WEEDS

Weeds compete with sunflowers for resources, limiting crop growth and reducing yield. Yield losses caused by weed competition is a factor of weed species, density, relative time of emergence to the crop and environmental conditions. Weed species differ in competitive ability; some causing higher yield losses on a per plant basis.

Sunflowers are a good competitor once the crop is established. Weed competition during the early stages of growth has the largest impact on yield, thus the Critical Period of Weed Control in sunflowers is V-E to V-4.

The following weed sections contains information on specific weed species that are difficult to control in sunflower.

Cocklebur

Cocklebur has the ability to reduce crop yields and quality considerably. It is an annual plant that usually grows in rangelands, along roadsides, and in waste areas. Cocklebur is said to be one of the biggest foreign material problems for confectionary sunflower processors.

Quick ID

Seedling – Long and narrow cotyledons. The stem below the cotyledons is purplish green. First true leaves are triangular with toothed margins. If the plant is pulled up, the remains of the bur can be used to confirm seedling identification.

Juvenile – Cocklebur has an erect, ridged, rough-hairy stem with purplish spots. Leaves have three main veins and are heart-shaped or triangular. Leaves and stems are rough to the touch.

Mature – Female and male flowers are on the same plant, but are separate. The male flowers are spherical and non-spiny. The female flower is green and spiny. If crushed the plant gives off a distinctive odor.

CONTROL TIPS

No in-crop herbicides are available for control of cocklebur in sunflower. Cocklebur plants are shorter and are typically not harvested with the sunflower seed. Use of an all-crop header increases the potential for cocklebur seeds to be collected as it cuts closer to the ground. Crop rotations with small grains and cultivation help manage cocklebur problems.

Figure 55. Mature cocklebur plant
**Biennial Wormwood**

A native, prolific, small-seeded weed for which both annual and biennial types coexist. Traditionally, biennial wormwood has been classified as a non-crop land weed, and therefore received little attention as a major arable-land weed. Plants typically grow 3 to 7 feet tall with a woody stem averaging 1 to 2 inches (3 to 5 cm) in diameter.

Seedling emergence can occur during the entire growing season under favorable conditions. The plant grows slowly after emergence, remaining as a rosette until midsummer, after which growth becomes rapid. Biennial wormwood is often confused for common ragweed.

**Quick ID**

**Seedling** – Cotyledons are oval or oblong and very small (2 to 3 mm). First two leaves are opposite, oval to elongated having 2 small teeth on the leaf margin.

**Juvenile** – Forms a basal rosette, short-stalked, pinnately divided and re-divided leaves that are coarsely toothed.

**Mature** – Erect, hairless plant, with a slender stem and little to no branching growing 10 to 175 cm tall. Leaves appear to form a whorl around the stem. Green, inconspicuous clusters of flowers develop on short branches in the axils of small leaves towards the top of the stem. When the upper leaves, stem and flower heads are crushed, they give off an odor resembling a combination of sage and carrot.

**Biennial Wormwood VS. Common Ragweed**

Biennial wormwood have hairless leaves with sharp edges, where as common ragweed leaves are smooth, hairy and have round edges.

**CONTROL TIPS**

Biennial wormwood has natural tolerance to many soil-applied and post-emergence broadleaf herbicides. Where possible, pre-emergent followed by post-emergent herbicide applications are the most effective strategy to control biennial wormwood. Since it can germinate season long, a soil applied herbicide with prolonged residual activity is needed to provide optimal management.

Sulfentrazone has shown to have up to 80% control of biennial wormwood in NDSU trials, but no data to support that has yet been established in Canada.

Post-emergent herbicides must be applied to seedlings less than 8 cm tall. No in-crop herbicides are registered for control of biennial wormwood in sunflower. For this reason, crop rotation and planning in previous crops is important to manage the weed. Refer to the Guide to Crop Protection for products that can control biennial wormwood.
Canada Thistle

Is a very aggressive creeping perennial that has the potential to cause significant yield loss. Canada thistle spreads primarily by a deep, horizontal, creeping root system forming dense patches. It thrives in a wide range of soil types, growing best in disturbed areas and overgrazed pasture. A single plant can produce over 6 m of rhizome per year. It is these underground roots that make control of Canada thistle difficult. Canada thistle has separate male and female plants, where only the female plants produce seed. Each plant may produce over 40,000 seeds, which can remain viable in the soil for 21 years.

Quick ID

**Seedling** - Oblong to broadly oval cotyledons. Shoots that emerge from underground root buds lack cotyledons. First true leaves are ovate with sharp spines along margins (Figure 57).

**Juvenile** - Irregularly lobed leaves with spines only on the margins. Plants vary in the extent of lobing, length of spines on margins and the presence or absence of hair on the undersides of the leaves. Upper surface is shiny.

