Rice Notes
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In This Issue

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California Rice Industry Loses Longtime Colleague, Dr. Albert Fischer

We are sad to report the passing of our friend and colleague, Dr. Albert Fischer. Albert was a huge part of the rice industry and community for many years, leading the Weed Science program at the Rice Experiment Station from 1997 to 2016.

Albert joined the faculty at UC Davis in 1997, as a Professor of Weed Ecophysiology, and held the Melvin D. Androus Endowed Professorship for Rice Weed Control. He contributed greatly to the rice industry over his 18-year career, assisting in the research and registration for several key herbicides including Cerano, Regiment, Granite, Shark and many others. He identified herbicide resistance soon after growers began reporting it in fields in the late 1990's and worked tirelessly to come up with creative solutions to combat it. His work is still having impacts on rice today. He began work on the research that resulted in the registration of Butte, and he started the oxyfluorfen research with Dr. Kent McKenzie that served as the foundation for the development of Roxy rice.

Aside from his research efforts, Albert also mentored many students and post-doctoral scholars over the years, many of whom are now leaders in the rice industry themselves, both in California as well as in the southern United States and even internationally.

UC Davis recently published an article (link) about Albert's life. If you would like to send a message to the Fischer family, you can do so here.

Albert's celebration of life is scheduled for **11:00 AM** (PST) on Saturday, **February 11, 2023** at the Buehler Alumni Center on the **UC Davis campus**. Everyone is welcome to attend. For those unable to attend in person, it will be streamed live (via Zoom webinar).

For those not able to attend in person, if you would like to share a couple of thoughts on Albert, please send them to Gale Perez (gperez@ucdavis.edu) a short video (1-3 minutes) and we will play it at the celebration of life. In the video, please be sure to tell us your name and your relationship to Albert.

If you have photos you would like to share, you can send them to Gale Perez (gperez@ucdavis.edu).

Save The Date!
Rice Production Workshop
Wednesday-Thursday: March 15-16, 2023
Location TBD

Effects of competition from California weedy rice biotypes on a cultivated rice variety

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Teresa De Leon, Breeder, California Cooperative Rice Research Foundation
Luis Espino, UCCE Rice Advisor
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Introduction

Weedy rice, also called red rice, is a conspecific relative of cultivated rice that infests cultivated rice fields (Langevin et al. 1990) and can reduce the yield and value of harvested rice (Shivrain et al. 2010; Singh et al. 2017a). Weedy rice's phenotypical similarities to cultivated rice make it difficult to identify until late in the growing season and challenging to control. In California weedy rice is controlled predominantly through cultural practices, such as using a stale seedbed, planting clean seed, hand pulling, or fallowing. Studies of yield loss due to weedy rice competition indicate maximum yield losses from 49% to 90% (Estorninos et al. 2005; Marambe and Amarasinghe 2000; Shivrain et al. 2009). To understand and quantify the effects of weedy rice infestation on cultivated rice, plant competition between cultivated rice and weedy rice in California was investigated in this study. The objectives of this study were to (1) measure the impact of weedy rice competition on cultivated rice growth and yield components using an additive design competition experiment, (2) examine how growth rates of cultivated and weedy rice are altered under competitive conditions, and (3) characterize the different competitive strategies of weedy rice biotypes in California.

Materials and Methods

The 'M-206' rice variety and five weedy rice biotypes from California were used in competition growth experiments conducted in a greenhouse, because of a lack of field sites where weedy rice could be grown uncontrolled. Weedy rice types were Type 1, Type 2, Type 3, Type 4, and Type 5. Experiments were performed under a randomized complete block design where blocks were planting time, and treatments were weedy rice density and weedy rice biotype. Each block consisted of 25 pots (18.9-L), each containing four M-206 rice plants, representing a density of 32 plants m^{-2}. Each pot also contained one of five weedy rice biotypes at a density of 0, 1, 2, 3, or 5 weedy rice plants per pot, representing a planting density of 0, 8, 16, 24, or 40 plants m^{-2}. M-206 yield-component measurements were taken for plant height, tiller number, panicle number, panicle weight, seed weight adjusted to 14% moisture content, fresh biomass, and dry biomass. Yield-component measurements for the high-density treatment of weedy rice biotypes were collected for plant height, tiller number, panicle number, panicle weight, fresh weight, and dry weight.

Two-way ANOVA was conducted for weekly M-206 rice plant height and tiller number data with repeated measures to determine the significance of block, weed biotype, and weed density each week. R software, version 3.5.1 was used (R Foundation for Statistical Computing, Vienna, Austria). Differences among biotypes were tested by a Tukey honest significant difference (HSD) test. Harvest yield component measurements were analyzed by ANOVA, and differences among biotypes were tested by a Tukey HSD test. Three-parameter logistic curves were fitted to M-206 weekly height data for the 0 and 40 plants m^{-2} treatments and to weedy rice measurements for 40 plants m^{-2} using the self-starting logistic model function SSlogis in R.

