

**OBSERVATIONS OF BREEDING ATTEMPTS BY ALLEN'S  
GALLINULE *Porphyrio alleni* Thomson (RALLIDAE)  
in Irrigated Lowland Rice Fields in Niger State, Nigeria**

E. O. Bright and J. Yisa

National Cereals Research Institute

P. M. B. 8, Bida Niger State

email: funsobright@yahoo.com

**Abstract**

Observations on the habitat use of the Allen's Gallinule (*Porphyrio alleni*) in irrigated lowland rice fields near Wushishi (9°43'14"North, 6°4'47"East) in Niger State, Nigeria were made during the rice cropping seasons of May 2008 to December 2012. The water birds associated with seed multiplication plots of irrigated lowland NERICA (New Rice for Africa) were observed and recorded. Single-strip technique and variable number of 20-min standardized searches were employed. The basic method used consisted of observing birds in daylight by walking slowly along tracks and trails. In 2008, the breeding activity of *P. alleni* occurred from second week of June to the first week of August; correlating with peak rainfall in the area. Nesting material consisted of whole rice plants, leaves and panicles knitted and interwoven with the stem to form a platform on which eggs were laid. The tall rice varieties L19 and NCRO 59 were the most preferred. The egg-laying period averaged 28 days. Clutch size varied from one to eight eggs with a mean clutch size of  $2.6 \pm 1.5$ . Length of incubation could not be determined because predators and/or possibly other competing breeding conspecifics broke and removed eggs from nests, causing nesting individuals to abandon their nests. However, in 2009 only uncompleted nests were constructed and thenceforth there was absolute abandonment of rice plants as nesting site in the study area. The use of rice plants as nesting support and material by *P. alleni* had an insignificant effect on rice grain yield, though it appeared to be a nuisance and of economic importance. Investigations into whether nest sites are selectively or randomly chosen by *P. alleni* or other water birds consequent upon conversion of habitats to rice growing fields are warranted.

### Introduction

The ornithology of the Wushishi Rice Fields is comparatively poorly known and large areas of the 7km x 2km area have not been systematically surveyed. Various bird species forage in the rice fields; some resident and others winter visitors or Palearctic migrants (Bright and Ogunyemi 2000; Bright *et al.*, 2002). Rice fields have become important foraging habitats for waterbirds because the reduction in the area of natural wetlands has caused the fields to become vital refuges (Toral, *et al.*, 2011). Allen's Gallinule, *Porphyrio alleni* is a small to medium-sized, ground-dwelling waterbird of the family Rallidae. It was formerly known as the Lesser Gallinule *Porphyryla alleni* (Serle *et al.*, 1980). It has a short red bill, greenish back and purple upper parts. From a distance it appears black, but up close it is olive-brown on the back (Brown, *et al.*, 1982). It has strong red legs with long toes; probes with the bill in mud or shallow water picking up mainly insects, seeds and small aquatic animals. The birds are solitary, not gregarious, secretive but occasionally bold, and have been observed feeding on insects and tadpoles. Breeding males have a blue frontal shield which is green in the female. Eggs are laid on a nesting platform of floating aquatic plants in open swamps or rice fields, where rice stems, leaves and panicles may be used in nest construction (Mackworth-Praed and Grant 1970; Serle, *et al.*, 1980; Brown, *et al.*, 1982). The bird is a vagrant in Great Britain and several other European countries.

To the best of our knowledge, this study is the first report of Allen's Gallinule, *Porphyrio alleni*, use of irrigated rice fields in Central Nigeria.

### Study Area

The Wushishi Rice Fields (9°43'14"N, 6°4'47"E) are located in the Southern Guinea Savannah of Central Nigeria (Keay, 1959). Its unimodal rainfall averages (1,200mm - 1,500mm) per annum, lasting from June to October; and the dry season occurs from November through April. An earth embankment about half a kilometer long prevented the Tungakawo River from supplying adequate water to irrigate the rice field by surface irrigation. Plants that cover the surface of the water before land preparation for rice cultivation include: reeds (*Typha* sp.), *Phragmites* sp., *Juncus* sp., *Ipomoea* spp, water lilies (*Nymphaea* sp.), as well as floating aquatic plants such as *Lemna* sp., and *Ceratophyllum* sp. Rice is cultivated by private farmers throughout the year and consequently, a large area of standing water remains the in dry season. This provides an important habitat and crucial mini-refuge for water birds because during the rice growing season the rice fields are intentionally or naturally flooded. About 3 hectares out of about 5 km X 2 km government-owned rice field are leased annually to the National Cereals Research Institute to conduct research on a new hybrid rice, NERICA.

### Methodology

The waterbirds associated with Wushishi irrigated lowland rice fields of the National Cereals Research Institute (NCRI) experimental and NERICA seed multiplication plots were surveyed over five cropping seasons, 2008-2012. Birds were observed in daylight with binoculars while walking along tracks and trails. Estimates of bird numbers were made through point counts and by listening carefully for typical calls of the species, and by the direct sighting of individuals in the rice fields. Upon each contact the number of individuals was recorded. The single-strip technique and variable number of 20-min standardized searches (Watson, 2003) were employed for most parts of the study area. This technique allowed us to observe the primary purpose of birds' detection and activities in the rice fields. Identification was based on Serle et al (1980). Field observations; foraging, nesting behaviour and nest fate (whether successful/unsuccessful) were recorded. Nests of *P. alleni* were located and confirmed by direct observation. Some mist nets were set in the area, and morphological measurements and photographs of captured birds and nest sites were taken. Measurements relating to the production of rice in the experimental plots were also simultaneously made.