**Mature** – Heads form at the end of stems in clusters made of numerous pinkish purple disc flowers. Bracts are flattened and end in short, weak prickles.

Stems are hollow, erect and smooth; spines may be present near the base of the plant.

**CONTROL TIPS**

Most of the biomass of Canada thistle plants is below ground; therefore killing the roots is the only effective control method. An integrated management plan is required to reduce infestations. Rhizomes are unaffected by cultivation as they grow below the normal tillage depths. Rhizomes higher in the soil profile that are broken by tillage will produce small root pieces that rapidly develop into new plants. Repeated mowing of the infestation throughout the growing season over several years will deplete the food energy stored in the root system. A variety of herbicides are available for controlling Canada thistle, but residual herbicides are more effective. Fall applications maximize translocation of the chemical into the roots since the plant is putting reserves into the root system to survive the winter. Spring applications just cause re-sprouting of the plants. Most effective control is through a combination of spring-summer mowing, followed by a fall herbicide application.

Figure 57. Canada thistle seedling
Figure 58. Juvenile Canada thistle
**Kochia**

Kochia is an annual plant, originally introduced as an ornamental garden plant. Since then, kochia has become a major weed problem in many areas of Canada causing severe reductions in yield.

**Quick ID**

**Seedling** – Cotyledons are short and narrow, dull-green on the upper surface and bright pink on the underside. The first leaves have many soft hairs. Plants form a basal rosette when not in competition with other vegetation.

**Juvenile** – Has an erect, purple-striped stem that is heavily branched. Leaves retain the greyish-green appearance and are hairy.

**Mature** – Leaves become much smaller towards the branch tips resulting in a pyramid-shaped plant. Flowers are green, lack petals, and are inconspicuous in leaf axils. The whole plant turns bright red in the fall. When the plant dries, the stem breaks off at ground level and acts as a tumbleweed, scattering seeds along its path.

**CONTROL TIPS**

Kochia seeds remain viable in the soil for approximately two years. For this reason, preventing seed production for a few years will nearly eradicate populations. To adequately control kochia, an integrated approach is required. Fallow or short term perennial forage production prevents seed production. Seedlings are controlled by late-spring cultivation. Sulfentrazone (Authority), a pre-seed herbicide, is registered to control kochia. Mow heavy patches of kochia in saline areas to prevent seed production. When spraying seedlings, it is important to maintain water volumes in the upper recommended ranges to achieve sufficient coverage and penetrate hairs on the leaf surface. It is important to rotate herbicide groups as kochia can quickly develop herbicide tolerance.
**Prairie Sunflower**

Wild sunflower grows to about the same height as cultivated sunflower, competing for sunlight, space and moisture. It is a host to pests of cultivated sunflower, reducing yield and quality.

**Quick ID**

**Seedlings** – Oblong cotyledons and oppositely arranged first leaves. Often found on sandier soils.

**Juvenile** – Leaves are lanceolate to ovate in shape with a wavy margin, whereas annual sunflowers have distinctly toothed margins. Prairie sunflower stems are covered with short hairs, flattened to the surface. This is contrasting to annual sunflowers which are bristly to the touch.

**Mature** – The heads of prairie sunflower are smaller than annual sunflower. The central disk flowers are purplish brown and flattened.

**CONTROL TIPS**

Pre-plant burn down is necessary using any of the labeled products. Solo or Odyssey sprayed in CLEARFIELD hybrids only and Express in ExpressSun hybrids only, has shown to provide control of Prairie Sunflower. Application of these herbicides in non-tolerant hybrids will cause extensive damage. If there are many wild sunflowers growing in CLEARFIELD or ExpressSun sunflower crops, control of the wild species is essential to prevent cross-pollination which could cause the wild sunflower to develop tolerance to these herbicides, diminishing the effectiveness of these technologies. Contact your local seed dealer to find out more about the Crop Stewardship Program.

Figure 62. Wild sunflower

Figure 63. Wild sunflower leaves have a wavy margin.
**Wild-Buckwheat**

An annual introduced from Europe in contaminated seed, this twining natured plant makes field work difficult. Although not as competitive in sunflower compared to other crops like wheat, a significant seed bank can be produced in sunflower creating problems in future years.

**Quick ID**

**Seedlings** – Linear cotyledons attached at 120 degrees to one another. The stem below the cotyledons is often reddish purple. The true leaves are arrow shaped with pointy tips and pointed basal lobes. A papery sheath is found at the base of the first leaves.

**Juvenile** – Twining growth habit, slender stem branches near the stem. Tangling with crops can cause lodging and make harvest difficult.

**Mature** – Greenish pink flowers are produced in axillary and terminal clusters.

Field bindweed and wild buckwheat are often confused. The cotyledons of field bindweed are round, leaves have a rounded tip, lacks sheath at the stem nodes, and has a trumpet–shaped flower.

