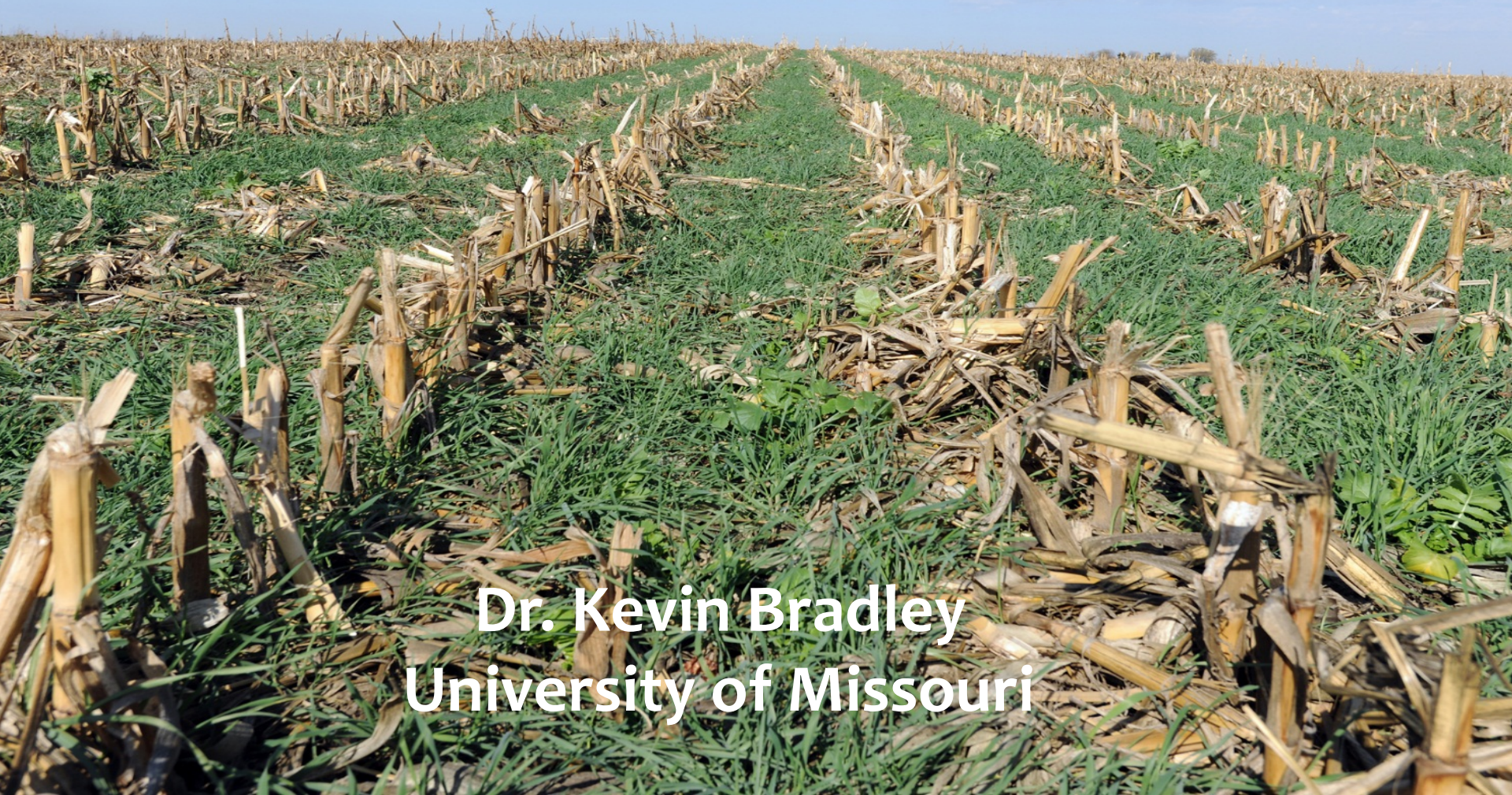


A Review of the Effects of Various Cover Crop Species on Winter and Summer Annual Weed Emergence

Dr. Kevin Bradley
University of Missouri



My Perspective

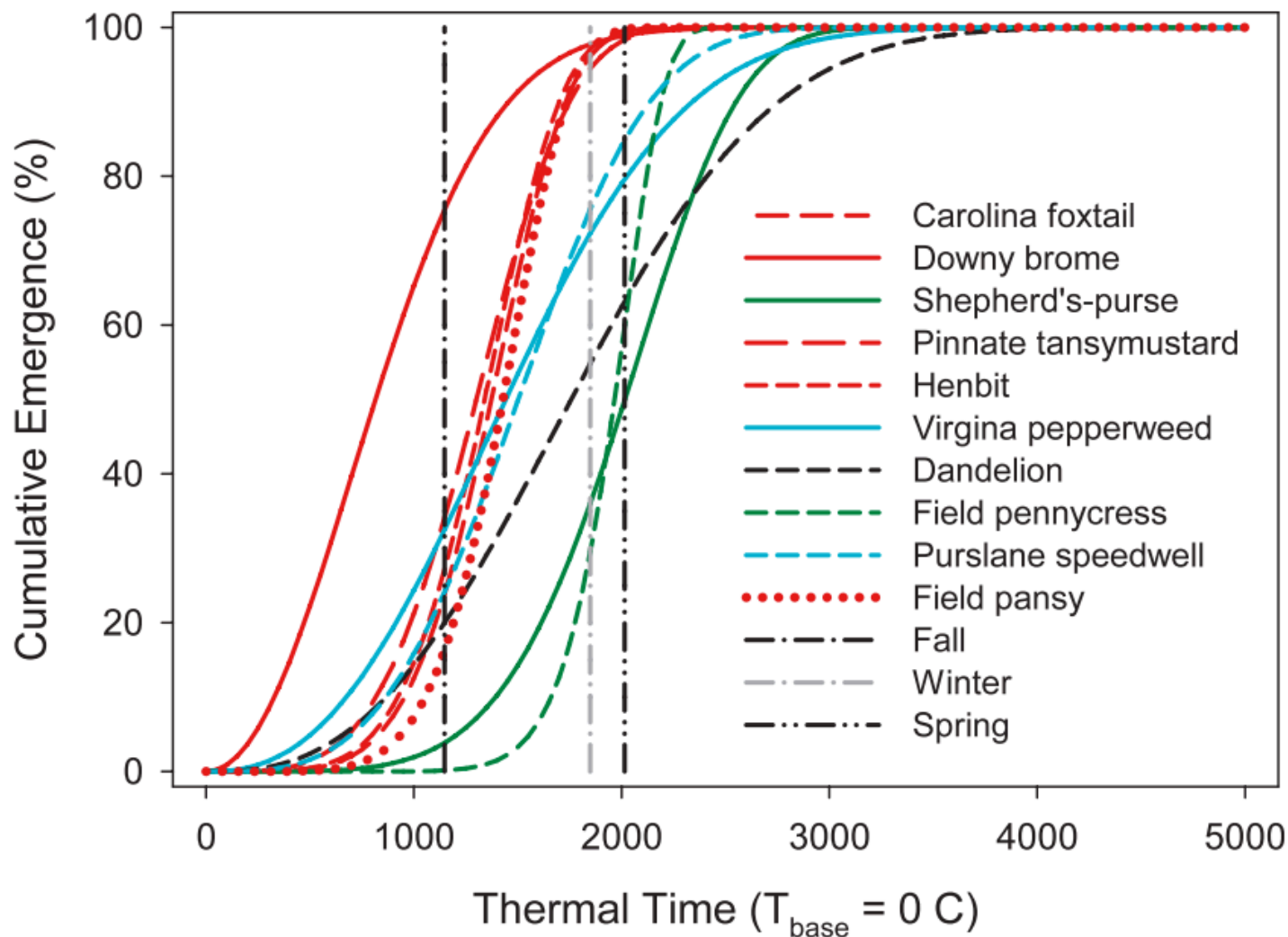
Based on our research and the results of other published studies, the ability of cover crops to reduce the emergence of **WINTER ANNUAL** weed species:

- Is usually good but rarely 100%
- Is dependent on the winter annual weed species and time of weed emergence
- Is dependent on the cover crop species and/or mix selected

Cover Crops are a Great Fit for Winter Annual Weeds!

