Acroptilon repens

Russian Knapweed (L.) D.C., Asteraceae

Common Names:

Russian Knapweed, Mountain Bluet

Nomenclature: Other names for this species include *Centaurea repens* and *Centaurea picris*

NATIVE RANGE

Mongolia, western Turkestan, Iran, Turkish Armenia, and Asia Minor

DESCRIPTION

Acroptilon repens, perennial herb, is a member of the Aster family. It has erect stems and ranges in height from 3 to 8 dm (Welsh *et al*. 1993). *A. repens* is extensively branched with solitary flower heads terminating each branch (Lacey *et al*. 1995, Cronquist 1994). Leaves are both basal and cauline. Both are covered with fine hair giving the plant a bluish-gray appearance (Lacey *et al*. 1995, Whitson *et al*. 1991, University of Illinois Agricultural Experiment Station 1976). Basal leaves are deeply notched and form a rosette which often is withered by the time of flowering (Cronquist 1994, Taylor 1990, Whitson *et al*. 1991, University of Illinois Agricultural Experiment Station 1976). Cauline leaves are sparcely toothed and alternately arranged on the stem (Watson 1980); these leaves attain a maximum size of 15 cm long and 4 cm wide (Cronquist 1994). Leafs are small and alternately arranged leaves which support buds in their axils (Watson 1980, Ball and Robbins 1931). These buds develop into adventitious shoots allowing for colonization of large areas quickly (Watson 1980, Ball and Robbins 1931, Whitson *et al*. 1991).

A. repens, reproduces vegetatively and has an extensive root system, which enables it to form large stands.

Flowers are solitary, urn-shaped, and pink to purple in color (Cronquist 1994, Lacey *et al*. 1995, Taylor 1990, Watson 1980, Welsh *et al*. 1993). Upon maturity, these flowers turn straw-colored (Watson 1980, Welsh *et al*. 1993). An easily recognizable characteristic of the flower of *A. repens* are its inner and outer involucral bracts. *A. repens* flowers from July to September in Canada and from June to October in the United States (Watson 1980).

The seed of *A. repens* is a flattened, glabrous, ivory- colored achene (Watson 1980, Cronquist 1994). This achene is 2-3 mm long, 2 mm broad and 1 mm thick with a deciduous pappus of unequal bristles (Cronquist 1994, Watson 1980). The achenes are retained in cup-shaped seed heads.

ECOLOGICAL THREAT

In 1967*, Acroptilon repens* was designated a prohibited noxious weed in the Federal Seeds Act of Canada; however, it does not appear on the U.S. Federal Noxious Weed List (Watson and Harris 1984). On the Colorado Plateau, it is considered an Arizona 'restricted noxious weed', a 'designated undesirable species' in Colorado, a New Mexico 'candidate species' for the noxious weed list, and a Utah 'designated' weed species. This species is also listed on the the Arizona Interagency Noxious Weed List.

Once established, the allelopathic effect of *A. repens* excludes desirable plants allowing the formation of single species stands. These stands have been reported to survive for more than 75 years (Watson 1980). In addition, the allelopathic effects of this plant greatly reduce crop production in agricultural situations (Renney and Dent 1958, Watson 1980, Fletcher and Renney 1963). The presence of *A. repens* in hay decreases feeding value and lowers market price as it is toxic to horses (Young *et al*. 1970, Watson 1980, Morrison *et al*. 1995).

DISTRIBUTION

A. rubens is now established on every continent (Rosenthal 1995). In the U.S., this exotic has been recorded in 26 western and mid-western states (Plants Database), which includes all Colorado Plateau states. California, Idaho, Montana, Oregon, and Washington contain the greatest densities of this exotic (Rosenthal 1995). The table below provides infestations by county within Colorado Plateau states.

Infestations on the Colorado Plateau by state and county from 1985.

Arizona		Colorado		New Mexico		Utah	
Apache	Graham	Delta	Boulder	Bernalillo	Sandoval	Cache	Morgan
Coconino	Greenlee	Dolore	El Paso	Catron	San Juan	Carbon	Rich
Navajo	Mohave	Garfield	Huerfano	Guadalupe	Santa Fe	Daggett	Sanpete
Cochise	Pima	Larimer	Jackson	McKinley	Sierra	Davis	Sevier
Gila	Yavapai	Moffat	La Plata	Otero	Socorro	Emery	Tooele
		Montezuma	Las Animas	Quay	Taos	Garfield	Utah
		Mesa	Pueblo	Tio Arriba	Valencia	Iron	Washington
		Montros	Rio Blanco			Juab	Wayne
		Saguache	Routt			Millard	Weber
		Adams	San Miguel				
		Archuleta	Weild				

