

Effect of Field Pests on the Quality of Rice

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Effects of Pests on Rice Quality

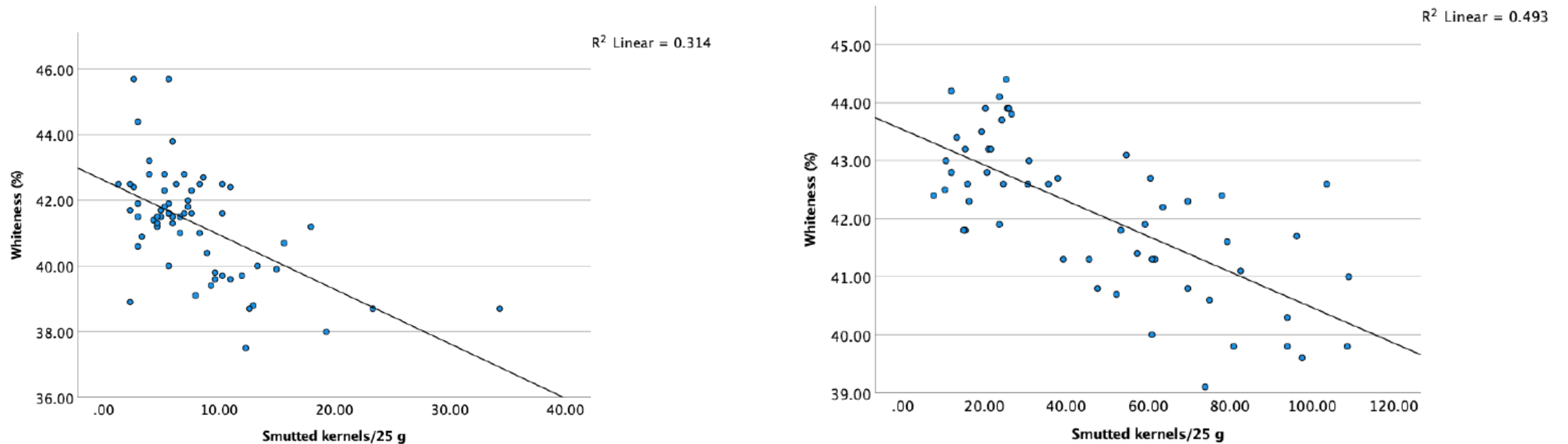
- Direct effects
 - Kernel smut
 - Discolored grains
 - Reduction of milling yield (MY) and head rice yield (HRV)
 - Weedy rice
 - Contamination
 - Reduction of HRV
- Indirect effects
 - Blast, tiller diseases
 - Reduction of HRV
 - Rice water weevil, rice seed midge, tadpole shrimp, armyworms
 - Premature or delayed maturity

