



A FIELD GUIDE TO BROADLEAF WEEDS

Presented by the Ontario Ministry of Agriculture,
Food and Rural Affairs, University of Guelph,
and Bayer CropScience



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Ontario

Cover images



Velvetleaf

Abutilon theophrasti (L.)
flower
page 38



Field violet

Viola arvensis (L.)
flower
page 18



Hairy nightshade

Solanum sarachoides (L.)
flower
page 26



Flower of an hour

Hibiscus trionum (L.)
flower
page 20



Field violet

Viola arvensis (L.)
seed pod
page 18



Table of contents

How to use this guide 2

Contributors 4

Common broadleaf weeds

Black medick 6

Canada fleabane 8

Common mallow 10

Common ragweed 12

Eastern black nightshade 14

Field horsetail 16

Field violet 18

Flower of an hour 20

Giant ragweed 22

Green pigweed 24

Hairy nightshade 26

Lamb's-quarters 28

Prostrate knotweed 30

Redroot pigweed 32

Spreading atriplex 34

Tufted vetch 36

Velvetleaf 38

Waterhemp 40

White cockle 42

Wild buckwheat 44

Wild carrot 46

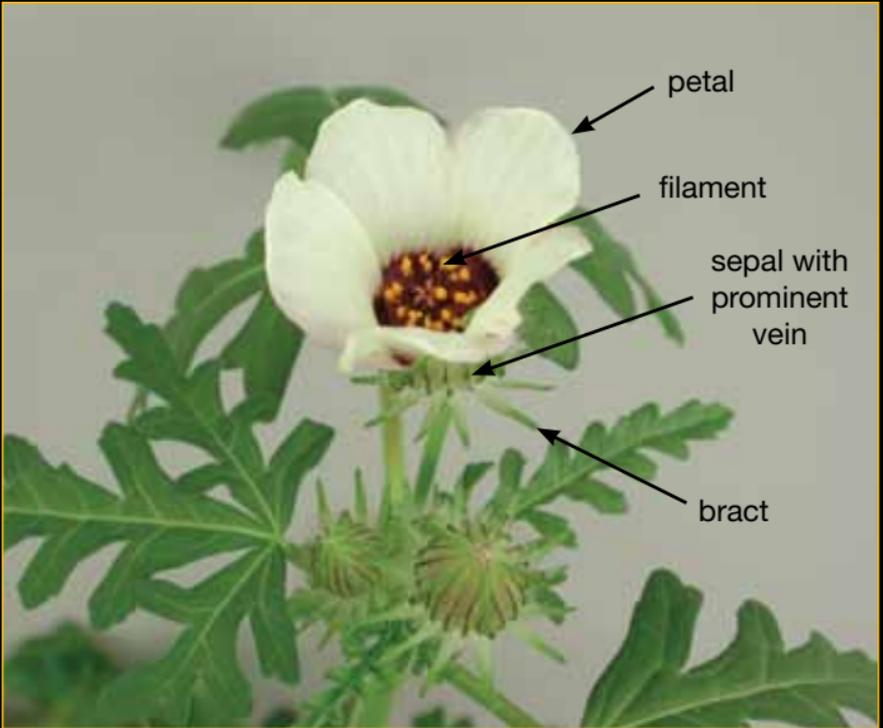
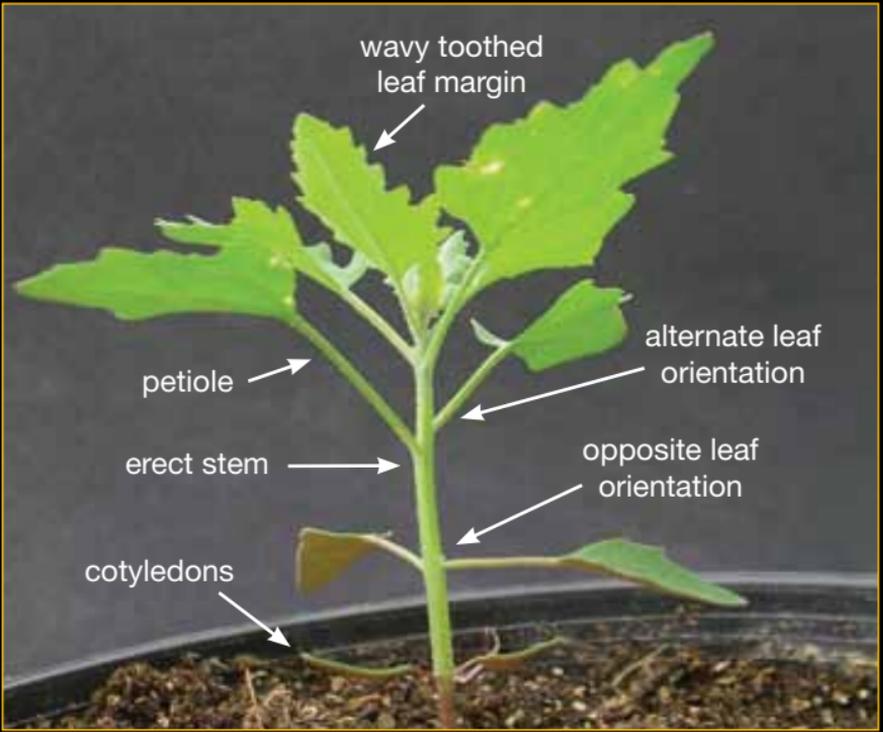
How to use this guide

