A FIELD GUIDE TO

GRASSY WEEDS

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

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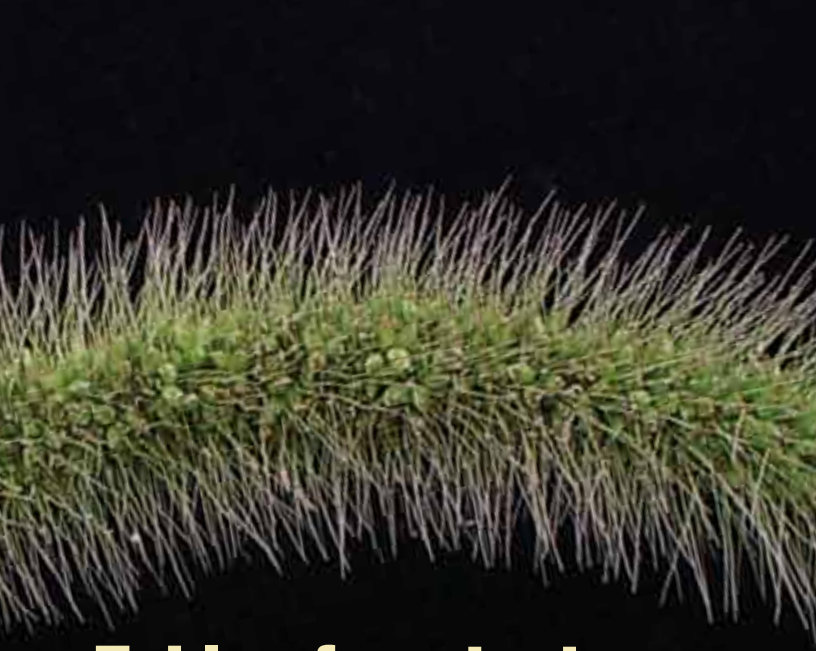

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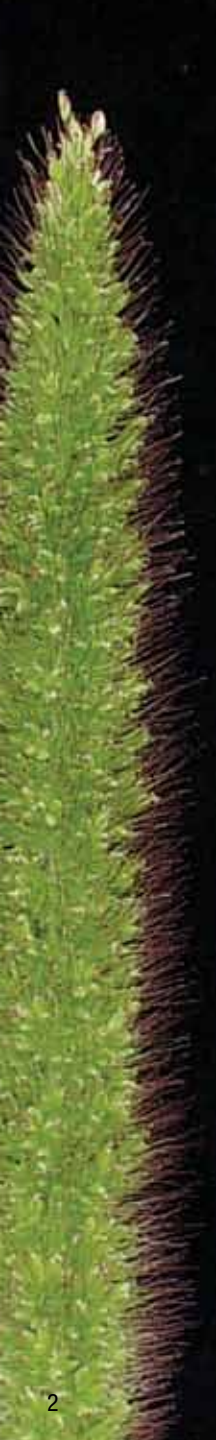


How to use this guide

Grassy weeds are generally harder to identify in the field than broadleaf weeds, and are also highly selective when it comes to herbicide sensitivity. Correctly identifying grassy weed species is critical to designing an effective weed control program.

This field guide provides all the necessary information to correctly identify 11 of the most common grassy weeds found in corn, soybean, canola and cereal crops.

The information on each weed includes:

- key agronomic info including estimates of crop yield losses
- close-up photos to clearly identify various plant parts
- clues to help distinguish from similar weed species

Contributors

Special thanks to Mike Cowbrough and Peter Smith for providing the agronomic information and photography for this field guide.

Mike Cowbrough

Mike is the Weed Specialist for Field Crops with the Ontario Ministry of Agriculture, Food and Rural Affairs. Although a relatively young lad, Mike has been involved in weed management research and extension for more than a decade. A University of Guelph graduate with a Master's degree in Weed Science, Mike is responsible for editing OMAFRA Publication 75 – Guide to Weed Control, the Problem Weed Control in Field Crops database and the Herbicide Resistant Weeds in Ontario website. Mike lives on the family farm in Guelph with his wife Shannon.

