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## COMMON MOORHENS IN DADE COUNTY, FLORIDA, RAISE FIVE BROODS IN ONE YEAR

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The Common Moorhen (*Gallinula chloropus*) is a year-round resident throughout Florida (Stevenson and Anderson 1994). The reproductive biology of this species in Florida has been poorly studied, however, and most published literature on moorhen breeding ecology presents investigations conducted in other parts of the United States and in the Old World.

Karhu (1973) suggested that because of high chick mortality, moorhens must produce at least two broods per year to maintain a stable population. In the northern United States, moorhens are known to raise two broods annually in Michigan (Greij 1994) and in Pennsylvania (Miller 1946). In Florida, moorhens are reported to raise three broods annually (Stevenson and Anderson 1994). There are no previous reports of moorhens raising more than three broods annually in North America. In this paper, I report on a case of five broods raised between March and September 1996 by fly-in moorhens at Miami Metrozoo (Metrozoo) in south suburban Dade County, Florida.

On 26 March 1996, I discovered a moorhen nest containing one newly hatched chick and one pipped egg in an ornamental bed of firecracker (*Russelia equisetiformis*) along the northwest shore of Metrozoo's waterfowl-flamingo lake. The lake is an 0.4-ha, water-filled, poured concrete basin for the display of flamingos and exotic waterfowl. Two days after discovering the nest, I observed three chicks swimming near the nest site. Moorhen females typically lay one egg daily, producing seven to nine eggs with an incubation period of 20 to 22 days (Wood 1974, Greij 1994). Accordingly, this nesting must have begun the last week of February 1996.

All three chicks were alive and well on 18 April 1996, when I discovered a new nest containing eight eggs just 2 m south of the first nest. Although several breeding pairs of moorhens inhabit the lake and individuals are not marked, location of the nest and conspecific observance of territorial boundaries indicated that this was a renesting by the same pair whose first nest I had discovered on 26 March. On 4 May 1996, the first of five chicks hatched in the second nest. Chicks from the first brood remained in the area and assisted the parents in feeding the new hatchlings, further confirming that both nests were produced by one pair.

The pair successfully nested again three more times between late May and mid August of 1996. The third nest, 5 m south of the second, contained nine eggs; the first of five chicks hatched on 14 June 1996. I did not examine the fourth and fifth nests, but I concluded that both of these were within 15 m of the first nest based on observations of the adult moorhens entering and exiting the vegetation. Four chicks hatched from the fourth clutch by 28 July 1996; three hatched from the fifth clutch by 15 September 1996.

Like the first nest, all subsequent nests were in a dense bed of firecracker. After the initial clutch, all nestings took place with chicks from the most recent brood still in the territory, indicating that this was not a case of rapid renesting prompted by quick mortality of an entire brood of very young chicks.

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Based on recorded and inferred laying and hatching dates, the interval between hatching of the first chick of a brood and the laying of the first egg of a successive clutch averaged 20 days (range: 15-27). Among multiple-brood moorhen pairs in England, Huxley and Wood (1976) considered 25 to 30 days between the hatching of one brood and laying of the subsequent clutch to be typical; in South Africa, Siegfried and Frost (1975) found the same interval averaged only 14 days.

It is possible that these adults were able to nest successfully five times in rapid succession because they received assistance in feeding the chicks by juveniles from the previous brood or broods. However, none of the other moorhen pairs I monitored at the waterfowl-flamingo lake from 1994 to 1996 raised more than four broods; many of these pairs also had juvenile helpers. Whether or not assistance by juveniles enhances reproductive success in moorhens is uncertain. Based on his observations, Gibbons (1987) concluded that pairs with helpers reared more chicks per nesting attempt than those without helpers. By contrast, Leonard et al. (1989) conducted a removal experiment that showed no significant difference in reproductive success between pairs whose juvenile helpers were removed and control pairs.

Commenting on persistent successful renesting by Common Moorhens in South Africa, Siegfried and Frost (1975:102) declared ". . . it may be assumed that the species has the propensity for reproducing whenever and for as long as conditions are favorable." The conditions at the Metrozoo lake appeared favorable for moorhen reproductive success. A constant water level was maintained and supplemental food intended for the zoo's captive birds was available daily. Furthermore, the lake is located in a warm climate and does not freeze over. Freed from extremes of drought or frost and having constant access to a reliable food source, this pair of Common Moorhens was able to produce five broods in just six months.

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