Successful weed identification requires two things – the ability to pay attention to detail, and repetition. People often look at a weed, go to an identification book and flip through the pages hoping to find a match. This often fails. If you document all distinguishing features that are identified in the figures (at right) you will have a higher probability of finding a correct match. Still stumped? Visit weedinfo.ca or mauvaisesherbres.ca and go to the weed identification services link. There you can submit a photo and provide any distinguishing features. A response will be emailed to you and posted on the blog page.

This field guide provides all the necessary information to correctly identify 21 of the most common broadleaf weeds found in corn, soybean and cereal crops.

The information on each weed includes:

- key agronomic info including geographic ranges and competitiveness
- close-up photos to clearly identify various plant parts
- important decision-making tools including potential herbicide resistance



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Black medick

Medicago lupulina (L.)



Lifecycle	Annual, biennial or short-lived perennial
Propagation	Reproduces by seed
Emergence	Seedlings emerge in early spring
Range	Found throughout Eastern Canada
Habitat	Establishes in all types of soil
Competitiveness	Limited field trials indicate 15-20% yield losses in corn due to moderate to heavy populations of black medick
Resistance	No documented cases of herbicide resistance in Eastern Canada to date. Medicago species are generally more tolerant to glyphosate than other annual and biennial weed species.

Identification clues:



cotyledons

- elongated cotyledons, followed by a long petiole and a round unifoliate leaf and pointed apex



young seedling leaves

- alternate and compound with 3 round leaflets
- last third of leaf serrated



flowers

- small dense head-like and yellow clusters



seed pods

- green then turning black
- coiled and prominently ridged

Canada fleabane

Conyza canadensis (L.)



Lifecycle	Annual, winter annual
Propagation	Reproduces by seed
Emergence	The majority of seedlings will emerge in early spring, but will also emerge in the fall and overwinter
Range	Found throughout Eastern Canada
Habitat	Moist fertile soils of varying texture, more common on loam and clay soils
Competitiveness	Very competitive especially at high densities
Resistance	Populations resistant to glyphosate (Group 9), Group 2 (i.e. Classic®) and Group 22 (i.e. Gramoxone®) herbicides exist in the United States. There are no documented cases of glyphosate or Group 2 resistant fleabane in Eastern Canada to date.

Identification clues:



cotyledons

- round-oval



young leaves

- hairy, round with entire margins, but then turning oval with margins having 2-3 notches and a rounded apex



older leaves

- hairy, elongated with margins having 2-3 notches with a tapering apex



flowers

- very short white ray florets
- yellow disk florets
- fluffy at maturity

Common mallow

Malva neglecta (L.)



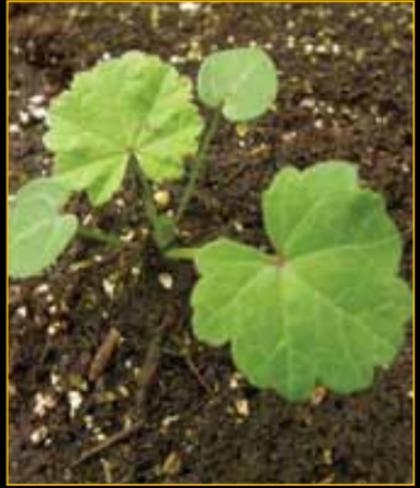
Lifecycle	Annual, biennial or short-term perennial
Propagation	Reproduces by seed
Emergence	Germinates very early in the spring
Range	Prominent throughout Eastern Canada mainly on field borders and headlands, but increasing in minimum-till cropping systems
Habitat	Establishes in all types of soil
Competitiveness	Very competitive, especially at high densities
Resistance	No documented cases of herbicide resistance in Eastern Canada to date. Members of the mallow family tend to be more tolerant to glyphosate compared to other annual species.

