Weed Control in Dryland Cropping Systems

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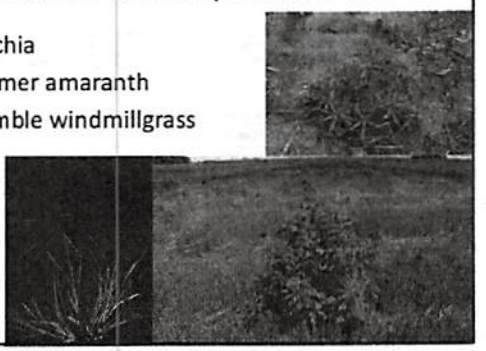
Weed Control in Dryland Cropping Systems

- Diversified Weed Management Program:
  - Cultural Practices: crop rotations, cover crops, nutrient management, planting dates, etc.
  - **Knowledge of Weed Biology**
  - Multiple Effective Herbicide Sites of Action
  - Residual Herbicides
  - Weed Seedbank management
  - Tillage?

Problematic Weed Species in NW KS

- Kochia
- Palmer amaranth
- Tumble windmillgrass



Herbicide Resistance!

Kochia:

- ALS inhibitors
- Atrazine
- Glyphosate
- Dicamba
- Starane
- 2,4-D has never worked very well.

Palmer amaranth:

- ALS inhibitors
- Atrazine
- Glyphosate
- HPPD
- PPO?
- 2,4-D?
- Dicamba ?

Tumble Windmillgrass?

Kochia

Primarily cross pollinated
Short seed life
Early germination
Highly pubescent
Drought tolerant
Tumbleweed seed dispersal
Resistance to 4 herbicide sites of action

Kochia emergence experiment, J. Anita Dille etal.

Locations	Site
Garden City, KS	crop
Hays, KS	crop & non-crop
Ness City, KS	non-crop
Stockton, KS	non-crop
Ft. Collins, CO	crop, dryland & irrigated
Mitchell, NE	non-crop
Scottsbluff, NE	non-crop
Lingle, WY	non-crop

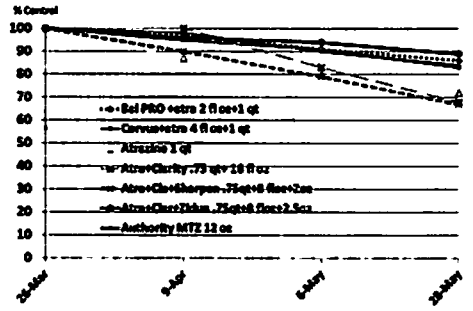
Kochia emergence dates and GDD, Anita Dille etal.

Location & site	Site	GDD to 10% E	Date	GDD to 90% E	Date	GDD Duration 10% to 90% E
Lingle, WY	NC	76	3/21	191	4/10	115
Mitchell, NE	NC	84	3/17	456	5/7	372
Scottsbluff, NE	NC	69	3/15	415	4/29	346
Hays, KS	Crop	238	3/18	365	3/24	127
Hays, KS	NC	137	3/31	173	4/10	36
Ness City, KS	NC	114	3/11	475	4/18	361
Garden City, KS	Crop	283	3/31	1056	5/26	773

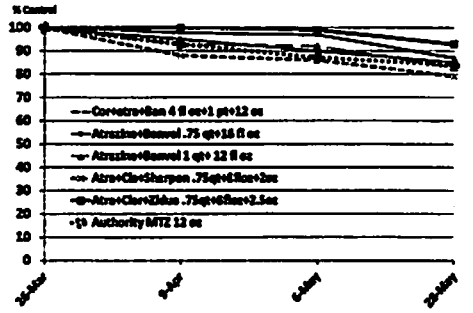
Effective Herbicides for Kochia Control

- Postemergence
  - Dicamba?
  - Starane (fluroxypyr)?
  - Glyphosate?
  - Atrazine?
  - Sharpen (small)
  - HPPD: Callisto, Laudis, Huskie, Impact, Armezon, Shieldex (+ atrazine)
  - Paraquat
- Residual
  - Spartan/Authority
  - Atrazine
  - Metribuzin
  - Isoxaflutole: Balance, Scoparia, Corvus
  - Mesitrione: Lexar, Lumax, Acuron, Resicore
  - Zidua, Anthem, Auth. Supreme
  - Sharpen (short residual)
  - Dicamba (easily activated)

