, 14, 27, 33, 116, 126, 131, 132, 142; 1, 23, 84)
248	***Heterocapsa triquetra*** (Ehrenb.) F. Stein = *Peridinium triquetrum* (Ehrenb.) M. Lebour	**2-4, 6-12, 14, 19, 20, 24-27, 33-36, 68, 81, 82, 94, 99, 100, 108, 118, 125, 126, 127, 129, 130, 132, 136, 138, 139, 140, 142, 144** (1, 5, 15, 18, 21, 38, 58, 67, 72, 73, 93, 109, 110, 123)
249	***Heterodinium mediterraneum*** Pavill.	**2, 63**
250	***Heterodinium murrayi*** Kof.	**7, 9, 142**
251	***Huia caspica*** (Ostenf.) H. Gu, K.N. Mertens, T.T. Liu = *Glenodinium caspicum* (Ostenf.) J. Schiller; *Diplopsalis caspica* Ostenf.	(1, 2, 8, 9, 14, 15, 20, 23, 27, 93, 132, 136, 142; 126)
252	***Hypnodinium sphaericum*** G.A. Klebs	**1, 4, 14, 15, 18, 49, 86, 94, 126, 129, 136**
253	***Kapelodinium vestifici*** (F. Schütt) Boutrup, Moestrup & Daugbjerg = *Amphidinium extensum* A. Wulff	(1, 4, 9, 10, 11, 14, 21, 23, 49, 129, 136, 142)
254	***Karenia brevis*** (Davis) G. Hansen & Moestrup = *Gymnodinium breve* Davis	**12, 36** (12, 19)
255	***Karenia mikimotoi*** (Miyake & Kominami ex Oda) G. Hansen & Moestrup = *Gymnodinium mikimotoi* Miyake & Kominami ex Oda	(12)
256	***Katodinium fungiforme*** (Anisimova) A.R. Loebl. = *Gymnodinium fungiforme* Anisimova; *Gymnodinium blax* Harris	**12, 14, 27, 126, 132, 142** (6, 9, 11; 12, 14, 27, 47, 126, 132, 140, 14)
257	***Kofoidinium lebouriae*** (Pavill.) F.J.R. Taylor = *Gymnodinium lebouriae* Pavill.	(2)
258	***Kofoidinium velleloides*** Pavill.	**99**
259	***Kolkwitziella acuta*** (Apstein) Elbrächter = *Diplopsalis acuta* (Apstein) Entz; *Peridinium latum* Paulsen	**9** (14, 126, 136, 144; 1, 4, 8, 20, 27, 49, 89, 92, 132, 142)
260	***Kryptoperidinium foliaceum*** (F. Stein) Er. Lindem. = *Glenodinium foliaceum* F. Stein	**2, 9, 20, 27, 126, 129, 132, 142** (1, 3, 6, 8, 10, 14, 18, 72, 101)
261	***Kryptoperidinium foliaceum* var. *ponticum*** (Roukh.) Krachm. = *Glenodinium foliaceum* var. *ponticum* Roukh.	**115, 129** (10, 98)
262	***Lebouridinium glaucum*** (M. Lebour) Gómez, Takayama, Moreira & López-García = *Katodinium glaucum* (M. Lebour) A.R. Loebl.; *Gyrodinium glaucum* (M. Lebour) Kof. & Swezy	**144** (2, 12, 126, 129, 142; 109, 136)
263	***Lessardia elongata*** Saldarriaga & Taylor	**11, 52, 129, 139, 144**
264	***Levanderina fissa*** (Levander) Moestrup, Hakanen, G. Hansen, Daugbjerg & M. Ellegaard = *Gyrodinium fissum* (Levander) Kof. & Swezy; *Gymnodinium fissum* Levander; *Gyrodinium pavillardii* Biecheler; *Gyrodinium instriatum* Freud. & J.J. Lee	(1, 2, 3, 6, 9, 14, 15, 19, 27, 34, 38, 126, 129, 132, 142; 18, 101; 4, 9, 136;142)

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265	***Lingulodinium polyedra*** (F. Stein) J.D. Dodge = *Gonyaulax polyedra* F. Stein	**2, 3, 6, 9-12, 14, 15, 20, 26, 27, 35, 36, 68, 77, 81, 82, 99, 100, 108, 126, 129, 130, 132, 136, 137, 139, 142, 144** (1, 4, 5, 7, 8, 18, 19, 21, 25, 34, 38, 49, 51, 54, 55, 58, 67, 72, 73, 74, 85, 89, 92, 94, 104, 105, 109, 110, 123, 125, 140)
266	***Margalefidinium citron*** (Kof. & Swezy) Gómez, Richlen & D.M. Anderson = *Cochlodinium citron* Kof. & Swezy	**144** (2, 8-12, 14, 15, 18, 20, 27, 38, 50, 79, 93, 126, 129, 131, 132, 142)
267	***Margalefidinium polykrikoides*** (Margalef) Gómez, Richlen & D.M. Anderson = *Cochlodinium polykrikoides* Margalef	(2, 14, 27, 33, 47, 77, 126, 131, 132, 135, 139, 142)
268	***Mesoporos perforatus*** (Gran) Lillick = *Exuviaella perforata* Gran; *Porella perforata* (Gran) J. Schiller	**2, 7, 9, 10, 12, 14, 19, 27, 111, 126, 129, 132, 142, 144** (1, 15, 18, 21, 34, 38; 38, 78)
269	***Micracanthodinium bacilliferum*** (J. Schiller) Deflandre = *Cladopyxis bacillifera* J. Schiller	**129** (10, 142)
270	***Micracanthodinium setiferum*** (Lohmann) Deflandre = *Cladopyxis setifera* Lohmann	11 (8, 27, 132, 142)
271	***Monaster rete*** F. Schütt = *Achradina pulchra* Lohmann; *Achradina sulcata* Lohmann	(2, 9-11, 19, 21, 24, 27, 50, 129, 130, 132, 142; 10, 24, 34, 78, 129, 131)
272	***Noctiluca scintillans*** (Macartney) Kof. & Swezy = *Noctiluca miliaris* Suriray & Lamarck	**7, 9, 14, 19, 25, 27, 33, 36, 45, 99, 108, 125, 126, 129, 130, 132, 136, 139, 142** (1, 13, 15, 18, 22, 50, 51, 59, 72, 73, 87, 93, 105, 109)
273	***Nusuttodinium aeruginosum*** (F. Stein) Takano & T. Horiguchi = *Gymnodinium aeruginosum* F. Stein	(9, 14, 27, 47, 126, 132, 140, 142)
274	***Nusuttodinium amphidinioides*** (Geitler) Takano & T. Horiguchi = *Amphidinium amphidinioides* (Geitler) J. Schiller	(9, 14, 126, 142)
275	***Oblea rotunda*** (M. Lebour) Balech & Sournia = *Glenodinium rotundatum* (M. Lebour) J. Schiller; *Peridiniopsis rotunda* M. Lebour	**5, 9-12, 14, 19, 27, 111, 126, 127, 129, 132, 136, 142, 144** (1, 3, 4, 6, 18, 23, 55, 67, 74, 93, 94, 105;10)
276	***Opisthoaulax vorticella*** (F. Stein) Calado = *Katodinium vorticella* (F. Stein) A.R. Loebl.; *Katodinium vorticellum* (F. Stein) Fott; *Gymnodinium vorticella* F. Stein; *Massartia vorticella* (F. Stein) J. Schiller	**129, 130** (132, 142; 9, 14, 27, 126, 142;18, 101; 1, 6, 8, 15, 21, 27)
277	***Oxyrrhis marina*** Dujardin	**2, 129, 132, 142**
278	***Oxytoxum adriaticum*** J. Schiller	**2, 9, 21, 142**
279	***Oxytoxum brunelli*** Rampi	142
280	***Oxytoxum caudatum*** J. Schiller	**10, 12, 24, 142**
281	***Oxytoxum gladiolus*** F. Stein	**2, 3, 10, 24, 129, 142**
282	***Oxytoxum laticeps*** J. Schiller	**67**
283	***Oxytoxum milneri*** G. Murr. & Whitting	**7, 9, 142**
284	***Oxytoxum mitra*** F. Stein	**7, 9, 142**
285	***Oxytoxum parvum*** J. Schiller	**9, 14, 38, 117, 126, 131**
286	***Oxytoxum reticulatum*** Bütschli	**10, 142**
287	***Oxytoxum scolopax*** F. Stein	**10, 142**
288	***Oxytoxum sphaeroideum*** F. Stein	**10, 34, 142**

