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Optimizing Preemergence Weed Control in Christmas Tree Plantations.

Many broadleaf and grassy weeds compete with young Christmas trees for water, nutrients, light, and space. As you might know, there are limited safe and effective, postemergence, over-the-top, herbicides for controlling several broadleaf weeds in Christmas trees. Therefore, the management of annual broadleaved weeds within Christmas tree rows largely relies on the use of preemergence herbicides.

Image 1: Weed control (on the row) following a pre-emergent herbicide treatment.

A number of preemergence herbicides are available for controlling weeds in newly planted and established Christmas tree plantations. A factsheet on recommended preemergence herbicides for use in Christmas tree plantations is available at: http://www.ct.gov/caes/lib/caes/documents/publications/fact_sheets/valley_laboratory/herbicides_for_pre-emergence_weed_control_in_christmas_trees.pdf.

If you have scouted for weeds in previous years you might have a fairly good idea what type of weeds may pop up this season. Remember, many weed seeds can perpetuate in the soil for several years, and weeds may continue to emerge and compete with Christmas trees for many growing seasons. For example, seeds of field bindweed may remain viable in soil for over 20 years. Most annual grassy and broadleaf weed seeds, in general, have soil viability of 4 to 5 years. Premergence herbicides do not kill the weed seeds but the emerging seedlings. Further, due to their seed dormancy differences, seeds of a given weed species continue to emerge over many years. Based on weed scouting, you can select the most suitable herbicide or herbicide combinations to control a broader range of weeds. Else, a grower should consider using a herbicide with the broadest weed control spectrum that includes grasses as well as broadleaf weeds. For example, Marengo SC/G (indaziflam) or Sureguard (flumioxazin) etc. Always, consult herbicide label for labeled Christmas tree species.

Several factors influence the performance of preemergence herbicides. Therefore, the success of preemergence weed control may vary with herbicide characteristics (efficacy, dosage, persistence) weed species characteristics (sensitivity, density, emergence timing), soil characteristics (texture, pH, organic matter), and management practices (tillage, irrigation, movement of machinery and equipment) and environmental factors (timing and amount of

rainfall etc.).Following tips may be helpful in optimizing the performance of a preemergence herbicide:

1) Select the right herbicide for your weed management needs (Appendix 1). Correct identification of weed species is very critical for selecting the most suitable herbicide (Appendix 2).
2) Use recommended herbicide rates depending upon soil texture, organic matter, soil pH, and Christmas tree species and age. Herbicide rates may also vary with the weed species to be controlled, and the duration of weed control desired.
3) Apply preemergent herbicide to a clean surface free of clods and weed residue. For a preemergent herbicide to be effective, it must come in contact with the soil and make a uniform barrier layer to prevent weed emergence. Do not disturb the herbicide barrier layer by movement of machinery or other crop management activities.
4) Rotate herbicides or use compatible tank-mix partners. No single herbicide controls all the weed species, therefore to widen the weed control spectrum, combine/tank-mix compatible herbicides. Furthermore, application of same herbicide year after year may result in selection for herbicide-resistant weeds or weed species naturally tolerant to a particular herbicide. Also, continuous use of the same herbicide may result in reduced duration of weed control due to buildup of microbial populations that decompose a particular herbicide.
5) Preemergent herbicides need 0.25 to 0.5 inch of moisture for activation. Therefore, either time your herbicide application before a decent rainfall event (check weather forecast for rain) or apply irrigation if possible.
6) Preemergence herbicides have very little or no activity on emerged weeds. Some winter annual or biennial weeds such as annual bluegrass, chickweeds, horseweed, henbit, purple deadnettle, primrose, wild carrot or Queen Ann's lace, shepherdspurse, wild mustard, and wild radish etc. may be present at the time of preemergent herbicide application due to their early emergence in fall of previous years or early spring of current year. Control weeds that are already emerged. Atrazine, Goal 2XL, Goal Tender, and Sureguard are some of the Christmas tree herbicides that can control small emerged annual weed seedlings. Goal 2 XL or Goal Tender can control certain broadleaf weeds less than 4 inches in size. Additionally, directed or semi directed application of a non-selective herbicide such as glyphosate may help control emerged weeds. Low rates of glyphosate at 8 to 16 oz/ac will control most of the emerged annual weeds less than 3 inches in size. However, established (≥2 yr field planted) Christmas trees can tolerate a semi-directed application of glyphosate (3 lb ae/gal), up to 32 to 43 oz/ac depending upon tree species and age, before bud-break. Since the Roundup Original is no longer available, equivalent glyphosate formulations (Glyphos, Glyphosate 4, and Credit etc.) may be used to control emerged weed seedlings while putting down a preemergence herbicide.