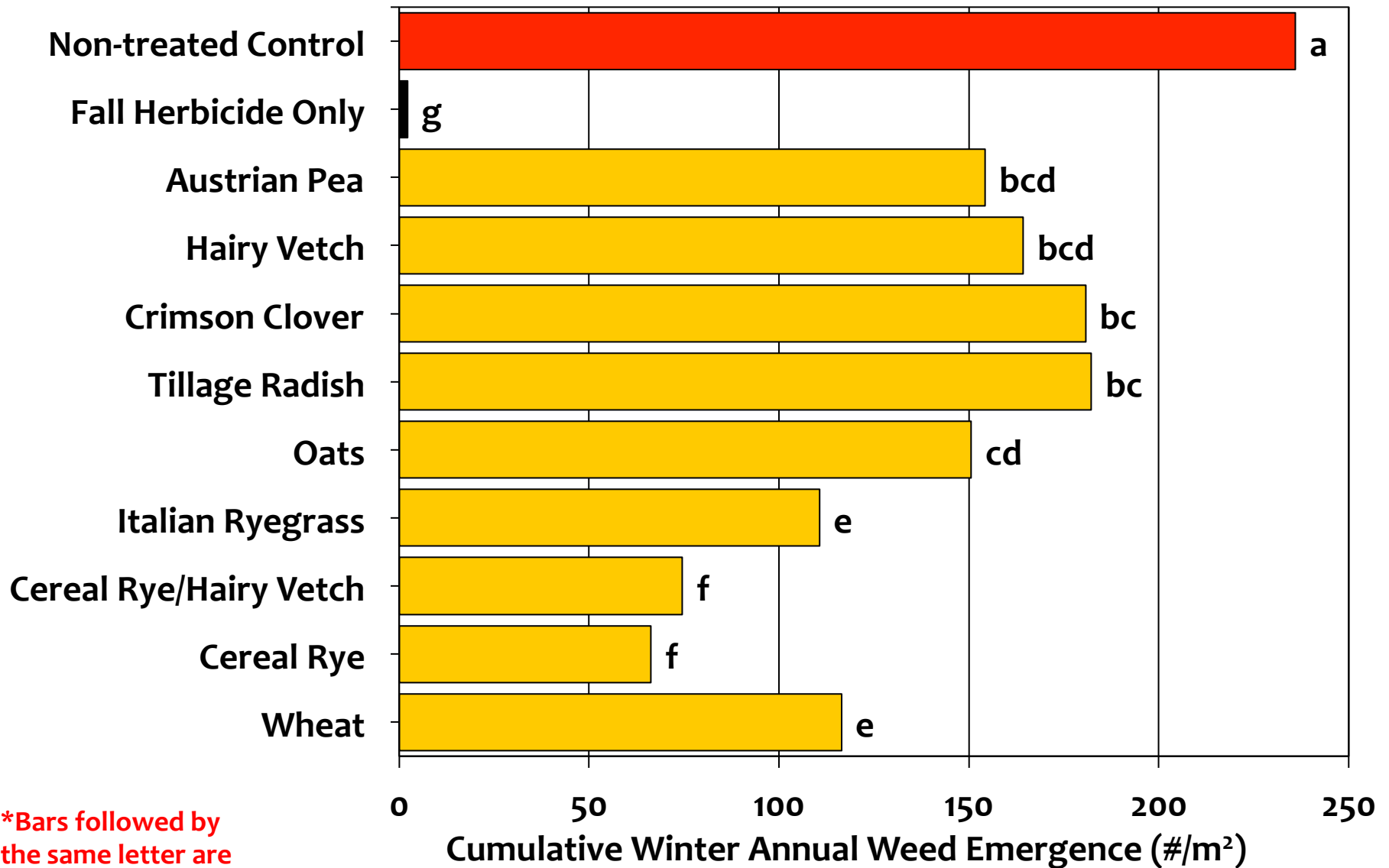
Successful Establishment of Cover Crops = Reduction in Winter annual Weed Emergence

Winter Annual Weed Emergence Sequence in Nebraska as Influenced by Thermal Time Accumulation



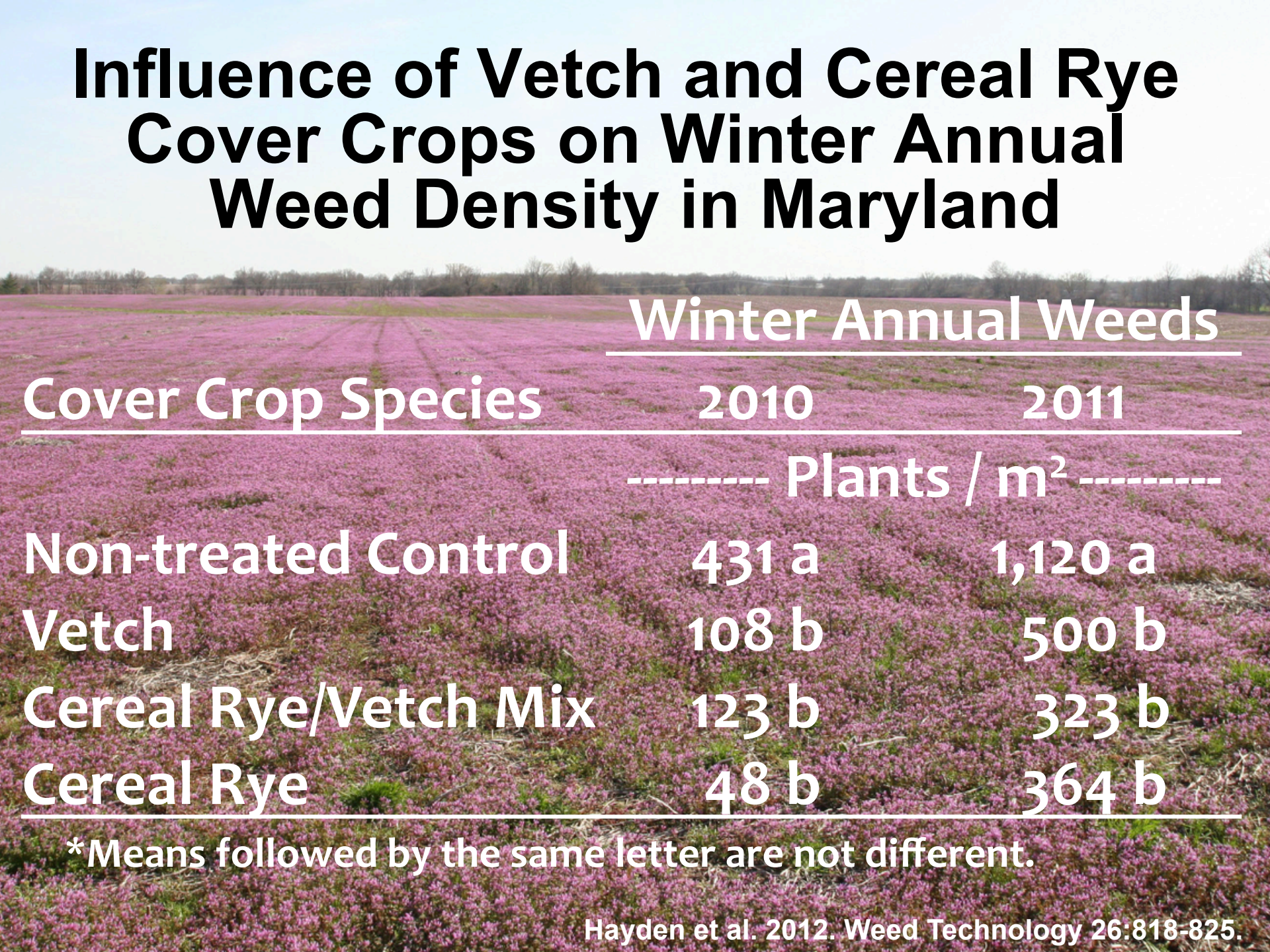
Influence of Cover Crops vs. Herbicide Treatments on Cumulative Winter Annual Weed Density

(results summarized across 9 site-years in Missouri)



*Bars followed by the same letter are not different, $LSD_{0.05}$

Influence of Vetch and Cereal Rye Cover Crops on Winter Annual Weed Density in Maryland



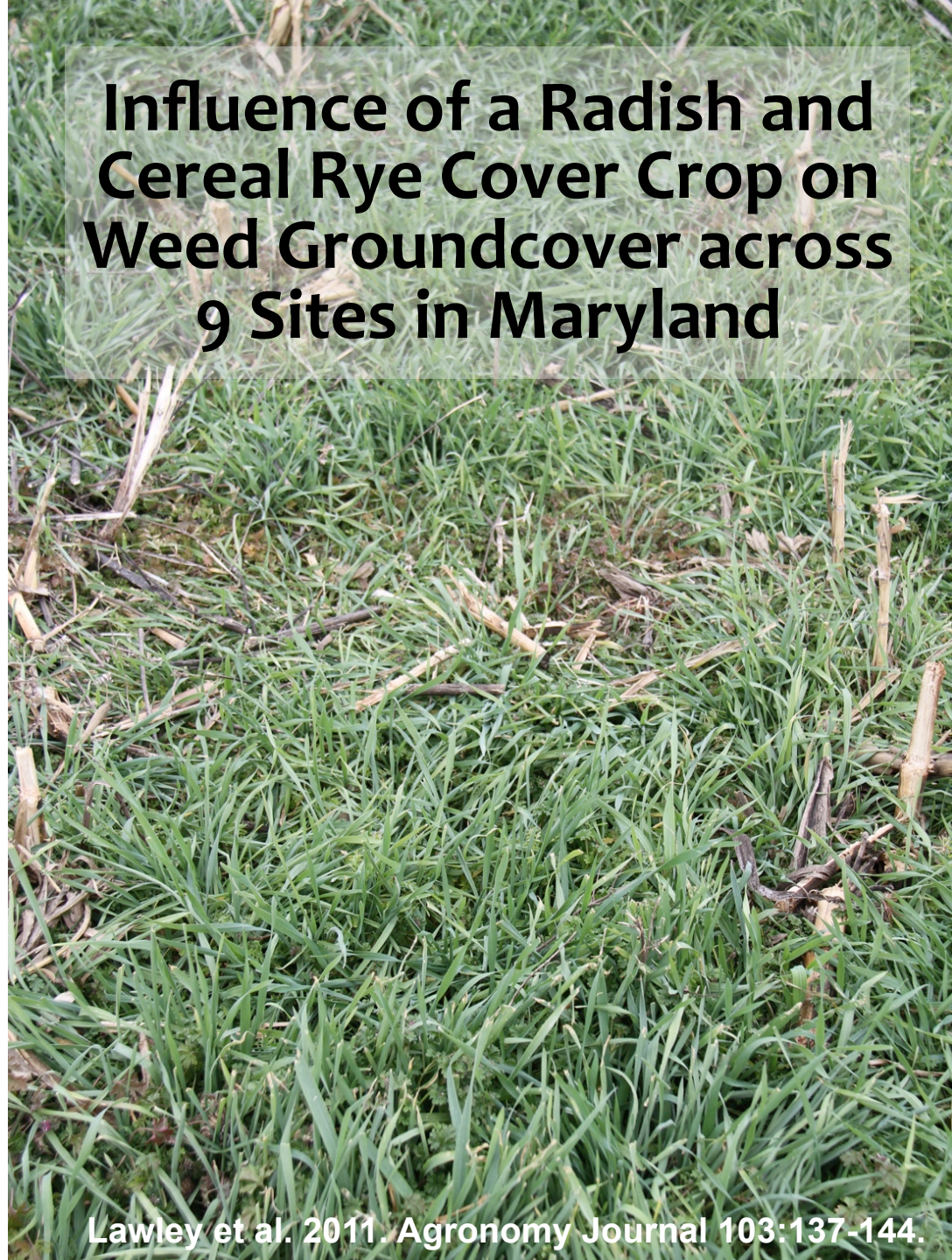
Cover Crop Species	Winter Annual Weeds	
	2010	2011
	----- Plants / m ² -----	
Non-treated Control	431 a	1,120 a
Vetch	108 b	500 b
Cereal Rye/Vetch Mix	123 b	323 b
Cereal Rye	48 b	364 b