Identification clues:



cotyledons

- spade shaped



seedling plants



leaves

- kidney-shaped leaves on a long stalk with shallow toothed margins

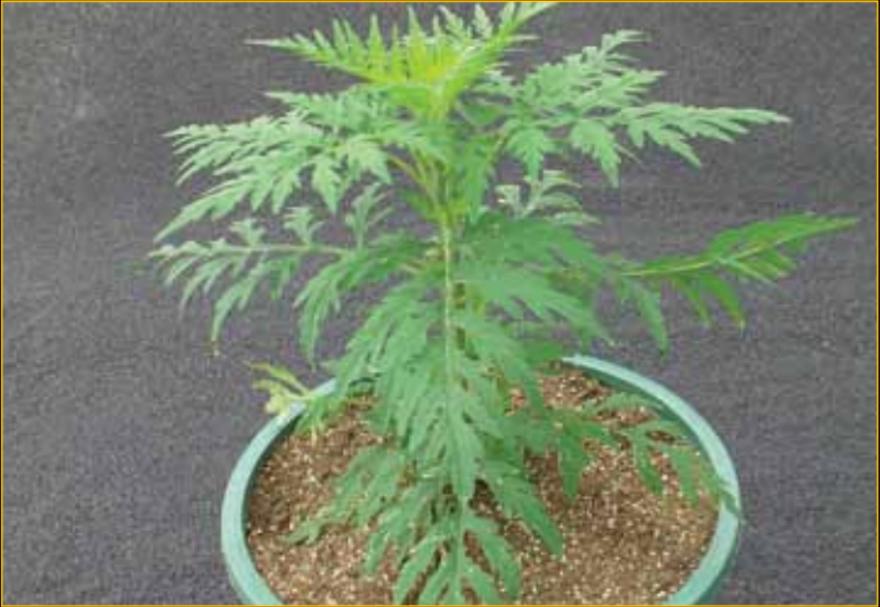


flowers

- 5 white to pinkish white petals

Common ragweed

Ambrosia artemisiifolia (L.)



Lifecycle	Annual
Propagation	Reproduces by seed
Emergence	Germinates and emerges early in the spring
Range	Found throughout Eastern Canada
Habitat	Establishes in all types of soil
Competitiveness	Extremely competitive especially at high densities. In field crops yield losses can approach 90%.
Resistance	Populations resistant to glyphosate (Group 9) exist in the United States. Group 5 (i.e. atrazine) and Group 2 (i.e. Classic) resistant populations exist in Ontario.

Identification clues:



cotyledons

- orbicular



leaves

- compound and finely divided



stems

- erect, much branched and hairy
- leaves have an opposite orientation on the stem (as shown) but become alternate higher up on the plant



flowering heads

- unisexual with pollen producing flower heads (as shown) and seed producing flower heads

Eastern black nightshade

Solanum ptychanthum (L.)

Lifecycle	Annual
Propagation	Reproduces by seed
Emergence	Will emerge early in the spring, but are also able to germinate late in the spring and into the summer and can easily thrive in low light environments
Range	Throughout Eastern Canada
Habitat	Is most commonly found on loam and clay loam soils, but will exist in all soil types
Competitiveness	Competitive, but will negatively impact crop quality through staining
Resistance	A number of populations are resistant to Group 2 (i.e. Pursuit®) herbicides in Ontario and throughout North America. No documented cases of glyphosate resistance in Eastern Canada. However, due to the limited residual activity of glyphosate combined with this weed's emergence pattern, it is common to see eastern black nightshade in glyphosate tolerant cropping systems.

Often mistaken for: redroot pigweed, green pigweed

I know it's NOT because...

The leaf margins of eastern black nightshade are hairy compared to the hairless and entire margins of redroot and green pigweed. In addition, the margins of older leaves on eastern black nightshade are wavy toothed.

Often mistaken for: hairy nightshade

I know it's NOT because...

The leaf surface and stems of eastern black nightshade are hairless and the berries upon maturity are black, as opposed to the mature brown berries of hairy nightshade.

