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PORPHYRIO PORPHYRIO VIRIDIS BEGBIE, 1834 (PURPLE SWAMPHEN), GEM OF SINGAPORE'S MARSHES

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INTRODUCTION

Porphyrio porphyrio belongs to the order Gruiformes, suborder Grues and family Rallidae (rails, gallinules and coots) (del Hoyo et. al., 1996). It is one of the largest rails in existence and is a very widespread species of water fowl. The species is further divided into 13 subspecies differentiated by their size and plumage variations, ranging from Southern Europe, Africa, the Indian subcontinent, through Southeast Asia, Australia, New Zealand, and a few Pacific Islands (Table 1) (del Hoyo et. al., 1996). This species prefers fresh- or brackish water habitats that are stagnant, or slow-flowing, and overgrown by marsh plants such as *Carex*, *Cyperus*, *Phragmites*, and *Typha* (del Hoyo et. al., 1996). It is omnivorous but mainly vegetarian, eating shoots, leaves, roots, stems, flowers, and seeds of aquatic, and semi-aquatic plants. Its principal food includes *Scirpus*, and *Typha* leaf bases and pith, young rice plants, seeds of grasses, sedges, *Polygonum* and *Rumex*, and vegetative parts of water lilies (tubers) (del Hoyo et. al., 1996). Animal foods constitute only a small portion of its diet, and include molluscs, leeches, small crabs, insects and their larvae, spiders, fish and their eggs, frogs and their eggs, lizards, snakes, as well as birds, their eggs and nestlings (del Hoyo et. al., 1996).

The subspecies occurring in Singapore is *Porphyrio porphyrio viridis*, the purple swamphen (Wang & Hails, 2007). It and has a large reddish-orange shield, black upperparts and upperwing coverts with a greenish tinge, caerulean blue throat and breast, and large red legs and feet (Fig. 1). The typical habitat for the purple swamphen in Singapore would be a water body with copious amounts of aquatic or semi-aquatic plants such as water spangle (*Salvinia molesta*), water hyacinth (*Eichhornia crassipes*), *Acrostichum aureum* and *Dillenia suffruticosa*. In the past, these habitats would have been more common, e.g., when some of Singapore's reservoirs were heavily vegetated and covered with floating plants such as water hyacinth in 1975 (Wee & Corlett, 1986).

Table 1. *Porphyrio porphyrio* subspecies and their natural geographical ranges.

Subspecies	Geographical Range
Porphyrio porphyrio bellus	Southwest Australia
Porphyrio porphyrio caspius	Caspian Sea, Northwest Iran, and Turkey
Porphyrio porphyrio indicus	Greater Sundas to Bali, and Sulawesi
Porphyrio porphyrio madagascariensis	Egypt, sub-Saharan Africa, and Madagascar
Porphyrio porphyrio melanopterus	Moluccas, and Lesser Sundas to New Guinea
Porphyrio porphyrio melonotus	North and East Australia and Tasmania, to New Zealand, Kermadec Island and Chantham Island; New Guinea
Porphyrio porphyrio pelewensis	Palau Islands
Porphyrio porphyrio poliocephalus	India and Sri Lanka through Bangladesh, the Andamans, Nicobars and North Myanmar to South-Central China and North Thailand
Porphyrio porphyrio porphyrio	East and South Spain, South France and Sardinia to Morocco, Algeria and Tunisia
Porphyrio porphyrio pulverulentus	The Philippines
Porphyrio porphyrio samoensis	Admiralty Island to New Caledonia, and East Samoa
Porphyrio porphyrio seistanicus	Iraq, and South Iran to Afghanistan, Pakistan, and Northwest India
Porphyrio porphyrio viridis	South Myanmar, South Thailand, and Peninsular Malaysia through Indochina to South China

Fig. 1. *Porphyrio porphyrio viridis* at the Public Utilities Board (PUB) experimental bioremediation wetlands at Neo Tiew Lane 2. (Photograph by: Alvin Francis Lok Siew Loon).

