

# WEEDS

## COMPETITIVENESS OF SUNFLOWER

Sunflower in the young vegetative growth stages is not very competitive. Herbicides are continually being registered for use on sunflower to help manage weeds. The first step for successful weed control is correct identification to utilize the appropriate weed control techniques. This section contains close-up photos of distinguishing features to clearly identify various plant parts, key agronomic info including geographic ranges and competitiveness and control tips and important decision-making tools including potential herbicide resistance.

## GRASSY WEEDS

The grass family is a very large, diverse family with over 10,000 species ranging from small herbs and shrubs to trees. As with other families, the grass family is divided into several subfamilies based on morphological characteristics.

It can be difficult to differentiate one grassy species from another. The collar region is very characteristic between grass species and is often used to properly identify species. A magnifying glass is a great gadget to get a better look at this detailed area of the plant.

The base of the leaf that surrounds the stem is referred to as a sheath. The sheath can be hairless or covered in fine hairs. This can be a distinguishing feature between similar species. Where the sheath and blade meet is a papery structure called a *ligule*. Projections that look like extensions of the collar region may be present, and are called *auricles*. The auricles length and color can be used in identifying species.

Grass flowers are borne in clusters called spikelets. At the base of each spikelet are 2 bractlets, which are referred to as the first and second glume.

Royer, F. and R. Dickenson. 1960. Weeds of Canada and the Northern United States. Lone Pine Publishing.

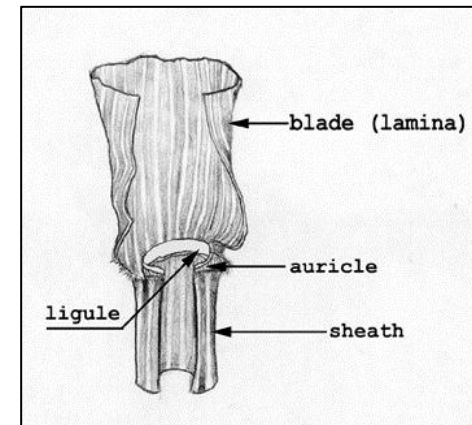







Figure 5. Grassy weed distinguishing features. Oregon State University. 2008.




## Barnyard Grass *Echinochloa crusgalli*

<b>Lifecycle</b>	Annual
<b>Propagation</b>	By seed only
<b>Range</b>	Throughout Canada and U.S.A. except for Florida
<b>Habitat</b>	Cultivated fields, waste places, roadsides, gardens. More abundant in moist soil.
<b>Competitiveness</b>	Highly competitive
<b>Herbicide Resistance</b>	Triazine resistant (Group 5) in Ontario
	 <p>Peter Smith</p>
<b>Seedling</b> Leaves have pointed tip and are hairless. The base of the seedling is slightly red.	<b>Leaves</b> The collar region has no ligule or auricles. Leaf blades are dark green and hairless. The leaf sheath is split with overlapping margins
	 <p>Peter Smith</p>
<b>Stems</b> Erect stems, 5-150 cm long, coarse, smooth, usually round in gross section but flattened especially near the base of plant. Often lying horizontally along the ground. Nodes touching the soil surface will often form roots.	<b>Inflorescence</b>
<b>Control</b> Nodes touching the ground can form roots as can nodes broken after a light cultivation. Barnyard grass may not be controlled by tillage in minimum tillage programs. Herbicides are available.	




## Yellow Nut Sedge – not a true grass

<b>Lifecycle</b>	Perennial
<b>Propagation</b>	Rhizomes and seed
<b>Range</b>	All Provinces east of Manitoba except P.E.I. and throughout the U.S.A.
<b>Habitat</b>	Moist, sandy soil
<b>Herbicide Resistance</b>	None documented to date
 <p>© Peter Smith Peter Smith</p>	 <p>© Peter Smith Peter Smith</p>
<p><b>Seedling</b> Seedlings are rarely produced in nature, and when present are often overlooked since they look like grass. Auricles and ligules not present Leaf tips are sharply pointed.</p>	<p><b>Leaves</b> Numerous grass-like leaves form at the plant base. Leaves are light green and glossy with a prominent midrib. <b>Stems</b> 10-90 cm high, triangular in cross-section - "If it has edges, it's a sedge" Typically under 1 cm thick</p>
Peter Smith	<p><b>CONTROL</b> Tillage is a primary factor in Yellow Nutsedge movement within and between fields. The majority of tubers are within 5" of the soil surface. Those buried deeper tend to last longer. No-till or shallow tillage are best for control of this weed. Herbicide programs for weed control in corn and soybean are effective in controlling Nutsedge early in the season. Late season control is essential to prevent tuber formation and control the weed long term. Nutsedge infestations usually starts in patches. It is beneficial to isolate the patches and conduct repeat herbicide applications to the patches throughout the season, continuing past crop harvest to prevent tuber formation. Tillage of the patch (isolated from the crop) to stimulate emergence follow by herbicide applications works to control infestations. Clean equipment after working in infected fields.</p>
<p><b>Inflorescence</b> Umbrella-like clusters of yellowish to brown flowers at the tip of stems</p>	




