



INVASIVE ALIEN SPECIES

Squarrose knapweed (*Centaurea virgata* ssp. *squarrosa*)

aka Protean knapweed

SK Provincial Designation: Prohibited

Overview:

Squarrose knapweed is a long-lived perennial native to southwest Asia and the Middle East.³ Its method of introduction is not known, but it became weedy in the western U.S. in the 1950s and its spread was associated with the trailing of sheep.³ It is a tap rooted plant which develops a rosette of leaves in its first year of growth and then develops a woody root crown from which flowering stalks grow each season. Under unfavorable conditions squarrose knapweed plants can remain as rosettes for several years.³

Squarrose knapweed appears to be well adapted to the harsh climate of shrub steppe environments,³ making it a serious invader of these dry, rocky rangelands.

Squarrose knapweed flowers from June to August and seed dispersal continues through the winter.³ Basal leaves often wither by flowering. Seed heads are deciduous at maturity, although some seed heads can remain on the plant into the following spring.³ A Utah study of sheep coming off winter range found mature squarrose seed heads in the topknot of 73% of sampled ewes. The germination rate of the recovered seeds was 69%.⁴

The flower head and bracts are very similar to diffuse knapweed (*C. diffusa*) but squarrose heads are more slender and urn-shaped.³



ABOVE: Squarrose knapweed flower (photo by Steve Dewey, Utah State)

Habitat:

Squarrose knapweed prefers coarse, well drained soils on sites with cold winters and dry, hot summers. It is tolerant of alkaline soils and summer drought.

Identification:

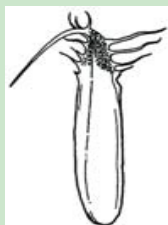
Stems: Several highly branched, rough textured stems grow 20-50 cm tall. Stems are covered with tiny, fine hairs and tiny resin dots.¹

Leaves: Basal and lower stems leaves are 10-15 cm long, with petioles, and minutely resin-gland-dotted. Leaf margins are pinnately or bi-pinnately lobed. Leaves decrease in size upper stem, are sessile (no petioles) or almost bract-like and may be simple or pinnately divided.¹

Flowers: Flowers are solitary at branch tips and composed of 10-14 linear, pink or pale purple florets.¹ Flower heads are small (7-8 x 3-5mm) and narrowly oval or cylindric. The base of flower heads are covered with overlapping bracts which pale green or straw colored, oval to lance shaped, sometimes purple tinged, smooth or finely hairy.¹ Bract margins have 1-3 mm recurved spines, the terminal spine longer and stouter than the four to six pairs of lateral spines.³ Seeds are light brown or straw colored, 2.5-3 mm long, with a pappus of 1-2.5 mm white bristles.¹ Seeds may have faint linear stripes and an oblique scar where they detach from the head.³



Flowerhead (left) and bract (right)



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Squarrose knapweed *(continued)*

Prevention:

Seeds can be dispersed in soil, hay, animal hair/fur or by plants caught in vehicles. Rangelands susceptible to squarrose knapweed invasion must be kept in a healthy condition.

Control:

Grazing: Squarrose knapweed is palatable in the rosette stage, but palatability and nutrition diminish with plant maturity. Since the spiny bracts of seed heads can attach to animal fur any grazing of squarrose knapweed infested areas will likely only contribute to weed spread. *Invasive plants should never be considered as forage.*

Mechanical: Small infestations can be hand pulled or dug up before seed set. The root crown must be removed to prevent re-sprouting. Cultivation needs to cut the root at least 20 cm below the soil surface to prevent re-sprouting. Dislodged rosettes can continue to grow if they are attached to a piece of root that touches the soil.³ Once a seed bank has developed seasonal control efforts will be required for many years.



ABOVE: Squarrose knapweed infestation

RIGHT: Squarrose knapweed plant

Both photos by Steve Dewey, Utah State University, Bugwood.org

Chemical: Currently there are no herbicides registered for use on squarrose knapweed. Consult your Regional Forage Specialist, the Agriculture Knowledge Centre at 1-866-457-2377 or the Guide to Crop Protection for more details.

Biological: Two gall flies (*Urophora quadrifasciata*) introduced to control spotted and diffuse knapweed also reduce the seed production of squarrose knapweed.³



References

- 1 *Centaurea virgata* ssp. *squarrosa* in Flora of North America. www.efloras.org
- 2 Identification of Knapweeds and Starthistles in the Pacific Northwest. PNW 432. Pacific Northwest Extension.
- 3 C. Roché, L.C. Burrill. Squarrose Knapweed. 1994. Oregon State University Extension Service. Reprinted July 2008 as PNW 422-E, Pacific Northwest Extension.
- 4 C. T. Roché, B. F. Roché Jr., G.A. Rasmussen. Great Basin Naturalist. 1992. Vol. 52 No. 2

Always follow the product labels. Pesticides should only be applied by certified pesticide applicators. The use of pesticides in any manner not published on the label or registered under the *Minor Use of Pesticides* regulation constitutes an offence under both the *Federal Pest Control Products Act* and provincial acts in Saskatchewan. For the latest information on pesticides for agricultural use in Saskatchewan, please consult the provincial *Guide To Crop Protection*, produced annually by the Saskatchewan Ministry of Agriculture.