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289	***Oxytoxum turbo*** Kof.	**27, 47, 126, 132, 142**
290	***Oxytoxum variabile*** J. Schiller	**2, 9, 10, 12, 14, 24, 27, 38, 57, 79, 84, 126, 129, 131, 132, 142**
291	***Oxytoxum viride*** J. Schiller	**10, 38, 67, 131**
292	***Palaeophalacroma unicinctum*** J. Schiller	**9**
293	***Palatinus apiculatu***s (Ehrenb.) Craveiro, Calado, Daugbjerg & Moestrup = *Peridinium palatinum* Lauterborn	**129**
294	***Parvodinium goslaviense*** (Wołosz.) S. Carty = *Peridinium goslaviense* Wołosz.	**144** (11)
295	***Parvodinium inconspicuum*** (Lemmerm.) S. Carty = P*eridinium inconspicuum* Lemmerm.	(1, 6, 8, 27, 72, 73, 93, 132, 142)
296	***Parvodinium lubieniense*** (Wołosz.) S. Carty = *Peridinium lubieniense* Wołosz.	(6)
297	***Parvodinium umbonatum*** (F. Stein) S. Carty = *Peridinium umbonatum* F. Stein; *Peridinium pusillum* (Penard) Lemmerm.	(9, 11, 14, 126, 137, 142; 6, 20, 27, 132, 142)
298	***Paulsenella chaetoceratis*** (Paulsen) Chatton	**1, 8, 10, 14, 23, 27, 93, 126, 132, 142**
299	***Pentapharsodinium dalei*** Indelicato & A.R. Loebl.	**27, 111**
300	***Pentapharsodinium tyrrhenicum*** (Balech) Montresor, Zingone & Marino	**27, 111**
301	***Peridiniella catenata*** (Levander) Balech	**2, 10, 142**
302	***Peridiniella danica*** (Paulsen) Okolodkov & J.D. Dodge = *Glenodinium danicum* Paulsen	**9, 20, 126, 129, 136, 142, 144** (1, 2, 4, 6, 8-11, 14, 15, 18, 21, 27, 67, 68, 72, 73, 74, 84, 89, 92, 94, 118, 129, 132)
303	***Peridiniella sphaeroidea*** Kof. & Michener	**111**
304	***Peridiniopsis cunningtonii*** Lemmerm.	**143**
305	***Peridiniopsis elpatiewskyi*** (Ostenf.) Bourr. = *Peridinium elpatiewskyi* (Ostenf.) Lemmerm.	**14, 126, 143** (9)
306	***Peridiniopsis quadridens*** (F. Stein) Bourr. = *Glenodinium quadridens* (F. Stein) J. Schiller	**136** (4, 21)
307	***Peridiniopsis thompsonii*** (Thomps.) Bourr.	**9, 14, 143**
308	***Peridinium bipes*** F. Stein = *Peridinium bipes* f. *tabulatum* (Ehrenb.) Lefèvre; *Peridinium tabulatum* Ehrenb.	**4, 5, 8-10, 14, 20, 49, 126; 136** (1; 13, 18, 129)
309	***Peridinium cinctum*** (O. Müll.) Ehrenb.	**1, 2, 4, 7-11, 14, 19, 21, 24, 27, 38, 85, 89, 92, 94, 100, 117, 126, 129, 132, 136, 142**
310	***Peridinium willei*** Huitf.-Kaas	**1, 4, 9, 14, 18, 126, 129, 136, 142**
311	***Petalodinium porcelio*** J. Cachon & M. Cachon	**9, 91, 142**
312	***Phalacroma acutum*** (F. Schütt) Pavill. = *Dinophysis acutoides* Balech	**1, 9, 23** (14, 126)
313	***Phalacroma cuneus*** F. Schütt = *Dinophysis cuneus* (F. Schütt) T.H. Abé	A.F. Krakhmalnyi (pers. obs.)*
314	***Phalacroma cuneolus*** Kof. & Skogsb.	**136**
315	***Phalacroma favus*** Kof. & Michener = *Dinophysis favus* (Kof. & Michener) T.H. Abé	**9** (142)
316	***Phalacroma oxytoxoides*** (Kof.) Gómez, Moreira & López-García = *Oxyphysis oxytoxoides* Kof.	(6, 9, 11, 82, 107, 125, 142)

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	Taxa	References
317	***Phalacroma rotundatum*** (Clap. & J. Lachm.) Kof. & Michener = *Dinophysis rotundata* Clap. & J. Lachm.; *Dinophysis whittingae* Balech; *Prodinophysis rotundata* (Clap. & J. Lachm.) Balech	**1, 2-4, 6, 8, 9, 15, 18, 21, 34, 38, 49, 54, 55, 58, 63, 67, 72, 73, 74, 78, 84, 85, 86, 89, 92, 94, 99, 105, 108, 109, 116, 117, 118, 125, 129, 130, 136, 144** (7, 10-14, 18, 20, 22, 25-27, 33, 36, 50, 56, 77, 100, 125-127, 130, 132, 141, 142; 14; 10)
318	***Plectodinium nucleovolvatum*** Biecheler	**7, 9**
319	***Podolampas bipes*** F. Stein	**19**
320	***Podolampas elegans*** F. Schütt	**7, 9, 19, 142**
321	***Podolampas palmipes*** F. Stein	**99**
322	***Podolampas spinifera*** Okamura	**9, 14, 39, 99, 126, 131**
323	***Polykrikos geminatus*** (F. Schütt) D.X. Qiu & Senjie Lin = *Cochlodinium geminatum* (F. Schütt) F. Schütt; *Gymnodinium geminatum* F. Schütt	(9, 14, 15, 19, 21, 26, 27, 47, 126, 129, 132, 140, 142; 19)
324	***Polykrikos hartmannii*** W.M. Zimmermann = *Pheopolykrikos hartmannii* (Zimmerman) Matsuoka & Fukuyo	(2, 10, 11, 21, 24, 129, 142)
325	***Polykrikos kofoidii*** Chatton	**2, 9, 11, 12, 14, 19, 20, 27, 33, 47, 99, 126, 129, 132, 140, 142, 144**
326	***Polykrikos schwartzii*** Bütschli	**1, 2-4, 6-10, 12, 14, 20, 21, 23, 24, 26, 27, 34, 36, 50, 51, 68, 85, 94, 126, 129, 132, 136, 139, 142, 144**
327	***Preperidinium meunieri*** (Pavill.) Elbrächter = *Diplopsalis minor* (Paulsen) Er. Lindem.; *Diplopeltopsis minor* Pavill.; *Glenodinium lenticulum* f. *minus* (Paulsen) J. Schiller; *Zygabikodinium lenticulatum* A.R.Jr. Loebl. & A.R. Loebl.	**2, 9, 11** (12; 27, 132, 142; 1, 6, 58; 14, 126)
328	***Pronoctiluca acuta*** (Lohmann) J. Schiller	**2, 8-10, 21, 24, 27, 38, 50, 129, 131, 132, 142**
329	***Pronoctiluca pelagica*** Fabre-Dom.	**2, 3, 7, 8, 9, 10, 11, 12, 21, 24, 27, 34, 38, 50, 63, 85, 129, 130, 131, 132, 142**
330	***Pronoctiluca spinifera*** (Lohmann) J. Schiller	**7, 9, 11, 85**
331	***Prorocentrum aporum*** (J. Schiller) J.D. Dodge = *Exuviaella apora* J. Schiller	**7, 9, 10, 25, 26, 129, 130, 142** (6, 21, 84)
332	***Prorocentrum balticum*** (Lochmann) A.R. Loebl. = *Exuviaella baltica* Lochmann	**2, 4, 8-11, 14, 25-27, 33, 35, 36, 45, 94, 99, 111, 125, 126, 129, 132, 136, 142** (1, 7, 15, 18, 21, 54, 55, 58, 89, 92, 105)
333	***Prorocentrum caspicum*** (Kisselev) Krachm. = *Exuviaella caspica* Kisselev	**14, 27, 126, 132, 142** (1, 34, 89, 92)
334	***Prorocentrum compressum*** (Bailey) T.H. Abé & J.D. Dodge = *Exuviaella compressa* (Bailey) Ostenf.	**2-4, 8-12, 14, 19, 20, 25-27, 33, 36, 57, 68, 94, 99, 100, 108, 109, 111, 126, 127, 129, 130, 132, 136, 142, 144** (1, 5-7, 15, 18, 21, 22, 34, 38, 49, 51, 54-56, 58, 63, 67, 72-75, 78, 84-86, 89, 92, 105, 110, 116, 117, 123, 125)
335	***Prorocentrum cordatum*** (Ostenf.) J.D. Dodge = *Exuviaella cordata* Ostenf.; *Prorocentrum minimum* (Pavill.) J. Schiller	**2-5, 8-10, 12, 14, 20, 25-27, 31, 33, 35, 36, 57, 68, 81, 94, 100, 111, 118-120, 126, 127, 129, 130, 132, 136, 137, 139, 140, 144** (1, 7, 15, 18, 21, 34, 38, 49, 54, 63, 67, 72-75, 78, 85, 86, 89, 92, 105, 109, 110, 116, 117, 123; 2, 6, 7, 9, 10-12, 19, 36, 82, 107, 108, 125, 136, 142, 144)
336	***Prorocentrum cordatum*** **var.** ***aralensis*** (Kisselev) Krachm.	**14, 23**
337	***Prorocentrum dentatum*** F. Stein	**2, 7, 9, 19, 25, 30, 126, 142**
338	***Prorocentrum gracile*** F. Schütt	**11, 19, 108**

