

**2015 CNY  
SMALL GRAIN WORKSHOP**

**Russ Hahn**




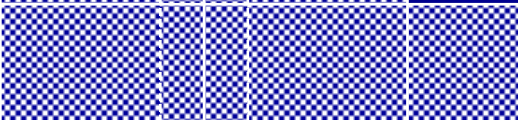



**Soil and Crop Sciences**

**Cornell University**

# **Weed Control in Small Grains**

- Common weeds in grains**
- Control options**
- Osprey for wheat**
- How these herbicides work**
- Potential for resistance**

# WEED LIFE CYCLES

LIFE CYCLE	EXAMPLE	YEAR 1	YEAR 2	YEAR 3
		Growing Season	Growing Season	Growing Season
Annual				
Summer	Ragweed			
Winter	Chamomile			
Biennial	Burdock			
Perennial	Quackgrass			

# COMMON FIELD CROP WEEDS

## Summer Annuals

Velvetleaf

Redroot/smooth pigweed

Common ragweed

Common lambsquarters

Wild mustard

Eastern black nightshade

Large crabgrass

Barnyardgrass

Fall panicum

Giant foxtail

Yellow foxtail

Green foxtail

## Summer/Winter Annual

Horseweed

## Winter Annuals

Corn chamomile

Shepherd's-purse

Purple deadnettle

Common chickweed

Roughstalk bluegrass

Cheat

## Biennials

Common burdock

Bull thistle

## Perennials

Hedge bindweed

Canada thistle

Horsenettle

Dandelion

Quackgrass

Wirestem muhly

Johnsongrass

Yellow nutsedge



# Corn Chamomile



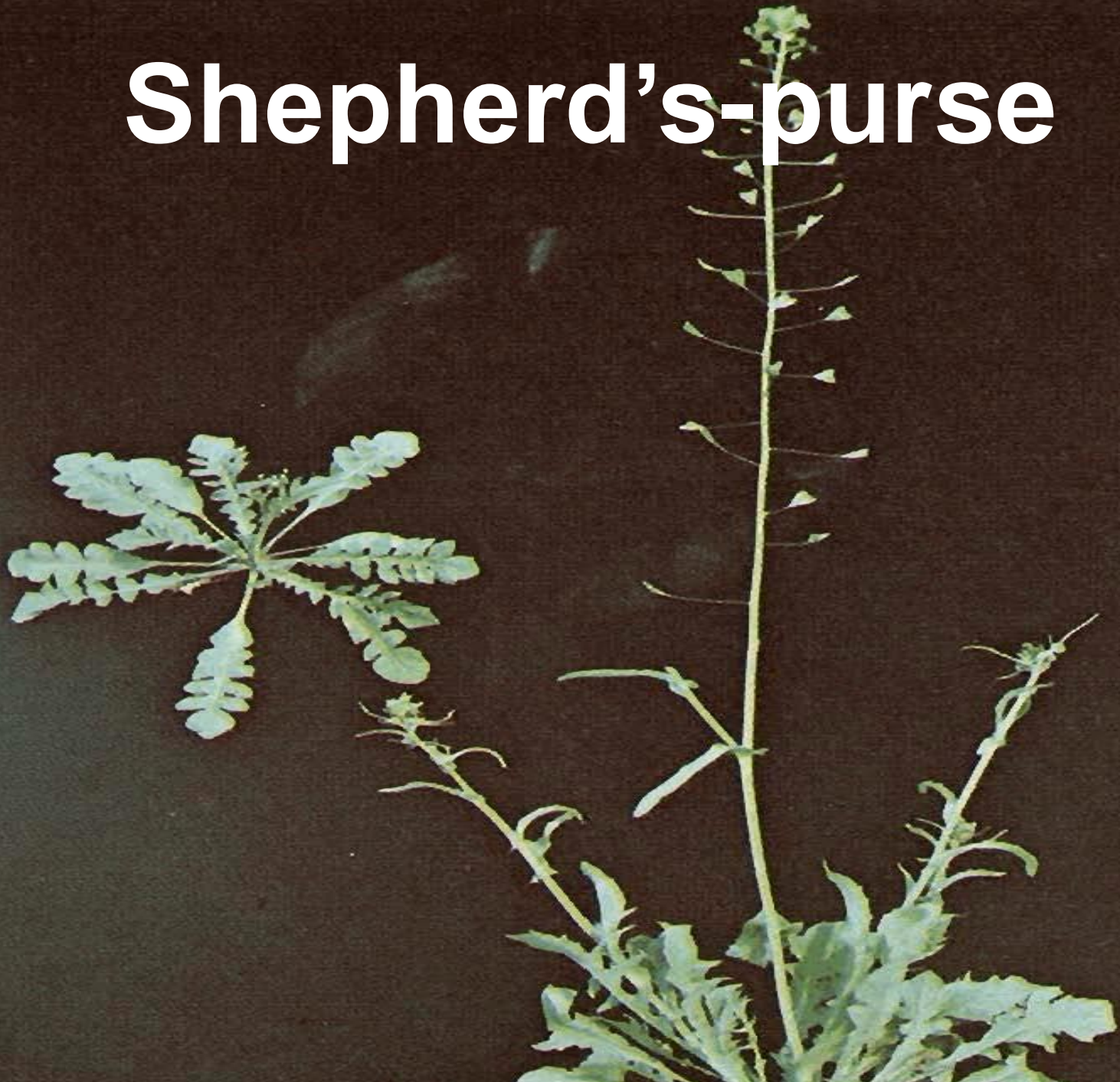


# Corn Chamomile





# Shepherd's-purse







**Purple Deadnettle**

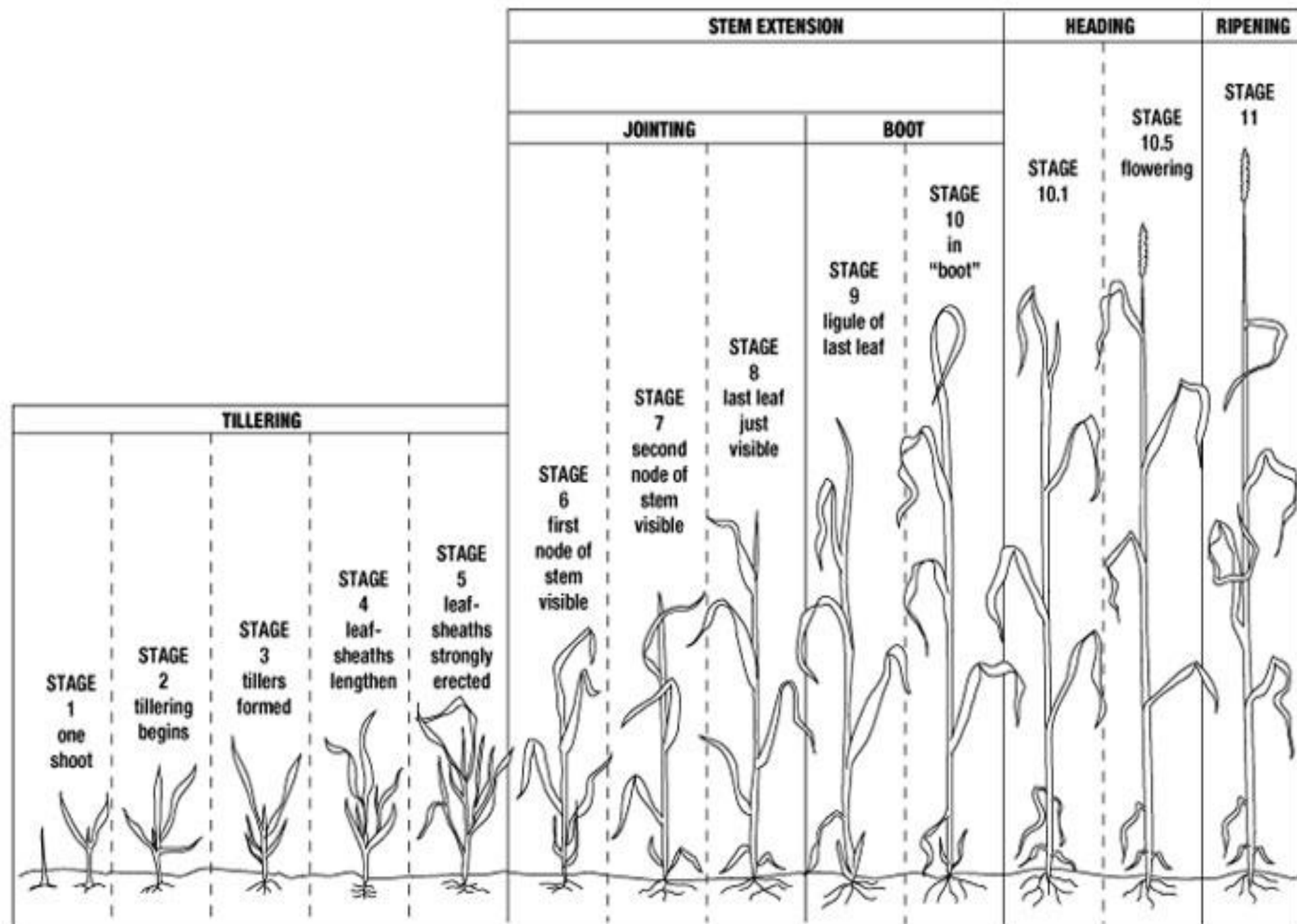




**Common Chickweed**



Figure 1.7-2. Growth stages of cereals.





