

# Evaluation of Dichlorprop-p for Management of Resistant Kochia in Fallow and Small Grains.

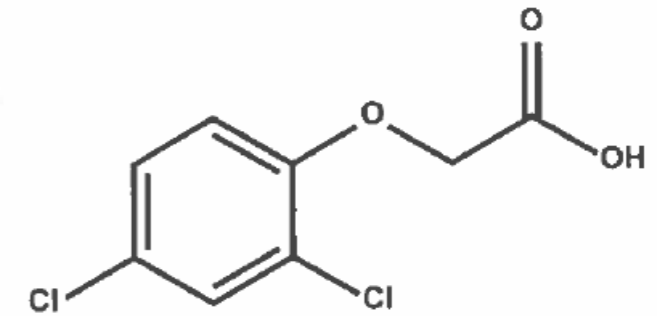
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Dan Beran and Bob Bruss,  
Nufarm Americas, Inc.

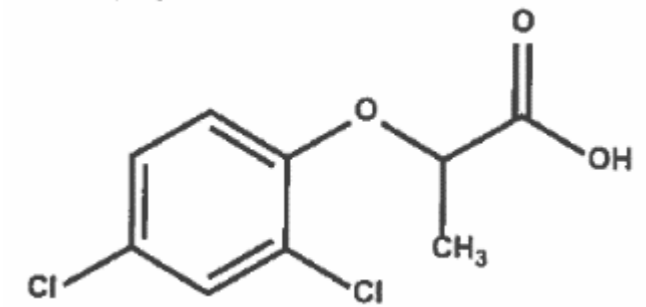
# Recent History of Dichlorprop-p

- Refined isomer of dichlorprop
  - Duplosan™
- Herbicide component in combination products in noncropland and turf in the US
- Cereal crops in Europe and Canada
- Introduction of 2,4-D tolerant cotton
- Efficacy needed for post harvest cotton stalk destruct in boll weevil eradication region
- Screening of 2,4-D resistant weeds

2,4-D:

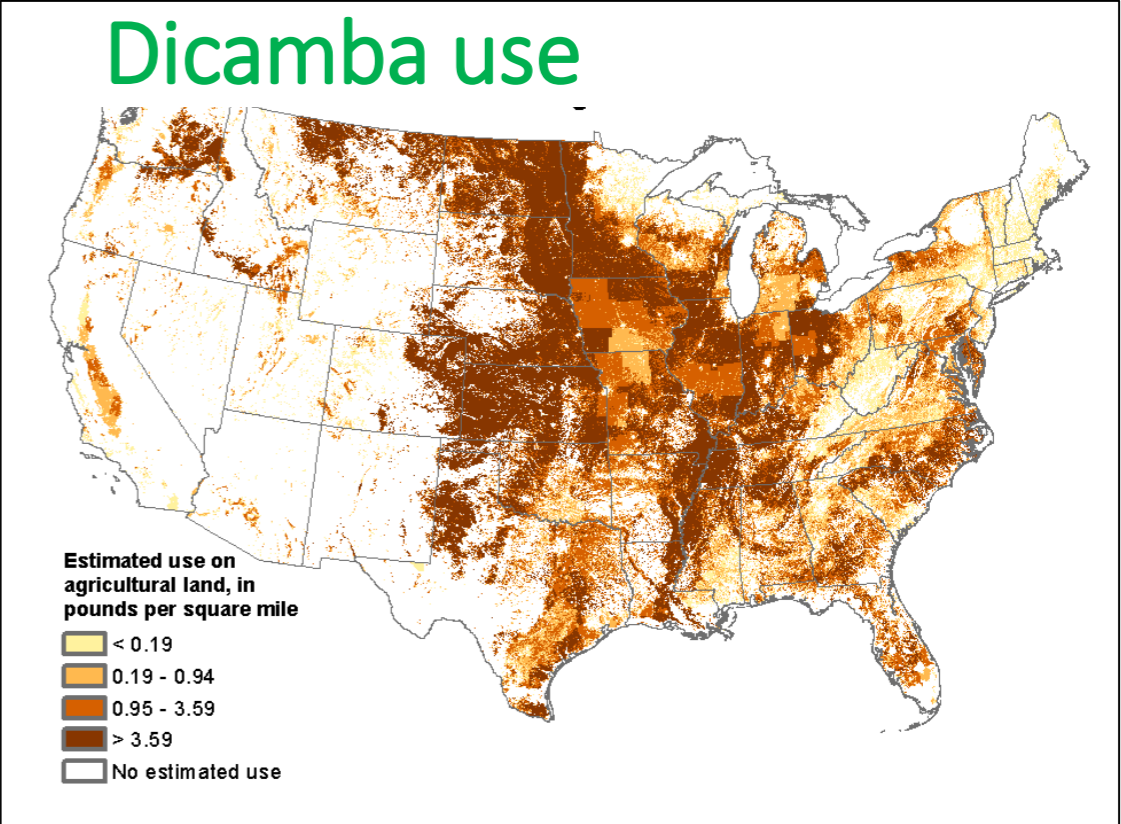