*Means followed by the same letter are not different.

Location	Field	Percentage of ground covered by weeds		
		Forage radish	No cover crop	Rye
		%		
		<u>Late fall</u>		
BARC-NF	A	0b	40a	—
	B	0b	83a	—
	C	0b	24a	—
BARC-SF	D	0c	78a	—
	E	0c	94a	10b
	F	0b	96a	0b
	G	0b	94a	0b
CMREC	I	0b	8a	0b
WREC	J	0b	47a	0b
		<u>Late March</u>		
BARC-NF	A	0b	84a	—
	B	1b	39a	—
	C	0b	71a	—
BARC-SF	E	0c	71a	7b
	F	3b	99a	1b
	G	1b	97a	0b
CMREC	H	22b	53a	4c
	I	0b	22a	0b
WREC	J	2b	55a	0b
		<u>Typical time of corn planting</u>		
BARC-NF	A	37c	95a	—
	B	19	—†	—
	C	11b	87a	—
BARC-SF	E	3	—†	—†
	F	37ab	75a	0b
	G	11	—†	—†
CMREC	H	63	—†	—†
	I	4	—†	—†

† Weeds sprayed with herbicides before typical time of corn planting.

Influence of a Radish and Cereal Rye Cover Crop on Weed Groundcover across 9 Sites in Maryland

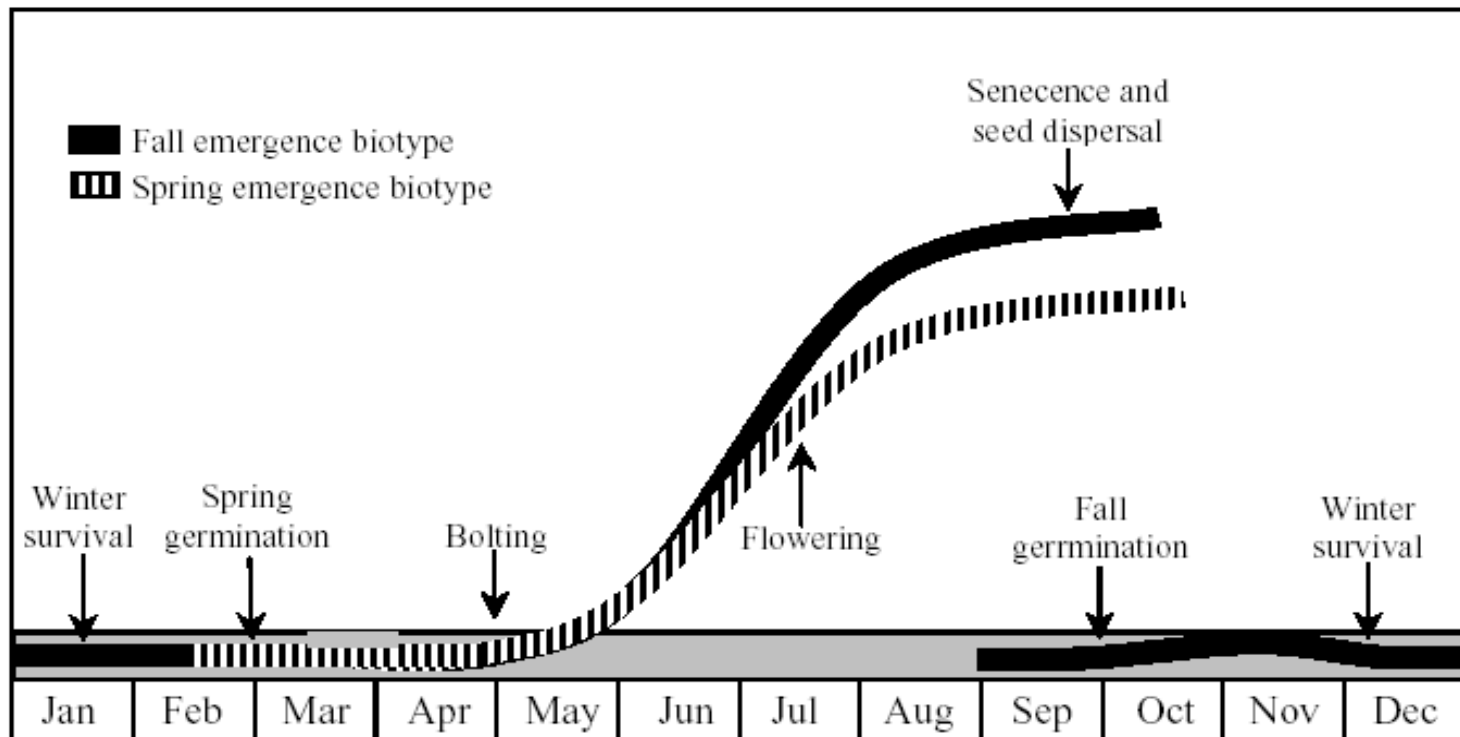


Lawley et al. 2011. Agronomy Journal 103:137-144.

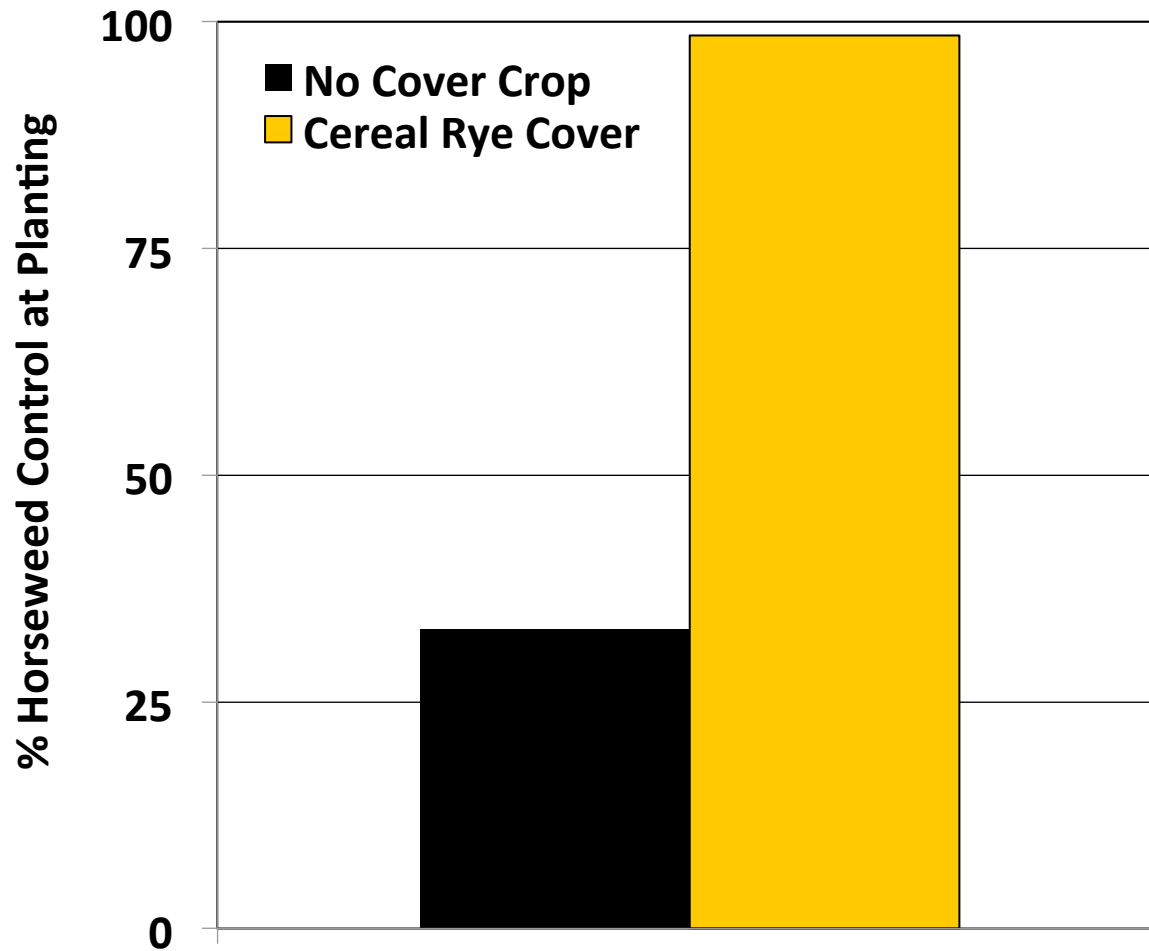
Successful cover crop establishment will prevent the emergence of horseweed (a.k.a. marestail), one of the most widespread glyphosate-resistant weeds in the U.S.



