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Rice Briefs

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Agriculture and Natural Resources | Cooperative Extension Colusa County

Collecting weed seeds for herbicide-resistance testing

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Herbicide resistance is a serious problem in California rice. However, not every control failure can be attributed to herbicide resistance. Other factors can be the cause of control failures. Among the most common are weather, incorrect rate, poor coverage or application timing, skips, and spray equipment malfunction.

When weed control fails, it is important to determine the cause. And when the cause is herbicide resistance, herbicide programs need to be adjusted. Resistance occurs after the same herbicides have been used repeatedly at the same site for several years. You will notice a gradual decline in the efficacy of the herbicide to control weeds that were once susceptible. When herbicide resistance is the problem, you will find healthy plants alongside dead ones of the same species after treatment; surviving weeds form discrete patches that consistently survive the herbicide treatment.

The UCCE Rice Weeds Program conducts herbicide resistance testing for the major rice herbicides used in California at the Rice Experiment Station (RES) in Biggs. Results of these tests help growers improve their weed control programs and also help the rice industry keep track of resistance issues. If you suspect herbicide resistance, collect seeds of the target weed, fill out the Resistant Weed Seed Testing form (included in this newsletter), and bring them to your local Farm Advisor, or send or drop off at the RES to be tested. Follow these guidelines:

- Don't wait until harvest to collect the seed. By then, most weeds have shattered their seeds. If you collect after harvest, you may collect seeds from weeds that have emerged late and thus have not been exposed to the herbicide. The objective is to collect seed from plants that have survived the herbicide action.
- Collect seeds when they are mature and dislodge easily from the seedhead. In general, sprangletop matures the earliest, between rice panicle initiation and heading. Early watergrass, barnyardgrass, smallflower umbrellasedge, and ricefield bulrush usually follow, maturing sometime before rice heading until maturity. Late watergrass matures last, at about the same time early rice varieties (M-205, M-206) mature.
- Collect seeds, not seedheads. Gently shake the seedhead inside a paper bag. Seeds that shatter are mature and will readily germinate. If seedheads are collected, seeds might not be mature or might have shattered already.

- Collect seeds from areas of the field where you are certain the herbicide application in question was appropriate. Avoid field borders, tractor tire tracks, skips or areas where you suspect the herbicide was not sprayed correctly or not sprayed at all.
- Make sure to collect enough seed. In order to have conclusive results, several replications of herbicide resistance testing are needed. When not enough seed is provided, replications may not be possible. For small sized seed weed species such as sprangletop, smallflower umbrellasedge or ricefield bulrush, collect seeds from at least 20 mature seedheads at each location. For barnyardgrass, early and late watergrass, collect from at least 30 mature seedheads.

For more information on how to collect seeds from suspected herbicide resistant weeds, visit the UC Rice Blog (search for resistance) or the Weeds section of the UC Rice On-line website.

Armyworm outbreak: what's next?

Luis Espino, Rice Farming Systems Advisor, UCCE Colusa, Glenn and Yolo Counties
Cass Mutters, Farm Advisor, UCCE Butte County

The armyworm outbreak we experienced a few weeks ago seems to be over. Several fields in Glenn and Butte counties had very high populations and experienced severe defoliation. In some cases, the affected areas have recovered. However, there are reports that a few fields were defoliated to the water line. It is worth thinking about the likely consequences of the outbreak.

Rice has the capacity to recover from defoliation by producing new leaves and tillers. When the main tillers are affected, the plant will try to compensate for the loss in foliar area by producing additional lateral tillers. These tillers will mature later and will delay the maturity of affected areas of the field respect to less affected areas. In these fields, expect uneven grain maturity at harvest.

Nitrogen may help in the recovery of defoliated plants. In some cases, growers have applied nitrogen to the affected areas in an attempt to promote rapid regrowth. However, excess nitrogen can have several undesirable consequences. Excess nitrogen promotes stem rot and blast, diseases that can affect plants all the way until panicle maturity. Also, too much nitrogen can extend the plant's vegetative growth period, resulting in delayed development and uneven grain ripening.

