PURPLE STARTHISTLE
Centaurea calcitrapa

Life History/Identification:

Purple starthistle is a close relative of yellow starthistle and is primarily a biennial plant that sometimes acts as an annual or a short-lived perennial. The scientific name comes from the word "caltrop," an ancient weapon with four spine-like projections that was used against mounted warriors to obstruct their passage. As its name suggests, sharp spines that are about one inch long protect the flowers of purple starthistle. Mature plants are about one to four feet tall, have a stout taproot, and are densely and rigidly branched. Young stems and leaves have fine, cobwebby hairs that fall off with time, giving older leaves a smooth characteristic. Lower leaves are deeply divided into oblong-linear segments, while the upper leaves are narrow and undivided and taper off at the tip. This plant produces numerous flower heads, ranging from ¾ to one inch long, and the flowers vary from lavender to a deep purple hue. Purple starthistle can be distinguished from yellow starthistle mainly by flower color, however, when the flowers have not yet bloomed, yellow starthistle can be identified by the wing-like leaf margins on the stem. Fruits of purple starthistle are about 1/8 of an inch long and do not have bristles. They are straw colored and mottled with dark brown. Seeds will develop soon after bees visit and pollinate the flowers. Because this weed has a reduced pappus, a structure that facilitates seed dispersal, most seeds fall to the ground near the parent plant. This creates a large seed bank in the soil that can remain viable for many years. Seedheads also break off easily and stick to animals, vehicles, and can be transported by moving water. The sharp spines are particularly well suited for attaching to rubber tires, where they can be transported to great distances and begin new colonies. Purple starthistle spends roughly one year as a prostrate rosette before bolting and flowering. The rosettes leaves are deeply divided with a circle of spines residing in the center.

Flagstaff Localities:

Purple starthistle is a native of Asia Minor from a region that encompasses the Mediterranean, southern Europe, and northern Africa. It was accidentally introduced into California in the early 20th century, and it was also reported in Ellensburg, Washington in 1929. Recently the pest has invaded and established itself in Idaho, New Mexico, Oregon, and within the Arizona strip. It is not yet a serious problem in northern Arizona, but control methods must be implemented in order to keep purple starthistle from forming dense monocultures that choke out native plants. Look for the plant in waste sites, uncultivated fields, in moist, grazed areas, and along roadsides and cattle trails.

Economic Impact:

Like yellow starthistle, purple starthistle is extremely aggressive and poses a major threat to annual rangelands. In California, from San Diego County in the south to Humboldt County in the north, this noxious weed has dominated native plants and has choked out a fragile ecosystem. The plant is unpalatable to both wildlife and livestock due to its poor taste and its spine-covered flowers and seedheads. Unmanaged populations of the plant threaten the quality of grazing lands, thrive in healthy, moist soils, reduce forage production, and decrease the overall health of native plants. Animals avoid purple starthistle infestations, thereby reducing grazing potential and causing a reduction in the cattle carrying capacity of rangelands. In recreational areas, such as parks and public lands, the weed degrades the usefulness of the land and inhibits proper management.

Control:

Integrated pest management systems are most effective when purple starthistle is concerned, particularly plans that incorporate containment, reduction, and ultimately eradication. On grazing lands, combining the suppression of the weed with the enhancement of perennial grass species is imperative for success. Grazing always gives starthistle an ecological advantage over grasses, so a 12-18 month period of rest from livestock grazing may be required after a treatment.

Cultural Control:

Monitor and eradicate small, new infestations of purple starthistle. Insist on certified weed-free hay and forage. Check soil sources for weed seeds before introducing the soil to new areas, such as highway median strips or other types of roadways. Prevent vehicles from moving freely between infested and non-infested areas. Thoroughly clean vehicles after using land that is infested with purple starthistle. Permit animals to graze weeds only after they flower and set seed. If this is impossible, contain animals for 7-14 days in a holding area before moving them to a non-infested plot.

Mechanical Control:

Hand pulling or grubbing purple starthistle is most effective for small infestations or on individual plants that border new invasions. Because manual removal is labor intensive, it is usually applied to small populations unless greater resources are attained. It is generally more effective to concentrate on older plants that are more conspicuous than rosettes, which are sometimes difficult to find. Remove the plants before seeds are formed to prevent the increase of the viable seed bank. Mowing has proven to be ineffective against purple starthistle, and, like yellow starthistle, can cause resprouting populations to explode.

Chemical Control (*Noted here are chemical control techniques that have been used in other areas. Always check with weed specialists or chemical suppliers before treatment to ensure correct dosage and application. Mention of these products does not imply endorsement by the Northern Arizona Weed Council or The Nature Conservancy.)*:

It is very important to apply herbicide on purple starthistle before seeds are produced, when food reserves are at their lowest. Apply herbicides directly to the tops of the individual plants. Use just enough of the poison to cover the crowns of the plant, but not so much that it drips onto the vegetation below. If the native vegetation is killed along with purple starthistle, it increases the likelihood of the weed's seed bank to reestablish itself in the bare patches. Add a non-toxic, biodegradable dye to the herbicide to facilitate even coverage and the identification of the treated plants. Glyphosate, 2,4-D, dicamba, and picloram have been effective against the spread of purple starthistle.

Biological Control (*No exotic species should be introduced into an ecosystem without extensive research into the long-term effects. Mention of the species below does not imply appropriateness for use in Northern Arizona.)*:

Currently, there is no biological control program available for purple starthistle. Two insects that have been introduced to control other *Centaurea* spp. were observed feeding on the weed; however, they do not specifically control purple starthistle. An airborne rust fungus that is used as a control agent for yellow starthistle also attacks purple starthistle leaves, thereby reducing leaf longevity. Despite attack, purple starthistle can withstand rust invasion with little effect on the root biomass of the plant. The long-term effect on the plant is largely unknown.

Note: No single control method, or any one-year treatment plan, will ever achieve effective control of an area contaminated with purple starthistle. The fast growth, deep root system, fast rate of spread, and high seed viability of this plant require long-term cooperative integrated management programs and planning to prevent, contain, and reduce purple starthistle infestations.

Moser, L; D. Crisp. San Francisco Peaks Weed Management Area fact sheet on Centaurea calcitrapa. Coconino National Forest.