Identification clues:



cotyledons

- oblong with hairy margins
- first leaves oval, the underside usually being purple



leaves

- younger leaves oblong with hairy margins
- older leaves lacking the hairy margins, but margins become wavy toothed and the purple underside may begin to diminish in flamboyance



flowers

- often 2-5 flowers grouped together in a small umbel
- the petals are white and unite into a star shaped corolla with 5 sharp lobes
- the tubular floret is yellow



berries

- green then turning black
- the calyx of 5 united green sepals that were behind the white star shaped corolla will enclose the berries once they are formed



whole plant

Field horsetail

Equisetum arvense (L.)



Lifecycle	Perennial
Propagation	Mainly by rhizomes, but may reproduce by spores in early spring
Emergence	Will emerge in early spring as shoots with spore-producing tips and then later the shoots emerge as a pine tree-like structure
Range	Prominent throughout Eastern Canada
Habitat	More typically found in poorly drained soils, but can certainly grow in sandy soils
Competitiveness	Considered an extremely competitive species
Resistance	No documented cases of herbicide resistance in Eastern Canada. Field horsetail is more tolerant of glyphosate as compared to other perennial weeds.

Identification clues:



rhizomes

- dark brown or blackish and will often go as deep as 1 m



shoots

- green, slender, erect and hollow



leaves

- leafless, but with whorls of 6-8 branches at nearly every black node

Field violet

Viola arvensis (L.)



Lifecycle	Annual, winter annual
Propagation	Reproduces by seed
Emergence	The majority of seedlings will emerge in the fall and early spring
Range	Found throughout Eastern Canada
Habitat	Most prominent in cereal crops and in sandy and loam soils
Competitiveness	Research in the United Kingdom has shown that field violet is one of the least competitive species in cereal crops and does not cause any appreciable yield loss
Resistance	No documented cases of herbicide resistance in Eastern Canada to date

Identification clues:



cotyledons

- round to ovate



leaves

- lower leaves round
- upper leaves elongated with round toothed margins with short sparse hairs



flowers

- resembling those of cultivated pansy but much smaller



seed pods

- seedpods will split into 3 divisions scattering numerous, small, brownish seeds

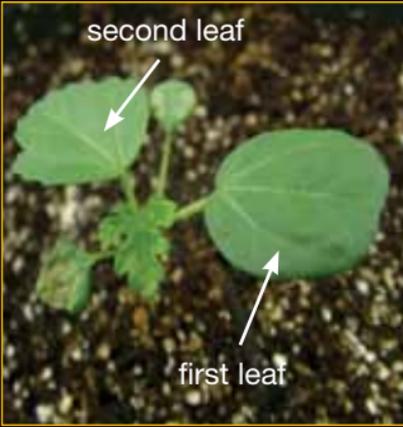
Flower of an hour

Hibiscus trionum (L.)



Lifecycle	Annual
Propagation	Reproduces by seed
Emergence	Requires warmer soil temperatures to germinate, therefore typically emerges in late spring to early summer. Germinates poorly when close to the soil surface.
Range	Most typically found in southwestern Ontario
Habitat	Establishes in all types of soil
Competitiveness	Very competitive, especially at high densities
Resistance	No documented cases of herbicide resistance in Eastern Canada to date. Members of the mallow family tend to be more tolerant to glyphosate compared to other annual species.

Identification clues:



cotyledons

- orbicular

young leaves

- first leaf orbicular with a somewhat entire margin, second leaf orbicular but with toothed margins



stems

- erect at first, then branched and spreading with coarse whisker-like hairs along with a more fuzzy pubescence



mature leaves

- blades are oriented alternately on the stem, are 3-parted with each division being coarsely lobed



flowers

- light yellow petals with a purplish centre and within a coarsely hairy calyx having prominent purplish veins with a linear ring of hairy bracts below the calyx

Giant ragweed

Ambrosia trifida (L.)



Lifecycle	Annual, winter annual
Propagation	Reproduces by seed
Emergence	The majority of seedlings emerge in early spring to early summer
Range	Typically found in the southern and central regions of Eastern Canada
Habitat	Establishes in all types of soil
Competitiveness	Extremely competitive especially at high densities. In field crops yield losses can approach 90%.
Resistance	Populations resistant to glyphosate (Group 9) and Group 2 (i.e. Classic) herbicides exist in the United States. No documented cases of herbicide resistance in Eastern Canada to date.