Kernel Smut



Kernel Smut

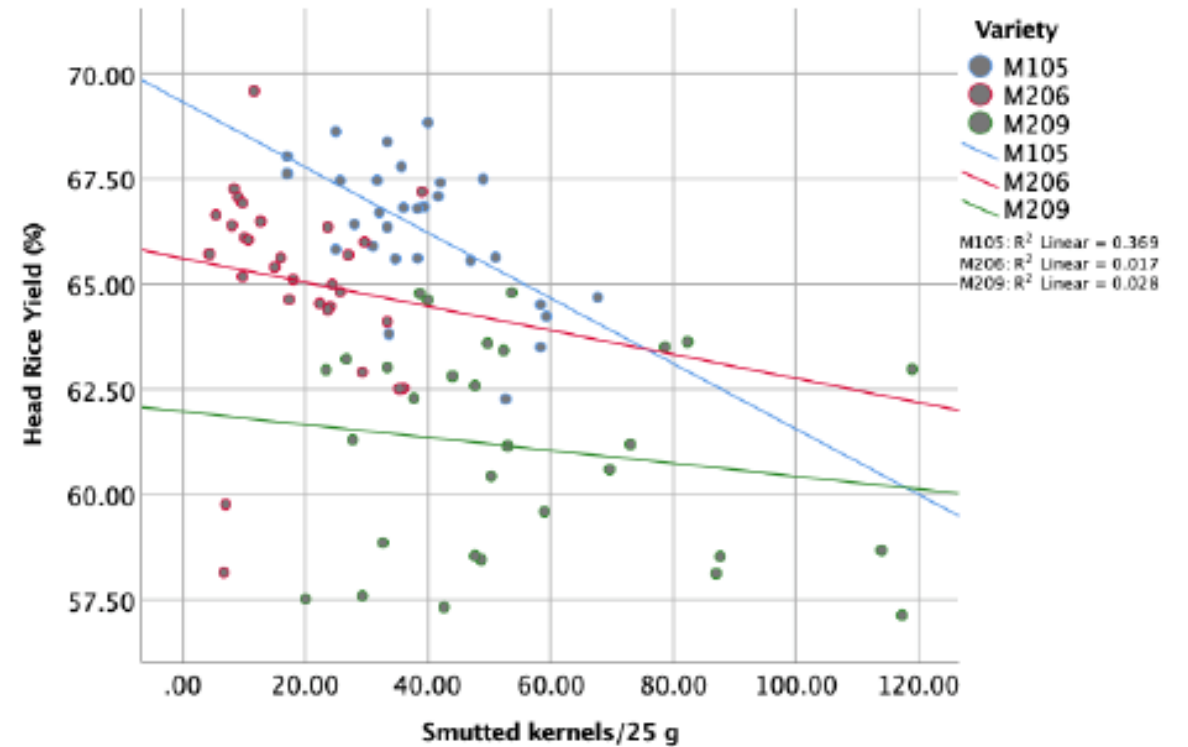
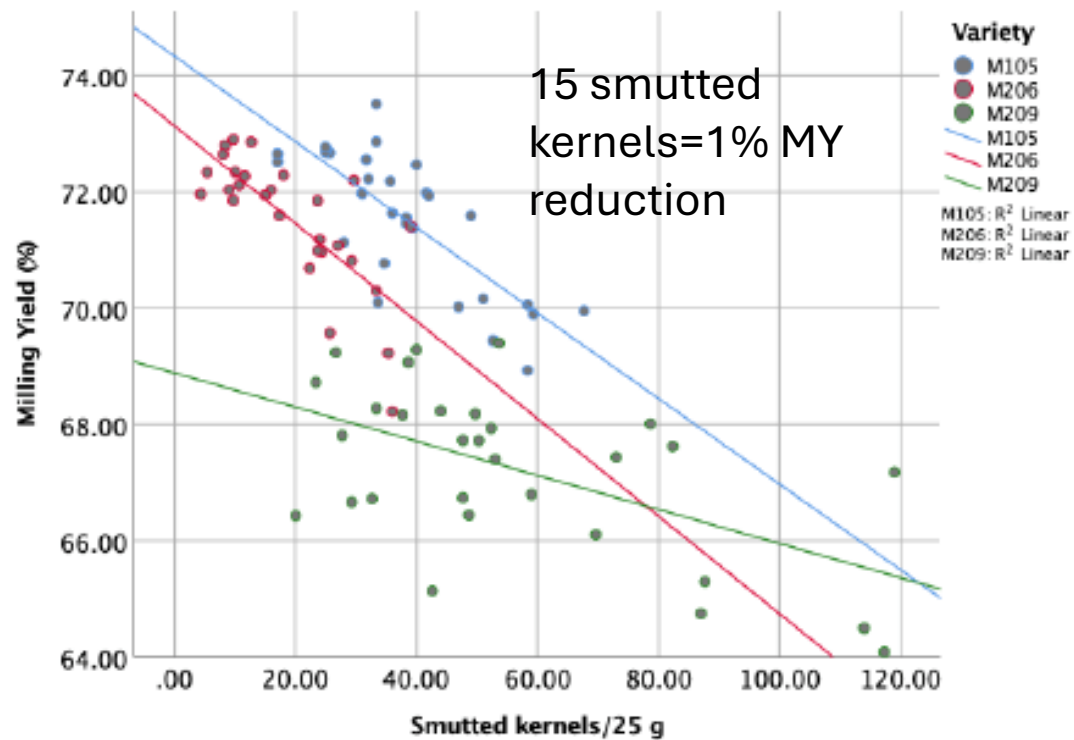
- Reduction of milled rice whiteness



