Weeds are Changing, So Should your Approach to Control Them

Caleb Dalley
Brian Jenks
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How are weeds changing?

- New weeds not seen before
  - Narrowleaf hawksbeard (coming from Canada and Montana)
  - Palmer amaranth (not yet in ND, but is a potential problem)
  - Waterhemp moving west?

- Herbicide resistance
  - Failures in control as weed biotypes resistant to common herbicides become dominant

Narrowleaf hawksbeard

- Taprooted annual in the aster or sunflower family
- Juvenile stage appears much like dandelion
- Flowering stalk with narrow leaves up to 3 feet in height
- Problem in no-till crops, CRP, and hay crops
- Is becoming a problem in Northwest and North Central North Dakota
  - Is coming south from Canada where it is a widespread problem
  - Also found in Montana
  - Has not been reported in southwest North Dakota yet
    - If you see this weed, please let us know

Narrowleaf hawksbeard

Brian Jenks, NCSU


Clair Kaeppel/WREC


Clair Keene - WHFS


Clair Keene - WREC

narrow-leaved hawksbeard (*Crepis tectorum* L.)

Controlling Narrowleaf Hawksbeard

- Need to increase monitoring of fields after harvest
- A late-season fall herbicide application may be needed
  - (mid-October or later)
- Control is best when herbicides are applied to seedling or rosette-stage plants
- Fall burndown herbicide application may need to include more than just glyphosate
  - Growth regulator 2,4-D at 1-2 pt/A provides good control
    - Precaution must be taken following 2,4-D application when rotating to sensitive crops
  - Combination of glyphosate + 2,4-D + Valor (2 oz/A) to increase burndown and provide some residual control
- Spring burndown needs to happen before plants start to bolt

Preventing/Managing Resistant Weeds

- Crop rotation
  - Cool vs. warm-season crops
  - Short-season vs. long-season crops
  - Fall vs. spring planted crop
  - Annual vs perennial crops
  - Annual forage crop (oat/barley hay)
- Herbicide selection
  - Residual vs. POST
  - Different MOA
  - Tank mixes
  - Labeled rates
  - Labeled stages
- Other practices
  - Planting date
  - Row spacing
  - Higher seeding rates
  - Fertilize placement
  - Layered herbicides
  - Cover crops
  - Cultivation
  - Occasional tillage
  - Hand weeding
  - Zero tolerance

Resistant weeds in ND

Herbicide Group	Weed
Group 1	Wild oat, Green foxtail
Group 2	Kochia, Green foxtail, Marshelder, Common ragweed, Pigweed, Waterhemp, Wild oat
Group 3	Green foxtail
Group 4	Kochia
Group 5 (atrazine)	Kochia
Group 9	Kochia, Horseweed, Common ragweed, Waterhemp
Group 14	Common ragweed and Waterhemp (suspected)

*Not a complete list

Multiple resistance in ND

Weed	Groups
Green foxtail	1, 2
Wild oat	1, 2, 8
Kochia	2, 9, 14
Common ragweed	2, 9, 14
Waterhemp	2, 9, 14

*Not a complete list

Wild Oat Testing

	Field 1	Field 2	Field 3	Susceptible Check
Herbicide	**Rating**	**Rating**	**Rating**	**Rating**
Puma	MR	R	R	S
Axial XL	R	MR	R	S
Assure II	R	R	R	S
Select	S	S	S-SR	S
Everest	R	MR	R	S
GoldSky	R	R	R	S
Huskie Complete	R	R	R	S
Raptor	R	SR-MR	R	S

S = Susceptible
SR = Slightly Resistant
MR = Moderately Resistant
R = Resistant

Wild Oat Testing

	Field 4	Field 5	Field 6	Field 7	Susceptible Check
Herbicide	**Rating**	**Rating**	**Rating**	**Rating**	**Rating**
Puma	R	MR	R	S	S
Axial XL	R	S	S	S	S
Assure II	R	SR	R	S	S
Select	MR	S	S	S	S
Everest	R	SR-MR	S	S	S
GoldSky	R	SR-MR	S	S	S
Huskie Complete	R	SR-MR	S	S	S
Raptor	R	S	S	S	S

Now what ?

