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RICE INFORMATION

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Managing Rice with Furrow or Overhead Irrigation

Recently rice has become an increasingly interesting option for use in upland rotations. Since rice is a semi-aquatic plant, upland production research efforts are limited. Contained in this information sheet are general recommendations to follow if attempting to grow upland rice using furrow or overhead irrigation. Please be advised that at this time, upland rice is not eligible for crop insurance through USDA-RMA.

Cultivar Selection

In upland rice, blast disease is of serious concern. Therefore, it would be wise to select a cultivar that is not extremely susceptible to blast. Choose a hybrid, or select a less-susceptible variety that makes disease easier to manage with a fungicide. Please note that in some situations, a disease such as blast may not be effectively managed with fungicides. Standard cultivar performance trials do not provide dependable predictions of performance for upland rice production. Modern breeding programs focus on cultivars intended to perform optimally in flooded conditions – these cultivars may not necessarily perform similarly in the absence of a flood.

Seed Treatments

Fungicide and insecticide treatments should be used in upland rice. Rice water weevil is less of a concern than in flooded rice, but grape colaspis and billbug can be incredibly damaging in these situations. A neonicotinoid seed treatment (CruiserMaxx Rice or NipsIt INSIDE) may be the best choices for these situations.

Fertility Management

Nitrogen (N)

Apply preflood N in a single application followed by a midseason application based on standard nitrogen fertilizer recommendations. A more efficient approach for upland rice may be to apply preflood N in a split application with half applied at the 4-5 leaf stage and the other half applied 10 days later. The timing of this split is important, as plant demand for N will drastically

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increase after 10 days. Applying the split earlier than 10 days may be too early and plants may still be taking up N from the first application. Nitrogen use efficiency will be closely related to how wet or saturated the soil remains following nitrogen applications. Soils that are allowed to dry following N application and then remain muddy will be more prone to N losses via denitrification. In this case N applications will be more efficient if broken into multiple applications similar to “spoon-feeding”.

Phosphorous (P)

Phosphorous availability to rice is significantly increased when a permanent, continuous flood is applied. Therefore, when using furrow or overhead irrigation methods, P deficiency might be more prevalent in areas with high pH (>7.0). Soils that have a combination of low soil test P and high pH should be monitored closely for P deficiency symptoms especially following N applications when rice experiences periods of rapid growth.

Weed Management

The lack of a flood changes weed management for rice considerably. However, repetitive irrigation can increase herbicide activation. This may call for multiple residual herbicides to be applied a bit later in the growing season to replace the weed suppression accomplished by the establishment of a permanent flood.

A good program for conventional rice in upland conditions may include Command applied at planting as a pre-emergence herbicide; followed by Propanil + Bolero early post-emergence; followed by Ricestar HT + Facet or a similar program that provides residual grass control multiple times throughout the season. Permit or Permit Plus should be included as needed for nutsedge control. The reduced need for aquatic weed control in furrow irrigated rice is often replaced by the need for multiple applications of grass and broadleaf herbicides. Care should be taken to follow labeled cut-off dates and timings for certain herbicides and pre-harvest intervals (see MP44, MP519, or product label).

For Clearfield rice in upland conditions, Command followed by Clearpath; followed by Newpath; followed by Beyond maybe a sufficient program. Many producers find the length of residual offered by Newpath in Clearfield rice to be a good fit in furrow and overhead irrigated scenarios; however, care should be taken not to rely solely on the ALS chemistry to prevent resistance.

*Mention of a specific product does not constitute endorsement and are only provided as examples.

Disease Management

Aerobic conditions created by upland rice production are more favorable for development of rice blast disease. There is known risk to planting fields to cultivars rated very susceptible (VS), susceptible (S), or moderately susceptible (MS) for blast. The safest bet is to select a highly resistant cultivar, as fungicides may not be able to control neck blast on furrow-irrigated rice under some conditions for susceptible cultivars. All commonly grown varieties have some level of blast susceptibility and should be scouted regularly to manage for this disease – even more so than flooded fields. Upland rice fields can be more easily managed with resistant cultivars (i.e. hybrids). Do not forget a new pathogen race may even attack the known resistant rice cultivars. In an upland rice production system you need to be prepared to treat with a fungicide unless resistant cultivars are used. In a blast season, upland rice should be managed very carefully because of its increased susceptibility to blast disease. Two well-timed fungicide applications should be made: the first as heads begin to emerge from the boot (boot split to 10% heading) and the second approximately 7 days later when ~70% of the head is out of the boot.

Sheath blight and other minor diseases such as sheath blight are of little concern in upland rice. However, cultivars susceptible to kernel smut and false smut will still require preventative treatments particularly if the season is cool and wet. Moreover, remember these two diseases are aggravated with high nitrogen fertility and late planting, especially false smut.

See Table 1 for a list of disease ratings for selected cultivars. Listed cultivars can be grown under upland conditions, though extreme care should be taken if growing a cultivar susceptible to blast. Cultivars rated as very susceptible for blast are not included in the table and should not be considered for production under upland conditions.