**CONTROL TIPS**

Between row cultivation or hooded sprayer herbicide application can be used for control in-crop. Pre-emergent herbicide applications including Glyphosate additions offer good control. Several pre-seed herbicides are registered and achieve fair to good control of wild buckwheat. In-crop herbicides such as Assert are rated fair to good. Best control is achieved when plants are 3 inches or smaller. Consult the current Guide to Crop Protection for updated information on registered herbicides and application information.

Figure 64. Wild buckwheat has arrow shaped leaves.

Figure 65. The cotyledons of wild buckwheat are angled at 120 degrees.
Redroot Pigweed

Redroot pigweed is a common weed of cultivated fields, gardens, and waste areas. This weed has an extended germination period, grows rapidly, and has a high rate of seed production. Redroot pigweed thrives and can quickly out-compete suffering crops.

Quick ID

**Seedlings** – Long narrow cotyledons. First true leaves have a notched tip, into which the midrib extends as a small bristle. The cotyledons and first true leaves are red on the underside. The taproot and stems are also red.

**Juvenile** – Erect stems, usually hairy and green near the top of the plant while green and smooth near the base. The leaves are diamond shaped, with entire to slightly wavy margins. Prominent white veins on the underside of the leaf.

**Mature** – Tiny green flowers develop in bristly spikes at the top of the plant. They look and feel bristly.

**CONTROL TIPS**

Control of redroot pigweed is required continually throughout the crop rotation. Authority has excellent control and can be used in reduced and no tillage systems. The CLEARFIELD and ExpressSun systems also achieve excellent control. Consult the current edition of the Guide to Crop Protection for product information and application tips. Inter-row cultivation or inter-row hooded sprayer applications can also be employed for control; chemical control is most efficacious when made prior to the 4-leaf stage.

Figure 66. Mature redroot pigweed plant

Figure 67. The underside of Redroot pigweed seedling leaves are red.
False Ragweed

Also known as marsh elder, false ragweed is a robust, competitive annual weed of roadsides and waste areas that can grow up to 2 m tall. It produces large amounts of pollen causing hay fever. When not in flower, false ragweed resembles sunflowers.

Quick ID

Seedling – Cotyledons are oval and stalked. The first true leaves are opposite, variably lobed with a soft, hairy texture.

Juvenile – Stems are smooth, much branched and erect. Lower leaves are often three-lobed whereas the upper leaves are broad, almost heart-shaped, with coarse irregular-toothed margins. Leaves are covered with hairs on both surfaces.

Mature – Small, greenish white flowers in branching clusters at the top of the plant.

CONTROL TIPS

Many of the pre-seed herbicides registered for sunflowers achieve good control of false ragweed. Glyphosate burndown at planting and cultivation are the most common control methods. Although it usually germinates before the crop, a cool spring can delay germination. Few post-emergent control options are available. CLEARFIELD sunflowers utilizing Odyssey achieves good control and has residual activity for prolonged control, but not as long as some other “imi” herbicides. Caution is needed with use of residual herbicides and it is important to manage a crop rotation to avoid planting an imi-sensitive crop within the recommended time period. See the Guide to Crop Protection for more details.

Figure 68. Mature false ragweed plant.
Figure 69. False ragweed seedling leaves are hairy.
Green and Yellow Foxtail

Annuals introduced from Europe, green and yellow foxtail are serious weeds of cultivated crops, gardens and roadides. Seeds germinate throughout the growing season whenever conditions are favorable, making control difficult.

Quick ID

Green Foxtail

Seedling – The first leaves are arched and hairless. Base of the seedling is often reddish.

Juvenile - Leaf blades are flat and light green. The margins and upper surface of leaf blades may feel slightly rough to the touch. The ligule (membrane at the inner base of the leaf where the leaf attaches to the main stem) has an uneven fringe of hairs. Auricles are absent.

Mature – Soft, green or purple-tinged bristly spike-like panicle resembles a bottle brush.

Yellow Foxtail

Seedling – Arched, hairless early leaves. Base of the seedling is often reddish.

Juvenile – Leaf blades are flat or V-shaped and loosely twisted. Blades are hairless except for long, kinky hairs on the upper surface of the leaves near the base of the blade (completely lacking in Green foxtail). Auricles are absent. Ligule is a fringe of hairs about 3 mm long.

Mature – Spikelets are larger than those of green foxtail

CONTROL TIPS

Pre-plant herbicide options are available that can provide good to excellent control of both these weed species. Post-emergent herbicides are available that provide excellent control. Consult the current issue of the Guide to Crop Protection for control options. Maintaining water volume is important to achieve adequate coverage since the leaves are narrow.

Figure 70. Green foxtail seedling have light green leaves and are completely hairless.

Figure 71. Collar region of Yellow foxtail has long hairs on the upper leaf surface.