## Yellow Foxtail, *Setaria glauca*

<b>Lifecycle</b>	Perennial
<b>Propagation</b>	Seed only
<b>Range</b>	Throughout Canada and the northern two thirds of the U.S.
<b>Habitat</b>	Can grow on almost any soil texture in cultivated fields, pastureland and waste places.
<b>Competitiveness</b>	Very competitive
<b>Herbicide Resistance</b>	Photosystem II inhibitors
 <p>Peter Smith</p>	 <p>Peter Smith</p>
<p><b>Seedling</b>          First leaves are arched, and hairless.          Sheath is ridge and slightly flattened.          Base of seedling is often reddish.</p>	<p><b>Leaves</b>          No auricles. Ligule is a fringe of hairs, 1.5 to 3 mm long.          Leaf blades are flat and light green and have a few, slinky hairs 3-10 mm long on the upper leaf surface just near the stem. Leaf sheaths are split, distinctly nerved and with overlapping margins.</p>
	 <p>Peter Smith</p>
<p><b>Stem</b>          Erect or spreading, 10-100 cm tall. Usually round, but are occasionally flattened.</p>	<p><b>Inflorescence</b>          Dense spike, 2-10 cm cm long, covered with short orange bristly with forward pointing barbs. Spikelets are slightly larger than Green foxtail.</p>
<p><b>CONTROL</b>          Herbicides are available. Close grazing reduces seed production.</p>	




## Quack Grass, *Agropyron repens*

<b>Lifecycle</b>	Perennial
<b>Propagation</b>	Rhizomes and seed
<b>Range</b>	Throughout Canada and the northern two thirds of the U.S.
<b>Habitat</b>	Can grow on almost any soil texture in cultivated fields, pastureland and waste places.
<b>Competitiveness</b>	Very competitive
<b>Herbicide Resistance</b>	None documented to date.
	
<b>Seedling</b> First leaves are bright green and slightly hairy. Lower part of stem is often pinkish-brown and hairy	<b>Leaves</b> Flat, nearly smooth, split sheath with overlapping margins and soft hairs Auricles are about 3mm long and clasp the stem like little hooks. Ligule is less than 1 mm long and papery. <b>Stems:</b> Erect, up to about 120 cm tall.
 <p style="text-align: right;">Peter Smith</p>	
<b>Inflorescence</b> Spikes composed of 1 un-stalked spikelet at each node set edgewise to the stem.	<b>Roots</b> Creeping rhizomes tht are hard, white and very sharp pointed. Each internode is partly covered by a short, light brown sheath.
<b>NOTE:</b> Distinguishes from Smooth brome by its slender, un-branched seed head, auricle, open sheath, and sharp-pointed rhizomes.	
<b>CONTROL:</b> The rhizomes form buds for new plant development. The carbohydrate reserves in this rhizomes fluctuates throughout the season, influencing control. Reserves are generally highest in the fall and lowest during quackgrass flowering. Fall tillage is more effective in reducing rhizomes in the soil than spring tillage. Under no-till production, rhizomes are closer to the soil surface. Under conventional tillage, rhizomes are concentrated throughout the plough layer. Due to the distribution throughout the soil profile under conventional tillage, emergence is more even under no-till systems, allowing for more efficient herbicide applications. Herbicides are available.	

## Green Foxtail, *Setaria viridis*

<b>Lifecycle</b>	Annual
<b>Propagation</b>	Seed only
<b>Emergence</b>	Late in spring; often following crop emergence
<b>Range</b>	Throughout Canada and the U.S.
<b>Habitat</b>	Grows well in all soil textures. Cultivated land, waste places, roadsides, gardens and sometimes lawns.
<b>Competitiveness</b>	Very competitive
<b>Herbicide Resistance</b>	Sulphonylurea and imidazolinone (Group 2) populations in Ontario ACCase inhibitors, Dinitroanilines and ALS inhibitors
	 <p style="text-align: right;">Peter Smith</p>
<p><b>Seedling</b> First leaves are arched, and hairless.</p>	<p>Leaves Sheath is open with overlapping margins, and hairy after emergence of the second leaf. No auricles. Ligule is a fringe of hairs, 1.5 to 3 mm long. Leaf blades are flat and light green.</p>
	 <p style="text-align: right;">Peter Smith</p>
<p><b>Stem</b> Erect or spreading, 10-100 cm tall. Usually round in cross section but can be flattened.</p>	<p><b>Inflorescence</b> Dense spike, 1 – 15 cm long, usually straight and erect and covered with short green to slightly purplish bristles. Green foxtail can be distinguished from yellow foxtail by the lack of long inky hairs on the upper leaf surface near the stem, presence of a fringe of hair on both margins and on the leaf sheath.</p>
<p><b>CONTROL</b> Green foxtail is a poor competitor with crops, early seeding, strong crop stands and good fertilization can control this weed. Populations usually decline under minimum or no-till systems due to not thriving under cool, loose soil as found between rows in these systems. Banding nitrogen into the soil makes the fertilizer unavailable to the shallow root system of this weed. Green foxtail thrives when fertilizer is broadcast on the soil surface. Suppressed plants may still produce adequate seed to infest the field in subsequent years.</p>	

## Foxtail barley, *Hordeum jubatum*





<b>Lifecycle</b>	Perennial
<b>Propagation</b>	Seed and roots
<b>Range</b>	Throughout Canada and the northern two thirds of the U.S.
<b>Habitat</b>	Roadsides, waste ground and open fields.
 <p>MAFRI</p>	 <p>MAFRI</p>
<b>Seedling</b> First leaf is narrow and tall, greyish green and covered in hair.	<b>Leaves</b> Leaves are bluish green, have a sandpapery texture and flat of V-shaped. Sheath is split with overlapping margins. The margins have numerous soft hairs. No auricles. Ligule is transparent about 1 mm long.
 <p>Photo property of MAFRI</p> <p>MAFRI</p>	<b>CONTROL</b> Foxtail barley is a tough-to-control perennial weed in zero tillage systems since few herbicides options are available. The plant has a shallow root system making it more susceptible to control by tillage than many other perennial weeds. Fall-seeded cereals may allow foxtail barley populations to increase because the crop and weed develop during the same period with few in-crop herbicide control options.  <b>Chemical</b> Herbicides containing glyphosate can effectively control spring and fall- emerging seedlings at relatively low rates (0.5L/ac with formulations containing 360 grams active ingredient per litre). Much higher rates required for control of mature plants for which rates of 1 to 2 litres/acre are require. Post harvest applications generally offer best results because the plant translocates the glyphosate to the root system. Application under good environmental conditions increases control.
<b>Stem</b> Erect bluish-green stems up to 100 cm tall. Often have swollen nodes.  <b>Inflorescence</b> A nodding panicle with three spikes per node. Long awns (up to 8 cm long) fade from purplish green to white as the seed matures.	
<b>Cultural practices</b> Encourage a competitive crop using techniques such as high seeding rates and banding of nitrogen fertilizer, help reduce yield losses and development of foxtail barley. Tillage provides good control of foxtail barley. Other cultural practices outside of the sunflower crop to reduce infestations include cut for hay before seed form, early spring grazing reduces competitiveness, control water level in low lying areas to prevent salinity increase (foxtail barley is quite salt tolerant).	