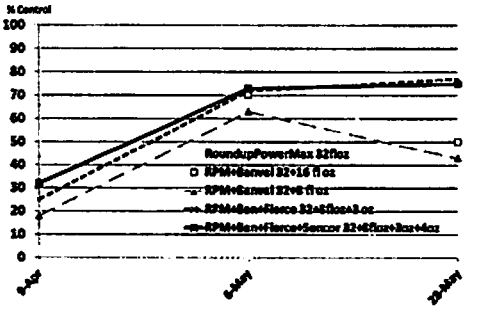
Fall herbicides applied Dec 7, 2014 for kochia control, Tribune, KS.



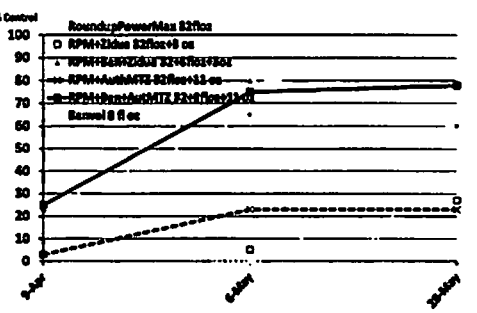
Fall herbicides applied Feb 3, 2015 for kochia control, Tribune, KS.

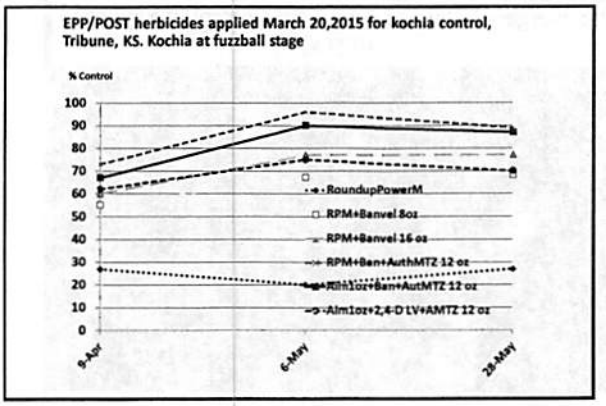


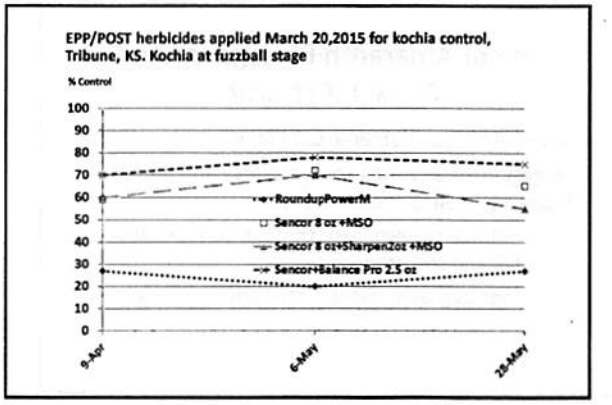
EPP/POST herbicides applied March 10,2015 for kochia control, Tribune, KS. Kochia at cotyledon stage