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	Taxa	References
339	***Prorocentrum lima*** (Ehrenb.) F. Stein = *Exuviaella marina* Cienk.; *Prorocentrum marinum* J.D. Dodge & B.T. Bibby; *Exuviaella marina* var. *lima* (Ehrenb.) J. Schiller	**2, 7, 9-11, 14, 24, 33, 36, 77, 111, 125, 126, 129, 142** (1, 6, 13, 18, 21, 34, 38, 84, 117; 3-5, 8, 10, 19, 57, 94, 100, 132, 136, 142; 1)
340	***Prorocentrum maximum*** (Gourret) J. Schiller	**7-9, 14, 25, 27, 100, 126, 132, 142**
341	***Prorocentrum micans*** Ehrenb.	**1-15, 18-22, 25-27, 33-36, 38, 45, 49, 54-59, 63, 67, 68, 72-75, 78, 81, 82, 84-86, 89, 90, 92, 94, 99, 100, 105, 108-110, 116, 117, 120, 123, 125-127, 129, 130, 132, 137, 139, 140, 142, 144**
342	***Prorocentrum micans* var. *micans* f. *duplex*** Krachm. & Terenko	**126, 128, 132, 142**
343	***Prorocentrum nanum*** J. Schiller = *Exuviaella pusilla* (J. Schiller) J. Schiller; *Prorocentrum pusillum* (J. Schiller) J.D. Dodge & B.T. Bibby	**10, 84, 126, 129** (1, 10, 15, 18, 84, 142; 5, 9, 14)
344	***Prorocentrum oblongum*** (J. Schiller) T.H. Abé	**27, 132, 142**
345	***Prorocentrum obtusum*** Ostenf.	**1, 4, 8, 9, 11, 14, 23, 34, 36, 38, 74, 94, 126, 136**
346	***Prorocentrum ovum*** (J. Schiller) J.D. Dodge	**7, 9, 142**
347	***Prorocentrum ponticus*** Krachm. & Terenko	**14, 27, 95, 111, 126, 132, 142**
348	***Prorocentrum pyriforme*** (J. Schiller) Taylor	**7, 25**
349	***Prorocentrum reticulatum*** M.A. Faust	**2, 21**
350	***Prorocentrum rostratum*** F. Stein	**9, 142**
351	***Prorocentrum rotundatum*** J. Schiller	7, 9, 25, 84, 142
352	***Prorocentrum scutellum*** Schröd. = *Prorocentrum sphaeroideum* J. Schiller	**1, 2, 4, 5, 7-10, 12, 14, 15, 18, 19, 21, 25, 27, 34, 36, 38, 49, 74, 86, 108, 116, 126, 129, 132, 136, 137, 139, 142, 144** (27, 132, 142)
353	***Prorocentrum triestinum*** J. Schiller	**9, 11, 25, 108, 142**
354	***Prorocentrum vaginula*** (F. Stein) J.D. Dodge = *Exuviaella vaginula* (F. Stein) Lemmerm.; *Prorocentrum vaginulum* (Ehrenb.) J.D. Dodge	**5, 8, 14, 27, 36, 126, 132, 142** (1, 15, 23, 67; 2, 9, 10, 24, 129)
355	***Prosoaulax lacustris*** (F. Stein) Calado & Moestrup = *Amphidinium elenkinii* Skvortsov; *Amphidinium larvale* Er. Lindem.; *Amphidinium lacustre* F. Stein; *Amphidinium turicense* Huber-Pestalozzi	**144** (9, 14, 126; 27, 47, 132, 140, 142; 9, 14, 19, 27, 47, 132, 142; 27, 132, 142)
356	***Protoceratium areolatum*** Kof.	**2, 6, 7, 9, 10, 14, 25, 27, 126, 129, 132, 142**
357	***Protoceratium reticulatum*** (Clap. & J. Lachm.) Bütschli = *Peridinium reticulatum* Clap. & J. Lachm.; *Gonyaulax grindleyi* Reinecke; *Peridiniopsis reticulatum* (Clap. & J. Lachm.) Starmach	**1, 4-12, 14, 15, 18, 19, 26, 27, 34, 36, 49, 54, 55, 58, 67, 72-75, 77, 84-86, 94, 100, 105, 109, 117, 125-127, 129, 130, 132, 142, 144** (13; 2, 7, 10, 20, 33, 108; 136)
358	***Protoceratium spinulosum*** (G. Murr. & Whitting) J. Schiller	**108**
359	***Protoperidinium abei*** (Paulsen) Balech	**5, 9, 12, 142**
360	***Protoperidinium achromaticum*** (Levander) Balech = *Peridinium achromaticum* Levander	**9, 11, 27, 50, 126, 129, 132, 142** (1, 5, 6, 8, 14, 15, 18, 67, 72, 73, 89, 92)
361	***Protoperidinium bipes*** (Paulsen) Balech = *Glenodinium bipes* Paulsen; *Minuscula bipes* M. Lebour.; *Peridinium minusculum* Pavill.	**2, 4, 9-12, 14, 15, 19, 27, 35, 108, 126, 129, 130, 132, 136, 142, 143, 144** (55, 105; 7, 20; 1, 3, 4, 6-8, 10, 18, 21, 26, 34, 38, 49, 50, 57, 58, 67, 72, 73, 86, 89, 92, 94, 109, 110, 117, 118, 136)
362	***Protoperidinium breve*** Paulsen	**2, 11, 12, 20, 26, 27, 34, 57, 126, 129, 132, 142**