Identification clues:



cotyledons

- oblong



leaves

- large and rough to the touch (sandpaper-like)
- round with 3-5 lobes
- coarsely toothed margins



stems

- opposite orientation, much branched and very hairy



flowering heads

- unisexual with pollen producing flower heads (as shown) and seed producing flower heads

Green pigweed

Amaranthus powelli (L.)

Lifecycle	Annual
Propagation	Reproduces by seed
Emergence	Will emerge in the spring, typically after lamb's-quarters
Range	Throughout Eastern Canada. Contrary to popular belief, green pigweed is more common in Ontario than redroot pigweed.
Habitat	Exists in all types of soils, can withstand a range of soil pHs and is most prominent in soils rich in phosphorus and potassium
Competitiveness	Extremely competitive
Resistance	A number of populations are resistant to Group 2 (i.e. Pursuit), Group 5 (i.e. atrazine) and Group 7 (i.e. linuron) herbicides in Ontario and throughout North America. There are no known cases of glyphosate resistant populations in North America.

Often mistaken for: redroot pigweed

I know it's NOT because...

The stem of redroot pigweed is covered in dense short hairs, whereas only the upper nodes on the stem of green pigweed have hairs. The first leaves are tapered and shiny green compared to the rounded and dull green leaves of redroot pigweed.

Often mistaken for: waterhemp

I know it's NOT because...

The upper stem node of green pigweed has a cluster of dense hairs whereas the stem of waterhemp is smooth and hairless (with the possible exception of some sparse short whiskers on the top node). Waterhemp will typically have narrower leaves with wavy margins and no notched apex.

Often mistaken for: eastern black nightshade

I know it's NOT because...

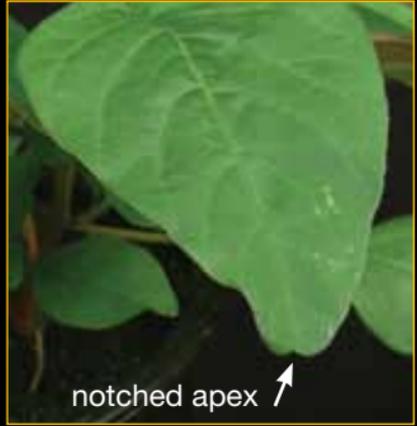
The leaf margin of young eastern black nightshade leaves are hairy and the older leaves have wavy toothed margins.

Identification clues:



stems

- sparse short hair primarily near the top node, alternate leaf orientation



leaves

- early leaves, tapered, older leaves round, shiny green (see also stems figure) and with a notched apex



whole plant

- young seedling plant



seed heads

- the individual bristly finger-like spikes are longer than that of red root pigweed
- produces seed that is indistinguishable from other pigweed species

Hairy nightshade

Solanum sarachoides (L.)



Lifecycle	Annual
Propagation	Reproduces by seed
Emergence	Emerges early in the spring and generally at the same time as lamb's-quarters
Range	Throughout Eastern Canada
Habitat	Is most commonly found on sandy and muck soils and more frequently in horticultural crops
Competitiveness	Competitive, particularly at high densities
Resistance	No documented cases of herbicide resistance in Eastern Canada exist to date

Often mistaken for: eastern black nightshade

I know it's NOT because...

The stem and leaves of hairy nightshade are covered in dense hairs. The berries upon maturity are brown, as opposed to the black berries of eastern black nightshade.

Identification clues:



cotyledons

- oblong with hairy margins

stems

- extremely hairy



leaves

- alternate orientation on the stem, extremely hairy
- ovate to almost triangular
- note the hairy petiole



flowers

- often 3-9 flowers in a short raceme
- the corolla is white, but sometimes with a bluish purple undertone
- the tubular floret is yellow



whole plant

Lamb's-quarters

Chenopodium album (L.)

Lifecycle	Annual
Propagation	Reproduces by seed
Emergence	Emerges very early in the spring
Range	One of the most prominent species in Eastern Canada
Habitat	Found on all soil types and mainly in agricultural fields
Competitiveness	One of the most competitive species in field crops that causes significant yield losses if uncontrolled
Resistance	Group 2 (e.g. Pinnacle®) and triazine resistant populations exist in Eastern Canada. Populations resistant to glyphosate have been confirmed in Ohio, U.S. There have been significant performance issues in Eastern Canada causing speculation of elevated tolerance to glyphosate.

Often mistaken for: spreading atriplex

I know it's NOT because...