A-201, Butte County, 2020

Kernel Smut

- Reduction of MY, smaller effect on HRY



Kernel Smut Management

- Variety
 - Long grain > medium grain > short grain
 - M-209 and M-211 most susceptible
- Nitrogen
- Propiconazole at mid to late boot

Weedy Rice (Red Rice)

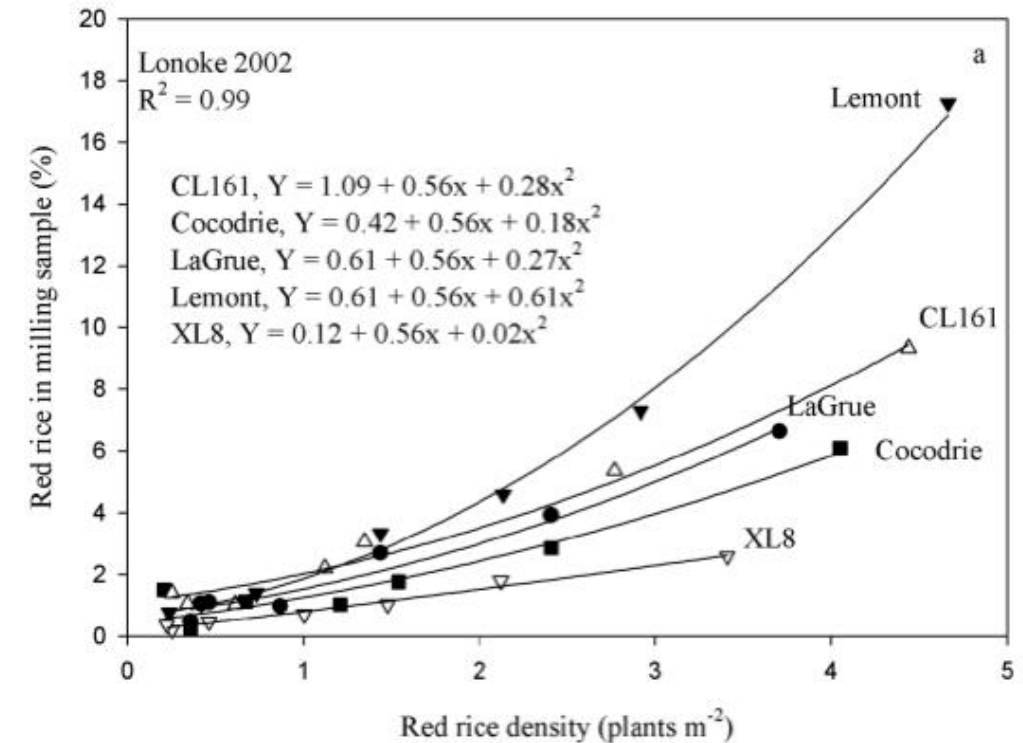


Weedy Rice Contamination

GRADES, GRADE REQUIREMENTS, AND GRADE DESIGNATIONS

§868.210 Grades and grade requirements for the classes of Rough Rice. (See also §868.212.)