In fields that have been severely affected, water management may also be complicated. Flooding periods may have to be extended, and with current water conditions, this will put extra demands on an already stressed water system. If possible, plan on turning off the irrigation and allowing the water to subside instead of draining the field. In fields with heavy clay soils, it is safe to not have standing water (soil still saturated) 24 days after 50%

heading (when one-half of the panicles in a field have emerged) without risking yield loss and grain quality.

Be on the lookout for another armyworm infestation by early August. Most years, there is a second population peak during heading. Typical panicle injury consists of blank panicle branches, although sometimes the whole panicle can be blank. What happens is that the armyworm bites the rachis of the branch and the grains in that branch don't fill. Sometimes, armyworm injury can be confused with other causes, such as cold temperature blanking. However, if you look closely at the blanked panicle or branches, you will see a chewing mark where the blanked area begins.

Inspect your fields as the panicles come out of the boot – I believe this is when most of the armyworm damage occurs. If after inspecting your field you find that 10% or more panicles are affected, and you can still find armyworms, a treatment might be needed. Monitor your fields constantly to catch those infestations as early as possible.

The California Rice Commission has submitted a Section 18 Crisis application for Intrepid, a Dow AgroSciences product for armyworm control. There is no guarantee that the Department of Pesticide Regulation (DPR) will approve the Section 18, but the application has been submitted and DPR will review it if there is a second armyworm outbreak that starts injuring rice panicles. We need your help in determining if armyworms are causing problems again. If you see injury, contact your local UCCE Farm Advisor or County Ag Commissioner.

For more information on the armyworm outbreak, injury and worm pictures, visit the UC Rice Blog.

Salinity Mangement in Rice

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After the driest year on record, it is important to consider how salinity impacts rice. In general, plants are stressed by salinity because they must expend more energy to take up water, leaving less energy for plant growth. This can cause stunting and reduced yields. Salt can also degrade soil physical conditions which, in turn, impair water penetration and/or the plant's ability to access water. There could also be specific ion toxicities. Some soils are salty because parent materials weather to positively-charged cations (Ca^{2+}, Mg^{2+}, K^{+}, and Na^{+}) that join with negatively-charged anions to form soluble salts (NaCl, $CaCl_2$, $MgCl_2$, $CaSO_4$, and KCl). On croplands, salts may be carried in irrigation water to create or exacerbate salty soil conditions.

Management practices that could help alleviate salinity include site selection, monitoring soil and water salinity, maintenance flow to flush out salts, and leaching. Rice should not be planted on high salinity soils because it is moderately sensitive to salinity. Soil surveys

provide salinity information that would serve as a starting point for selecting appropriate sites.

While accessing soil survey information is an important first step in determining appropriate sites, periodically monitoring soil and irrigation water salinity is also important, especially since agricultural practices can change soil characteristics. Commercial laboratories can test for salinity and toxic ions. Electrical conductivity (EC) is a measure of a solution's ability to conduct an electric current. When the solution comes from a soil saturated paste, the abbreviation used is ECe, and when the solution is water, the abbreviation is ECw. Electrical conductivity is generally expressed in units of decisiemens per meter (dS/m). The sodium adsorption ratio (SAR) and exchangeable sodium percentage (ESP) characterize the sodium status of an alkaline soil. Laboratory results may provide total dissolved solids (TDS) instead of EC. This would be expressed as parts per million (ppm) or milligrams per liter (mg/L), which are equivalent. To convert ppm (or mg/L) to dS/m, divide by 640.

In rice, beyond average root zone soil salinity (ECe) of 3.0 dS/m or average flood water salinity (ECw) of 2.0 dS/m, yield reductions are expected. Rice seedlings, however, may be damaged with an irrigation water salinity of 1.2 dS/m. Specific ions, like boron (B) and chloride (Cl) may also cause problems. While it is not typical to find toxic boron concentrations in California rice growing regions, the thresholds are 2 ppm in the irrigation water and 2.5 ppm in the soil solution. The level of concern for Cl in the irrigation water is 100 ppm.

In many irrigation districts water is being limited this year due to the drought. This means that maintenance flow practices are restricted. Maintenance flow helps to flush out salts that concentrate in the flood water due to evapo-concentration. In a study conducted by UCCE in 2014, we found that if irrigation water was of good quality (i.e. less than 0.5 dS/m), flood water never reached 2.0 dS/m in any location in the field at any time during the season, and yield was not compromised. If water entering the field is lower quality, however, maintenance flow may be necessary to keep the EC low. Additionally, having the water zig-zag down the field through alternate weirs rather than having the water pass through the weirs on the same side of the field could help reduce flood water salinity.