The mentioning of trade names in this publication is solely for the purpose of providing specific information. The CAES does not guarantee or warranty the products named, and references to them in this publication do not signify our approval to the exclusion of other products of suitable composition.

Appendix 1. Preemergence herbicides efficacy on weeds of Christmas tree plantations.

Common name	Scientific name	Atrazine 4L	Gallery 75 DF/ Gallery SC	Goal Tender*Goal 2 XL	Marengo SC/Marengo G	Pendulum 3.3 EC	Pennant Magnum	Sureguard	Simazine 4L	Surflan AS/Oryzalin 4 AS	Westar
Alyssum, Hoary	*Berteroa incana*							c	c		c
Annual Bluegrass	*Poa annua*			*c**	*c*	*c*	*c*	c	c	c	
Barnyardgrass	*Echinochloa crus-galli*	*s*		*c**	*c*	*c*	*c*	c	c	c	
Bittercress, Hairy	*Cardamine hirsuta*		*c*	.	*c*			c		c	c
Bramble/Blackberry	*Rubus fruticosus*							.			s
Chickweed, Common	*Stellaria media*		*c*		*c*	*c*		c	c		
Chickweed, Mouseear	*Cerastium vulgatum*		*c**		*c*	*c*		c			
Common Evening Primrose[1]	*Oenothera lbiennis*			*c*	*c*	*c*					
Crabgrass Large	*Digitaria sanguinalis*	*s*		*c**	*c*	*c*	*c*	c	c	c	c
Crabgrass, Smooth	*Digitaria ischaemum*	*s*		*c**	*c*	*c*	*c*	c	c	c	.
Dandelion[1]	*Taraxacum officinale*		*c*		*c*			c			c
Downy Brome	*Bromus tectorum*							.	c	c	
Fireweed	*epilobium angustifolium*			c							
Foxtail Giant	*Setaria faberi*	*s*		*c**	*c*	*c*	*c*	c	c	c	c
Foxtail Green	*Setaria viridis*	*s*		*c*	*c*	*c*	*c*	c	c	c	c
Foxtail Yellow	*Setaria glauca*	*s*		*c*	*c*	*c*	*c*	c	c	c	c
Groundsel, Common	*Senecio vulgaris*		*c*	*c*	*c*		*c*	c	c	c	
Henbit	*Lamium amplexicaule*		*c*	*c*	*c*	*c*		c	c	c	
Horseweed	*Conyza canadensis*		*c*	*c*	*c*			c			c
Ivy, Ground[1]	*Glechoma hederacea*							c			
Ladysthumb	*Polygonum persicaria*		*c*	*c*				c			
Lambsquarters, Common	*Chenopodium album*	*c*	*c*	*c*	*c*	*c*		c		c	c
Lettuce, Prickly	*Lactuca serriola*		*c*	*c*				.		s	
Mallow, Common	*Malva neglecta*		*c*	*c*				c		s	
Mallow, Little	*Malva parviflora*		*c*	*c*	*c*			c			
Mustard, Wild	*Brassica kaber*	*c*	*c*	*c*				c	c	s	

c- Weed species controlled.
c* Higher rates required for some weeds.
[1]Biennial or perennial weed emerging from seed only.
s- Suppression only.

Appendix 1. Preemergence herbicides efficacy on weeds of Christmas tree plantations.