Horseweed Life Cycle



Integration of a Cereal Rye Cover Crop for the Control of Glyphosate-resistant Horseweed/Marestail



My Perspective

Based on our research and the results of other published studies, the ability of cover crops to reduce the emergence of **SUMMER ANNUAL** weed species is determined by the:

1. Cover crop species selected
2. Amount of cover crop biomass accumulated
3. Time of cover crop termination/rate of cover crop decay
4. Type of weed species

My Perspective

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All cover crops should not be viewed equally...

- Consider how easy or difficult it might be to terminate the cover crop you select.
- Consider the “weediness” potential of the cover crop you select.

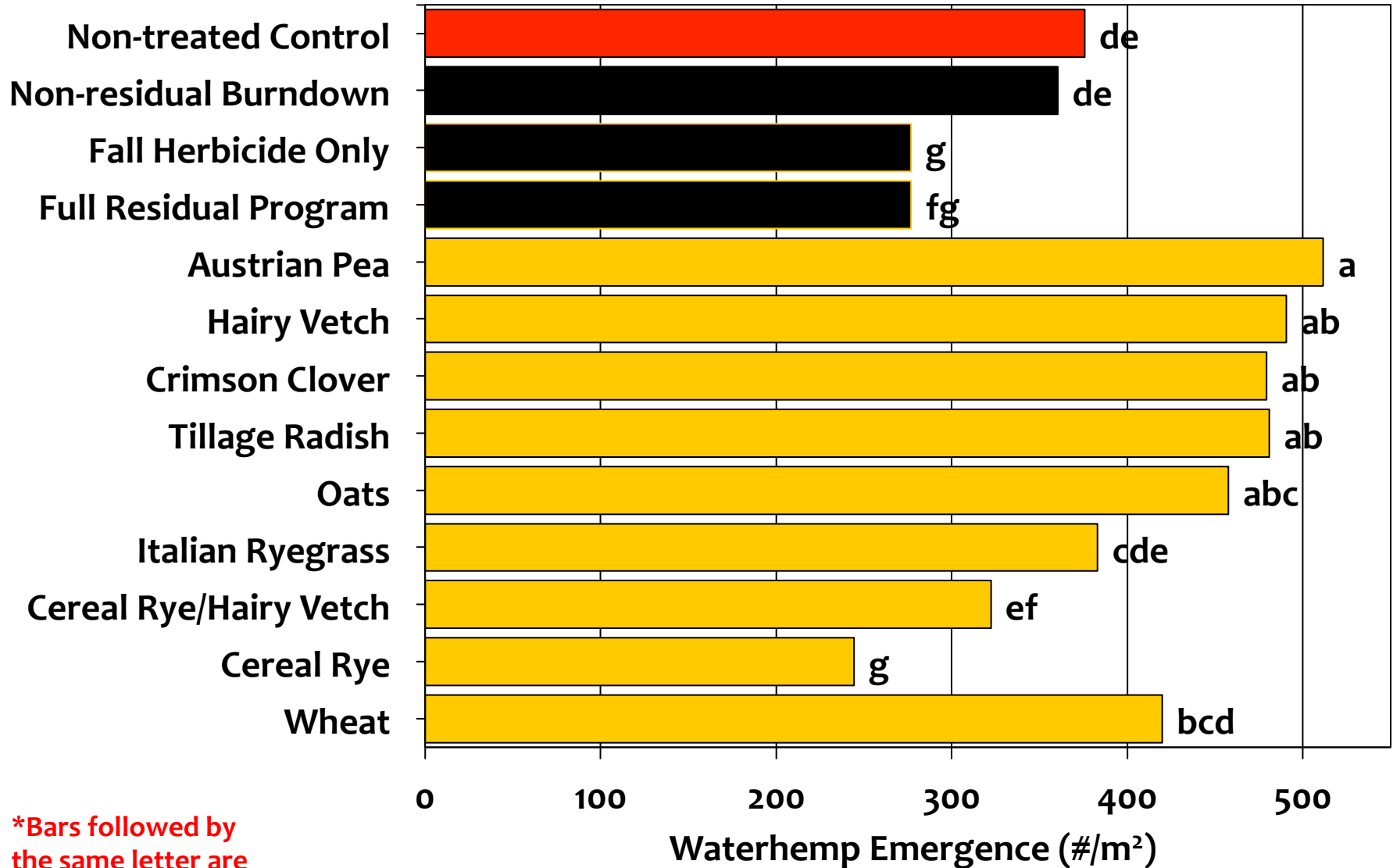
All cover crops should not be viewed equally...

Consider what kind of summer annual weed control you can get out of cover crops that will winter kill.



Influence of Cover Crops vs. Herbicide Treatments on Early Season Waterhemp Emergence

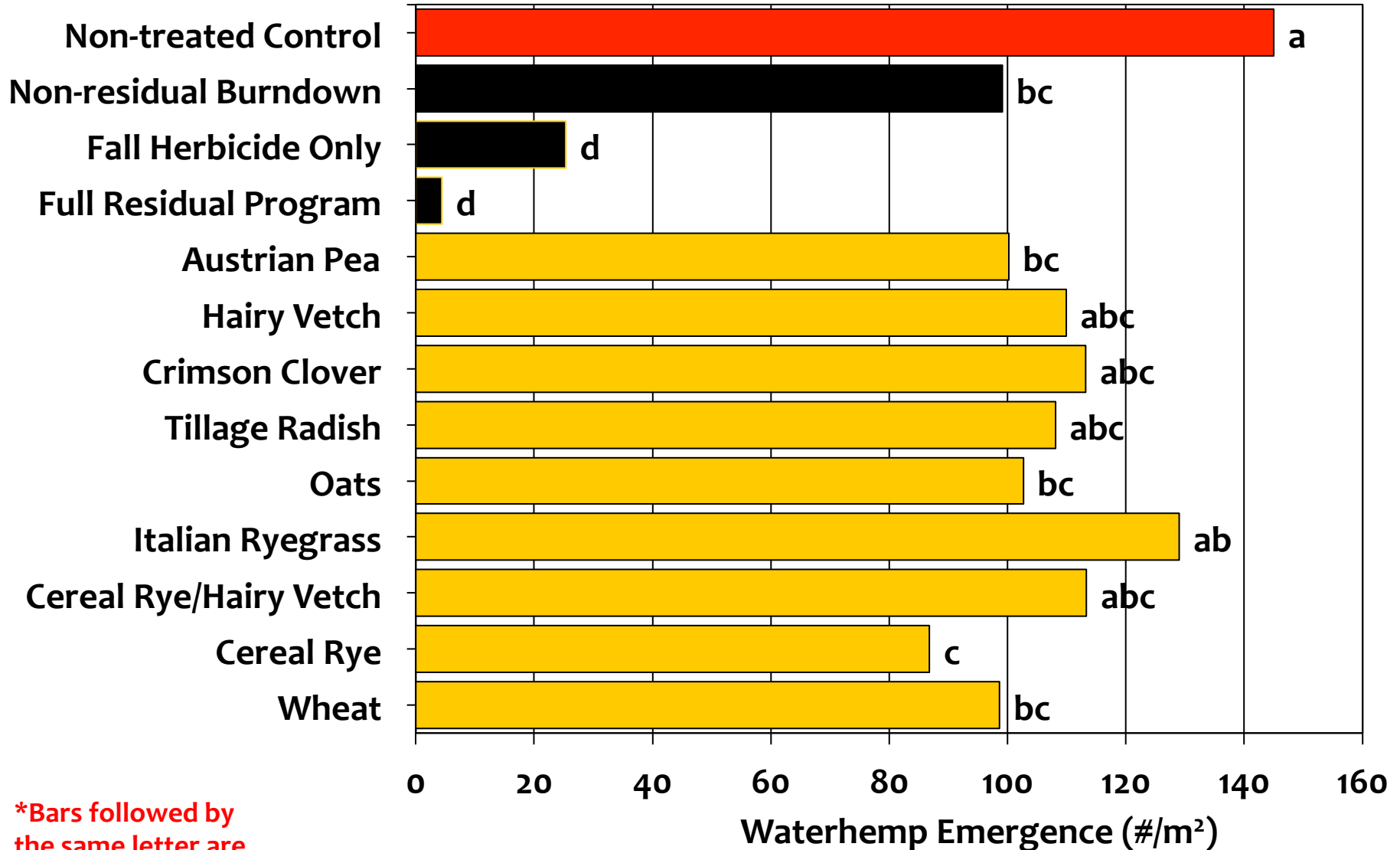
(results summarized across 9 site-years in Missouri)



