

June 10, 2008

## **A Dusting of Yellow**

In recent weeks, you may have noticed a mysterious dust that has descended upon your car, sidewalk and outdoor furniture. It turns surfaces a lemon colour and makes puddles appear as if some strange, yellow algae has bloomed. Even in the city, you may have had to turn on the wipers in order to remove the film of yellow dust that has accumulated on the windshield overnight. And, each year, the Ministry of Environment actually receives complaints in the early summer about the build up of a mustard yellow scum on inland lakes and along the shore and bays of Georgian Bay. The scum becomes most visible during June, when it floats in large masses and piles up on shorelines and beaches.

This bizarre phenomenon is simply a manifestation of the sex lives of our coniferous trees as huge amounts of pollen are released to the wind every spring in May and June. When the weather is hot and dry, you can sometimes even see what looks like a yellow shroud around certain conifers as the wind jostles the male cones on the boughs and spills copious amounts of pollen into the air.

A good starting point for a discussion on the reproduction of conifers is to simply understand what a “cone” really is. The term refers to the organs on coniferous plants that contain the reproductive structures. In this respect, a cone is essentially a flower or more precisely, a collection of flowers. Cones, like flowers, come in both male and female varieties. This comes as a surprise to many people. Male and female cones are found on the same tree in all conifers, with the exception of yews and junipers.

The familiar woody cone that we find on the ground under evergreens is the female cone which produces seeds. The individual plates of these cones are known as scales. The male cones, which produce pollen, are herbaceous or soft-tissued unlike female cones which are woody at maturity. They are also fairly inconspicuous.

All conifers are wind-pollinated. Unlike wildflowers and many deciduous trees like cherries and basswoods, conifers do not rely on insects to carry pollen to the female flowers. Therefore, cones do not offer bright colours, nectar rewards, or tantalizing perfumes to attract pollinators.

White pine is typical of many of our conifers with regard to reproduction. In the spring, before the female cones develop, light yellow-brown male pollen cones appear in clusters at the base of new shoots. They are catkin-like in appearance and measure less than half an inch in length. The male cones are usually located in the lower part of the crown of the tree, although some occasionally appear even on the bottom branches.

The green-coloured, seed-producing female cones also occur at the tip of new shoots, usually on the same tree as the male cones. A little larger than the male cones, they tend to be located in the upper part of the crown. Female cones become receptive to the wind-blown pollen at precisely the same time as the pollen grains are being released. At this time, they are very soft and their scales are partially separated.

A pollen grain is uniquely designed for wind pollination and actually contains two air bladders. They give it buoyancy and enable the pollen to take what amounts to a balloon ride. As pollen is carried off by the wind, some of it will inevitably come into contact with the female cones, and sift down between the scales. With any luck at all, a grain will come to rest on one of

the two ovules attached to the bottom inside of each cone scale. Each ovule contains an ovum or egg cell.

After their pollen is released, the male cones soon wither and fall away, often dropping from the trees like a veritable rain shower. These dry, shriveled up male cones are a common sight anywhere pine trees occur and often cover the ground, cottage deck and anything else under the trees. Keep your eyes open for them.

Following pollination, the scales on the female cones grow together. A pitch-like material then seals the outside. Over the next two years, the cone gradually grows to full size. In white pine, the seeds are ripe by August or September of their second summer. The seeds are released to the wind when the cone scales open up.

White pines may start to bear female cones when 5 to 10 years old. Large numbers of cones do not usually appear, however, until the trees are about 6 m (20 ft) tall. At that size, 200 to 300 flowers may be produced in 1 year. Few or no male flowers appear during the early flowering years. The number of cones produced can vary greatly from one year to the next and therefore have a major impact on the populations of animals that eat the seeds. Two years ago, we saw a huge production of cones on nearly all of our conifers.

Pollen grains are very interesting structures. First of all, they are extremely small, less than 1/250th of an inch in diameter. A scanning electron microscope is needed to make out their details. When they land on a lake, they form a temporary film but soon sink to the bottom. That is not the end of the story, however. Pollen grains are actually protected by thin, glassy, plastic covers which are highly resistant to decay. This makes them nearly indestructible. They therefore become microfossils that remain unchanged for thousands of years in the layers of bottom sediment. This allows paleobotanists to describe with great accuracy the history of the vegetation of an area. And, by knowing the vegetation that existed, scientists can also theorize what kind of climate there was in the past. For example, by examining the pollen grains found in deep peat bogs, scientists have been able to piece together the story of the changes in climate and vegetation that occurred during and since the last Ice Age. As the glaciers retreated, vegetation followed them. The pollen grains in these peat bogs show that the first trees to repopulate the land were firs and spruces. Later, pines and tamaracks came along, followed by birches and elms. Finally, oaks and maples appeared on the scene. You can see forest distribution maps from twenty-one thousand years ago by Googling "pollen viewer."

Pine pollen often gets blamed for allergic symptoms that in reality are usually caused by other pollens that may be present at the same time. Because pine pollen is relatively heavy, it is usually not breathed in as much as the lighter wind-borne pollens of birch, ragweed and various grasses that are responsible for most allergy symptoms. Also, the chemical composition of pine pollen makes it less likely to produce allergic symptoms than other types of pollen.

Take the time to go out and closely examine the male and female cones of our conifers this month. Their colour, shape, texture and location vary widely from one species to the next but they all share a special beauty. The female cones of the tamarack - or larch - are particularly attractive. Right now, they are a deep red colour, and their scales are partially open. They almost look like scrumptious little fruits decorating the branches. Balsam fir, too, has interesting seed cones. They sit erect and cylindrical in dense groupings, almost at the top of the tree.

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