The occurrence of algal blooms in some small water ponds on the Kraków - Częstochowa Upland

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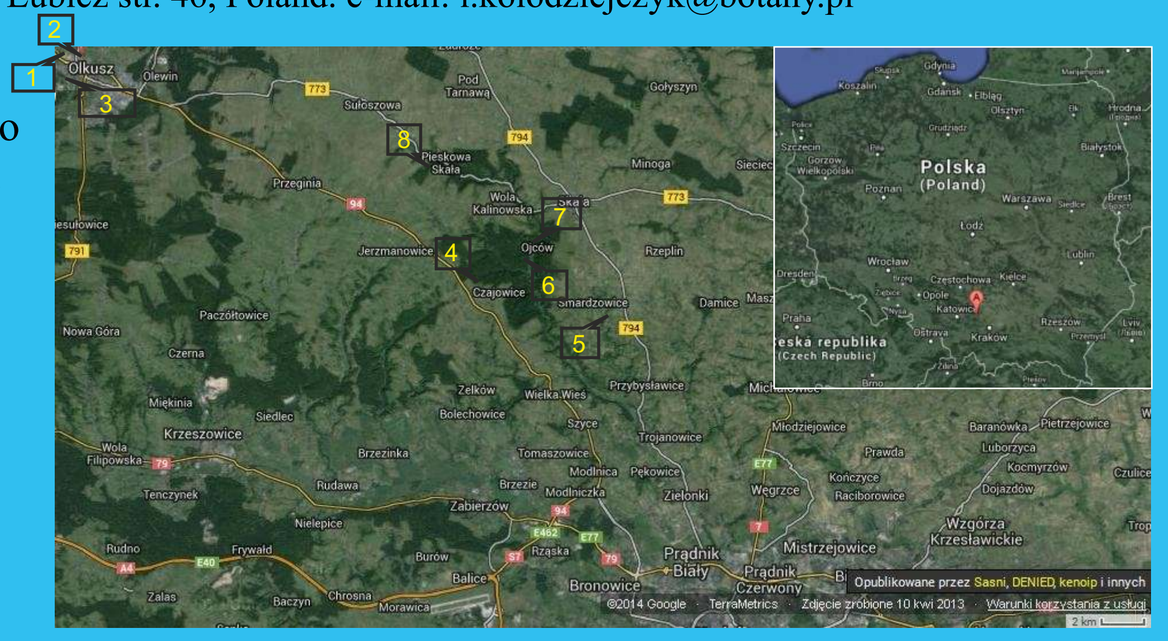
The algal blooms are important ecological problem and cause severe hydrobiological disturbances occurring usually in spring, but sometimes also in summer or even in autumn. This phenomenon is especially destructive in small water habitats where the ecological balance is very sensitive.

Ponds in Pieskowa Skała: 2008-06-07; intensive growth of *Oedogonium pisanum* and *Chaetophora elegans*.

Ponds in Pieskowa Skała: 2009-07-26; blooming *Tribonema vulgare* and *Zygnema* sp.

The old swimming pool in Ojców: 2009-04-19; domination of *Aphanothece elabens* and *Oscillatoria limosa*.

Fish - keeping ponds in Ojców: 2010-06-13; problematic development of *Euglena viridis* and *Merismopedia glauca*.



The satellite map of the research area. A - the investigated region on the map of Poland. 1 - swamps on nortern suburbs of Olkusz; 2 - small lake near Rabsztyńska street in Olkusz; 3 - a fishing pond in the center of Olkusz city; 4 - a pond in Czajowice village; 5 - a pond in Smardzowice village; 6 - fish keeping ponds in Ojców National Park; 7 - old swimming pool in Ojców; 8 - ponds near the castle in Pieskowa Skała (Ojców National Park). Copyrights: Google Earth.

Eight small water ponds on the Kraków - Częstochowa Upland (South Poland) were observed between 2008 and 2013 and their algal blooms were estimated during every vegetative season. We found that the intensive growth of filamentous green algae and cyanobacteria takes place every year in the majority of investigated ponds and often algal conglomerates cover up to 90% of the water surface.