The leaves of lamb's-quarters are more broad and triangular with shallow toothed margins. Spreading atriplex has lanced shaped leaves with 1 or 2 distinct lobes at the base, the margins are entire and the stems are prostrate and wirey.

Identification clues:



cotyledons

- linear



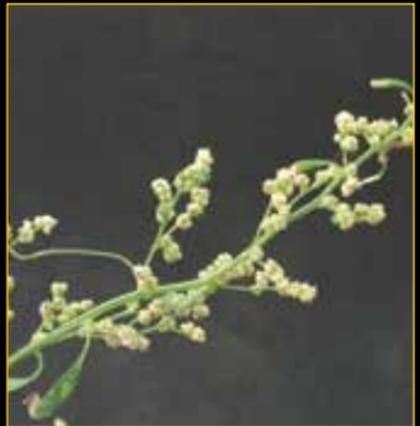
leaves

- broad, triangular shaped, toothed margins, mealy surface
- first leaves of opposite orientation, but later ones are distinctly alternate



stems

- erect, young stem green, mature stem green with sometimes reddish or purplish lengthwise strips or ridges



flowers

- small, green, densely grouped granular clusters then turning brown with small, round but somewhat flattened grayish black seed within

Prostrate knotweed

Polygonum aviculare (L.)



Lifecycle	Annual, winter annual
Propagation	Reproduces by seed
Emergence	Majority of seed germinates and emerges in the spring
Range	Prominent throughout Eastern Canada
Habitat	Establishes in all types of soil, but most prominent in heavy soils and compacted soils
Competitiveness	Less competitive than other annual species
Resistance	No documented cases of herbicide resistance in Eastern Canada to date. Members of the smartweed family tend to be more tolerant to glyphosate compared to other annual species.

Identification clues:



cotyledons

- linear



stems

- prostrate, thin, wirey

leaves

- length typically 3 times its width, but may be broader when competing with field crops, alternate orientation on the stem



ocrea

- a skin-like membrane sheath that wraps around the stem at each node



flowers

- very small, almost unnoticeable with white to pinkish white sepals

Redroot pigweed

Amaranthus retroflexus (L.)

Lifecycle	Annual
Propagation	Reproduces by seed
Emergence	Will emerge in the spring, typically after lamb's-quarters
Range	Throughout Eastern Canada
Habitat	Exists in all types of soils, can withstand a range of soil pHs and is most prominent in soils rich in phosphorus and potassium
Competitiveness	Extremely competitive
Resistance	A number of populations are resistant to Group 2 (i.e. Pursuit), Group 5 (i.e. atrazine), Group 6 (i.e. Pardner®) and Group 7 (i.e. linuron) herbicides in Ontario and throughout North America. There are no known cases of glyphosate resistant populations in North America.

Often mistaken for: green pigweed

I know it's NOT because...

The stem of redroot pigweed is covered in dense short hairs, whereas only the upper nodes on the stem of green pigweed have hairs. The first leaves are rounded and dull green compared to the tapered and shiny green leaves of green pigweed.

Often mistaken for: waterhemp

I know it's NOT because...

The stem of redroot pigweed is covered in dense short hairs. The stem of waterhemp is smooth and hairless.

Often mistaken for: eastern black nightshade

I know it's NOT because...

The leaf margin of young eastern black nightshade leaves are hairy and the older leaves have wavy toothed margins.

Identification clues:



stems

- short dense hairs, alternate leaf orientation



leaves

- round, dull green with a notched apex



whole plant

- young seedling plant



seed heads

- a number of short, thick and bristly spikes producing many small black seeds

Spreading atriplex

Atriplex patula (L.)

Lifecycle	Annual
Propagation	Reproduces by seed
Emergence	Emerges very early in the spring and typically grows quite quickly
Range	Throughout Eastern Canada
Habitat	Will exist in all soil types but most typically found on heavier textured soils
Competitiveness	A very competitive species that will cause significant yield reductions if left uncontrolled
Resistance	No documented cases of herbicide resistance in Eastern Canada to date. However, spreading atriplex is more tolerant to glyphosate when compared to other annual species. This is more noticeable in larger plants, which are common early on in the spring due to this species' early emergence and quick growth.

Often mistaken for: lamb's-quarters

I know it's NOT because...

Spreading atriplex has lanced shaped leaves with 1 or 2 distinct lobes at the base, the margins are entire and the stems are prostrate and wirey. The leaves of lamb's-quarters are more broad and triangular with shallow toothed margins.