## Persian Darnel

<b>Lifecycle</b>	Annual
<b>Propagation</b>	Seed
<b>Range</b>	Throughout Canada and the northern two thirds of the U.S.
<b>Habitat</b>	Roadsides, waste ground and open fields.
<b>Competitiveness</b>	Can be very competitive with cereal and oilseed crops
<b>Seedling</b> First leaf is narrow, tall and folded. It is dark green with a shiny upper surface. Auricles are absent on the first few leaves. Second and subsequent leaves have prominent veins above and a midrib below the leaf surface.	<b>Leaves</b> Long, flat and narrow leaves which are rough on the upper surface and margins with a smooth underside. Short membranous ligule with a smooth margin. Small claw-like auricles are only typically present on later emerging leaves. Closed sheaths are split, smooth and prominently veined.
<b>Stems</b> Short (15 to 45 cm tall), slightly roughened, branched at the base and upright.	<b>Inflorescence</b> Spikelets are arranged edgewise to the rachis, making the inflorescence appear flat.



## Wild oats, *Avena fatua*

<b>Lifecycle</b>	Annual
<b>Propagation</b>	Seed
<b>Range</b>	Throughout Canada and the U.S. except for the southern states.
<b>Herbicide Resistance</b>	Thiocarbamates, ACCase inhibitors, ALS inhibitors AB Arylamino propionic MB
 <p style="text-align: right;"><b>MAFRI</b></p>	 <p style="text-align: right;"><b>MAFRI</b></p>
<p><b>Seedling</b> Leaves are slightly hairy, twist counter-clockwise and have no auricles. . Grows slowly for first 2 weeks, but quickly surpass cultivated crop height.</p>	<p><b>Leaves</b> Flat leaf blades lined with hair along the margins and at the base of the blade. Membranous ligule is about 2-5 mm long. Open, transparent sheath with hairy edges</p>
 <p style="text-align: right;"><b>MAFRI</b></p>	 <p style="text-align: right;"><b>MAFRI</b></p>
<p><b>Stem</b> From the plant base, 3 to 5 hairless stems rise reaching up to 1.5 m tall.</p>	<p><b>Inflorescence</b> Open panicle containing large spikelets producing drooping inflorescence. Seeds are shed at maturity, usually prior to crop harvest.</p>
<p><b>CONTROL</b> Wild oats are a very competitive weed. Early planting and cultural practices to give the crop a jump on the weed helps provide a strong competition and limit yield loss. Such practices include proper fertility, shallow planting and herbicide burnoff of tillage close to crop emergence. Herbicides are available for control of wild oats. Herbicide resistant wild oats are a problem. Crop and herbicide rotation is important to prevent development of herbicide biotypes developing.</p>	

### Smooth Brome, *Bromus inermis*

Lifecycle	Perennial
Propagation	Seed and rhizomes
Range	Throughout Canada and the northern two thirds of the U.S.
Habitat	Roadsides, waste ground and open fields.
Herbicide Resistance	G 1 & 2
<b>Seedling</b> Leaves are covered with fine hairs and the base is often pale red.	<b>Leaves</b> Flat, long and nearly hairless leaf blades. The leaf sheaths are closed with a small V-shaped notch with a few scattered hairs. Ligule is long (1 to 2 mm), and brownish at the base. Auricles are absent.
<b>Stem</b> Erect, hairless stems reaching 20-100 cm tall.	<b>Inflorescence</b> Open, nodding panicle with 1 to 4 branches per node. Spikelets are purplish brown.

**Downy Brome, *Bromus tectorum***

Lifecycle	Annual, or winter annual
Propagation	Seed
Range	Throughout Canada (except Newfoundland) and the U.S. (except Florida)
<b>Seedling</b> First leaf is tall and narrow.	<b>Leaves</b> Leaf blades are flat, twisted, and covered with long, soft, white hairs. Thin ligule is 1 to 3 mm long and irregularly toothed. Auricles are absent.
<b>Stem</b>	<b>Inflorescence</b> A nodding, purple panicle with several drooping branches covered in soft white hairs.
<b>CONTROL</b> Herbicides are available that offer control. Glyphosate applications prior to crop emergence at 0.51 to 0.77L/ac (360g/L formulations) using 4 to 10 gallons/ac water before the grass is 6 inches tall. Trifluralin applied in the fall.	

## BROADLEAVED WEEDS

Identification of seedlings is based on the shape of the **cotyledons** (seed leaves). This method of identification cannot always be used since some species rarely produce seedlings in nature. Cotyledon shape is simplified into several groups including: lance; spatula; oval; linear; kidney; oblong; round; and heart shaped.

The stem can also be used to help identify species. The stem may stand erect; lay prostrate or vine-like. Other features to look for when studying a stem is striping, spots, or streaks, presence of hairs, solid or hollow, height and branching.