Identified taxa:

Cyanobacteria:
1. *Microcystis aeruginosa* Kützing
2. *Aphanothece elabens* (Brebisson) Elenkin
3. *Merismopedia glauca* (Ehrenberg) Nägeli
4. *Tetrapedia crux-Michaeli* Reinsch
5. *Lyngbya aerugineo-coerulea* (Kützing) Gomont
6. *Oscillatoria limosa* Agardh
7. *Oscillatoria splendida* Greville
8. *Oscillatoria Gebhardtiana* Claus
9. *Cylindrospermum stagnale* (Kützing) Bornet et Flahault
10. *Phormidium cincinnatum* Itzigsohn
11. *Pseudanabaena* sp.
12. *Dolichospermum circinalis* Rabenhorst ex Bornet et Flahault

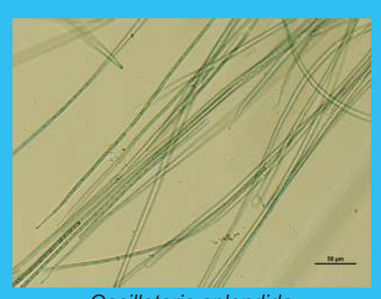
Euglenophyta:
13. *Euglena viridis* Ehrenberg
14. *Euglena adhaerens* Matvienko

Chrysophyta:
15. *Tribonema vulgare* Pascher
16. *Vaucheria* sp.

Chlorophyta:
17. *Chloromonas* sp.
18. *Chaetophora elegans* (Roth) Agardh
19. *Cladophora glomerata* (L.) Kützing
20. *Closterium* sp.
21. *Cosmarium botrytis* Meneghini ex Ralfs
22. *Pediastrum biradiatum* Meyen
23. *Desmodesmus armatus* (Chodat) Hegewald
24. *Desmodesmus communis* Hegewald
25. *Scenedesmus spinosus* Chod.
26. *Scenedesmus acuminatus* (Lagerheim) Chodat
27. *Eudorina elegans* Ehrenberg
28. *Hydrodictyon reticulatum* (L.) Lagerheim
29. *Oedogonium pisanum* Wittrock
30. *Zygnema* sp.
31. *Spirogyra maxima* (Hassall) Wittrock
32. *Micrasterias truncata* Ralfs

