

COVERS CROPS AS AN INTEGRATED MANAGEMENT STRATEGY AGAINST TROUBLESOME WEEDS IN KANSAS

Sarah Lancaster
Assistant Professor & Extension Specialist
Kansas State University



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Herbicide resistance in troublesome weeds

	Palmer amaranth	Waterhemp	Kochia
ALS inhibitors Group 2 (Classic, Harmony, Pursuit)	X	X	X
Plant growth regulators Group 4 (2,4-D, dicamba, Starane Ultra)	X		X
PSII inhibitors Group 5 (atrazine)	X	X	X
EPSPS inhibitor Group 9 (glyphosate)	X	X	X
Glutamine synthetase inhibitor Group 10 (glufosinate)	S		
PPO inhibitors Group 14 (Cobra, Reflex)	<, S	X	
HPPD inhibitors Group 27 (Armezon, Callisto, Laudis)	X		
Multiple resistance	3- & 5-way	2-way	2- & 4-way

X = Heap, 2021; < = reduced sensitivity; S = suspected

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Best management practices for herbicide resistance

- Competitive crop
- Cover crops ←
- Tillage
- Seed bank management
- Scouting



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How cover crops suppress weeds

- Alter moisture, temperature during weed seed germination
- Outcompete emerging weeds for light, water, and nutrients
- Release allelochemicals that inhibit weed seed germination



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How cover crops suppress weeds

- Alter moisture, temperature, and light during weed germination

BIOMASS PRODUCTION

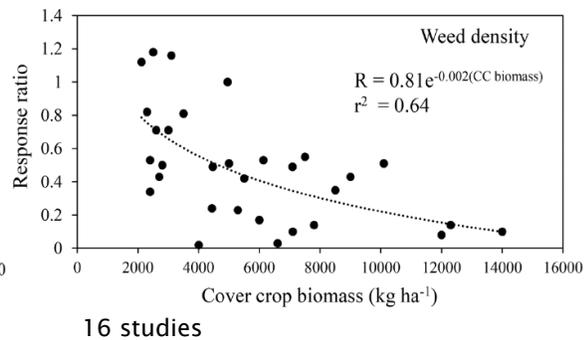
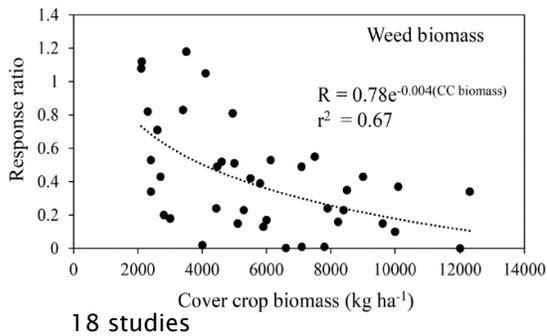
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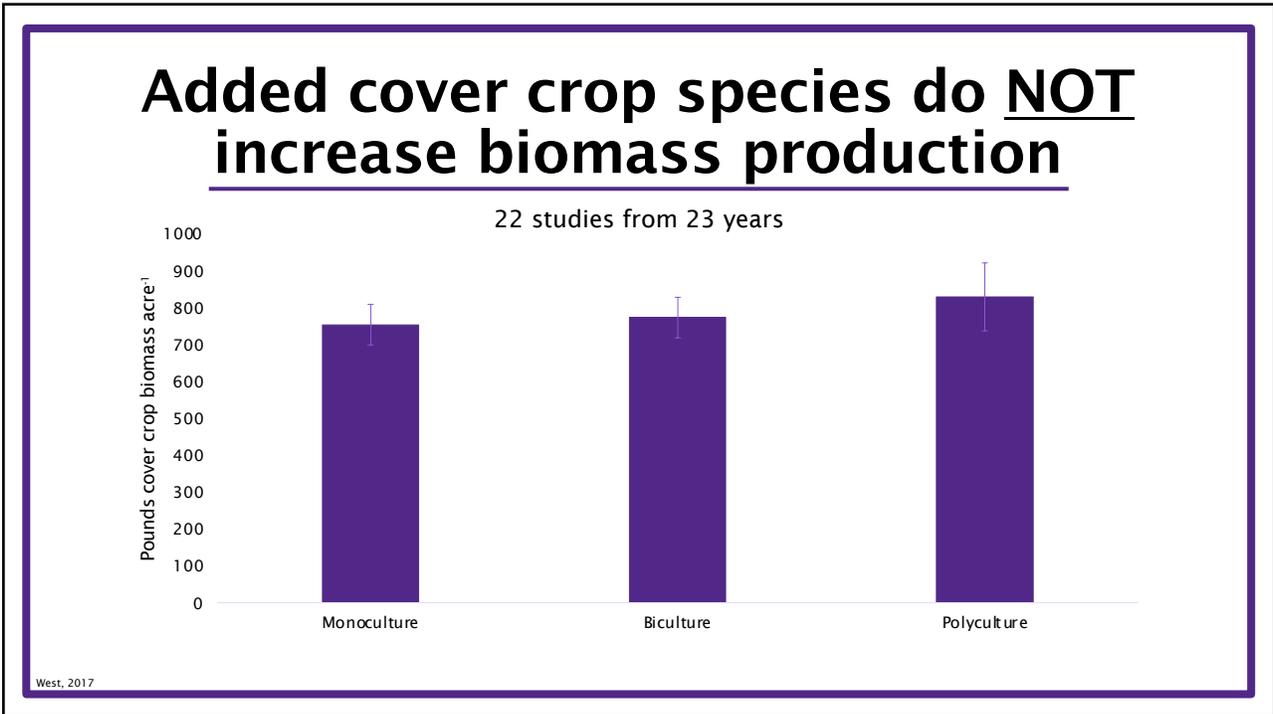
Relationship between fall-sown cover crop biomass and weed suppression Meta-analysis