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	Taxa	References
363	***Protoperidinium brevipes*** (Paulsen) Balech = *Peridinium brevipes* Paulsen	**2, 9-11, 14, 19, 20, 24-27, 33, 34, 99, 108, 126, 129, 130, 132, 136, 142, 144** (1, 4, 5, 7, 8, 15, 18, 21, 38, 49, 51, 58, 74, 86, 94, 117)
364	***Protoperidinium brochii*** (Kof. & Swezy) Balech = *Peridinium brochii* Kof. & Swezy	**2, 9-11, 14, 25, 50, 108, 126, 142, 144** (1, 6, 15, 18, 21, 51, 54, 55, 58, 67, 72, 73, 105, 109, 116)
365	***Protoperidinium bulla*** (Meunier) Balech = *Peridinium bulla* Meunier	**14, 126** (8)
366	***Protoperidinium claudicans*** (Paulsen) Balech = *Peridinium claudicans* Paulsen	**2, 9, 11, 14, 25, 27, 34, 50, 108, 125, 126, 130, 132, 142, 144** (1, 7, 8, 51, 89, 92)
367	***Protoperidinium compressum*** (T.H. Abé) Balech	**11, 142**
368	***Protoperidinium conicoides*** (Paulsen) Balech = *Peridinium conicoides* Paulsen	**9-11, 14, 25, 27, 57, 125, 126, 129, 132, 142** (1, 18)
369	***Protoperidinium conicum*** (Gran) Balech = *Peridinium conicum* (Gran) Ostenf. & A.W.F. Schmidt;	**2, 9-11, 14, 20, 27, 33, 50, 99, 108, 125, 126, 129, 130, 132, 142** (1, 6-8, 18, 51, 54, 55, 72, 73, 85, 93, 105, 109)
370	***Protoperidinium conicum* var. *concavum*** (Matzen.) Balech = *Peridinium conicum* f. *concavum* Matzen.; *Protoperidinium conicum* f. *concavum* (Matzen.) Krachm.	**142** (1, 8, 58, 93; 14, 132)
371	***Protoperidinium crassipes*** (Kof.) Balech = *Peridinium crassipes* Kof.	**2, 9-12, 14, 20, 26, 27, 34, 36, 77, 108, 119, 120, 126, 127, 129, 130, 132, 136, 142, 143, 144** (1, 4, 6-8, 15, 18, 38, 49, 51, 54, 55, 58, 67, 72-74, 78, 85, 86, 93, 94, 105, 109, 110, 116, 123)
372	***Protoperidinium curtipes*** (Jörg.) Balech = *Peridinium curtipes* Jörg.	**9, 50, 125, 130, 142** (7)
373	***Protoperidinium curvipes*** (Ostenf.) Balech = *Peridinium curvipes* Ostenf.	**2, 9, 12, 20, 34, 142** (7)
374	***Protoperidinium decipiens*** (Jörg.) Parke & J.D. Dodge = *Peridinium decipiens* Jörg.	**2, 9, 10, 14, 19, 20, 68, 126, 129, 136, 142** (1, 4, 5, 15, 18, 38, 54, 55, 94, 105)
375	***Protoperidinium deficiens*** (Meunier) Balech = *Peridinium deficiens* Meunier	**9, 142** (7)
376	***Protoperidinium depressum*** (Bailey) Balech = *Peridinium depressum* Bailey	**2, 9-12, 14, 15, 25-27, 33, 34, 50, 99, 108, 125-127, 129, 130, 132, 136, 142, 143** (1, 4, 7, 8, 18, 21, 38, 49, 51, 54, 55, 67, 74, 85, 86, 89, 92, 94, 105, 117)
377	***Protoperidinium diabolus*** (Cleve) Balech = *Peridinium diabolus* Cleve	**2, 9, 14, 25, 27, 50, 108, 126, 129, 132, 142** (1, 7, 8, 18, 51, 85)
378	***Protoperidinium divergens*** (Ehrenb.) Balech = *Peridinium divergens* Ehrenb.	**2, 3, 9-12, 14, 19, 20, 25-27, 33, 34, 50, 57, 68, 99, 108, 125-127, 129, 130, 132, 136, 142, 144** (1, 4, 6-8, 18, 21, 22, 38, 49, 51, 54-56, 58, 59, 63, 72, 73, 78, 85, 87, 89, 92, 94, 103, 105, 109, 110, 116, 117)
379	***Protoperidinium elegans*** (Cleve) Balech = *Peridinium elegans* Cleve	**9, 10, 14, 19, 126, 142** (1, 5, 6, 15, 51, 55, 105)
380	***Protoperidinium excentricum*** (Paulsen) Balech = *Peridinium excentricum* Paulsen	**9, 10, 11, 14, 19, 27, 126, 129, 130, 132, 136, 142** (1, 5-8, 15, 18, 20, 72-74, 89, 92, 109)
381	***Protoperidinium globulus*** (F. Stein) Balech = *Peridinium globulus* F. Stein	**2, 9-12, 14, 25, 27, 33, 34, 50, 99, 100, 126, 129, 132, 136, 142** (1, 4, 6, 7, 8, 18, 21, 38, 49, 51, 58, 67, 72, 73, 93, 94, 109, 116)
382	***Protoperidinium gracile*** Gran & Braar.	**142**

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	Taxa	References
383	***Protoperidinium grande*** (Kof.) Balech = *Peridinium grande* Kof.	**9, 12, 25, 142** (7)
384	***Protoperidinium granii*** (Ostenf.) Balech = *Peridinium granii* Ostenf.	**2, 9-12, 14, 19, 20, 24-27, 33, 34, 50, 57, 68, 99, 100, 119, 125-127, 129, 130, 132, 136, 142** (1, 3, 4, 6-8, 18, 21, 38, 49, 51, 58, 67, 74, 85, 89, 92, 94, 110, 118, 123)
385	***Protoperidinium grenlandicum*** (Wołosz.) Balech	**27, 132, 142**
386	***Protoperidinium inflatum*** (Okamura) Balech	**9, 50, 142**
387	***Protoperidinium joergensenii*** (Balech) Balech	**2, 9-11, 14, 27**
388	***Protoperidinium knipowitschii*** (Usachev) Balech = *Peridinium knipowitschii* Usachev	**2, 9, 11, 12, 14, 126, 129, 136, 144** (4, 6, 8, 10, 89, 92, 109, 129, 132, 136, 142)
389	***Protoperidinium leonis*** (Pavill.) Balech = *Peridinium leonis* Pavill.	**2, 6, 8, 9, 11, 14, 27, 50, 125, 126, 130, 132, 142, 144** (7, 20, 51)
390	***Protoperidinium leonis* var. *concavilaterale*** (Kisselev) Krachmalny	**14, 27, 126**
391	***Protoperidinium longipes*** Balech	**25, 27, 35, 132, 142**
392	***Protoperidinium longispinum*** (Kof.) Balech = *Peridinium longispinum* Kof.	**2, 9, 12, 14, 27, 126, 132, 142** (136)
393	***Protoperidinium marielebouriae*** (Paulsen) Balech	**7, 9, 33, 142**
394	***Protoperidinium mediterraneum*** (Kof.) Balech	**33, 142**
395	***Protoperidinium mite*** (Pavill.) Balech = *Peridinium granii* f. *mite* (Pavill.) J. Schiller	**14, 126, 129, 132, 142** (8, 10, 15, 100)
396	***Protoperidinium monovelum*** (T.H. Abé) Balech = *Peridinium monolevum* T.H. Abé	(136)
397	***Protoperidinium nudum*** (Meunier) Balech	**27, 132, 142**
398	***Protoperidinium oblongum*** (Auriv.) Parke & J.D. Dodge	**9, 12, 26, 129, 130, 142, 143**
399	***Protoperidinium oceanicum*** (Vanhöffen) Balech = *Peridinium oceanicum* Vanhöffen	**2, 9-11, 14, 19, 27, 33, 50, 99, 108, 126, 129, 132, 142** (1, 6, 8, 15, 18, 38, 51, 54, 55, 58, 67, 72, 73, 89, 92, 105, 109)
400	***Protoperidinium ovatum*** C.H.G. Pouchet = *Peridinium globulus* var. *ovatum* (C.H.G. Pouchet) J. Schiller; *Protoperidinium globulus* var. *ovatum* (C.H.G. Pouchet) Balech	**126, 132, 142, 144** (1, 8, 14, 15, 23, 93; 2, 10, 14, 19, 27)
401	***Protoperidinium ovum*** (J. Schiller) Balech	**34**
402	***Protoperidinium pallidum*** (Ostenf.) Balech = *Peridinium pallidum* Ostenf.	**2, 9-12, 14, 15, 27, 50, 99, 108, 125-127, 129, 130, 132, 136, 142, 144** (1, 4, 6, 7, 18, 51, 54, 55, 58, 72, 73, 74, 94, 105, 109)
403	***Protoperidinium parthenopes*** Zingone & Montresor	**111**
404	***Protoperidinium paulsenii*** (Pavill.) Balech	**130**
405	***Protoperidinium pedunculatum*** (F. Schütt) Balech = *Peridinium pedunculatum* F. Schütt	**2, 9-11, 14, 27, 126, 129, 132, 136, 142** (1, 4, 7, 8, 15, 18, 21, 51, 54, 55, 56, 58, 93, 105)
406	***Protoperidinium pellucidum*** Bergh = *Peridinium pellucidum* (Bergh) F. Schütt	**2, 3, 9-12, 14, 15, 19, 20, 25-27, 33-35, 50, 57, 99, 108, 125-127, 129, 130, 132, 136, 139, 142, 144** (1, 4-8, 18, 21, 49, 51, 54, 55, 58, 72, 73, 85, 89, 92, 101, 105, 109)
407	***Protoperidinium pentagonum*** (Gran) Balech = *Peridinium pentagonum* Gran	**2, 9-11, 14, 25, 27, 50, 99, 108, 125, 126, 129, 132, 136, 142, 144** (1, 6-8, 15, 18, 20, 38, 49, 51, 54, 55, 72-74, 85, 86, 93, 105, 109, 116, 117)
408	***Protoperidinium ponticum*** Vershinin & Morton	**80, 111, 126, 131, 142**
409	***Protoperidinium punctulatum*** (Paulsen) Balech	**7, 9, 25, 108, 125, 142**

