The Seventeenth Session of the IOC-FAO Intergovernmental Panel on Harmful Algal Blooms (IPHAB-XVII)

Paris, March 18-20, 2025

Task Team on Algal Taxonomy

TTAT

Chair: Nina Lundholm (Denmark)

Main task: provide a curated and updated list of harmful microalgae

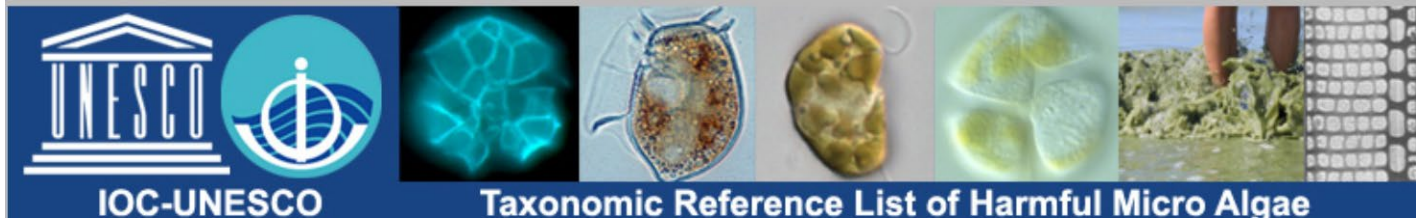
https://www.marinespecies.org/hab/

WoRMS- World Register of Marine Species

IOC-UNESCO Taxonomic Reference List of Harmful Micro Algae

- a product of the IOC Harmful Algal Bloom Programme and the World Register of Marine Species .

- ✓ provides the most up-to-date and accurate nomenclature
- ✓ a starting point for assessments of toxigenic microalgae

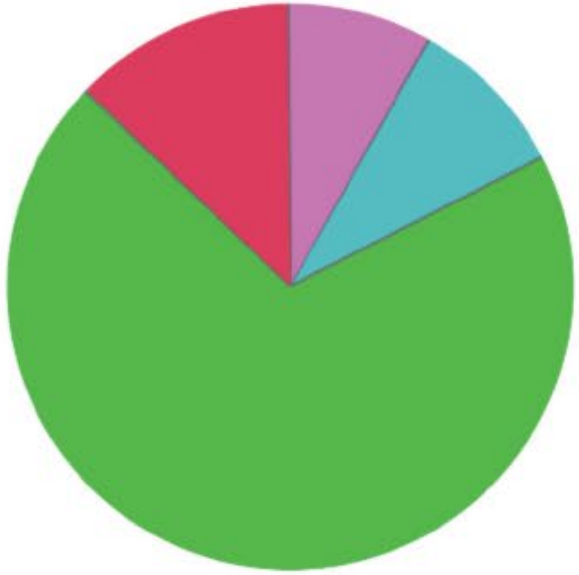


The list only includes **toxigenic species**

i.e. species that **may produce specific compounds (toxins)** that directly or indirectly **may** affect human health, as well as the health of natural and cultured marine animals

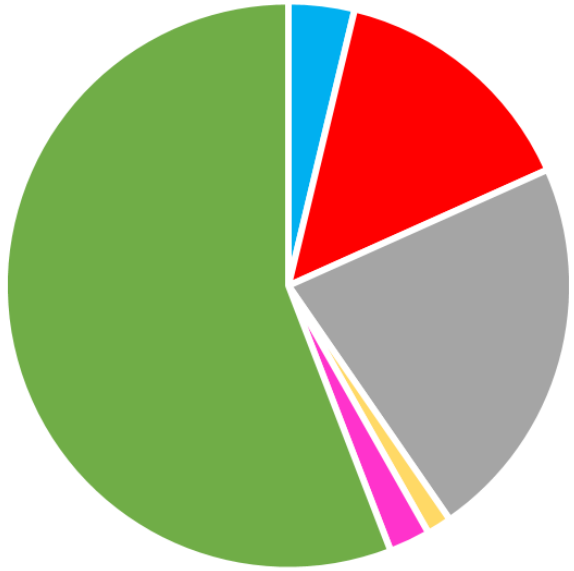
119 dinoflagellates
47 blue-green algae
31 diatoms
8 haptophytes
5 raphidophytes
3 dictyochophytes
Pelagophytes moved to grey list