Results and Discussion

Effect of Competition of Rice

In the presence of weedy rice competition, M-206 tiller production during early growth was reduced by varying amounts by different weedy rice biotypes. Differences in tiller number among weed density treatments became significant by week 3 for all five weedy rice biotypes.

Competition from all weedy rice biotypes resulted in similar trends of reduction in M-206 rice height with increasing density, with a maximum height reduction of 13% (Figure 1). Differences in height between weed density treatments became significant by week 2 and resulted in diverging plant height over time between weed density treatments.

To examine further the effects of weedy rice competition on M-206 growth, relative growth analysis was conducted for weekly plant height measurements in the absence of competition and at high weed density competition. The relative growth rate, calculated as the change in plant height relative to the already accumulated height of the plant per week, showed that rice grew fastest relative to its size initially and slowed over time. M-206 growth was already affected by competition at the earliest measured growth stages, with an initial relative growth rate of 0.47 cm^{-1} wk^{-1} without competition versus 0.53 cm^{-1} wk^{-1} with competition. The competition then resulted in a steeper decline in relative growth rate over time. This indicates that M-206 rice detects and responds to competition very early on, initially growing rapidly to compete with the weed. But this competition slows growth earlier and results in a shorter mature size than rice grown in the absence of competition.

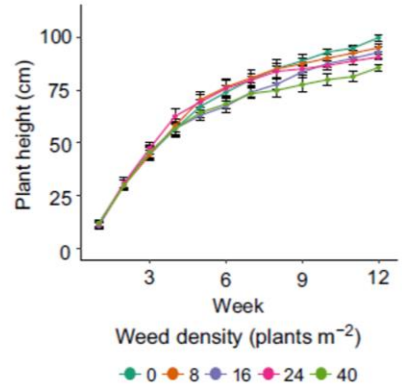

Figure 1. Weekly early growth measurements of M-206 rice height per plant when grown in competition with weedy rice biotypes at varying weed density. Effects of competition on rice height was not significant between biotypes.

Yield-component measurements at harvest of M-206 rice showed a negative impact of weedy rice competition on most yield components. In contrast, panicle number, total panicle weight, yield per plant, and aboveground biomass of M-206 rice were highly sensitive to weedy rice competition, with a yield reduction of more than 50% for each yield component at 40 plants m^{-2}. The exception to the trend of decreasing yield with increasing weed density was 100-seed weight, which did not decrease significantly.

Weedy Rice Competitive Strategies

Differences in the impact of weedy rice biotypes on M-206 yield components may be due to differences in the competitive abilities of biotypes to take up available resources required for M-206 growth. Overall growth patterns are similar between weedy rice biotypes and M-206 rice, but weedy rice biotypes vary in their early growth and final yield components. Only the highest-density weedy rice treatment of 40 plants m^{-2} is considered here because lower-density treatments had correspondingly smaller sample sizes.

Biotype	Plant height[a]	Tiller	Panicle	Yield plant^{-1}	Fresh weight	Dry weight
	cm	no.	no.	g		
1	121.0 c	6.7 a	6.1 ab	11.1 a	27.4 bc	10.8 b
SE	4.3	0.5	0.4	1.0	4.2	0.7
2	120.5 c	7.9 a	6.6 b	12.8 bc	31.0 c	10.2 b
SE	3.7	0.8	0.5	0.8	2.9	0.4
3	115.2 bc	10.0 ab	9.0 c	14.1 c	28.3 c	10.9 b
SE	3.2	0.6	0.8	1.3	3.2	1.0
4	78.9 a	11.6 b	8.0 c	12.7 ab	18.3 a	5.4 a
SE	2.3	0.6	0.6	0.9	1.7	0.3
5	111.8 b	6.8 a	5.7 a	12.4 ab	24.8 b	10.3 b
SE	2.3	0.4	0.3	0.6	3.0	1.0

[a]Letters indicate significant differences between weed biotypes arranged vertically, determined by Tukey test ($\alpha = 0.05$).

Table 1. Final measurements of yield components of weedy rice biotypes when grown at a density of 40 plants m^{-2} in competition with M-206 rice.

All weedy rice biotypes had higher yield per plant under high competition than did M-206 rice (Table 1), indicating these biotypes are highly successful competitors. The wide variation in growth and yield components between weedy rice biotypes suggests multiple strategies for success as a weed with the differing allocation of resources to height, tillering, or seed production. Tall plant height and tiller production, like that seen in many biotypes, may contribute to competitive ability in the current growing season, whereas the high allocation to seed production seen in Type 3 could lead to a larger weedy-rice seed bank and more severe infestations in future growing seasons if not controlled effectively.

It is possible in some areas that multiple weedy rice biotypes could be present in the same field, and it is unclear whether the combined action of different weedy rice biotypes may result in greater yield loss, similar levels of yield loss as observed for each biotype alone, or if their competitive strategies may interfere with each other, resulting in lower M-206 yield loss. It is also unclear from this study how competitive California weedy rice biotypes would be against other cultivars of rice because cultivars can differ in their competitive abilities (Estorninos et al. 2002). M-206 rice accounted for 46% of California rice acreage in 2018 (California Cooperative Rice Research Foundation 2019).

