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Inter-island Dispersal of the Mariana Common Moorhen: A Recolonization by an Endangered Species

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ABSTRACT.—Mariana Common Moorhens *(Gallinula chloropus guami)* rapidly colonized a human-made wetland on the Island of Rota in Micronesia. Although prehistoric evidence suggests that moorhens once occurred on Rota, the historic lack of wetland habitat prior to construction of an artificial wetland apparently precluded more recent occupation. This recolonization demonstrates that moorhens can rapidly exploit newly available habitat by dispersing significant distances (at least 77 km) over open ocean. *Received 25 Aug. 1997, accepted 14 March 1998.*

The Common Moorhen *(Gallinula chloropus)* is nearly cosmopolitan in distribution and is dependent on freshwater marshes with emergent vegetation (Ripley 1977, Taylor 1996). In the Pacific, it occurs on many islands with suitable wetland habitat. *Gallinula chloropus sandvicensis* is a resident of Kauai and Oahu in the Hawaiian Islands (Engilis and Pratt 1993), and *Gallinula c. orientalis* is a rare resident in Palau (Engbring 1988, Pratt et al. 1980, Taylor 1996). In the Mariana Islands, the Mariana Common Moorhen (*G. c. guami*) is endemic to Guam, Tinian, and Saipan, but was recently extirpated from Pagan. Ash deposition from a volcanic eruption, together with feral ungulates and introduced fish, eliminated the remaining habitat in 1981 (Stinson et al. 1991; Stinson 1993, 1994, 1995). Between 300 and 400 moorhens remain in the Mariana Islands (Stinson 1995). Both *G. c. guami* and *G. c. sandvicensis* are listed as federally endangered (USFWS 1984).

The Mariana Island archipelago comprises the 14-island U.S. Commonwealth of the Northern Mariana Islands and the Territory of Guam (Fig. 1). The 15 islands extend 750 km between 13° 14′ N, 144° 45′ W and 20° 3′ N, 144° 54′ W, about 1500 km east of the Philippine Islands. Though volcanic in origin, the islands where moorhens occur are largely forested limestone plateaus. The climate is tropical, with daily mean temperatures of 24-32° C and average annual rainfall of 200–260 cm.

Paleobiological evidence indicates that the Mariana Common Moorhen occurred prehistorically on the small (85 km^2) island of Rota (Steadman 1992) approximately 1500–2000 ybp (Becker and Butler 1988) but were extirpated, possibly by human-related losses of wetlands (Steadman 1992), or the natural elimination of wetland habitat over time caused by sea-level changes (Stinson et al. 1991). Hunting, introduced rats, or cats may also have contributed to the loss of moorhens from Rota (Steadman 1992, Stinson et al. 1991). There is no historic evidence of this species on Rota (Baker 1951).

Construction of an 18-hole golf resort on the north coast of Rota began in 1992. The waste water treatment plant for the resort includes two 0.6 ha primary stabilization ponds and two 0.15 ha secondary polishing ponds. The primary ponds are devoid of vegetation, but the polishing ponds contain thick plantings of sedge (*Cyperus* sp.). These ponds were filled with water and planted late in 1994. Since its creation, the site has attracted a variety of migratory birds, including several species new to the island (Wiles and Worthington 1996; Worthington, unpubl. data). On 12 April 1995, an adult Mariana Common Moorhen was observed at one of the vegetated secondary ponds. This was followed on 14 June by the sighting of an adult with two juveniles approximately ten weeks old (based on Ritter 1994). Subsequent observations confirmed the presence of two adults and three juveniles; at least two of these young fledged. Three 1 month-old chicks and two more chicks of similar age were seen at the same location on 23 November 1995 and 13 April 1996 respectively, and one older chick was observed on 26 July 1996, indicating three additional cases of successful breeding. Single moorhens were

