

**You Ain't from Around Here! Invasive of the Quarter:
Spotted Knapweed (*Centaurea stoebe* ssp. *micranthos*)
By: Jennifer Gagnon, Virginia Tech**

This summer I walked around the farm feeling quite pleased with myself. The bee balm I had been planting in my herb gardens had spread so very nicely all throughout my pollinator gardens and even into the hay fields. What a marvelous friend to pollinators I had become. My smugness was quickly subdued when I realized it wasn't bee balm at all. In fact, it wasn't even a native species. It was actually spotted knapweed, an invasive species. And then I truly understood the overwhelming despair so many landowners with invasive species experience. How would I even begin to control this mess?

Of course, I always like to look on the bright side. As you might imagine, since it looks like bee balm, spotted knapweed is an aesthetically pleasing plant. Pollinators such as butterflies, flies, bees, and beetles are attracted to it. And the grub-filled dried seed heads attract goldfinches. I can attest to this personally since we've spent many summer afternoons on the front porch watching the birds flit around in the pollinator garden next to the house.

Unfortunately, as I have personally experienced, spotted knapweed is also an aggressive invader that rapidly takes over pasture land and other sunny disturbed areas. Individual plants are reported to produce over 1,000 seeds per year. In addition to copious reproduction, the plants grow vigorously and the foliage and roots contain a toxin, catechin, that acts like an herbicide. This is called allelopathy and further increases spotted knapweed's competitive advantage over native species.

And although pollinators do use this species, it replaces native species that are typically higher-quality food sources. Ultimately, spotted knapweed crowds out native plants, threatens wildlife habitat, degrades pastures, and increases soil erosion. On some pasture land, spotted knapweed can occupy up to 95% of the available plant community. And while

edible, it is less palatable than other pasture plants and is thus less likely to be eaten by herbivores.



Although pollinators do use spotted knapweed, it displaces native vegetation that are typically higher-quality food sources. Photo by Jennifer Gagnon, Virginia Tech.

Spotted knapweed is in the genus *Centaurea*, which, in ancient Greek, means “of the centaur.” Apparently, centaurs are known for having healing powers, and many species in this genus do as well. Knapweeds as a group have been used to treat wounds, jaundice, eye disorders, venomous bites, indigestion, and many other ailments.

There are two other invasive knapweeds here in the U.S., diffuse and Russian. The three species can be identified by their bracts. Spotted knapweed bracts are, well, spotted, diffuse knapweed bracts have rigid sharp spines, and Russian knapweed has opaque bracts. While

they are all invasive and should all be controlled, the exact method of control depends on the species. This article will focus on identification and control of spotted knapweed.

Spotted knapweed is native to central, eastern, and southeastern Europe. It was introduced into the U.S. in the late 1800s, probably as seeds in contaminated alfalfa and/or in ships' ballasts. In 1920, it was limited to the San Juan Islands in Washington state. By 1980, it had spread to 48 counties in the Pacific Northwest. Today, it is reported in 45 states (including Virginia) and is listed as a noxious or restricted weed in at least 15 of them. Spotted knapweed is estimated to affect 6.9 million acres in the U.S., including 89 national parks.

How to Identify Spotted Knapweed

Roots: Deep, stout taproot

Form: An herbaceous biennial or perennial plant. In the spring of the first year, it grows as a rosette. In the second year and beyond, plants have several (1-20) branched, upright stems, 3 to 5' tall. The woody shrub is dull green and covered with small rough hairs.

Stems: Slender, hairy, upright, stiff, and branched. Small plants usually have an unbranched stem and one flower head. Large plants have many branches and over 100 flower heads.

Leaves: Basal leaves at the base of the plant are up to 8" long, deeply lobed, and arranged in a rosette. As they move up the stem, leaves become smaller (1-3") and more linear. The leaves are alternately arranged, medium-green with a silvery cast, and a rough surface. The uppermost leaves are more bract-like.

Flowers: The pink to purple flowers bloom from May through October and occur at the ends of branches. They are small (0.2-0.4" long), oval, and thistle-like. Each flower head has stiff bracts (modified leaf structures just below the flower) marked with fine, vertical streaks and tipped with dark, comb-like fringes that give the flower head a spotted appearance.



The arrows point to the spots on the bracts of the flower. These spots distinguish spotted knapweed from the similar diffuse and Russian knapweeds. This photo also shows the alternately-arranged lanceolate leaves on the upper stems. Photo by:

Jennifer Gagnon, Virginia Tech.

Seeds: Seeds develop in erect, slender, green pods that turn pale brown when mature. The seeds are 0.1" long, oval, and shiny black or brown with pale, vertical lines. At the tip of each seed is a short, bristly pappus (a ring of fine feathery hairs) that enables wind dispersal. Seeds are also dispersed by seed-eating animals. Seeds can remain dormant for 5 or more years.

How to Control Spotted Knapweed

Manual: For small, localized infestations, digging up or pulling individual plants can be an effective means of control. This method is easiest after the plants have bolted and left the rosette stage, and when the soil is moist. Remove as much root as possible and monitor the

area for new plants. Gloves and long sleeves are recommended for this activity, as spotted knapweed can be a skin irritant.

Mowing spotted knapweed can be effective if mowing is continued throughout the growing season until the first hard frost. Simply mowing the plants once will cause them to regrow and flower within weeks.

Chemical: Small, young infestations of knapweed are generally easy to control with herbicides. However, treated areas must be monitored for several years and retreated as necessary. Before using any herbicide, double-check the label for appropriate application methods and any site-specific restrictions.

Rosettes can be sprayed in the fall to prevent them from bolting and seeding the following year. Larger plants should be sprayed in spring or early summer before seeds have formed.

According to the 2020 Pest Management Guide: Home Grounds and Animals (VCE Publication ENTO-336P), 2,4-D is an effective active ingredient when used in conjunction with dicamba, MCPP, or dicamba + MCPP. Glyphosate is also effective, but is non-selective, meaning it may kill nearby desirable vegetation as well. Spray herbicide on the entire leaf and stem surface of actively growing plants; do not cut the stem until plants are dead, since this stops the plant from absorbing the chemical. A heavy seedling infestation can be efficiently controlled with an herbicide application in spring, followed by an application later in the summer or fall if needed.

As with any invasive control program, continued monitoring for new infestations is essential, as is reclaiming the site quickly with desirable vegetation.

As for my infestation, it is neither small nor young. The plants in the pollinator gardens will be hand-pulled in the spring. My plan is to work with the farmer to whom we lease our hay fields and see what he wants to do in those areas. He already does spot control of the multiflora rose, so hopefully he'll be willing to take on spotted knapweed as well.

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