Additional studies will be needed to determine whether the results of this greenhouse study translate into similarly high rice yield losses under field conditions. Field studies of weedy rice competition in other areas have shown yield losses ranging from 22% to 90% (Estorninos et al. 2005; Marambe and Amarasinghe 2000; Shivrain et al. 2009; Vidotto and Ferrero et al. 2005), putting the results of this greenhouse study in the top half of that range. Additional weedy rice experiments have recently begun in research fields. To limit the spread of weedy rice, weedy rice cannot be grown uncontrolled for yield-loss studies in grower fields. However, it is clear from the results of this study that California weedy rice biotypes are highly competitive and have the potential to cause high-yield losses in rice.

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Summary of 2022 University of California Rice Variety Trials

Bruce Linquist, UCCE Rice Specialist
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Michelle Leinfelder-Miles, UCCE Delta Farm Advisor
Ray Stogsdill, UCCE Staff Research Associate

Every year, the University of California Cooperative Extension, in cooperation with the Rice Experiment Station (RES), conducts rice variety trials in several locations of the Sacramento Valley (fig. 1). The trials are conducted at the RES and eight farm locations across the Sacramento Valley, and one location in the San Joaquin Delta (not on the map) representing the main production areas of California. Due to the drought, in 2022 we did not have trials at the Colusa, Yolo, and South Yolo locations. Plots in the Sacramento Valley trials were 200 ft^2 and hand seeded while in the San Joaquin Delta trial plots were 150 ft^2 and drill seeded; seeding rate for all trials was of 150 lbs/a. Grower cooperators treated the trial in the same manner as the rest of the field. Parameters evaluated in the trials included seedling vigor, days to 50% heading, plant height, lodging at harvest, grain moisture at harvest, and grain yield at 14% moisture. Varieties are replicated four times. In this summary, only yields are presented. All other parameters are included in the complete report, which will be available on our website at the end of February (http://rice.ucanr.edu).

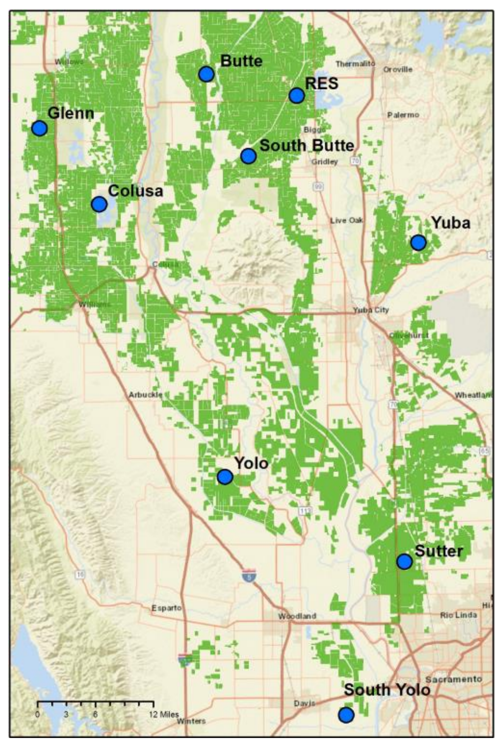

Figure. 1. Location of the UCCE and RES variety trials (RES=Rice Experiment Station)

Table 1. Yield (lbs/a) from variety trials conducted at six locations across the Sacramento and San Joaquin Valleys and at the Rice Experiment Station (RES) in 2021.

Varieties	RES	Glenn	Butte	South Butte	Sutter	Yuba	San Joaquin
M-105	7,840	7,170	8,490	9,090	8,640	8,530	9,070
M-206	7,670	8,600	7,840	9,460	8,660	8,710	9,150
M-209	9,390	9,530	8,960	9,180	8,220	8,390	7,200
M-210	8,320	8,440	8,200	9,330	8,780	8,350	9,060
M-211	9,850	8,740	9,260	9,050	8,970	8,250	7,810
S-102	7,230	6,260	8,180	8,060	6,650	7,580	9,150
S-202	8,670	5,190	9,230	10,370	8,180	9,380	11,880
CA-201	6,300	5,390	6,660	6,720	6,400	6,390	6,620
CH-201	8,170	8,000	7,500	7,950	8,810	7,800	8,220
CH-202	7,920	4,530	8,010	8,270	8,660	8,160	8,880
CM-101	6,940	5,240	6,710	8,470	7,730	7,520	8,350
L-207	9,410	10,730	9,420	10,240	9,760	8,110	9,470
L-208	9,330	9,990	9,820	11,350	10,270	9,100	11,050
A-202	7,910	8,480	8,690	9,950	8,180	7,310	8,070
CJ-201	9,060	8,160	7,960	8,940	8,370	8,220	7,110
CT-202	6,230	6,160	6,080	6,580	6,070	5,920	5,670

2022 Disease Observations

Luis Espino, UCCE Rice Advisor
Michelle Leinfelder-Miles, UCCE Delta Farm Advisor

Thankfully, 2022 was not a bad year for rice diseases, but it is worth mentioning a couple of observations. As mentioned in a previous article, there was very little blast this year. In the Sacramento Valley, UCCE did not diagnose any blast in the field but did receive a couple reports of it after harvest.

