

# NUTS about TRUFFLES

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from Southeast Alaska's Natural World



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## What good are squirrels?

Most of us encounter red squirrels when they have ripped out armloads of insulation from our cabins, or gnawed holes to get into our attics, or made off with disgraceful quantities of the food we've put out to attract birds. Fewer of us have seen Southeast's northern flying squirrels, which feed primarily at night and are seldom active during the day.

Both species of squirrels occur naturally on the Southeast Alaska mainland and on many of the islands south of Frederick Sound. Red squirrels were introduced on Baranof and Chichagof Islands in the mistaken belief they would provide food for martens introduced there in the 1930s and '50s. The red squirrels now found on Ad-

miralty Island were also recently introduced. Only flying squirrels are found on Prince of Wales Island.

Though they sometimes damage trees and prey on nestling birds or eggs, squirrels—and especially flying squirrels—play an important role in Southeast Alaska forests. They help disperse the spores of specialized fungi that promote the health and well-being of trees and other plants in the forest.

We see the fruiting bodies of *ectomycorrhizal* fungi when they sprout aboveground as mushrooms. But hidden below ground are extensive networks of fine white threads called *hyphae* that the fungi send out through the soil in all directions.

When hyphae come in contact with a soft young tree root, they wrap themselves

*With membranes that stretch between their front and back legs, northern flying squirrels glide through the forest as if they had wings.*

(Right) These truffles (*Elaphomyces muricatus*) grow underground in Southeast forests. They look like tiny potatoes about the diameter of a nickel or a dime.



(Far right) Cut open, truffles reveal an interior packed with dark-colored spores.



(Below) Besides spruce seeds, berries, buds, and bird eggs, red squirrels eat mushrooms such as this fly agaric (*Amanita muscaria*) and truffles.

around it, forming a kind of sheath that encases the root tip. They penetrate into the root, grow in the spaces among the root's cells, and become essentially inseparable from the root itself.

As they grow and spread out, hyphae tremendously expand the ability of roots to absorb minerals, nitrogen, and water to feed the tree. They produce growth-regulating chemicals that induce the tree to produce new root tips, and they displace or fend off other fungi, bacteria, and nematodes otherwise poised to attack vulnerable roots.

In return, the host tree supplies food in the form of sugars, which the fungi cannot produce on their own because they do not possess chlorophyll for conducting photosynthesis. It's a classic symbiotic relationship from which both the trees and the fungi benefit.

Some ectomycorrhizal fungi are truffles that grow entirely underground, forming fruiting bodies that look like small potatoes. Unlike fungi that fruit above ground and scatter their spores on the wind, truffles cannot reproduce unless animals such as squirrels, mice, or voles dig them up and eat them. When a flying squirrel eats a truffle, the spores pass into the squirrel's digestive system, where they mix with yeast and nitrogen-fixing bacteria. This blend then ferments and is eventually compacted into pellets that the squirrel excretes.

The spores of the truffle, encased in pellets, are thus spread throughout the forest, where they germinate into fungi that help the forest trees to thrive.

Truffles work hard to be sure they will be eaten. When they are mature they emit strong odors. Smelling like fruit, fish, cheese, or garlic, they lure hungry squirrels to dig into the ground after them—savory meals with ulterior motives of their own. ●