Peter Smith

Peter is a Field Technician in Weed Science in the Department of Plant Agriculture, University of Guelph, working with Dr. François Tardif since 1996. Peter focuses his time on herbicide resistance as well as current issues in weed research and product development. After graduating from the University of Guelph in 1988 with an honours degree in biology, Peter became a technician in the Pastures and Forage Management Program. Further experience as both a summer student and full time in corn physiology and cropping systems – as well as eight years as a weeds technician – have given Peter an excellent, well rounded look into many areas of agricultural research. Peter comes from a large family centred in the Guelph area, where he and his wife, Janette Hogan, raise their three children.

Barnyard grass

Echinocloa crusgalli (L.)

Lifecycle	Annual
Overview	A very common annual grass in field crops found on a number of different soil types
Range	Found throughout the province
Resistance	No documented cases of herbicide resistance in Ontario to date
Competitiveness	• Corn: 2% & 7% yield loss at 1 & 5 barnyard grass/m^2 respectively • Soybean: 3% & 12% yield loss at 1 & 5 barnyard grass/m^2 respectively
Emergence	Considered an early- to mid-season emerging annual grass

Often mistaken for:

fall panicum
yellow foxtail

I know it's NOT	**because…**
fall panicum	barnyard grass has no ligule
yellow foxtail	barnyard grass has no ligule and no hairs on the leaf sheath margin

Identification clues:

ligule
- none, the only common annual grass without a ligule

leaf blade
- hairless on both sides of the leaf blade

leaf sheath
- flat and hairless
- leaf sheath margins are also hairless

seed head
- central axis with lateral branches containing dense clusters of spikelets

Fall panicum

Panicum dichotomiflorum

Lifecycle	Annual
Overview	An annual grass species that, in general, is poorly controlled by soil-applied herbicides because of its late emergence pattern
Range	Most prominent in the southwest portion of the province
Resistance	No documented cases of herbicide resistance in Ontario to date
Competitiveness	• Corn: 2% & 10% yield loss at 1 & 5 fall panicum/m^2 respectively • Soybean: 2% & 10% yield loss at 1 & 5 fall panicum/m^2 respectively
Emergence	One of the last annual grass species to emerge in the spring

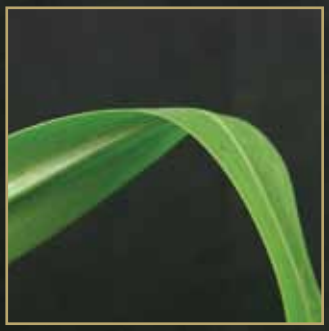
Often mistaken for:

giant foxtail
green foxtail
proso millet
smooth crabgrass

I know it's NOT	**because…**
giant foxtail	all panicum does not have hairy leaf sheath margins and the upper leaf blade is hairless
green foxtail	fall panicum does not have hairy leaf sheath margins
proso millet	fall panicum does not have a hairy stem or hairs along the base of the leaf blade margin
smooth crabgrass	fall panicum has a hairy ligule

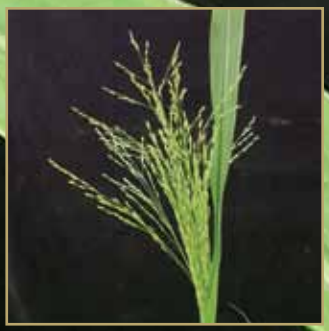
Identification clues:

ligule
- hairy



leaf blade
- young seedlings: lower leaf surface is densely hairy, but becomes less hairy with age
- older seedlings: smooth and hairless with a very prominent mid-rib

leaf sheath
- margins are hairless



seed head
- several branched panicles about 10-40 cm long
- seed is yellow to brown in colour

Giant foxtail

Setaria faberii (L.)