*Bars followed by the same letter are not different, LSD_{0.05}

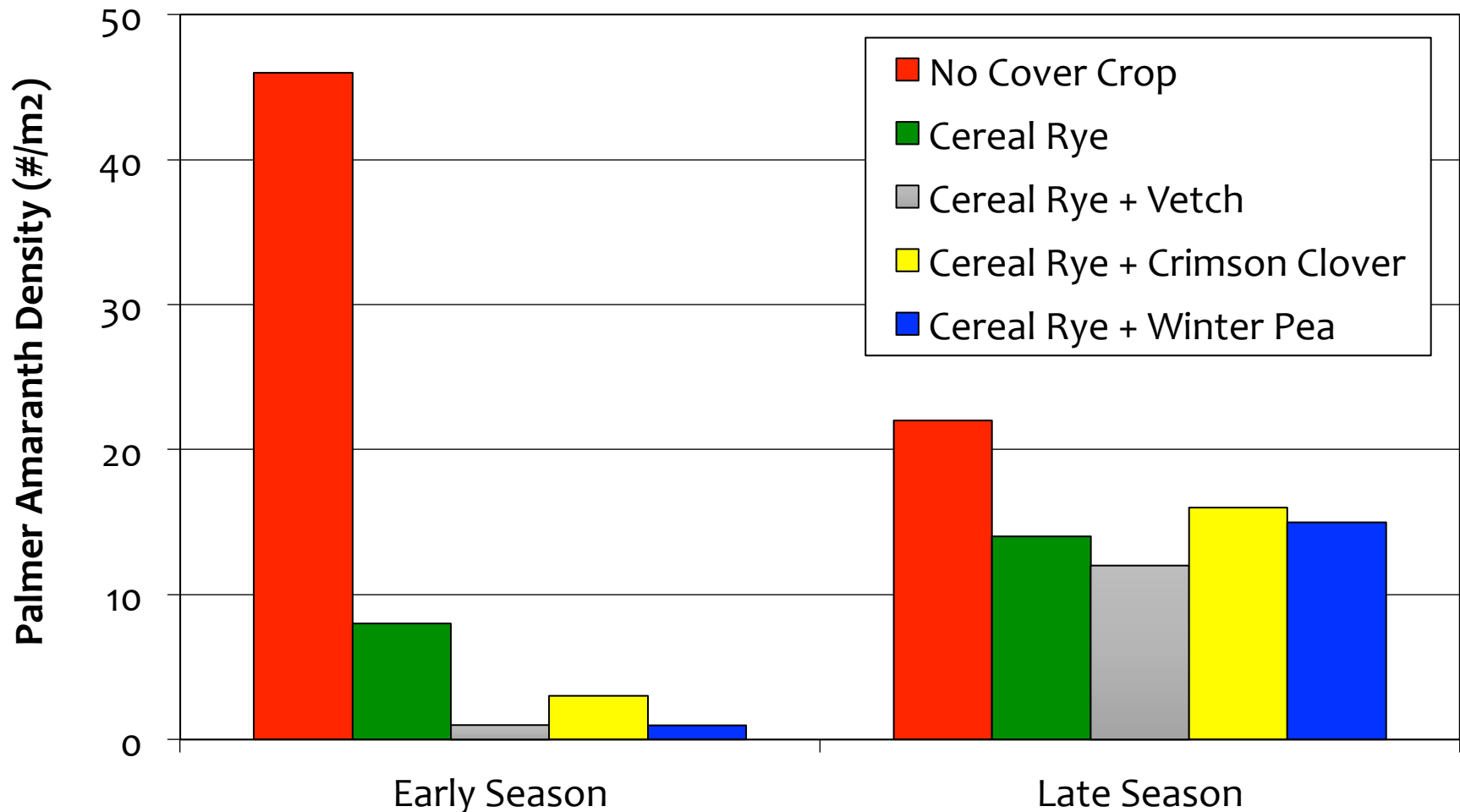
Influence of Cover Crops vs. Herbicide Treatments on Late Season Waterhemp Emergence

(results summarized across 9 site-years in Missouri)

