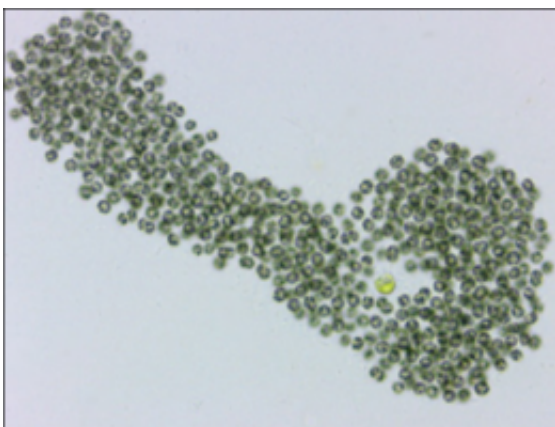


The impact of human activities on a selection of lakes in Tanzania

December 28 2011



Cyanobacteria

An increase in human activity is posing a threat to natural aquatic ecosystems in Tanzania and contributing to environmental damage and ecological changes. Doctoral research carried out by Hezron Emmanuel Nonga shows that agriculture and livestock farming leads to eutrophication in lakes and the proliferation of cyanobacteria which produce microcystins. New information about microcystins and other mycotoxins in Tanzanian lakes is useful for appraising the risk linked to drinking water and edible fish, which in turn affects the health of both humans and animals.

In Tanzania, there are many and varied wetland areas and aquatic ecosystems which are productive but also vulnerable. Hezron Emmanuel

Nonga's doctoral research project has studied how human activities affect ecosystems in [wetlands](#) and has also examined the incidence of [cyanobacteria](#), the production of microcystins and the possible effects of these toxins on wild species.

The study was carried out on three alkaline (high pH) lakes (of which lake Manyara was the most important) in the north of Tanzania. In addition, similar experiments were conducted in the fresh-water [Lake Victoria](#) in the Northwest of the country.

Sociological, cross-sectional studies were conducted in order to ascertain what effects human activities have had on the wetlands and ecosystems around the lakes. The results of these studies show that non-sustainable human activities contributed significantly to the [environmental damage](#) detected in the selected lakes in Tanzania.

In addition, Nonga carried out field and [laboratory experiments](#) over a period of time in order to determine physical and chemical parameters, the incidence of phytoplankton, concentrations of different microcystins and microcystin-producing bacteria in the lakes. This research has resulted in new data which will be useful for appraising the risk of the lakes as sources of [drinking water](#) and edible fish.

Pathological examinations of dwarf flamingos (*Phoeniconaias minor* Geoffroy) at Lake Manyara revealed a high concentration of microcystins in the birds' liver, which may be one of the reasons for the observed mass death of these birds. However, further studies are needed in order to confirm whether microcystins are to blame for this increase in mortality.

The sociological study showed that Lake Manyara and the surrounding wetlands are valuable resources for local communities but that exploitation is too intensive. The main source of income for people

living near the lake is from agriculture and livestock, and these are currently far from sustainable. Limited access to expertise, easily available pesticides and lack of knowledge about the latter has led to the uncontrolled spread of chemicals, with hitherto unknown consequences for the environment. Soil erosion and the frequent drying-out of Lake Manyara and rivers in the area have moreover led to a lack of water and high animal mortality.

In order to protect the resources of these wetland areas, human activities must be better controlled and a more sustainable exploitation of land and water resources introduced. It is necessary to make the farmers aware of the importance of environment-friendly agriculture and train them in the use of pesticides and pest control.

Nonga's doctoral research was carried out in Tanzania and at The Norwegian School of Veterinary Science in Norway.

More information: Hezron Emmanuel Nonga defended his doctoral thesis on 19th December 2011 at The Norwegian School of Veterinary Science. His thesis is entitled: "Impact of human activities in selected lake ecosystems in Tanzania and occurrence of microcystins and potential microcystin-producing cyanobacteria".

Provided by Norwegian School of Veterinary Science

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