OBSERVATIONS ON THE FULVOUS TREE DUCK IN LOUISIANA

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THE Fulvous Tree Duck (*Dendrocygna bicolor*) is a locally common breeding bird of the rice fields of southwestern Louisiana. The "Mexican Squealer," "Yankee Duck," or "Canard Yankee," as it is variously known to the Cajun rice farmer, is probably more closely associated with this cultivated marsh type than is any other bird. In Louisiana the tree duck nests only in rice fields, as far as can be ascertained; no breeding records for it have been reported from the coastal marshes, though it is found there regularly before and after the nesting season.

The first authentic nesting records of this species in Louisiana were reported by Lynch (1943) for August 13, 1939. He found several nests in Acadia Parish rice fields and made notes on nesting habits. The status of the Fulvous Tree Duck in this area before the introduction of rice culture is conjectural. Early occurrence records coincide fairly closely with the introduction of rice culture shortly after the Civil War. Lynch (*ibid.*) says that "it is not impossible that rice culture made possible the extension of the nesting range of this bird into Louisiana, since most of this region had been prairie prior to cultivation."

Since information on the Fulvous Tree Duck in this area is scant, we made a study of its ecology and local distribution during 1955, 1956 and 1957. Observations were made in all rice-producing parishes but were centered mainly in Evangeline and Jefferson Davis parishes, where the greatest concentrations occur during the nesting season.

Nesting densities in two large areas were estimated by counting the number of paired birds that regularly visited certain feeding fields. In one study tract, the number of pairs occupying nesting fields was determined by census. The search for nests occupied considerable time because of the difficulty of locating them in dense stands of rice, which were often over five feet high. Farmers helped locate several nests. Habitat preferences were appraised by surveys of various areas where the ducks were known to occur. Information on depredations upon crops was obtained through inspections of rice fields where Fulvous Tree Ducks had been feeding. U. S. Fish and Wildlife Service field reports provided additional material on this subject.

DISTRIBUTION AND POPULATIONS

In seasons other than the breeding period, the Fulvous Tree Duck has been reported from marshlands of the coastal parishes extending from the Mississippi River to the Texas border. Lowery (1955) reported that it was known to occur within the state during every month of the year except February.

Before rice planting begins in March and April, many Fulvous Tree Ducks concentrate in the fresh-water marshes of Vermilion and Cameron parishes. On the Lacassine Refuge, in Cameron Parish, the preferred marsh type is a fairly uniform stand of "Paille Fine" or maidencane (*Panicum hemitomon*) containing many small ponds (Fig. 1). Watershield (*Brasenia Schreberi*) is abundant in most of these ponds (Fig. 2).

FIG. 1. Coastal Marsh habitat in Cameron Parish, Louisiana. "Paille Fine" dominant vegetation.

FIG. 2. Pond of watershield in "Paille Fine" marsh.

In the spring, the first rice fields occupied by Fulvous Tree Ducks are in the area bordering the coastal marshes and extending inland about 20 miles. As these lower rice fields are being planted, flocks of the birds loaf and feed in the native marsh throughout the day and fly into the fields to continue their feeding at night. Fish and Wildlife Service personnel estimated that in May, 1945, 5000 tree ducks were operating between the Lacassine Refuge marsh and adjacent newly-sown rice fields.

A progressive movement of tree ducks into the northern tier of rice-producing parishes occurs as the young rice plants in these interior areas attain a height of eight or ten inches. By the end of April, when the earliest rice is a foot high, most Fulvous Tree Ducks are pretty well dispersed over the rice country in the vicinity of their breeding grounds.

The breeding range extends into all rice-producing parishes of Louisiana, with the exception of a small area located in the extreme northeastern section of the state. Principal nesting areas lie north and northeast of the Lacassine Wildlife Refuge in Jefferson Davis, Acadia and Evangeline parishes. The

greatest nesting concentrations appear to be in the northern part of the rice belt (Fig. 3) rather than in rice fields adjacent to the coastal marsh. This may be because rice usually is planted first in the northern part of the rice belt; drainage is better in that area and the farmer can prepare his seed bed earlier.