2002

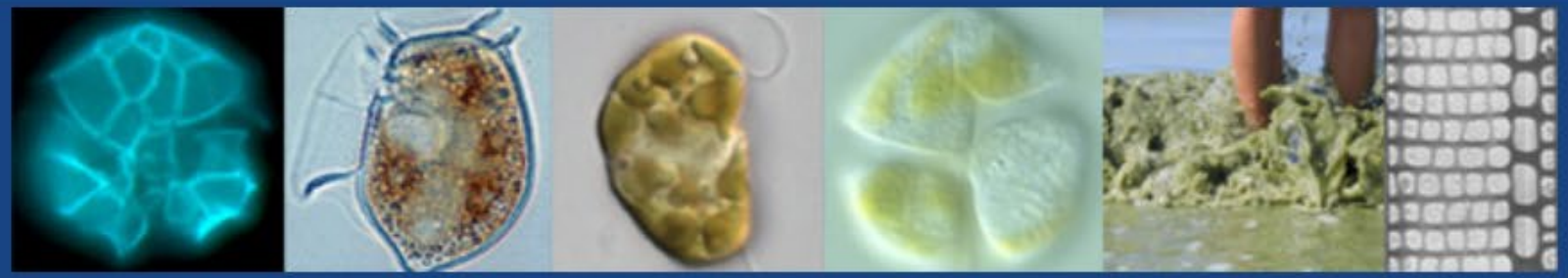


(83 species)

2025



(213 species)



ToR 1: modify the list, continuing the inclusion of **toxic cyanobacteria**,

ToR 9: identify **editors** within or external to the Task Team who will be responsible for validating, completing and updating the Reference List,

ToR 10: convene **online meetings** with Reference List Editors, TT members and a representative from WoRMS,

M. Iwataki (Japan), **Naked dinoflagellates**
S. Murray (Australia): **Amphidiniales**
C. Churro (Portugal), **Cyanobacteria**
L. Escalera (Spain), **Gonyaulacales**
Cecile Bernard (France), **Cyanobacteria**
K. Mertens (France), **Gonyaulacales**
J. Larsen (Denmark), **Dinophysiales**
M. Hoppenrath (Germany), **Prorocentrales**
R. Salas (Spain), **Thoracosphaerales**
Ø. Moestrup (Denmark), **Other flagellates**
U. Tillmann (Germany), **Amphidomataceae**
A. Zingone (Italy), **Dinophysiales**
N. Lundholm (Denmark) Chair, **Diatoms**

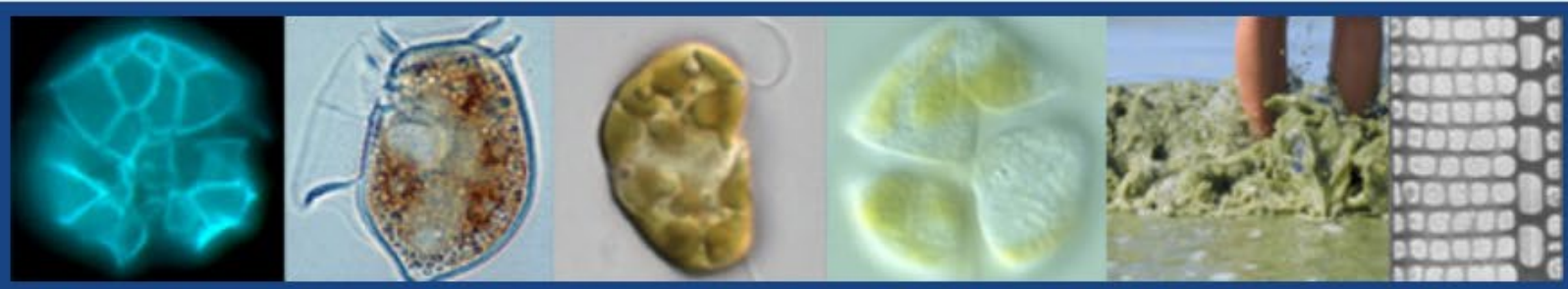
Leen Vandepitte, Stefanie Dekeyzer- **WorMS**

2021: Workshop in Hillerød, Denmark

Henrik Enevoldsen- **IOC**

Three online meetings each year

unesco
Intergovernmental Oceanographic Commission



Taxonomic Reference List of Harmful Micro Algae

Home | Literature | Log in

Diatoms | Haptophytes | Dinoflagellates | Raphidophyceans | Dictyochophyceans | Pelagophyceans | Cyanobacteria

