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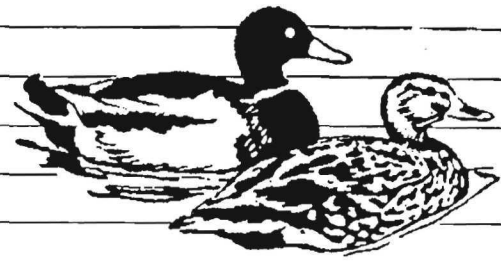

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Breeding Waterbird Use of Louisiana Rice Fields in Relation to Planting Practices

Rice (*Oryza sativa*) is cultivated throughout the southeastern United States and in California. Between 1987 and 1993, 0.95–1.24 million ha of rice were planted annually nationwide. Rice fields are managed wetlands and as such represent habitats with high potential value to wildlife, especially waterbirds. Whereas the importance of rice fields for wintering waterfowl is widely recognized, use of this habitat by nesting waterbirds such as king rails (*Rallus elegans*), common moorhens (*Gallinula chloropus*), purple gallinules (*Porphyrula martinica*), least bitterns (*Ixobrychus exilis*), fulvous whistling ducks (*Dendrocygna bicolor*), and mottled ducks (*Anas fulvigula*) has not been adequately studied. Because enforcement of the Clean Water Act will eventually prohibit discharge of silt-laden water and require farmers practicing "water seeding" (seed planted in water) to hold water on fields for at least 15 days before discharge, "dry seeding" (seed spread or drilled in fields before flooding) of rice will probably become more common in southwestern Louisiana. We undertook this study to estimate densities of waterbirds nesting in rice fields in southwestern Louisiana and compare densities of waterbirds nesting in water-seeded and dry-seeded fields.

Densities of Waterbird Nests in Rice Fields Were Estimated

This study was conducted in Acadia, Evangeline, and Vermillion Parishes in southwestern Louisiana. We selected 14 dry-seeded fields that were about 16.2 ha, had planting dates spanning the entire planting season, and were representative of the varieties of rice grown in southwestern Louisiana. Water-seeded plots were chosen from nearby fields planted with the same variety of rice and on the same schedule as companion dry-seeded plots. Plots were surveyed completely for waterbird nests after rice had headed. Surveys consisted of two persons walking through the rice spaced about 20 m apart

and looking for openings created by nest-building birds. As many as 4 h per 16.2 ha were allotted for searching individual plots. Pairs of dry-seeded and water-seeded plots were surveyed in the same day by the same two persons. Species, status (active or inactive), and location of all waterbird nests were recorded. We determined the fate (successful hatching one or more eggs, or unsuccessful) of all fulvous whistling duck nests. Additional nests were located outside study plots during a concurrent study and were used here to compare apparent nest success in dry-seeded and water-seeded rice. Rice yields (barrels/acre) for individual plots were obtained from farmers. We assumed that yields were correlated with plant stem density. Between paired comparisons, plots with the greatest yield were classified as "dense," while companion plots were considered "less dense."

High Densities of Waterbird Nests in Louisiana Rice Fields Were Observed

We surveyed 207 ha of water-seeded and 274 ha of dry-seeded rice between 6 July and 17 August 1993 and found waterbird nests in all but one plot. The minimum density of waterbird nests in Louisiana rice fields averaged (±SE) 37.2 ± 4.4 nests/km^2, but ranged as high as 92.7 nests/km^2. Densities of waterbird nests as high as 175.0 nests/km^2 were observed in selected rice fields not included in this study. Nests of king rails (15.9 ± 3.1 nests/km^2), fulvous whistling ducks (15.1 ± 3.3 nests/km^2), and purple gallinules (5.1 ± 1.4 nests/km^2) were common, whereas common moorhen and least bittern nests were rare (< 1 nest/km^2). Density estimates obtained here are lower than actual use by breeding waterbirds because some nests may have been missed during surveys, and nests were initiated by some waterbirds after surveys were completed. Furthermore, birds that were present in plots but did not attempt to nest were not accounted for in this study.

Planting Practices Had No Effect on Waterbird Nest Density

Method of planting had no effect on density of waterbird nests (paired-t = 0.69; df = 13; P = 0.505), but waterbird nesting densities tended to be greater in dense stands than in less dense stands (paired-t = 2.08; df = 13; P = 0.058). Dense stands probably provided better substrate for nests than less dense stands; however, farming practices (e.g., stable water management, soil fertility, or frequency of fertilizer application) producing dense stands also may have contributed to their selection by nesting waterbirds. Other factors potentially influencing use of rice fields by nesting waterbirds included time of planting, size of fields, number of levies, edge-to-area ratio, stature of rice (i.e., semi-dwarf vs. tall varieties), proximity of fields to buildings and roadways, adjacent land uses, previous rotation crop, availability of foods, and proximity of brood-rearing habitat.

Relative Abundance of Waterbirds Nesting in Rice Fields Seems to Have Changed

Although data are limited, it seems that the relative abundance of waterbirds nesting in rice fields has changed. For example, nesting common moorhens and purple gallinules were formerly abundant in rice fields. Eighteen common moorhen nests and 32 purple gallinule nests were found in a 24-ha rice field in Acadia Parish, Louisiana, in 1977; in 1978, 32 common moorhen nests and 28 purple gallinule nests were found in the same field. Twenty-two active purple gallinule nests were located in a 4.1-ha section of a 10.1-ha rice field in Evangeline Parish. Whereas densities of common moorhen and purple gallinule nests observed in this study were lower than those previously reported, king rail nests were relatively abundant in our study plots. Nesting density of king rails in one Arkansas rice field in 1958 (16.5 nests/km^2) was similar to that observed in this study; however, king rail populations have declined dramatically during the past 30 years in several areas of former abundance. A decrease in the king rail population nesting in Arkansas rice fields was attributed to the effects of pesticide use on crayfish (Decapoda), an important food of king rails. Expansion of crayfish aquaculture in southwestern Louisiana since the mid-1970's may account for apparent increases in king rail numbers in Louisiana rice fields.

Expansion of the breeding distribution of fulvous whistling ducks into the southeastern United States after the mid- to late 1800's coincided with the establishment of rice cultures in Texas, Louisiana, and Florida. Estimated nesting density of fulvous whistling ducks at two sites in southwestern Louisiana in 1955–57

(1.0–1.5 nesting pairs/km^2) was substantially lower than that reported here; however, statewide estimates made in 1985 indicate a breeding population of about 10,000 individuals.

Management and Research Implications

Densities of waterbird nests were not affected by planting practices during the year of study, but there was some suggestion that hatching success of fulvous whistling ducks was greater in water-seeded than in dry-seeded rice fields (15.9 vs. 8.8%). Further study is required to clarify the effects of planting practices on nesting success of waterbirds and survival of young in rice fields. Moreover, because rice fields also receive extensive use by waterbirds during other times of the year, a more comprehensive assessment is needed to understand how water versus dry planting practices influence waterbird use of rice fields throughout the year. For example, rice fields are heavily used by spring-migrating shorebirds after fields, flooded in preparation for planting, have been leveled with a blade. Dry-planted rice fields are not flooded in spring and therefore are unavailable to migrating shorebirds. Furthermore, flooding of rice fields in winter to control weeds, a practice commonly followed by farmers that plant in water, provides habitat for wintering waterbirds. Patterns of waterbird use of rice fields probably vary geographically because the timing of planting, planting practices, and varieties of rice differ between states. Additional research is needed to better understand factors influencing waterbird use of rice fields throughout rice-growing areas. Such information is essential for the development of management options for rice cultivation that maximize benefits to both producers and waterbirds.

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