Blast was identified in the San Joaquin Delta in a field of M-206. Blast in the Delta is a rare occurrence because of the cooler temperatures in the area. In fact, UCCE has only identified blast there once before. Back in 2010, one Delta field of variety M-104 was confirmed as infected with blast. Year 2010 was a bad blast year, with many fields affected across the Sacramento Valley.

Blast can infect seed, it can survive in crop residue, and its spores can move long distances. Additionally, weeds are suspected to be alternate hosts. All these factors can be sources of inoculum that can result in a blast epidemic. In seed, the mycelium of the blast fungus has been found colonizing the internal surfaces of the lemma and palea (the seed coat), the pericarp and endosperm. Unfortunately, treating the seed with bleach for bakanae does not help with the blast fungus. In general, seed is not considered a major source of blast inoculum in California. Until a few years ago, certified seed used to be tested for blast. The requirement for this test was stopped in 2018 because results were always negative. However, if during the certification inspection a seed field or a portion of a seed field is identified as infected with blast, that field or portion can be rejected. Research has shown that under water seeding, there is no seed to seedling blast transmission. Seedling transmission has been documented from infected seeds planted in soil or infected seeds that remain on the soil surface. Given that most of the acreage in California is water seeded, the risk of infected seed producing blast inoculum is low. However, in the Delta, where rice is drill seeded, the risk is higher.

While disease was low overall, we did come across another fungus that is relatively new to us. A report of possible blast in M-211 was received in late summer form a PCA in Butte County. Inspection of the field revealed only a few plants affected with symptoms that looked like collar blast (fig. 1). Samples were submitted to the UC Davis Plant Pathology Lab, and the identification came back as *Nigrospora oryzae*, which causes "panicle branch rot". Interestingly, this fungus was also identified in three Delta fields (fig. 2), one of which also had blast. Prior to 2022, we identified this fungus from samples with symptoms similar to stem rot in 2017 and 2021, and in a field with heavy discoloration of rice panicles in 2021 (fig. 3).

Figure 1. Ear blight attributed to *Nigrospora oryza* on M-211 rice, Butte County, 2022.

Figure 2. *Nigrospora oryza* was identified prior to harvest on the culm of this Delta M-105 sample. The fungus was also identified at other locations in the Delta on M-206.

Figure 3. Panicle discoloration attributed to *Nigrospora oryza* on CM-203, Yolo County, 2021.

The Compendium of Rice Diseases and Pests (2018, APS Press) indicates that *Nigrospora* species are common and occur in senescing plant tissue, and may cause lesions in plants weakened by diseases, insects, or poor nutrition. This fungus is reported to cause an ear blight and blackening of rice kernels. These descriptions fit the symptoms mentioned above. Additionally, *Nigrospora oryzae* has recently been identified as the causal agent of panicle branch rot disease in China (Liu et al., 2021, Plant Disease 105 (9): 2724), a disease very similar to blast, with reported yield and quality losses.

It is not clear if this fungus is developing in tissues that are already affected by stem rot or blast, or if it is causing disease symptoms. In any case, given the information in the literature and the low frequency of observation, at this point the identification of *Nigrospora oryzae* from California rice samples is not cause of concern but warrants vigilance from the industry. Please reach out to us in the future if you see symptoms similar to these so that we can gather more information about this fungus.

Insecticides for Armyworm Control

Luis Espino, UCCE Rice Advisor

During 2022 I continued monitoring for armyworms using pheromone traps. Because of the drought, instead of the 15 locations typically monitored, I only had 12. Moth numbers showed that there was a typical peak in late June, reaching 28 moths/night (fig. 1). In the next week, there were some heavy larval infestations in Butte and Sutter counties that in some cases required treatment. Later, in mid August, there was almost no moth activity. This was reflected in the field with no worm pressure. At that time, it was nice to update growers with this information so that they had one less thing to worry about.

2022 Insecticide Trial

Insecticides remain one of the main tactics to manage armyworms. In 2022 I established an insecticide trial in an M-211 field with a heavy worm infestation. Treatments (table 1) were applied to small plots (10x20 ft) on 6/30 using a CO_2-powered backpack sprayer. All treatments included the surfactant DyneAmic at 0.25%. Armyworm density was determined by counting the number of larvae/ft^2 in three areas of each plot before treatments were applied and 3, 5, 7 and 11 days later. Before treatments were made, larvae were collected for identification and instar determination.

