

Population Density and Relative Number of Purple Swamphen *Porphyrio Porphyrio* (Linnaeus, 1758) At Sunye In (Lake) Sintkaing Township, Mandalay Region

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Abstract

There is an inadequate record to reveal population density and relative number of Purple Swamphen *Porphyrio porphyrio* in relation to habitat availability. Thus, it is hoped that this studies would be beneficial in gathering accurate population density and relative number from Sunye In and which would also contribute some knowledge in many areas of Myanmar. Studies in Population density and relative number of Purple Swamphen *Porphyrio porphyrio* was conducted from January to July 2018. A total number of *Porphyrio porphyrio* was 757 individuals at study site A and site B. At the site A the highest number 105 (262.50 birds/ km²-57.38%) were recorded in January and the lowest number 42(105.00 birds/ km²-63.64%-58.33%) were recorded in June and July respectively. At the site B the highest number 78 (195.00 birds/ km²-42.62%) were recorded in January and the lowest number 24(60.00 birds/ km²-36.36%) were recorded in June. In the study area, the highest total number of 183 individuals (228.75 bird/ km²-24.17%) was recorded in January and the lowest number 66 individuals (82.50 birds/ km²-8.72%) were recorded in the June. Habitat changes occurred in the Sunye In area due to fishery, especially over harvesting of birds and agricultural development leading to reduction in natural resources and biodiversity. Protection and conservation of *Porphyrio porphyrio* and their habitat at Sunye In should be undertaken, so that they can breed and thrive successfully. Thus they can increase their individual number relation to biodiversity.

Keywords: *Porphyrio porphyrio*, population density, relative number.

Introduction

Central Burma is dominated by the river valleys of the Ayeyarwaddy, Chindwin and Mu. In Mandalay Division, Kyaukse and Shwebo district, extensive areas of flat land are irrigated by canals which made the cultivation of rice possible Robson (2008).

Study area is located Kyaukse district, Sintkaing Township, Mandalay Division.

Purple Swamphen is mainly crepuscular and forages in the early morning and late evening. It shows a preference for permanent, fresh or brackish, still or slow-flowing, sheltered, extensive wetlands. Suitable habitats include ponds, lakes, dams, marshes, swamps, rivers, flood-plains, artesian wells, sewage farms (del Hoyo et al. 1996).

Purple Swamphen species is sedentary, nomadic or partially migratory, with many populations making local seasonal movements in response to changing habitat conditions (del Hoyo et al. 1996), (e.g. the drying of marshes) (Tylor and ven Perlo 1998). The timing of breeding varies geographically in relation to peaks on local rainfall.

In the Sunye In area shrubs, marshes, swamp area, floating gardens, patches of green lands exist and as the consequence an extra-ordinary diversity of plants and animals life could be observed in the Sunye In. Recent changes in study area occurred due to fishery, over harvesting of birds, irrigation, agricultural development which reflects a reduction in natural resources and biodiversity.

Especially over harvesting of birds and agricultural development leading to reduction in natural resources and biodiversity. Biodiversity loss particularly affects the poor, who are

most directly dependent on ecosystem services at the local scale, and are unable to pay for alternatives. So that Sunye In area was selected for the waterbird study.

Objectives of this research are:

- to access the monthly population number of Purple Swamphen
- to evaluate the monthly variation in the number of Purple Swamphen
- to reveal population density of Purple Swamphen at Sunye In

Materials and Methods

Study area

Sunye In (Lake) is located in the Kyaukse District, Sintkaing Township, Mandalay Region which lies between North Latitudes 21° 41' and East Longitudes 96° 13'. The area is about 3.28 km². The length is about 2.33 km in length and 1.41 km in width. Its topography is slightly concave and extended to the hilly section, and connected by Thindwe ditch (Zawgyi Dam) from which water is contributed to cultivate fields (Fig. 3.1).

Study period

The present study was conducted from January 2018 to July 2018.