PAST AND PRESENT RECORDS

The purple swamphen was first recorded in Singapore as a rare vagrant, with an immature bird shot at Paya Lebar in 1940 (Molesworth in Gibson-Hill, 1949a). This subspecies was later again recorded near Jurong River on 27 Sep.1969 (Tweedy in Wells, 1972). Although unrecorded in Johore (Wells, 1999), the purple swamphen could very well have occurred there, but was probably overlooked ;because of poor surveying efforts in the Johore area over the past 30 years (R. Subaraj, pers. obs.). This combined with the general lack of suitable habitats within the state, may be the reason why the purple swamphen has never been recorded in Johore (R. Subaraj, pers. obs.). This lack of sightings of the purple swamphen in Johore may have led Wang & Hails (2007) to assume that the birds seen in the western parts of Singapore were free-flyers from the Jurong Bird Park rather than from natural populations. This assumption however, does not take into consideration that the purple swamphen started occurring in the western parts of Singapore in larger numbers, only after the development of the Western Catchment Area reservoirs (Murai, Poyan, Sarimbun, and Tengeh Reservoirs) that quickly became overgrown with floating water weeds. Colonisation of these wetland areas could have then started from migrating individuals en route between the Malay Peninsula and Sumatra, which found a suitable habitat and started to breed.

In the 1980s, purple swamphen populations were found at Poyan Reservoir, and Tengeh Reservoir (Raffles Country Club), when the reservoirs' water bodies had portions covered with floating vegetation, inlets stocked with thick bordering vegetation, swampy edges and ponds (R. Subaraj, pers. obs.). For a few years, a suitable swampy habitat across the road from the Raffles Country Club, saw some purple swamphens colonise this waterlogged grassland at Tuas (R. Subaraj, pers. obs.). In the early 1990s, however, all floating vegetation on these reservoirs were cleared, the water volume was increased through dredging, and canalisation took place upstream, resulting in the almost complete demise of the purple swamphen population there (R. Subaraj, pers. obs.).

Large healthy populations of the purple swamphen also once occurred around Kranji Reservoir, including the old farming ponds near the Neo Tiew Road area. These populations also began to decline when traditional agriculture was phased out, old fish ponds became overgrown or were filled in, and when the Public Utilities Board (PUB) cleared

floating and marsh vegetation on or at the edge of the reservoir. The number of the purple swamphen individuals in these areas is now a small fraction of what it once was and this bird survives only in tiny remnants of the old habitat.

The purple swamphen was also reported from Sungei Buloh Wetland Reserve, though those sightings may have been of a migrant or a stray from the nearby populations at Kranji Reservoir or the Neo Tiew Road area. There are only a couple of records of individuals, from Senoko, Lorong Halus, Tampines and West Coast Park (Wang & Hails, 2007), although there is no evidence that these were/are residents of any of these areas. The purple swamphen was also observed in simpoh air (*Dillenia suffruticosa*) vegetation behind Clementi North Primary School (along the Sungei Ulu Pandan in the 1980s) (A. F. S. L. Lok, pers. obs.).

Wherever the Singapore purple swamphen populations may have originated from, it is agreed upon by most, that since the 1990s, numbers of purple swamphen have decline tremendously, owing to the lost of freshwater habitats (Wang & Hails, 2007) that coincided with the PUB's concerted efforts to eradicate water spangle and water hyacinth from Singapore's reservoirs (R. Subaraj, pers. obs.).

Today purple swamphen populations are restricted to only a few areas around Kranji Reservoir (especially the marshes around the BBC World Service Far Eastern Relay Station and the National Service Resort & Country Club (NSRCC) Kranji Sanctuary Golf Course) (R. Subaraj, pers. obs.), marshes at Neo Tiew Lane 2, and some small, densely vegetated islands in Tengeh Reservoir, close to the shoreline of the Raffles Country Club (A. F. S. L. Lok & R. Subaraj, pers. obs.). The purple swamphen is considered a rare resident by Wang & Hails (2007).

SIGHTING DETAILS

All observations made in this article were made from a camouflage-netted, photography hide from 0630 hrs to around 1000 hrs at the PUB's experimental bioremediation wetlands at Neo Tiew Lane 2 from Feb.2007 to Sep.2008, which are predominantly covered with *Ludwigia adscendens*, *Neptunia plena*, water spangle and water hyacinth and bordered by long grasses, *Hanguana malayana*, *Stenoclaena palustris*, *Colocasia esculenta* and sparse clumps of *Dillenia suffruticosa* (Figs. 2 & 3). The peak period of activity was noted to be around 0730 hrs when numerous adults could be seen creeping across the mat of floating plants (Fig. 3). Chicks were observed with an adult in Feb.2007 at around 0700 hrs, walking on the earth bund, but disappeared immediately upon seeing movement from the observation hide (A. F. S. L. Lok, pers. obs.). The chicks were near black and covered in down. A juvenile was later spotted around mid Apr.2007 and was seen flying away, probably startled by the author's arrival at the observation site (A. F. S. L. Lok, pers. obs.). The juvenile was around the same size as an adult bird, but instead of the conspicuous purple, was a dull grey with dull reddish legs and blackish beak and shield (A. F. S. L. Lok, pers. obs.). Both the chicks and juveniles were very difficult to observe because of their size and dull colours, making them hard to spot when motionless or foraging slowly, only spotting them when they were seen fleeing the area (A. F. S. L. Lok, pers. obs.). Both sightings of the chicks and juveniles are more or less consistent with those of Wang & Hails (2007), who reported chicks in January and juveniles in Mar. to Apr.