Before treatments, armyworm larval population was high, averaging 7.2 larvae/ft^2. At this time, the number of larvae was not significantly different among treatments (fig. 2). A 30 larvae sample taken from the trial area showed that all larvae were true armyworm, *Mythimna unipuncta*. The sample consisted of 14, 33, and 53% 4th, 5th, and 6th instar larvae, respectively. The number of larvae started to decline naturally in untreated plots a week after treatments were applied. Most likely, 6th instar larvae started to pupate, resulting in a reduction in the number of larvae found.

Three days after treatment, both rates of Intrepid produced a significant reduction in larval density compared to control plots, reducing the armyworm population in average 67%. Dimilin, at both rates tested, resulted in a 37% density reduction; however, the armyworm density in Dimilin-treated plots was not significantly different from the density in untreated plots. Treatment with SpearLep, Xentari, or Sevin did not result in a significant density reduction when compared with untreated plots.

Five days after treatment, Dimilin and Intrepid significantly reduced the armyworm density compared to untreated plots. Intrepid at both tested rates reduced armyworm populations the most, reaching on average 90% control. The two rates of Dimilin resulted in similar control, reaching on average 62% density reduction. However, the lowest rate of Dimilin resulted in an armyworm density not significantly different from the density in plots treated with SpearLep, Xentari, or Sevin.

Results seven and eleven days after treatment were similar. Both rates of Dimilin and Intrepid provided similar control, averaging 90 and 95% control for each of the dates, respectively. Other tested products resulted in densities not significantly different from densities in untreated plots.

Overall, good control of armyworms was achieved with both tested rates of Dimilin and Intrepid; however, Intrepid provided faster control. Intrepid reduced larval density 67 and 90% three and five days after treatment, respectively, while Dimilin achieved 37 and 62% control. Level of control with both products was similar seven and eleven days after treatment.

Summary of trials conducted between 2018-2021

Luis Espino, UCCE Rice Advisor

I have been conducting trials for armyworm for several years. Figure 3 is a summary of six trials conducted between 2018 and 2021. The trials show that pyrethorids provide about 50% control. I know that in some fields with a history of armyworm problems, a pyrethoid insecticide was tankmixed with the clean-up herbicide application made 35 to 45 days after seeding to save on insecticide and application costs. While I have not conducted trials with this application timing, in these fields I have observed that control is very little to non-existent. Using an insecticide against armyworms at this timing could be classified as a "preventive" application because at that time it is not known if populations are going to be high enough to warrant a treatment. While preventive applications have their place, I don't think they are appropriate to manage armyworms.

As in the 2022 trial, the two insect growth regulators provided the best control for armyworms in rice, methoxyfenozide and diflubenzuron. They have different modes of action. Diflubenzuron inhibits the biosynthesis of chitin, which is the main component of the worm's exosqueleton. Methoxyfenoizde is an ecdysone mimic; affected worms are tricked into initiating the molting process, resulting in their death. For resistance management, alternating the use of these two insecticides would be a good strategy.

Chlorantraniliprole is not registered on rice, but I have tested this product several years due to its control of similar pests in other systems. Chlorantraniliprole has shown very good activity against armyworms, very similar to methoxyfenozide; if it were to become available in rice, it would be a great addition to the toolbox, providing a different mode of action for resistance management.

Unfortunately, *Bacillus thuringiensis* (Bt) insecticides don't have a good fit in the rice system. In rice, armyworms are not easily noticeable until they start causing significant defoliation. This defoliation is caused by fifth and sixth instar larvae. Small larvae (first to fourth instar) eat very little and their feeding can hardly be seen since it mostly occurs in lower leaves under the canopy. Bt insecticides are very good at killing young larvae, but do not do a good job of killing larger larvae. In the trials I have conducted, Bt insecticides reached 40 to 70% control. These insecticides kill the young larvae present in the field, but do not kill the large worms that eat the most. Spraying Bt preventively, as described above for pyrethroids, may not be the best idea because worm populations may not reach treatable levels.

Having effective insecticides to manage a pest is a key component of IPM. In the case of armyworms, the availability of methoxyfenozide and diflubenzuron allow growers and PCAs to have an effective alternative to use when needed and avoid unnecessary preventive applications.

Table 1. Products tested in the 2022 armyworm insecticide trial.