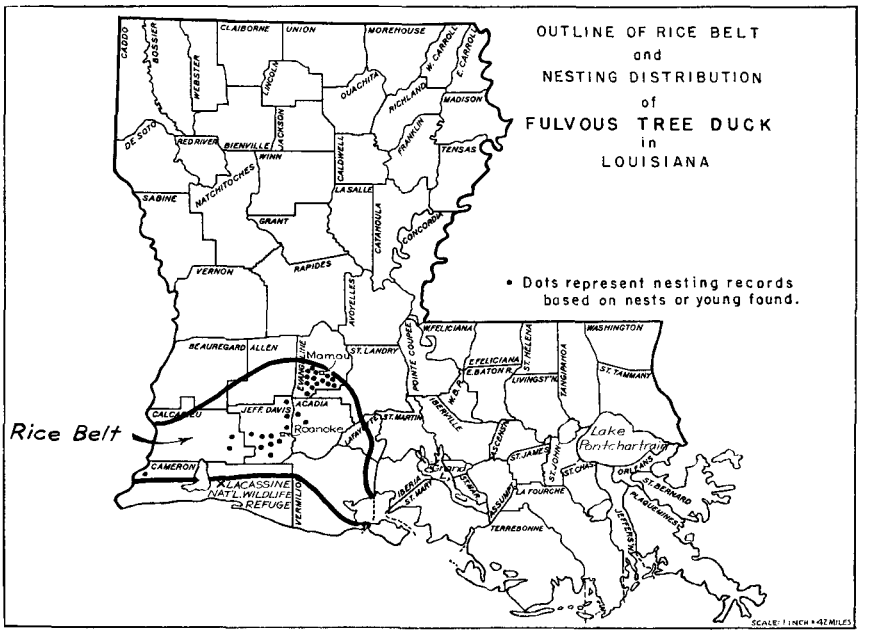

FIG. 3. Rice belt and nesting distribution of Fulvous Tree Duck in Louisiana.

We attempted to determine nesting densities in two localities in which tree ducks seemed to be most abundant. At Mamou, in Evangeline Parish, approximately 20 pairs nested in a five-square-mile area; while at Roanoke, in Jefferson Davis Parish, approximately 13 pairs were in a five-square-mile area. Nesting densities for small areas may be considerably higher, as several pairs often nest in a single field. One rice farmer located six nests in several contiguous rice fields, comprising 400 acres, on his farm near Mamou. High nesting densities in these areas may be related to the fact that they are almost due north of the Lacassine Refuge marsh, one of the important concentration points before and after the nesting season.

Following the nesting season, in late August and early September, tree ducks begin moving into large ponds, lakes, openings in mature rice fields, and flooded rice stubbles. At Mamou, a favorite gathering area is a shallow 200-acre lake. On September 17, 1955, we observed 140 tree ducks on this lake.

On September 27, 1955, approximately 500 were recorded feeding in rice stubbles and potholes in mature fields at Roanoke. Claude Lard, manager of the Lacassine Wildlife Refuge, reported that the tree duck occurs on the refuge throughout most of the year, but reaches its peak population between the latter part of August and the end of September. He recorded a flock of 3000 birds during this period in 1954 (letter of August 19, 1955).

In 1955, tree ducks had moved southward out of the northern rice-producing parishes by October 15. This movement was coincident with the first cold wave of the season and with termination of the rice harvest. To our knowledge, the latest fall flight occurred the evening of November 2, 1955, when 200 tree ducks flew over Bayou Lacassine in the direction of an inundated field of rice stubble.

Winter records in the coastal marshes are fairly numerous and include the following: four on November 25, 1956, at the mouth of the Mississippi River (R. Beter, personal communication); 400 on a 1940 Christmas count at the Lacassine Refuge (U. S. Fish and Wildlife Service files); 500 in the marshes at Chenier au Tigre, on the southwest coast of Vermilion Bay, between December 8 and 18, 1925 (A. M. Bailey, 1928). Winter recoveries of banded and recaptured birds at Avery Island were reported by E. A. McIlhenny as follows:

Banded	Recaptured
September 18, 1937	December 11, 1937
September 14, 1940	December 30, 1942
September 27, 1941	1944–45 hunting season
September 27, 1941	December 14, 1942

Wintering populations such as those mentioned above are not recorded from Louisiana every year; it is the opinion of several wildlife biologists and game enforcement officers who work in the coastal marshes that most of the tree ducks migrate southward to Mexico in winter. At present, however, there are no banding records to support this view.