# Oats (not seeded)

<b>Situation</b>	<b>Product/A</b>	<b>Growth Stage</b>
<b>Annual broadleaf weeds</b>	<b>0.5 – 1 pt 2,4-D amine</b>	<b>4 or 5 (4 – 8 inches)</b>



# Wheat *or* Barley (not seeded)

Situation	Product/A	Growth Stage
Annual broadleaf weeds	0.5 – 1 pt 2,4-D amine	4 or 5 (4 – 8 in. tall)
	4 fl oz Banvel <i>or</i> Clarity	4 or 5 (4 – 8 in. tall) Use 3 fl oz for spring barley

# Wheat or Barley (not seeded)

Situation	Product/A	Growth Stage
Wild garlic	1.5 pt 2,4-D ester	4 or 5 (fully tillered)
Wild garlic and annual broadleaf weeds	0.75-0.9 oz Harmony Extra	Garlic < 12 in. tall with 2-4 in. new growth



# Wheat or Barley (not seeded)

Situation	Product/A	Growth Stage
Chamomile and other broadleaf	1.5 pt 2 lb/gal Buctril	Rosettes less than 1 in. across
	0.45 – 0.9 oz Harmony Extra	Fall after 2-leaf stage Spring before flag leaf (stage 8)

# SMALL GRAINS

<b>Herbicide</b>	<b>Site(s) of Action</b>	<b>Group #</b>
<b>2,4-D</b>	<b>Auxin</b>	<b>4</b>
<b>Banvel/Clarity</b>	<b>Auxin</b>	<b>4</b>
<b>Harmony Extra</b>	<b>ALS</b>	<b>2</b>
<b>Buctril</b>	<b>PSII - site B</b>	<b>6</b>



# 24 (C) REGISTRATION OSPREY IN WHEAT

Product	Ingredients	Group #
Osprey	Mesosulfuron	2



# Roughstalk Bluegrass















# OSPREY IN WHEAT

## AM FARMS – NIAGARA COUNTY

Date	Harmony GT + 2,4-D	4.75 oz/A Osprey