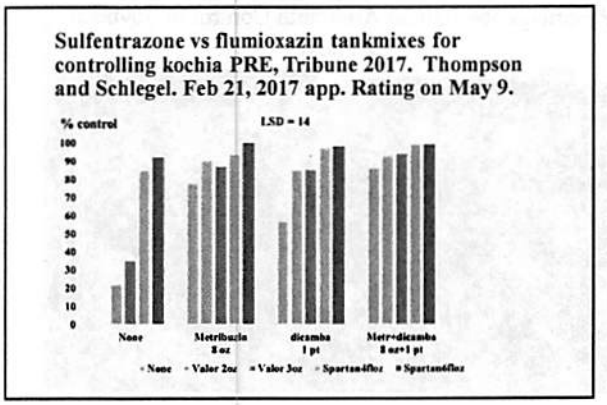


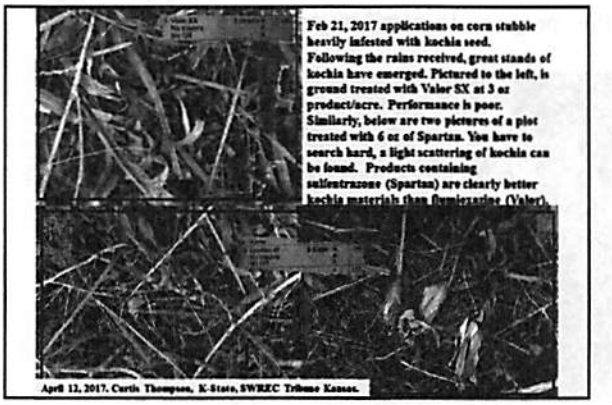
EPP/POST herbicides applied March 10,2015 for kochia control, Tribune, KS. Kochia at cotyledon stage. Value of dicamba!!











PRE herbicides for kochia control

- Corn and Sorghum
  - Atrazine (5), *mesotrione (27)*, Lexar/Lumax (5, 27, 15), Sharpen (14), Verdict (14, 15)
- Corn
  - Corvus (2, 27), Balance Flexx (27), Acuron (5, 27, 27, 15), Resicore (4, 15, 27), Harness Max (15, 27), Zidua (15), Anthem Maxx (15, 14), Anthem Flex (15, 14)
- Soybeans
  - Authority (14) based products, ie. Authority MTZ (15, 5), Spartan (14)
  - Zidua (15), Zidua PRO (15, 14, 2), Anthem (15, 14) products
  - Metribuzin (5) or Valor+Metribuzin
- Sunflower
  - Spartan (14) based products

Palmer Amaranth

Dioecious

May produce a million seeds per plant

Can hybridize with other pigweeds

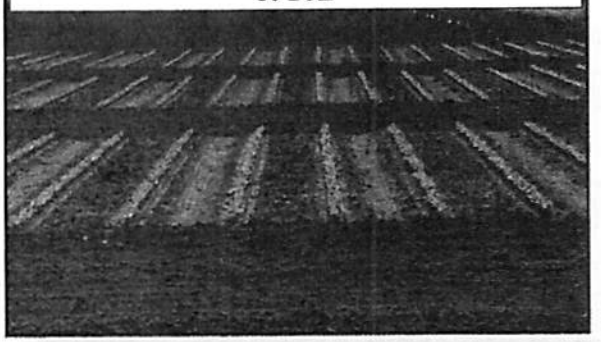
Tremendous growth rate

Resistance to 6 herbicide sites of action

Palmer Amaranth Emergence and Growth Patterns

- Generally doesn't emerge until May.
- Biggest flushes typically occur in May and June following intense rainfall events.
- Will continue to germinate through summer and early fall and still produce seed.
- Tremendous growth rates with warm temperatures.

Preemergence Palmer Amaranth Control in Soybeans
10 DAP



Preemergence Palmer Amaranth Control in Soybeans
14 DAP

Preemergence Palmer Amaranth Control in Soybeans
20 DAP

Effective Herbicides for Palmer Control

- Postemergence
  - Dicamba
  - 2,4-D?
  - Atrazine?
  - HPPD: Callisto, Laudis, Huskie, Impact, Armezon, Shieldex (+ atrazine)
  - PPO?: Sharpen, Cobra, Blazer Small
  - Paraquat
- Residual
  - Spartan/Authority
  - Valor, Fierce
  - Atrazine/metribuzin
  - Isoxaflutole: Balance, Corvus
  - Mestrione: Lexar, Lumax, Acuron, Resicore
  - VLCFA (Group 15): Zidua, Outlook, acetochlor, *S*-metolachlor
  - Sharpen (short residual)
  - Dicamba (very short residual, but easily activated)

Palmer Amaranth Control in Summer Crops

- Utilize overlapping residual program consisting of preplant, preemergence, and/or postemergence applications.
- Split preplant and pre treatments with 2/3 rate preplant by mid-April and the other 1/2 rate after planting or early postemergence (with your regular postemergence treatment).