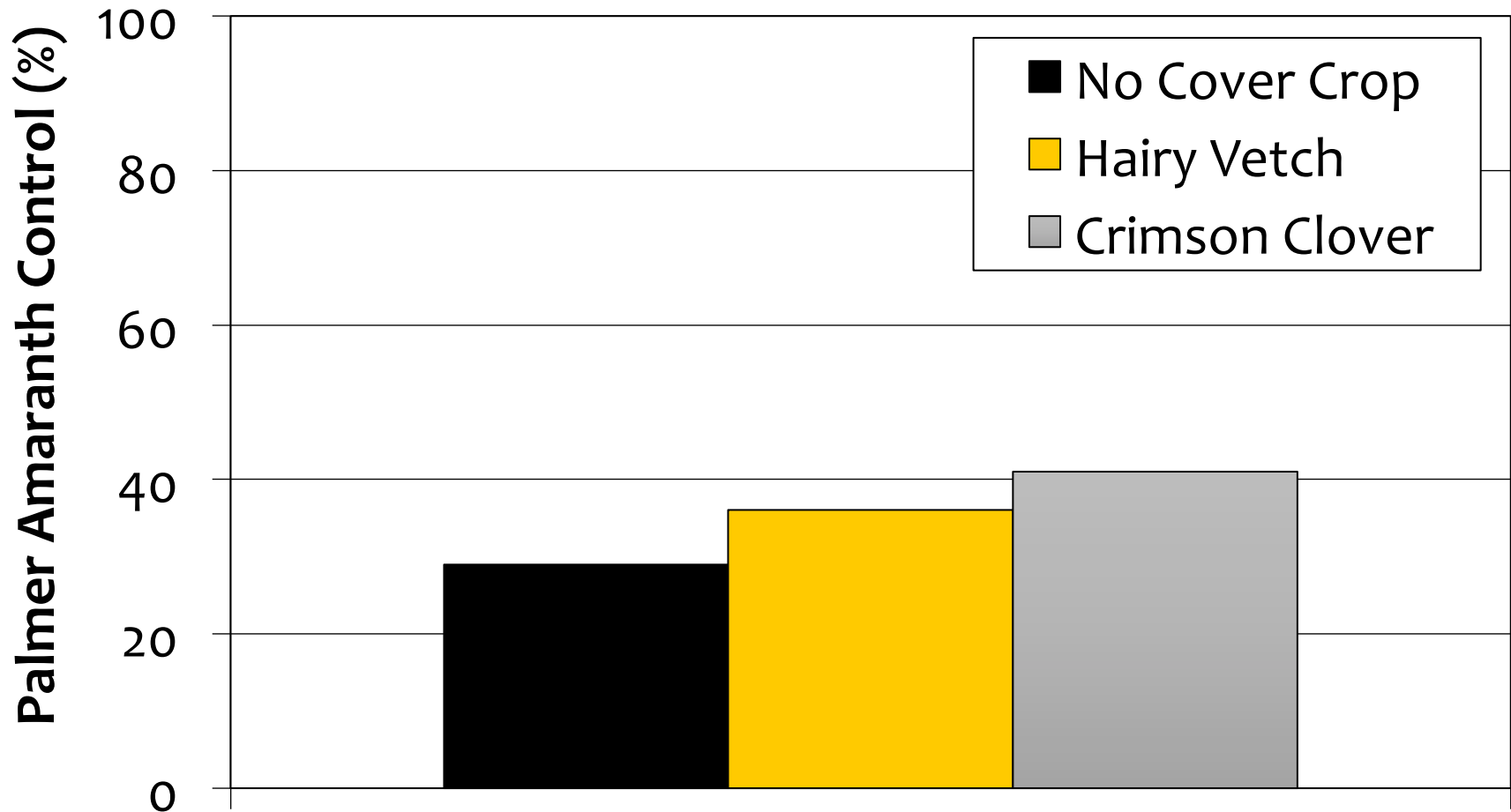


*Bars followed by the same letter are not different, $LSD_{0.05}$

Influence of Cover Crops on Palmer Amaranth Emergence in Georgia



Influence of Cover Crops on Palmer Amaranth Control Prior to Corn Planting

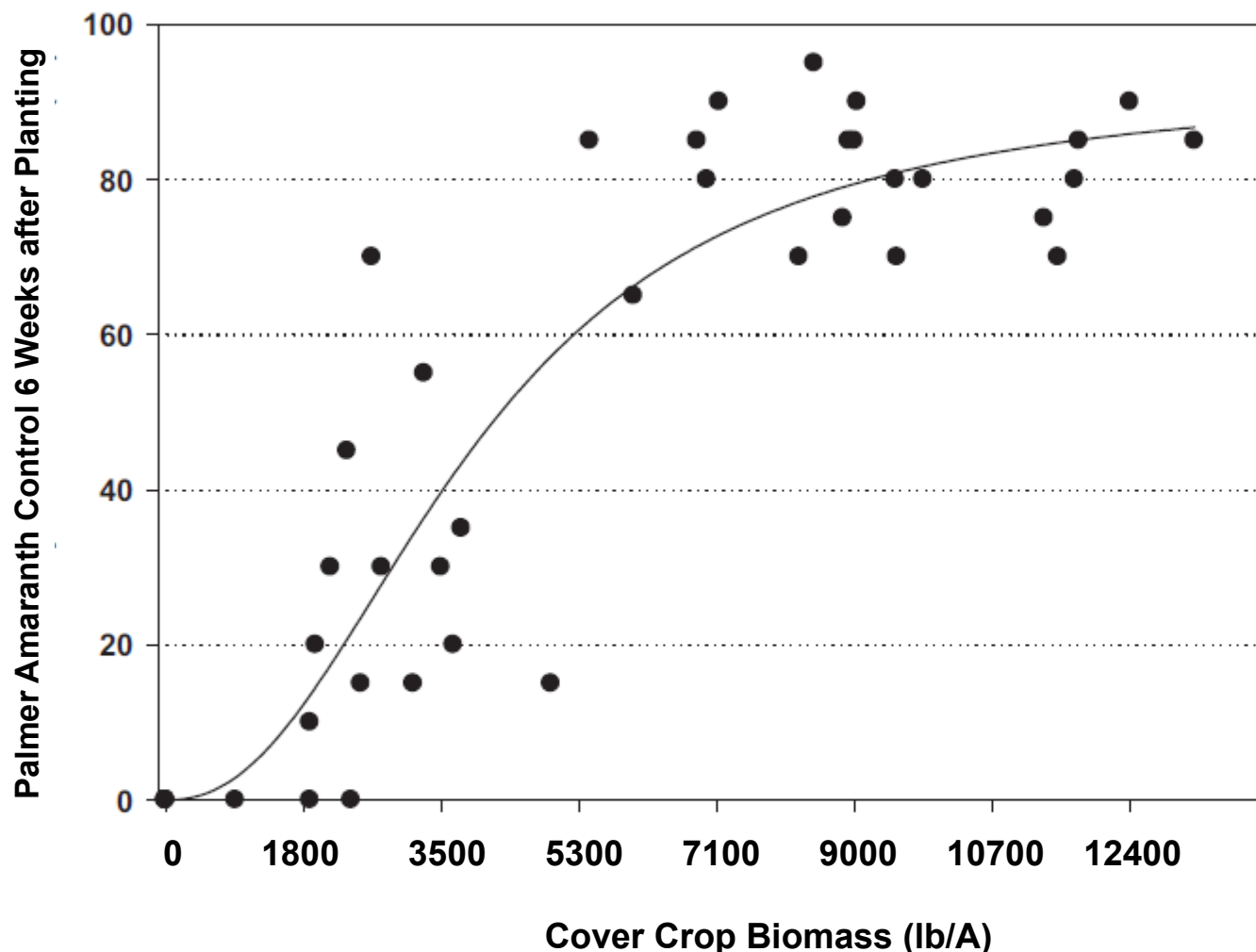


My Perspective

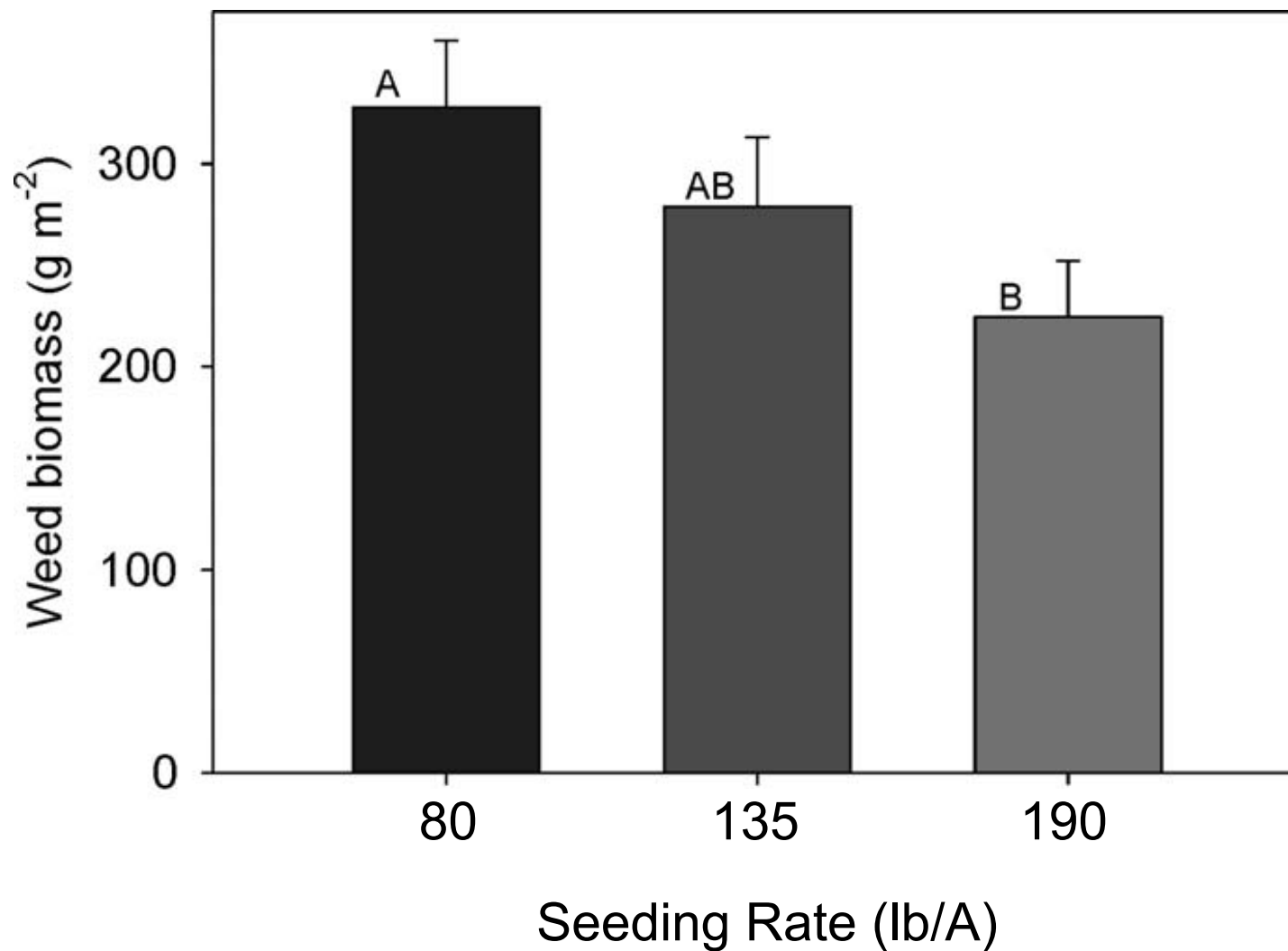
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4. Type of weed species

Relationship Between Rolled Cover Crop Biomass and Pigweed Control After Planting



Influence of Cereal Rye Seeding Rate on Weed Biomass 10 Weeks after Cereal Rye Termination



Which situation will provides more opportunity for summer annual weed emergence?