Lifecycle	Annual
Overview	Generally more competitive, though not as common as its close relatives, green and yellow foxtail
Range	Most prominent in the southwest portion of the province
Resistance	Group 2 resistant population has been confirmed in Lambton county
Competitiveness	• Corn: 2% & 10% yield loss at 1 & 5 giant foxtail/m^2 respectively • Soybean: 3% & 12% yield loss at 1 & 5 giant foxtail/m^2 respectively
Emergence	One of the first annual grass species to emerge in the growing season

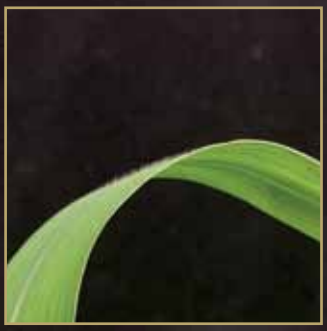
Often mistaken for:

fall panicum
green foxtail

I know it's NOT	**because…**
fall panicum	giant foxtail has a hairy upper leaf blade surface as well as hairy leaf sheath margins
green foxtail	giant foxtail has a hairy upper leaf blade surface

Identification clues:

ligule
- hairy



leaf blade
- hairy upper leaf surface and hairless lower leaf surface

leaf sheath
- hairy margins

seed head
- 15-20 cm long
- roughly twice the size of green foxtail's seed head

Green foxtail

Setaria viridis (L.)

Lifecycle	Annual
Overview	Perhaps the most common annual grassy weed species in Ontario
Range	Species found throughout the province
Resistance	Group 2 resistant populations have been confirmed in Huron, Lambton, Perth, Wellington and Victoria counties
Competitiveness	• Corn: 2% & 7% yield loss at 1 & 5 green foxtail/m^2 respectively • Soybean: 2% & 8% yield loss at 1 & 5 green foxtail/m^2 respectively
Emergence	One of the first annual grass species to emerge in the growing season

Often mistaken for:

fall panicum
giant foxtail

I know it's NOT	**because…**
fall panicum	green foxtail has a hairy leaf margin, fall panicum does not
giant foxtail	the upper and lower leaf blade surface of green foxtail is hairless

Identification clues:

ligule
- hairy

leaf blade
- smooth upper and lower surface

leaf sheath
- hairy margins

seed head
- 4-10 cm long
- roughly half the size of giant foxtail's seed head

HOT TIP: Still can't see the hairy margins on the leaf sheath? Look at the point where the leaf sheath separates from the stem. The hairy margins are most visible at this location. A magnifying glass will help you see this botanical detail.

Large crabgrass

Digitaria sanguinalis (L.)

Lifecycle	Annual
Overview	A common annual grass that thrives in many different soil types. Soil-applied herbicides are generally most effective at controlling this weed. However, late emerging seedlings often escape herbicide applications.
Range	Found throughout the province
Resistance	No documented cases of herbicide resistance in Ontario to date
Competitiveness	• Corn: 1% & 3% yield loss at 1 & 5 crabgrass/m^2 respectively • Soybean: 1% & 3% yield loss at 1 & 5 crabgrass/m^2 respectively
Emergence	Considered a mid- to late-season emerging annual grass

Often mistaken for:

proso millet
smooth crabgrass
witchgrass

I know it's NOT	**because…**
proso millet	large crabgrass has a membranous ligule, proso millet's ligule is hairy
smooth crabgrass	large crabgrass has a hairy leaf sheath and both sides of the leaf blade are hairy
witchgrass	large crabgrass has a membranous ligule, witchgrass's ligule is hairy

Identification clues:

ligule
- membranous

leaf blade
- hairy on both sides of the leaf blade

leaf sheath
- hairy, yet the margins are hairless

seed head
- finger-like with several thin and slender spikes

Proso millet

Panicum milliaceum (L.)

Lifecycle	Annual
Overview	A common annual grass found in many different soil types. One of the most competitive annual grass species.
Range	Throughout the province, but most prominent in south-central Ontario
Resistance	No documented cases of herbicide resistance in Ontario to date
Competitiveness	• Corn: 2% & 10% yield loss at 1 & 5 proso millet/m^2 respectively • Soybean: 3% & 12% yield loss at 1 & 5 proso millet/m^2 respectively
Emergence	Emerges over a long-period of time but generally considered an early- to mid-season annual grass