Identification clues:

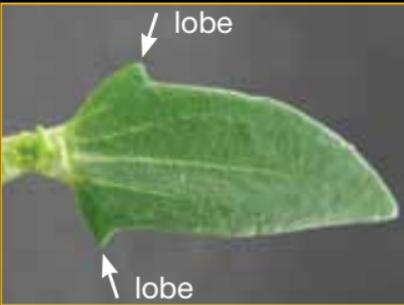


cotyledons

- linear

seedlings

- key distinction from lamb's-quarters: the lobes at the base of the leaf



leaves

- lance shaped with one or two distinctive lobes at the base
- usually has very few if any teeth along the leaf margin

stems

- prostrate to nearly erect, the younger leaves are opposite in orientation off the main stem, but eventually becoming alternate



unisexual flowers

- the female flower shown is enclosed between triangular bracts and in clusters of 2-5 within the axils of smaller leaves

Tufted vetch

Vicia cracca (L.)



Lifecycle	Perennial
Propagation	Reproduces by seed and spreading underground roots
Emergence	Tends to emerge later in the spring
Range	Found throughout Eastern Canada
Habitat	Establishes in all types of soil
Competitiveness	A very patchy species in terms of field distribution. Where established can cause significant yield losses and reduces harvesting efficiency.
Resistance	No documented cases of herbicide resistance in Eastern Canada to date. However this species is tolerant to typical field rates of glyphosate.

Identification clues:



stems

- long and wirey



leaves

- alternate and pinnately compound with 8-12 pairs of hairy leaflets and a tendril at the end which allows the plant to climb up objects



flowers

- purple to bluish-purple resembling the flower head of a pea



seed pod

- green then turning black
- coiled and prominently ridged

Velvetleaf

Abutilon theophrasti (L.)



Lifecycle	Annual
Propagation	Reproduces by seed
Emergence	Germinates and emerges over a long period of time during the spring and early summer
Range	Found throughout Eastern Canada
Habitat	Establishes in all types of soil but most prominently on nutrient rich soils
Competitiveness	Very competitive, especially at high densities
Resistance	No documented cases of herbicide resistance in Eastern Canada to date. Members of the mallow family tend to be more tolerant to glyphosate compared to other annual species.

Identification clues:



cotyledons

- orbicular



leaves

- broad and heart-shaped with a sharp pointed apex, velvety touch and alternate orientation on the stem, margins are shallowly round-toothed



flowers

- containing 5 yellow petals and 5 green sepals



fruit

- circular cluster of 12-15 seedpods which are green at first then turning black

Waterhemp

Amaranthus rudis (L.)

Lifecycle	Annual
Propagation	Both male and female plants exist with only the female plants producing seed
Emergence	Will emerge in the spring, typically after lamb's-quarters
Range	This species has only been documented in the southern part of Ontario. It has migrated slowly north from the southern and midwest United States.
Habitat	Exists in all types of soils, can withstand a range of soil pHs and is most prominent in soils rich in phosphorus and potassium
Competitiveness	Extremely competitive
Resistance	A number of populations are resistant to Group 2 (i.e. Pursuit) and Group 5 (i.e. atrazine) herbicides in Ontario and throughout North America. Waterhemp populations resistant to glyphosate have been documented in the United States.

Often mistaken for: redroot pigweed

I know it's NOT because...

The stem of redroot pigweed is covered in dense short hairs, whereas waterhemp is smooth and hairless. The waterhemp leaf lacks a notched leaf apex.

Often mistaken for: green pigweed

I know it's NOT because...

The upper stem node of green pigweed has a cluster of dense hairs whereas the stem of waterhemp is smooth and hairless. Waterhemp will typically have narrower leaves with wavy margins and without a notched apex.

Often mistaken for: eastern black nightshade

I know it's NOT because...

The leaf margin of young eastern black nightshade leaves are hairy and the older leaves have wavy toothed margins.

Identification clues:



stems

- alternate leaf orientation, smooth with no hairs, variable colouring



leaves

- tapered, typically leaves will have a wavy margin and lack a notched apex



whole plant

- young seedling plant



seed heads

- long narrow spikes with only the female plants producing seed (male sterile flowering head shown)

White cockle

Silene alba (L.)

