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Invasive Birds

Global Trends and Impacts

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32 Grey-headed Swamphen (*Porphyrio poliocephalus* Latham, 1801)

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32.1 Common Names

Grey-headed Swamphen, Purple Swamphen, Pukeko (New Zealand).

32.2 Nomenclature

The taxonomic status of *Porphyrio* swamphens is under refinement. Although taxonomic uncertainties exist in the eastern portion of the swamphen's range (A.W. Kratter, personal communication), most authorities now consider the Purple Swamphen complex to consist of six species: the Western Swamphen (*P. porphyrio*) of south-western Europe and north-western Africa; the African Swamphen (*P. madagascariensis*) of Egypt, sub-Saharan Africa and Madagascar; the Grey-headed Swamphen (*P. poliocephalus*) from Turkey to Thailand; the Black-backed Swamphen (*P. indicus*) from Burma to Borneo; the Philippine Swamphen (*P. pulverulentus*) of the Philippines; and the Australasian Swamphen (*P. melanotus*) from Sulawesi through Australia, New Guinea and New Zealand to American Samoa (Sangster, 1998; Garcia-R and Trewick, 2015). For this chapter, we supplement information on the non-native Grey-headed Swamphen population found in Florida with information on Purple Swamphens throughout their range, even if not necessarily specific to Grey-headed Swamphens.

32.3 Distribution

Purple Swamphens are widespread in the Old World, occurring from Western Europe and Africa east through southern

Asia, Australia, New Zealand and islands in the Pacific Ocean to American Samoa. Swamphens are non-migratory throughout their range, but are known to disperse long distances (over 1000 km; e.g. Grussu, 1999; Sánchez-Lafuente *et al.*, 2001) in response to local wetland conditions. Grey-headed Swamphens are native from Turkey and Saudi Arabia east through India and southern Asia to northern Thailand (Sangster, 1998; Fig. 32.1). The first record of a Grey-headed Swamphen in North America was an adult photographed at Wilmington, Delaware, in December 1990; this individual was considered to be ship-assisted, perhaps from an American naval vessel returning from the Persian Gulf (Boyle *et al.*, 1991; Mumford, 2013; Pranty, 2013a, b). Around 1996, a population of Grey-headed Swamphens was discovered in south-eastern Florida, 1580 km farther south; this population began from an unintended release and is now well established (Pranty and Schnitzius, 1998; Pranty *et al.*, 2000; Pranty, 2001, 2012, 2013a, b; Hardin *et al.*, 2011; Callaghan *et al.*, 2017). The Florida population of Grey-headed Swamphens is believed to be the only non-native population of the Purple Swamphen complex found anywhere in the world.

32.4 Description

Purple Swamphens are huge rails with a stocky body, a large bill and prominent frontal shield, and long legs and feet (Fig. 32.2). Swamphen measurements differ by populations; adult measurements include body lengths of 38–50 cm and wingspans of 90–100 cm. Adult body mass ranges are 480–737 g in African Swamphens, 679–1310 g in Australasian Swamphens, and 505–850 g in Grey-headed Swamphens (Taylor, 1996; Callaghan and Gawlik, 2016). Adult plumage varies but is characterized by bluish or purplish bodies, often with greenish feathering on the back and/or upperwings, reddish bills, frontal shields and legs (the latter often with darker joints), reddish or orangish irides and white undertail coverts. The sexes may be indistinguishable