Greylist | Harmful non-toxic

ToR 2: i
techniqu
selected
locality,

ToR 3: p
lacking

Greylist

Documentation for toxicity is lacking for the following species:

- *Prorocentrum micans* Ehrenberg, 1833
- *Halamphora coffeaeformis* (C.Agardh) Levkov, 2009
- *Aureococcus anophagefferens* Hargraves & Sieburth, 1988
- *Aureoumbra lagunensis* D.A.Stockwell, DeYoe, Hargraves & P.W.Johnson, 1997

New lists

ToR 4: develop lists of

a) harmful but non-toxic species **causing damages or killing of marine fauna** and
b) harmful but non-toxic species producing high biomass blooms, mucilages, foams and discolorations with impacts on human activities in the coastal zone (e.g. tourism, fisheries, recreation, and desalination plants),

List of non-toxigenic marine microalgal species associated with animal kills or health impairment

Version: 1.1, November 2024

- View the list
- Download the list (Excel format)

This list includes species **not known to produce toxins** that have been associated **with mortality or damage to marine organisms**. The list is meant to complement the IOC list of harmful species that produce toxic substances, with no overlap between the two lists. Therefore known **toxigenic species are not included in this list**, even in case the damage they caused was not due to their known toxins (e.g., they caused anoxia).

Non-toxigenic species causing harm other than to marine organisms' health, e.g., to recreational use of the sea, tourism, or other economic activities related to the sea (e.g. seawead cultivation) **are not included** and will be part of another list (in preparation).

The list only includes species responsible for **traceable cases**, i.e., harmful events reported in the literature (based on a non-exhaustive search) or in the IOC-ICES-PICES Harmful Event Database (HAEDAT).

The species reported to produce fish kills were the most abundant but not the only species found at the time of the event. Therefore, there is no certainty that those species were actually responsible for the animal kill. Exceptions are the repeated cases of mortalities associated with physical damage caused by spines, barbs, mucus or other specific mechanisms.

In addition to the 'Read me' and 'Quality Flag' explanation, the file includes two main sheets:

1. A list of species not known to produce toxins but reported to have caused damage to marine organisms
2. A list of events that support the inclusion of a species in the list in sheet 1. The list of events is not exhaustive, nor tells how frequent the events attributed to one species were. In some cases, multiple events are listed, to provide some indications on the spatial and temporal incidence.

A	B	C	D	E	F
	Link to the page		**Valid name**	**Authority**	**Reported as**
149619	https://www.marinespecies.org/aphia.p	Bacillariophyta	Cerataulina pelagica	(Cleve) Hendey, 1937	
156607	https://www.marinespecies.org/aphia.p	Bacillariophyta	Chaetoceros concavicornis	Mangin, 1917	
156611	https://www.marinespecies.org/aphia.p	Bacillariophyta	Chaetoceros convolutus	Castracane, 1886	
465389	https://www.marinespecies.org/aphia.p	Bacillariophyta	Chaetoceros criophilus	Castracane, 1886	
149219	https://www.marinespecies.org/aphia.p	Bacillariophyta	Chaetoceros debilis	Cleve, 1894 emend Xu, Y.Li & Lundholm in Xu et al., 2020	Chaetoceros debile
839985	https://www.marinespecies.org/aphia.p	Bacillariophyta	Chaetoceros gelidus	Chamnansinp, Li, Lundholm & Moestrup, 2013	Chaetoceros socialis
156623	https://www.marinespecies.org/aphia.p	Bacillariophyta	Chaetoceros tenuissimus	Meunier, 1913	Chaetoceros calcitrans
160524	https://www.marinespecies.org/aphia.p	Bacillariophyta	Chaetoceros wighamii	Brightwell, 1856	
149109	https://www.marinespecies.org/aphia.p	Bacillariophyta	Corethron sp.	A.F. Castracane, 1886	
149159	https://www.marinespecies.org/aphia.p	Bacillariophyta	Coscinodiscus centralis	Ehrenberg, 1844	
148992	https://www.marinespecies.org/aphia.p	Bacillariophyta	Coscinodiscus concinnus	W.Smith, 1856	
148917	https://www.marinespecies.org/aphia.p	Bacillariophyta	Coscinodiscus spp.	C.G. Ehrenberg, 1839	
149131	https://www.marinespecies.org/aphia.p	Bacillariophyta	Eucampia zodiacus	Ehrenberg, 1839	
967041	https://www.marinespecies.org/aphia.p	Bacillariophyta	Guinardia striata	Hensen, 1911	Rhizosolenia stolterfothii
149039	https://www.marinespecies.org/aphia.p	Bacillariophyta	Leptocylindrus minimus	Gran, 1915	
573477	https://www.marinespecies.org/aphia.p	Bacillariophyta	Palmeria hardmaniana	(Greville) Hasle	Hemidiscus hardmanianus
418637	https://www.marinespecies.org/aphia.p	Bacillariophyta	Pseudohimantidium pacificu	Hustedt & Krasske, 1941	