Look at the individual leaves. Many have a leaf stalk coming off of the stem. True leaves are either simple (containing 1 leaflet) or compound (more than one leaflet). The leaf margin may be toothed, scalloped, serrated, or smooth, and the leaf texture may be rough, hairy, or smooth.

Some species may have similar cotyledon shape. To help identify species from one another, it is important to look at leaf arrangement. Leaf arrangement can be opposite, alternate or whorled.

The following section contains tables to identify weeds. The sections are organized based on cotyledon shape.

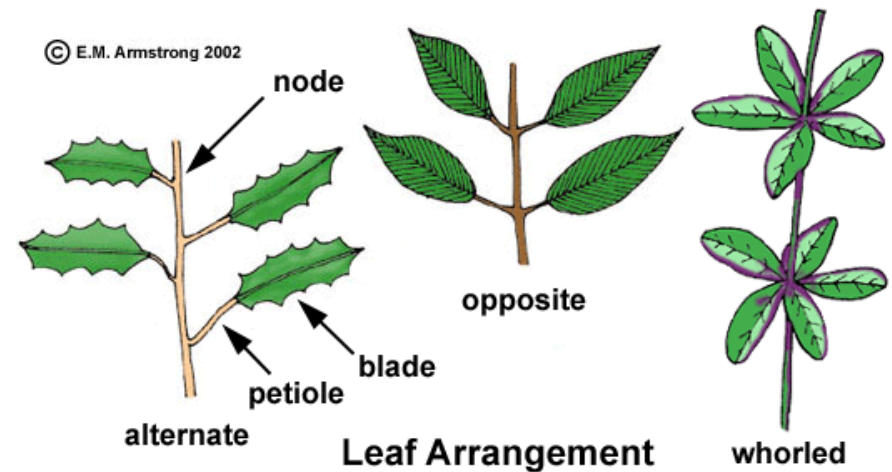
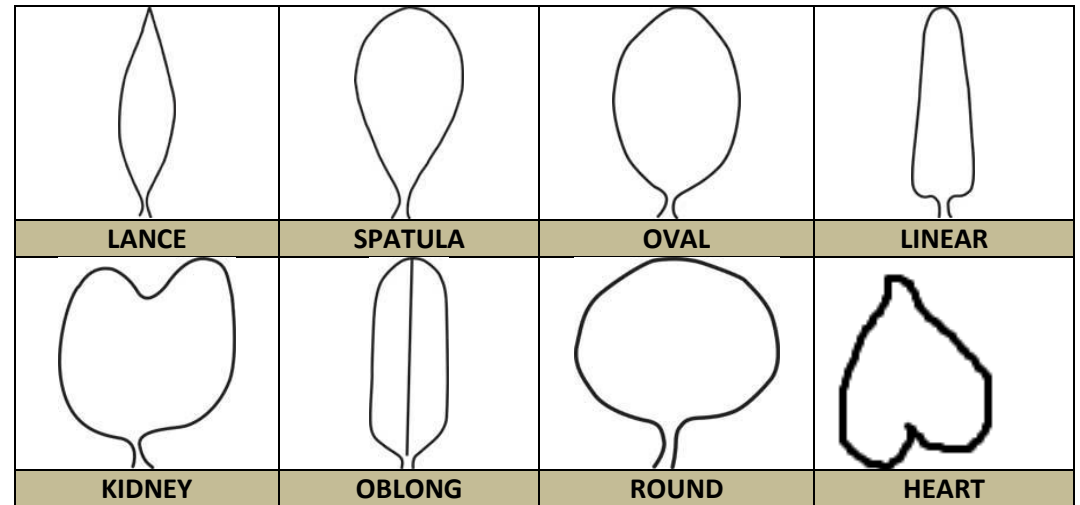








Figure 6. Broadleaf plant leaf arrangement. E.M.Armstrong, 2002.



SPATULA SHAPED COTYLEDONS

Common Plantain	
<b>Lifecycle</b>	Perennial
<b>Propagation</b>	Seed only
<b>Range</b>	Throughout Canada and the U.S.
<b>Habitat</b>	Cultivated land, pastures, meadows, waste places, roadsides, lawns and gardens.
 <p>Peter Smith</p>	 <p>Peter Smith</p>
<b>Cotyledons</b>	<b>Seedling</b> Have 3 faint veins and wither soon after the emergence of the first true leaves.
 <p>Peter Smith</p>	 <p>Peter Smith</p>
<b>Plant</b> Forms a basal rosette. Leaves are dull, oval with smooth margins and 3 to 5 prominent ribs on the underside of the leaf. Leaf undersides may be slightly hairy.	<b>Inflorescence</b> A compact spike on an erect, leafless stalk emerging from among the basal leaves.

**American Dragonhead, *Dracocephalum parviflorum***



<b>Lifecycle</b>	Annual or biennial
<b>Propagation</b>	Seed only
<b>Range</b>	Throughout Canada and northern two thirds of the U.S.
<b>Habitat</b>	Reduced tillage, roadsides, forage crops and waste areas.
<b>Competitiveness</b>	Highly competitive
 <p>Photo property of University of Manitoba Plant Science Department</p>	U of Manitoba
<b>Seedling</b> Cotyledons are ovate with 2 backward pointing basal lobes. Stem below the cotyledons has a few short hairs at or near the soil surface.	<b>Leaves</b> Mature leaves are opposite, lanceolate and have toothed margins.
	 <p>Photo property of Manitoba Agriculture Soils and Crops Branch</p>
<b>Stem</b> Erect, smooth to hairy and branched. Opposite leaves that are coarsely toothed and hairy below.	<b>Inflorescence</b> Dense spikes, bluish-purple with stiff spines at the base of the spike. at end of branches or clustered in leaf axis.
<b>CONTROL</b> Herbicides are available for tolerant crops. Consult the Guide to Field Crop Protection.	

