Algae that really are bacteria

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As the temperature rises and the sun gets hot crops such as alfalfa, become green. This is because the plant pigment chlorophyll is present. Alfalfa has an association with bacteria; these bacteria can fix atmospheric nitrogen and make it available to the alfalfa. The plants themselves cannot fix nitrogen gas from the air (air is composed of about 80% nitrogen and 20% oxygen). Without the bacteria one would need to give these plants "combined nitrogen", such as nitrate and ammonium common in many fertilizers.

Looking across an alfalfa field bordering a surface water reservoir the colour change may not be all that dramatic if there is a bloom of blue-green algae in the dugout. These blue-green algae, just like the bacteria in the alfalfa field, can fix nitrogen. The knowledge that plants cannot fix nitrogen and algae are plants (just like wheat and alfalfa) is one clue to the fact that blue-green algae are not plants at all, they are bacteria.

The blue-green algae were renamed about 25 years ago to cyanobacteria, but old habits die hard and they are still commonly known as blue-green algae. They do have the pigment chlorophyll a, similar to higher plants, giving them a greenish colour. Sometimes some other pigments that they also produce will give them a bluish colour and hence the "blue-green algae".

Blue-green algae are some of the oldest organisms on earth and they have adapted to surface water reservoirs, typically thriving during the hot summer months. They like warm water, conditions with low levels of nitrogen, high pH, and shallow water. This just about describes every dugout on the prairies come June.

Why do we need to worry about the blue-green algae? Blue-green blooms will often give the water a distinct taste and odour. About half of all blue-green algal blooms are also toxic. Deaths of cattle and even humans have been caused by blue-green algae. A farmer will often hesitate putting cattle on a "green" dugout because of concerns about the blue-green algae.

Here are some things to look for if you are wondering whether the algae in your dugout are composed of blue-greens. First, look into your dugout. Can you see green clumps or grass clippings floating around with some floating on the surface (see picture 1)?

If you answered yes, then proceed to the next step. Try to pick up the floating "algae" with your hands. If the "algae" just run through your fingers and you are left with a green to blue-green colour on your hands, then chances are you have blue-green algae in your dugout (as in picture 1). If the algae can be squeezed and remain in your hand, then you most likely don't have blue-green algae (picture 2). These algae are green algae. They are similar to the seaweeds in the ocean and are not toxic. They are sometimes attached to the bottom of your dugout.

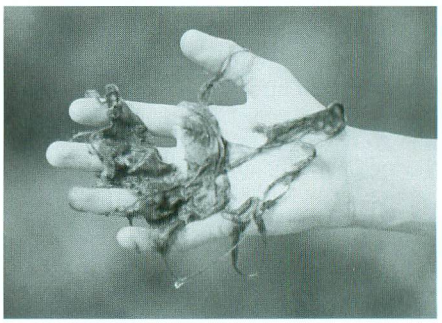
If you check your pasture dugout a couple of weeks before you are ready to put your cattle onto it, you have the option of trying to kill the blue-green algae before you let the cattle onto the dugout. A low dose of copper sulphate may be applied. Use around 0.5 kg/million L (1.25 lbs/250,000 gallons). The toxins from the blue-greens will be released, within 10-14 days they should disappear.

If you use this water to supply your house, you may want to collect drinking water that will last you 10-14 days and then treat the dugout. If the bloom in the dugout still remains after a couple of days, you may have to increase the dose, but then you increase the possibility of developing some other negative effects.

These problems can include the death of the organisms that eat phytoplankton called zooplankton, which are beneficial for the dugout. This can result in massive "man-made" algal blooms of small green algae, the water may turn into lime-juice. You cannot see any clumps or clippings, they don't accumulate on the surface of the dugout, and they are not toxic. But, they are still a nuisance and will go through many in-house water treatment systems. These algae are copper-tolerant and the more copper you put in your dugout the bigger the bloom! This is because at high copper levels the algal grazers (zooplankton) will not be able to survive.

By learning how to recognize blue-green algae blooms, you can make informed decisions about cattle watering and dugout treatments. If you are unsure, take a water sample and contact your local provincial or federal extension office. Once you have positively identified what is in your dugout, you will be able to recognize it from year-to-year. ■

Small clumps of blue-green algae in the watr with larger accumulations floating on the surface.



Green algae remaining in hand after squeezing them.