Lower response ratio indicates greater weed suppression

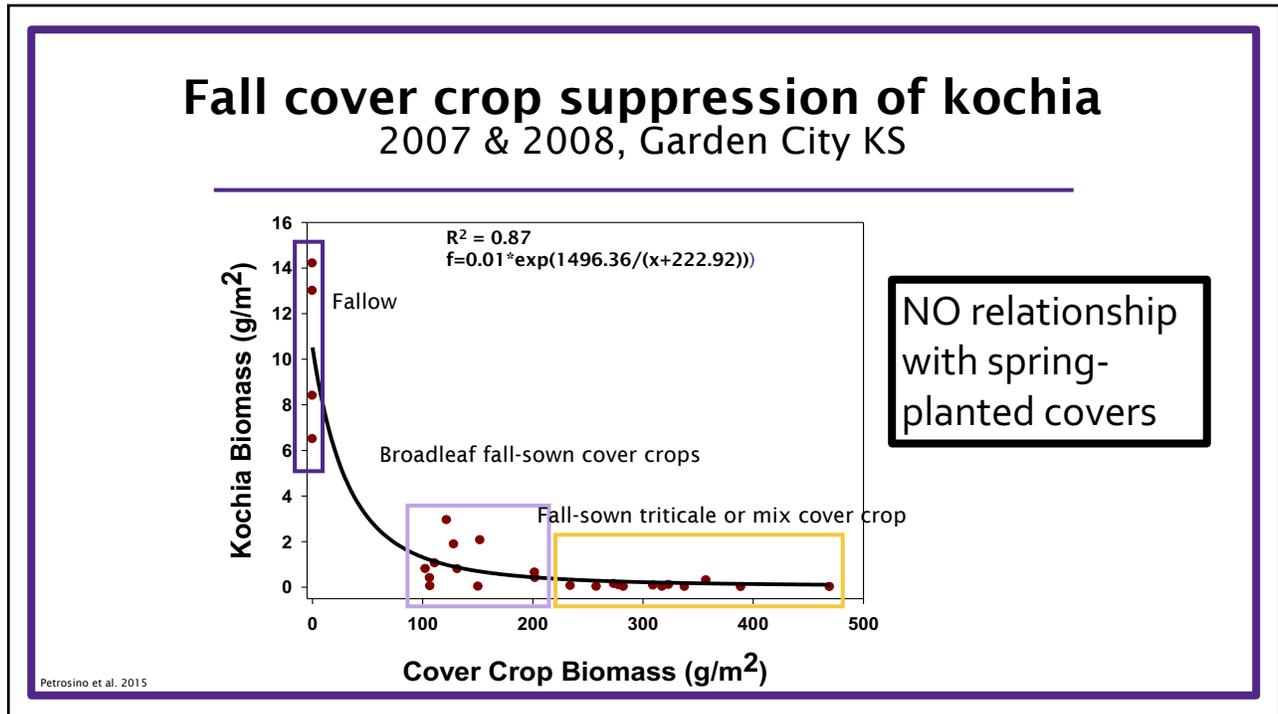


Osipitan et al., 2019

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Integrated pigweed management in Kansas