April 4	38 Bu/A	52 Bu/A



# OSPREY IN WHEAT

## AM FARMS – NIAGARA COUNTY

<b>Date</b>	<b>Harmony GT + 2,4-D</b>	<b>4.75 oz/A Osprey</b>
<b>April 4</b>	<b>38 Bu/A</b>	<b>52 Bu/A</b>
<b>April 13</b>	<b>26 Bu/A</b>	<b>54 Bu/A</b>

# Cheat







# Winter Wheat Only

<b>Situation</b>	<b>Product/A</b>	<b>Growth Stage</b>
<b>Roughstalk bluegrass and Cheat</b>	<b>4.75 oz *†Osprey</b>	<b>Emergence up to jointing (stage 5) Section 24(c) SLN Label</b>



# **ROUGHSTALK BLUEGRASS**

## **4.75 OZ/A OSPREY**

<b>Application</b>	<b>Date</b>	<b>% Control</b>
<b>FMPO</b>	<b>11-20-12</b>	<b>35</b>
<b>SMPO</b>	<b>4-25-13</b>	<b>100</b>
<b>SLPO</b>	<b>5-7-13</b>	<b>100</b>

# SMALL GRAINS

<b>Herbicide</b>	<b>Site(s) of Action</b>	<b>Group #</b>
<b>2,4-D</b>	<b>Auxin</b>	<b>4</b>
<b>Banvel/Clarity</b>	<b>Auxin</b>	<b>4</b>
<b>Harmony Extra</b>	<b>ALS</b>	<b>2</b>
<b>Buctril</b>	<b>PSII - site B</b>	<b>6</b>
<b>Osprey</b>	<b>ALS</b>	<b>2</b>



# AMINO ACID SYNTHESIS INHIBITORS

Group	Site of Action	Family	Product
2	ALS inhibitor (150)	Sulfonylurea	Harmony Extra Osprey

# AMINO ACID SYNTHESIS INHIBITORS

**ACTION** - Inhibit enzymes, ALS (amino lactate synthase), to prevent amino acid production.

**INJURY** - Grass plants stunted with interveinal chlorosis or purpling. Broadleaf plants stunted and chlorotic or purple.