S = Susceptible

SR = Slightly Resistant

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R = Resistant

Herbicides for POST grass control

Group 1

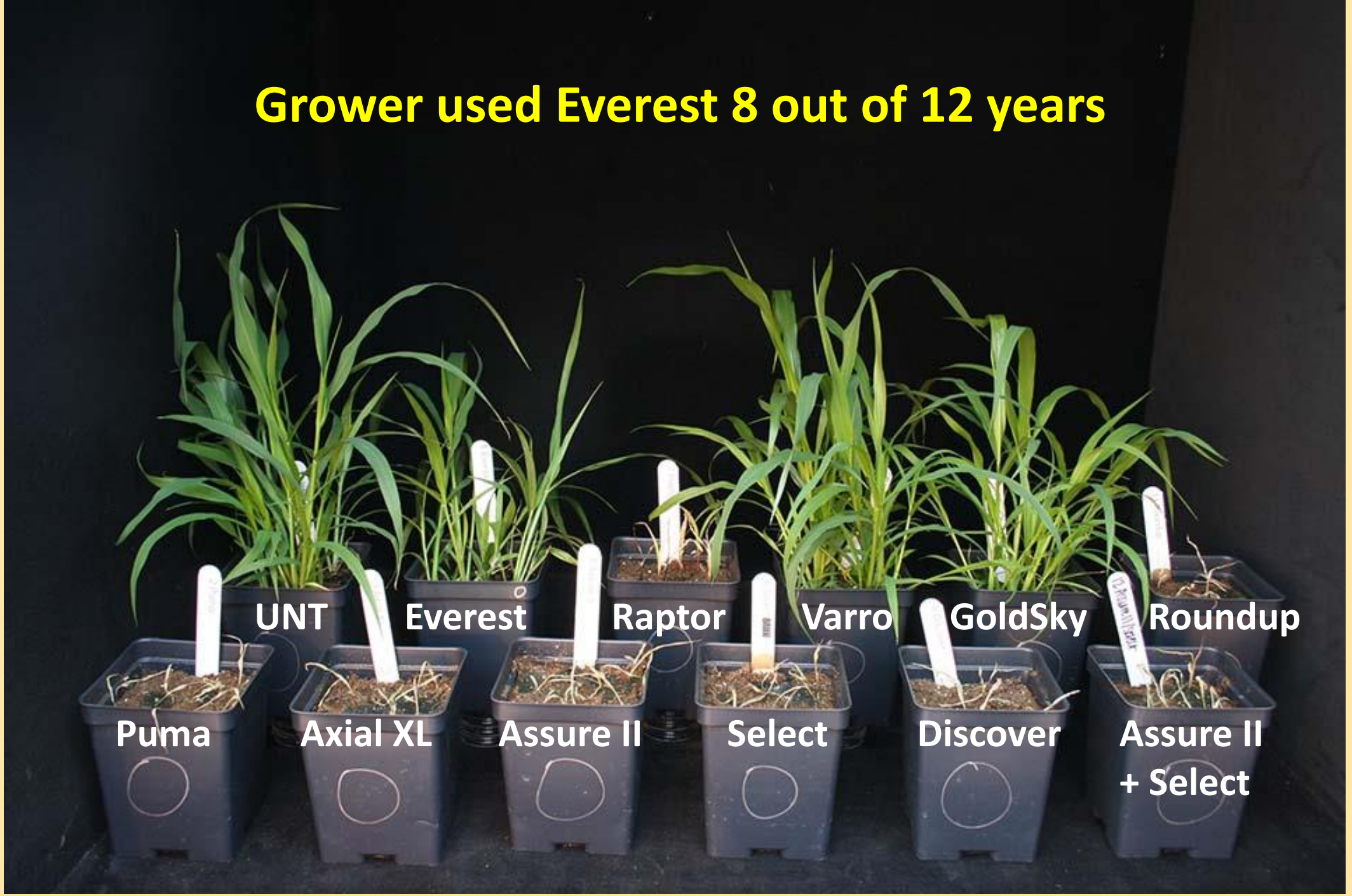
Puma	**1-fop**
Discover	**1-fop**
Assure II	**1-fop**
Select	**1-dim**
Poast	**1-dim**
Axial XL	**1-den**