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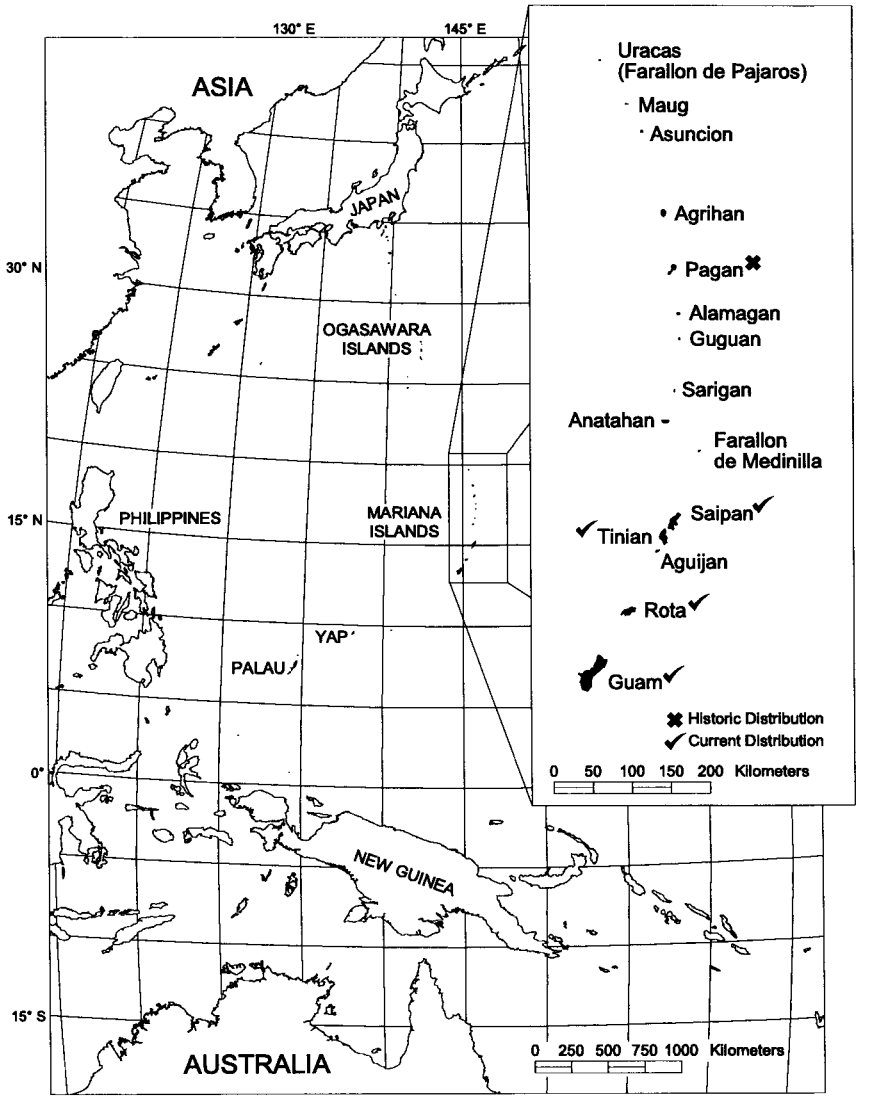

FIG. 1. Mariana Common Moorhen distribution in the Mariana Islands.

also observed in late 1995 at the golf course water hazards. One subadult was observed over 600 m from the nearest water, indicating that, as elsewhere, the birds on Rota are not exclusively restricted to wet areas. However, the lack of wetland habitat elsewhere on the island would preclude their breeding outside of the golf course property (K. Evans, pers. comm.).

Rota was probably re-colonized by moorhens migrating from one of the three Mariana islands occupied by the species. Guam lies 77 km SSW of Rota, and Tinian and Saipan are located about 120 and 127 km NNE of Rota, respectively. The birds were initially observed on Rota during the dry season (roughly January through June), the period when considerable intra-island movement of moorhens occurs on Guam (G. Wiles, pers. comm.) and on Saipan and Tinian (A. Marshall, pers. comm.). During April 1995, water was absent from Lake Hagoi on Tinian, and the number of moorhens observed during monthly counts there fell to zero from a mean of 22 birds

during the previous rainy season. No moorhens were seen elsewhere on the island during that time (S. Kruger, pers. comm.; USFWS 1996). Moorhens may fly between Tinian and the other islands seasonally, possibly regularly (Stinson 1993). Tinian lies just 5 km south of Saipan, so movement between these two islands seems likely, but remains to be documented.