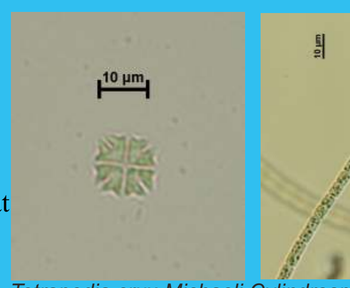
Aphanothece elabens

Dolichospermum circinalis



Oscillatoria splendida

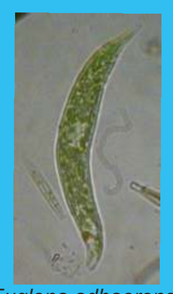
Oscillatoria limosa



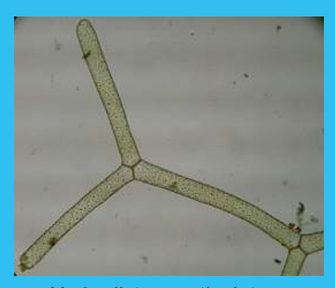
Tetrapedia crux-Michaeli

Cylindrospermum stagnale

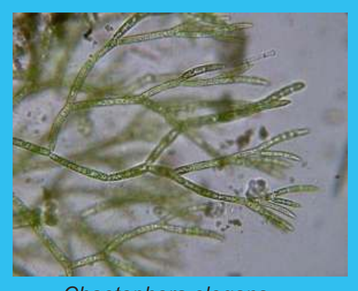
Euglena viridis



Euglena adhaerens

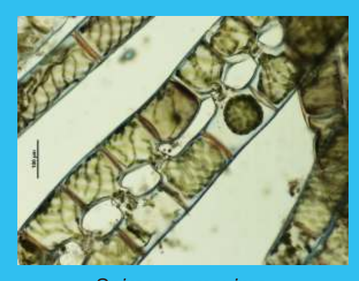


Hydrodictyon reticulatum



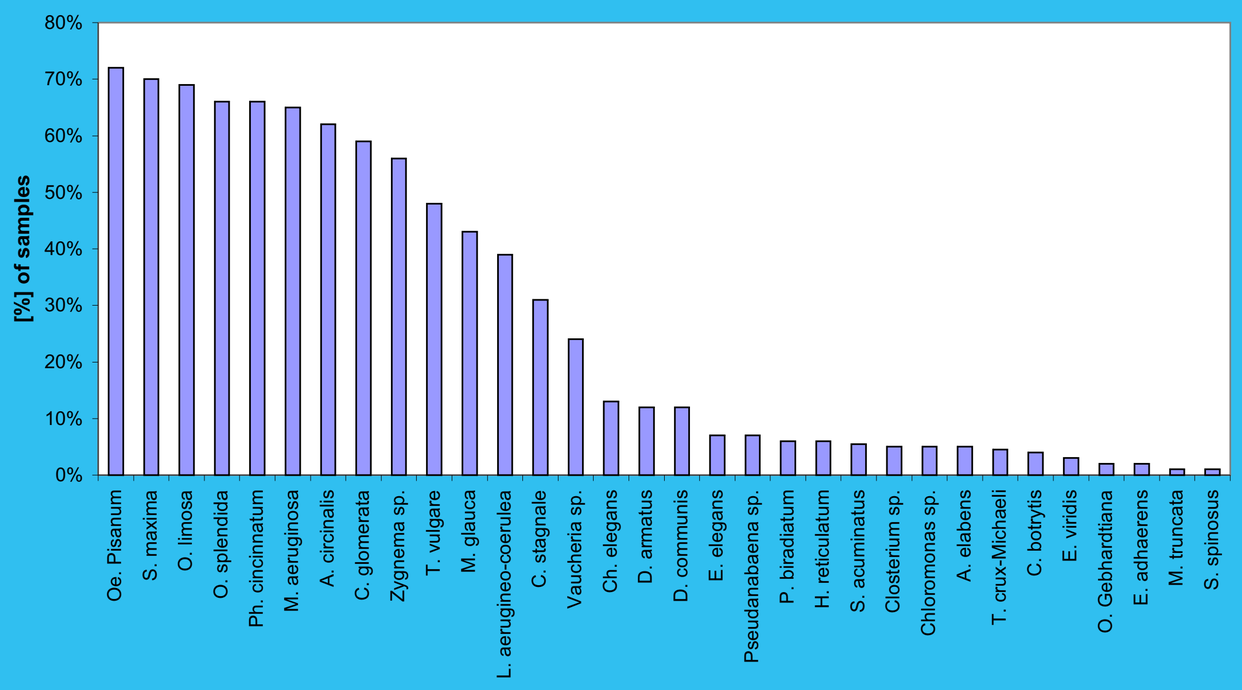
Chaetophora elegans

Oedogonium pisanum

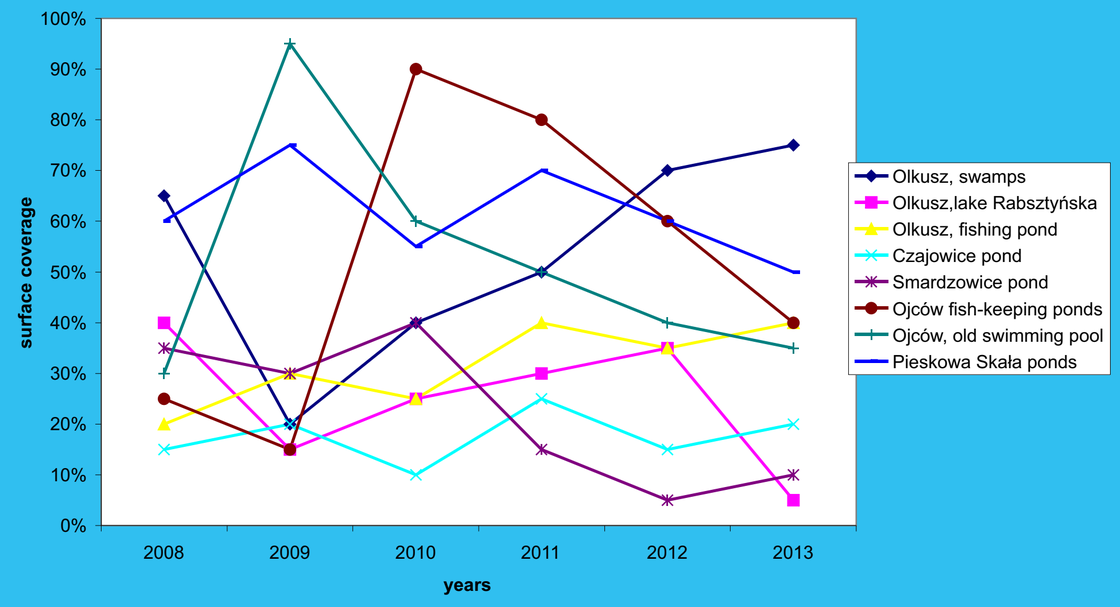


Spirogyra maxima

Taxa frequency



The maximal surface coverage by algal conglomerates



In total 32 taxa involved in the water blooming phenomenon were determined in the presented research. The most abundantly represented genera were: *Oedogonium*, *Spirogyra*, *Oscillatoria*, *Phormidium* and *Microcystis*. We can conclude that the uncontrolled development of algae often occurs on the Kraków - Częstochowa Upland, both in protected and polluted habitats.

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