## Hemp nettle, *Galeopsis tetrahit*

<b>Lifecycle</b>	Annual
<b>Propagation</b>	Seed. Seeds can remain dormant in soil for several years.
<b>Range</b>	Throughout Canada and northeastern U.S.
<b>Habitat</b>	Pastures, roadsides, waste ground and cultivated fields.
<b>Competitiveness</b>	Highly competitive for moisture and nutrients.
<b>Herbicide Resistance</b>	Group 2. Synthetic Auxin, ALS inhibitors
<b>Seedling</b> Cotyledon- backward pointing basal lobes and a small notch at the tip of the cotyledons. Stem below cotyledons is often purplish at soil level.	<b>Leaves</b> Coarsely toothed and very hairy with prominent veins.
 <p style="text-align: right;">MAFRI</p>	
<b>Stem</b> Square in cross section, up to 100 cm tall and have downward pointing hairs. Nodes are swollen.	<b>Inflorescence</b> Lobed flowers appear in terminal or axillary clusters. Can be white, pink, purple or variegated.
<b>CONTROL</b> Hemp nettle should be controlled in the early growth stages, between 2- and 4- leaf stage. Early, strong stands of competitive crops such as wheat, canola and barley are effective at suppressing hemp nettle. Herbicides are registered for control of hemp nettle in cereal crops, canola and peas. Crop rotations are important to allow for herbicide control options to be utilized.	





LANCE SHAPED COTYLEDONS

**Lamb's quarters, *Chenopodium album***

<b>Lifecycle</b>	Annual
<b>Propagation</b>	Seed only
<b>Range</b>	Throughout Canada and the U.S.A.
<b>Habitat</b>	Cultivated fields, pastures, wasteland, roadsides and gardens.
<b>Competitiveness</b>	Moderately competitive
<b>Herbicide Resistance</b>	Sulphonylurea and imidazolinone (G2) and triazine (G5) resistant populations in Ontario. Photosystem II and ALS inhibitors
	
<b>Seedling</b> Underside of cotyledons and the stem below are pink to purple.	<b>Leaves</b> Leaves are green on the upper surface and mealy (powdery)-white below. Often have reddish purple blotches.
	 Peter Smith
<b>Stem</b> Branched, smooth, green with reddish-purple lengthwise stripes and ridges and between 20 and 200 cm tall.	<b>Inflorescence</b> Small, greenish and dense terminal or axillary clusters.
<b>CONTROL</b> Herbicides are available for control of lamb's quarters in most crops. For crops where in-season control options are limited, pre-seed herbicides may be available. Consult the Guide to Field Crop Protection. Make note of surfactant requirements to improve control due to the mealy layer on lamb's quarters leaves hindering chemical adsorption.	




## Cocklebur, *Xanthium strumarium*

<b>Lifecycle</b>	Annual	
<b>Propagation</b>	Seed only	
<b>Range</b>	Throughout Canada (except for Atlantic provinces) and the U.S.A.	
<b>Habitat</b>	Particularly common in low areas and fine textured soils such as clays and clay loams.	
<b>Competitiveness</b>	A foreign material problem in harvested sunflower	
 <p>Peter</p> <p style="text-align: right;">Smith</p>	 <p style="text-align: right;">MAFRI</p>	
<b>Seedling</b> Cotyledons are hairless, and the stem below is often purplish green and are usually still present at maturity.	<b>Leaves</b> First leaves have 3 prominent veins. Later leaves have a sandpaper texture with wavy to toothed edges.	
	 <p style="text-align: right;">MAFRI</p>	
<b>Stem</b> Erect, branched, hairy with lengthwise ridges and spots growing to 30-120 cm tall.	<b>Inflorescence</b> Clustered in axils or leaves and at the ends of branches. Separate male and female flowers on the same plant.	
<b>CONTROL</b> No in-crop herbicides are available for control of cocklebur in sunflower. Cocklebur plants are shorter and typically not harvested with the sunflower seed. Crop rotations with small grains and cultivation help manage cocklebur problems.		

## Redroot pigweed, *Amaranthus retroflexus*

<b>Lifecycle</b>	Annual
<b>Propagation</b>	Seed only
<b>Emergence</b>	Late in spring often after emergence of crop
<b>Range</b>	Throughout Canada (except for Newfoundland) and the U.S.A.
<b>Habitat</b>	Cultivated fields, gardens, pastures, waste places and roadsides
<b>Competitiveness</b>	Very competitive once emerged
<b>Herbicide Resistance</b>	Sulphonylurea, imidazolinone (G2) and triazine (G5) resistant populations in Ontario. Photosystem II inhibitors, ALS inhibitors, amides and Nitriles

 <p style="text-align: right;">MAFRI</p>	 <p style="text-align: center;">Peter                      Smith</p>
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<b>Seedling:</b> Underside of cotyledons and stem below is dark red.	<b>Leaves:</b> Leaf stalks and margins are lined with hair. Leaf surfaces are dull green, somewhat hairy, and the tips have a shallow notch.
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 <p style="text-align: right;">Peter Smith</p>	 <p style="text-align: center;">Peter                      Smith</p>
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<b>Stem:</b> Pale green or reddish, erect, 50-90 cm tall and have a rough texture.	<b>Inflorescence:</b> Coarse, branching, bristly panicle made of short terminal spikes.
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**CONTROL**  
 Control of redroot pigweed is required 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 Guide to Field Crop Protection for product information and application tips. Inter-row cultivation and inter-row hooded sprayer applications can also be employed. Chemical control is most efficacious when made prior to the 4-leaf stage.