<table>
<tr><th>Product</th><th>Active ingredient</th><th>Rate</th></tr>
<tr><td>Dimilin</td><td>Diflubenzuron</td><td>4 oz</td></tr>
<tr><td>Dimilin</td><td>Diflubenzuron</td><td>8 oz</td></tr>
<tr><td>SpearLep + Leprotec</td><td rowspan="2">GS-omega/kappa-Hxtx-Hv1a
+ Bacillus thuringienses ssp kurstaki</td><td>1 pt + 1 pt</td></tr>
<tr><td>SpearLep + Leprotec</td><td>2 pt + 1 pt</td></tr>
<tr><td>Intrepid</td><td>Methoxyfenozide</td><td>7 oz</td></tr>
<tr><td>Intrepid</td><td>Methoxyfenozide</td><td>10 oz</td></tr>
<tr><td>Xentari</td><td rowspan="2">Bacillus thuringienses ssp aizawai</td><td>1 lb</td></tr>
<tr><td>Xentari</td><td>2 lb</td></tr>
<tr><td>Sevin</td><td>Carbaryl</td><td>1.5 qt</td></tr>
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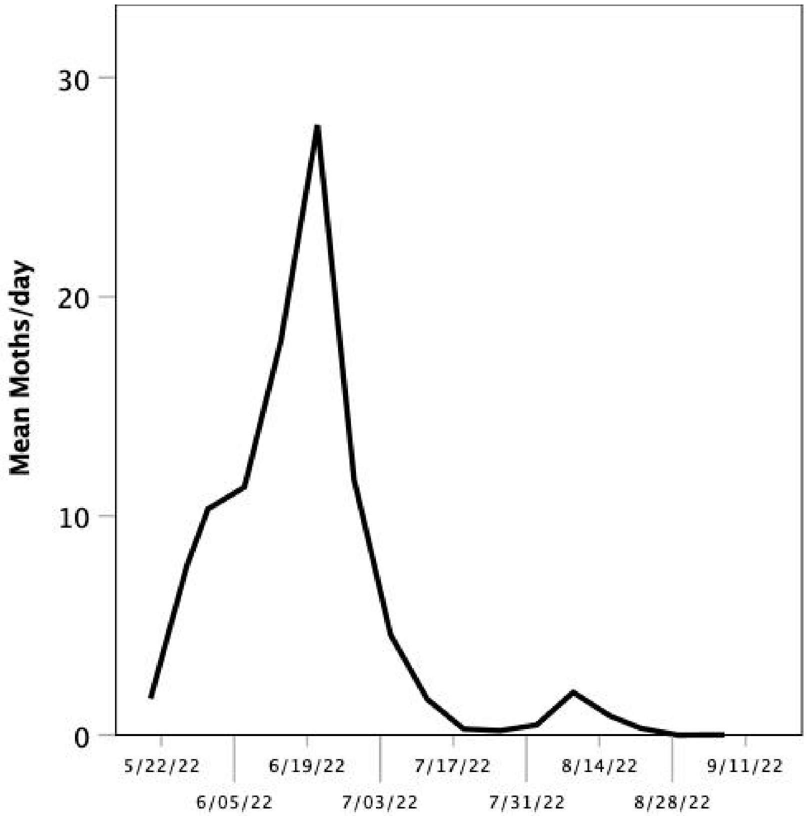

Figure 1. Number of moths/day trapped in pheromone traps across the Sacramento Valley of California during 2022.

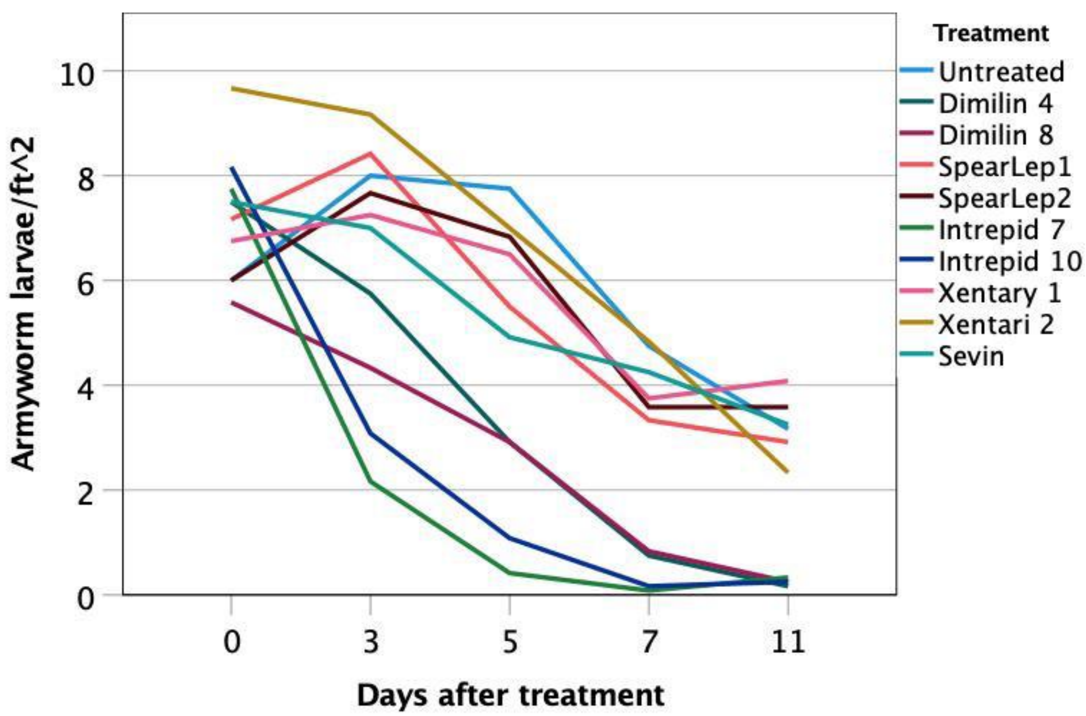

Figure 2. Number of armyworm larvae/ft^2 at different times after application of insecticide treatments.