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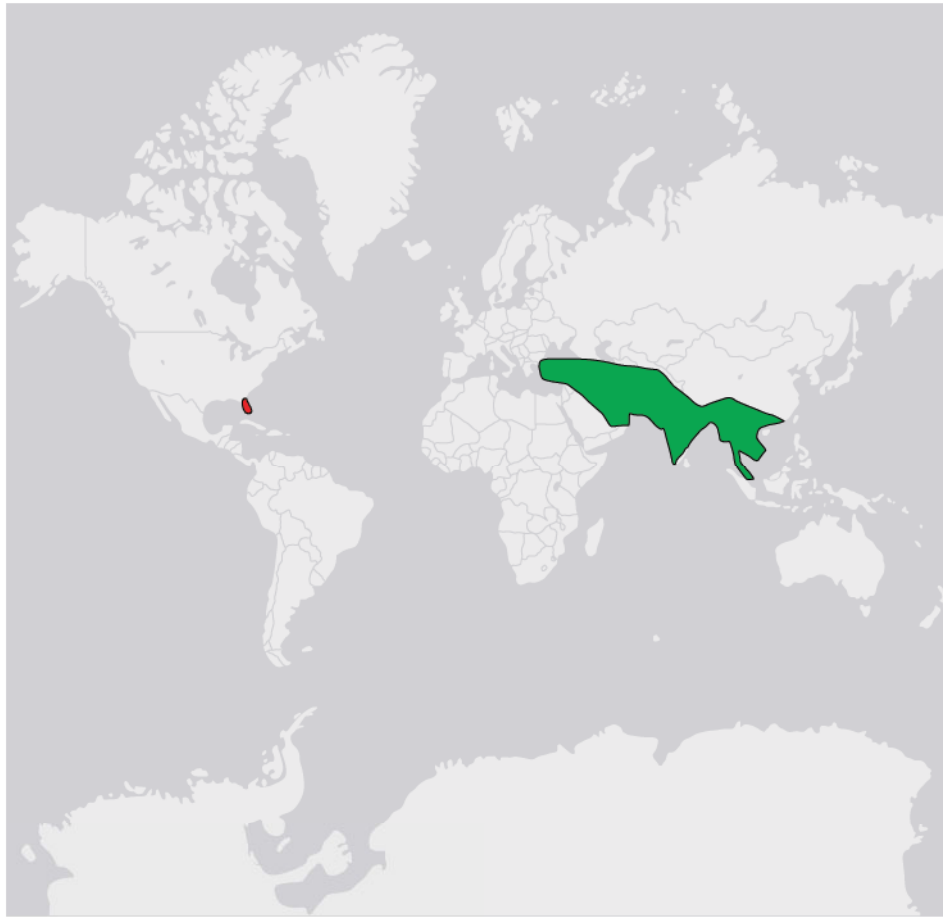


Fig. 32.1. Global distribution of the Grey-headed Swamphen (*Porphyrio poliocephalus*) showing its native (green) and non-native (red) ranges. The population of Grey-headed Swamphens in Florida, USA, is believed to represent the only non-native population of the Purple Swamphen complex found anywhere in the world. (Map created by Corey T. Callaghan.)



Fig. 32.2. Adult Grey-headed Swamphen feeding on its preferred food item in Florida, Gulf coast spikerush *Eleocharis cellulosa*. Swamphens feed by grasping tubers in the toes of one foot while balancing on the other foot. (Location: Wakodahatchee Wetlands, Delray Beach, Palm Beach County, Florida; 15 November 2007.) (©Photograph: Bill Pranty.)

by plumage, but males are larger and heavier than females. The wings are rather broad and rounded, and the tail is short, as is typical of rails. Juveniles have duller plumage and dusky bare parts. The chicks are downy black with a whitish bill and frontal shield and pink legs and feet. True to their name, adult Grey-headed Swamphens are distinguished from other swamphens by their pale heads and upper necks, along with a generally duller purple coloration in their plumage. Vocalizations include a variety of croaks and moans typical of rail species, including a ‘creek’ and a ‘bark’ (Pranty 2013a; Callaghan *et al.*, 2017), frequently calling in flight. Although strong fliers, swamphens often run away to escape danger, and they rarely swim. Callaghan *et al.* (2017) has provided detailed plumage descriptions, including of juveniles, as well as detailed vocalization descriptions of Purple Swamphens.

32.5 Diet

Purple Swamphens have a varied diet but feed primarily on the soft shoots of reeds (*Poaceae*) and rushes (*Juncaceae*) (Ripley, 1977). Some individuals also feed opportunistically on insects,

arthropods, molluscs, fish, amphibians, reptiles, birds and rodents (Taylor, 1996). Tubers are plucked off with the bill and held with the toes of one foot, while the swamphen balances on the other foot. Sometimes the tubers are eaten whole, while at other times the stem is opened to reveal the soft inner core, and the hard outer shell is discarded (Pranty, 2013a). Swamphens also feed by climbing tall (over 1 m) reeds and eating from the top (Hamling, 1949). A diet study at three sites in southern Florida (Lake Okeechobee in Glades County, Water Conservation Area 2B in Broward County, and Stormwater Treatment Area 1W in Palm Beach County) found that Grey-headed Swamphens feed primarily on the stems of Gulf coast spikerush (*Eleocharis cellulosa*), but the study also found grit, insects, Lepidoptera, and molluscs in swamphen stomachs (Callaghan and Gawlik, 2016). Additionally, swamphens in Florida have been observed feeding on rice (*Oryza sativa*) planted in conservation areas and the Everglades Agricultural Area, and on earthworms (Oligochaeta), bird seed, grass shoots and human foods such as peas, melon rinds and cooked pasta in suburban areas (Pranty *et al.*, 2000; Pranty, 2013a).