Data collection methods

The line transect method described by Gaston (1975) was used to estimate the population number and density of Purple Swamphen. In each study site, the length of one kilometer and the width of 0.2 kilometer (200m) in Sunye In (Lake) were laid as Site A and B. All of data collections were carried out from a boat. During that period, the boat went through near the boundary of lake in the study area where was possible to move for a little boat. The census was done at the rate of 1km/hr. Data collection was conducted one time a month at survey site in the morning from 07:00 to 09:00 hours. Double counting was avoided by noting the direction of movements of the birds. A binocular was utilized to count of bird from a distance.

Data analysis

To estimate the bird densities as number per sq km the following formula by Gaston, 1975 was used.

$$D = \text{Number of birds} / (2 \times L \times W)$$

Where,

D = Density

L = Length of transect

W = ½ width of transect

Climatic data

Climatic data such as rainfall and temperature were obtained from the Hydrology and Meteorology Department, Mandalay. Measurement of average water depth was randomly collected three differences places from study site.

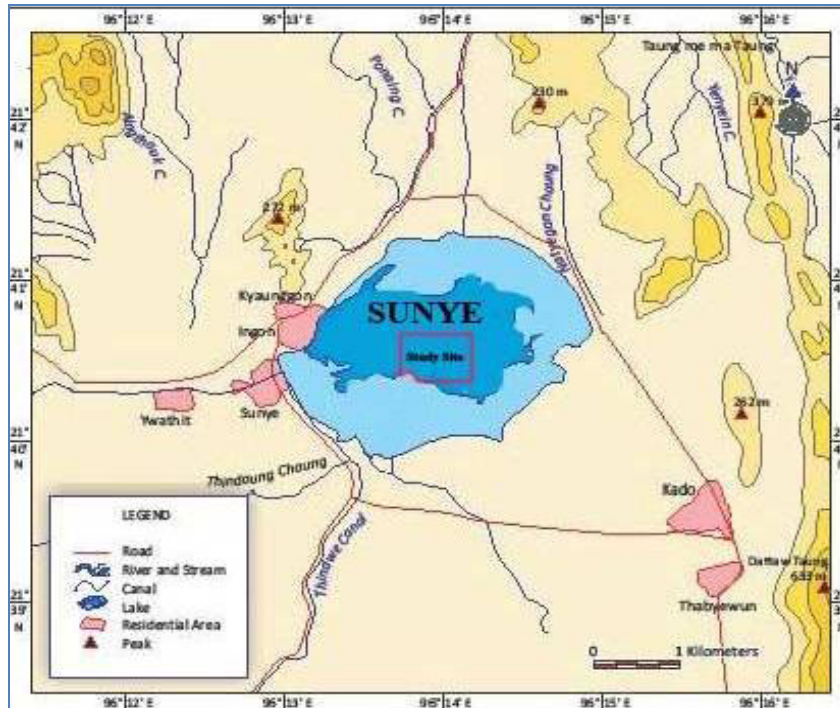


Figure. Study area of Sunye In (Lake)

Source: Topographic map No. 2196_02 and 2196_06,



Site A. Northern part of Sunye In



Site B. Eastern part of Sunye In

Plate (1). Study site of Sunye In (Lake)

Results

Monthly population density and relative number of Purple Swamphen

Population density and relative number of Purple Swamphen *Porphyrio porphyrio* was conducted from January to July 2018. A total number of *Porphyrio porphyrio* was 757 individuals at study site A and site B.

In January, number of 105 individuals were recorded and the population density was 262.50 (birds/ km²) and their relative number 57.38% are found at site A (Fig. 4.1). A number of 78 individuals were recorded and the population density was 195.00 (birds/ km²) and their relative number 42.62% are found at site B (Fig. 4.2).

The average water depth was 2.38m and average temperature 21.8°C and rainfall 1.78mm was recorded in this month (Table 4.2).