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410	***Protoperidinium pyriforme*** (Paulsen) Balech = *Peridinium pyriforme* Paulsen	**2, 9, 11, 14, 15, 25, 27, 35, 126, 108, 132, 136, 142** (1, 4, 6, 7, 23, 67)
411	***Protoperidinium pyriforme* subsp. *breve*** (Paulsen) Balech = *Peridinium breve* (Paulsen) Paulsen	**142** (4-6, 8, 10, 21, 26, 38, 49, 136)
412	***Protoperidinium quarnerense*** (Schröd.) Balech = *Peridinium globulus* var. *quarnerense* Schröd.; *Protoperidinium globulus* var. *quarnerense* (Schröd.) Krachm.	**10, 11, 24, 126, 132, 136, 142** (1, 23, 89; 14, 27, 136)
413	***Protoperidinium sinaicum*** (Matzen.) Balech = *Peridinium sinaicum* (Matzen.) Balech	**2, 9, 14, 126, 131, 142** (38, 51, 85)
414	***Protoperidinium solidicorne*** (Mangin) Balech = *Peridinium solidicorne* Mangin	**2, 9-12, 14, 20, 27, 50, 126, 129, 132, 142, 144** (1, 4-8, 15, 18, 21, 51, 54, 55, 58, 94, 105, 136)
415	***Protoperidinium spiniferum*** Balech	**12, 14, 19, 27, 50, 126, 132, 142, 144**
416	***Protoperidinium steinii*** (Jörg.) Balech = *Peridinium steinii* Jörg.; *Peridinium michaelis* Ehrenb.	**2, 9-12, 14, 15, 19, 20, 25-27, 34, 50, 57, 68, 99, 108, 125-127, 129, 130, 132, 136, 142, 144** (1, 3, 4, 6-8, 18, 21, 22, 38, 49, 51, 55, 58, 63, 67, 72-74, 78, 84-86, 89, 92, 94, 105, 109, 116, 117; 13, 18, 22)
417	***Protoperidinium subinerme*** (Paulsen) A.R. Loebl. = *Peridinium subinerme* Paulsen	**2, 9-11, 14, 19, 25, 26, 50, 125, 126, 129, 130, 142, 144** (1, 5-7, 15, 18, 58, 72, 73, 109)
418	***Protoperidinium thorianum*** (Paulsen) Balech = *Peridinium thorianum* Paulsen	**9, 10, 19, 125, 129, 142** (6)
419	***Protoperidinium tuba*** (J. Schiller) Balech = *Peridinium tuba* J. Schiller	(10)
420	***Protoperidinium verrucosum*** (Meunier) Balech = *Gymnodinium fusus* F. Schütt; *Peridinium verrucosum* Meunier	(20)
421	***Pseliodinium fusus*** (F. Schütt) Gómez = *Gymnodinium fusus* F. Schütt; *Gyrodinium falcatum* Kof. & Swezy	(1, 2, 4, 8, 14, 19, 21, 23, 26, 27, 34, 49, 84, 89, 92, 94, 100, 126, 129, 132, 136, 142; 9)
422	***Pseliodinium vaubanii*** Sournia	10
423	***Ptychodiscus noctiluca*** F. Stein	**2, 6, 9, 10, 11, 142**
424	***Pyrocystis elegans*** Pavill.	**9, 10, 25, 99, 142**
425	***Pyrocystis fusiformis*** Wyville-Thompson	**7, 131, 142**
426	***Pyrocystis hamulus*** Cleve	**38, 131**
427	***Pyrocystis lunula*** (F. Schütt) F. Schütt = *Diplodinium lunula* (F. Schütt) G.A. Klebs	**1, 9, 10, 14, 26, 51, 84, 85, 117, 126, 129, 142** (18)
428	***Pyrocystis pseudonoctiluca*** Wyville-Thompson = *Pyrocystis noctiluca* G. Murr. & Haeckel	**38** (2, 10, 24, 129, 131, 142)
429	***Pyrophacus horologium*** F. Stein	**1, 4, 6-11, 14, 15, 18, 20, 25, 27, 34, 35, 49, 54, 55, 58, 67, 72-75, 84, 85, 89, 92, 94, 99, 101, 105, 108, 109, 126, 129, 132, 136, 142, 144**
430	***Pyrophacus steinii*** (J. Schiller) Wall & Dale = *Pyrophacus horologicum* var. *steinii* J. Schiller	**2, 7, 9, 11, 99, 142** (14, 15, 24, 126)
431	***Scaphodinium mirabile*** Margalef	**9, 91, 112, 130, 142**

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	Taxa	References
432	***Scrippsiella acuminata*** (Ehrenb.) Kretschmann, Elbrächter, Zinssmeister, S. Soehner, Kirsch, Kusber & Gottschling = *Scrippsiella trochoidea* (F. Stein) A.R. Loebl.; *Glenodinium trochoideum* F. Stein; *Peridinium trochoideum* (F. Stein) Lemmerm.; *Goniodoma acuminatum* (Ehrenb.) F. Stein	**129, 144** (2-4, 6, 8-12, 14, 20, 25-27, 33-36, 57, 68, 81, 82, 83, 94, 99, 100, 108, 111, 118-120, 125-127, 129, 130, 132, 136, 139, 142; 18, 54; 1, 5, 7, 19, 21, 23, 38, 51, 84, 85, 93, 105, 110, 116, 117, 123; 9, 18, 22, 59, 101)
433	***Scrippsiella sweeneyae*** Balech & A.R. Loebl.	**11, 142**
434	***Spatulodinium pseudonoctiluca*** (C.H.G. Pouchet) J. Cachon & M. Cachon = *Gymnodinium pseudonoctiluca* C.H.G. Pouchet; *Gymnodinium conicum* Kof. & Swezy; *Gymnodinium viride* M. Lebour	**9, 11, 14, 27, 47, 91, 126, 129, 132, 135, 142, 144** (2, 21, 34; 6, 9, 142; 20)
435	***Sphaerodinium limneticum*** Wołosz.	***27, 132, 142***
436	***Spiniferodinium palustre*** (A.J. Schill.) Kretschmann & Gottschling = *Gymnodinium palustre* A.J. Schill.	(20)
437	***Syndinium turbo*** Chatton	**136**
438	***Thecadinium kofoidii*** (Herdman) J. Schiller	**142**
439	***Torodinium robustum*** Kof. & Swezy	**1, 9-12, 14, 19, 23, 78, 126, 129, 130, 142, 144**
440	***Torodinium teredo*** (C.H.G. Pouchet) Kof. & Swezy	**2, 12**
441	***Tovellia coronata*** (Wołosz.) Moestrup, Lindberg & Daugbjerg = *Gymnodinium coronatum* Wołosz.	**11, 144**
442	***Triadinium polyedricum*** (C.H.G. Pouchet) J.D. Dodge = *Goniodoma polyedricum* (C.H.G. Pouchet) Jörg.	(1, 2, 4, 6-9, 11, 14, 15, 18, 19, 22, 27, 67, 94, 126, 129, 132, 136, 142)
443	***Unruhdinium penardii*** (Lemmerm.) Gottschling = *Glenodinium penardii* Lemmerm.; *Peridiniopsis penardii* (Lemmerm.) Bourr.	**144** (8, 100; 14, 27, 126, 132, 133, 134, 137, 142, 143)
444	***Warnowia maculata*** (Kof. & Swezy) Er. Lindem.	**11, 27, 47, 132, 142**
445	***Warnowia schuettii*** (Kof. & Swezy) J. Schiller	**27, 33, 47, 132, 142**
446	***Woloszynskia neglecta*** (A.J. Schill.) Wyville-Thompson = *Gymnodinium neglectum* (A.J. Schill.) Er. Lindem.	**9, 142, 144** (6, 21)
447	***Woloszynskia pascheri*** (Suchlandt) Stosch	**27, 132, 142, 144**

References

1 Ivanov A.I. Characteristics of the qualitative composition of Black Sea phytoplankton. In: *Issledovaniya planktona Chernogo i Azovskogo morej [The study of plankton of the Black Sea and the Sea of Azov]*. Kiev: Naukova Dumka, 1965. Pp. 7–35.

2 Mikaelyan A.S., Senichkina L.G., Pautova L.A., Georgieva L.V., Dyakonov V. *Cell volumes of phytoplankton of the Black Sea*. Database. 2008.

3 Polikarpov I.G., Saburova M.A., Manzhos T.V., Pavlovskaya T.V., Gavrilova N.A. Microplankton biological diversity in the Black Sea coastal zone near Sevastopol (2001–2003). In: *Modern condition of biological diversity in near–shore zone of Crimea (the Black Sea sector)*. Sevastopol: EKOSI-Gidrofizika, 2003. Pp. 16–42.

4 Petranu A. *Black Sea biological diversity, Romania. Black Sea Environmental. Ser. 4.* New York: Unit. Nat. Publ., 1997. 314 p.

5 Komakhidze A., Mazmanidi N. *Black Sea biological diversity, Georgia. Black Sea Environmental. Ser. 8.* New York: Unit. Nat. Publ., 1998. 167 p.

6 Konsulov A. *Black Sea biological diversity, Bulgaria. Black Sea Environmental. Ser. 5.* New York: Unit. Nat. Publ., 1998. 161 p.

7 Öztürk B. *Black Sea biological diversity, Turkey. Black Sea Environmental. Ser. 9.* New York: Unit. Nat. Publ., 1999. 144 p.

8 Zaitsev Y.P., Alexandrov B.G. *Black Sea biological diversity, Ukraine. Black Sea Environmental. Ser. 7.* New York: Unit. Nat. Publ., 1998. 351 p.