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	A	B	C	D	E	F	G	H	I	
1		Species	Species (reporte	uality fla	Resource/organisms affe	Harmful event type	Location	Region	Date	Reference
2	Pelagophyceae	Aureococcus anophageff		1	Oysters and mussels	Growth arrest	Saldanha Bay and Lar	Benguela (South	998 and 1999	Pitcher, G. & Cal
3	Pelagophyceae	Aureococcus anophageff		1	Suspended bivalves	Mortality, recruitment failu	Mid Atlantic coast (U	North East Atlant	6/7/1985	Bricelj, V. M. & L
4	Pelagophyceae	Aureoumbra lagunensis		1	Invertebrates and ecosystem	Mass mortality	Laguna Madre, Texas	Gulf of Mexico		Stockwell, D. A.,
5	Pelagophyceae	Aureoumbra lagunensis		1	Fish and bivalves	Mass mortality	Mosquito Lagoon, Flo	Florida, Caribbea	Summer 2012	Gobler CJ, Koch
6	Pelagophyceae	Aureoumbra lagunensis		1	Fish	Mass mortality	Indian River Lagoon,	Florida, Caribbea	March 2016	
7	Dinophyta	Blixaea quinquecornis	Protoperidinium quir	1	Small pelagic fish (sardines)	Mass mortality	Al Hodeidah and Kho	Arabian Sea	June 6, 2012	Alkawri, A., Al A
8	Bacillariophyta	Cerataulina pelagica		1	Fish and benthic fauna	Mucilage clogging gills	Northeastern coast o	Soth West Pacific	- March 1983	Taylor, F., Taylor,
9	Bacillariophyta	Chaetoceros concavicorr		1	Farmed fish	Mass mortality	Clayoquot Sound, we	North East Pacific	11/1/2019	
10	Bacillariophyta	Chaetoceros concavicorr								
11	Bacillariophyta	Chaetoceros concavicorr								
12	Bacillariophyta	Chaetoceros concavicorr								
13	Bacillariophyta	Chaetoceros concavicorr								
14	Bacillariophyta	Chaetoceros concavicorr								
15	Bacillariophyta	Chaetoceros concavicorr								
16	Bacillariophyta	Chaetoceros concavicorr								
17	Bacillariophyta	Chaetoceros concavicorr								
18	Bacillariophyta	Chaetoceros concavicorr								

	Reference	Remarks	SOURCE	HAEDAT Code
1997, 1998 and 1999	Pitcher, G. & Calder, D. 2000. Harmful algal blooms of the southern Benguı		Literature	-
6/7/1985	Bricelj, V. M. & Lonsdale, D. J. 1997. Aureococcus anophagefferens: Causes		Literature	-
	Stockwell, D. A., Buskey, E. J. & Whitledge, T. E. 1993. Studies on condition		Literature	-
Summer 2012	Gobler CJ, Koch F, Kang Y, Berry DL, Tang YZ, Lasi M, et al. 2013. Expansion		Literature	-
March 2016			HAEDAT	US-16-043
June 6, 2012	Alkawri, A., Al Areeki, M., & Alsharaby, K. 2016. The first recorded bloom c		Literature	-
er 1982 - March 1983	Taylor, F., Taylor, N. & Walsby, J. 1985. A bloom of the planktonic diatom, C		Literature	-
11/1/2019			HAEDAT	CA-19-007
2015			HAEDAT	CA-15-005
March 2010			HAEDAT	CA-10-003
2009		low mortality	HAEDAT	CA-09-004
May 2019			HAEDAT	CA-09-003
10/14/2006			HAEDAT	CA-06-001
2005			HAEDAT	CA-05-001
2004			HAEDAT	CA-04-009
2003			HAEDAT	CA-03-012