Grade	Maximum limits of ---							Color requirements (minimum)
	Seeds and heat-damaged kernels			Red rice and damaged kernels (singly or combined) (Percent)	Chalky kernels ,		Other types (Percent)	
	Total (singly or combined) (Number in 500 grams)	Heat-damaged kernels and objectionable seeds (singly or combined) (Number in 500 grams)	Heat-damaged kernels (Number in 500 grams)		In long grain rice (Percent)	In medium or short grain rice (Percent)		
U.S.No. 1	4	3	1	0.5	1.0	2.0	1.0	Shall be white or creamy.
U.S.No. 2	7	5	2	1.5	2.0	4.0	2.0	May be slightly gray.
U.S.No. 3	10	8	5	2.5	4.0	6.0	3.0	May be light gray.
U.S.No. 4	27	22	15	4.0	6.0	8.0	5.0	May be gray or slightly rosy.
U.S.No. 5	37	32	25	6.0	10.0	10.0	10.0	May be dark gray or rosy.
U.S.No. 6	75	75	75	15.0 ^d	15.0	15.0	10.0	May be dark gray or rosy.



Ottis et al. 2005, Arkansas

Weedy Rice Effect on HRY

Table 1. Effect of CaO₂, molinate, and R-33865 applications on rice and red rice, 1982 and 1983^a.

Treatments			Culms		Total rice grain yield	Red rice grains in rough rice	White rice grain yield ^b	Head rice yield
CaO ₂	Molinate	R-33865	Rice	Red rice				
(% w/w)	(kg/ha)	(% v/w)	— (no./m ²) —		(kg/ha)	(%)	(kg/ha)	(%)
40	0	0.0	261 a	120 c	5200 ab	25 cde	4130 abc	63 bc
40	0	0.5	173 b	132 bc	3950 bc	49 abcd	2190 cd	60 bcd
40	0	1.0	31 cd	146 bc	2810 c	61 abc	1010 d	52 e
40	6.7	0.0	211 b	7 d	5690 a	4 e	5480 a	64 ab
40	6.7	0.5	184 b	7 d	6030 a	4 e	5850 a	63 ab
40	6.7	1.0	64 c	16 d	3900 bc	7 e	4480 ab	60 bcd
0	0	0.0	10 d	185 abc	3160 c	74 a	880 d	55 de
0	0	0.5	14 cd	226 a	2720 c	67 a	880 d	52 e
0	0	1.0	51 cd	192 ab	4020 bc	65 ab	1740 d	56 cde
0	6.7	0.0	20 cd	6 d	2680 c	9 e	2410 cd	63 ab
0	6.7	0.5	37 cd	2 d	2740 c	19 de	2370 cd	60 bcd
0	6.7	1.0	51 cd	3 d	3050 c	30 bcde	2640 bcd	68 a

^aValues are for the triple-order interaction of CaO₂ by molinate by R-33865. In the same column, means followed by the same letters do not differ significantly at the 5% level according to Duncan's multiple range test.

^bCalculated by subtracting the weight of red rice from the total rice grain yield.

Diarra et al., 1985, Arkansas

Weedy Rice Management

- Use certified seed
- Roguing
- Managed fallow
- Crop rotation



What is weedy rice?

Weedy rice, also known as red rice, is a plant that belongs to the same genus and species as cultivated rice. In other words, it is a very close relative of cultivated rice. Because of this, the herbicides we use in rice do not kill it.

Why is weedy rice a problem?

Weedy rice is one of the most damaging weeds of rice worldwide. It can affect yield and quality significantly. Reports from the southern US show that yields can be reduced by 60%.

How extensive is the weedy rice problem in California?

California was practically free of weedy rice for the past 50 years but the weed has recently resurfaced. By 2021, over 3000 acres have been found infested.

What should I do if I suspect I have weedy rice in my field?

Follow the identification guidelines in this handout to rule out weedy rice.