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Nightshade, Eastern Black	*Solanum ptycanthum*	*c*	*c*	*c*				c			
Northern Willowherb	*Epilobium cillatum*							c			
Nutsedge, Yellow	*Cyperus esculentus*				*s*		*c*	.			s
Orchardgrass	*Dactylus glomerata*							.			c
Panicum, Fall	*Panicum dichotomiflorum*			*c*		*c*	*c*	c	c	c	c
Pennycress, Field	*Thlaspi arvense*							c			
Pigweed, Redroot	*Amaranthus retroflexus*	*c*	*c*	*c*	*c*	*c*	*c*	c		c	
Plantain, Broadleaf[1]	*Plantago major*		*c*					c			
Plantain, Buckhorn[1]	*Plantago lanceolata*		*c*		*c*			c			
Purslane, Common	*Portulaca oleracea*	*c*	*c*	*c*	*c*	*c*	*c*	c	c	c	
Quackgrass	Agropyron repens							.			c
Ragweed, Common	*Ambrosia artemisiifolia*	*c*	*c*	*c*	*c*			c	c	s	c
Ragweed, Giant	*Ambrosia trifida*	*c*	.					c		s	.
Sandbur, Field	*Cenchrus incertus*			*c*	*c*	*c*	*c*	.		c	
Smartweed, Pennsylvania	*Polygonum pensylvanicum*	*c*	*c*	*c*	*c*	*c*		c	c	s	
Sorrel, Red[1]	*Rumex acetocella*		*c*					.			s
Sowthistle, Annual	*Sonchus oleraceus*		*c*	*c*	*c*			c		s	
Spiderwort, Tropical	*Commelina benghalensis*							c			
Thistle, Canada[1]	*Cirsium arvense*							c			c
Velvetleaf	*Abutilon theophrasti*	*s*		*c*	*c**	*c*		c		s	
Wild Carrot[1]	*Daucus carrota*		*c*		*c**			.			c
Wild Radish	*raphanus raphanistrum*		c								
Willowherb	*epilobium brachycarpum*				c						