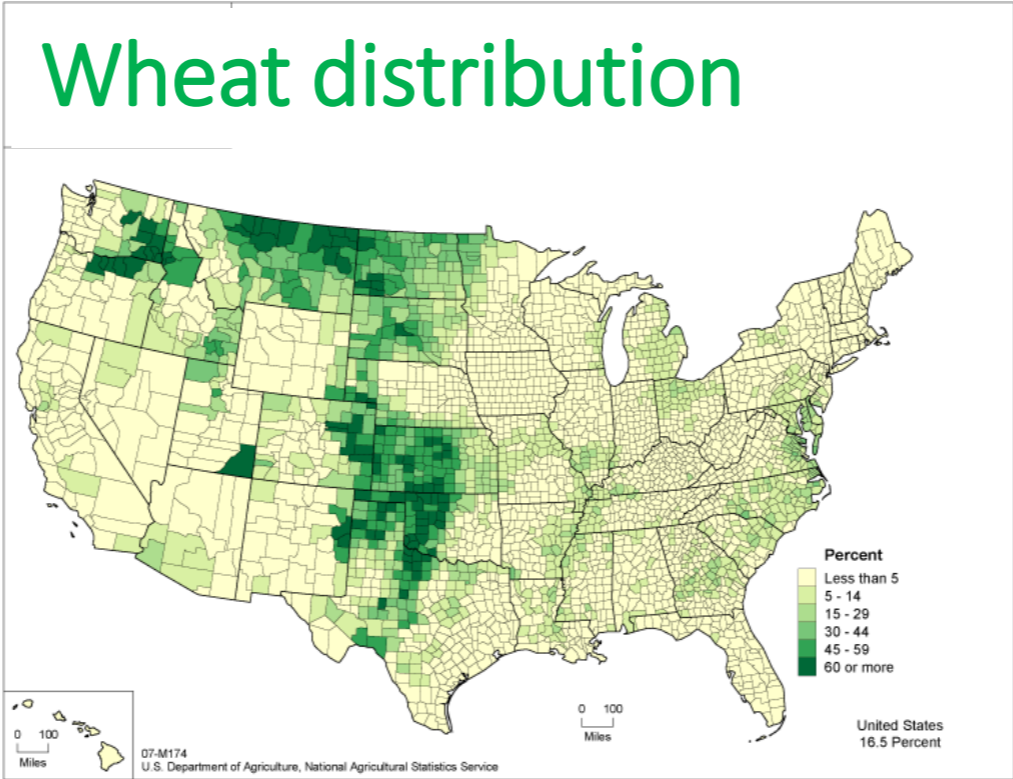
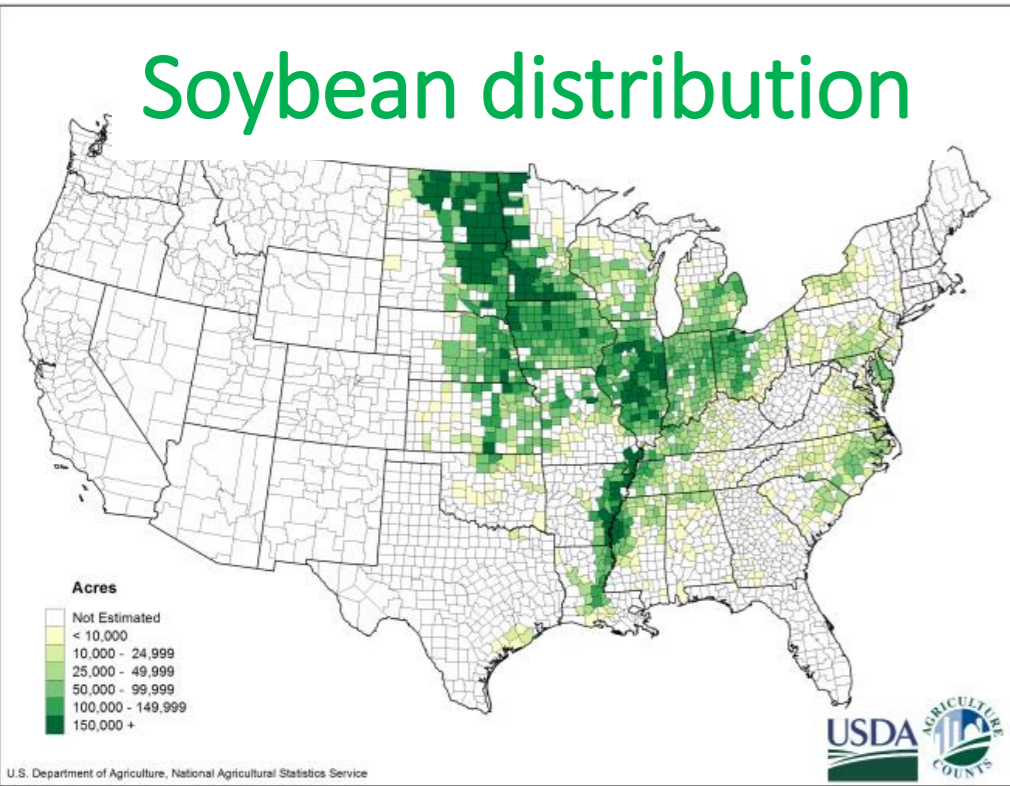
