

MSU

Researchers Advise Not To Waste 'Waste Rice'

By Karen Brasher

Millions of ducks and geese depend on waste rice—grain that escapes combines during harvest—as a rich source of energy while wintering in major rice-growing states such as Arkansas, California, Louisiana, Mississippi, Missouri and Texas.

Rice producers do not intentionally waste rice, but combines are unable to collect all the rice and some falls to the ground. In fact, recent research conducted in Mississippi State University's Forest and Wildlife Research Center shows that, on average, about 240 pounds per acre, or about five bushels, of rice remains in fields after harvest in the Mississippi Delta.

The study found that between harvest in September and the first major arrivals of waterfowl in mid- to late-November, about 70 percent of the original deposit of waste rice gets further wasted through decomposition and consumption by rodents, birds and insects. Part of the loss is also from rice seedlings that germinate from the fallen grain but die after the first hard freeze.

By early winter, an average of only about 70 pounds an acre remains in harvested rice fields. That may seem like a lot, but when spread over an acre it is near the level at which ducks will stop feeding, said Rick Kaminski, professor and waterfowl ecologist in the Department of Wildlife and Fisheries.

"There is scientific evidence that ducks stop feeding and abandon rice fields when the 'giving-up' density of rice reaches about 45 pounds per acre," Kaminski said. "Additional research was needed to evaluate strategies that might decrease the loss of waste rice."

Kaminski, along with former graduate student and now Ducks Unlimited biologist Jennifer Kross and U.S. Geological Survey scientist Ken Reinecke, tackled the problem of how to conserve waste rice during fall in harvested fields. Ducks Unlimited, MSU's Forest and Wildlife Research Center, the Mississippi Agricultural and Forestry Experiment Station, the North American Wetlands Conservation Council, the U.S. Fish and Wildlife Service, the U.S. Geological Survey, and the states of Mississippi and Arkansas funded the research.

Kross evaluated the effects of postharvest burning, rolling, disking, mowing and no manipulation (control) of rice stubble to determine which strategies conserved the most waste rice. Immediately after harvest, the treatments did not significantly affect the abundance of waste rice, indicating all treatments had a similar starting point in early fall.

"By late fall, however, only standing stubble, burned and mowed paddies contained levels of waste rice above the giving-up density for feeding ducks," Kross said. "Paddies left in standing stubble contained the most waste rice at 93 pounds per acre, followed by burned at 65 pounds, mowed at 60 pounds, rolled at 45 pounds and disked paddies at 43 pounds."



Joe Mac Hudspeth, Jr.

Dense standing stubble, she noted, may protect waste rice from seed predators and reduce germination of fallen seed, while fire may kill the embryo of waste seeds and prevent them from germinating.

New research by current MSU graduate student Houston Havens has found that while the most waste rice was conserved by leaving fields in standing stubble, ducks and geese do not use those fields as much as those that are burned or rolled and then flooded.

"Perhaps standing stubble may not provide the optimal interspersion of vegetation and open water favored by waterfowl," Havens said.

He added that burning conserves the second greatest amount of waste rice, is far more economical than mechanical treatments and remains a legal postharvest field practice in the Delta.

The researchers recommend burning harvested rice fields with a slight head wind. This way, the fire will travel across fields quickly and produce a "patchy" distribution of stubble and open water after flooding.

"In regions of the country where fire is not permitted because of air-quality regulations, the next best strategy appears to be rolling stubble to create openings for ducks and geese to land after fields are flooded," Havens said. "Mowing and disking are not recommended because both are costly, and disking buries rice seed, making it less available for feeding waterfowl."

In addition to managing harvested rice fields to maximize availability of waste rice after harvest, the researchers strongly recommend integrating moist-soil wetlands into farmed landscapes. These natural wetlands occur frequently where rice and other lowland agriculture flourish and support a great diversity of natural grasses and sedges that produce abundant seeds and tubers used by ducks and geese.

"Managed moist-soil wetlands can help lessen losses of waste rice, because these unharvested natural crops provide more than five times the seed and duck foraging potential as harvested rice fields," said Kross, who has also researched seed availability in moist-soil areas.