TABLE 1
WEIGHTS AND WING LENGTHS OF *SERINUS KOLIENSIS* AND *S. CITRINELLOIDES BRITTONI* FROM CENTRAL NYANZA, KENYA

		Weight (g)			Wing (mm)		
		Range	Mean	SD	Range	Mean	SD
S. koliensis	15 ♂♂	11.3–15.0	13.4	1.21	61–67	64.3	1.48
	15 ♀♀	11.9–16.1	13.8	1.20	60–66	63.0	1.75
S. citrinelloides	8 ♂♂	11.5–15.3	12.9	1.25	63–67	65.5	1.12
	7 ♀♀	11.7–14.7	13.2	0.97	63–66	64.3	1.16
	8 imm.	10.3–13.1	11.7	0.97	61–64	63.3	0.97

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Common Gallinule breeding biology and development.[1]—The breeding biology of the Common Gallinule (*Gallinula chloropus cachinnans*) in North America is little known. While studying the American Coot (*Fulica americana*) in northwestern Iowa during the summers of 1963 through 1966 (Fredrickson, 1967), I had an opportunity to study Common Gallinules.

The Ruthven Area is a small remnant of glacial lakes and marshes in Clay and Palo Alto counties. Although many marshes have been drained, the Iowa Conservation Commission has purchased the best remaining wetlands and maintains water

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levels by man-made structures. During the study, the dominant emergent vegetation was cattail (*Typha* spp.). A detailed description of the area was made by Glover (1956).

Gallinule nests were found during systematic searching of marshes for coot nests. Nests were rechecked to determine nest and hatching success. Behavioral observations were made from blinds and were recorded with a 16mm Bolex, a 35mm Pentax, and a portable tape recorder.

Interspecific conflicts.—The interaction between coots and gallinules was similar to aggressiveness within either species. Birds holding a territory had an obvious advantage because the intruding bird was always driven out. Because gallinules attain flight more quickly than coots, gallinules escaped or attacked coots more readily than coots responded to intruding gallinules. The posture of gallinules in attack or retreat was similar to the position in coots (Gullion, 1952). When attacking, gallinules held their heads parallel to the water, but retreating birds held their heads more vertically. Garter snakes (*Thamnophis* sp.) and Redhead (*Aythya americana*) females left gallinule territories after being threatened.

Sexual behavior.—Sexual displays of the Moorhen (*G. c. chloropus*) involve a series of acts described by Howard (1940: 18–37) as meeting and passing, tilting, arching, pretence pecking and pretence preening, the form of a bow, pawing, standing on the back, pecking and chasing, and coition. My two observations of copulation generally agree with Howard. One precopulatory sequence lasted 4 minutes and consisted of pecking and chasing by the male. Chases lasted 50 seconds early in the sequence but only 5 seconds immediately before the climax. The male pawed the back of the female before mounting. During copulation the male flapped his wings rapidly but did not grasp the female with his bill at any time.

Nesting.—During the 4 years I located 19 nests, but eggs in six of the nests were hatching. The mean clutch size of the other 13 nests was 7.1 ± SE 0.05 (range 5–10). See Table 1 for a summary of Common Gallinule clutches reported in North America.

Although exact dates of nest initiation were unknown, dates of initiation were classed as early, mid-, or late May or June by using the mean clutch size of gallinules on the area and the incubation period for coots, and then back-dating from the date of hatching. Of the 19 nests studied, 3 were initiated in mid-May, 2 in late May, 7 in early June, 4 in mid-June, and 3 in late June.

TABLE 1

CLUTCH SIZE OF COMMON GALLINULE NESTS REPORTED IN THE LITERATURE

Number	Mean clutch	Range	Location	Author
5	12.5	12–14	Pennsylvania	Miller (1910)
26	10	6–14	Pennsylvania, New Jersey	Harlow (1918)
9	9.33	5–15	Delaware, New Jersey, Pennsylvania	Miller (1946)
39	8.33[1]	5–16	Louisiana	Causey et al. (1968)
142	9.1	4–17	Texas	Cottam and Glazener (1959)
13	7.1	5–10	Iowa	Present Study

[1] Mean calculated by the author.

