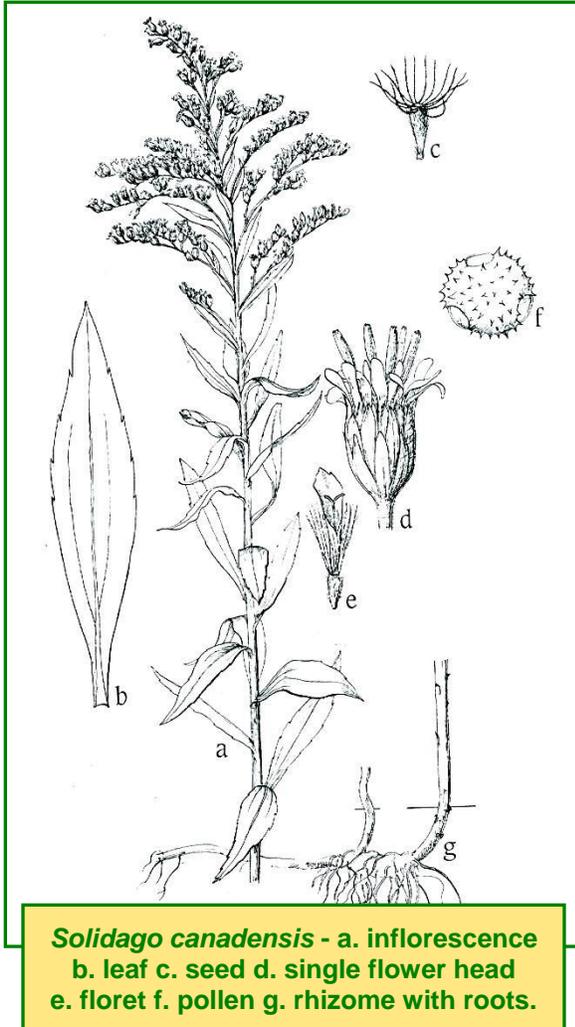


Scientific Name: *Solidago canadensis* L.

Family: Asteraceae

Common Names: Canada goldenrod, common goldenrod



Plant Description

Erect robust perennial herb; slender leafy stems 30 to 90 cm high, pubescent at the summit below the inflorescence, growing from long creeping rhizomes (5 to 12 cm long) that can form large clonal colonies; leaves lanceolate, acuminate, serrate crowded 4 to 7 cm long, three-nerved, rough/hairy above and below, basal and lowest leaves are reduced and soon fall off; numerous small flower heads in narrow or broadly pyramidal terminal clusters on ascending

branches; yellow ray flowers (10 to 17) 1 to 3 mm long with 3 to 5 mm high involucre and linear pointed bracts (Moss 1983).

Fruit: Achenes with attached pappus (Pahl and Smreciu 1999).

Seed: Achenes tan brown, hairy, with a pappus of fine white hairs (Pahl and Smreciu 1999).



Habitat and Distribution

Found in open woods, moist meadows and roadsides, damp thickets, abandoned farmland, and tall-grass prairies. Fairly shade tolerant.

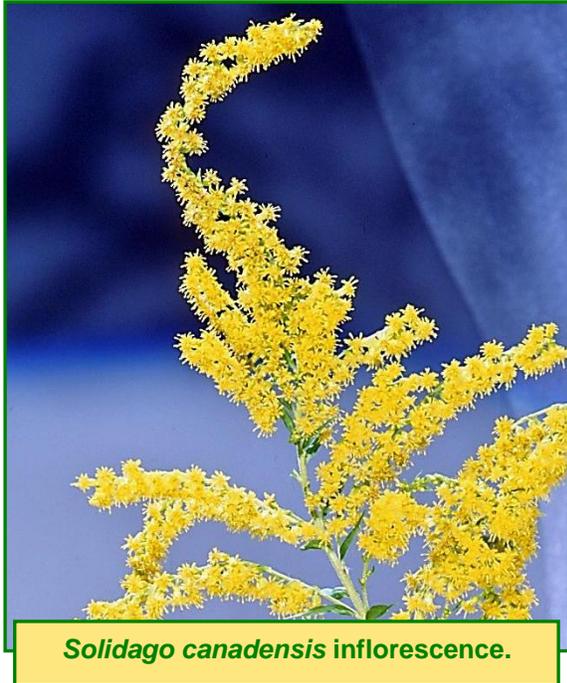
Seral Stage: Early seral; colonizes disturbed sites.

Soils: Tolerant of a wide range of soil fertility and texture however it is most common on moist but not waterlogged soils and rarely on dry sites (Rook 2002).



Can tolerate soil pH ranging from 4.8 to 7.5 and is shade and salt intolerant (USDA NRCS n.d.).

Distribution: Widespread across Canada and USA and scattered north to the Arctic Circle. Alaska, Yukon, southwestern District of Mackenzie to Hudson Bay, Newfoundland south to California, New Mexico, Texas, Florida (Moss 1983).



Phenology

Flowers late July to early August. Seeds mature from late August to October (Pahl and Smreciu 1999).

Seeds are gradually dispersed during the autumn and winter months (Coladonato 1993).

Rhizomes are produced in late autumn, lie dormant during the winter months and shoot growth proceeds in the following spring.

Pollination

Insect pollinated (honeybees, bumblebees, soldier beetles and syrphid flies) (Werner et al. 1980).

Cross-pollinating and self-incompatible. 55% pollen viability and no apomixis (Pahl and Smreciu 1999).