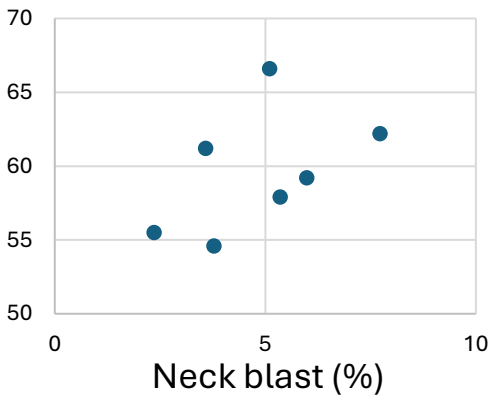
Blast



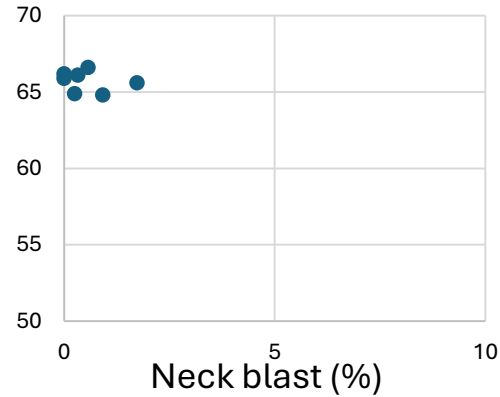
Blast

- Reduction of Head Rice Yield (%)
- Blast Trial, Glenn and Colusa Counties, 1998

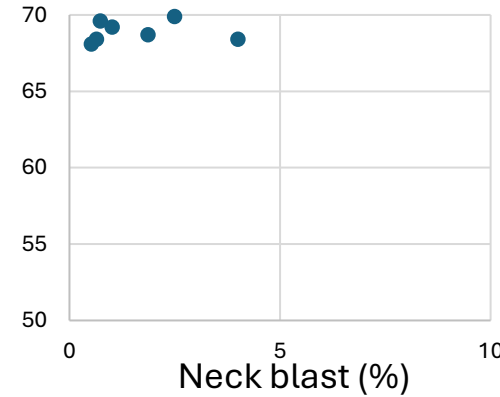
Trial 1



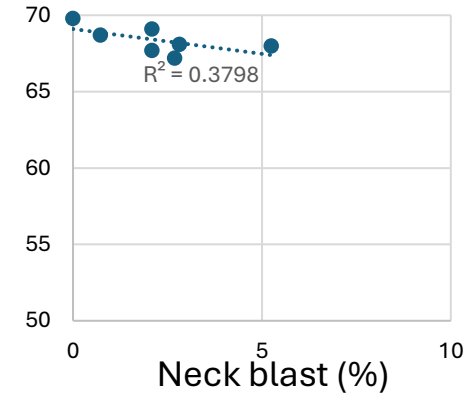
Trial 2



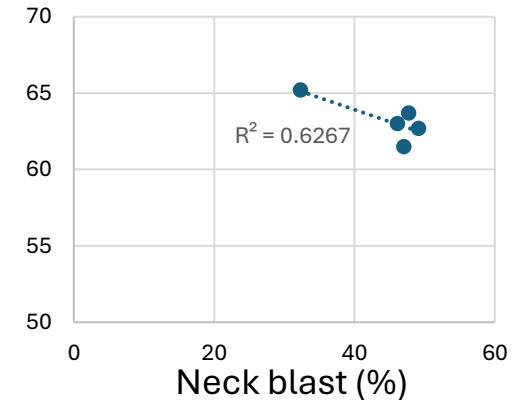
Trial 3



Trial 4



Trial 5



- Neck blast reduced HRY 2 to 4 percentage points

Blast - Reduction of Head Rice Yield (%)

Table 14 - Evaluation of commercial application of Quadris for control of rice blast - Site 4 - Colusa County -1997.

Treatment	Percent ¹ Neck Blast	Yield ² (lbs/Ac)	% Total ³ Rice	% Head ³ Rice	% Infested ⁴ Seed
Untreated	78.00 a	7176 a	63	12	24.2 a
0.2 lbs a.i./Ac at 70-90% heading	23.99 b	7900 b	65	29	5.6 b
LSD (P = 0.05)	11.2	654.9			2.73
Cultivar M-204					

