

Scotch thistle (*Onopordum acanthium*)

Family: Asteraceae (Compositae)

Legal Status: Class B

Updated April 2000

Description and Variation: Scotch thistle is a branched, robust biennial (or sometimes annual) that often grows 8 feet or more in height and 6 feet in width. Main stems may be up to 4 inches wide at the base. Stems have vertical rows of prominent, spiny ribbon-like leaf material or “wings” that extend to the base of the flower heads.

Leaves, which are armed with sharp, yellow spines, are up to 2 feet long and 1 foot wide. Upper and lower leaf surfaces are covered with a thick mat of cotton-like or woolly hairs, which give the foliage a gray-green appearance. Plants flower in mid-summer. The globe-shaped flower heads are borne in groups of 2 or 3 on branch tips. Flower heads are up to 2 inches in diameter, with long, stiff, needle-like bracts at the base. Flowers range from dark pink to lavender. Seeds are smooth, slender, and plumed (Dewey 1991; Callihan and Miller 1998).

Economic Importance: *Beneficial:* Scotch thistle is sometimes sold as an ornamental plant. It has reportedly been used to treat cancers and ulcers and to diminish discharges of mucous membranes. The receptacle was eaten in earlier times like an artichoke. The cottony hairs on the stem have been occasionally collected to stuff pillows. Oil for Scotch thistle seeds has been used in Europe for burning and cooking. Scotch thistle is the national emblem of Scotland (Grieve 1971).

Detrimental: Scotch thistle is a weed problem on western rangeland that produces significant economic losses for ranches (Cargill et al. 1998). Infestations of Scotch thistle reduce forage production and virtually prohibit land utilization for livestock. Dense stands of the large, spiny plants constitute a barrier to livestock movement, almost totally excluding animals from grazing and access to water (Hooper et al. 1970; Sindel 1991).

Scotch thistle can spread rapidly. For example, it was first found in Utah in 1963. By 1981, it covered approximately 6070 hectares in 17 counties. Eight years later, it had spread to cover more than 22,540 hectares in 22 counties (Dewey 1991).

Geographical Distribution: Scotch thistle is native to Europe and Asia (Cargill et al. 1998). The Mediterranean region is the developmental center for the genus, with most *Onopordum* species occurring in Mediterranean or sub-Mediterranean regions (Mucina 1989). The plant has been widely introduced at mid-latitudes across much of North America (Taylor 1990). In Washington, Scotch thistle is found in most counties east of the Cascades. It has also been reported from Clallam, Thurston and Pierce counties in western Washington.

Habitat: In Europe, Scotch thistle is well-established in continental areas with summer-dry climates (Mucina 1989). In the western U.S., Scotch thistle infests wet meadows and pastures, as well as more arid big sagebrush (*Artemisia tridentata* Nutt.) sites (Hooper et al. 1970). Scotch thistle is often associated with waste places, as well as rivers, streams, canals, or other waterways. It can also be abundant in dry pastures, fields, and rangeland (Dewey 1991). In particular, the plant thrives in light, well-drained, and sandy or stony soils (Piper 1984). Temperature and moisture, rather than soil nutrient concentrations determine the ecological performance of *Onopordum* species (Austin et al. 1985 cited in Sindel 1991).

In Europe, the plant tends to colonize disturbed pastures. In its native range, Scotch thistle is considered a weak competitor that needs regeneration gaps to develop and maintain stands; populations tend to retreat when disturbance ceases (Mucina 1989).

History: Scotch thistle has been credited with helping Scotland fend off Viking invasion. As the Vikings moved into Scotland for a sneak attack, they yelled out in pain when they stumbled through thistle plants. Their cries alerted the Scots and allowed them to push out the Vikings. Since then, Scotch thistle has been the national emblem of Scotland. Scotch thistle was probably introduced to North America as an ornamental plant in the late nineteenth century (Callihan and Miller 1998; Young and Evans 1969).

Growth and Development: Scotch thistle is usually a biennial, although it can behave as a winter or summer annual or a short-lived perennial under certain situations (Piper 1984; Hooper et al. 1970). As a biennial, Scotch thistle typically lives for two growing seasons. Seeds usually germinate in the late fall, but germination can occur at other times, as well. Seedlings that appear in late autumn behave as true biennials, but seedlings produced during late summer or early autumn behave as annuals. During its first year, Scotch thistle produces a rosette with a taproot that may extend down 1 foot or more. Early in the second year, the plant bolts (Piper 1984). Flowering occurs July to September (Hitchcock et al. 1955).

Reproduction: Plants produce 8,400 to 40,000 seeds (Young and Evans 1969 cited in Sindel 1991). Reports on seed longevity in the soil vary from unknown (Groves et al. 1990 cited in Sindel 1991) to up to 20+ years (Joley et al. 1998). Seeds are dispersed locally by wind; humans, water, livestock, and wildlife are involved in longer-distance dispersal (Piper 1984). Seeds are sensitive to light. While some seeds will germinate in the dark, studies indicate that most germination occurs with alternating light/dark cycles, with 8 hours being the optimal day length (Young and Evans 1972).

Response to Mechanical Control Methods: Small areas can be eradicated by digging. Plants must be cut off below the soil, leaving no leaves attached (Julian and Rife). Mowing has limited effectiveness for controlling Scotch thistle. It usually only prevents seed production if done either immediately prior to flowering or when plants are just starting to flower. When mowing is conducted too early, it may only delay flowering. However, when plants are cut too late in the flowering process, viable seed may still develop in the capitula following cutting. Because there can be a wide variety in the maturity of plants, a single mowing is unlikely to provide satisfactory control (Sindel 1991).

Response to Cultural Control Methods: Establishing and maintaining dense, vigorous, competitive pasture can effectively prevent Scotch thistle establishment. Healthy pasture is particularly important in the autumn, when most Scotch thistle seeds germinate. Thistle invasion is unlikely to occur in ungrazed pasture. Goats will graze Scotch thistle, reducing plant numbers and preventing seed production (Sindel 1991).

Response to Herbicides: Picloram, dicamba, 2,4-D, dicamba + 2,4,-D, and metsulfuron are effective for controlling Scotch thistle (Beck 1991; Cargill et al. 1998). Application rates vary depending on stand density and environmental conditions. Herbicides should be applied in the spring before Scotch thistle bolts, or in the fall to rosettes (Beck 1991). . For chemical control recommendations, refer to the *Pacific Northwest Weed Control Handbook*, an annually revised publication available from Washington State University Cooperative Extension.

Biocontrol Potentials: No biological controls are currently available in the United States. Australia has released several biocontrol insects, but some of them have failed host specificity tests in the U.S. Additional insects are being evaluated by USDA for release in the U.S. (Joley et al. 1998).

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