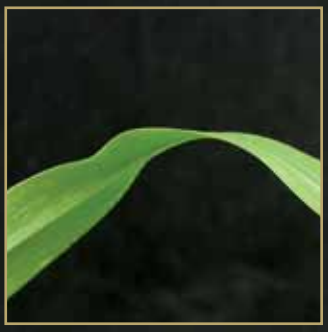
Often mistaken for:

large crabgrass
witchgrass

I know it's NOT	**because…**
large crabgrass	proso millet has a hairy ligule, large crabgrass has a membranous ligule
witchgrass	the leaf blade of proso millet is usually hairless and has prominent leaf veins running parallel to the leaf blade margins

Identification clues:

ligule
- hairy



leaf blade
- usually hairless, but can have sparse hairs on upper and lower leaf surfaces

leaf sheath
- extremely hairy, leaf sheath margin is also hairy

seed head
- will have two different seed head types, a closed broom-like panicle or a more wide open panicle
- six different seed colours exist: white, yellow, green, orange, reddish brown, black

HOT TIP: Still unsure whether it's witchgrass or proso millet? Dig up a seedling. Proso millet will have a shiny seed (may be one of six different colours) attached to the end of the root.

Quackgrass
Agropyron repens (L.)

Lifecycle	Perennial
Overview	The most common perennial grass species found in field crops
Range	Found throughout the province
Resistance	No documented cases of herbicide resistance in Ontario to date
Competitiveness	• Corn: 4% & 15% yield loss at 1 & 5 quackgrass/m^2 respectively • Soybean: 4% & 18% yield loss at 1 & 5 quackgrass/m^2 respectively
Emergence	Will emerge at any point throughout the season, as long as it isn't shaded by competing crops

Often mistaken for:
wire-stemmed muhly

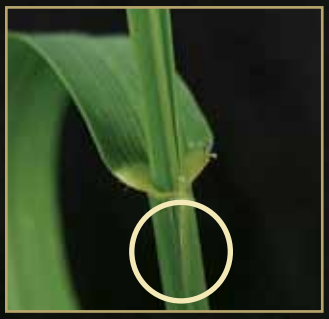
I know it's NOT	**because…**
wire-stemmed muhly	quackgrass has an auricle, plus wire-stemmed muhly has very wirey stems with short, thin leaves

Identification clues:

ligule
- membranous, but very short and hard to see

auricle
- present at the base of the leaf blade

leaf blade
- hairless on both sides of the leaf blade



leaf sheath
- hairless
- leaf sheath margins are also hairless

rhizomes
- sharp-pointed and far-reaching in the soil

seed head
- elongated narrow spike (5-20 cm long) with spikelets in 2 rows

Smooth crabgrass

Digitaria ischaemum (L.)

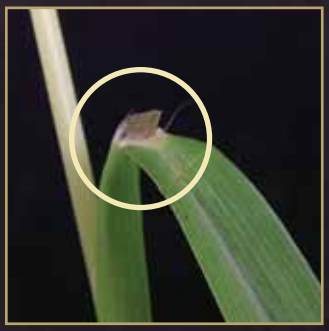
Lifecycle	Annual
Overview	Considered mainly a weed problem in turf, smooth crabgrass is not as common as large crabgrass in terms of distribution in agricultural fields. Nonetheless, it can be problematic due to its late emergence pattern.
Range	Found throughout the province
Resistance	No documented cases of herbicide resistance in Ontario to date
Competitiveness	• Corn: 1% & 3% yield loss at 1 & 5 crab grass/m^2 respectively • Soybean: 1% & 3% yield loss at 1 & 5 crab grass/m^2 respectively
Emergence	Considered a late-season emerging annual grass

Often mistaken for:

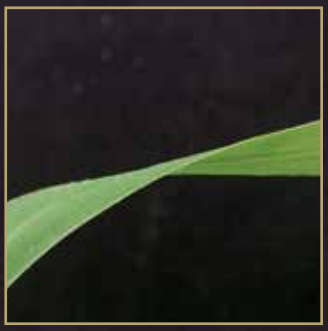
fall panicum
large crabgrass

I know it's NOT	**because…**
fall panicum	smooth crabgrass' ligule is membranous
large crabgrass	the leaf blade, leaf sheath and leaf sheath margin of smooth crabgrass are hairless with the exception of some hair tufts on the collar

Identification clues:



ligule
- membranous



leaf blade
- hairless on both sides of the leaf blade

leaf sheath
- smooth, leaf sheath margins are also hairless

seed head
- finger-like with several thin and slender spikes, very similar to large crabgrass

Witchgrass

Panicum capillare (L.)