Neck blast reduced HRY 17 percentage points

Tiller diseases

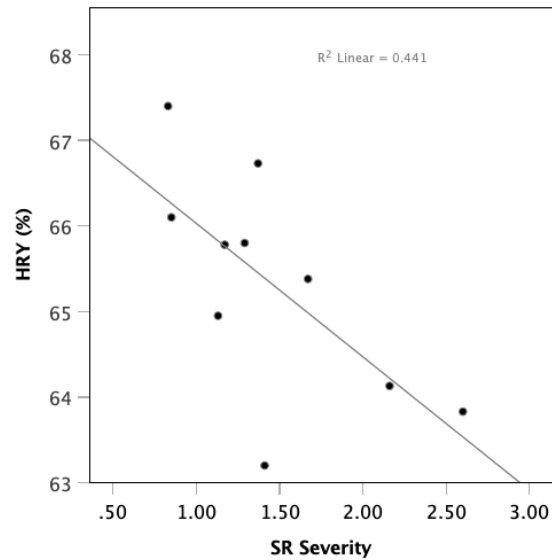
Aggregate sheath spot



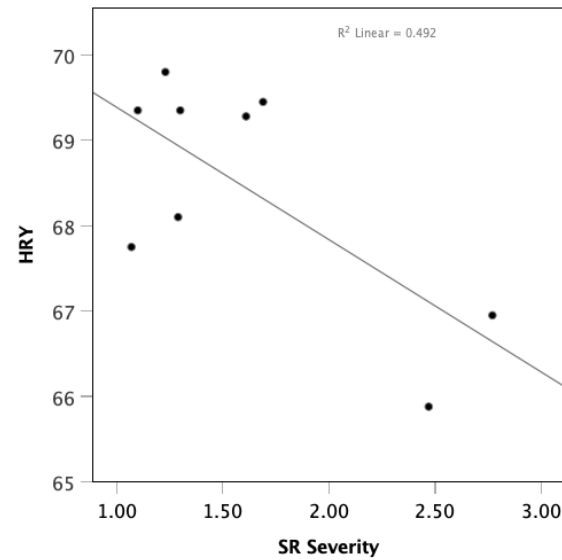
Stem Rot

Tiller diseases

- Limited effect of SR or AGSS on HRY
 - Out of 27 trials conducted between 2018 and 2023, in only two HRY was affected



M-206, Yuba County, 2023



M-206, Yolo County, 2023

Blast and Tiller Diseases Management

- Residue management
- Nitrogen and potassium management
- Variety
 - M210 and M521 blast resistant
 - Early varieties more susceptible to stem rot
- Azoxystrobin at late boot, early heading

Other pests that may affect quality

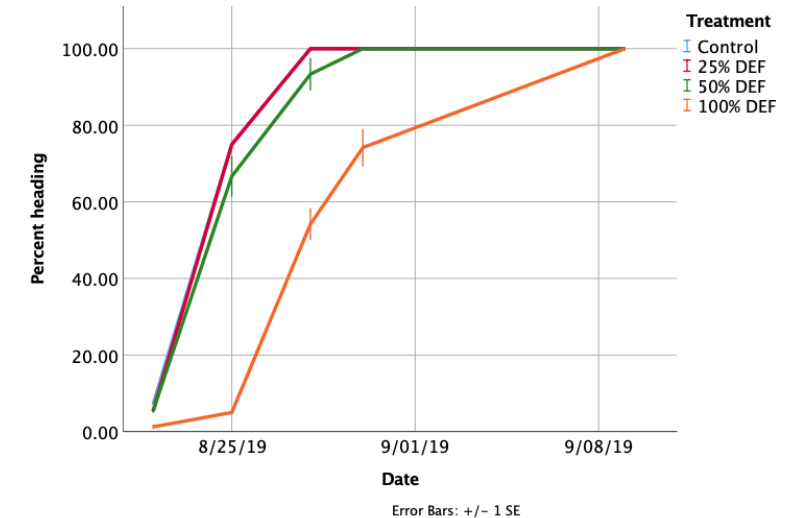
- Premature or delayed maturity



Rice seed midge, tadpole shrimp



Rice water weevil



Armyworms