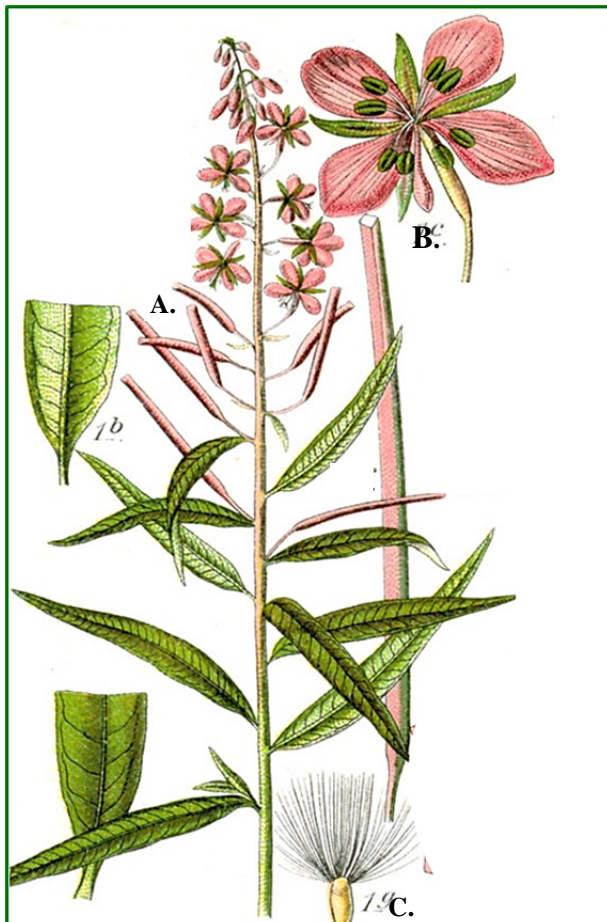


Scientific Name: *Chamerion angustifolium* L. Holub. **Family:** *Onagraceae*

Common Names: fireweed, great willow-herb

Plant Description

Stems 1.3 to 3 m tall, unbranched with creeping rhizome, forming colonies; leaves alternate, lance-shaped, 1.5 to 20 cm long, 0.5 to 35 mm wide and predominately veined, short stalked; margins smooth to wavy; inflorescence raceme, large, terminal, 8 to 80 flowered, nodding in bud; flowers pink to light purple (occasionally white), 2 to 3 cm across, 4 sepals, 4 petals, 8 stamens, 1 pistil; stigma 4-lobed and nodding (Royer and Dickinson 2007).



***Chamerion angustifolium*. A. Seed pod
B. Flower C. Seed**



***Chamerion angustifolium* in flower.**

Fruit: Capsule 4 to 10 cm long pinkish green, often 4-sided (Royer and Dickinson 2007).

Seed: Seeds are small, dark brown and numerous with white hairs (Royer and Dickinson 2007, USDA NRCS n.d.).

Habitat and Distribution

Open forests, riverbanks, gravel bars, waste ground, roadsides and areas subjected to forest fires (Moss 1983, Royer and Dickinson 2007).

Seral Stage: Pioneer species (Pavek 1992).

Soil: Found on soils ranging from clays to sandy loams. Most prevalent on disturbed soils. Tolerant

of acidic conditions and rolling to steep slopes (Pavek 1992).

They survive within a pH range 4.8 to 7 and have no salinity tolerance (USDA NRCS n.d.).

Distribution: Circumpolar and throughout Alberta, Alaska, Yukon, District of Mackenzie to southern Baffin Island to Newfoundland south to California, Arizona, New Mexico, South Dakota, Ohio, North Carolina (Moss 1983).

Phenology

Blooms July and August. Capsules begin forming at the end of July with the majority ripe in late August.

Pollination

Chamerion is pollinated by insects (Rook 2002).

Wolfe et al. (2005) found that arbuscular mycorrhizal associations increased the size of *Chamerion* inflorescences, which in turn increased the likelihood of pollination by insects.

Seed Dispersal

Wind (Luna and Dedekam 2008).

Genetics

$2n=36, 72, 108$ (Moss 1983).

Symbiosis

Broderick (1990) noted the establishment of mycorrhizal associations on a coal mine site being reclaimed. Wolfe et al. (2005) found arbuscular mycorrhizal associations.

Seed Processing

Collection: Cut or snap off top portion of stem. Place in breathable bag (paper or Tyvek) to allow further ripening and drying.

Seed Weight: 41 g/1,000 seed (Thompson et al. 1993).

Average Seed/Fruit: 300 to 500 seeds/fruit (Aiken et al. 2007).

Harvest Dates: Mid to late August.

Cleaning: Use blender with dulled or wrapped blades on a low speed and pulse. Attention must be made to

the quantity of seed blended at once; too little material will not allow for adequate abrasion, while too much will result in uneven abrasion. Follow with sieving/winnowing (Scianna 2002). Forced air through a series of screens can also be used to remove fluff.

The tiny seed and silky hairs (that aid in wind dispersal) makes this species very difficult to feed into cleaning equipment (Barner 2009).

Storage Behaviour: Possibly orthodox (Royal Botanic Gardens Kew 2008).

Storage: Store dry in sealed containers.

Longevity: Found to be unsuccessful in long term seed banking (Pavek 1992).

Fireweed seeds stored at 1 to 3° C in sealed containers remain viable for at least a few years (Luna and Dedekam 2008). Rarely viable after 3 years (Aiken et al. 2007).