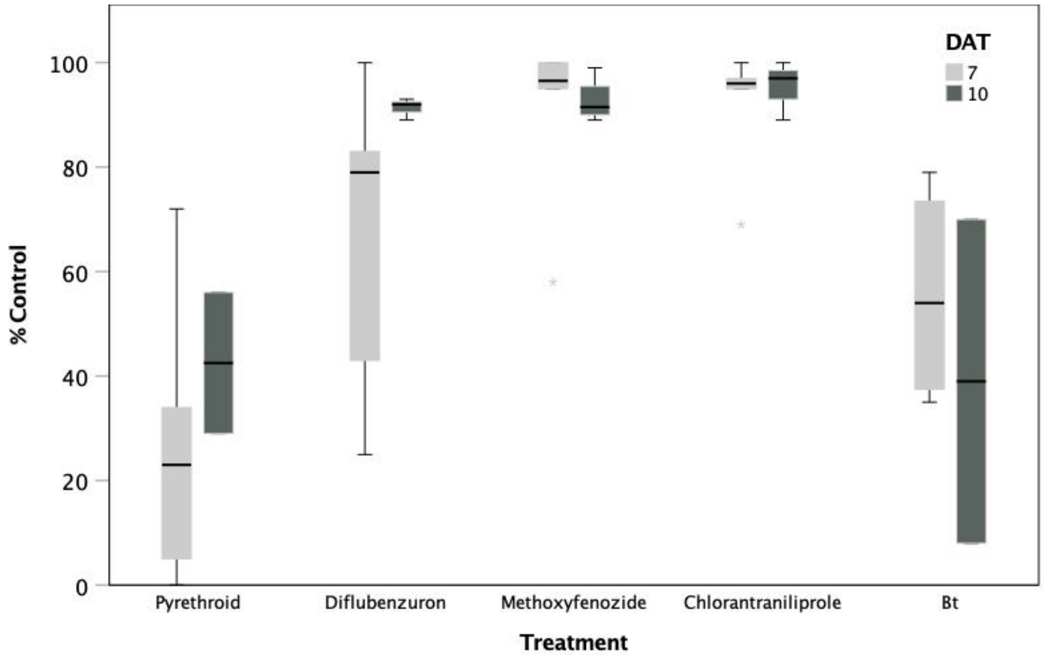

Figure 3. Boxplot of percentage armyworm control at 7 and 10 days after treatment (DAT) with registered and experimental insecticides for six armyworm trials conducted between 2018 and 2022. Treatments were applied in late June or early July at label rates. Asterisks indicate outliers.

Choosing a medium grain variety

Bruce Linquist, UCCE Rice Specialist

Varietal selection is an early and important decision a rice grower need to make each year. In planning, first consider the maturity class that fits into your farming operations and climatic zone. There are three maturity classes for California medium grains: very early (M-105), early (M-206, M-209, M-210, and M-211), and late-maturing (M-401, M-402 – both premium medium grains). Consider how planting varieties of different duration at different times affects harvest operations. Second, think about your climate: M-105, M-206 and M-210 are considered broadly-adapted varieties that will do well in most California rice-growing areas. However, in the coolest areas of the region (southern Sacramento Valley and Delta), M-105 out yields M-206. If you are in a blast prone area consider M-210 which has broad resistance to blast. Both M-209 and M-211 are longer in duration than M-206. Both are also less suited to cooler areas (M-209 being the least suited). Duration is also important when thinking about drought and water limitations. Shorter duration varieties require less water.

The newest commercially available medium grain variety is M-211 which has high eating quality (comparable to M-401). In our statewide variety tests, in the warmer areas where it is best suited, it out-yields all other varieties by 2 to 3 cwt/ac and has produced the highest yields we have reported in our yield contest. Given its high yield potential, there is a lot of interest in M-211. However, there are concerns with the milling quality of M-211. This variety needs to be harvested close to 20% as quality drops fast when harvested drier. From a management standpoint to optimize yield and quality, at the end of the season, be sure not to drain your field too early. This past year, made a number of growers think twice about M-211. It was a longer duration variety, so fields had to be irrigated for a longer period. Also, many growers had trouble uniformly drying their fields out at the end of the season and this caused milling quality problems. That said, I think M-211 has promise, but growers need to learn how best to manage it on their fields and under their conditions.