Adult individuals were generally observed on the floating plant mats foraging for food from 0700–1000 hrs, which included mainly plant matter such as shoots, young leaves, stems, and flowers of aquatic plants such as *Ludwigia adscendens*, and *Neptunia plena* (A. F. S. L. Lok, pers. obs.). Foraging times were extended on days when the sky was overcast. In Jun.2007, an individual was seen pecking at a *Pomacea canaliculata* (apple snail) shell and began violently shaking it from side to side, till most of the snail's body hung out of its shell. The snail was then pulled clean of its shell, by holding the shell down with one of its legs and pulling on the snail's body with its beak, before swallowing the snail whole. This probably explained why this particular area had many empty *Pomacea canaliculata* shells scattered on the ground.

The purple swamphens were also commonly observed sun bathing on the floating plant mats of *Ludwigia adscendens* during mid-morning (Fig. 4). Preening was done by spreading each wing out, one at a time, and interestingly, were never observed spreading both wings out together to sun. The purple swamphen population at the Neo Tiew Lane 2 location were extremely skittish, making observation very difficult. A hide needed to be erected before 0630 hrs and the observer in place, before the birds became active. The purple swamphens here are frightened by the slightest movements, blasting a long nasal "cooah" or "gooweh" (alarm call), raising and lowering the tail feathers repeatedly before flying off and hiding in the bordering thick vegetation (Fig. 5). The purple swamphen is very noisy, so sometimes more often heard than seen. Its calls include "nyip" contact calls, nasal rattling "quinquinkrrkrrquinquinquinkrrkrr" calls, crowing territorial calls as well as soft "puk-puk" noises.

Fig. 2. The PUB experimental bioremediation marshlands at the end of Neo Tiew Lane 2. (Photograph by: Hugh Tan Tiang Wah).

Fig. 3. Purple swamphens (arrowed) foraging on *Ludwigia adscendens* (Photograph by: Hugh Tan Tiang Wah).

Fig. 4. A purple swamphen preening (Photograph by: Alvin Francis Lok Siew Loon).

