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Full Length Research Paper

Nesting Ecology of Mallard (*Anas platyrhynchos*) in Haigam Wetland Kashmir

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Abstract

Nesting ecology of mallard was studied during breeding seasons of 2012 and 2013 in Haigam wetland Kashmir. Nesting was initiated in the month of February and completed till ending March. Majority of the nests (72.73%) were found in macrophytic vegetation. Nesting material was dominated by Scirpus palustris. The nest diameter averaged 26.74±1.74cm and nest depth varied from 5.6 cm to 7.4 cm. The nests were placed at an average height of 25.5 ± 1.5cm above water surface.

Key words: *Haigam, Nesting, Mallard, Macrophytes, Wetland*

Introduction

Nesting is an important parameter of the breeding biology of birds. In ducks the position, structure, concealment and surrounding vegetation of the nest plays an important role in overall breeding success. The nesting studies are of paramount importance in designing conservation plans for maintenance and regulation of bird populations, as a good nesting site generally provides protection against predators, offers adequate stability and materials to support and construct the nest, and also influences hatching success (Ludwig *et al.* 1994) and fledging success (Buckley and Buckley 1980). In the present study an attempt has been made to find some nest parameters of mallard.

Methods

Study Area

Haigam wetland is the largest of the few remaining wetlands of Kashmir, situated a**t** a Distance of 55km to the north - west of Srinagar near Sopore town. It is a well protected reserve for birds especially water fowl – ducks and geese which arrive the wetland in september and stay as long as the end of April or early May (Shah, 1984).The wetland with a maximum depth of one metre has an area of 14 sq. Km. About half of this area is covered by a dense growth of reeds and other emergent and free floating vegetation. The common species are *Eleocharis palustris*, Carex sps., *Phragmites communis, Typha angustata, Butomus umbellatus, Sparganium ramosum and Saccharum spontaneum.* The reed bed is partitioned by a series of boat channels varying in width between1 metre to 4 metres. There is a protective bank around the reserve and inside the bank there are strips of long and bushy willows (Fig –1).

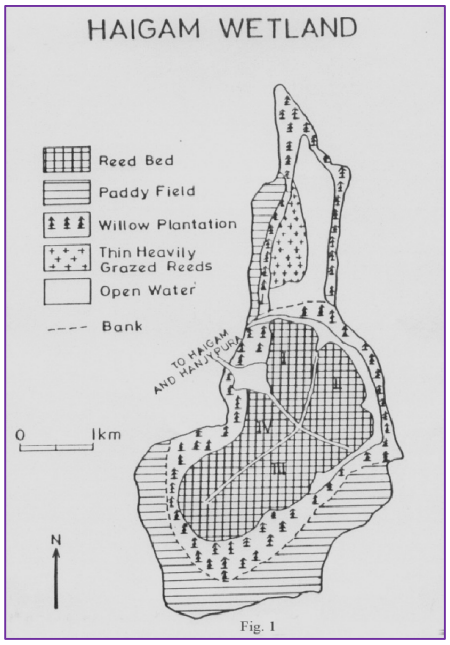

Fig. 1

Methods of observation

To observe the nesting behaviour, the lake was visited regularly during the breeding season, March–October. The activities of birds were recorded on every visit. Nesting site was defined as an area where mating, nest building, adult incubating and brooding occurred. Nests were searched systematically throughout the wetland.The nests of ducks were generally located in the study area by wading through reeds. Any residing place of a bird with one or more eggs was classified as a nest. Slender willow stakes flagged with strips of red cloth were used to mark nest locations so that nests could be relocated (Klett *et.al,* 1988). Nest numbers were marked on the flags with waterproof ink. In some cases plastic numbers were tied to the nest material and placed a few feet away from the nest. When a nest was spotted the following parameters were recorded: location, nesting material, plant species in the immediate vicinity of the nest and, water depth at the nesting site. In addition, at each nest, the type, height and density of vegetation cover and its

condition; shape, size and the position of the nest and concealing arrangements were recorded.

Results

Mallard is an early breeder and nest building started in late February and was completed by the end of May. In 2013 nesting started earlier (in late February) as compared to 2012 when it was delayed until mid-March. During the month of February 2013, comparatively lower temperature prevailed due to which nesting was delayed until mid- March.

i) Nesting Sites: - Nesting site was always in vicinity of water. Nesting sites were so chosen that provided sufficient cover to the bird and its clutch. Most of the nests were found in the patches of tall and dense macrophytic vegetation on the marshy parts of the wetland. The vegetation at these sites was dominated by ***Scirpus palustris, Phragmites communis, Typha angustata*** and ***Sparganium ramosum***. Willow (***Salix*** sp.) bushes growing among the macrophytes and the hollows of old willows were also used as nesting sites although to a very less extent. A total of 22 nests were found during the two-year study, 13 in 2012 and 9 in 2013. Out of these 16 (72.73%) were found in tall and dense macrophytic vegetation, 4 (18.18) in willow bushes growing among macrophytes and 2 (9.09%) in the hollows of old willows (Table1).

Table 1: Nesting sites of Mallard

Nesting site	Year	No. of nests found(n)	∑n	%
Macrophytic vegetation	2012 2013	9 7	16	**72.73**
Willow bushes	2012 2013	2 2	4	**18.18**
Hollows of old Willows	**2012** **2013**	**1** **1**	**2**	**9.09**

Nest Building: As bird builds its nest in tall and dense macrophytic vegetation and other well concealed sites, the direct observations on nest building were not possible. However flushing of only females from macrophytic beds in which nest building was in progress, revealed that only female was involved in nest building. Once the nest was built, addition of nesting material and nest repair continued until hatching.

iii) Nest Structure, Dimensions and Position: - Mallards constructed simple nests which were semi-spherical depressions of rushes and dried grass resting on a platform of same material. The nest building material was dominated by ***Scirpus palustris*** followed by ***Phragmites communis***, ***Typha angustata*** and ***Sparganium ramosum***.