32.6 Introduction and Invasion Pathways

The population of Grey-headed Swamphens in Florida, USA, was founded inadvertently by one or two aviculturists at Pembroke Pines, Broward County, who allowed their captive swamphens to roam freely. Evidently, some of these swamphens found suitable wetlands nearby and remained to breed. The first swamphen was photographed in May 1998, a period thought to be around 18 months after the first sighting; thus, many references list the date of discovery as 1996 or December 1996 (e.g. Pranty *et al.*, 2000; Pranty, 2001, 2012; Callaghan *et al.*, 2017). The founding population must have been small, as neither aviculturist noted any reduction in their captive flocks, but additional immigrants may have supplemented the population over several years (Pranty, 2013a). The non-captive swamphen population at Pembroke Pines numbered 84 individuals in October 1998, 135 individuals in February 1999 and smaller numbers up to February 2003 when the surveys ended (Pranty and Schnitzius, 1998; Pranty *et al.*, 2000; Pranty, 2001, 2012, B. Pranty, personal observation).

By 2000, Grey-headed Swamphens in Florida had begun to disperse, with movements noted as far as 83 km from Pembroke Pines (Pranty, 2001). Based on the swamphen's increasing numbers and expanding range, staff of two state agencies undertook an eradication programme. Begun in 2006, the programme was deemed a failure and was discontinued in 2008 (see section 32.10). By 2011, the Grey-headed Swamphen population in Florida was considered established: swamphens had been breeding for at least 15 years; they occurred at 30 discrete sites; four dispersals between 250 and 350 km from Pembroke Pines had been documented; their core area in Broward, Hendry and Palm Beach counties encompassed 2840 km²; and a polygon drawn around all swamphen locations in the state exceeded 35,000 km² (Pranty, 2012). Two Grey-headed Swamphens photographed at Gainesville, Alachua County, in 2015 and 2016 currently represent the northern-most record in Florida (Callaghan *et al.*, 2017; B. Pranty, personal observation);

this site is less than 112 km from the Florida/Georgia border. Colonization by swamphens of additional wetlands in Florida, and perhaps beyond, is expected if not already under way. An adult Grey-headed Swamphen photographed at Bull Island, Cape Romain National Wildlife Refuge in Charleston County, South Carolina, in October 2018 (Wagner-McLean, 2018), probably dispersed from the Florida population. If so, it would represent a dispersal of more than 775 km.

32.7 Breeding Behaviour

The breeding ecology of Grey-headed Swamphens in Florida is poorly known and is based exclusively on opportunistic observations, so most information provided here refers to studies of Purple Swamphens elsewhere in their range. Swamphens have variable mating systems, ranging from monogamous to promiscuous to communal. The mating system of Grey-headed Swamphens in Florida is unknown, but their propensity for occurring in groups suggests that they may breed communally (Callaghan *et al.*, 2017). Some Purple Swamphen populations build several nests and then select one of these for egg-laying. Swamphen nests are built close to, above or on top of shallow water and are composed of the leaves and stems of various aquatic plants (Fig. 32.3). Both sexes bring material to the nest, but it is the female that largely builds the nest. Nest construction continues through incubation (Callaghan *et al.*, 2017). Western Swamphen nests in Italy contain ramps, and other swamphen nests have had stems bent over the top to form a canopy (Callaghan *et al.*, 2017); these behaviours have not been noted in Florida.

Purple Swamphen clutch size varies by population; communal clutches are larger than single clutches. Grey-headed Swamphen clutch size in India was 4.5 eggs (range three to seven, $n = 25$; Doss *et al.*, 2009). Incubation begins after the



Fig. 32.3. An incubated Grey-headed Swamphen clutch in Florida. Information on the breeding biology of swamphens in Florida is poorly known and based entirely on opportunistic observations; this may be the only active swamphen nest found (Location: Pembroke Pines, Broward County, Florida, 25 July 1999). (©Photograph: Bill Pranty.)

penultimate egg is laid. The incubation period varies among populations but is 19–22 days for Grey-headed Swamphe ns in India (Doss *et al.*, 2009). From about day 2, chicks can feed themselves but are reliant on adults for most of their food until they reach about 2 months of age, after which the juveniles feed themselves exclusively (Craig, 1980). Because of the subtropical climate in Florida, Grey-headed Swamphe ns appear to breed year-round; downy chicks have been observed in all months except December (Pranty, 2012; Callaghan *et al.*, 2017; eBird: www.ebird.org, accessed 7 November 2019). Year-round breeding was also reported for Western Swamphe ns in Italy (Grussu, 1999). In contrast, egg-laying in Western Swamphe ns was restricted to March and April in Algeria (Mouslim *et al.*, 2014) and in Grey-headed Swamphe ns to January–April in southern India (Doss *et al.*, 2009).