Group 2

Raptor/Beyond	**IMI**
GoldSky	**TPS**
PerfectMatch	**TPS**
Everest	**SACT**
Varro	**SACT**
Rimfire MAX	**SACT**

18 DAT

Green foxtail resistant to Group 1's


Grower used Everest 8 out of 12 years
UNT
Everest
Raptor
Varro
GoldSky
Roundup
Puma
Axial XL
Assure II
Select
Discover
Assure II
+ Select

Rotating herbicides for grass control in wheat/pulse crops

Year	Crop	Herbicide	Group
2017	Wheat	Everest/Varro/Olympus	2 (SACT)
2018	Dry pea	Select	1 (dim)
2019	Wheat	GoldSky	2 (TPS)
2020	Lentil	Select	1 (dim)

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2019	Wheat	GoldSky	2 (TPS)
2020	Lentil	Select	1 (dim)
2021	Wheat	Everest/Varro/Olympus	2 (SACT)
2022	Dry pea	Select	1 (dim)
2023	Wheat	GoldSky	2 (TPS)
2024	Lentil	Select	1 (dim)

What could we do different to delay resistance?

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2018	Dry pea	Sonalan / Select	3 / 1 (dim)
2019	Wheat	Puma	1 (fop)
2020	RR Soybean	Spartan Elite / Glyphosate	14/15 / 9

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2018	Dry pea	Prowl / Select	3 / 1 (dim)
2019	Wheat	Puma/Wolverine	1 (fop)
2020	RR Soybean	Spartan Elite / Glyphosate	15 / 9
2021	Wheat	Axial XL	1 (den)
2022	Clearfield Lentil	Beyond / Assure II	2 (IMI)/1 (fop)
2023	Wheat	GoldSky	2 (TPS)
2024	LL Canola	Liberty + Select	10 + 1 (dim)

Canadian barley/wild oat study:

- Taller cultivars yielded higher than the semi-dwarf varieties
- Higher than normal seeding rates competed better with wild oat
- Rotating crops and herbicides as opposed to continuously planting barley decreased wild oat populations
- Overall, high seeding rates and more competitive cultivars combined with diverse crop rotation proved to be the most successful.