## Wild Buckwheat, *Polygonum convolvulus*

<b>Lifecycle</b>	Annual
<b>Propagation</b>	Seed only
<b>Range</b>	Throughout Canada and the U.S.A.
<b>Habitat</b>	Conventional tillage, reduced tillage, hay fields, waste areas
<b>Competitiveness</b>	Very competitive. Hinders harvest due to twining nature.
<b>Herbicide Resistance</b>	ALS inhibitors
	
<b>Seedling</b> Cotyledons are attached at 120 degrees. Stem below cotyledons is often reddish purple.	<b>Leaves</b> Arrowhead-shaped with backward-pointing basal lobes. Leaf tips are pointed. Have a papery sheath at the base of the leaves surrounding the stem.
 Peter Smith	 Peter Smith
<b>Stem</b> Branched, hairless, slender and twine around vegetation or structures for support. <b>Inflorescence</b> Small, greenish-white sepals (no petals) in clusters at tips of short branches or from axils of leaves.	Can be confused for field bindweed, but the leaf tips of field bind weed are rounded and the flowers are large white to pink trumpet-shaped flowers.
<b>CONTROL</b> 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 or rates fair to good. Best control is achieved when plants are 3 inches or smaller. Consult the Guide to Field Crop Protection for update information on registered herbicides and application information.	



## HEART/KIDNEY SHAPED COTYLEDONS

Round leaved mallow, <i>Malva rotundifolia</i>	
<b>Lifecycle</b>	Annual, winter annual or biennial
<b>Propagation</b>	Seed only
<b>Range</b>	Throughout Canada (except for Atlantic provinces) and the U.S. (except for New England states)
<b>Habitat</b>	Conventional and reduced tillage, rangeland, roadsides and waste areas.
<b>Competitiveness</b>	Highly competitive
 <p>© Peter Smith</p>	
<b>Seedling</b> Heart shaped cotyledons with prominent veins.	<b>Leaves</b> Leaves are round to kidney shaped with scalloped margins.
 <p>© Peter Smith</p>	 <p>© Jason Szewc</p>
<b>Stem</b> Stems are generally spreading, with many branches and hairy. Under heavy competition the stems will grow erect.	<b>Inflorescence</b> Small, pale-blue to white flowers form in leaf axils.
<p><b>CONTROL</b></p> <p>No selective herbicides are available to control round leaved mallow in sunflower. Not many selective herbicides are availability is for other crops, and those that are usually have limited success.</p> <p>Tillage in the fall or spring can be used to control the short-lived perennial form of the weed. Tillage aimed to control the summer annual plants in the fall is usually of now benefit since the plants have already set seed and won't survive the winter.</p> <p>Control throughout the rotation utilizing burn off and high plant populations in competitive crops such as wheat and barley is the best way to control this weed.</p>	



## Wild mustard, *Brassica kaber*

<b>Lifecycle</b>	Annual
<b>Propagation</b>	Seed only
<b>Range</b>	Throughout Canada and the U.S.A.
<b>Habitat</b>	Conventional and reduced tillage, roadsides and waste areas.
<b>Competitiveness</b>	Strong competitor
<b>Herbicide Resistance</b>	Triazine (G5) resistant populations in Ontario. ALS inhibitors
 <p style="text-align: right;">Leanne Freitag</p>	 <p style="text-align: right;">Mike Cowbrough</p>
<b>Seedling</b> The cotyledons are broad and kidney-shaped with an indented tip.	<b>Leaves</b> Lower leaves are stalked, have small lateral lobes and a large terminal lobe. Upper leaves are stalk-less and do not clasp the stem. There are sparse hairs especially on the veins on the undersurface of the leaves.
<b>Stem</b> The stem is branched with stiff downward-pointing hairs near the base. The plant is basically hairless near the top. Stem nodes and the bases of branches have purple blotches.	<b>Inflorescence</b> Yellow flowers produced in clusters at the ends of branches.
<b>CONTROL</b> Selective herbicides options are available for control of wild mustard in sunflower, such as Assert and Muster Toss-N-Go. Solo used in the CLEARFIELD system and Express in the ExpressSun technology systems both offer control of wild mustard. Wild mustard thrives under cool and moist conditions. When thinking of making a herbicide application, monitor growth closely as it grows quickly and can escape the window for herbicide application.	




IRREGULAR SHAPED COTYLEDONS

Stork's-bill, <i>Erodium cicutarium</i>	
<b>Lifecycle</b>	Annual, winter annual or biennial
<b>Emergence</b>	Fall
<b>Range</b>	Throughout Canada and northeastern U.S.
<b>Habitat</b>	Gardens, waste places and summer fallow.
<b>Competitiveness</b>	Highly competitive for moisture and nutrients.
 MAFRI	
<b>Seedling</b> Three-lobed cotyledons that are unique to stork's-bill.	<b>Leaves</b> Pinnately divided. Resembles carrot leaves. Covered with short, stiff hairs.
	 MAFRI
<b>Stem</b> Forms a basal rosette and flowering stalks. Flowering stalks are erect, about 50 cm tall.	<b>Inflorescence</b> Flowers have 5 pink-purple petals and 5 sepals with pointed tips that form in clusters.
<b>CONTROL</b> Stork's-bill is an early season plant, flowering early in the spring and matures before the crop does. Because of this, plants should be controlled in the fall with tillage after the majority of plants have germinated or early in the following season. Repeated cultivation (many times through the growing season) may result to be effective for new infestations before seed production. If the plants develop, mow or burn the infestations prior to flowering. Very few herbicides are registered for control of stork's-bill. Early season applications of 2,4-D or dicamba can be effective. These products are not registered for use in sunflower. Stork's bill grows quickly and can advance through growth stages rapidly escaping the window for herbicide application.	