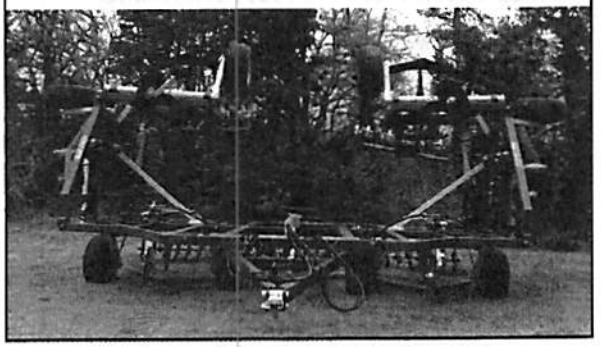
Tumble Windmillgrass

Warm season perennial
Shallow rooted
Does not spread vegetatively, only via seed dispersal
Tumbleweed seed dispersal
Waxy, narrow leaves
Drought tolerant

Effective Herbicides for Tumble Windmillgrass Control

- High rates of glyphosate in the spring when actively growing on established plants.
- Postemergence herbicides on established plants under drought stress probably provides minimal control.
- Preemergence grass herbicides probably effective on germinating seedlings and glyphosate and other postemergence grass herbicides likely effective on true seedlings, but not on established plants.

Undercutting during hot, dry weather can be quite effective.



Weed Management in Fallow and Wheat Stubble

- Maybe our weakest link in managing the weed seedbank.
- Glyphosate plus 2,4-D no longer adequate.
- Paraquat can be effective, but needs to be done right.
- Utilize residual herbicides where they fit, ie Valor or sulfentrazone.

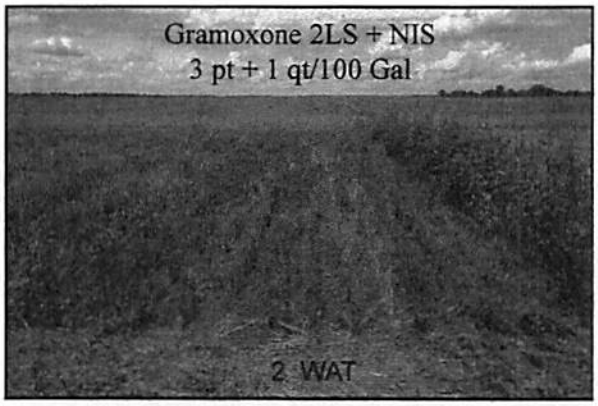
Kochia control in wheat stubble with no in wheat crop treatment, SWREC Tribune 2017. Thompson, Schlegel, and Peterson. 1701whtTR

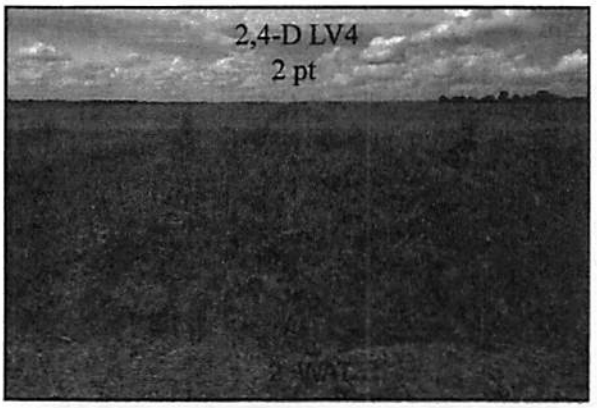
Treatment	Rate	Appl. time	Kochia in fallow	
			13 DAT	33 DAT
	Lb / acre			
Clarity+Sharpen+Linex+MSO+UAN	0.5+0.045+0.75+1%+2.5% v/v	Fallow	84	87
Clarity+Atrazine+COC	0.5+1.0+0.5%	Fallow	59	78
Clarity+etre+Sharpen+MSO+UAN	0.5+1.0+.045+1%+2.5%v/v	Fallow	82	87
Gramoxone SL+NIS	0.75+0.5% v/v	Fallow	91	88
Gramoxone SL+etre+COC	0.75+0.25+1%	Fallow	94	91
Clarity+2,4-D+NIS	0.5+0.5+0.125%	Fallow	70	82
LSD (0.05)			8	5