c- Weed species controlled.
c* Higher rates required for some weeds.
[1]Biennial or perennial weed emerging from seed only.
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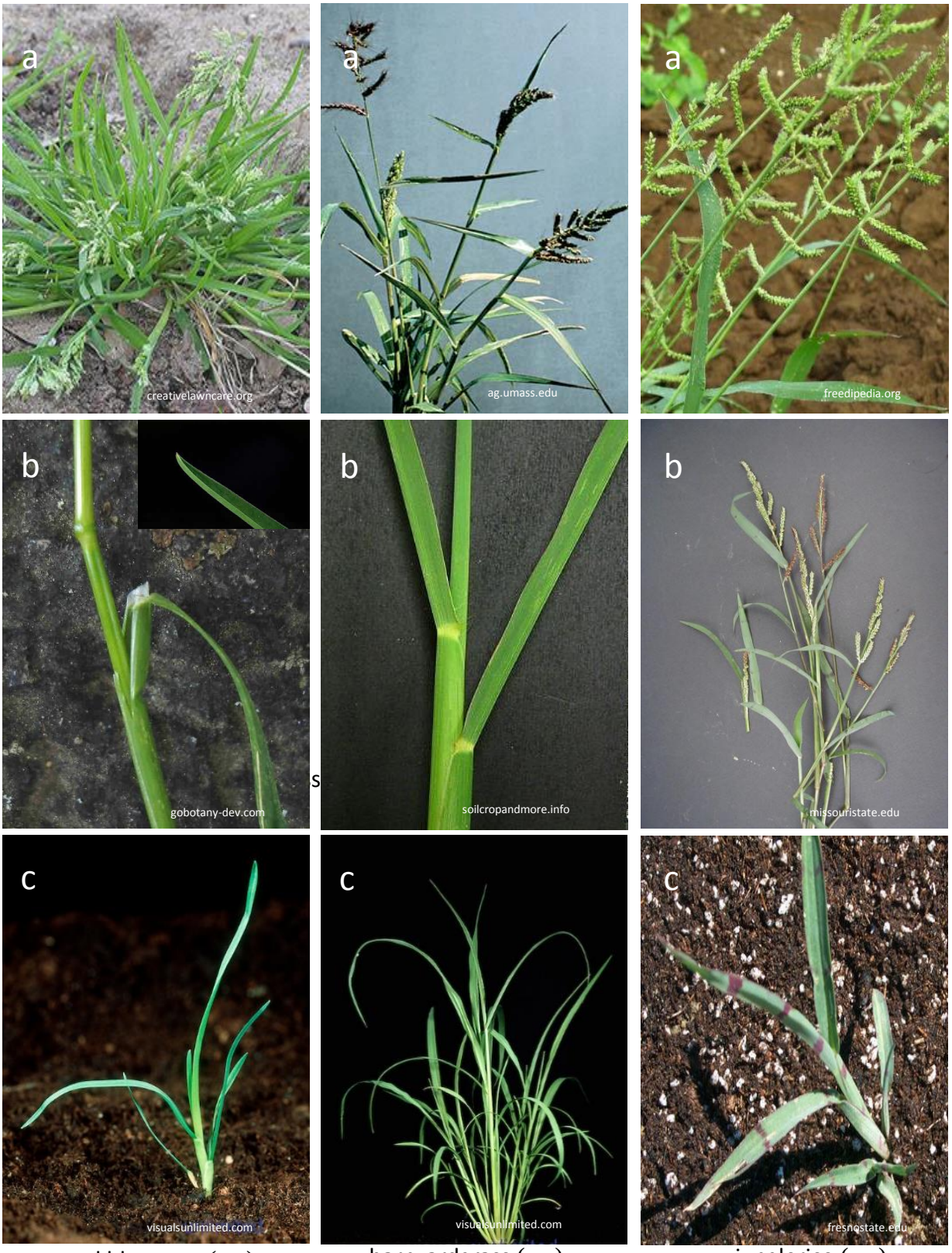
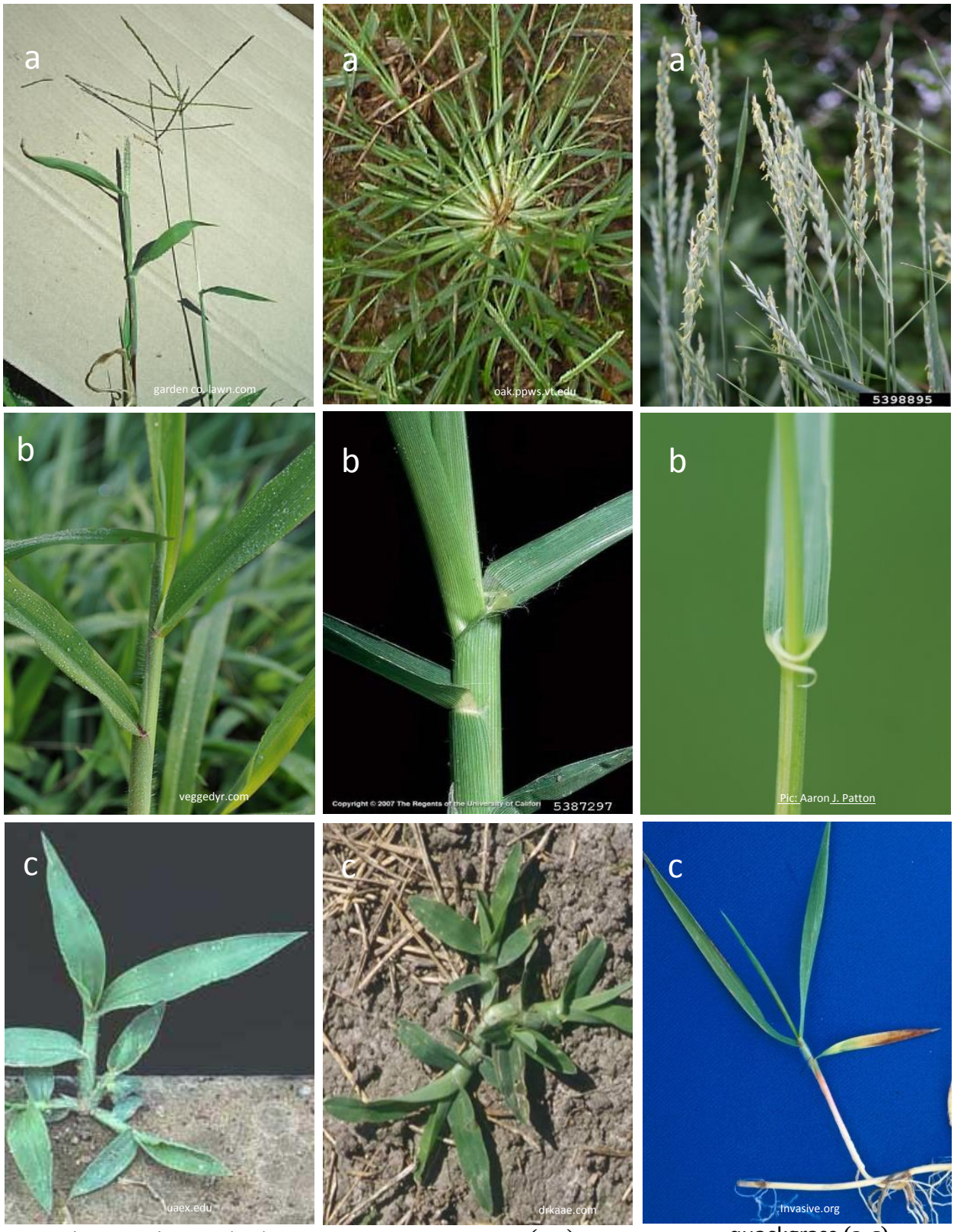
Appendix 2: Common grassy and broadleaved weeds of Christmas tree plantations.