Read me | 1 - species list | 2 -event list | Quality fla

Quality flags

0 - (zero) Unverified: ***The name of the record has not been checked by any authority and/or cannot be verified because no additional documentation (pictures***

1 – ***Good:*** ***The name of the species is correct - determined to the best of the existing knowledge and possibile approaches, i.e., with:***

Light Microscopy (LM) when this is sufficient, e.g., Pseudo-nitzschia multistriata, as the only sigmoid species in the genus

LM & acid frustule cleaning for diatoms, e.g., Pseudo-nitzschia galaxiae (unique ultrastructure in the genus, visible in LM in acid-cleaned frustules

LM & dinoflagellate plate staining, e.g., Alexandrium minutum, with unique tabulation and size

Electron Microscopy, e.g., many Alexandrium and Pseudo-nitzschia with unique ultrastructural fetaures

Molecular methods in case of cryptic or pseudocryptic species, which cannot be identified with optical methods (e.g., Pseudo-nitzschia delicatissima)

2 – ***Probable*** ***The species identification is based on available, non.sufficient tools, but is supported by the literature and previous knowledge***

Based on other records for the area or complementary information there is a good probability that the identification is correct. This flag includes cases

Example: chain forming Alexandrium in the south Pacific identified as A. catenella in LM or in the Mediterranean Sea identified as A. pacificum in LM

3- ***Uncertain*** ***The species identification is based on inadequate techniques, not allowing to confirm it***

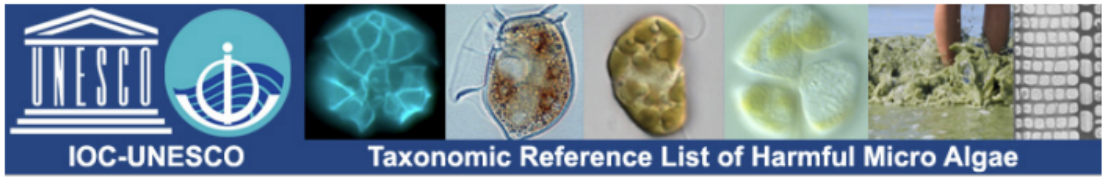
Example: cryptic Pseudo-nitzschia delicatissima and P. pseudodelicatissima identified in LM, and even in TEM

Dissemination

ToR 5: each year issue a summary in **Harmful Algae News** detailing the taxonomic changes to the Reference List,

Harmful Algae News

AN IOC NEWSLETTER ON TOXIC ALGAE AND ALGAL BLOOMS
No. 77 – December 2024 · https://hab.ioc-unesco.org/



New toxic species – and what about their names?

News from the IOC-UNESCO Task Team on Algal Taxonomy

The IOC-UNESCO Taxonomic Reference List of Harmful Micro Algae (available via the *HAB Index*) is an actively maintained and comprehensive list of all microalgae known to produce toxins.

- It may serve as a starting point for assessing toxigenic microalgae.
- It provides up-to-date and accurate

to reflect that several species have been confirmed to be toxigenic (Table 1).

Additions to the list

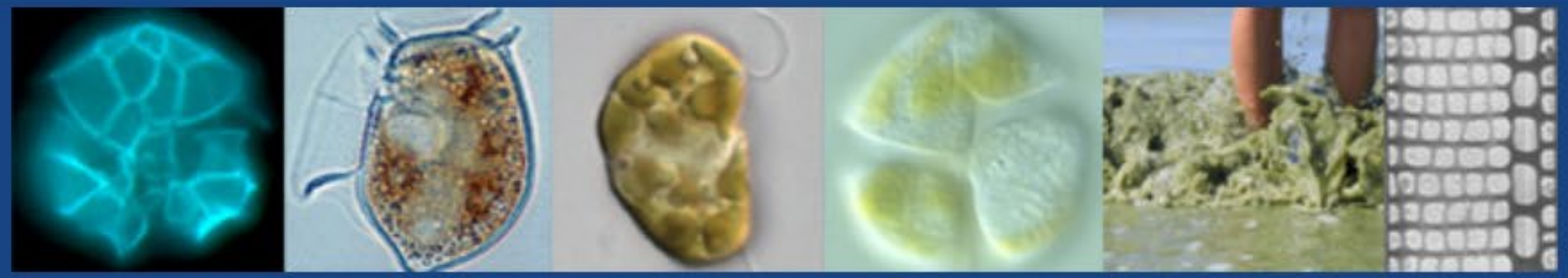
(in red: recently described species, in black: species not recently described but newly identified as toxic):

unesco
Intergovernmental
Oceanographic
Commission

Content

Feature article
New toxic species – and what about their names?
Nina Lundholm and the Taxonomy TaskTeam 1