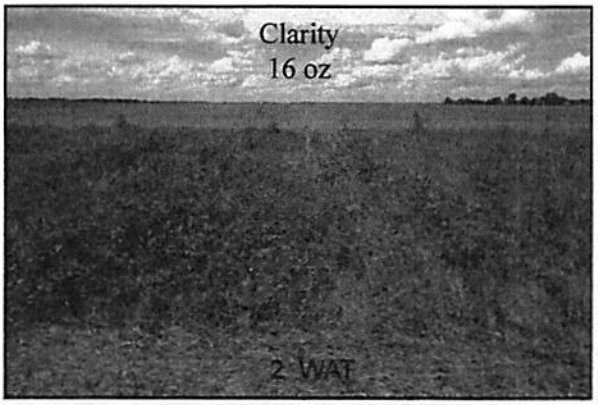
Weed control in Wheat and wheat stubble following harvest, SWREC Tribune 2017. Thompson, Schlegel, and Peterson. 1701whtTR

Treatment	Rate	Appl.	Kochia in crop		Kochia in fallow	
			May 9	PreHarv	13 DAT	33 DAT
	Lb / acre	Time	(% control)			
Clarity + 2,4-D/	0.125+0.375/	Preint	91	89	88	85
Clarity+2,4-D+NIS	0.5+0.5+0.125%	Fallow				
Clarity+Zidua/	0.125+0.106/	Preint	88	89	91	89
Clarity+2,4-D+NIS	0.5+0.5+0.125%	Fallow				
Clarity+Prowl H2O/	0.125+1.12/	Preint	94	96	95	96
Clarity+2,4-D+NIS	0.5+0.5+0.125%v/v	Fallow				
Clarity+Huskie+NIS+AMS/	0.125+0.23+0.25%v/v+1lb/	Preint	99	95	100	100
Atrazine+Sharpen+MSO+UAN	1.0+.045+1%+2.5%v/v	Fallow				
Clarity+Huskie+Zidua+NIS+AMS/	0.125+.23+.106+0.25%+1lb/	Preint	99	97	98	100
Atrazine+Sharpen+MSO+UAN	1.0+.045+1%+2.5%v/v	Fallow				
Rave+NIS/	0.147+0.5% v/v	Preint	95	89	97	97
Atrazine+Sharpen+MSO+UAN	1.0+.045+1%+2.5%v/v	Fallow				
Rave+Zidua+NIS/	0.147+0.106+0.5%/	Fall	94	84	92	93
Atrazine+Sharpen+MSO+UAN	1.0+.045+1%+2.5%v/v	Fallow				
Widematch/	0.25/	Fligf	80	89	100	100
Atrazine+Sharpen+MSO+UAN	1.0+.045+1%+2.5%v/v	Fallow				
LSD (0.05)			4	3	1	1

Fall = Nov 15,2016; Preint = April 12; Figlf = May 9; Fallow = June 15







Critical Factors for Paraquat Performance

- Requires NIS or OC
- Spray coverage
  - Minimum 15 gpa
  - Avoid Very coarse or very fine sprays
- Moderate Sprayer speeds
- Weed size
- Control enhanced by tank-mixing with atrazine, metribuzin, Sharpen, or auxin herbicides
- Be aware of potential for spray drift

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