a. annual bluegrass, barnyardgrass, and junglerice



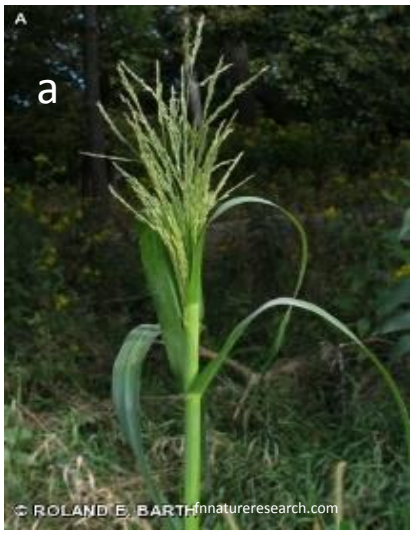
annual bluegrass (a-c) barnyardgrass (a-c) junglerice (a-c)

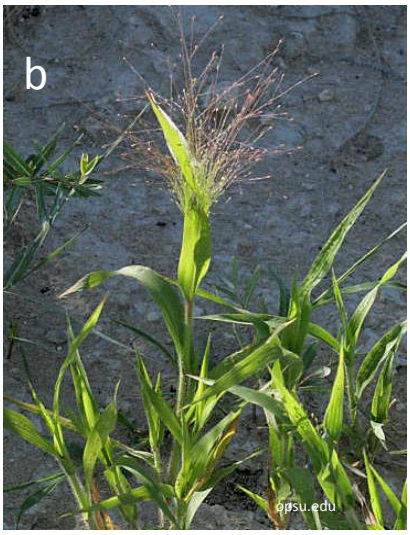
b. large crabgrass, goosegrass, and quackgrass