Insect Management

As mentioned earlier, the use of an insecticide seed treatment is strongly recommended in upland rice. Grape colaspis can result in significant stand loss (and the larvae feed underground so no foliar options are available). Insecticide seed treatments will protect plants from rootworm and wireworm infestations which can be a problem in upland rice. Also, billbugs tunnel into rice plants near the base and can result in blank heads – severe infestations have been observed causing 10% yield loss across the field. Insecticide seed treatments should help reduce issues with this pest. Neonicotinoid seed treatments (CruiserMaxx Rice or NipsIt INSIDE) may be the best options for upland rice. Rice stink bug (RSB) management will remain similar to that for flooded rice with a threshold of 5 RSB per 10 sweeps the first 2 weeks of heading and 10 RSB per 10 sweeps the next 2 weeks.

Irrigation Management

Irrigation

Water use information comparing flood to upland rice is limited and primarily only observational at this time. Water use for furrow-irrigated rice has the potential to be lower than for flood-irrigated rice depending on rainfall, soil type, and environmental conditions. It should be noted that in some studies comparing furrow and flood irrigation, it was difficult to achieve similar yields with furrow irrigation to those achieved with flood irrigation. However, the fields evaluated were those more conducive to flood irrigation (gentle slopes and few levees), whereas most of the current interest in furrow irrigation is for fields with steep slopes that consist of many levees.

General recommendations for improving irrigation in furrow-irrigated rice include the use of a 'tail levee' at the bottom of the field to retain water in the field resulting in the lower end of the field holding some level of flood throughout the season. Also, more frequent irrigation to ensure adequate soil moisture and to avoid drought stress is highly recommended. Again, irrigation practices for furrow-irrigated rice will vary widely depending on soil type, field slope, irrigation capacity, and the cultivar being grown.

Irrigation Termination

Little information is available for determining the timing of irrigation termination for upland rice. Care should be taken not to terminate irrigation too early and risk drought stressing plants as they fill remaining kernels. As a general rule, active irrigation will be necessary longer in upland rice than in flooded rice – flooded fields have saturated soil that will take time to dry and delay drought conditions. Upland rice will not have a saturated soil profile, resulting in faster drying and drought conditions can occur much faster.

Comparative Returns for Upland Rice

Budgets comparing different rice production systems (conventional, Clearfield, hybrid, and Clearfield hybrid) are included as a separate document. This worksheet displays current average budgets for these production systems comparing estimated costs for conventional flood irrigation versus furrow irrigation. Estimated values can be changed to more accurately reflect those costs for specific grower situations. As currently entered, the estimated break-even price per bushel is $0.11 to $0.58 greater for furrow-irrigated fields than for flood-irrigated fields. For example – a conventional variety yielding 180 bu/acre would have a break-even cost of $3.93 per bushel for flood irrigation, but would increase to $4.51 per bushel for furrow irrigation.

Table 1. Rice cultivar reactions[1] to diseases (2014).

Cultivar	Sheath Blight	Blast	Straight head	Bacterial Panicle Blight	Narrow Brown Leaf Spot	Stem Rot	Kernel Smut	False Smut	Lodging	Black Sheath Rot	Sheath Spot
Antonio	S	S	--	MS	MS	S	S	MS	MS	--	--
Caffey	MS	MR	--	S	R	--	--	MS	--	--	--
CL111	VS	MS	S	VS	VS	VS	S	S	MS	S	--
CL163	MS	--	--	MS	--	--	--	--	--	--	--
CL271	S	MR	--	MS	MR	--	--	--	--	S	--
Cocodrie	S	S	VS	S	S	VS	S	S	MR	S	--
Della-2	S	R	--	S	MS	--	--	--	--	--	--
Jazzman	MS	S	S	S	S	S	MS	S	MS	MS	--
Jazzman-2	VS	S	--	VS	MR	--	S	S	--	--	--
JES	S	R	VS	S	R	VS	MS	MS	S	MR	--
Jupiter	S	S	S	MR	MS	VS	MS	MS	MS	MR	--
LaKast	S	S	MS	S	MS	S	S	S	MS	MS	S
Mermentau	S	S	VS	MS	MS	--	S	S	MS	--	--
Roy J	MS	S	S	S	MR	S	VS	S	MR	MS	--
RT CL XL729	MS	R	MS	MR	MS	S	MS	S	S	S	--
RT CL XL745	S	R	R	MR	MS	S	MS	S	S	S	--
RT XL723	MS	R	S	MR	MS	S	MS	S	MS	S	--
RT XL753	MS	R	MS	MR	--	--	MS	S	--	S	--
Taggart	MS	MS	R	MS	MS	S	S	S	MS	MS	--
Wells	S	S	S	S	S	VS	S	S	MS	MS	--

[1] Reaction: R = Resistant; MR = Moderately Resistant; MS = Moderately Susceptible; S = Susceptible; VS = Very Susceptible (cells with no values indicate no definitive Arkansas disease rating information is available at this time). Reactions were determined based on historical and recent observations from test plots and in grower fields across Arkansas. In general, these ratings represent expected cultivar reactions to disease under conditions that most favor severe disease development.

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