Colorado State Parks

COLORADO STATE PARKS
BEST MANAGEMENT PRACTICES
WEED PROFILE

Date Created: April 25, 2003
Revised: April 1, 2005
Author: Various
Parks Affected: Many

Field bindweed

***Convolvulus arvensis** L.*

BMPs

☹=List B

Family: *Convolvulaceae* (Morning-glory)
Other Names: small-flowered morning glory, wild morning glory, perennial morning glory, creeping jenny.
USDA Code: COAR4
Legal Status: Colorado Noxious List B

Keys to Identification:

- Leaves of field bindweed are shaped like arrowheads.
- Flowers are funnel-shaped, white to pink, and have two small bracts 1 inch below the flower base.

Identification

Growth form: Perennial forb.

Flower: Flowers are white to pink, borne singularly or in pairs on long stalks from the axils of the leaves with two bracts.

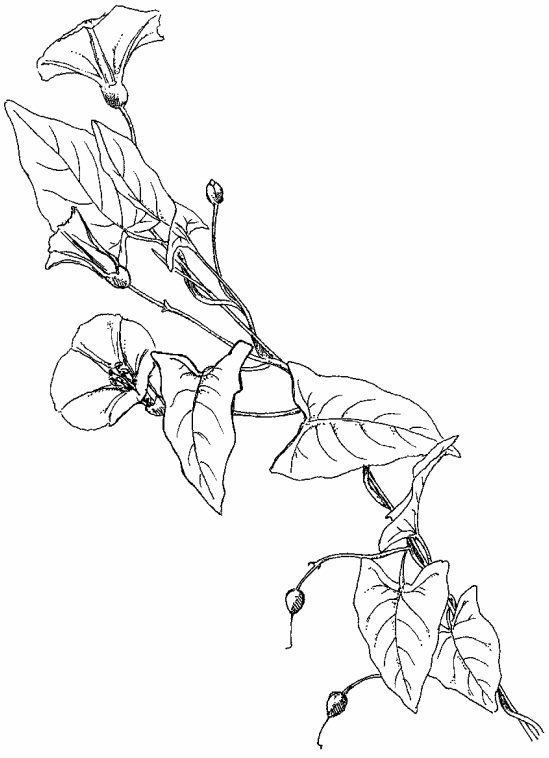
Seeds/Fruit: Seeds are ovoid to pearl-shaped, three-angled with one rounded and two flattened sides. Seeds are dull, brownish-gray, and coarsely roughened.

Leaves: Leaves are alternate, simple, glabrous to finely pubescent, more or less arrowhead-shaped.

Stems: Stems are prostrate, 1-4 ft long, often climbing or forming dense mats.

Roots: The roots system and rhizomes are extensive, whitish, cord-like, and fleshy. The primary root is a taproot from which lateral roots develop (Peterson 1998).

Seedling: Seed leaves (cotyledons) are spatulate, and are broad and indented at the tip.



Similar Species

Exotics: *Fallopia convolvulus* (black bindweed) in the knotweed family *(Polygonaceae)* is similar.

Natives: *Calystegia sepium* (hedge bindweed) has larger leaves and flowers.

Impacts

Agricultural: Can be a problem in cultivated fields.

Ecological: Field bindweed can be a serious threat to native plant communities because it has such a great capacity for regeneration (Peterson 1998). Detached roots and rhizomes have the potential to produce large numbers of new shoots. Both a high rate of seed production, and long-term viability allow the plant to spread and persist. Disturbance, especially cultivation and/or overgrazing, is a prerequisite for bindweed to invade. Field bindweed's broad range of environmental tolerances make it highly competitive in most areas.

Human: No information available.

Habitat and Distribution

General requirements: Field bindweed occurs, and is competitive on, disturbed ground that is rich in introduced species. Field bindweed cannot tolerate shade and uses its viney stems to move into sunlight. Therefore, it is unlikely that field bindweed persists in later stages of community succession (FEIS 1996). Field bindweed is commonly found on more basic (rather than acidic) soil types and those of heavier texture. It can persist in dry to moderately moist soils, and is capable of surviving drought (Rutledge and McLendon 1998).

Distribution: Field bindweed may be found at altitudes as high as 10,000 feet (Whitson et al. 1996).

Historical: Native to Europe, introduced in North America as early as the 1730s (Peterson 1998).