# GROWTH REGULATORS

## SYNTHETIC AUXINS

Group	Site of Action	Family	Product
4	Synthetic auxin (31)	Phenoxy acetic acid	2,4-D
		Benzoic acid	Banvel Clarity

# GROWTH REGULATORS

**ACTION** - Disrupt hormone balance and protein synthesis resulting in abnormal growth.

**INJURY** - Corn shows onion-leafing, fused brace roots, bent and brittle stalks. Broadleaf plants show epinasty, callus tissue and leaf malformations.



# NON-MOBILE PHOTOSYNTHESIS INHIBITORS

Group	Site of Action	Family	Product
6	Photosynthesis inhibition at PSII - site B (4)	Nitrile	Buctril

# **NON-MOBILE PHOTOSYNTHESIS INHIBITORS**

**ACTION** - Bind to sites within chloroplasts and stop carbohydrate production.

**INJURY** - Postemergence activity only. Leaves turn yellow or bronze and then turn brown and die. Symptoms like that from cell membrane disrupters.



# INTERNATIONAL SURVEY OF HERBICIDE RESISTANT WEEDS

<http://www.weedscience.org>

Maintained by

Ian Heap

Funded and Supported by the  
Herbicide Resistance Action Committee ([HRAC](#))

North American Herbicide Resistance  
Action Committee ([NAHRAC](#))  
Weed Science Society of America ([WSSA](#)).

# HERBICIDE RESISTANT WEEDS

## SUMMARY 2/2/15

Herbicide Group	WSSA Group	Example Herbicide	Total
<b>ALS inhibitor</b>	<b>2</b>	<b>Harmony Extra</b>	<b>151</b>
<b>Triazine</b>	<b>5</b>	<b>Atrazine</b>	<b>72</b>
<b>ACCase inhibitor</b>	<b>1</b>	<b>Fusilade</b>	<b>46</b>
<b>Bipyridilium</b>	<b>22</b>	<b>Gramoxone</b>	<b>31</b>
<b>Glycine</b>	<b>9</b>	<b>Roundup</b>	<b>31</b>
<b>Synthetic Auxin</b>	<b>4</b>	<b>2,4-D</b>	<b>31</b>
<b>Ureas and Amide</b>	<b>7</b>	<b>Lorox</b>	<b>26</b>
<b>Dinitroaniline,etc.</b>	<b>3</b>	<b>Prowl</b>	<b>12</b>





**ALS Resistant  
Common Chickweed  
in Pennsylvania**



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## SUMMARY 2/2/15

Herbicide Group	WSSA Group	Example Herbicide	Total
ALS inhibitor	2	Harmony Extra	151
Triazine	5	Atrazine	72
ACCase inhibitor	1	Fusilade	46
Bipyridilium	22	Gramoxone	31
Glycine	9	Roundup	31
<b>Synthetic Auxin</b>	<b>4</b>	<b>2,4-D</b>	<b>31</b>
Ureas and Amide	7	Lorox	26
Dinitroaniline,etc.	3	Prowl	12



# HERBICIDE RESISTANT WEEDS

## SUMMARY 2/2/15

Herbicide Group	WSSA Group	Example Herbicide	Total
Thiocarbamate, etc.	8	Eptam	9
PPO inhibitors	14	Sharpen	6
Chloroacetamide, etc.	15	Dual II Mag	4
<b>Nitriles and others</b>	<b>6</b>	<b>Buctril</b>	<b>4</b>
Glutamine syn. inh.	10	Liberty 280	2
HPPD inhibitors	27	Callisto	2
Others	-	-	18
<b>Total Herbicide Resistant Biotypes</b>			<b>445</b>



A wide-angle photograph of a lush green agricultural field, likely corn, stretching towards a horizon line. The field is filled with rows of young plants. In the background, a line of bare trees is visible against a clear, light blue sky. The overall scene is bright and open.

**QUESTIONS?**



The only good weed  
is a dead weed

