

## Clutch predation in relation to mean vegetation height at Northern Mallards' *Anas platyrhynchos* nests

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### INTRODUCTION

Northern Mallards *Anas platyrhynchos* are the only species of wild duck currently breeding in Kashmir. In fact, Kashmir is the only territory within India where they breed (Bates and Lowther 1952). They are winter visitors to the valley of Kashmir, where they occur in huge numbers in wetlands and lakes. In spring (March and April) most leave for their breeding grounds in the Palearctic Region that extends from North Europe to Central Asia (Ali 1979). However, a small population remains to breed in the lakes and wetlands of the Kashmir valley.

Northern Mallards build their nests in macrophytic vegetation and many workers have reported on clutch predation within this environment. Reynold *et al.* (2001) indicated that with an increase in the amount of grass in the landscape, duck nesting success also increased. Ball *et al.* (1995) found high duck productivity rates in study areas where large areas of grass remained intact. Dwernychuk and Boag (1972) found that the amount of overhead cover at a duck's nest was the most important factor in its siting because other birds were the main predators. This research was undertaken to test the hypothesis that as the average vegetation height around the nest decreases, the level of clutch predation increases.

### STUDY AREA

This study was carried out in Anchar Lake, Kashmir. The lake, with an area of four square kilometres, is situated at a distance of 10 kilometres north-west of Srinagar. The northern part of the lake is marshy with patches of tall, dense macrophytic vegetation containing *Scirpus palustris*, *Typha angustata*, *Phragmites communis*, *Carex* sp., *Cyperus* sp. and *Sparganium ramosum* (Fig. 1) and it is in these patches that Northern Mallards build their nests.

### METHODS

Nest searching was carried out every fourth day during the breeding season (February to August) of 2006 and 2007, so that nests could be found during the laying period. Northern Mallard nests were detected as ducks were flushed. This was achieved by gently disturbing the macrophytic vegetation (Klett *et al.* 1988). A nest was defined as any depression in which the bird laid one or more eggs (Miller and Johnson 1978) (Fig. 2). The height of

vegetation at and around the nest was measured at the time when the nest was first detected. Vegetation height was measured at the centre of the nest bowl and at four diagonal points one metre away from the nest centre and at right angles to each other in order to obtain mean vegetation height around the nest (Hill 1984). Slender willow stakes flagged with strips of cloth were used to mark nest locations so that the nests could be relocated (Klett *et al.* 1988). Predation was determined by searching for egg remains. The main clutch predators were the Common Crow *Corvus splendens* and Black Kite *Milvus migrans*.



Figure 1. Typical macrophytic vegetation where Northern Mallards nested.



Figure 2. Nest of Northern Mallard

TABLE 1

Clutch predation and average vegetation height at nest sites

Month	Year	No. of nests found (n)	$\Sigma n$	No. of nests predated (np)	$\Sigma np$	Average vegetation height at nest site (cm)
March	2006	5	12	1	3	44.83
	2007	7		2		
April	2006	11	20	2	3	66.3
	2007	9		1		
May	2006	8	16	0	1	123.75
	2007	8		1		
June	2006	3	7	0	0	190.14
	2007	4		0		

## RESULTS

A total of 55 nests was found during the two seasons with 27 nests in 2006 and 28 in 2007. All these nests were detected during the egg laying stage. Of these 55 nests, 12 were found in March, 20 in April, 16 in May and 7 in June. The average height of the vegetation surrounding the nests increased during the breeding season (Table 1). Thus Northern Mallards breeding early build their nests in relatively shorter vegetation (March and April are at the beginning of the growing season), which had not attained sufficient height to fully conceal the clutch. Overall, only 13 per cent of clutches were predated but those laid early in shorter vegetation were more susceptible to predation than the clutches in tall vegetation. In March, 25 per cent of clutches were predated but the birds laying at the end of the season in June had nests well concealed by vegetation and experienced no predation. The negative correlation (Fig. 3) between the number of clutches predated and average vegetation height at the nest site was significant, despite having only two degrees of freedom ( $r = -0.978$ ).

## DISCUSSION

While the total number of clutches predated during this study was small, similar results have been reported by other workers and provide some confidence that the hypothesis about the negative relationship between vegetation height and the level of nest predation is correct. Hill (1984) reported that the proportion of Northern Mallard nests destroyed by predators increased as the minimum height of vegetation around the nest declined. Lizevy (1981) showed that successful nests were in taller vegetation than nests destroyed by predators.

The management implication of this research is that the Northern Mallard population is likely to benefit from strategies that create or restore large blocks of tall, dense macrophytic vegetation around wetlands.

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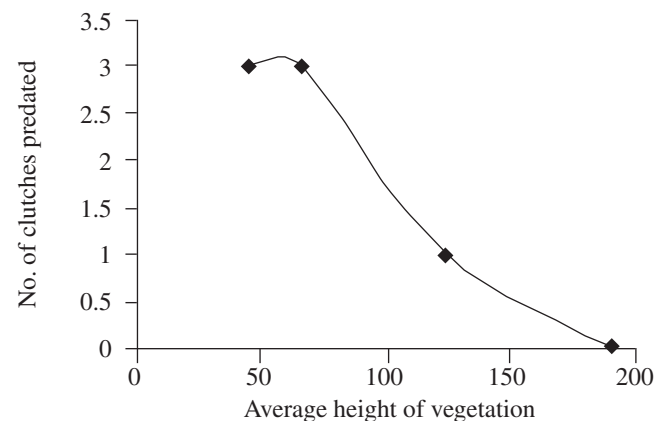


Figure 3. Graph showing negative correlation between the average vegetation height at nest site and the number of clutches predated.

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