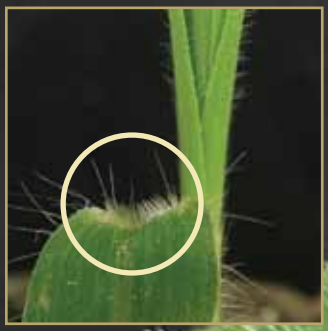
Lifecycle	Annual
Overview	A common annual grass found in many different soil types. One of the least competitive annual grass species.
Range	Throughout the province, but most prominent in central Ontario
Resistance	No documented cases of herbicide resistance in Ontario to date
Competitiveness	• Corn: 1% & 5% yield loss at 1 & 5 witchgrass/m^2 respectively • Soybean: 1% & 4% yield loss at 1 & 5 witchgrass/m^2 respectively
Emergence	Typically one of the last annual grass species to emerge in the spring

Often mistaken for:

fall panicum
large crabgrass
proso millet

I know it's NOT	**because…**
fall panicum	witchgrass has a hairy stem and hairy leaf sheath margin
large crabgrass	witchgrass has a hairy ligule
proso millet	the leaf blade of witchgrass is extremely hairy on both sides

Identification clues:



ligule
- hairy

leaf blade
- hairy on the upper and lower leaf surfaces

leaf sheath
- extremely hairy
- leaf sheath margins are also hairy

seed head
- fluffy panicle with numerous fine branches
- seed head can be up to half as long as the entire plant, about 20-40 cm long

Yellow foxtail

Setaria glauca (L.)

Lifecycle	Annual
Overview	Not necessarily the most widespread annual grass species in Ontario, but perhaps the most problematic since it emerges late and is not well controlled by a number of post-emergent herbicides
Range	Same distribution pattern as green foxtail, throughout Ontario
Resistance	A population resistant to the triazine herbicides exists in York Region
Competitiveness	• Corn: 1% & 5% yield loss at 1 & 5 yellow foxtail/m^2 respectively • Soybean: 1% & 5% yield loss at 1 & 5 yellow foxtail/m^2 respectively
Emergence	Will emerge over a lengthy period of time, but generally is considered a mid- to late-season emerging annual grass weed

Often mistaken for:

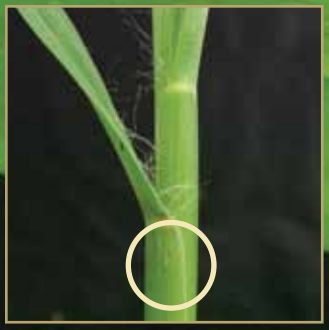
barnyard grass
large crabgrass
proso millet
witchgrass

I know it's NOT	**because…**
barnyard grass	yellow foxtail has a hairy ligule, barnyard grass has no ligule
large crabgrass	yellow foxtail has a hairy ligule
proso millet	yellow foxtail has a flattened and hairless leaf sheath
witchgrass	yellow foxtail does not have a hairy stem

Identification clues:

ligule
- hairy

leaf blade
- base of leaf blade covered with a number of straggly hairs that are roughly 1-2 cm in length



leaf sheath
- hairless margins (outside edges)
- very flat when compared to the round sheaths of green and giant foxtail

seed head
- 4-6 cm in length
- bristles are darker and shorter than green or giant foxtail

Yellow nutsedge

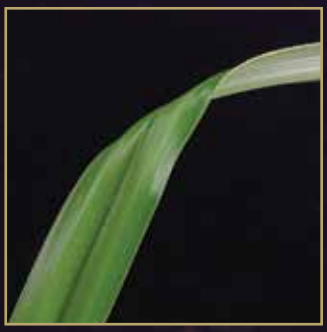
Cyperus esculentus (L.)