32.8 Habitat

Throughout their range, Purple Swamphe ns are habitat generalists, found in and along the margins of slow-flowing or stagnant fresh- or brackish-water marshes, lakes, ponds, rivers and floodplains, as well as artificial habitats such as sewage-treatment facilities, agricultural fields, parks, golf courses and other grasslands (Taylor, 1996, 1998). Swamphe ns use their long legs to wade in shallow water and their long toes to walk across floating vegetation. In Florida, Grey-headed Swamphe ns inhabit shallowly flooded fresh-water wetlands with open or semi-open, emergent vegetation such as Gulf coast spikerush, arrowhead (*Sagittaria* spp.), pickerelweed (*Pontederia cordata*), water lily (*Nymphaea* spp.) and sawgrass (*Cladium jamaicense*) interspersed with patches of cattail (*Typha domingensis* and *T. latifolia*) and willow (*Salix caroliniana*) (Pranty *et al.*, 2000; Hardin *et al.*, 2011; Pranty, 2012). Swamphe ns in Florida are commonly observed in agricultural areas growing rice or sugarcane, and they often forage on residential lawns, dikes and other grassy or weedy areas adjacent to marshes (Hardin *et al.*, 2011; Callaghan *et al.*, 2017; B. Pranty and C.T. Callaghan, personal observation). In contrast, swamphe ns in Florida appear to avoid brackish and saltwater habitats, such as some habitats in the Everglades National Park.

32.9 Impacts

The attempted Grey-headed Swamphe n eradication programme (see section 32.10) was initiated based on the concerns that swamphe ns in Florida would negatively impact native species such as Purple Gallinules (*Porphyrio martinica*), Common Gallinules (*Gallinula galeata*) and American Coots (*Fulica americana*), and/or substantially damage vegetation in native and human-modified wetlands (Hardin *et al.*, 2011). The swamphe n population was also thought to be small and limited in range, and thus susceptible to a targeted eradication effort (Hardin *et al.*, 2011). However, the impacts of swamphe n

competition on native bird species have yet to be documented, and negative impacts of swamphe ns foraging on wetland vegetation presently appear to be localized and minor (e.g. photographs in Pranty, 2013a), but can sometimes encompass areas of approximately 500 m². None the less, additional studies on the potential impacts of swamphe ns on native flora and fauna are needed (Callaghan *et al.*, 2017).

32.10 Control

From October 2006 to December 2008, 3187 Grey-headed Swamphe ns were culled, mostly by shot-gunning from airboats, at seven sites in the Lake Okeechobee to Everglades region in south-eastern Florida (Hardin *et al.*, 2011). The eradication programme was discontinued because it was not reducing the size of the swamphe n population, which proved to be much larger than had been anticipated, and because some swamphe ns had moved into wetlands where control efforts were not taking place (Hardin *et al.*, 2011). After the attempted eradication programme ended, state authorities discussed making the swamphe n a game bird in Florida (United Press International, 2010), but, to date, no hunting season has been enacted. In addition to humans, predators of Grey-headed Swamphe ns and their eggs in Florida undoubtedly include reptiles such as snakes and American Alligators (*Alligator mississippiensis*), birds, and native and domestic mammals, but few depredations have been observed (Pranty, 2013a). One swamphe n chick at Pembroke Pines was taken by a Great Blue Heron (*Ardea herodias*), and other swamphe ns have been traffic casualties (Pranty *et al.*, 2000; Pranty, 2013a).

32.11 Uses

The Grey-headed Swamphe n in Florida has proven to be a popular species for study, from the perspectives of research, management and observation (e.g. Pranty *et al.*, 2000; Hardin *et al.*, 2011; Pranty 2012, 2013a; Callaghan and Gawlik, 2016). Through August 2018, birders in Florida had submitted 11,891 checklists to eBird (www.ebird.org) that contain Grey-headed Swamphe n observations. These data originated from the following counties (with the number of reports from each in parentheses): Alachua (141), Brevard (217), Broward (1231), Collier (36), Glades (133), Hendry (1512), Indian River (42), Lee (753), Martin (33), Miami-Dade (652), Okeechobee (34), Orange (178), Osceola (8) and Palm Beach (6921). Another potential use for swamphe ns in Florida, as noted above, is as a game bird.

32.12 Acknowledgements

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32.13 References

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