9 Gómez F., Boicenco L. An annotated checklist of dinoflagellates in the Black Sea. *Hydrobiologia*. 2004. 517: 43–59.

10 Senicheva M.I. Species diversity, seasonal and annual variability of planktonic microalgae near Crimea coast. In: *Chernomorskiye mikrovodorosli: problemy sokhraneniya bioraznoobraziya i primeneniya biotekhnologiy [The Black Sea microalgae: problems of biodiversity conservation and biotechnological applications]*. Sevastopol: Inst. Biol. South. Seas NAS Ukraine, 2008. Pp. 5–18.

11 Moncheva S. *Species lists based on sampling identifications and literature. Bulgarian waters (IO-BAS, unpubl. data).* 2010.

12 Yasakova O.N. *Fitoplankton severo-vostochnogo poberezh'ya Chernogo morya, 1995−2009 gg. [Phytoplankton of the northeastern Black Sea, 1995–2009] (unpubl. data).* 2010.

13 Pereyaslavtseva S.M. [The Black Sea *Protozoa*]. *Mémoires de la Soc. Impériale des Natur. de la Nouvelle-Russie.* 1886. 10(2): 79–114.

14 Krakhmalnyy A.F., Panina Z.A., Krakhmalnyy M.A. *Dinophyta*. In: *Algae of Ukraine: Diversity, nomenclature, taxonomy, ecology and geography, Vol. 1. Cyanoprocaryota, Euglenophyta, Chrysophyta, Xanthophyta, Raphidophyta, Phaeophyta, Dinophyta, Cryptophyta, Glaucocystophyta, Rhodophyta.* P.M. Tsarenko, S.P. Wasser, E. Nevo (Eds). Ruggell, Liechtenstein: A.R.A. Gantner Verlag K.-G., 2006. Pp. 470–532.

15 Kiselev I.A. *Pantsirnye zhgutikonostsy (Dinoflagellata) moreji presnyh vod SSSR [Thecate flagellates (Dinoflagellata) of the seas and freshwater bodies of the USSR].* Moscow; Leningrad: USSR Acad. Sci. Publ., 1950. 280 p.

17 Boicenco L. Updated list from Bodeanu N. 1987–88. Structure et dynamique de l'algoflore unicellulaire dans les eaux du littoral Roumain de la mer Noire. *Recher. Mar.* 1987–1988. 20/21: 19–250.

18 Morozova-Vodyanitskaya N.V. [Phytoplankton of the Black Sea: Pt 1]. *Trudy Sevastop. Biol. St.* 1948. 6: 39–72.

19 Gvarishvili T. *Phytoplankton species composition along the Georgian Black Sea coast (unpubl. data).* 2010.

20 Dereziuk N.P. List of phytoplankton species observed in the water area near Zmiinyi Island in 2004–2007. In: *Ostrov Zmiinyi. Ekosistema pribrezhnykh vod [Zmiinyi Island. Ecosystem of coastal waters].* V.A. Smyntyna, V.I. Medinets, I.O. Suchkov et al. (Eds). Odessa: Astroprint, 2008. Pp. 208–218.

21 Bryantseva Yu.V. *Izmenchivost strukturnykh kharakteristik fitoplanktona Chernogo morya [Variability of the Black Sea phytoplankton structural characteristics]*. Ph.D. Thesis, Sevastopol, 2000. Pp. 171–178.

22 Reinhard L.V. [Phytoplankton of the Black Sea, Kerch Strait, Bosphorus Strait and the Sea of Marmara]. *Trudy Obshchestva Ispytatelei Prirody pri kharkovskom Universitete [Travaux de la Société des naturalists l'Université Impériale de Kharkov]*. 1909. 43: 295–323.

23 Morozova-Vodyanitskaya N.V. [Phytoplankton of the Black Sea. Pt II]. *Trudy Sevastop. Biol. St.* 1954. 8: 11–99.

24 Senichkina L.G., Altukhov D.A., Kuzmenko L.V., Georgieva L.V., Kovaleva T.M., Senicheva M.I. Species diversity of the Black Sea phytoplankton in the southeastern coast of Crimea. In: *Karadag: istoriya, biologiya, arkheologiya: Sbornik statey, posvyashchennykh 85-letiyu nauchnoy stantsii Karadag [Karadag: History, biology, archaeology. Collection of papers dedicated to the 85th anniversary of the Karadag Scientific Station]*. Simferopol: Sonat, 2001. Pp. 119–125.

25 Turkoglu M., Koray T. Phytoplankton species succession and nutrients in the southern Black Sea (Bay of Sinop). *Turkish J. Bot*. 2002. 26: 235–252.

26 Bryantseva Yu.V. *Baza dannykh monitoringa fitoplanktona Sevastopol'skoy bukhty [The Sevastopol Bay phytoplankton monitoring database] (unpubl. data).* 2016.

27 Nesterova D.A., Terenko L.M., Terenko G.V. Phytoplankton species list. In: *The northwestern Black Sea: Biology and ecology.* Y.P. Zaytsev, B.G. Alexandrov (Eds). Kiev: Naukova Dumka, 2006. Pp. 557–576.

30 Krakhmalny A.F. *Prorocentrum dentatum* (*Dinoflagellata*) Stein – new for the Black Sea species of *Dinoflagellata*. *Vestnik Zoologii*. 2005. 39(6): 61–64.

31 Velikova V., Larsen J. The *Prorocentrum cordatum/Prorocentrum minimum* taxonomic problem. *Grana*. 1999. 38: 108–112.

33 Vershinin A.O., Moruchkov A.A., Leighfield T., Sukhanova I.N., Pan'kov S.L., Morton S.L., Ramsdell J.S. Potentially toxic algae in the coastal phytoplankton of the northeastern Black Sea in 2001–2002. *Oceanology*. 2005. 45(2): 224–232.

34 Eker E. *Abundance and biomass of micro and nanophytoplankton in the northwestern and southern Black Sea in 1995.* MSc Thesis. Erdemli, Icel, Turkey, 1998.

35 Nesterova D.A. Phytoplankton of the dry estuary and contiguous part of the Black Sea. *Ekologicheskaya bezopasnost pribrezhnoyi shelfovoy zony i kompleksnoye ispolzovaniye resursov shelfa*. 2002. 1(6): 328–337.

36 Ryabushko L.I. *Potentsialno vrednyye mikrovodorosli Azovskogo i Chernomorskogo basseyno [Potentially harmful micro-algae of the Sea of Azov and Black Sea basin]*. Sevastopol: EKOSI-Gidrofizika, 2003. 288 p.

38 Georgieva L.V. *Fitoplankton prolivov i blizhayshikh vod Sredizemnomorskogo basseyna [Phytoplankton of straits and nearest waters of the Mediterranean Basin]*. Ph.D. Thesis. Sevastopol, 1979.

39 Kuzmenko L.V. Two new *Dinoflagellata* species new for the Black Sea. *Novosti sistematiki nizshikh rasteniy*. 1966. 3: 51–54.

42 Senicheva M.I. New and rare species of the diatoms and dinoflagellates in the Black Sea. *Ekol. Morya*. 2002. 62: 25–29.

45 Koray T. Potentially toxic and harmful phytoplankton species along the coast of the Turkish Seas. In: *Harmful Algae* 2002. K.A. Steidinger, J.H. Landsberg, C.R. Tomas, G.A. Vargo (Eds). St. Petersburg; Florida, USA: Florida Fish and Wildlife Conservation Commis., Florida Inst. Oceanography and Intergovernmental Oceanographic Commis. UNESCO, 2004. Pp. 335–337.

47 Terenko L.M. New dinoflagellate (*Dinoflagellata*) species from Odessa Bay of the Black Sea. *Oceanol. and Hydrobiol. Stud*. 2005. 34 (Suppl. 3): 205–216.

48 Krakhmalny A.F. *Gymnodinium radiatum* Kofoid et Swezy (*Gymnodiniales, Dinophyta*): new species for Black Sea flora. *Ukr. Bot. J.* 2001. 58(5): 593–595.

49 Skolka V.H., Roban A. La repartition et la dynamique du phytoplancton sur la plateforme continental eroumaine au cours des années 1980–1981. *Recher. Mar*. 1989. 22: 147–171.

50 Sukhanova I.N., Cheban A.E. Heterotrophic phytoplankton of the Black Sea in the early spring development of the phyto-cenosis. *Oceanology*. 1990. 30: 724–792.

51 Bityukov E.P., Evstigneev P.V., Tokarev Y.N. Luminescent *Dinoflagellata* of the Black Sea impacted by anthropogenic factors. *Gidrobiol. J*. 1993. 29: 27–34.

52 Eker-Develi E., Velikova V. New record of a dinoflagellate species, *Lessardia elongata* in the Black Sea. *Mar. Biodivers. Records.* 2009. 2: e104.

