

Weeds

Research has shown that if weeds are kept out of corn fields for the first 5 to 7 weeks after emergence, later weed infestations will not significantly reduce yields. Optimum planting dates, narrow row spacing, good seedbed preparation and soil fertility management can improve corn competitiveness against weeds.

Rotate weedy fields to a crop that is more competitive against your major weed problem. For example, going from corn to a solid-seeded forage legume such as alfalfa can effectively reduce wild proso millet.



Barnyardgrass

Left photo Lair
Right photo P. Westra



Buffalobur

Top right photo G.Y. Frissoe
Bottom left photo A.P. Knight

Weed management in corn is often more complex than insect and disease management due to the number of different weed species that occur in any one field. Uncontrolled weeds cause yield loss, harbor insects and disease organisms, cause harvest problems and may decrease silage quality. Weeds that tend to prevail in cultivated corn fields are often highly competitive with young corn plants.

The IPM approach to weed management includes crop rotation, weed and weed seed scouting and mapping, tillage, and spot treatment or banding herbicides. As important tools for weed control, herbicides presently account for approximately 65% of all pesticide use in Colorado. Rather than rely exclusively on herbicides for weed control, producers can save money and manage weeds by incorporating all appropriate management measures. Herbicide resistance has become a problem for some corn growers in Colorado. More than 55 resistant weed species have been reported in the U.S. including pigweeds, kochia and others. Instead of increasing herbicide rates, producers must accept the need to rotate both crops and herbicide chemistry.

Know the weed species in each field, the location and severity of weed infestations, and the options for managing the most yield limiting weeds. Early-season weed scouting and mapping, followed by a late season weed survey, can help growers obtain an accurate assessment of weed species, location and infestation severity.

Barnyardgrass (*Eschinochloa crus-galli*) is found throughout Colorado, but especially in irrigated or wet areas. The grass has flat, smooth, and broad leaf blades and smooth, flattened, branched stems that are reddish to purple at base. Bristly spikelets are green or purple. Plant height ranges from 8 inches to 5 feet tall, reproduces by seed but has the ability to root at the nodes and reestablish after a light cultivation. Seed can spread through irrigation water.

Buffalobur (*Solanum rostratum*) is a seed-producing annual found in Colorado in cultivated fields, meadows, pastures, waste areas and serves as a host for the Colorado potato beetle. Each alternate, hairy leaf is sectioned into 5 to 7 lobes. Yellow flowers develop into a spiny bur.

Chemical control guidelines can be found in the most recent Colorado Weed Management Guide - XCM 205 available from CSU Cooperative Extension or the most current Guide for Weed Management in Nebraska at www.ianr.unl.edu/pubs.

Canada thistle (*Cirsium arvense*) is an introduced, colony-forming perennial weed with a deep and extensive root system. The branched stem can be 1 to 5 feet tall, topped by purple or, occasionally, white flowers.

Heavy infestations can reduce corn yields up to 80%. Herbicides are most effective when applied at the bud stage and at fall regrowth.

Field bindweed (*Convolvulus arvensis*) is an introduced perennial weed found throughout Colorado. Arrow shaped leaves are alternate on the twining stems. White or pink flowers are bell or trumpet shaped. Field bindweed reproduces by seeds that remain viable in the soil for decades, and has a very resilient, long taproot.

Field bindweed and Canada thistle must be controlled using translocating herbicides applied when plants are actively growing. Fields with heavy infestation are good candidates for Roundup® Ready corn.

Green foxtail (*Setaria viridis*) is found in cultivated fields and waste areas throughout Colorado. It has an erect stem with or without branches. This foxtail has a hairy ligule and slightly rough leaf margins. Leaves can be 2 to 10 inches long and the seedhead is dense and bristly. Plant grows from 8 to 24 inches tall and reproduces by seed.

Yellow foxtail (*Setaria glauca*) is found in cultivated fields and waste areas throughout Colorado, but it is not as common as green foxtail. This grass has an erect stem that tends to be taller than green foxtail. Smooth leaves have distinct long hairs on the leaf margin and fuzzy yellowish-brown spikelets. Height ranges from 12 inches to 3 feet. It reproduces by seed.