Lifecycle	Perennial
Overview	Technically not a grass but rather a very aggressive sedge that thrives in moist soils within cultivated fields and a strong competitor against numerous field crops
Range	Found throughout the province
Resistance	No documented cases of herbicide resistance in Ontario to date. Various different biotypes exist, with each exhibiting different levels of herbicide sensitivity.
Competitiveness	• Corn: 2% & 7% yield loss at 1 & 5 yellow nutsedge/m^2 respectively • Soybean: 2% & 7% yield loss at 1 & 5 yellow nutsedge/m^2 respectively
Emergence	Will emerge at any point throughout the season, and emergence is greatly reduced in heavily shaded areas

HOT TIP: The old weed science 101 saying, "If it has edges, it's a sedges" holds true. Touch the stem of yellow nutsedge and you can feel a distinct triangle-shape stem, the only prominent-"grass-like"-weed in the province with this unique characteristic.

Identification clues:

leaf sheath
- closed forming a 3-sided, triangle shape around the stem



leaf blade
- hairless with a prominent mid rib
- numerous leaves come out at the base of the plant

rhizomes
- light brown to whitish

tubers
- located at the tip of the rhizome
- mature tubers are dark brown, newly formed tubers start out white

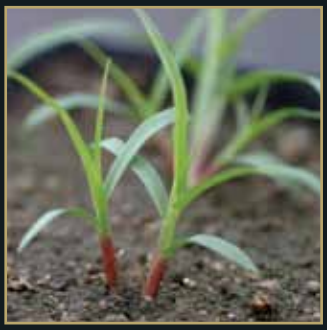
seed head
- cluster of yellowish to brownish branches at the tip of the stem

Weeds to watch

Long-spined sandbur

Cenchrus longispinus (Hack.) Fern

Lifecycle	Annual
Overview	An aggressive annual grass that inhabits lighter (sandy) soil types
Range	Found throughout the province
Resistance	No documented cases of herbicide resistance in Ontario to date
Competitiveness	Similar level of competitiveness as the foxtail species
Emergence	Considered a mid- to late-season emerging annual grass



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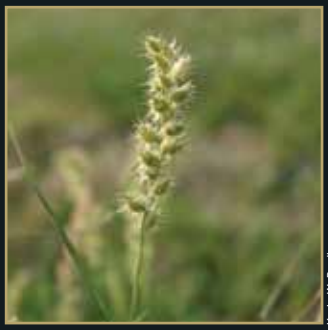


Kevin W. Bradley

ligule
- hairy

leaf blade
- mostly hairless, but can feel rough to the touch when stroked

leaf sheath
- hairy margins

seed head
- inflorescence consists of a group of spiny burs at the end of each stem

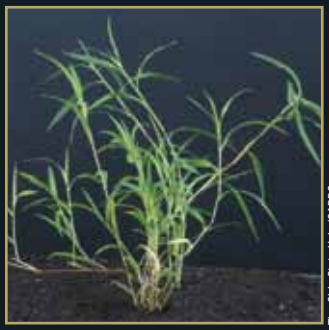
HOT TIP: Long-spined sandbur often gets incorrectly identified as green or giant foxtail at the seedling stage. By digging up a seedling, a prominent bur should be attached to the base of the root. Also, the soil surface may have burs.

Weeds to watch

Wire-stemmed muhly

Muhlenbergia frondosa (Poir.) Fern

Lifecycle	Perennial
Overview	An up and coming perennial weed in the province. Traditionally found more in the southwest, but becoming more prominent in central and eastern Ontario.
Range	Found throughout the province, mainly in the southwest
Resistance	No documented cases of herbicide resistance in Ontario to date
Competitiveness	Very similar to quackgrass in terms of competitiveness
Emergence	Considered a mid- to late-season emerging perennial grass



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ligule
- membranous, no auricle

leaf blade
- thin and long, tapering to a long thin point

stem
- slender and very wiry

seed head
- in flower from July to September with small, soft, somewhat silky panicles, green at first then becoming greenish-purple to purple at maturity

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