In February, number of 76 individuals were recorded and the population density was 190.00 (birds/ km²) and their relative number 55.07% are found at site A (Fig. 4.1). A number of 62 individuals were recorded and the population density was 155.00 (birds/ km²) and their relative number 44.93% are found at site B (Fig. 4.2).

The average water depth was 1.99m and average temperature 24.15°C and rainfall were not found in this month (Table 4.2).

In March, number of 55 individuals were recorded and the population density was 137.50 (birds/ km²) and their relative number 50.46% are found at site A (Fig. 4.1). A number of 54 individuals were recorded and the population density was 135.00 (birds/ km²) and their relative number 49.54% were found at site B (Fig. 4.2).

The average water depth was 1.88m and average temperature 28.15°C and rainfall was not found in this month (Table 4.2).

In April, number of 53 individuals were recorded and the population density was 132.50 (birds/ km²) and their relative number 50.48% are found at site A (Fig. 4.1). A number

of 52 individuals were recorded and the population density was 130.00 (birds/ km²) and their relative number 49.52% are found at site B (Fig. 4.2).

The average water depth was 1.91m and average temperature 30.75°C and rainfall 2.03mm was recorded in this month (Table 4.2).

In May, number of 54 individuals were recorded and the population density was 135.00 (birds/ km²) and their relative number 64.29% are found at site A (Fig. 4.1). A number of 30 individuals were recorded and the population density was 75.00 (birds/ km²) and their relative number 35.71% are found at site B (Fig. 4.2).

The average water depth was 1.72m and average temperature 31.65°C and rainfall 4.06mm was recorded in this month (Table 4.2).

In June, number of 42 individuals were recorded and the population density was 105.00 (birds/ km²) and their relative number 63.64% are found at site A (Fig. 4.1). A number of 24 individuals were recorded and the population density was 60.00 (birds/ km²) and their relative number 36.36% are found at site B (Fig. 4.2).

The average water depth was 1.63m and average temperature 29.96°C and rainfall 2.54mm was recorded in this month (Table 4.2).

In July, number of 42 individuals were recorded and the population density was 105.00 (birds/ km²) and their relative number 56.40% are found at site A (Fig. 4.1). A number of 30 individuals were recorded and the population density was 75.00 (birds/ km²) and their relative number 41.67% are found at site B (Fig. 4.2).

The average water depth was 1.59m and average temperature 30.86°C and rainfall 0.51 was recorded in this month (Table 4.2).

At the site A the highest number 105 (262.50 birds/ km²) were recorded in January and the lowest number 42(105.00 birds/ km²) were recorded in June and July (Table. 4.3).

At the site B the highest number 78 (195.00 birds/ km²) were recorded in January and the lowest number 24(60.00 birds/ km²) were recorded in June (Table. 4.3).

A total number of 427 individuals and the population density of 1067.50 (birds/ km²) were recorded at site A. A total number of 330 individuals and the population density of 825.00 (birds/ km²) were recorded at site B (Table 4.3).

A total number of 183 individuals were recorded in January. In this period it was observed that, the population density of 228.75 (birds/ km²) (Table 4.3).

A total number of 138 individuals were recorded in February. In this period it was observed that, the population density of 172.5 (birds/ km²) (Table 4.3).

A total number of 109 individuals were recorded in March. In this period it was observed that, the population density of 136.25 (birds/ km²) (Table 4.3).

A total number of 105 individuals were recorded in April. In this period it was observed the population density of 131.25 (birds/ km²) (Table 4.3).

A total number of 84 individuals were recorded in May. In this period it was observed the population density of 105.00 (birds/ km²) (Table 4.3).

A total number of 66 individuals were recorded in June. In this period it was observed the population density of 82.50 (birds/ km²) (Table 4.3).

A total number of 72 individuals were recorded in July. In this period it was observed the population density of 90.00 (birds/ km²) (Table 4.3)

In the study area, the highest total number of 183 individuals (228.75 bird/ km²) was recorded in January and the lowest number 66 individuals (82.50 birds/ km²) were recorded in the June (Table 4.3).