Distribution of this exotic occurs throughout the Colorado Plateau. In Arizona, *A. repens* infestations have been reported in Apache, Coconino, Navajo, Cochise, Gila, Graham, Greenlee, Mohave, Pima, and Yavapai counties; infestations appear to be most severe on tribal lands in Coconino, Navajo, and Apache counties (Maddox *et al*. 1985). Infestations in Colorado include Delta, Dolores, Garfield, Larimer, Moffat, Montezuma, Mesa, Montros, Saguache, Adams, Archuleta, Boulder, El Paso, Huerfano, Jackson, La Plata, Las Animas, Pueblo, Rio Blanco, Routt, San Miguel, Weild counties totalling an estimated 20,234 ha of infested land (Maddox *et al*. 1985). In New Mexico, *A. repens* infestations

occurred in Bernalillo, Catron, Guadalupe, McKinley, Otero, Quay, Tio Arriba, Sandoval, San Juan, Santa Fe, Sierra, Socorro, Taos, and Valencia counties. In Utah, Cache, Carbon, Daggett, Davis, Emery, Garfield, Iron, Juab, Millard, Morgan, Rich, Sanpete, Sevier, Tooele, Utah, Washington, Wayne, and Weber counties contain this exotic (Maddox *et al*. 1985). These distributions reflect data compiled in 1985, so current infestations may be more extensive.

HABITAT IN U.S.

A. repens is highly adaptable occurring in most soil types and is prolific in both moist and arid climates (Watson 1980, Selleck 1964). Its heartiness creates a serious concern for arid and semi-arid ecosystems of British Columbia and the southwestern United States (Fletcher and Renney 1963).

A. repens is a strong competitor and forms dense colonies in disturbed areas (i.e. roadsides, riverbanks, pastures, and cropland) (Cronquist *et al*. 1994, Whitson *et al*. 1991, Harrod and Taylor 1995).

BACKGROUND

A. repens was introduced several times into the U.S. around the turn of the century in shipments of impure Turkestan alfalfa (Groh 1940, Ball and Robbins 1931, Whitson *et al*. 1991). After initial infestation, dispersal between sites occurs mainly through the distribution of impure hay and through attachment of seeds or root pieces to machinery and vehicles (Taylor 1990, Watson 1980, Lacey *et al*. 1995, Dall'Armellina and Zimdahl 1988, Whitson *et al*. 1991). Although *A. repens* is not a prolific seed producer, the species is a serious problem due to its ability to spread vegetatively once established, making it difficult to control (Lacey *et al*. 1995).

Flower and rhizome production appears to be negatively corralated with a reduction in sunlight availability (Dall'Armellina and Zimdahl 1988). Therefore,

infestations that occur during advanced stages of crops' life cycle may be less successful than infestations occurring during optimal sunlight availability (Dall'Armellina & Zimdahl 1988). Thus, proactive preventative measures could inlcude shorter row spacing intervals and increased crop plant densities.

METHODS OF REPRODUCTION AND DISPERSAL

The root system of this exotic can extend more than 7 meters below the soil surface and radiate more than *?????* (Selleck 1964). First year root growth may exceed 2-2.5 meters with second year growth around 5 to 7 meters (James *et al*. 1991). Located on these roots are buds producing rhizomes which initiate shoots when the soil surface is reached (Dersched *et al*. 1960, Watson 1980). Dense patches may exceed 300 shoots/m2 and in this way *A. repens* is able to outcompete and exclude desirable vegetation (James *et al*. 1991, Morrison *et al*. 1995, Maddox *et al*. 1985).

Acroptilon repens does not self-pollinate, nor is it a ***high seed producer*** (Watson 1980, Maddox *et al*. 1985) It reproduces primarily vegetatively, which tends to increase the potential success of this species by promoting genetic diversity and increasing the likelihood of dispersal into into natural habitats (Harrod and Taylor 1995). Seed production serves primarily for dispersal into new areas. Additionally, Selleck (1964) reports this exotic can be dispersed along river corridors during flooding events; the plants are uprooted and transported downstream becoming established in the disturbed riparian areas. Flowering occurs late in the year when competition for pollinators is reduced, thus increasing reproductive success (Harrod and Taylor 1995).

CURRENT MANAGEMENT PRACTICES

Current biological control measures consist of a gall-forming nematode (*Subanguina picridis*), which forms galls on the stems, leaves and root crown of this exotic. This important biological control agent (Rees *et al*. 1995) was introduced to Washington state in 1984 (Watson 1986b, Rees *et al*. 1995); it is

now well established in Washington, as well as Colorado, Montana, Oregon, Utah, and Wyoming (Rees *et al*. 1995). Additional studies are underway to evaluate the potential introduction of *Aulacida acroptilonica* (a gall-forming wasp) and *Puccinia acroptili* (a rust fungus that infects foliage) (Rosenthal 1995) as biological control agents.

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Links to other *Acroptilon repens* web sites

Biocontrol of Russian Knapweed

Distribution of *Centaurea repens* in Utah