- 2 crops, 2 years, 3 locations
- Cover crop, row-width, cultivation, herbicides



Hay et al., 2019

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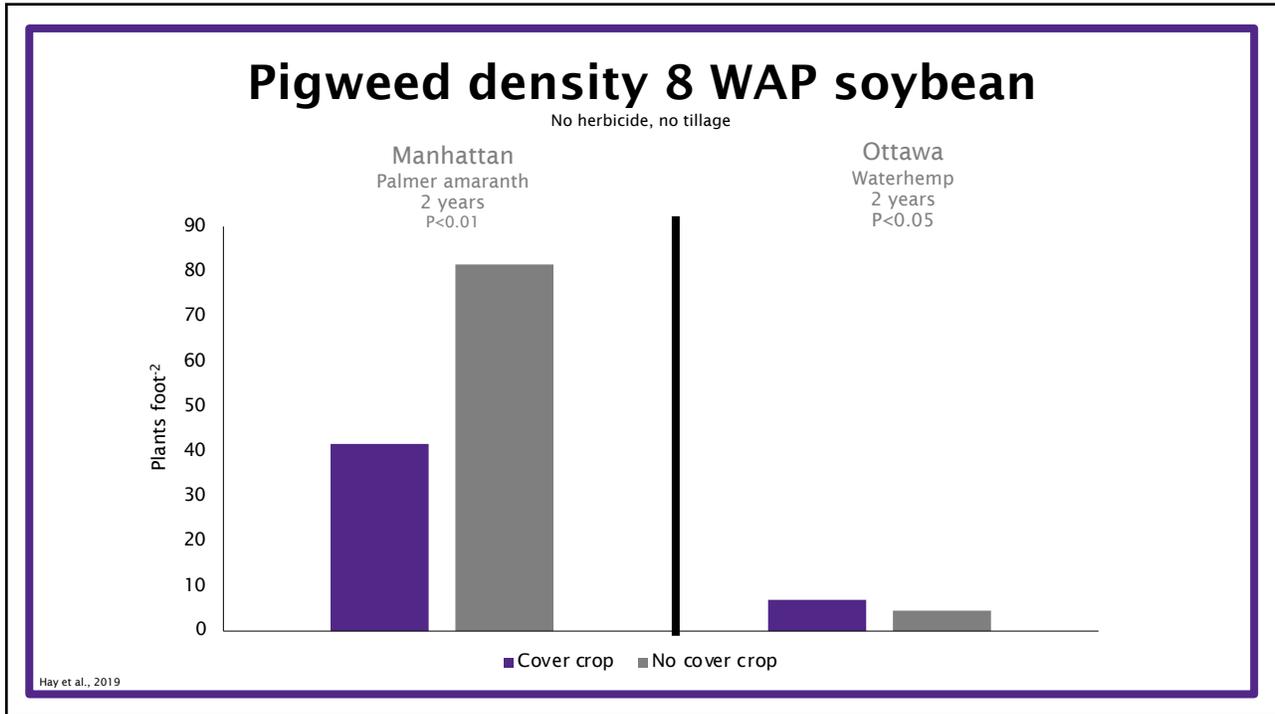
Integrated pigweed management in Kansas

- Herbicide program provided > 97% weed control
- Row width reduced pigweed growth in some environments
- Cover crop generally suppressed pigweeds