Foxtails are warm-season grasses; increasing early crop vigor can decrease competition.

BMP

Recycle empty pesticide containers whenever possible. Do not burn or dispose of containers on the farm.

Train all employees in proper pesticide handling and safety procedures. Employees should have a clear understanding of the operation's emergency response plan in case of any spill or fire.



Canada thistle

Photos P. Westra



Field bindweed

Photos P. Westra



Foxtail seedling in corn

Photos P. Westra

Weeds



Hairy nightshade
Photo A.P. Knight



Johnsongrass seedling
Photo R.F. Jepson



Kochia
Photos P. Westra

Hairy nightshade (*Solanum sarrachoides*) is a seed-producing annual found in eastern Colorado. The plant grows prostrate with alternate, oval and dark green leaves. Leaves and stems are covered with tiny hairs and may feel sticky to the touch. Flowers have olive green berries and the plant grows up to 1.5 feet long.

Johnsongrass (*Sorghum halepense*) is a perennial weed resembling forage sorghum that is found in southeastern Colorado, but is moving north. Seedheads are large, arranged loosely and are purplish. The plant can grow from 2 to 5 feet high and reproduces both by seeds and rhizomes. Cultivation can help with control, but cultivation tools must be cleaned after going through patches.

Kochia (*Kochia scoparia*) is an introduced annual found throughout Colorado. Leaves are alternate, long and narrow, and attached directly to the reddish, erect stem. This plant reproduces by seeds that are spread by windblown plants tumbling in autumn. Up to 50% of kochia in Colorado is resistant to triazine and ALS herbicides.

Lambsquarters (*Chenopodium album*) is found throughout Colorado in cultivated fields and waste areas. Leaves are alternate, with lower ones more oval shaped than upper ones. Flowers are found at the tip of the stem. Seedlings appear similar to redroot pigweed, but pigweed has a prominent midrib. The pink-purple stems can grow up to 6 feet tall. Lambsquarters is an annual and reproduces by seeds.



Lambsquarters
Right photo P. Westra
Left photo A.P. Knight

Dryland weed considerations

Non-irrigated corn production in Colorado requires catching, retaining, and using precipitation efficiently. Because this tight water budget does not allow for tillage during the growing season and preferably none between corn and the previous crop (usually wheat), herbicidal weed control is critical. Research at Akron, Colorado has found that higher populations (19,000/A) and decreasing row spacing to 15 inches improves weed management. Late emergence of weeds probably will not decrease current year yields, but are building the weed seed bank for future years.

Prostrate pigweed (*Amaranthus blitodes*) is found throughout Colorado in cultivated fields and waste areas. Smooth, pale, oval and alternate green leaves attach to branching stems that form a mat. An annual, this plant grows 12 to 18 inches long and reproduces by small, black, shiny seeds.

Redroot pigweed (*Amaranthus retroflexus*) is found throughout Colorado in cultivated fields and waste areas. Small green flowers are densely clustered in bristly seedheads growing from the stem can grow from 1 to 6 feet tall and has a reddish taproot. An annual, this plant reproduces by small, black, shiny seeds and resistance to triazine herbicides is increasing in Colorado.

Russia thistle (*Salsola iberica*) is an introduced annual found throughout Colorado in cultivated fields, roadsides and waste areas. This plant is round and bushy and the first leaves are soft and slender, replaced by short (0.5 inch) and spiny leaves. It reproduces by seeds spread by tumbling windblown plants. Two species of Russian thistle exist: *S. iberica* and *S. kali*. *S. kali* tends to resemble asparagus in growth habit.

Sandbur (*Cenchrus longispinus*) is a warm-season annual grass found in cultivated fields and waste areas, particularly on sandy soils. Sandbur grows from 8 inches to 3 feet tall and reproduces by seed that spreads primarily by animals or machinery.

Sandbur is a difficult problem in no-till fields and may require tillage or Roundup® Ready corn to control.

Seeds germinate throughout the growing season, however, control of early season seedling will promote higher corn yields.