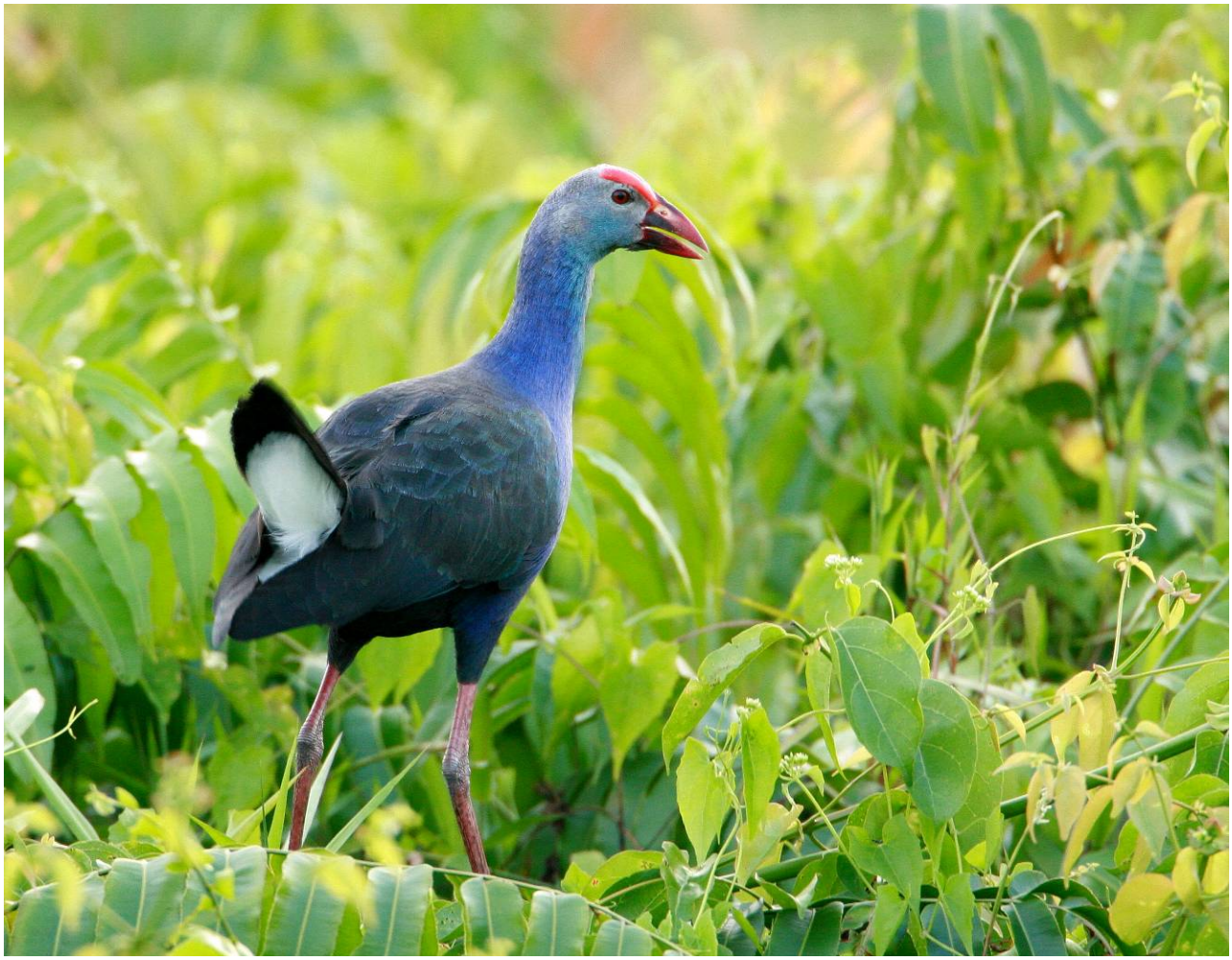

Fig. 5. A purple swamphen in an alarm posture (Photograph by: Alvin Francis Lok Siew Loon).

CONCLUSIONS

Although the purple swamphen is not globally threatened, many of the other subspecies such as *Porphyrio porphyrio porphyrio* as well as *Porphyrio porphyrio pelewensis* are declining in numbers owing to habitat destruction, such as through wetland drainage (del Hoyo et. al., 1996). Other subspecies such as *Porphyrio porphyrio madagascariensis* have declined through over-hunting (del Hoyo et. al., 1996). *Porphyrio porphyrio melanotus* on the other hand, is thriving in Australia and New Zealand, with their range expanding, because of the increase in available habitats from the construction of artificial lakes (del Hoyo et. al., 1996). The future of the Singapore subspecies remains unclear. However, we do know from past experience that this bird is extremely sensitive to habitat destruction, and because of their shy nature, tends to stay clear of places with higher human traffic.

Because of the very few sustainable populations of the purple swamphen in Singapore, we recommend that this taxon be accorded the status of nationally near threatened and that more artificial habitats with thick stands of marsh and water plants be created, which is more or less in line with the PUB's ABC Waters Programme which entails transforming Singapore's concrete waterways into natural-looking rivers with lush riverside marsh plantings (PUB, 2008). Numerous floating islands will also be created for human usage such as water sports, although it would be advisable to create some of these floating islands solely for bird life and restricting access to the public. Introducing floating plants such as water spangle and water hyacinth back into our reservoirs in secluded inlets and restricting their spread over the rest of the reservoir with floating booms, will help attract water fowl, prevent smothering of the entire water surface, and also help phytoremediate the water; removing excess nitrogen and phosphorus that might have been introduced into the reservoirs from fertiliser runoffs.

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LITERATURE CITED

del Hoyo, J., A. Elliot & J. Sargatal. 1996. *Handbook of the Birds of the World. Volume 3. Hoatzin to Auks.* Lynx Edicions, Barcelona, Spain. 197 pp.

Gibson-Hill, C. A., 1949a. A checklist of the birds of Singapore Island. *Bulletin of the Raffles Museum*, **21**: 132–183.

PUB, 2008. Public Utilities Board website. http://www.pubabc.com. (Assessed 1 Nov.2008)

Wang, L. K. & Hails, J., 2007. An Annotated Checklist of Birds of Singapore. *The Raffles Bulletin of Zoology, Supplement* **15**: 1–179.

Wee, Y. C. & R. Corlett. 1986. *The City and the Forest: Plant Life in Urban Singapore*. Singapore University Press, Singapore. 186 pp.

Wells, D. R., 1972. Bird report: 1969. *Malayan Nature Journal*, **25**: 43–61.

Wells, D. R., 1999. *Birds of the Thai-Malay Peninsula. Volume 1. Non-Passerines.* Academic Press, San Diego, California, United States of America. 648 pp.