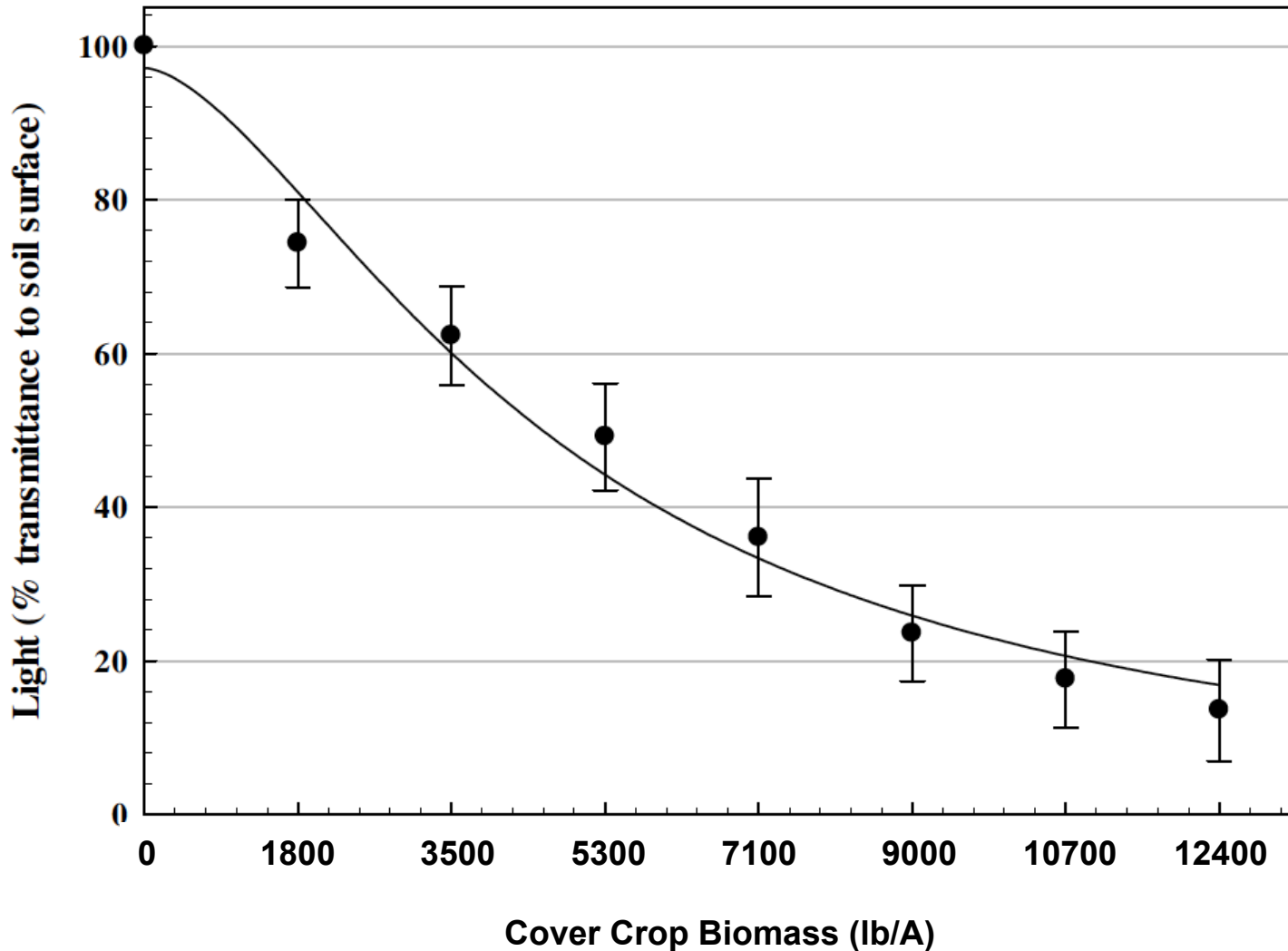
No Cover Crop



Cereal Rye

Glyphosate + 2,4-D applied 14 days previous

Relationship Between Rye Residue Levels and the Amount of Sunlight Reaching the Soil Surface

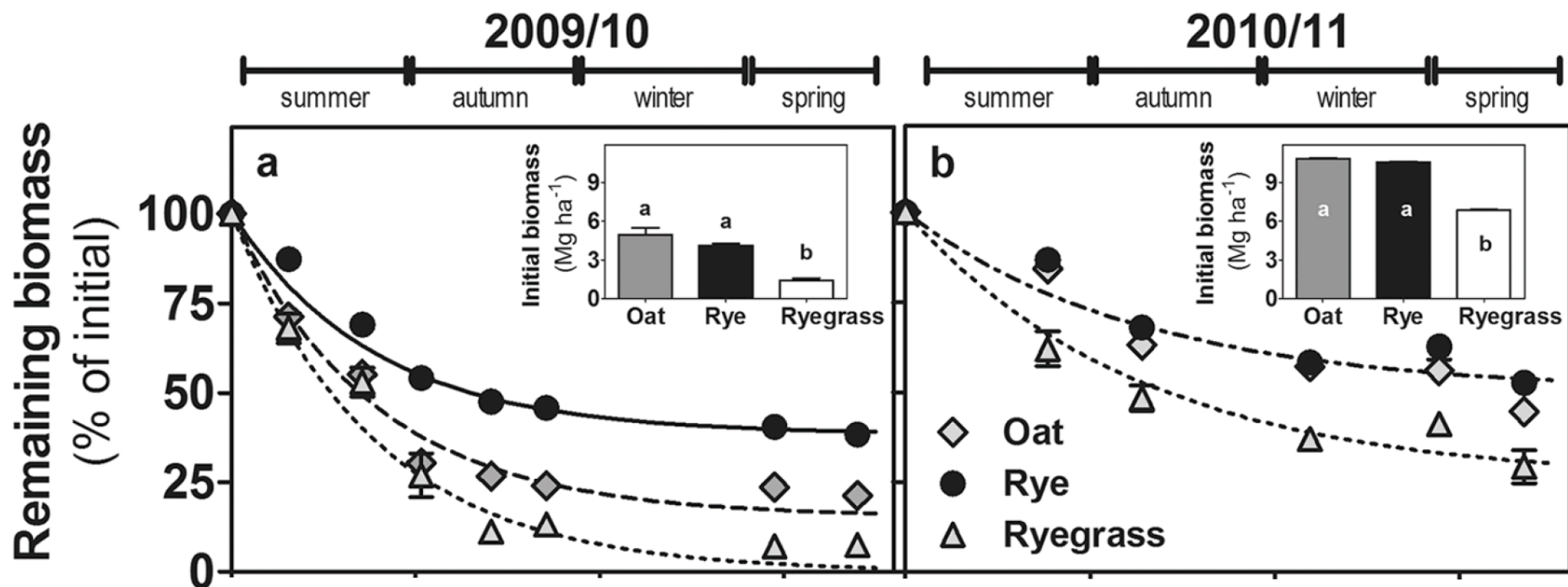


My Perspective

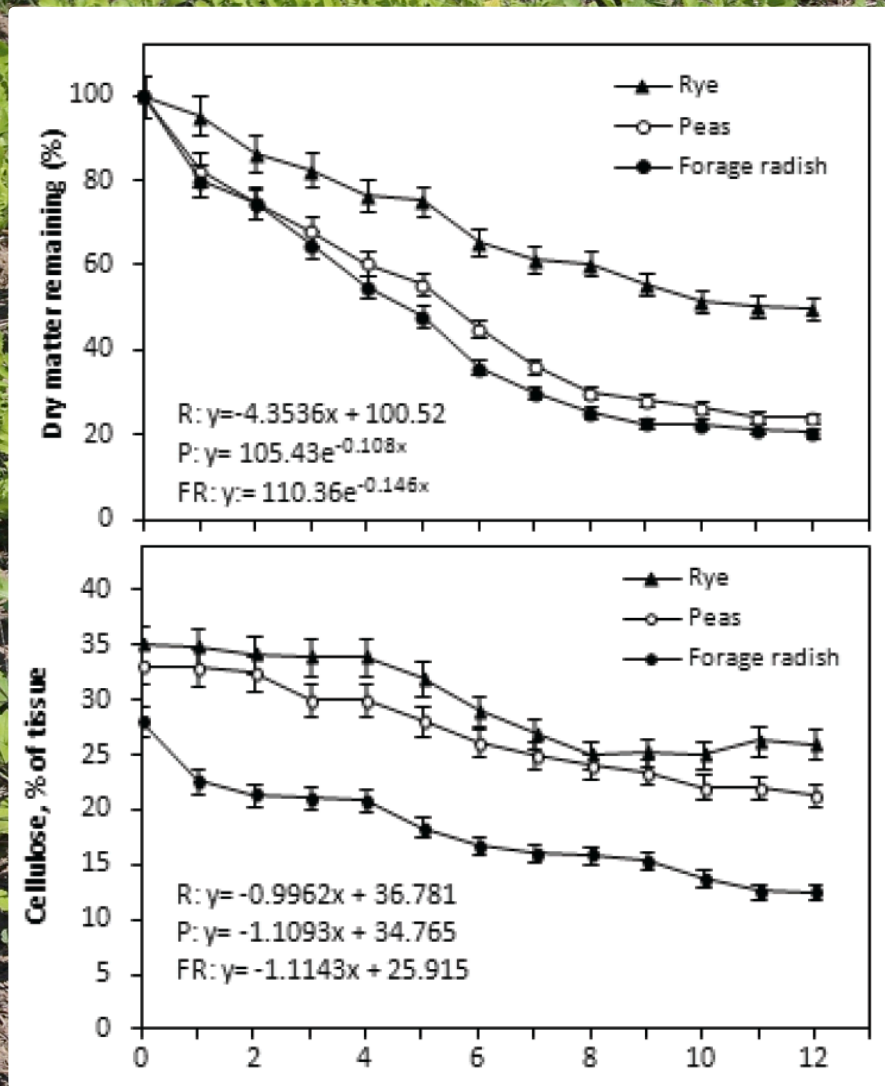
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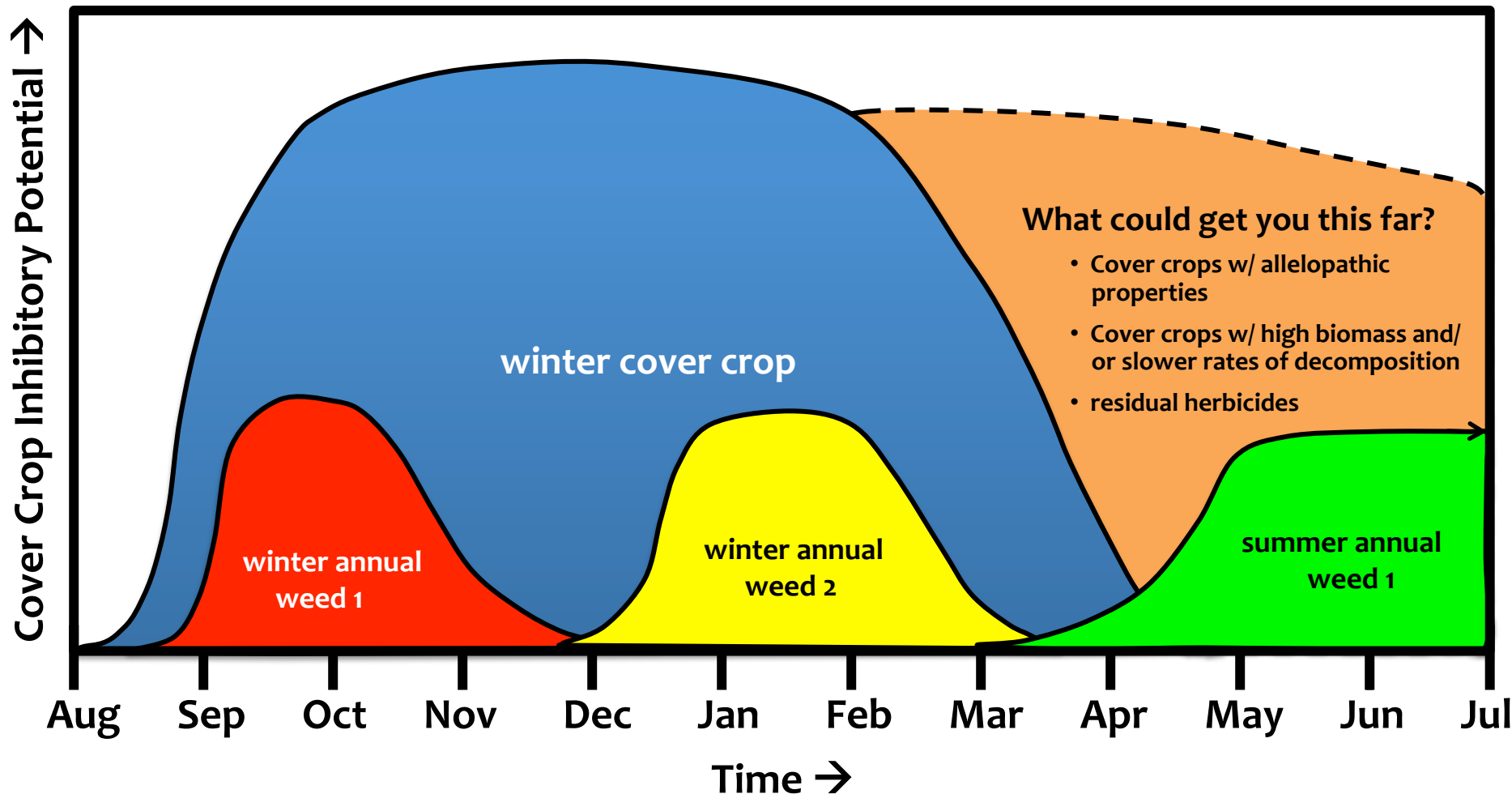
The rate of cover crop decomposition will be directly related to the weed control you get...