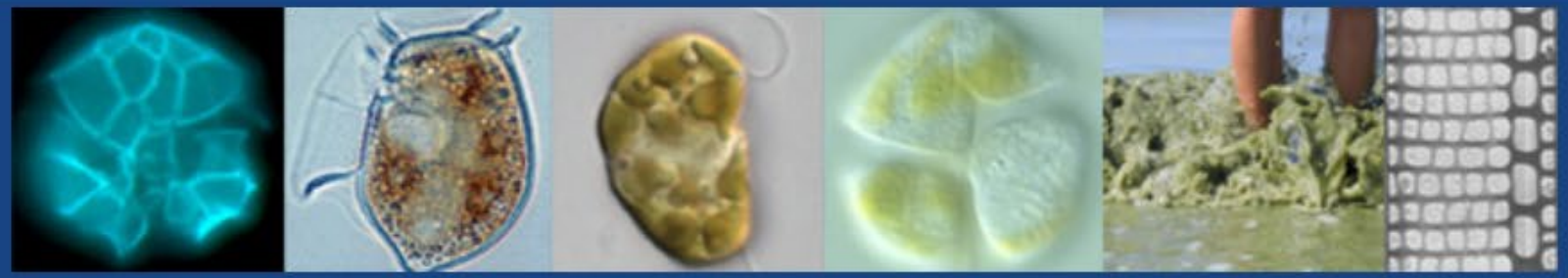
High Biomass HABs, anoxia and mucilage
Akashiwo sanguinea blooms, anoxia and mass mortalities in Peru during El Niño 2023-2024 4



Dissemination

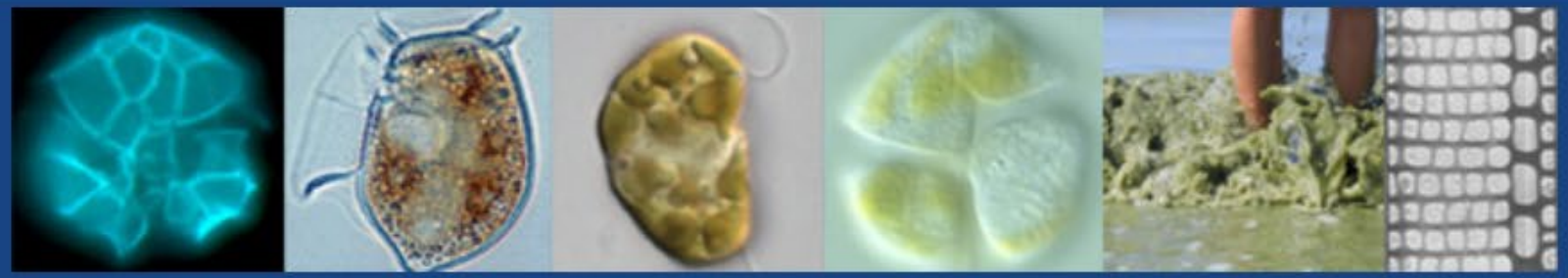
ToR 8: suggest themes for round-table discussions and other activities at the **International Conference on Harmful Algae (ICHA);** give presentation(s) at each ICHA conference, detailing recent changes in the taxonomy of harmful algal species, and in the information included in the Reference List,

ToR 6: invite the scientific community to contribute to keeping the Reference List updated,



Collaboration

ToR 7: Work in coordination with the Task Team on Biotoxins Monitoring, Management and Regulations to intercalibrate and interlink the information on toxigenic species,



Identified challenges :

Support for having an **onsite task team meeting** with attendance of Worms

Next generation of taxonomists should be trained.
Taxonomic expertise is disappearing in many parts of the world – can we maintain a reasonable number of experts on the different taxonomic groups of toxigenic microalgal species?