Biology/Ecology

Life cycle: The leaves of field bindweed vary greatly in size and shape with environmental factors such as light intensity, soil moisture, and with damage due to frequent cultivation. Flowers appear from June to September and occasionally until the first fall frost (Rutledge and McLendon 1998). Seeds mature within 2 weeks after pollination during hot summer days (FEIS 1996). Germination can occur in the fall or spring, over a wide range of temperatures (FEIS 1996). Field bindweed overwinters by means of its roots and rhizomes. Shoots are killed back to the crown by freezing temperatures, but hardened roots can withstand temperatures as low as -6° C (Peterson 1998). Most lateral roots die back each year but some persist for several years, spreading horizontally (Peterson 1998). Buds arise on the lateral roots and develop into rhizomes that have the potential to establish new crowns when they reach the surface. Excised root segments establish new roots and crowns more effectively than rhizome segments (Peterson 1998).)

Mode of reproduction: Reproduces both by seed and vegetatively.

Seeds production: The number of seeds produced per plant ranges from 25 to 300 and seed production is variable and depends on environmental conditions.

Seed bank: Field bindweed seeds can remain viable in the soil for over 20 years (Peterson 1998).

Dispersal: Seeds have a hard impermeable seed coat. They generally fall near the parent plant but can be dispersed by water, as a contaminant in crop seeds, and by mammals and birds after ingestion.

Hybridization: No information available.

Control

Biocontrol: Currently, there has been little evidence of a biological control agent that significantly damages or reduces populations of field bindweed. Two agents that are present in the U.S. and being studied are *Aceria mahlerbae*, a gall mite, and *Tyta luctuosa*, a moth (Rees et al. 1996).

Keys to Control:

- Contain and persistently control existing stands of field bindweed in order to exhaust the root system and deplete the soil seed bank.
- Maintain a healthy cover of perennial plants to discourage field bindweed establishment.

Mechanical: Cutting, mowing, or pulling has a negligible effect unless plants are cut below the surface in the early seedling stage. Well-established populations have a large seed bank in the soil that can remain viable for long periods of time (over 20 years).

Fire: Prescribed fire is not recommended as a control for field bindweed due to its potential for vegetative regrowth and a long-lived seed bank.

Herbicides: Chemical treatment often requires high rates as well as repeated applications. Successful treatment of bindweed can result in substantial damage to desirable plants. Foliar applications of glyphosate at 1.5 lb. ai/acre or picloram at 0.25-0.5 lb. ai/acre, dicamba, or 2,4-D at 1 lb. ai/acre can provide good control. Control is best when applied during early flowering and when soil moisture is low (Peterson 1998). Repeated applications are advised for long-term control.

Integrated Management Summary

Field bindweed can be a serious weed in native plant communities. Field bindweed requires active management once it is established because of its potential to regenerate rapidly. Even small infestations should be viewed as a serious threat and managed aggressively. It is also tolerant of a variety of environmental conditions which makes it highly competitive for resources (Rutledge and McLendon 1998). Due to the vegetative reproductive ability of field bindweed, as well as the large seed bank of established populations, successful control requires repeated applications over several years.

References

FEIS - Fire Effects Information System . 1996. Prescribed Fire and Fire Effects Research Work Unit, Rocky Mountain Research Station (producer), US Forest Service. http://www.fs.fed.us/database/feis/ [Version 12 Mar 98].

Peterson, D.L. 1998. Element stewardship abstract for *Convolvulus arvensis*, field bindweed. The Nature Conservancy, Wildland Weeds Management & Research Program. http://tncweeds.ucdavis.edu/esadocs/convarve.html [8 Nov 98].

Rees, N.E., P.C. Quimby Jr., G.L. Piper, E.M. Coombs, C.E. Turner, N.R. Spencer, and L.V. Knutson (eds). 1996. *Biological Control of Weeds in the West.* Western Society of Weed Science in cooperation with USDA Agricultural Research Service, Montana Department of Agriculture, and Montana State University.

Rutledge, C. R. and T. McLendon. No Year. An Assessment of Exotic Plant Species of Rocky Mountain National Park. Department of Rangeland Ecosystem Science, Colorado State University. 97pp. Northern Prairie Wildlife Research Center Home Page. http://www.npwrc.usgs.gov/resource/othrdata/Explant/explant.htm [Version 15 Dec 98].

Whitson, T.D.(ed.), L.C. Burrill, S.A. Dewey, D.W. Cudney, B.E. Nelson, R.D. Lee, R. Parker. 1996. Field bindweed. *Weeds of the West.* Western Society of Weed Science, in cooperation with the Western United States Land Grant Universities Cooperative Extension Services, Newark, CA.