My measurements of 29 eggs from four nests were 40.4 ± SE 0.015 mm (range 40.0–47.4 mm) × 31.4 ± SE 0.022 mm (range 29.7–33.7 mm). Bent's (1926: 350) measurements of 105 eggs averaged 44 mm (range 29–49.5 mm) × 31 mm (range 28–33 mm). Six eggs from Texas measured 43.9 mm (range 42.4–45.0 mm) × 31.8 mm (range 21.2–32.3) (Simmons, 1915).

Gallinule nests are smaller but otherwise similar to coot nests in shape, material used, and attachment to emergent vegetation. Of 19 nests 17 were located in cattail, 1 in softstem bulrush (*Scirpus validus*), and 1 in three-square bulrush (*S. fluviatilis*); 18 nests were made of dried cattail stalks and 1 of three-square bulrush and cattail. The mean water depth at the nests was 53 ± SE 4.4 cm (range 20–91 cm). Nests were a mean distance of 3.5 ± SE 1.2 m (range 0–18 m) from an edge of vegetative change or water and 4.7 ± SE 1.6 m (range 2–28 m) from open water.

Incubation.—Both sexes incubated. During the daylight hours six attentive periods (sex unknown) averaged 56 minutes (range 14 to 85 minutes) for two nests after mid-incubation. Nest building continued during incubation; both sexes brought new material to the nest, and the incubating bird arranged it on the nest.

Birds about to assume incubation duties stopped on the nest ramp and preened the breast before entering the nest bowl. The movements were similar to those of the American Coot (Gullion, 1952; Fredrickson, 1967).

One pair of gallinules incubated a Ruddy Duck (*Oxyura jamaicensis*) egg with their own. After hatching the dry downy Ruddy left the nest and was not seen again (Figure 1).

Brooding.—Broodiness increased as incubation neared completion. If the adults were disturbed at the nest when the eggs were hatching, adults gave a display similar to the churning of coots. They arched their backs, held their heads low, and treaded water, meanwhile giving a characteristic bubbling sound and an occasional sharp call.

At hatching time adult gallinules gave a call that resembled "kuk-kuk-kuk," three soft notes in rapid succession, for long, uninterrupted periods. After the young hatched, the adults ate the egg shells and vitelline membranes. I believe

Figure 1. A newly hatched Ruddy Duck in a Common Gallinule nest.

that both sexes ate the shells, including the thick-shelled egg of a Ruddy Duck.

Within an hour after hatching, the young were fed by the adults. Foods most often seen in the bills of adults were dragonfly and mayfly nymphs. The young had difficulty swallowing the larger nymphs and regurgitated some insects. Swallowing was accompanied by much head shaking.

Gallinules built brood platforms or used platforms built by coots and muskrats (*Ondatra zibethica*) for brooding their young. Both sexes shared brooding and rearing duties. One adult brooded the young while the mate brought food to the nest. The brooding bird received the food and then fed the young.

I found that only one adult (sex unknown) broods the young at night. As darkness approached one parent moved to the brood ramp, settled down, and gave the "kuk-kuk-kuk" call. Young approached the bird singly, gave a "peep-peep" note, and begged for a minute or less. The bird rose slightly, and the chick wiggled beneath the parent. This pattern was repeated until the entire brood was beneath the brooding bird.

Development.—Five Common Gallinule chicks were taken from a nest shortly after hatching and reared in captivity. Development of plumage, and growth of culmen-shield and tarsus were recorded, but no weights were taken. The birds were held in a small cage with an electric lamp as a heat source and were fed larval insects, catfood, crayfish, snails, and chick starter.