### Results

Plate 1 is one of the Allen's Gallinules caught in the study area. Plates 2 and 3 depict various parts of rice plants (leaves, stems, panicles and flowers) knitted and interwoven to form a nest platform on which a *P. alleni* laid eggs. Plate 3 shows an unsuccessful nesting attempt of the species, in which the eggs have been destroyed by a predator, but also probably by a competing breeding conspecific.

Table 1 is a summary of *P. alleni* nesting activities in plots of various rice varieties, vis a vis yields from the plots. Calls/vocalizations indicating breeding were more frequent during June-August. NERICA L34 and NCRO 48 rice varieties were intact but varying numbers of damaged rice stands were recorded in other rice varieties. Damage did not appear to affect grain yield significantly. The number of rice stands damaged (8) was the highest on variety NCRO 59 (a tall variety) followed by L19 with seven (7) damaged rice stands. The numbers of active nests were also highest in these tall varieties (L19 and NCRO 59). The egg-laying period spanned 28 days and nest dimensions were variable. Two nests had 6 and 8 eggs respectively, but clutch size varied from one to eight eggs, resulting in a mean clutch size of  $2.6 \pm 1.5$ . The birds abandoned their nests after damage by predators (plate 3).

**Table 1.** Number of rice stands used to construct nests and the clutch size of *P. alleni* in rice seed multiplication plots at Wushishi, Niger State, Nigeria

Rice variety	Plot size (m)	Number of rice stands damaged	Number of active nests	Total Number of eggs in nests	Mean number of eggs laid	Grain yield per plot
NERICA L34	9.3 x 20	0	0	0	0	25 kg
NERICA L36	12 x 20	3	2	1	0.5	24kg
NERICA L49	11 x 20	4	3	8	4	27.5kg
NERICA L19	10 x 20	7	7	14	7	23.5kg
NERICA L42	10 x 20	4	3	13	6.5	24kg
NERICA L38	10 x 20	3	3	5	2.5	26kg
NCRO 49	10 x 20	3	3	2	1	28.11kg
NCRO 48	10 x 20	0	0	0	0	27kg
NCRO 59	10 x 20	8	7	7	3.5	23kg
FAROX501-B-3-1-2-2	10 x 20	4	3	2	1	22.5kg
SE						1.98
5% LSD						6.34

## Discussion

Studies on nest site selection generally assume that individuals choose nests on the basis of factors that influence reproductive success rather than simply selecting a particular site by chance (Dornak, et al., 2004). The preponderance of Allen's Gallinules in rice is probably due to the gradual loss of its traditional foraging and breeding sites to rice cultivation but our results suggested no significant effect on rice grain yields. However, a study of another gallinule species (Purple Swamphen *Porphyrio porphyrio*) found that it damaged newly seeded rice in the Bafra region, Turkey (Koyuncu and Lüle 2008).



**Plate 1.** An Allen's Gallinule *Porphyrio alleni* caught in the study area.



Plate 2. *P. alleni* eggs on a nesting platform of rice plant parts.

For birds that breed in open nests, a principal cause of offspring mortality is nest predation (Martin 1993). Breeding waterbirds' habitat requires that dense and tall vegetated wetlands and the



Plate 3. An uncompleted nest of *P. alleni* in tall rice variety NCRO 59 at a height of about 1.2m.

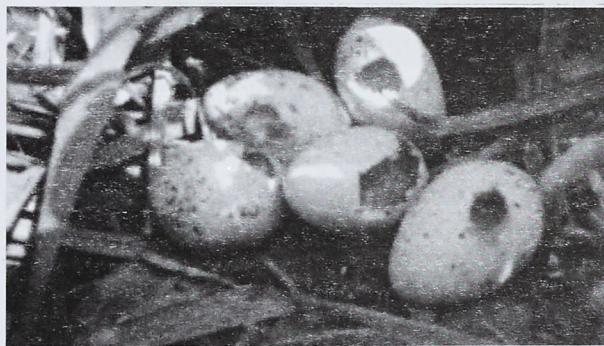


Plate 4. *P. alleni* nest abandoned after eggs were damaged.

predation, chemical applications, removal of water and early harvesting depreciate the quality and value of waterbird habitats that are affected by modern agricultural development and urbanization. To determine the factors that affect Allen's Gallinule choice of nesting sites, further studies are needed because this study presumed the species a potential pest of rice.

persistence of water, remain adequate long enough for egg laying, hatching and fledging to develop. This may explain the higher frequency of nests observed in this study in the plots of tall rice varieties. However, it should be noted that

### Acknowledgments

The facilities provided by the Director, National Cereals Research Institute and the field staff are gratefully appreciated.

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