The golf course treatment ponds and water hazards are presently the only permanent bodies of freshwater on Rota and are likely the reason these birds remain on Rota. Moorhens have been seen at the water hazards, which lack vegetation. Planting these ponds with emergent vegetation would likely expand the available breeding habitat on Rota. Many natural wetlands in the Mariana Islands undergo seasonal desiccation, precluding breeding by moorhens during the dry season. Human-created wetlands like the ones described here may provide year-round breeding habitat for moorhens, provided that alien species do not become established. The reed *Phragmites karka* can completely cover open water areas, eliminating moorhen habitat (Stinson et al. 1991), and tilapia (*Oreochromis mossambicus*) is an alien fish that probably competes with moorhens for food. Both of these species are invasive pests in many Mariana Island wetlands, although tilapia do not persist in ephemeral wetlands.

On Guam, moorhens have rapidly invaded human-created wetlands (Ritter and Sweet 1993), and they have been seen at newly flooded sites on Saipan (D. Stinson, pers. comm.). The species apparently is successful in exploiting scattered habitat, flying between areas at night (Roselaar 1980, Taylor 1996). Common Moorhens were not previously known on Yap, but one seen there in early July 1994 in an artificial wetland was probably a vagrant from the Philippines or Indonesia (G. Wiles, pers. comm.). The distribution of this species in the Pacific suggests that inter-island movement must have occurred historically, and these observations in Micronesia indicate that such movement continues. Nonetheless it is surprising how rapidly moorhens colonized Rota: the vegetated ponds on Rota possessed adequate cover for the birds for only a few months before moorhens were seen there. Moorhens may disperse frequently between islands, perhaps impelled by the natural desiccation of wetland habitat.

The observations described here, together with those of Engilis and Pratt (1993) and Ritter and Sweet (1993), demonstrate that human-created wetlands can provide important breeding habitat. The re-colonization of Rota shows that moorhens are capable of rapidly exploiting newly available habitat by dispersing significant distances over open ocean. Degradation and loss of natural wetlands is cited as a primary factor in the decline of moorhens in the Mariana Islands (Stinson et al. 1991, USFWS 1991). The success of moorhens in exploiting the new habitat on Rota further suggests that moorhen habitat can be augmented if the filling of wetlands that do not support moorhens is mitigated by the creation of open water wetlands when enhancement or management of existing habitat is not possible.

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The Diet of the Madagascar Red Owl (*Tyto soumagnei*) on the Masoala Peninsula, Madagascar

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ABSTRACT.—Based on pellets collected at the first known nest of this endemic species, data are presented on the diet of the Madagascar Red Owl (*Tyto soumagnei*). This owl feeds almost exclusively on small mammals, the vast majority of which are native to the island. There is evidence that this species hunts at the forest edge and uses open human-degraded habitats. There is virtually no overlap in the diet of the Madagascar Red Owl and the Barn Owl (*T. alba*). *Received 17 July 1997, accepted 10 May 1998.*

Until recently, the endemic Madagascar Red Owl (*Tyto soumagnei*) was thought to be extremely rare and restricted to primary rain forest in the eastern portion of Madagascar (Collar and Stuart 1985, Langrand 1995). Over the past five years this species has been recorded at numerous localities in eastern Madagascar, and it is becoming increasingly clear that it is at best reclusive, rather than rare, and is widespread in disturbed habitats (Halleux and Goodman 1994; Powzyk 1995; Thorstrom 1996; Goodman et al. 1996; Thorstrom et al. 1997). Although information on the distribution and natural history aspects of the Madagascar Red Owl have been significantly augmented in the past few years, certain aspects of its life history remain poorly known and some published information is contradictory to that gathered from recent field work.

With the capture and radiotagging of an adult female Madagascar Red Owl in October

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