

A rose is a rose unless it's a dandelion

by John Morton



Horned dandelion from the herbarium collection at the Kenai National Wildlife Refuge. The specimen was collected by Dave Klein in 1951 along the shore of Skilak Lake when he was a graduate student working on the Kenai National Moose Range. Klein subsequently became a prominent wildlife biologist at the University of Alaska – Fairbanks. Note the clasping, horned bracts below yellow flower head.

Photo Credit: Matt Bowser

My family hiked up Hideout Trail over Memorial Day. It's a favorite with my kids because it quickly gets us above treeline, giving us great views of the upper Kenai River and access to good berry picking later

in the summer. Mostly purple and white wildflowers lined the trail: wild geranium, dwarf Jacob's ladder, lupine, violets, *Draba* mustard, chickweed, high bush cranberry, star flower, and bunchberry. The only yellow flowers at this time of year are Indian paintbrush and the common dandelion.

I was a little disappointed to see the common dandelion being what its namesake suggests—so common. The yellow on both sides of the trail show how our boots help disperse seeds. However, the tale-tell growth in undisturbed alpine meadows and burned areas also indicates that wind is dispersing it beyond the trail's margin and human influence.

It's simply more evidence that some of the 110 or so exotic plant species known on the Kenai Peninsula really are becoming truly invasive. Just three years ago, a group of volunteers from the Friends of Alaska Refuges picked several garbage bags full of dandelions along this trail in an effort to slow its spread, but apparently with no long-term success.

The common dandelion, *Taraxacum officinale*, is a European species that was first introduced to the New World in the 1600s, and is now widely distributed over the U.S. In French, dandelion means “tooth of the lion” in reference to the leaf shape. It was almost certainly planted by colonists because dandelions can be used to make dandelion wine, salad greens, and a kind of coffee. The leaves are high in vitamin A, vitamin C, and iron, with more iron and calcium than spinach!

Unfortunately, Common dandelion is a highly invasive plant in the western hemisphere, rapidly colonizing disturbed soils. It often comes in after fires, both from wind-blown seeds and germination from the existing seed bank. Seeds can remain viable in the seed bank for many years, germinating after nine years in one study. This species is a prolific seed producer, with 54 to 172 seeds produced per head, a single plant can produce more than 5,000 seeds a year. Almost a billion seeds could be produced annually by a dense stand of dandelions on a single hectare! And when released, the seeds can be spread by the wind up to several hundred meters from their source.

But did you know that we have a native dandelion that is actually quite rare on the Kenai Peninsula? The

native horned dandelion (*Taraxacum ceratophorum*) is so closely related to the common dandelion that some taxonomists consider it a subspecies. Both *Taraxacum* species produce a basal rosette of leaves anchored by a thick taproot. Although they have similar flowers, *T. ceratophorum* has clasping, horned bracts (phyllaries) at the base of the yellow flower head as opposed to hornless reflexed bracts on the common dandelion. Insect pollinators move indiscriminately between both species which flower from mid-June to August.

It's thought that *Taraxacum* originally evolved in Asia, but fossil evidence indicates that the Horned dandelion was in Alaska at least 100,000 years ago. Horned dandelions have been documented on the refuge only twice. One was found somewhere on Skilak Lake, recorded as "campsite, rocky lake shore" on the herbarium label from 1951. The other was collected in 2007 from a nunatak poking through the Harding Icefield. Hulten's *Flora of Alaska* shows two other records, both from the area between Kenai and Nikiski.

We know these two dandelion species hybridize in the wild. So why is the exotic species invasive but the native species apparently not? And how is the native species continuing to persist despite the rapid spread of common dandelions?

Marcus Brock and his colleagues at the University of Missouri have studied what makes these two species different. Horned dandelion populations are composed of diploid plants, and intraspecific crosses confirm that this species has an obligately outcrossing breeding system (i.e., it can't self-pollinate). Hand-pollination of horned dandelion stigmas, using pollen from common dandelions, produces viable hybrids. Importantly, common dandelion can produce fertile seeds in the absence of pollination; such seeds are genetically identical clones. And because common dandelion seeds are smaller than the horned dandelion's, models predict greater dispersal of the exotic species within both open and vegetated habitats.

The researchers also found that common dande-

lions produce larger leaves, and taller and more canalized seed-bearing stalks, than horned dandelions under different light intensities. Common dandelions have greater above-ground surface area and a greater capacity to extract water from the soil, which are great characteristics when environmental conditions are relatively good.

However, horned dandelions appear to be better adapted to drought conditions. They have thicker leaves and use water more efficiently (carbon gained/water lost) than common dandelions or hybrids. After six days of greenhouse drought, photosynthesis and transpiration were reduced in common Dandelions compared to horned dandelions.

The characteristics of common dandelions may confer growth advantages in moderate (mesic) environments. However, as water becomes limiting such as during drought or in alpine habitats, native dandelions should be favored. These researchers caution, however, that other changes in environmental conditions, such as increasing atmospheric CO₂ in a climate changing world, could alleviate the severity of water limitation to photosynthesis and favor the continued spread of common dandelions.

There are two take-home messages. Shakespeare wrote that a rose is a rose by any other name, but native and exotic dandelions really are different regardless of their similar appearance. And the exotic dandelion really does pose a threat to our Alaskan native plant. So while I encourage you to pull Common dandelions whenever you can, make sure you've got the right species when you're traveling in the back country. Stop by the refuge if you want to better understand how to identify our native horned dandelion.

John Morton is the Supervisory Fish & Wildlife Biologist at the Kenai National Wildlife Refuge. He is also adjunct faculty at the University of Alaska Fairbanks and Colorado State University. Previous Refuge Previous Refuge Notebook columns can be viewed on the Web at <http://www.fws.gov/refuge/kenai/>.