The rate of cover crop decomposition will be directly related to the weed control you get...



Relationship Between Inhibitory Potential of Cover Crops and Various Weed Species

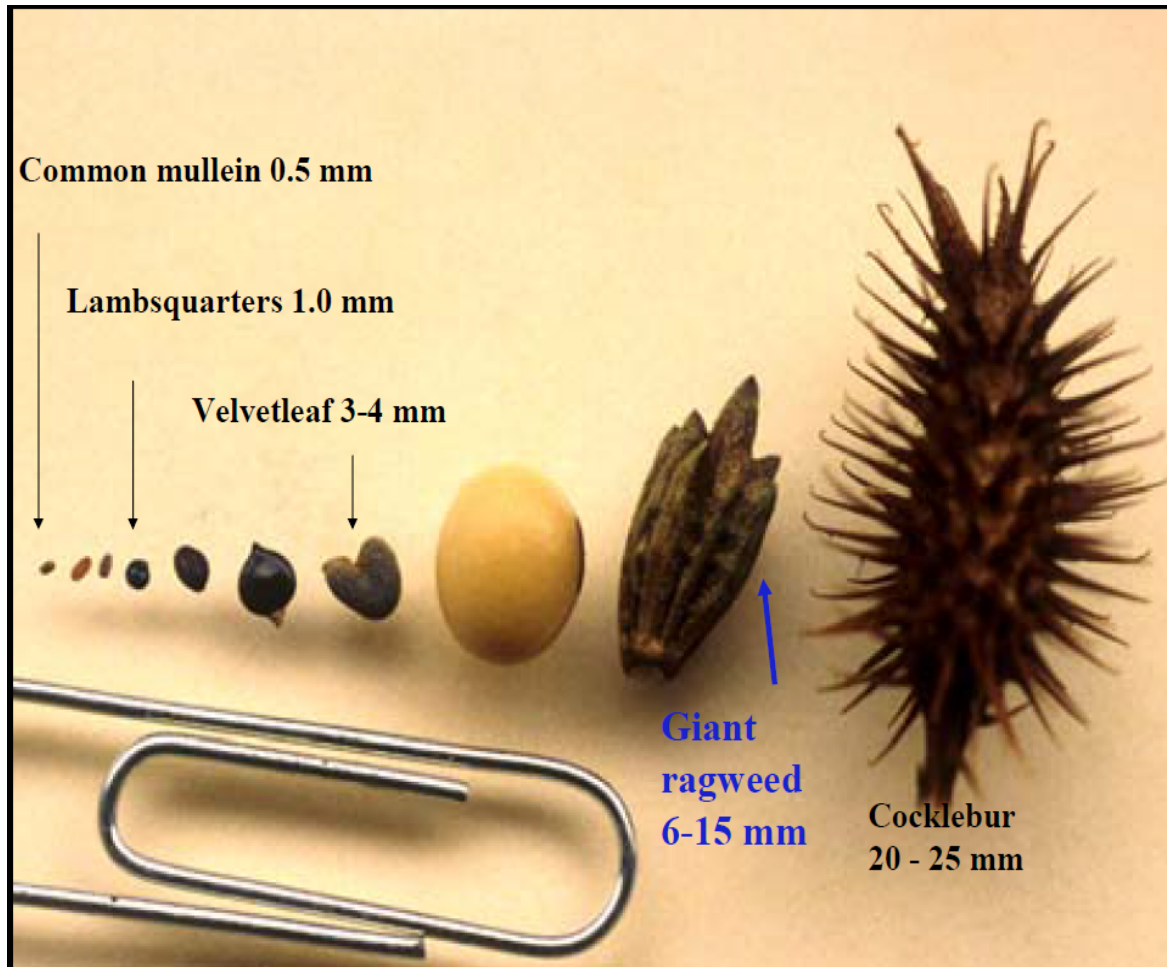


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Different Weed Seeds are Affected Differently by: soil cover, light, temperature, soil depth, etc.

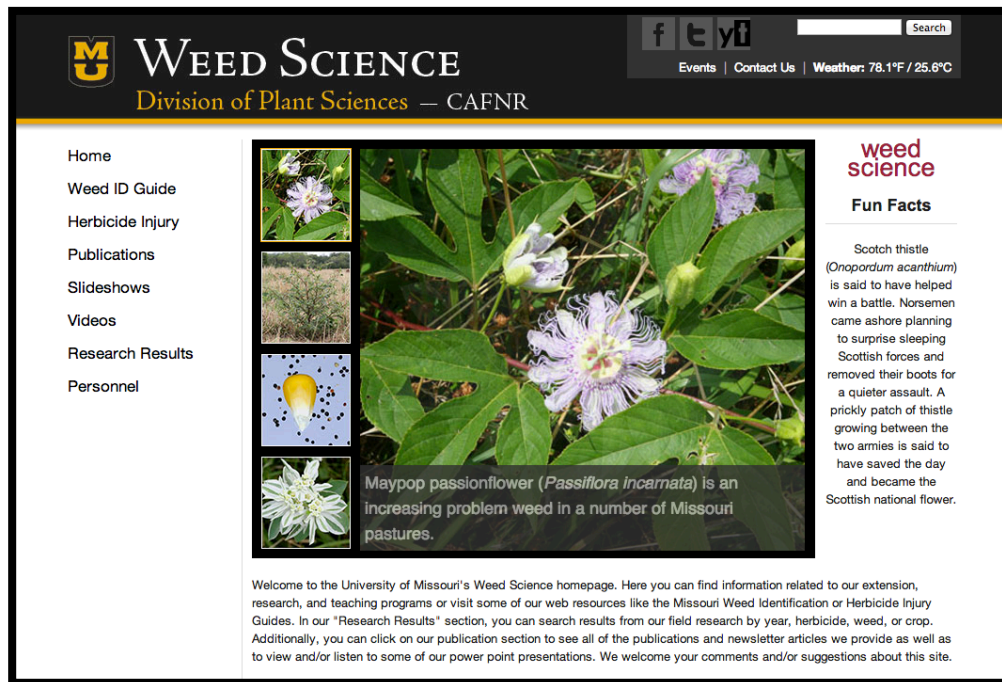


- We have seen greater success of cover crops on small-seeded broadleaf weeds and grasses
- Much less on larger-seeded broadleaf weeds like cocklebur and giant ragweed

Mizzou® Weed science

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