Nesting Ecology

Extensive areas of rice fields form the optimum nesting habitat of the Fulvous Tree Duck on the Louisiana prairies. Fields heavily infested with weeds appear to be preferred over purer stands.

In several localities, tree ducks were observed both feeding and nesting in the same weedy rice field; in certain other areas, a single weed-infested field was selected for feeding only. Among the more common herbaceous weeds occurring in Louisiana rice fields are: signal grass (*Brachiaria extensa*), knot grass (*Paspalum distichum*), bull paspalum (*Paspalum Boscianum*), jungle rice (*Echinochloa colonum*), barnyard grass (*Echinochloa crusgalli*), Walter's millet (*Echinochloa Walteri*), sedge (*Cyperus* spp.), mud plantain (*Heteranthera limosa*), and smartweed (*Polygonum* spp.).

Nests were situated either on rice field levees or between levees over water. Six of eight nests we found were located over water between levees. These nests were attached to growing plants. The floors of the nests were several inches above the water level, which generally is fairly constant in rice fields.

Rice (*Oryza sativa*), the dominant plant of the area, is the principal material used in construction of most nests. In two nests we found rice plants which had been pulled up by the roots. Some late nests had the ripening grainheads of rice woven into them. One early nest was constructed entirely of signal grass. This nest was found in a pure stand of signal grass, which had crowded out the rice over an area of about a quarter of an acre. Most nests had a canopy of vegetation pulled over them (usually after the clutch was complete), and several were equipped with ramps leading to the rims. One nest had an S-shaped ramp four feet long. The depth of this nest from ground to top of rim was 11¼ inches and the inside width at top was 12¾ inches. None of the nests contained down.

Nesting associates of the Fulvous Tree Duck in Louisiana rice fields, in order of relative abundance, are: Redwinged Blackbird (*Agelaius phoeniceus*), Purple Gallinule (*Porphyrula martinica*), King Rail (*Rallus elegans*), Least Bittern (*Ixobrychus exilis*), and Long-billed Marsh Wren (*Telmatodytes palustris*). These nesting associates usually nest in May, June and July, but there are also August records for each.

Breeding Activities

When tree ducks arrive in the spring, the ponds and rice stubble are already occupied by paired Blue-winged Teal (*Anas discors*). Most tree ducks feed, sleep and move about in groups, although individuals or odd numbers of birds may freely leave one group for another. It seems that some tree ducks pair after their arrival on the breeding grounds.

During this early period, small groups engage in eccentric flights. Two, three, or four ducks will fly about in unison, in a flight that is characterized by much twisting, turning and sharp banking from side to side. On one occasion we observed three males (identified by their calls) following a female on the ground. The female maintained a three- to ten-foot lead, but if the males stopped following, the female moved closer to them until they began to follow again. Whenever a calling female flew over a field, many males standing on the ground immediately answered the call.

Nesting begins about the middle of May, or as soon thereafter as the rice is high enough to provide nesting cover. The earliest record for Louisiana, as far as can be ascertained, is of a nest with one egg found at Mamou on May 25, 1956. At Mamou we also found a nest with six eggs on June 8, 1956; one with six eggs on June 23, 1956; and one with five eggs on July 8, 1957. At

Elton, a nest with five eggs was located on July 4, 1955, and one with 23 eggs on July 16, 1955 (Fig. 4). Nesting may occur even later, for three downy young, approximately 30 days old, were banded on September 17, 1955.

FIG. 4. Nest of 23 eggs of Fulvous Tree Duck in mature rice field at Elton, Louisiana, July 17, 1955.

The nest we discovered at Mamou on June 8 eventually contained 13 eggs, which is about average clutch size for the Fulvous Tree Duck. Clutches in several nests found by Lynch (*ibid.*) varied from 10 to 15 with an average of 13. "Dump nests" are not uncommon with this species, as exemplified by the nest of 23 eggs, referred to above. W. L. Dawson (1923) describes such a nest in California that contained 62 eggs. We flushed three adult birds from within five feet of a nest containing nine eggs. The day before it contained only seven.