54 Stroikina V.G. [Black Sea phytoplankton near Karadag and its seasonal dynamics]. *Trudy Karadag. Biol. St.* 1950. 10: 38–52.

55 Stroikina V.G. [Sur la composition du phytoplancton de la mer Noire près de Karadagh]. *Trudy Karadag. Biol. St.* 1940. 6: 141–144.

56 Nikitin V.N. The plankton of Batumi Bay and its annual quantitative changes. In: *Sbornik statey, posvyashchennykh nauch-noy rabote pochetnogo chlena Akademii nauk SSSR, zasluzhennogo deyatelya nauki i tekhniki N M. Knipovicha [Collection of papers dedicated to scientific work of honorary member of the USSR Academy of Science, honoured master of sciences and engineering N.M. Knipovich]*. Moscow: VNIRO, 1939. Pp. 63–86.

57 Manzhos L.A. Abundance and distribution of phytoplankton in the Feodosia coastal waters in December 2006. *Ekol. Morya.* 2008. 75: 16–22.

58 Mikhaylovskaya Z.N. [Phytoplankton of Novorossiysk Bay and its vertical distribution]. *Trudy Novoros. Biol. St.* 1936. 2(1): 37–54.

59 Zernov S.A. [To the issue of annual changes in the Black Sea plankton near Sevastopol]. *Bull. de l'Acad. impériale des sci. de St.-Pétersbourg.* 1904. 20(4): 119–134.

63 Senichkina L.G. Phytoplankton of the northwestern Black Sea in winter]. In: *Sezonnye izmeneniya chernomorskogo planktona [Seasonal dynamics of Black Sea phytoplankton].* Yu.I. Sorokin, V.I. Vedernikov (Eds). Moscow: Nauka, 1983. Pp. 55–65.

67 Nezlin N.P., Zernova V.V. *[Phytoplankton species composition in the northeastern Black Sea and size characteristic of some representatives]*. Moscow: Nauka, 1983. Pp. 6–12.

68 Nesterova D.A., Terenko L.M. Karkinit Bay phytoplankton in September 2008. *Ekologicheskaya bezopasnost pribrezhnykh i shelfovykh zon i kompleksnoye ispolzovaniye shelfovykh resursov.* 2009. 20: 293–300.

69 Roukhiyajnen M.I. De flagellatis nonnullis maris Nigrinotula.*Novosti sistematiki nizshikh rasteniy [Novitates systematicae plantarum non vascularium]*. 1971. 8: 3–9.

72 Petrova V.J. Phytoplankton along the Bulgarian coast of the Black Sea during the 1954–1957 period. *Bull. del'Institut Central de Recher. Sci. de Pisciculture et de Pêcherie (Varna)*. 1963. 3: 31–60.

73 Petrova V.J. Die Plankton *Dinoflagellaten* der Bulgarischen Schwarz-Meer Küste. *Izvestiya na nauchno-izsled. inst. za ribno stopanstvo i okeanografiya (Varna)*. 1957. 1: 113–124.

74 Skolka V.H., Bodeanu N. Study of phytoplankton in near Bosphorus Black Sea area. *Rev. Biol*. 1963. 8(1): 89–104.

75 Pitsyk G.K. [On quantitative development and horizontal distribution of phytoplankton in western part of the Black Sea]. *Trudy Azovo-chernomor. nauchno-issled. inst. morskogo rybnogoho khozyaystva i okeanografii*. 1950. 14: 215–245.

77 Vershinin A.O., Orlova T.Y. Toxic and harmful algae in coastal waters of the Russian federation. *Oceanology.* 2008. 48(4): 568–582.

78 Senicheva M.I. [Composition and quantitative development of phytoplankton in the neritic zone of the Sevastopol area during autumn-winter 1968–1969]. *Biol. Morya.* 1971. 24: 3–12.

79 Yasakova O.N. The new species of phytoplankton in the northeastern part of the Black Sea. *Rus. J. Biol. Invas.* 2010. 4: 90–97.

80 Vershinin A.O., Morton S.L. *Protoperidinium ponticum* sp. nov. (*Dinophyceae*) from the northeastern Black Sea coast of Russia. *Bot. Mar.* 2005. 48: 244–247.

81 Terenko G., Kovalyshyna S., Grandova M. Long-term structural changes in the phytoplankton community of the northwestern Black Sea. In: *The 3rd Biannual Black Sea Scientific Conference and the UP-GRADE BS-SCENE Project Joint Conference*: Abstracts (Odessa, 1–4 Nov., 2011). Odessa, 2011. P. 192.

82 Velikova V., Moncheva S., Petrova D. Phytoplankton dynamics and red tides (1987–1997) in the Bulgarian Black Sea. *Water Sci. and Technol.* 1999. 39(8): 27–36.

83 Feyzioğlu A.M., Oğut H. Red tide observations along the eastern Black Sea coast of Turkey. *Turkish J. Bot.* 2006. 30: 375–379.

84 Denisenko V.V. [Phytoplankton of the Adriatic, Ionian, Aegean and Black seas in August 1958]. *Trudy Sevastop. Biol. St.* 1964. 17: 13–20.

85 Sukhanova I.N., Belyaeva T.V. [Species composition, distribution and diurnal changes in phytoplankton of the Black Sea in October 1978]. In: *Ekosistemy pelagiali Chernogo morya [Pelagic ecosystems of the Black Sea]*. M.E. Vinogradov (Ed.). Moscow: Nauka, 1980. P. 65–91.

86 Bologa A.S., Skolka H.V., Frangopol P.T. Annual cycle of planktonic primary productivity off the Romanian Black Sea coast. *Mar. Ecol. Progr. Ser.* 1984. 19: 25–32.

87 Lebedev V. Observations sur les elements et les variations du plankton superficiel du Golfe D'Odessa. *Notes de la Soc. Impériale de l'agriculture du sud de la Russie.* 1916. 87(1): 102–147.

89 Ivanov A.I. [Mass development of phytoplankton in the northwestern Black Sea in 1954–1956]. *Nauch. Zap. Odes. Biol.* St. 1959. 1: 6–33.

90 Usachev P.I. [Notes on phytoplankton of the northwestern Black sea]. In: *Dnevnik vsesoyuznogo s'ezda botanikov v Leningrade v yanvare 1928 g. [Diary of the All–Union Congress of Botanists, Leningrad, January 1928]*. Leningrad, 1928. Pp. 163–164.

91 Stoyanova A.P. New representatives of *Noctilucales* in the Bulgarian Black Sea coastal water. *Compt. Ren. de'l Acad. Bul. Des Sci.* 1999. 52(9–10): 119–122.

92 Ivanov A.I. [Peculiarities of the taxonomic composition and quantitative distribution of the phytoplankton of the northwestern Black Sea]. *Trudy Vsesoyuz. Gidrobiol. Obshch. (USSR)*. 1960. 10: 182–196.

93 Ivanov A.I. [Notes on phytoplankton taxonomic composition in the northwestern Black Sea]. *Nauch. Zap. Odes. Biol. St.* 1964. 5: 51–54.

94 Bodeanu N. Structure et dynamique d'algoflore unicellulaire dans les eaux du littoral roumain de la mer Noire. *Recher. Mar.* 1987–1988. 20/21: 19–250.

95 Krakhmalny A.F., Terenko G.V. *Prorocentrum ponticus* Krachmalny & Terenko sp. nov., a new species of *Dinophyta* from the Black Sea. *Algologia*. 2002. 12(3): 371–375.

98 Roukhiyajnen M.I. De habitatione *Glenodinii foliacei* Stein in mari Nigro notula. *Novosti sistematiki nizshikh rasteniy*. 1970. 7: 23–26.

99 Baytut O., Gonulol A., Koray T. Temporal variations of phytoplankton in relation to eutrophication in Samsun Bay, southern Black Sea. *Turkish J. Fisher. and Aquat. Sci.* 2010. 10: 363–372.

100 Nesterova D.A. Variability of specific surface of cells of phytoplankton in the western Black Sea. *Algologia.* 2003. 13(1): 16–25.

101 Minkevich R.K. Rapport préliminaire d'un séjour à la station biologique de Sevastopol pendant l'été de 1899. *Travaux de Soc. Impériale des Natur. de St. Pétersbourg.* 1899. 30(1).

103 Geineman V.A. [Some data on the phytoplankton of the Black Sea]. *Vestnik Ryboprom.* 1903. 12: 661–665.

104 Zernov S.A. [To the problem of the study of life in the Black Sea]. *Bull. de l'Acad. des Sci. des St. Pétersbourg.* 1913. 32(1): 1–299.

