The Land of the Pink Snow

Hints of pink are visible in the snow drifts in this photo taken July 20, 2020, in the Snowy Range Mountains, Wyoming. Photo by the author.

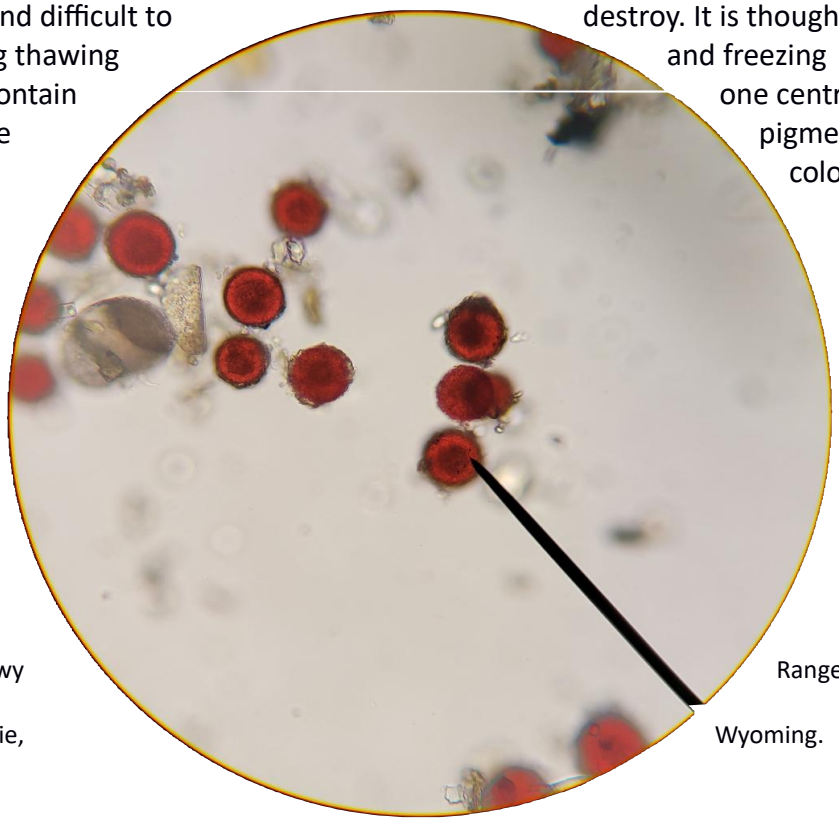
The Snowy Range Mountains west of Laramie, Wyoming, USA soar over 10,000 feet above sea level. High winds and extremely harsh conditions contribute to a perfect environment for *Chlamydomonas nivalus*, the algae that produces pink snow to grow and thrive.

Aristotle was the first to make note of pink or red snow. Mineral deposits and pollen were both credited with giving the snow its unique color. In 1819 Sir John Ross led an Arctic expedition, and stumbled across large patches of pink snow in Greenland's Cape York in Baffin Bay. He brought back samples of the unusual snow and two of those samples were passed on to Robert Brown and Francis Bauer. Both examined the samples, but could not agree on how to classify the organisms they saw. Brown thought it was a unicellular alga, while Bauer thought it was a fungus. The classification battle continued over the next century, with various scientists declaring it a lichen, a plant, alga, and even an animal. Researchers finally came to an agreement in the early 1900s, declared it a type of algae, and gave it its current name.

C. nivalus can be found worldwide in mountain regions, polar regions, and in snowfields on every continent. It is the most common species of snow algae. *C. nivalus* spends most of its three-stage lifecycle as a cyst, surrounded by snow. Cells at this final stage are resistant to the harsh environmental conditions.

The cell wall is rigid, and difficult to destroy. It is thought to help protect the cell during thawing and freezing seasonal changes. The cells contain one central chloroplast. Astaxanthin is the pigment that gives the cells their red color.

In the spring and summer, *C. nivalus* produces small, green, motile cells. When the temperatures are warmer the zygotes undergo meiosis in pools of melt water. The cells are sensitive to drought and temperature stress at this stage. Because the cells need to grow and produce energy, chlorophyll is the dominant pigment during this time. Later in the season, the cells develop into flagellated sexual gametes. They produce new zygotes, and start forming secondary carotenoids. These turn the zygotes orange. The cell wall begins to thicken, and the red, dormant cysts are formed.



Cysts of *C. nivalus* 400x. Collected at 10,000 feet in the Snowy Range Mountains, west of Laramie, Wyoming. Photo by the author.

There is some concern the red algae changes the reflectivity of the snow. Because red is a darker color, it absorbs more heat, and may cause the snow to melt faster. However, it is not caused by global warming, nor does it cause global warming. It is part of a natural cycle that occurs every year.

Pink snow goes by a variety of names, including Blood Snow, Strawberry Snow, and Watermelon Snow. It may even give off a slightly sweet smell. Despite this, it is probably not a good idea to consume pink snow. It can lead to gastric upset. This may be due to the algae, or may be due to bacteria that can also be present in the snow. Some people have eaten it with no ill effects. Despite some of the myths circulating on the internet, simply touching it will not kill you.

The best time to observe *C. nivalus* is during mid-summer, when much of the snow has melted. It will be found in Arctic areas, or high mountain regions where some of the snow just refuses to completely melt. If you are doing so in Wyoming, wear a jacket!

Colonies of *C. nivalus* in a snowbank. Photo by the author.

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