Seed Dispersal

Seed borne on pappus for wind dispersal.

Genetics

2n=18, 36, 54 (Moss 1983).

Symbiosis

Associates with *Endogone* sp. (Werner et al. 1980).

Colonized by arbuscular mycorrhizal fungi (Bohrer et al. 2004).

Forms symbiosis with AMF *Glomus constrictum* (more competitive in newly reclaimed sites) and *Glomus mosseae* (more competitive in older reclaimed sites) (Jin et al. 2004).

Seed Processing

Collection: Snip ripe stems.

Seed Weight: 0.085 to 0.1027 g/1,000 seeds (0.0943 g/1,000 seeds average).

Harvest Dates: Late August.

Cleaning: Pull seeds from seed heads or shake free.

Rub seeds with pappus between corrugated rubber in a box. Sieve to remove seeds from chaff using 1/25 inch round top screen and 45 x 45 mesh bottom screen. Small chaff and dust can be removed by winnowing (Pahl and Smreciu 1999).

Alternatively, pappus with attached seeds can be placed on a sieve with mesh size large enough to let seeds through and stacked on a sieve that will catch the seeds. Place a smaller sieve over the top sieve and direct a strong flow of air (such as that produced by a reversed vacuum) through the top sieve. Seeds will be removed from the pappus and lodge in the small mesh sieve (Pahl and Smreciu 1999).

Storage Behaviour: Uncertain (Royal Botanic Gardens Kew 2008).

Storage: Store cool in sealed containers (Wick et al. 2008).

Longevity: Up to 5 years (Wick et al. 2008).

Propagation

Natural Regeneration: From seed and creeping rhizomes that grow near the base of the current years shoot after the first year of growth. Each rhizome can

produce a single shoot from its apical tip and each shoot can produce 2 to 6 (or more) daughter rhizomes. This forms a cluster of stems.

Germination: Bradbury (1973) obtained 50% germination after 40 days (seeds collected before the first frost, no pre-treatments).

Werner et al. (1980) obtained 75% germination for seeds collected before first frost and allowed an after ripening period of 90 days.

Pre-treatment: None.

Direct Seeding: Greenhouse and nursery practice is to lightly cover seeds and keep evenly moist for 3 weeks of establishment and 5 weeks of active growth (Wick et al. 2008).

Seeding Rate: USDA NRCS (n.d.) recommends between 11,900 and 25,700 seeds/hectare.

Vegetative Propagation: With rhizome cuttings and by dividing mature plants (Pahl and Smreciu 1999).



Aboriginal/Food Uses

Food: None known.

Medicinal: Boiled leaves and stems are used to make decoction to treat kidney and bladder problems or constipation. Once cold, the decoction can also be used as a wash to dry weeping sores (Marles et al. 2000).

Used to treat sore throats by mixing mashed leaves and grease. Used as an ingredient for astringents and

diuretics and sometimes claimed to treat diphtheria (Royer and Dickinson 1996).

Other: The flower clusters can be used to make a strong yellow dye (Johnson et al. 1995, Royer and Dickinson 1996).

Wildlife/Forage Usage

Wildlife: White-tailed deer graze on it in the late summer and autumn (Coladonato 1993). Browsed by elk and mule deer (Pahl and Smreciu 1999).

The nectar is an important forage source for bees and butterflies and is also attractive to birds (Lady Bird Johnson Wildflower Center 2010).

Livestock: Good to fair palatability for cattle, sheep and horses (Coladonato 1993).

Grazing Response: Increaser; ability to spread readily by its vigorous rhizome growth (Tannas 1997).

Reclamation Potential

Solidago canadensis is a pioneer invader following disturbances (Coladonato 1993).

Has been shown to tolerate high heavy metals and moderate salt concentrations on a former cokery site (Immela et al. 2012).

It has aggressive vigorous rhizome growth which is recommended for re-vegetation of disturbed sites (provided there are good soil and moisture conditions) (Tannas 1997). It provides rapid and complete cover for erosion control (Pahl and Smreciu 1999).

Commercial Resources

Availability: Seed is commercially available in Alberta (ANPC 2010).

Cultivars: No known cultivars.

Uses: Essential oil for aromatherapy, dried herb and flower arrangements. Grown widely in western Europe for ornamental purposes (Werner et al. 1980), and to produce different shades of dye (Coladonato 1993).

Notes

S. canadensis can become a considerable invader in poorly managed pasture, and a pest in forest nurseries

and in perennial gardens and crops (Werner et al. 1980).

Goldenrod responds positively and is generally enhanced following low to moderate-severity fires because of its soil-stored seed and underground rhizomes (Coladonato 1993).

Unlike popular belief that *Solidago* species are the main cause of late summer hay fever, according to a study based out of New York, the atmospheric pollen of *Solidago* averaged only 1% to 2% of the total pollen caught. Other allergenic plants such as ragweeds are more abundant and prolific and contribute more to the hay fever syndrome. *S. canadensis* has three microorganisms (powdery mildew, root rot and needle blister rust of pine) that are pathogenic to economically important plants (Werner et al. 1980).

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Photo 1: T.Voekier,

<http://species.wikimedia.org/wiki/Solidago>

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http://upload.wikimedia.org/wikipedia/commons/2/26/Solidago_canadensis_20050815_248.jpg

Line Diagram: John Maywood, used by permission of Bruce Peel Special Collections, University of Alberta.

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