In the event that drought conditions and poor water quality has increased soil salinity, the soil profile should be leached. Ideally, winter rainfall provides adequate leaching. If winter rainfall is not adequate, however, growers could try to leverage rainfall by irrigating before a storm. The irrigation water would fill the soil profile, allowing the rain to leach rather than just wet the profile. Leveraging winter rainfall with irrigation could help to lower baseline soil salinity in the spring.

Rice Production Workshop presentations available on-line

If you missed the 2015 Rice Production Workshop, you can see the presentations on the UC Rice On-line website (http://rice.ucanr.edu/). The presentations were recorded; however, due to technical problems, the video of some of the presentations is not available. The slides of all the presentations are available.

Attendants received a hard copy of the Rice Production Workshop Manual. The Manual has the most up to date information on rice production practices for California. An electronic version of the Manual can be accessed on the UC Rice On-line website.

While on the website, take the time to explore. Sections for variety selection, water, harvest, fertilizer, arthropod, disease, weed, and straw management have been added. Also, you can view variety trial results for the past five years in an interactive map. UC Rice On-line also links to the UC Rice Blog, which gives you up-to-date information on issues affecting rice in the field. Be sure to let us know what you think of the website and what content you would like to see added.

DON'T FORGET THE RICE FIELD DAY!

★ Wednesday, August 26, 2015 ★

The annual Rice Field Day will be Wednesday, August 26, 2015, at the Rice Experiment Station (RES), Biggs, California. You and your associates are cordially invited to join us to observe and discuss research in progress at RES. The Rice Field Day is sponsored by the California Cooperative Rice Research Foundation and University of California with support from many agricultural businesses.

7:30 - 8:30 A.M.	**REGISTRATION** • Posters and Demonstrations
8:30 - 9:15 A.M.	**GENERAL SESSION** • CCRRF Annual Membership Meeting • D. Marlin Brandon Rice Research Fellowship • California Rice Industry Award
9:30 – NOON	**FIELD TOURS OF RICE RESEARCH** • Variety Improvement • Disease Resistance • Insects and Control • Weeds and Control
NOON	**LUNCH**

The program will begin at 8:30 a.m. with a General Session that serves as the Annual CCRRF Membership Meeting. Posters and demonstrations will be in place during registration until after lunch. Field tours of research will emphasize progress in rice variety improvement, disease, insect, and weed control. The program will conclude at noon with a complimentary luncheon. The RES is located at 955 Butte City Highway (Hwy. 162), approximately two and one half miles west of Highway 99 north of Biggs, California.

Resistant Weed Testing Form

The UCCE Rice Weeds Program tests grower submitted seed samples of potentially resistant watergrass, sprangletop, smallflower umbrellasedge and bulrush. We would like to get as much information as possible for each sample submitted so we can develop a database that may help understand the evolution and spread of resistance over time. We will keep individual grower information confidential and any reporting of results will not identify individual growers. Please fill out the form for each weed seed sample. Best timing of collection is when the seed easily falls off the seed head by gentle agitation in a paper bag. Allow seed to dry in the paper bag to prevent molding. Bring the sample and form to your local UCCE Farm Advisor or send or drop off samples at the Rice Experiment Station in Biggs:

Rice Experiment Station
955 Butte City Hwy (162)
PO Box 306
Biggs CA 95917

Resistant Weed Testing Form

Identification:

Submittee Name:_____Phone #:_____

Grower Name:_____Phone #:_____

Address:_____

Site Location:

GPS coordinates (if available):_____

Township, Section, Range:_____

Nearest road and cross road:_____

Field number (grower idenfication):_____

County: _____

Please draw a brief map of field with location of sampling

Field history:

When was resistance suspected at this site?_____

What % of farm is suspected to be resistant?_____

Size of farm?_____

Acreage of each area sampled:_____

Herbicides that resistance is suspected:_____

Herbicides used in past: _____

Herbicides used this season (application rate and method):_____

Water management at this site:

Source of water: Pump_____Canal_____Both_____

Irrigation management: Continuous flood_____Pinpoint_____ Leathers method_____

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