NEEDLE SHAPED COTYLEDONS

<b>Russian thistle, <i>Salsola kali</i></b>	
<b>Lifecycle</b>	Annual
<b>Propagation</b>	Seed only
<b>Range</b>	Found across Canada (except Newfoundland) and the U.S.A. (except states between the Mississippi River and the Atlantic coast)
<b>Habitat</b>	Roadsides, railroads, and dry open areas.
<b>Herbicide Resistance</b>	ALS inhibitors
	 <p>MAFRI</p>
<p><b>Seedling</b> Cotyledons are fleshy and narrow (less than 3 mm wide).</p> <p><b>Leaves</b> Leaves resemble the cotyledons except for a soft spine at the tip of true leaves.</p>	<p><b>Stem</b> Stems have numerous branches, are spiny, up to 120 cm tall, and stripped with red. At maturity when the stem dries, it breaks off at ground level and tumbles along the ground dispersing seeds.</p> <p><b>Inflorescence</b> Separate male and female flowers on the same plant in leaf axils. Both types are small and inconspicuous.</p>
<p><b>CONTROL</b> Russian thistle seed is short lived in the soil (2 to 3 years). If populations are intensively monitored and managed for 2 to 3 years, local eradication can be achieved. Mowing can be effective on smaller plants if all above ground tissue is removed. Tillage in the spring to kill young seedlings can be effective. Russian thistle can be grazed by cattle, however the diet should be supplemented or poisoning may occur. Herbicides are available to control Russian thistle. Pre-emergent herbicides help to control the weed (Edge, Treflan and Authority). Post-emergent applications can also be effective – but options are limited in sunflower. Express utilized in the ExpressSun technology package only can control Russian thistle. Herbicide applications should be made when plants are small (&lt;4 inches in diameter) for effective control. If possible, a tank mix of a pre-emergent and post-emergent herbicides control established weeds, and weeds yet to emerge. 2,4-D, dicamba and glyphosate offer intermediate to good control. <i>Only corn, sorghum, wheat and soybeans are recommended for planting the spring following a fall applications of dicamba.</i></p>	

OBLONG SHAPED COTYLEDONS




<b>Flixweed, <i>Descurainia sophia</i></b>	
<b>Lifecycle</b>	Annual, winter annual or biennial
<b>Propagation</b>	Seed only
<b>Emergence</b>	Fall. Only seeds at or near the soil surface germinate.
<b>Range</b>	Throughout Canada and the northern third of the U.S.A.
<b>Habitat</b>	Gardens, fence lines, waste places cultivated fields and along roadsides.
<b>Competitiveness</b>	Especially competitive in winter wheat and fall rye.
<b>Herbicide Resistance</b>	ALS inhibitor (GB/2) including chlorsulfuron, imazamox, metsulfuron-methyl, pyroxsulam, sulfosulfuron, triasulfuron and tribenuron-methyl in the U.S.
Peter  Smith	Peter Smith 
<b>Seedling:</b> Cotyledons are covered in dense hair. First true leaves have 3 lobes and covered with star shaped hairs.	<b>Leaves:</b> Leaves are very finely divided, almost feather-like, and covered in fine, grey hairs.
	 Peter Smith
<b>Stem:</b> Grayish-green due to a dense cover of hair, erect, 30-90 cm tall and branched.	<b>Inflorescence:</b> Pale yellow flowers in clusters at the ends of stems (resembles canola flowers).
<b>CONTROL</b> Flixweed is a winter annual. Herbicides offer better control when applied in the fall when they are more susceptible to herbicide and tillage than in the spring. Tank mixes that provide excellent and residual control of flixweed include chlorsulfuron, metsulfuron methyl, metribuzin, dicamba plus 2,4-D, and picloram plus 2,4-D. These products are not for use in sunflower, and recropping restrictions must be followed. Only corn, sorghum, wheat and soybeans are recommended for planting the spring following a fall applications of dicamba. Frequent spring cultivation will result in decreased populations of flixweed.	





**Kochia, *Kochia scoparia***

<b>Lifecycle</b>	Annual
<b>Propagation</b>	Seed only
<b>Emergence</b>	Early spring
<b>Range</b>	Throughout Canada except for Newfoundland, P.E.I. New Brunswick, and B.C. Throughout the northern half of the U.S.A. except for the west coast region
<b>Habitat</b>	Conventional and reduced tillage, rangeland, roadsides and waste areas.
<b>Competitiveness</b>	Very competitive and highly prolific seed producer
<b>Herbicide Resistance</b>	G2 herbicide resistance in Canada ALS inhibitors, Glycines,
<b>Seedling</b> Cotyledons are dull green on the upper surface and bright pink below, and covered in hairs.	<b>Leaves</b> Forms a basal rosette of linear to lance-shaped hairy leaves. Main stem leaves are larger than those on the lateral branches, and leaves get smaller towards the branch tips. This gives the plant a pyramidal shape.
<b>Stem</b> Erect, much branched with purple stripes. Once dried down, the stem breaks at the ground level and acts as a tumble weed.	<b>Inflorescence</b> Small, yellow flowers form in leaf axils.
<b>CONTROL</b>	