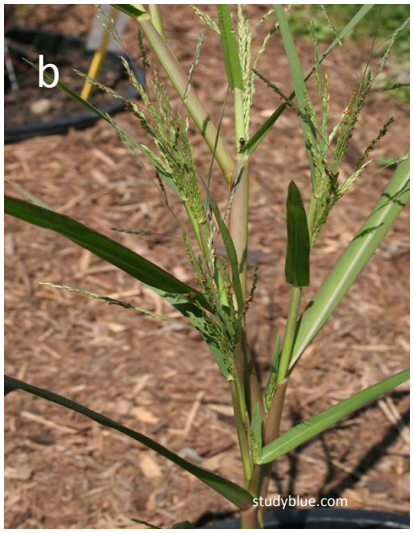


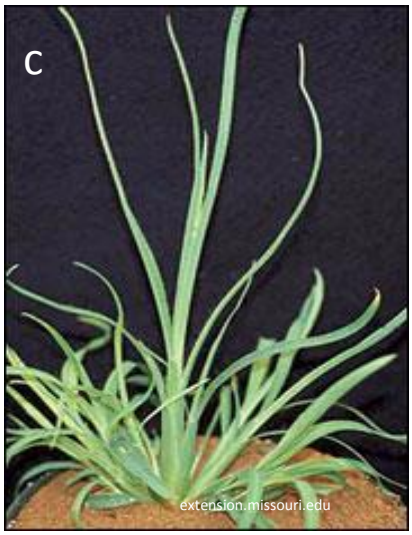
large crabgrass (a-c) goosegrass (a-c) quackgrass (a-c)

c. broomsedge, witchgrass, and fall panicum









bromesedge (a-c)

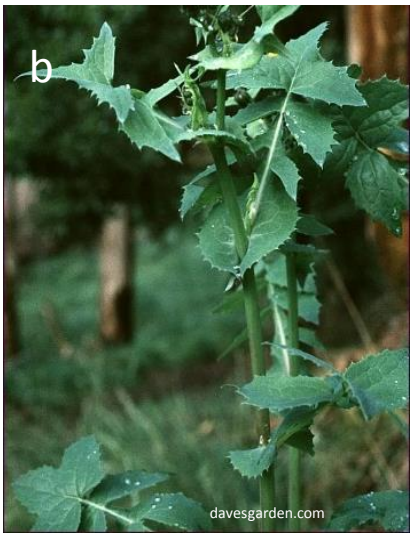
witchgrass (a-c)

fall panicum (a-c)

d. foxtails (yellow, green, giant)

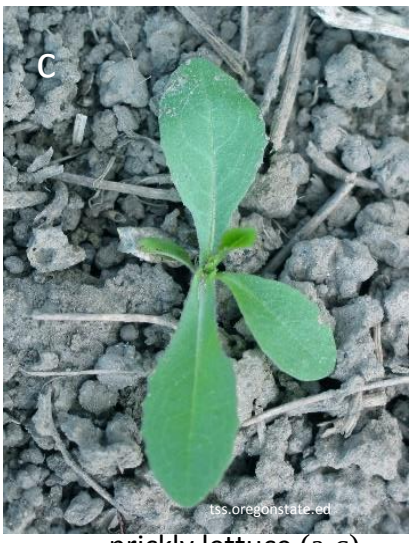
yellow foxtail (a-c) green foxtail (a-c) giant foxtail (a-c)

e. dandelion, annual sowthistle, and prickly lettuce



dandelion (a-c)

annual sowthistle (a-c)



prickly lettuce (a-c)

f. smooth cat's ear, golden rod, and horseweed

smooth cat's-ear (a-c) goldenrod (a-c) horseweed (a-c)

g. common chickweed, mouse-ear chickweed, and smooth bedstraw

common chickweed (a-c) mouse-ear chickweed (a-c) smooth bedstraw (a-c)

h. common purslane, prostrate spurge, and spotted spurge

common purslane (a-c) prostrate spurge (a-c) spotted spurge (a-c)