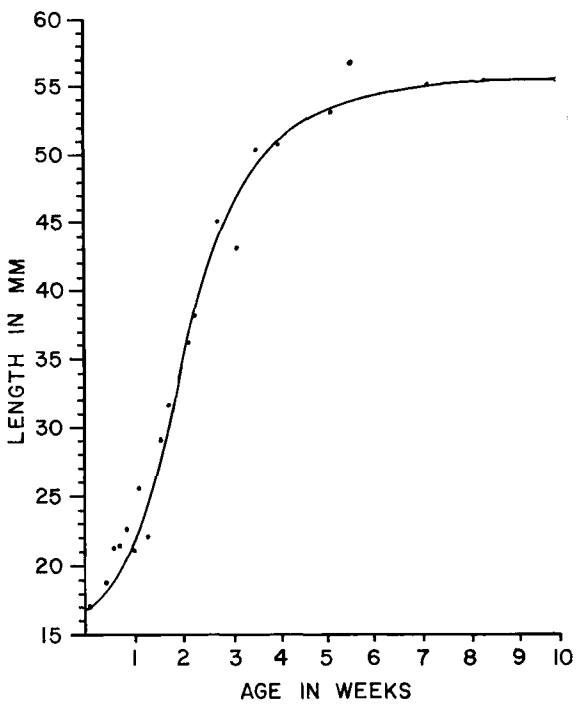

Figure 2. Growth of the tarsal length of five Common Gallinules reared in captivity from hatching to 10 weeks.

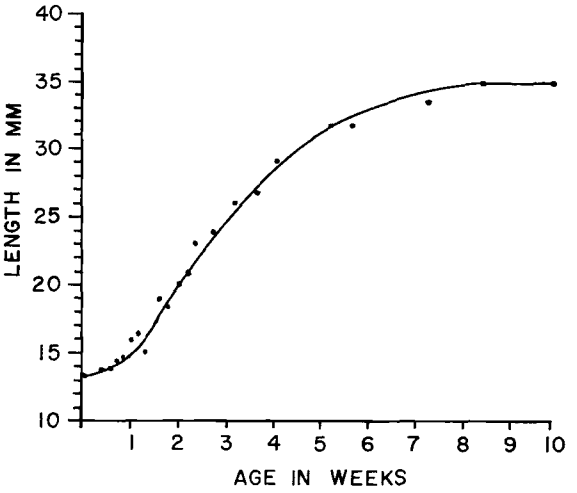

Figure 3. Growth of the exposed culmen shield of five Common Gallinules reared in captivity from hatching to 10 weeks.

At first chicks ignored food presented to them with a forceps or in shallow dishes, but they responded to a forceps with red and yellow tape that simulated the bill colors of a parent. After a few days the colors were no longer necessary. At 2 weeks of age the young no longer responded to the forceps by begging, but begging was observed in the wild beyond this time.

The begging posture of gallinules was similar to the begging posture of coots (Fredrickson, 1967). The young flapped their outstretched wings with the head tilted back and the posterior lowered. Newly-hatched birds often fell on their backs while begging.

The captive gallinules tended to defecate in water during the first 11 days after hatching, but later usually defecated in a corner of the cage. This behavior may be important in maintaining sanitary conditions on the brood ramp, but no information is available about wild bird behavior.

Measurements of the exposed culmen-shield and tarsus were recorded at 3-day intervals for 5 weeks and then at about 10-day intervals for 5 weeks. Growth of the culmen and tarsus was slow during the 1st week but was rapid from the 2nd to the 6th week (Figures 2 and 3).

Some observations on the development of Common Gallinules:

Day 8 First juvenal feathers appearing on capital tract
Day 19 Egg tooth still present on three of five young
Day 20 Tarsus changing color from a gray to a greenish; wing feathers growing rapidly; first feathers on crural tract
Day 23 Legs and ventral tract well feathered; juvenal feathers appearing on dorsal tract and tail; secondaries growing rapidly
Day 26 Auricular and ventral tracts well feathered; secondaries and primaries out of sheaths; not capable of flight
Day 28 Row of down remains on midline of belly

Day 40 Some down visible on midline of belly; white undertail coverts are distinct; wing feathers well developed

Day 54 Adult-like call given for first time; head still grayish; tarsus greenish but proximal area now yellow

Day 70 Proximal area of tarsus with hint of orange

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European Blackbird (*Turdus merula*) in Quebec.—On 23 November 1970 the junior author mist-netted and collected a specimen of European Blackbird (*Turdus merula*) in the yard of a house in Outremont, on the island of Montreal, Quebec. The bird was a male in postbreeding plumage, with fully ossified skull and testes measuring approximately 1.5 × 2.5 mm. The stomach was filled with mountain ash fruits (*Sorbus americana*). The spleen was apparently abnormally large, measuring approximately 8 × 38 mm. The preserved skin has been deposited