

Danger blooms have Maximized by Human Activities Worldwide

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A Review Article

Introductory Matter:

Cyanobacteria, also known as blue-green algae because of their color, have endured for more than 2.5 billion years, providing ample time to adapt to changes in the Earth's biosphere. They live in water where a diet heavy in nitrogen and phosphorus, combined with global warming, can prompt them to produce slimy toxic blooms that make the water unfit for drinking, agriculture and recreation. Human activities have dramatically increased nitrogen and phosphorus inputs into many rivers and lakes, causing algal blooms that threaten economic and recreational uses of those waters, This nutrient over-enrichment in freshwater has led to a global proliferation of cyanobacterial blooms (1) which foul the water, disrupt food webs, reduce oxygen, and produce metabolites toxic to fish, zooplankton, cattle, domestic pets and humans(2).

Recent Found Effects on Man:

Humans who drink the water or eat its fish or shellfish can suffer damage to the liver, intestines and nervous system (5). Moreover, while still unknown, the possibility exists that using this water for irrigation of edible crops could potentially lead to toxins (3) being transferred into consumable foods, since they don't break down easily. The major sources of nitrogen and phosphorus that enter these water systems and feed the cyanobacteria include runoff from chemical fertilizers, factories, urban impervious surfaces and waste water treatment facilities, and air pollution from fossil fuel and automobile combustion to create a "perfect soup" of noxious blooms (6). Climate change is complicating the calculations, since the microorganisms seem to thrive in warm temperatures. Cyanobacteria love warm weather, Many of the cyanobacterial blooms typically occur in summertime. Warmer weather will increase the probability that these blooms will become dominant (4).

True Nature of Cyanobacteria:

Despite the misnomer blue-green algae, cyanobacteria are not algae, but bacteria. They are prokaryotic, meaning they lack a nucleus, unlike traditional algae.

Cyanobacteria perform photosynthesis just like traditional algae, but they prefer warm conditions, unlike true algae groups, which reach peak growth rates at lower temperatures. Cyanobacteria are unique in that they are the only bacterial group capable of oxygen-evolving photosynthesis. This has had major ramifications for evolution of life on Earth, in particular oxygenation of the atmosphere, starting some two billion years ago. This transformation has provided opportunities for higher plants and animals, including human, to inhabit our planet. So, the influence of cyanobacteria on Earth is two-sided from a human perspective — both good and bad (7).

Current News:

Off the coast of South Africa, near where the South Atlantic meets the Southern Indian Ocean, a massive summer phytoplankton bloom colored the waters with a swirl of turquoise, green and white in late December 2011. Although this circular bloom has the appearance of a precious antique gaming marble, it is actually the result of millions of cyanobacterial blooms which are growing where nutrient-rich waters mix together. Each spring and summer, lengthening sunshine comes to the southern oceans, providing light to spur the growth of these blooms. The lengthening light also melts sea ice, which can release additional nutrients into the sea. Blooms such as this one become a banquet for krill, fish and other marine species which survive in these cool waters.

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