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Seeds Leaving Home

Many of the flowers of spring, summer and fall are now completing the one and only reason for their existence: the creation of a new generation. The process is not quite done, however. The final step is the dispersal of the flowers' seeds to sites that will be suitable for germination and growth. Much of this dispersal activity is happening right now. Dispersal is yet another example of the myriad adaptations that plants have developed to successfully complete their reproductive duties.

Common sense tells us that seeds must get away from below the parent plant if they are to survive. Try to imagine a tiny seedling struggling to compete for sunlight, nutrients, water and space as it attempts to grow among the roots at the base of its giant oak parent tree. Predators, too, would quickly devour the entire new generation, if they were to discover all of the seeds or seedlings directly below the parent plant. Since adult plants have no choice but to remain rooted where they are, their embryos must do the moving.

The special adaptations that seeds have developed for travel are fascinating. Since the seeds themselves lack mobility , evolution has had to be very creative. Seeds such as those of the burdock and tick trefoil are sticky or bristly and are able to hitch a ride on an animal's fur or a walker's pants. Plants that grow in or near water like purple loosestrife often have seeds with a waterproof coating that allows the embryo to float with the current and end up on some silty shoreline where it can take root. There are even few a few species in the Kawarthas that self-disperse. In other words, the parent plant actually shoots or catapults its seeds away. Jewelweed, also known as touch-me-not, uses this mechanism. Talk about getting kicked out of the house! However, today I want to talk about two other groups of adaptations, namely those seeds that are designed for flight and those that rely on animals as their means of transportation to a new home.

Certainly one of the most familiar species that has opted for wind dispersal to spread its genes is the milkweed. Right now, milkweed pods are opening and exposing their flat brown seeds which are arranged like cedar tiles on a roof. The October winds tug on the silky, parachute-like hairs attached to each of the seeds and one by one, they are carried aloft, typically drifting up to 100 feet before settling to earth. If conditions are right, you'll sometimes see them depart one right after another, almost like military paratroopers jumping in perfect order from a plane. Dandelions, cattails, goldenrods, poplars, aspens and willows are just a few of the other species that rely on this same mechanism.

Many common trees use another aerodynamic approach. They have taken the route of evolving twirling blades or helicopter-like rotors. Maple trees, for example, have winged, two-seeded samaras. When they fall from the tree, the samaras spin like helicopter blades. Because the "wings" have an asymmetrical profile similar to an airplane or bird wing, air is forced to flow faster over the top of the wing than the bottom. Therefore, as the samaras spin, a small amount of lift is created. The seeds travel gracefully downward in a wide arc, usually well away from the parent tree. Quite often, this lift holds the seeds in the air long enough for the wind to catch them and carry the spinning samaras even further away from home. Without this adaptation, the seeds would simply plummet straight down to the earth below. Ash and basswood trees also use this strategy but rely on a single twirling blade. Many other trees also have a small wing-like blade attached to the seed which extends the seeds' dispersal distance when the wind catches it. These include elm, birch, spruce, hemlock and pine. Birches and most of the conifers release theirs during the late fall and winter.

Animals, too, are excellent seed dispersers. Sometimes the seeds stick to their fur but the more common means is by eating the seed. You might wonder how a seed could be eaten and still survive? Well, most animals are only interested in the bright, nutritious and fleshy outer coating of the fruit. The seed within usually passes through the animal's gastrointestinal tract unharmed. In fact, the journey through an animal's gut has an unexpected bonus at the end of the trip: the seed usually ends up being deposited right in the middle of a pile of mineral-rich manure. In the Kawarthas, our various cherry species depend on this manner of dispersal. Robins and waxwings love wild cherries and either regurgitate or defecate the seeds far from the source trees. Bears, too, love ripe cherries and pass the stone - which contains the seed - through their systems unharmed. However, some animals don't play by the rules. Evening grosbeaks, for example, are able to break open the stone with their massive beaks and eat the nutritious seed within. Chipmunks, too, are often capable of gnawing right through to the reward within.

However, a quite different approach to dispersion by animals is taken by trees such as the American beech. Beech produce very big seeds that are loaded up with a large store of food to help the embryo within through its early days as a seedling. In theory, this should produce seedlings that will be big and vigourous. There is a price to be paid, however. Good food attracts hungry mouths, especially in the form of squirrels, blue jays, deer and bears. The jays and squirrels, at least, will hide - and sometimes forget about - the nuts they can't immediately eat. These will often germinate and produce new trees. Bears, however, will immediately eat all of the nuts they can find. They don't even wait for the nuts to ripen and fall to the ground. They simply go right up the tree after them. Not being able to walk out to the tips of the branches where the nuts are, they bend the branches back - usually breaking them off in the process - so as to bring the nut-bearing tips to them. All of this activity often leads to big piles of broken branches in the trees that, from a distance, look like the nest of a large bird. In some areas, the locals call these "bear nests".

Many tree species have developed an ingenious method of countering this high level of seed predation. In order to yield a surplus of seeds that will not be eaten, trees like the beech will often go several years without producing any seeds at all. Consequently, many of its seed predators will either starve or leave. The following year, when the number of predators has decreased, the tree will suddenly produce a crop of seeds so massive that many will go uneaten and be able to germinate. This phenomenon is called masting.

As you can see, it's a war zone out there and without their fascinating adaptations to seed dispersal, most plants would already have gone the way of the dodo. This, of course, would mean that we wouldn't be around either!

What to watch for this week

Mars is shining bright this fall. Tonight, if you watch the sky above the eastern horizon about two hours after sunset, you should be able to see the red planet to the lower left of the almost full moon. On October 30th Mars will be at its brightest. It will rise at sunset, hang overhead at midnight and shine nearly as intensely as Jupiter, the brightest object in the sky after the sun and moon.

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