Johnstone (1957) found the incubation period for captive birds to be 26 days. The following observations on wild birds also indicate an incubation period of approximately that length: Nest A contained six eggs when it was first located on June 8; it had nine eggs on June 9, and 13 on June 15; several eggs were pipped on July 5; three had hatched by July 6. Nest B had a single egg when it was found on May 25; it contained eight eggs on June 1; on this date the eggs were placed under a domestic hen, and they hatched 24 days later.

Apparently both the male and female share in most phases of nesting activity. Pairs were seen flying together over rice fields throughout the nesting season. They were frequently observed flying together to and from their nests

and were often observed together with their brood. Delacour (1954) suggests that the male probably spends more time at the nest than the female.

Notes on Development of Young

A downy young (female) raised in captivity lost its egg tooth on the fourth day (Fig. 5). At 35 days, quills on wings and tail appeared (with feathers showing at tips of quills). At the same time, the legs began changing color from olive-green to blue-grey, very nearly the adult color. At 40 days the juvenal plumage began to appear on the upper back, flanks and front of the neck (Fig. 6). At 60 days, a remnant of the downy cheek stripe was still present, and nearly complete juvenal plumage had developed, except for rectrices and remiges. At 63 days the cheek stripe was completely gone, and initial flight occurred. Weights of this young female were as follows:

Age in days	Weight in grams
4	28.4
6	32.3
8	34.7
33	223.8
60	523.0
365	654.0

Two ducks in breeding condition weighed 747.7 grams (male) and 771.4 grams (female). This pair was collected from a rice field at Roanoke, Louisiana, on May 30, 1956.

Fig. 5. Downy young four days old.

Fig. 6. Captive tree duck six weeks old.

Fate of Nests and Young

Nesting success of first attempts may not be high, for only three of the 10 we observed were successful. Renesting undoubtedly compensates for this low figure. The early nests are particularly vulnerable to destruction and theft by farm hands, who find them in the course of "rogueing" rice fields for undesirable weeds during late June and July. On many farms this operation consists of a rather systematic coverage by a crew of boys and men walking abreast throughout a field.

A few farmers detest the tree ducks so much that the nests are destroyed whenever they are found, as are the nests of the Purple Gallinule. More often, however, the eggs are gathered and placed under a barnyard hen. Upon hatching, the young ducks usually seem to adapt readily to their surroundings. In 1955, we saw ducklings of 15 different broods in 14 barnyards. Some of these young ducks die at an early age, or are eventually eaten, while others are kept as novelties. During the summer of 1955, a farm boy showed us two dead broods of downy young, which drowned in heavy rainstorms before they were a week old. Fortunately for the tree duck, there is a considerable period following the "rogueing" operation when there is relatively little human activity in the rice field. Nesting attempts at this time are more likely to be successful than those made earlier.

Raccoons (*Procyon lotor*), opossums (*Didelphis marsupialis*), skunks (*Mephitis mephitis*) and domestic dogs wander in rice fields and on rice field levees and may destroy some nests or young. The broken eggs we saw in one nest probably had been destroyed by a raccoon. One young tree duck was found dead on a highway bordering a rice field. Man is, however, the principal decimating factor.

Since the rice harvest begins in late July, and some ducks are still nesting through August, a few nests may be destroyed each year by the combine. The eggs in a nest we studied at Elton, Louisiana, began hatching on August 6, 1955, just four days before harvesting operations began.

Foods

From field observations and stomach examinations (see Table 1) it is obvious that rice is an important food in water-planted fields near the coast. Seeds of this cultivated plant comprised 78 per cent of the food of 15 tree ducks collected and examined by Imler (1944). These ducks were collected from newly sown fields in April and May of 1944. In the late summer and fall rice appears to be less important in their diet, even though it is again abundantly available either in the stubble or standing in unharvested fields. There was only a trace of rice in the gullets and gizzards of five birds and in 100 droppings collected in late summer and fall; instead, weed seeds formed the bulk of the food.