Kochia control

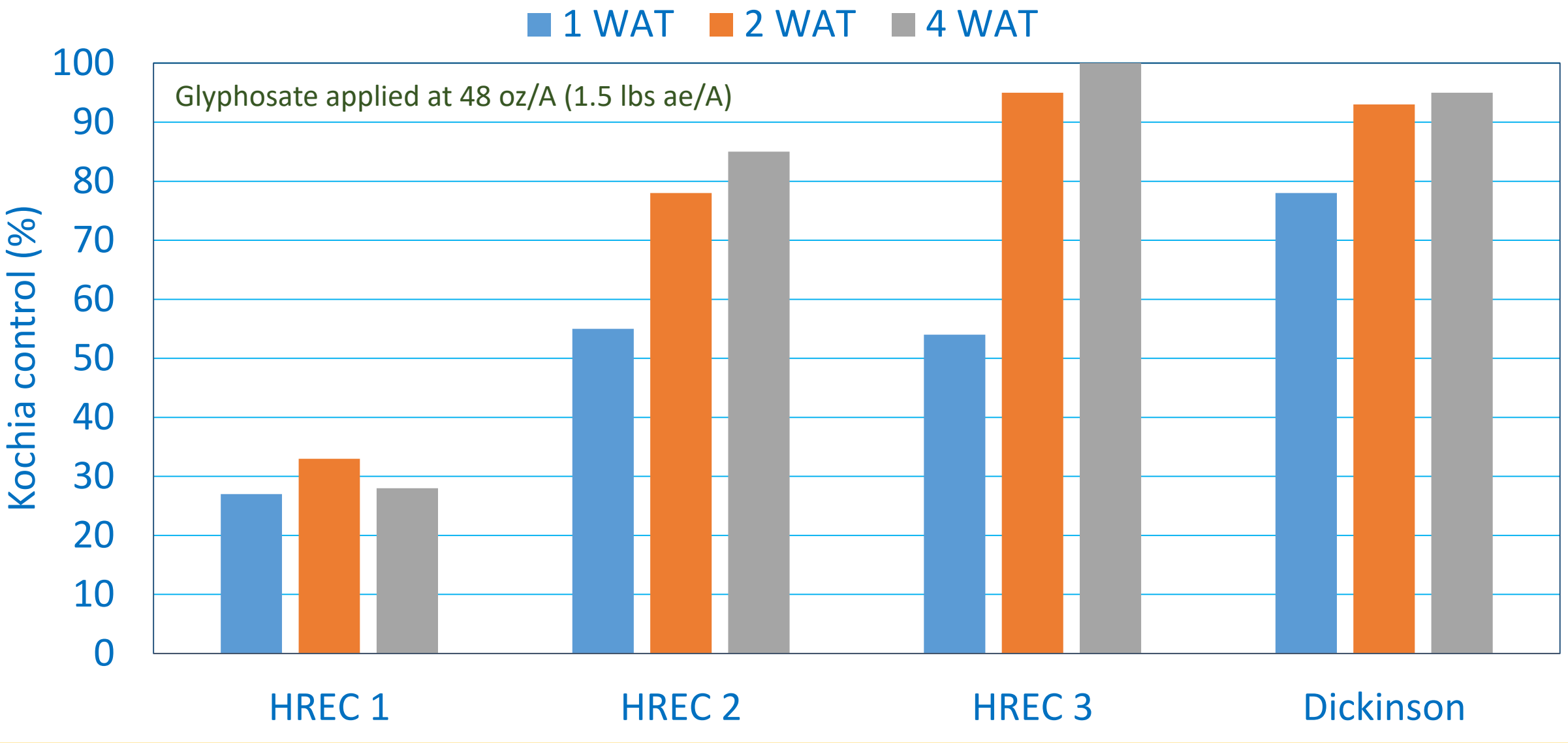
- Most effective control is achieved through use of both preemergence and postemergence herbicides
  - Seedlings emerge over a long time period from early spring though mid-summer or even in late summer in dry years
  - For postemergence applications, apply to kochia after the ‘puffball’ stage
  - Herbicide resistance to Groups 2, 4, 5, and 9
    - (ALS, GR, triazine, glyphosate)

Postharvest Kochia Control

Caleb Dalley
• Hettinger Research Extension Center

Ryan Buetow
• Dickinson Research Extension Center

Post-harvest kochia control trials 2017



Thoughts and Observations

- Drought in western North Dakota forced many growers to harvest small grains as hay rather than grain
  - July and August rains fueled a kochia infestation in many fields
- Kochia control needs to happen before it reaches 4 inches; this did not occur in many cases
- Larger, rapidly growing kochia is difficult to control
- We need to be concerned about glyphosate resistance in kochia as it is becoming more widespread
- Tank-mixing other broadleaf herbicides with glyphosate to control glyphosate-resistant kochia will only be successful if kochia is small at time of application
- Alternative to glyphosate is using paraquat (Gramoxone), which is very effective; needs higher application volume to get good coverage (contact herbicide)

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