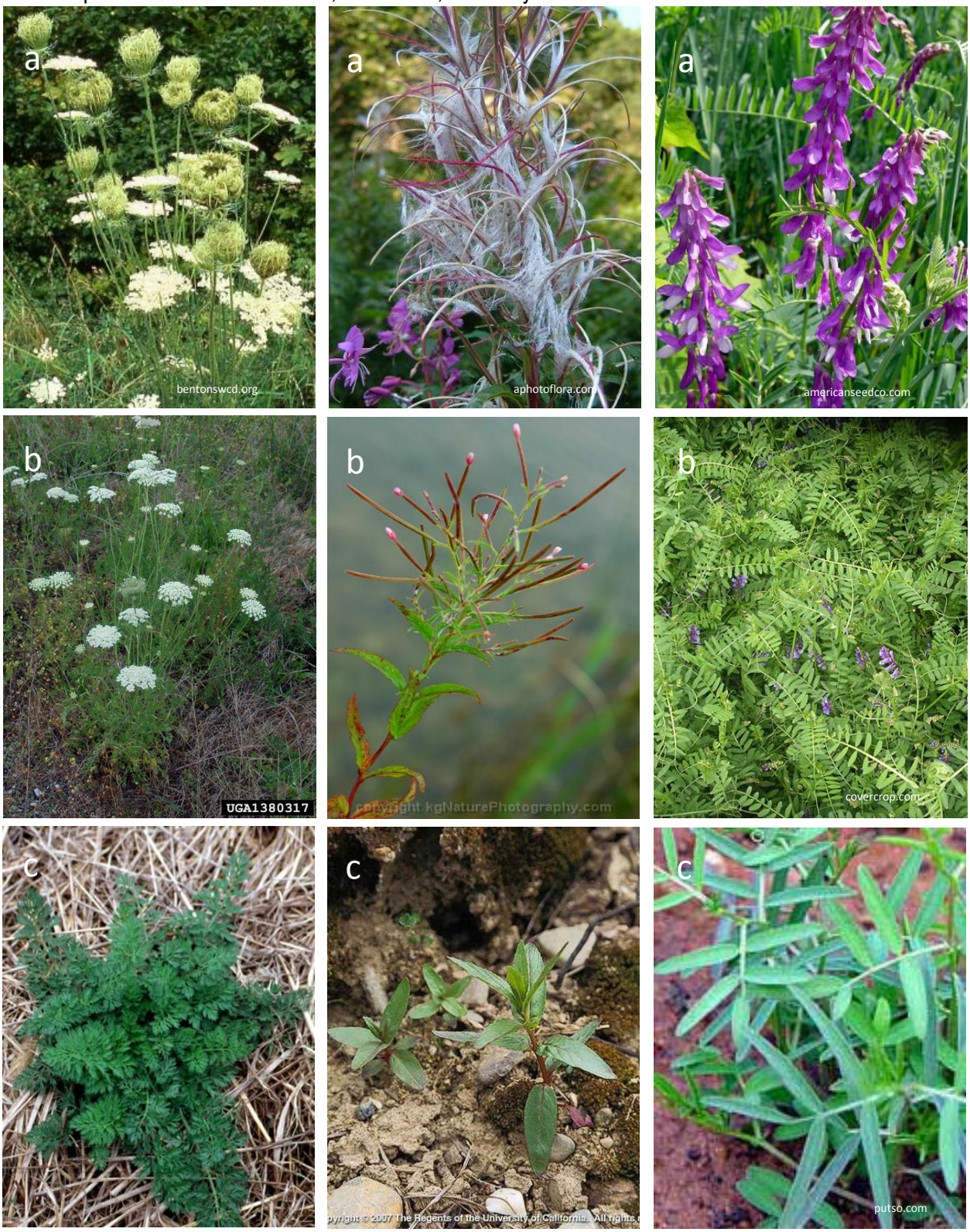
i. black nightshade, horsenettle, and Asiatic dayflower

black nightshade (a-c) horsenettle (a-c) Asiatic dayflower (a-c)