TABLE 1

FOODS OF THE FULVOUS TREE DUCK IN LOUISIANA
(BASED ON 200 DROPPINGS AND 20 GIZZARDS)

SPRING

Dry-planted fields Upper Rice Belt[1] (100 droppings)	Per Cent	Water-planted rice Fields near Coastal Marsh[2] (15 gizzards)	Per Cent
Fimbrystilis sp.	65	*Oryza sativa*	78
Paspalum distichum	25	*Brasenia Schreberi*	11
Eleocharis sp.	10	Misc. weed seeds (*Setaria, Paspalum, Caperonia, Ranunculus*)	11
Oryza sativa	trace		

EARLY FALL

Rice stubbles and mature rice fields[3] (Gizzards and gullets of 5 birds)	Per Cent	Rice stubbles and mature rice fields[3] (100 droppings)	Per Cent
Paspalum distichum and *P. Boscianum*	50	*Echinochloa colonum* and *E. Walteri*	45
Cyperus rotundus	30	*Paspalum distichum*	30
Echinochloa colonum and *E. Walteri*	20	*Oryza sativa*	15
		Misc. sedges and grasses	10

[1] Rice drilled or disked into dry soil.
[2] Field flooded and sown by airplane.
[3] Evangeline and Jefferson Davis parishes.

The importance of rice in the spring diet may reflect the relative scarcity of weed seeds during that period. It is true, however, that some weed seeds are available at the time rice is sown, particularly in pasture fields that were in rice the previous year. Weed seeds are available also in the native marsh where the ducks forage during the early part of the planting period. The gullets of two tree ducks collected from wet pastures at Roanoke, Louisiana, on May 30, 1956, were crammed with the seeds of knot grass, signal grass, and Walter's millet. Seeds of watershield, which are commonly found in the native marsh, formed 11 per cent of the food contents of 15 tree ducks collected by Imler (*ibid.*) in April and May.

In late summer and early fall, grassy spots in rice fields provide excellent foraging sites. The panicles of several aquatic plants such as knot grass, signal grass and jungle rice, extend just high enough above the surface of the water to be convenient for feeding ducks.

When foraging for food in deeper waters, such as ponds or small impoundments, tree ducks feed by "tipping." On occasion, they also make short dives in which their entire bodies disappear under water. In shallow water, they poke their heads and necks beneath the surface without tipping (Fig. 7).

FIG. 7. A typical feeding posture of Fulvous Tree Duck.

DEPREDATIONS

The Fulvous Tree Duck is often charged with depredations upon newly sown rice fields in the spring and on the maturing fields in late summer and early fall. Damage in the spring usually occurs in fields that were flooded at the time of sowing. If the weather is warm, the rice sprouts in four or five days, and the field is then drained for a few days before being flooded again for the summer. As this first draining takes place, tree ducks, Blue-winged Teal, Redwinged Blackbirds and Boat-tailed Grackles (*Cassidix mexicanus*) flock to the mud flats and shallow pools to feed on the sprouting seeds.

Tree ducks ordinarily feed in these fields at night. In late April, they usually depart from the coastal marshes at about 8:00 p.m. for their journey to the rice fields. On bright nights they could be observed in this flight and were seen to be moving fast and usually in small, tight flocks of 30 or 40 birds. Tree duck damage in spring is confined to a few fields in the rice belt, both because of the relatively small population of birds and the limited area of water-planted rice.

Personnel of the Branch of Game Management and Branch of Wildlife Research, U. S. Fish and Wildlife Service, made a study of tree duck depreda-

tions in Louisiana rice fields in 1944. Reports (Imler *et al.*, 1944; and Davis *et al.*, 1944) of these investigations showed that in limited sections tree ducks may take nearly all of the seed, while over most of the area their feeding will result only in a thinning of the stand. Ducks destroyed as much as three per cent of seeds in some 30 per cent of the fields which contained water-planted rice. It was assumed that more seed would have been taken if the fields had been entirely unprotected by the farmer. Actual crop damage was not nearly as severe as suggested by the destruction of the seed in the spring. For in the fall evaluation it was found that in most fields where the rice seed had been nearly cleaned up, the rice plants had stooled out and filled in the gaps. The reappraised damage thus was estimated to be one half of one per cent.