The nest diameter varied from 22.7cm to 29.8cm with an average of 26.74±1.74 cm (n=18) while as the depth of the nest depression varied from 5.6 cm to 7.4 cm with an average of 6.36 ± 0.54 cm (n=18).The nests were located at varying heights from the surface of water or ground and because of the fluctuations in the water level, the height of nests from water level fluctuated. For nests in the macrophytic vegetation the height from the surface of water varied form 20 cm to 31.5cm with an average of 25.5 ± 1.5 cm.

Discussion

Mallard is the only wild duck that presently breeds in lakes and wetlands of Kashmir. In fact, Kashmir is the only territory within Indian limits where it breeds (Bates and Lowther, 1952). Almost more than a century ago, this bird used to breed in large numbers in wetlands and lakes of Kashmir. Boatloads of their eggs were sold in the markets of Srinagar. Then due to the destruction of their nesting sites, illegal egg collection and duck shooting, they gradually abandoned their breeding in Kashmir.

As per Bates and Lowther (1952), mallards bred in very limited numbers in wetlands and lakes of Kashmir. Shah and Qadri (1984) after extensive studies could find no evidence breeding of mallard in Kashmir. However, during the recent years due to some improvement in the wetland habitat conditions the bird started to breed in Kashmir once again.

The present study showed that the breeding mallards form a very small fraction of the mallards that congregate in the wetland during winter. However, the breeding of mallards was much higher than reported by Bates and Lowther (1952). The increase in the number of breeding mallards in valley may be attributed to various rehabilitation measures taken in the past few years. Complete ban on the duck-shooting license, prohibition on the entry of the people in the protected wetlands without proper permission from the authorities, prohibition on the anthropogenic activities like fishing and collection of *Trapa natans* in the protected wetlands has reduced the

disturbance of the birds to a large extent. Besides, measures like maintenance of sufficient water level, plantation of such plants like *Trapa natans* and supplement of *Oryza sativa* during the pinch period (to serve as food for wintering waterfowl) in the protected wetlands attracted large congregations of waterfowl including mallards in winter. Moreover, over the last one and a half decade many socio- economic changes have taken place in the valley. People are shifting from the agriculture to city-based professions. This has resulted in a considerable decrease in the number of cattle. This in turn has resulted in a reduction in macrophyte harvesting. All these measures of habitat improvement might be attributed to the increase in the number of breeding mallards . Nilsson (1972) observed that waterfowl are attracted towards the open water areas that can offer abundant food and suitable resting areas while as Dar (1999) observed anthropogenic interference to be responsible for population decline of waterfowl in wetlands.

Birds of the temperate regions breed in spring because that is when supplies to the laying female and young are most available (Lack, 1968; Perrins, 1970). Krapu (1981) suggested that nest initiation in mallards is determined by a protein rich food source adequate to meet the needs of egg formation. In the present study, nesting started in late February and was completed by the end of May. The weather seemed to affect the onset of breeding. In 2013, nesting was delayed until mid-March because of heavy snowfall in the later half of February that resulted in decrease in temperature due to which nest initiation was delayed. Hill (1984) has also found that mallards nest earlier in the years with high mean February temperature.

In many temperate species, the onset of breeding season depends largely on the availability of nest site and most of the aquatic birds often breed in relation to water level and suitable nesting material (Sugden, 1979). Mallard mostly nested in the dense and tall macrophytic vegetation. Besides, it also nested in the willow bushes and hollows of old willows. All these sites provided sufficient concealment to the bird and its clutch.

Hill (1984) also reported that mallards mostly nest in tall and dense macrophytic vegetation as it gives sufficient cover to the bird as well as its clutch there by reducing the nest predation.

On the other hand, Gec (1970) reported that mallards mostly nest in willows (*Salix* sp.). He also found a few nests in the willow hollows. This was possibly due to presence of large number of *Salix* trees. During the present study, all these three types of nesting sites were used. The macrophytic vegetation at the nesting sites was dominated by *Scripus palustris*. This observation is in confirmation with that of Cowardin *et al.* (1985) who found that in wetlands mallards mostly nest in *Scirpus* species. Hill (1984) also reported nests in patches of tall and dense vegetation and vegetation height has overriding importance in terms of nest site selection.

In case of mallard, hen formed a shallow depression or bowl by dropping forward on to her breast and rotating to form a bowl. She does not carry material to nest but rather uses what she can reach and pull towards her with bill while sitting on the nest (Cladwell and Cornwell, 1975). Hen also pulled and bent tall vegetation over to conceal her and the nest.

Overwater nests range from simple bowls on floating vegetation mats to elaborate structures woven into emergent vegetation (Krapu *et al.,* 1979b). Gec (1983) has reported that only female is involved in nest building. He observed that mallard nests are semi-spherical depressions made by the circular motions of the female while as Bates and Lowther (1952) also reported a similar nest structure,. They also reported that mallard nests are mostly built in the heart of reeds. Similar observations were made during the present study.

Mallard nests vary in diameter from 26 cm to 29 cm while as the depth of nest bowl varies from 2.5cm to 14cm (Cramp and Simmons, 1977; Bellrose, 1980). Our results are close to this range as during the present study the average nest diameter was 26. 74 ±1.74cm and the average depth of nest depression was 6.36 ± 0.54cm.

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