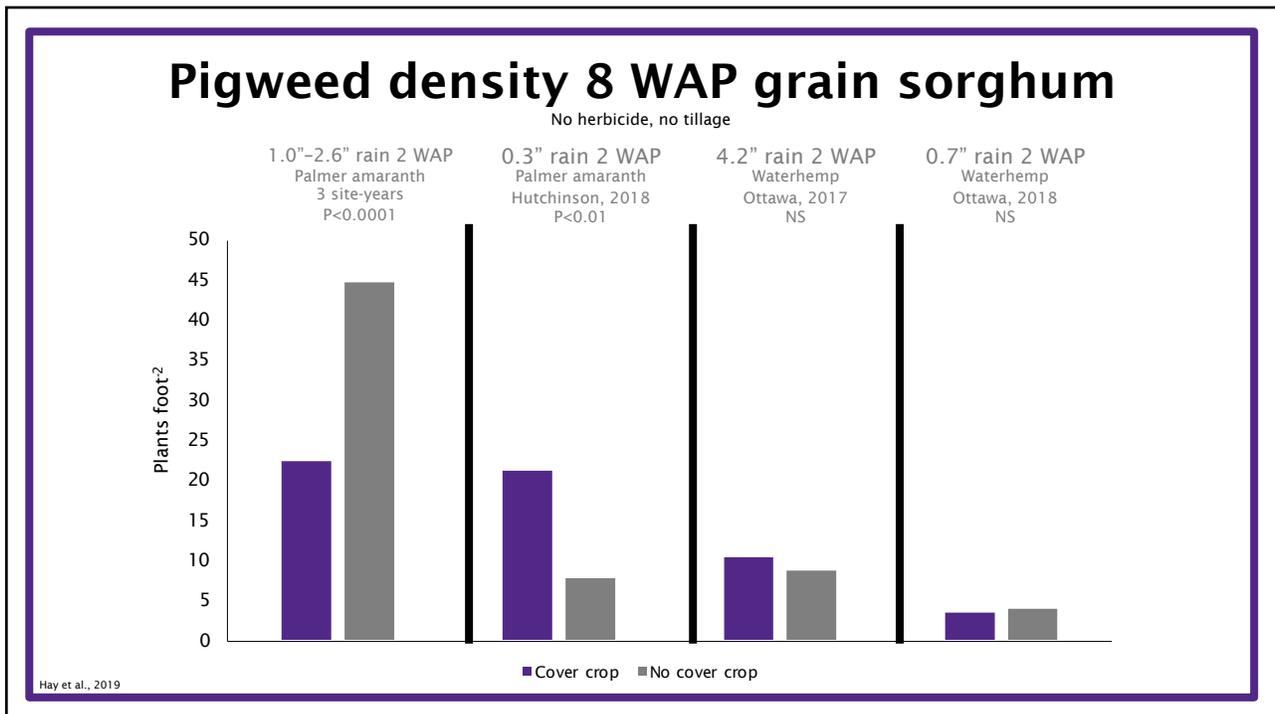


Hay et al., 2019

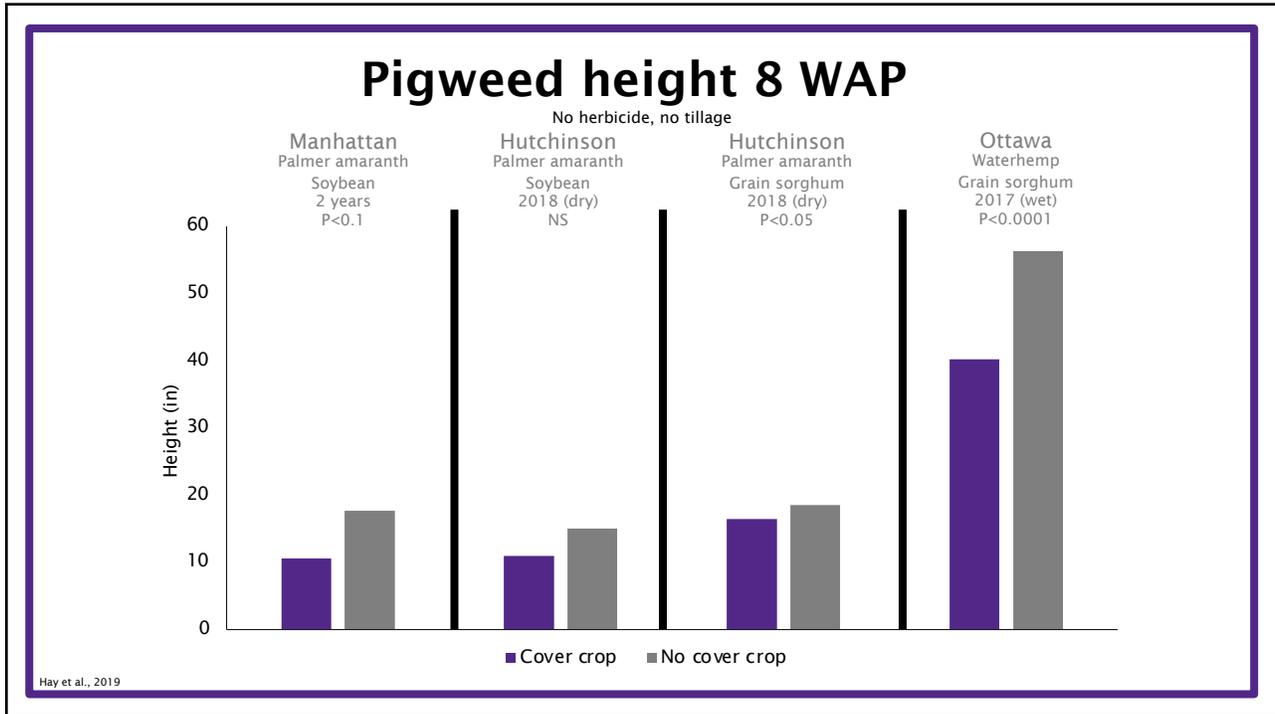
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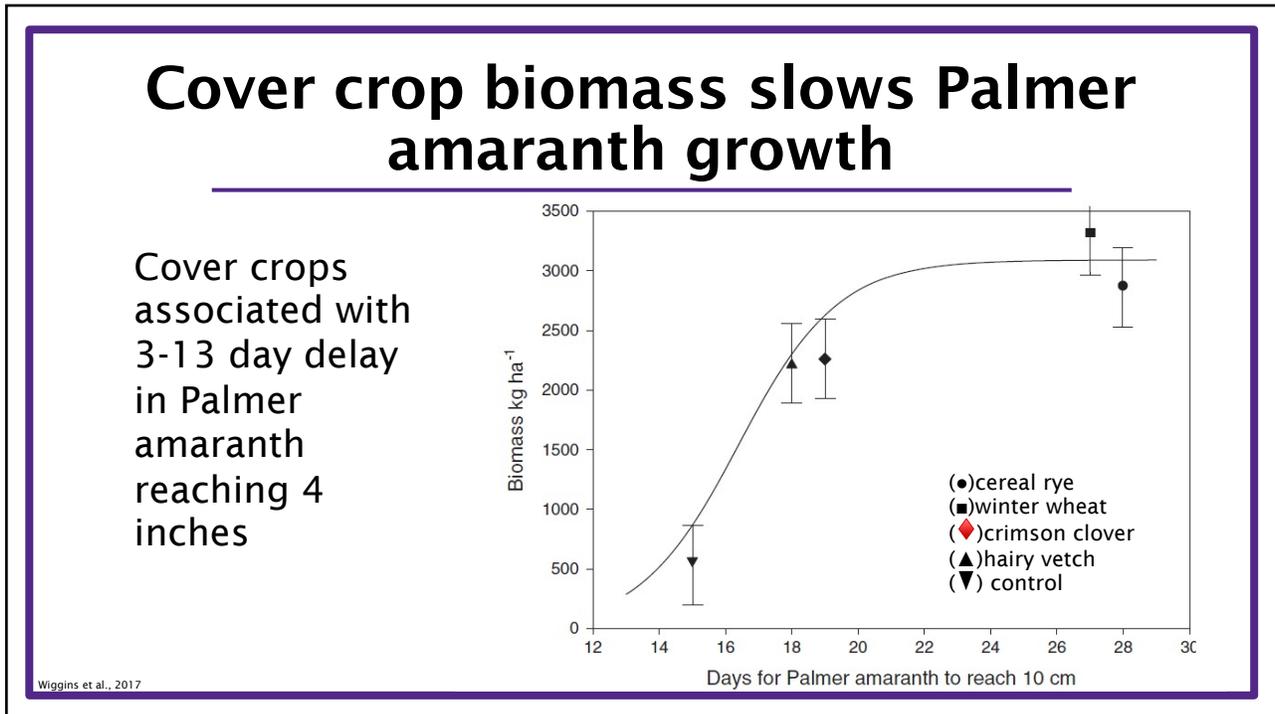
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Cover crop management for weed suppression

- Species selection
 - Proportion of cereals or other 'aggressive' species in mix is key for weed suppression
- Planting date
 - Sufficient cover crop biomass before key weeds emerge
- Termination
 - Closer to production crop planting increases weed suppression
 - Method less important

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