In early fall, after nesting is complete, tree ducks continue to feed in fields of ripening grain and in stubble fields that still have water on them. The seeds of grasses, sedges and other aquatic plants that grow in rice fields form the major food during this period. Nevertheless, many farmers contend that flocks of tree ducks feed mostly on the ripening rice, or otherwise damage the rice by opening up and enlarging potholes. An inspection of these potholes revealed that many of them are a result of the nesting of the Purple Gallinule. In many places where a gallinule builds its nest, the rice is knocked down for a radius of 5 to 10 feet and numerous potholes develop. Certain open pond areas in rice fields also may be the result of poor cultural methods. Ducks frequent these potholes primarily to forage for grass seeds, and do occasionally enlarge them somewhat.

J. J. Carroll (1932), in writing about depredations in Texas, presented another view on this matter. "In July and August when the rice is in 'the milk,' that is to say when the kernels are soft and juicy, this duck wreaks havoc in the rice fields. The plant is bent over by the weight of the bird's body and the 'head' containing the grains completely nibbled off. When it is taken into account that a flock of a thousand or more may descend into a field in one night some idea may be gained of the heavy damage resulting. The largest numbers are to be seen in the late fall just before the southward migration."

In July, 1957, we observed over 200 tree ducks in a rice field across the road from the Texas Rice-Pasture Experiment Station, a few miles west of Beaumont. The director of this station informed us that he was not aware of any depredations and had not received a single complaint. In early October, 1955, we spent two days at Roanoke, Louisiana, observing a flock of 500 tree ducks that were working through rice fields and stubbles in an area of approximately five miles. While contingents of this flock occasionally alighted in openings in mature rice fields, most of the feeding and loafing took place in one flooded stubble field. Although from three to five per cent of the rice remained in the

stubble after the harvesting operation, several birds collected from this flock had been feeding only on weed seeds.

In mid-August, 1956, when most of the rice fields had been harvested in the vicinity of Mamou, Louisiana, a flock of some 150 tree ducks shifted their activities to a field in the "milk" stage of development. A thorough inspection of this field failed to reveal any damage to rice plants by the ducks. They were feeding entirely within the numerous grassy pools that were located in the field.

Several days prior to harvesting, rice fields are drained to facilitate the combine operation. The progressive draining of the fields results in drying up of most of the stubble by mid-fall, and the ducks then return to the coastal marsh.

It would be impossible to estimate the number of tree ducks that are shot during the rice planting and ripening periods. Since the majority of rice fields are sown by drilling (a practice which does not attract the tree duck) rather than by water planting, illegal shooting is confined to relatively few areas in the spring. Some farmers make a regular practice of shooting these birds in an attempt to "protect" their fields. No duck is more easily killed as it circles within range over the gunner's head. It is fortunate for the tree ducks that most of them migrate southward prior to the opening of the waterfowl hunting season.

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Summary

The Fulvous Tree Duck is a locally common breeding bird of the rice fields of southwestern Louisiana. Observations made in 1955, 1956 and 1957, showed that this species was probably most abundant in the vicinity of Mamou, Evangeline Parish, and Roanoke, Jefferson Davis Parish. Tree ducks arrive in the rice country as the rice is planted in the spring and usually depart following fall harvest. A few winter in the coastal marshes. The nesting period extends from late May well into August. Thirteen and 20 pairs were found nesting in two separate five-square-mile areas. All nests observed were in rice fields. Clutch size in several nests found by John J. Lynch averaged about 13 eggs. A clutch of 23 eggs was probably a dump nest. Several

investigators have reported incubation periods varying from 24 to 26 days. Nests were constructed of rice or other plants that occurred in the rice fields; they usually had a canopy and ramp; none was lined with down. Renesting compensated for some first attempt losses. Depredations on rice plantings sometimes occurred in spring in water-planted rice fields. Favorite foods were seeds of grasses and sedges found in rice fields. Flocks totalling 3000 were occasionally seen in the fall on the Lacassine Wildlife Refuge.

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