j. field bindweed, field pennycress, and shepherd's purse

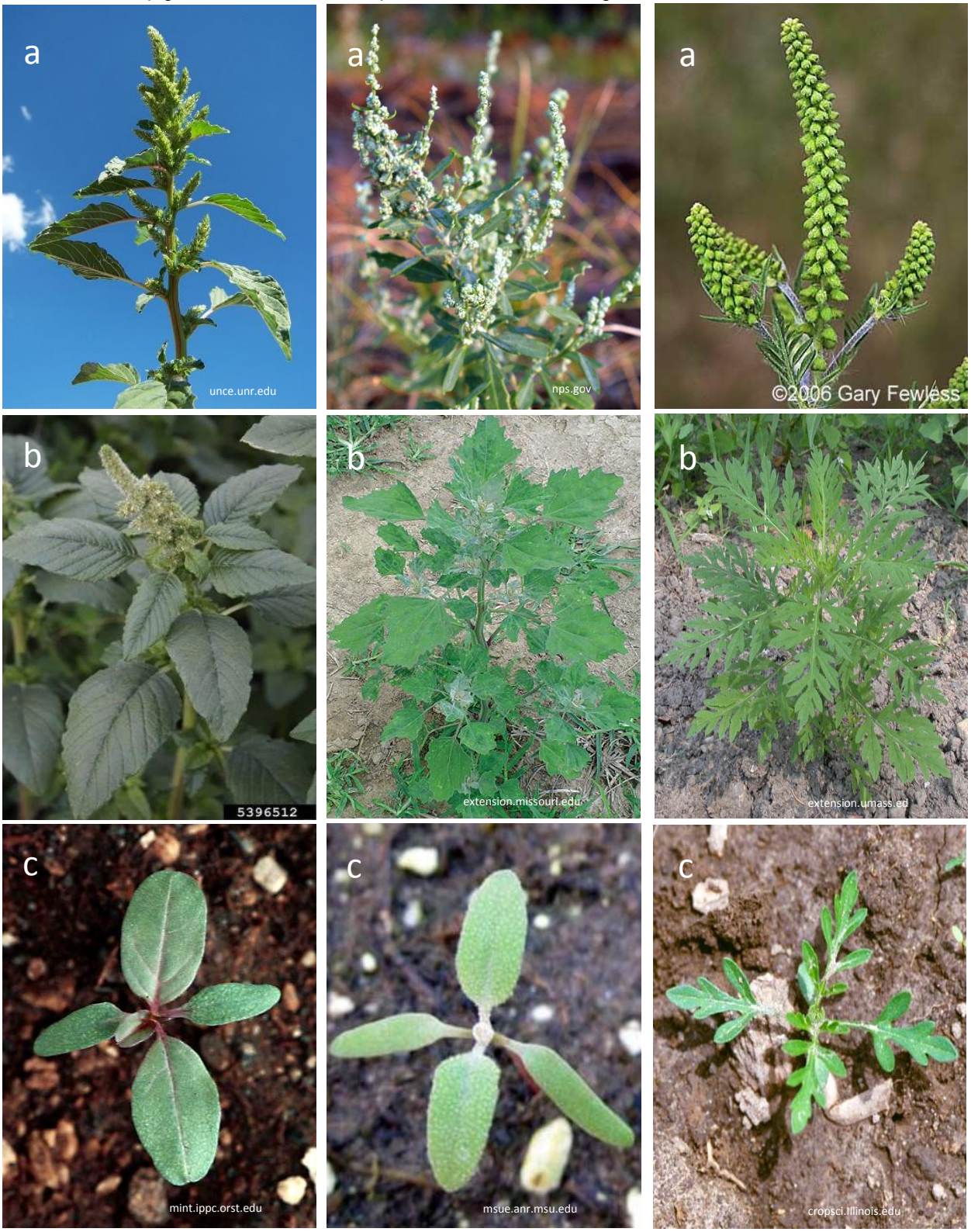
field bindweed (a-c) field pennycress (a-c) shepherd's-purse (a-c)

k. queen Ann's lace/wild carrot, willowherb, and hairy vetch



wild carrot (a-c) willowherb (a-c) hairy vetch (a-c)

l. redroot pigweed, common lambsquarters, and common ragweed



redroot pigweed (a-c) lambsquarters (a-c) common ragweed (a-c)

For additional assistance with weed identification visit:
http://weeds.cropsci.illinois.edu/extension/Other/NCR614.pdf
http://www.extension.umn.edu/agriculture/crops/weed-management/doc/broadleaf-andgrass-weed-seedling-id-key.pdf
Or email weed pictures to: Jatinder.Aulakh@ct.gov or bring fresh intact samples along with the root system to Valley Laboratory, Windsor CT.