If seed is orthodox, longevity might be improved by storing seed frozen.



Chamerion angustifolia capsules after bursting

Propagation

Natural Regeneration: Spreads by rhizomes (Pavek 1992) and by light seed which is widely dispersed. Seeds remain viable in natural seed bank for many years (Luna and Dedekam 2008).

Germination: Up to 75% germination with fresh seed from north-eastern Alberta (Smreciu et al. 2008).

Royal Botanic Gardens Kew (2008) achieved 80% to 100% germination with varying temperature (15 to 25°C) and light exposure regime.

Pre-treatment: None required for seed harvested in north-eastern Alberta (Smreciu et al. 2008).

30 day cold stratification was found to be successful (Baskin and Baskin 2002).

Direct Seeding: In a study in north-eastern Alberta, *C. angustifolium* established a cover on recently disturbed sites so consistent as to be indistinguishable from direct sowing (Smreciu et al. 2008).

Vegetative Propagation: Reproduces vegetatively by rhizomes, and so may be propagated from cuttings.

Micro-propagation: Root explants may be excised from sterile seedlings and cultured. Browning is a problem which can be countered with citric or



ascorbic acids to prevent oxidation. Murashige and Skoog's minimal organics containing a combination of Kinetin with 2, 4-dichlorophenoxyacetic acid or benzyladenine with indole-3-acetic acid (Turker et al. 2008).

Aboriginal/Food Uses

Food: Widely used as greens raw or cooked, young shoots taste like asparagus (Gray 2011). Stem pith was added to soups as a thickener or dried, boiled and fermented to make ale; was also used in teas

(MacKinnon et al. 2009, Turner 1997). Used to make fireweed jelly (Gray 2011).

Medicinal: Used to treat prostate problems, teas were used to treat asthma and whooping cough; peeled roots were applied to burns, swellings, boils, sores and rashes and leaves used to treat mouth ulcers.

Chamerion was also used to treat yeast infections, hemorrhoids and diarrhea (MacKinnon et al. 2009). Has a mild laxative effect and is used to dispel intestinal worms (Gray 2011).

Other: Stem fibres were used to make fish nets and cord, fireweed flowers were rubbed into raw hide for waterproofing. Seed fluff was used for blankets, clothing and tinder (MacKinnon et al. 2009). Shacklette (1964) reported that uranium contamination causes mutations producing white headed flowers; this could be used to find uranium deposits.

Wildlife/Forage Usage

Wildlife: Moose, elk, white-tailed deer, woodland caribou and bighorn sheep have been known to eat the foliage whereas, muskrats, and hares and small mammals eat seeds (Rook 2002).

Livestock: Has a good to poor palatability changing over seasons and sites (Pavek 1992). Cattle and sheep use it more for forage than horses do (Tannas 2004).

Grazing Response: Increaser (Tannas 2004).

Reclamation Potential

In a survey of plant invasion into reclaimed areas on Syncrude and Suncor, Hardy BBT Limited (1990) found *C. angustifolium* to be the most common invader and to have the highest cover. Geographic Dynamics Corp. (2006) reviewed Syncrude and Suncor plot data and found the same result though they noted a decline in cover and presence after 15 to 20 years.

C. angustifolium has been successfully used to reclaim mining disturbances in the alpine and subalpine regions of Western Canada. It has been found to successfully colonize following manual seeding and natural dispersal. It is recommended for

its ground cover abilities, and colonization speed, a result of its rhizomatous nature. *C. angustifolium* can tolerate moderately steep slopes, which makes it beneficial for erosion control. However, this species may cause problems in conifer seedling establishment, contributing to root rot and shading out the seedlings (Pavek 1992). Despite this possibility, it has been suggested as a nurse crop for aspen (Landhausser pers. comm.). Pinno et al. (2014) studied fireweed growth response to various oil sands reclamation soil types and fertilizer regimes in the greenhouse. They concluded that fireweed shows promise for reclamation as it was capable of growing in reclamation soils and taking up nutrients thus promoting nutrient capture and accumulation, and likely nutrient cycling. Naguit et al. (2013) reported that seeding 0.5 kg/ha of *C. angustifolium* on gold tailings (pH 5.5) near Flin Flon, Manitoba resulted in no seedlings after 4 and 9 years.

Commercial Resources

Availability: Commercially available but not on a large scale and not suitable for reclamation in Alberta (Alberta Native Plant Council 2010).

Cultivars: No literature found.

Uses: Common ornamental.

Notes

Synonym *Epilobium angustifolium* L. (ITIS n.d.). *Chamerion angustifolium* is listed as 94% intact (less occurrences than expected) in the Alberta oil sands region (Alberta Biodiversity Monitoring Institute 2014).

Chamerion angustifolium seed does not remain in the soil seed bank after fire disturbance (Baskin and Baskin 2002).

Is the Territorial flower of Yukon Territory (Gray 2011).

Photo Credits

Photo 1: Johann Georg Sturm @ Wikimedia commons 2012.

Photo 2: Dcsr 2010. Wikimedia Commons.

Photo 3: Frank Vincentz 2007. Wikimedia Commons.

Photo 4: Jose Hernandez @ USDA-NRCS PLANTS Database 2012.

Line drawing: Johann Georg Sturm 1796 (Painter: Jacob Sturm) @ Wikimedia commons.

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