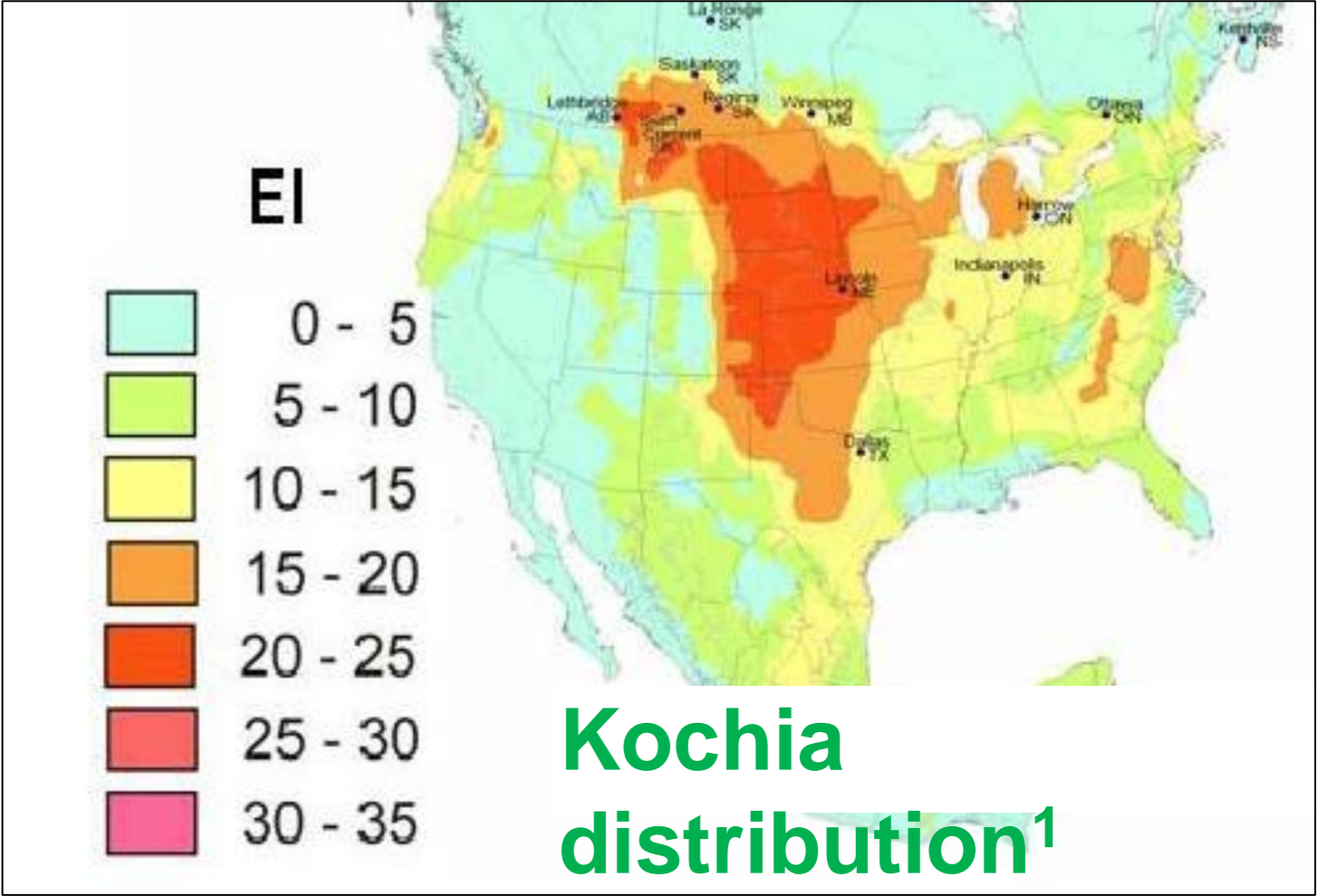