105 Prokudina L.A. [Catalogue of Black Sea fauna and flora near the Karadag Biological Station]. *Trudy Karadag. Biol. St.* 1952. 12: 116–127.

106 Terenko L.M. *Gymnodinium uberrimum* (Allman) Kof. et. Sw. (*Dinophyta*) from the littoral of the Black Sea. *Algologia.* 2002. 12(1): 142–146.

107 Moncheva S., Doncheva V., Kamburska L. On the long–term response of harmful algal blooms to the evolution of eutrophication off the Bulgarian Black Sea coast: are the recent changes a sign of recovery of the ecosystem — the uncertainties. In: *Proceedings of the Ninth International Conference on Harmful Algal Blooms. Hobart, Australia, 7–l1 Febr., 2000.* G.M. Hallegraeff, S.I. Blackburn, C.J. Bolch, R.J. Lewis (Eds). Paris, UNESCO, 2000. Pp. 177–182.

108 Tas S., Okus E. Investigation of qualitatively phytoplankton in the Turkish coasts of the Black Sea and a species list. *J. Black Sea/Mediterranean Environ.* 2006. 12: 181–191.

109 Valkanov A. Catalogue of our Black Sea fauna. *Proc. Mar. Biol. St. in Varna.* 1957. 19: 1–62.

110 Zaremba N.V. Changes in phytoplankton community in the southern Kerch Strait in 2003–2008. The main results of complex research in the basins of the Azov and Black seas and in the world ocean. *Proc. YugNIRO.* 2011. 49: 72–79.

111 Vershinin A.O., Velikova V.N. New records and commonly misidentified dinoflagellates from the Black Sea. In: *Modern problems of algology: abstracts of the International Scientific Conference and the VII Workshop on Marine Biology (9–13 June, 2008, Rostov-on-Don).* Rostov-on-Don, 2008. P. 448.

112 Gavrilova N.A. On findings of noctilucoid dinoflagellate *Scaphodinium mirabile* Margalef, 1963 in the northwestern Black Sea and the coastal waters of Crimea. *Mar. Ecol. J.* 2012. 21(2): 64.

113 Yasakova O.N., Kreneva E.V. ”Red high tide” in Novorossyisk Bay in July 2011 caused by *Heterocaspa rotundata* (*Dinophyceae, Heterocapsaceae*), *Myrionecta rubra*, and *Mesodinium pulex* (*Ciliophora, Litostomatea*). *Mar. Ecol. J.* 2012. 11(2): 9.

115 Krakhmalny A.F. New nomenclature and taxonomical combinations of *Dinophyta*. *Int. J. Algae.* 2011. 13(3): 301–304.

116 Senichkina L.G. [Phytoplankton of clear and sewage-contaminated waters near Yalta]. *Biol. Morya.* 1973. 28: 135–150.

117 Georgieva L.V. [Phytoplankton of Bosporus region of the Black Sea: qualitative composition and quantitative development of phytoplankton]. In: *Vodoobmen cherez Bosfor i ego vliyanie na gidrologiyu i biologiyu Chernogo morya [Water exchange through Bosphorus and its influence on hydrology and biology of the Black Sea]*. V.A. Vodjanitsky, M.A. Dolgopolskaya (Eds). Kiev: Naukova Dumka, 1969. Pp. 184–195.

118 Bodeanu N., Ruta G. Phytoplankton structure and dynamics in the contingency zone between the waters of the Danube – Black Sea canal and the sea waters. *Recher. Mar.* 1994–1995. 27–28: 81–99.

119 Bryantseva Yu.V. et al. State of the phytoplankton near Kerch strait after technogenic accident of 2007. In: *IV International conference Modern problems of Azov and Black seas region ecology (Kerch, 8–9 Oct., 2008)*. Kerch, 2008. Pp. 76–81.

120 Bryantseva Yu.V. et al. State of the phytoplankton near Kerch strait in August 2009. In: *V International conference Modern problems of Azov and Black seas region ecology (Kerch, 8–9 Oct., 2009)*. Kerch, 2009. Pp. 26–32.

123 Zaremba N.B. Phytoplankton community of the southern Kerch Strait during late spring period in 2009–2012. *YugNIRO Proc.* 2013. 51: 40–43.

125 Özdemyr G., Ak O. Qualitative and quantitative changes of phytoplankton in the South East Black sea (Trabzon coasts). 2012. *Aquacult. Stud.* 12(4): 13–25.

126 Krakhmalny A.F. *Dinophyta of Ukraine (illustrated book for identification).* P.M. Tsarenko (Ed.). Kiev: Alterpress, 2011. 444 p.

127 Yasakova O.N. The annual dynamics of the phytoplankton in the Novorossiysk bay in 2007. *Mar. Ecol. J.* 2011. 12(1): 92–102.

128 Krakhmalny A.F., Terenko G.V. New form of *Prorocentrum micans* Ehr. (*Prorocentrales, Dinophyta*) from the plankton of the Black Sea. *Int. J. Algae.* 2002. 4(4): 76–80.

129 Bryantseva Yu.V., Krakhmalny A.F., Velikova V., Sergeeva O. Dinoflagellates in the Sevastopol Coastal Zone (Black Sea, Crimea). *Int. J. Algae.* 2016. 18(1): 21–32.

130 Feyzioğlu A.M., Şahin F. Phytoplankton in the Black Sea. In: *Black Sea Marine Environment: The Turkish Shelf.* M. Sezgin, L. Bat, D. Ürkmez, Arici E., Öztürk B. (Eds). *Turkish Mar. Res. Foundat.* 2017. 46: 148–167.

131 Shiganova T.A., Musaeva E.I., Lukasheva T.A., et al. Increase in findings of Mediterranean nonnative species in the Black Sea. *Rus. J. Biol. Invas.* 2012. 3(4): 255–280.

132 Terenko L.M. (2005). *Dinoflagellates of the northwestern Black Sea Coastal Zone: biodiversity and ecology.* Ph.D. Thesis. Appendix A. Sevastopol, 2005. Pp. 191–197.

133 Terenko G.V. The winter phytoplankton in the Odessa bay of the Black Sea. *Visnyk Ternop. Volodymyr Hnatiuk Nat. Ped. Univ. Ser. Biology.* 2015. 3–4(64): 633–636.

134 Terenko G.V. Dynamics of freshwater dinoflagellate *Peridiniopsis penardii* in Odessa bay of the Black Sea (Ukraine). *Visnyk Ternop. Volodymyr Hnatiuk Nat. Ped. Univ.* 2017. 3(70): 109–115.

135 Alexandrov B.G. Problem of aquatic organisms transportation by ships and some approaches for risk assessment of the new invasions. *Mar. Ecol. J.* 2004. 3(1): 5–17.

136 Cărăuş I. *Algae of Romania. A distributional checklist of actual algae.* Studii şi Cercetări (Biologie). Univ. Bacău. 7, 2002.Third revision. 2012. 809 p.

137 Derezyuk N.V., Konareva O.P., Soltys I.V. Summer phytoplankton blooms in water area of the Dniester Estuary (2003–2016). In: *Proceedings of International Conference “Transboundary Dniester River Basin Management: Platform for Co-operation and Current Challenges” (Tiraspol, Moldova, 26–27 Oct., 2017).* Tiraspol: Eco-TIRAS, 2017. Pp. 96–100.

138 Derezyuk N.V., Konareva O.P. Phytoplankton biodiversity in the Zmiinyi Island coastal waters. In: *Proceedings of the International scientific and practical conference "Ecological problems of the Black Sea" (Odessa, 30–31 Oct., 2008)*. Odessa, 2008. Pp. 100–104.

139 Terenko L.M., Terenko G.V. Dynamics of *Scrippsiella trochoidea* (Stein) Balech 1988 (*Dinophyceae*) blooms in Odessa Bay of the Black Sea (Ukraine). *Oceanol. and Hydrobiol. Stud.* 2009. 38: 107–112.

140 Terenko L.M., Terenko G.V. Species diversity of the plankton phytocenosis in the Odessa Bay of the Black Sea. *Ecol. Morya.* 2000. 52: 56–59.

141 Terenko L.M. The genus *Dinophysis* Ehrenb. (*Dinophyta*) in the coast of the Ukrainian Black Sea: species composition, distribution, dynamics. *Algologia*. 2011. 21(3): 346–357.

142 Terenko L.M. Species composition and distribution of *Dinophyta* in the Black Sea. *Algologia.* 2007: 17(1): 53–69.

143 Krachmalny A.F. *Peridinopsis cunningtoni* Lemmerm. – new species of the dinoflagellates (*Dinoflagellata*) for the Black Sea. *Mar. Ecol. J.* 2014. 13(3): 43–46.

144 Derezyuk N.V. Microalgae species of the Odessa Bay and Zmiinyi Island (unpubl. data). 2018.