Plate (2). Study species *Porphyrio porphyrio*

Table (1). Monthly total individual number and Density of Purple Swamphen from January 2018 to July 2018 at Sunye In

Month	Site A	Density (birds/km ²)	Site B	Density (birds/km ²)	Total no of individual	Density (birds/km ²)
January	105	262.50	78	195.00	183	228.75
February	76	190.00	62	155.00	138	172.50
March	55	137.50	54	135.00	109	136.25
April	53	132.50	52	130.00	105	131.25
May	54	135.00	30	75.00	84	105.00
June	42	105.00	24	60.00	66	82.50
July	42	105.00	30	75.00	72	90.00
Total	427	1067.50	330	825.00	757	946.25

Table (2). Monthly total individual number, density, relative number, average temperature, water depth, and Rainfall

Month	Total.No	Population density	Relative No.	Temper (C°)	water (m)	Rainfall (mm)
January	183	228.75	24.17	21.8	2.38	1.78
February	138	172.5	18.23	24.15	1.99	0
March	109	136.25	14.4	28.15	1.88	0
April	105	131.25	13.87	30.75	1.91	2.03
May	84	105	11.09	31.65	1.72	4.06
June	66	82.5	8.72	29.96	1.63	2.54
July	72	90	9.51	30.86	1.59	0.51

Discussion

Monthly individual numbers and population density and their relative number of Purple Swamphen *Porphyrio porphyrio* were conducted from first week of January 2018 to July 2018.

The habitat of Sunye In is situated in the central dry zone, where the average annual rainfall is about 0.39 mm, average humidity 66%, average temperature 28.00°C and average water depth 1.20m (Soe Soe, 2013). These conditions are assumed to be suitable for more faunal and floral growth.

In the present study average temperature 28.19°C, average water depth 1.87m and average rainfall 1.56mm were recorded during the study period commence from January 2018 to July 2018.

Moreover Steyn (1977) and Womaski (1979) mentioned that higher species diversity was found in semi-evergreen forest and mixed plantations than in monoculture plantations presumable because the simplest structure of the latter provides food, ecological niches, food types and variety of nest sites.

In the present study the highest number 427(56.40%) of Purple Swamphen were found at the site A. These areas of site A have heterogenous mixture of plant life forms and more safety because these areas are more distance than other site from human settlement.

Obhas-Khobkhet (1983) and Nierenberg (1995) recorded that the population density of birds vary according to the weather conditions like rainfall, temperature, relative humidity and precipitation changes have a profound effect on water level, cover ratio and the quality of the habitat for the waterbirds.

In the study area, the temperature decrease up to 21.8C° in January but increase up to 29.96C° in June.

Above the mentions state that the highest number 183 (228.75 birds/ km²) of Purple Swamphen were found in January. The lowest number 66 (82.50 birds/ km²) were found in June.

In June month, it was observed that sufficient amount of rainfall (2.54mm) was taken, temperature increased than January about up to (29.96°C) and the depth of water level was decreased up to 1.63m. In June most of the vegetations were dry and unprotected for Purple Swamphen from the disturbance of fisherman hence they migrate to other suitable habitats.

These factors suggested the lowest density of Purple Swamphen (66 individual, 41.25 birds/km²) in June than in other months (Fig. 4.5).

Destroying wetlands causes the extinction of native species depending on these special habitats (UNEP, 2001).

Recent changes in study area occurred due to over hunting in January, February, and March which reflects a reduction in natural resources and biodiversity.

Current, there is an inadequate record of waterbirds distribution and abundance in relation to habitat availability. Thus, it is hoped that this study would be beneficial in gathering accurate individual number and population density data of water bird from Sunye In and which would also contribute some knowledge to the waterbirds of Upper Myanmar. So that Sunye In area was selected for the waterbird study especially Purple Swamphen.

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