Redroot pigweed

Top photo P. Westra
Bottom photo A.P. Knight



Russian thistle

Top photo P. Westra
Bottom photo A.P. Knight



Sandbur

Top photo P. Westra
Bottom photo H.F. Schwartz

Weeds



Shattercane

Top photo P. Westra
Bottom photo H.F. Schwartz



Common sunflower

Photos P. Westra



Toothed spurge

Photo F. Fishel

Shattercane (*Sorghum bicolor*) is an annual weed thought to have developed from outcrossing of sorghum with Johnsongrass. It is found in irrigated areas in eastern Colorado. Shattercane is a grass with long (1 to 2 feet) wide leaves and an erect stem. The plant can grow up to 12 feet high and reproduces by seeds that are black in color. Rotating to small grains, alfalfa or perennial grasses will help control shattercane.

Common sunflower (*Helianthus annuus*) is found in Colorado on roadsides, in fields and in waste areas. Alternate, toothed, oval or heart shaped leaves are rough and large. The stem is erect, stout, branched and covered with stiff hairs. It can reach up to 9 feet tall. Sunflower is an annual, reproducing by seeds.

Toothed spurge (*Euphorbia dentata*) is found in eastern Colorado fields and waste areas. Opposite, 1 to 3 inch long, oval, hairy and toothed leaves attach to a somewhat woody stem. Stems can grow to be 2 feet tall. All plant parts exude milky juice. Toothed spurge is an annual, reproducing by seeds.

Velvetleaf (*Abutilon theophrasti*) is an introduced annual found mainly in Morgan and Weld counties in cultivated fields, pastures, fence rows and waste areas. The occurrence of velvetleaf in western Colorado is increasing. Heart shaped, alternate leaves grow up to 5 inches or more wide and attach to an erect, branched stem. The stem and leaves are covered with tiny hairs. Yellow flowers form seed pods arranged in a disk, with each pod containing flat seeds. Velvet leaf grows up to 7 feet high.

Quick shading by the crop canopy and management that increases crop competitiveness combined with early tillage will help to suppress the growth of velvetleaf.



Velvetleaf

Photos P. Westra

Wild buckwheat (*Polygonum convolvulus*) is an introduced annual found throughout Colorado in irrigated areas, fields and waste areas. Seedling plants have distinctive heart-shaped leaves. The plant is sometimes confused with bindweed, but instead of showy flowers it has small, greenish white flowers that produce shiny, black seeds.

Wild proso millet (*Panicum miliaceum*) is found in cultivated fields throughout eastern Colorado. It is a grass with hairy leaf blades between a half inch to a quarter inch. The dark, shiny seeds are borne on a spreading 6 to 12 inch panicle, 2 to 6 feet tall. Wild proso millet reproduces by seed spread by birds, equipment and irrigation water. Crop rotation, cultivation and narrow rows are effective controls for this annual grass.

Witchgrass (*Panicum capillare*) is an annual found in cultivated fields and waste areas, particularly on dry, sandy soils. This grass has hairy leaf blades and sheaths, and a stout erect stem, 6 inches to 2 feet tall. Witchgrass reproduces by seed spread by tumbling seedheads.

In general, since broadleaf weeds are easier to control with post-emergence herbicides, often there is a shift in no-till fields to grassy weeds. Rotation to a broadleaf crop can help control grassy weeds.



Witchgrass

Photo H.F. Schwartz

Silage considerations

Growing silage instead of grain corn is a potential strategy on fields with perennial weeds such as Canada thistle and bindweed. Following the earlier silage harvest, there is time to control perennial weeds while they are still growing with effective herbicides before the weeds become dormant.

Dryland weed considerations

Most corn herbicide programs are designed for higher yields and can be uneconomical for dryland weed budgets (\$10.00 to \$20.00/A).

Resistance or tolerance occurs in some weed species (kochia, pigweed) to the more economical soil applied products and their effectiveness is spotty in dryland situations due to unpredictable precipitation.

Herbicide tolerant (Roundup Ready®) corn is one solution for herbicide tolerant weeds. Glyphosate products offer broad spectrum control to challenging weed species such as crabgrass, kochia, pigweed, sandbur and Russian thistle without rotational restrictions.



Wild buckwheat

Top photo P. Westra

Bottom photo G.Y. Frissoe



Wild proso millet

Photos P. Westra