2021-2022 California Rice Acres by Variety Report

Dustin Harrell, California Cooperative Rice Research Foundation – Rice Experiment Station

Each year the California Cooperative Foundation's Rice Experiment Station estimates the production acreage of each variety released by their breeding program. The data is generated by taking the number of seed acres of foundation and registered seed planted for seed production each year and certified by California Crop Improvement. The total acres of production of each variety is achieved by taking the variety's seed acres currently being grown and forecasting total acres in production using the USDA-NASS acreage reports for each rice market class. While the data is not 100% accurate, it does provide a very close representation of the varieties planted each year since all rice growers are required to plant certified rice seed. The rice acreage by variety reports for 2021 and 2022 are presented in Table 1.

Variety	2021			2022		
	Seed Acres†	Percentage	Estimated Acres‡	Seed Acres†	Percentage	Estimated Acres‡
Medium Grain						
M-105	2,945	12.1	48,808	2,645	13.8	35,279
M-206	8,172	32.4	131,382	5,332	27.9	71,119
M-209	4,665	20.5	82,957	2,506	13.1	33,429
M-210	2,053	8.4	33,944	1,725	9.0	23,013
M-211	1,542	6.5	26,232	2,729	14.3	36,401
M-401	1,136	4.6	18,790	407	2.1	5,428
Total RES-Medium	20,513	84.5	342,113	15,343	80.3	204,669
Non-RES Medium	1,400	5.2	20,887	999	5.2	13,331
Total Medium Grain	21,913	89.6	363,000	16,343	85.5	218,000
Short Grain						
CA-201	1	0.04	143	7	0.1	170
CH-201	50	0.2	707	46	0.4	1,126
CH-202	145	0.5	2,067	232	2.2	5,622
CM-101	484	1.9	7,525	106	1.0	2,569
CM-203	346	1.5	5,889	193	1.8	4,689
S-102	198	0.7	2,816	256	2.4	6,206
S-202	16	0.1	221	2	0.02	54
Total RES -Short	1,238	4.8	19,368	842	8.0	20,436
Non-RES Short	613	3.9	15,632	394	3.8	9,564
Total Short Grain	1,851	8.6	35,000	1,236	11.8	30,000
Long Grain						
A-201	241	0.5	1,987	206	0.6	1,476
A-202	220	0.4	1,814	214	0.6	1,540
CJ-201	79	0.2	652	276	0.8	1,984
CT-202	17	0.0	140	18	0.1	129
L-205	20	0.0	167	46	0.1	331
L-207	207	0.4	1,707	155	0.4	1,114
L-208	10	0.0	78	19	0.1	134
Total RES -Long	794	1.6	6,545	934	2.6	6,710
Non-RES Long	1	0.0	455	40	0.1	290
Total Long Grain	795	1.7	7,000	974	2.7	7,000
USDA-NASS Acres						
Medium			363,000			218,000
Short			35,000			30,000
Long			7,000			7,000
TOTAL			405,000			255,000

† Seed acres represent the number of approved seed acres in the California Crop Improvement seed certification program.

‡ Estimated acres were determined by using the percent acres in seed production and the total reported USDA-NASS acres.

Rice Regulatory Updates

Roberta Firoved, California Rice Commission

Here are some brief regulatory updates in advance of the rice use season in California.

Thiobencarb – the mandatory stewardship training is online again this year with the launch around February 1. The presentation will include subtitles in larger font. No continuing education units are available this year. If this becomes a problem, the one-hour credit can be applied for in 2024.

Drinking Water Supply Well Monitoring – this is a requirement for all agricultural parcels including rice. For rice, the monitoring is drinking water supply wells on parcels where rice is produced. The monitoring is an annual requirement. If samples are 8 mg/L or less for three consecutive years, the monitoring is reduced to once every five years. Please read the information at calricenews.org and click on the Drinking Water Well button.

Loyant® CA with Rinskor Active – the active ingredient florpyrauxifen-benzyl was registered in August 2022. No sales or usage in 2022 because the herbicide has a 60-day preharvest interval (PHI). Look for information at the grower meetings where Corteva will present February 7 to 10.

Intrepid® 2F – the active ingredient methoxyfenozide will no longer be a Section 18 Emergency Exemption. Intrepid® 2F was registered by the U.S. EPA with registration pending at the California Department of Pesticide Regulation. The California registration is anticipated in time for the use season. Only the Intrepid® 2F label will be registered for use on rice. Look for information at the grower meetings where Corteva will present February 7 to 10.

Please check out the industry calendar on calricenews.org for meeting information: https://calricenews.org/events/

Useful Websites

Weedy Rice: www.caweedyrice.com The California Weedy Rice website (a collaboration between UCCE and the California Rice Commission) contains information on identification, best management practices, sample collection, and additional resources on weedy rice. There is also a link to subscribe to our "Weedy Rice" e-communication, which will keep the rice industry updated on the latest information on weedy rice, as we progress through the rice season.

UC Rice: https://rice.ucanr.edu Find the latest information on rice in California, including meeting announcments. This site is a collaboration between the entire UC Rice Team.

UC Rice Rotation Calculator: https://rice-rotation-calculator.ipm.ucanr.edu/ An economic decision-support tool, this can help growers and PCAs to make informed decisions regarding switching from one crop to another.