2,4-DP:



# Kochia Dynamics and Herbicide Resistance

- Kochia distribution
- ALS, glyphosate, dicamba, fluroxypyr, PPO herbicide resistance
- Small grains in US Plains States and Canadian Prairie Provinces
- Herbicide use in fallow, small grains, corn, soybeans
  - \* Likely increase in dicamba resistant kochia
  - \* Documented increase in group 4 (Geddes), PPO (Jenks)



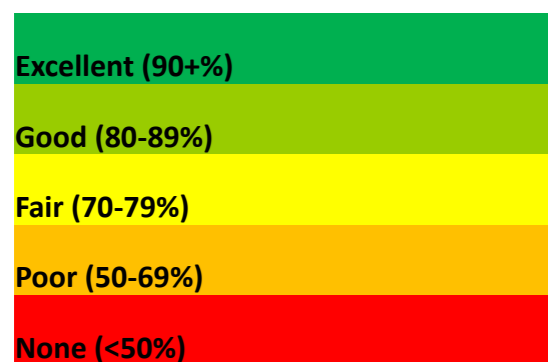
1. 2012. Beckie, Weiss, Leeson. Can. Weed Sci. Soc.

# 2019 Fallow Herbicide Evaluation with Dichlorprop-p

**Dichlorprop-p Fallow Concepts - % Weed control**

Treatment	Rate (lb a.i./A)	Kochia (n=8)	Lambsq. (n=4)	Russian thistle (n=2)	RR Pigweed (n=4)	Palmer Amar. (n=1)	Wild buckwheat (n=1)	Marestail (n=3)	Common ragweed (n=1)	Common sunflower (n=1)	Canada thistle (n=1)
Dichlorprop-p	0.50	80	89	52	74	26	86	43	43	86	80
Dicamba	0.25	87	93	88	91	73	89	81	53	87	95
2,4-D	0.375	33	93	66	86	66	88	50	73	97	80
Dichlorprop-p Dicamba 2,4-D	0.5 0.25 0.25	93	97	90	97	91	95	88	96	100	95

- Scorch EXT: ester premix 2:1:1 (2.67 lb dichlorprop-p + 1.33 lb dicamba + 1.33 lb 2,4-D)
- Registered in 2020 for noncropland, pending registration for fallow/preplant use



# Dichlorprop-p concepts being developed for kochia management

- Scorch EXT:
  - Ester formulation
  - 2.67 lb dichlorprop-p + 1.33 lb dicamba + 1.33 lb 2,4-D
  - 1X rate 24 oz = 0.5 lb dcpp + 0.25 lb dicamba + 0.25 lbs 2,4-D
  - Registered in 2020 for noncropland, pending registration for fallow/preplant use
  - PRIA date: 2024
- Maestro EXT:
  - Ester formulation
  - 3.2 lbs dichlorprop-p + 1.6 lbs bromoxynil (octanoic, heptanoic)
  - 1X rate 20 oz = 0.5 lbs dcpp + 0.25 lbs bromoxynil
  - Pending registration for use in wheat and barley (3-leaf to mid-jointing)
  - PRIA date 2024

# Efficacy Studies with Maestro EXT (2021)

Average % Weed Control (2021 Field Trials) \*

Product- product/A (lbs a.i./A)	Kochia	Lambsq.	R. thistle	RR pigweed	Wild buck- wheat	C. Mallow	P. Lettuce	C. ragweed	Sun- flower	Wild mustard
<b>Number Trials**</b>	<b>7</b>	<b>5</b>	<b>1</b>	<b>3</b>	<b>3</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>2</b>
Duplosan 16 oz (dcpp 0.5)	87	94	53	67	63	66	70	99	81	97
Maestro 2EC 16 oz (bromoxy. 0.25)	85	85	46	76	91	38	49	99	85	96
Maestro EXT 20 oz (dcpp 0.5 + bxn 0.25)	96	98	94	74	94	94	95	99	99	99
Maestro EXT 40 oz (dcpp 1.0 + bxn 0.5)	98	99	94	89	99	95	100	99	97	100

6 \* ~ 4 weeks after treatment \*\* Trials conducted in CO, KS, ND, MT, SD

# Summary of Maestro EXT Field Trials

- Effective control of kochia in wide range of environments
- Overall good broadleaf efficacy
- Spring wheat, durum, winter wheat and barley safety demonstrated at rates up through 40 oz/A Maestro EXT (1.0 lb ae dcpp + 0.5 lb bxn/acre)
- Application timing 3-leaf through mid-jointing (Feekes 7)
- Good compatibility with graminicides – pinoxaden and flucarbazone
  - Consistent with MCPA/bromoxynil premixes
  - Less antagonism than 2,4-D
- Pending Registration 2024

# Dichlorprop-p development and implications for kochia management and IR-4

- Kochia resistance is a major problem developing in the Plains states
  - PPO resistance reduces preplant burndown options
  - Increases pressure on fallow and in-crop herbicides – fluroxypyr, dicamba, etc
- Dichlorprop-p registration update
  - Preplant tolerances for corn, wheat, barley, soybean, grain sorghum – pending review
  - Likely default preplant interval for other crops 30 days – pending review
  - Potential preplant crop safety at 14 days for dry beans, sunflower, field peas
    - Would require additional research
    - Residue work
  - Solo product would NOT be supported by Nufarm for resistance concerns
- Bromoxynil combination introduces 30 preplant default on non-labeled crops
  - Need for residue work on potential preplant targets
  - Very little soil residual so preplant crop safety is likely to be good
  - Solo bromoxynil products used in preplant for kochia would increase resistance risk on kochia