Lifecycle	Biennial or short-term perennial
Propagation	Reproduces by seed
Emergence	New seedlings will emerge predominately in the spring, but can emerge in the fall
Range	Prominent throughout Eastern Canada
Habitat	More typically found in forage crops, and on heavier soils but increasingly becoming a problem in minimum-till corn and soybean fields
Competitiveness	Very competitive as this species grows quickly in the spring and will flower and set seed throughout the summer
Resistance	No documented cases of herbicide resistance in Eastern Canada to date

Often mistaken for: bladder campion

I know it's NOT because...

White cockle is extremely hairy and bladder campion is smooth and hairless, the calyx is also smooth and bladder shaped.

Often mistaken for: night-flowering catchfly

I know it's NOT because...

Night-flowering catchfly is extremely sticky to touch especially the stem and calyx, white cockle is not sticky at all.

Identification clues:



seedlings

- first few leaves appear as a rosette



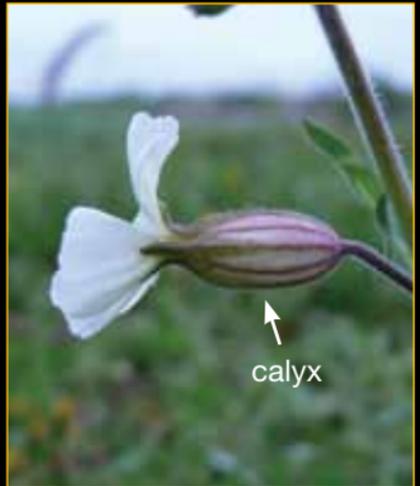
leaves

- softly hairy on both sides, lance shaped and tapering to a point, margins are hairy, entire and wavy



flowers

- white with 5 deeply lobed petals



male calyx

- tubular, with 10 distinctive purplish lengthwise veins, the female (seed producing) calyx with 5 prominent veins and usually 3 much fainter veins in between

Wild buckwheat

Polygonum convolvulus (L.)



Lifecycle	Annual
Propagation	Reproduces by seed
Emergence	Majority of seed germinates and emerges in the spring but will germinate throughout the summer and early fall
Range	Prominent throughout Eastern Canada
Habitat	Establishes in all types of soil
Competitiveness	Less competitive than other annual species, but can reduce harvesting ease in cereal crops due to its climbing nature
Resistance	No documented cases of herbicide resistance in Eastern Canada to date. Members of the smartweed family tend to be more tolerant to glyphosate compared to other annual species.

Often mistaken for: field bindweed

I know it's NOT because...

The presence of an ocrea, very small flowers and a less robust root system.

Identification clues:



cotyledons

- elongated



leaves

- arrowhead shape



ocrea

- a skin-like membrane sheath that wraps around the stem at each node



fruit

- triangular shaped, green then turning black
- seeds are dull black

flowers

- very small with greenish to whitish petals

Wild carrot

Daucus carota (L.)



Lifecycle	Biennial or short-term perennial, occasionally an annual
Propagation	Reproduces by seed
Emergence	Germinates early in the spring and sometimes in the fall
Range	Prominent throughout Eastern Canada mainly on field borders and headlands, but increasing in minimum-till cropping systems
Habitat	Establishes in all types of soil
Competitiveness	Very competitive, especially at high densities
Resistance	No documented cases of herbicide resistance in Eastern Canada to date. Field experience would suggest that there are populations more tolerant to glyphosate than others.

HOT TIP:

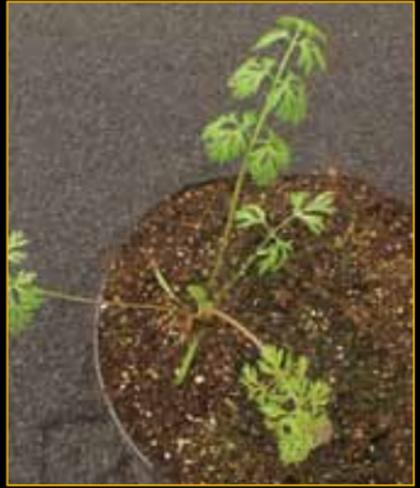
Crush the leaf tissue with your fingers and you should smell a carrot-like odour. The taproot will also smell and taste like cultivated carrot.

Identification clues:



cotyledons

- narrow and linear



leaves

- compound leaf, young leaves with 3 main divisions, older leaves with more than 3 divisions



flowers

- white in a compound umbel (a large umbel made up of many small umbels) with a single purple flower in the centre



fruit

- brownish with several rows of spines which cling to objects



Bayer CropScience

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