OVAL SHAPED COTYLEDONS

Perennial sow thistle, <i>Sonchus arvensis</i>	
<b>Lifecycle</b>	Perennial
<b>Propagation</b>	Seed and by a underground creeping root system
<b>Range</b>	Throughout Canada and the northern half of the U.S.
 <p style="text-align: right;">Peter Smith</p>	 <p style="text-align: right;">Peter Smith</p>
<b>Seedling</b> Oval cotyledons with slight indents at the tip. Almost impossible to distinguish from other species of sow thistle.	<b>Leaves</b> Deeply lobed with soft prickly margins. Upper leaves are less deeply lobed with spine-tipped teeth and clasp the stem with backward pointing basal lobes. Most leaves are found on the lower half of the stem.
	 <p style="text-align: right;">Peter Smith</p>
<b>Stem</b> Stems are bright green, erect, hollow and hairless at the base of the plant but have glandular hairs towards the top of the plant.	<b>Inflorescence</b> Numerous bright-yellow flowers composed of ray florets. Yellow hairs are present on the bracts.
<b>CONTROL</b> Dandelions have become more of a problem since the shift from cultivation to minimum or zero-tillage. Dandelions are best control using an out-of-crop application of herbicide. Being a perennial, it is best if the herbicide is translocated down to the root system along with the carbohydrates in the fall when the weed is preparing for the winter. If you cannot make an application in the fall, it must be made early in the spring. Just burning off the top leaves will not result in prolonged control of this weed. Spring-emerged dandelions (small rosette, and pale off-white roots versus the large, dark green rosette with thick, dark brown roots) can be easily controlled using an additive such as carfentrazone or ExPress.	




**Canada thistle, *Cirsium arvense***

<b>Lifecycle</b>	Creeping perennial
<b>Propagation</b>	Seed and horizontal stems
<b>Range</b>	Throughout Canada and the northern half of the U.S.A.
<b>Habitat</b>	Conventional and reduced tillage, rangeland, lawns, roadsides and waste areas.
<b>Competitiveness</b>	Highly competitive
<b>Herbicide Resistance</b>	No documented cases to date
	
<b>Seedling</b> Cotyledons are stalkless and hairless. First true leaves are slightly hairy with sharp spines along the margins.	<p><b>Leaves</b> Stalkless smooth leaves with a curled, wavy surface and several prickly toothed, irregularly shaped lobes. Underside of leaf is usually covered in soft hair.</p>
	
<b>Stem</b> Erect, usually branched, slender and hollow with a few leaf-like wings on the lower part reaching up to 120 cm tall. Becomes hairy with age.	<p><b>Inflorescence</b> Terminal or axillary flowers composed of numerous pinkish purple disc florets. Separate male and female plants.</p>
<b>CONTROL</b>	

## Shepherd's-purse, *Capsella bursa-pastoris*

<b>Lifecycle</b>	Annual or winter annual
<b>Propagation</b>	Seed only
<b>Range</b>	Throughout Canada and the U.S.A.
<b>Habitat</b>	Cultivated fields, waste areas, roadsides, gardens and lawns.
<b>Competitiveness</b>	Very competitive
<b>Herbicide Resistance</b>	ALS inhibitors in Saskatchewan
	
<b>Seedling</b> First true leaves are entire to slightly lobed.	<b>Leaves</b> Leaves are covered with star shaped hairs. Basal lobes are pointed and clasp the stem.
	
<b>Stem</b> Erect and branched, up to 80 cm tall and smooth to slightly hairy.	<b>Inflorescence</b> Small white flowers occur in terminal clusters. Seed pod is flat and triangular with a notched tip with a small beak.
<b>Control</b>	

**Dandelion, *Taraxacum officinale***

<b>Lifecycle</b>	Perennial		
<b>Propagation</b>	Seed only		
<b>Range</b>	Throughout Canada and the U.S.A.		
<b>Habitat</b>	Across all terrains and soil types		
<b>Competitiveness</b>	Competitive		
		Peter Smith	
<b>Seedling</b> First leaves are highly variable.	<b>Leaves</b> Leaves form a basal rosette. Leaves are elongated, and vary from slightly to deeply lobed divided to the midrib.		
			
<b>Stem</b> Smooth, leafless, round and hollow containing a milky substance.	<b>Inflorescence</b> Independent, bright yellow flowers composed of ray florets. The outer row of bracts are bent downwards. White, spherical seed heads made of many individual airborne seeds.		
<b>CONTROL</b>			

**Cleavers, *Galium aparine***

<b>Lifecycle</b>	Annual and winter annual
<b>Propagation</b>	Seed only
<b>Range</b>	Throughout Canada and the U.S.A.
<b>Habitat</b>	Conventional and reduced tillage, hay fields, roadsides, gardens.



Peter Smith



Peter

Smith

<b>Seedling</b> Cotyledons have a notched tip. First true leaves are arranged in a whorl of 4; each leaflet has a pointed tip.	<b>Leaves</b> Appear in whorls of 6 to 8. Leaf margins and midrib have bristly hairs that assist the plant clinging to surrounding vegetation.
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Peter

Smith






Peter Smith

<b>Stem</b> Square in cross section with roughly ribbed corners and short, downward-pointing bristles.	<b>Inflorescence</b> Appear in axils of upper leaves. Inconspicuous.
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**CONTROL**

**Night-flowering catchfly, *Silene noctiflora***

<b>Lifecycle</b>	Annual or winter annual		
<b>Propagation</b>	Seed only		
<b>Emergence</b>	Late spring		
<b>Range</b>	Throughout Canada the northern half of the U.S.A.		
<b>Habitat</b>	Cultivated fields, waste areas and hay fields		
			Annalee Winter
<b>Seedling</b> First true leaves are spatula shaped with hairy stalks and margins.	<b>Leaves</b> Forms a rosette of hairy leaves. Leaves become smaller moving up the stem. The upper leaves are covered with sticky, glandular hairs.		
	Annalee Winter		Annalee Winter
<b>Stem</b> 20 cm tall, erect, much branched near the top but always from a single stem	<b>Inflorescence</b> Terminal clusters of 3 to 8 white fragrant flowers that open at night. The calyx is sticky.		
<b>CONTROL:</b>			