Observations on Blink Rates in Ferruginous Duck (Aythya nyroca) in a flock of mainly Mallard (Anas Platyrhynchos)

Paul M.W. Hackett

Abstract

Ferruginous Duck (Aythya nyroca) is an extremely rare bird in the UK. The observations reported in these field notes are of a observations made upon a single male Ferruginous Duck (Aythya nyroca) in the Fen Lands of the East of England during the autumn of 1983. The duck was observed by the author from a portable hide, over a period of several daylight hours. Observations were made of the rate at which the bird blinked in comparison to the flock of over 100 birds that were mainly Mallard (Anas Platyrhynchos) and of which it was part. Initial observations of the Mallards (Anas Platyrhynchos) in the flock showed them to blink at a slower rate, and to keep their eyes open for shorter periods, of time when they were located towards the centre of the flock than when they were compared with birds that were positioned more peripherally in the flock. The Ferruginous Duck (Aythya nyroca) varied its position within the flock throughout the observation period. Whether the Ferruginous Duck (Aythya nyroca) was occupying a position in the flock that was more central or more towards the flock's edges, the Ferruginous Duck (Aythya nyroca) blinked at a faster rate than the adjacently positioned Mallards (Anas Platyrhynchos). Mallards blink rate had already been seen to appear to vary as a function of a specific Mallard's closeness to the edge of the flock where more peripherally positioned birds blinked faster. However, the solitary Ferruginous Duck (Aythya nyroca) that I observed, did not appear to have the rate or duration of its blinking effected by its position in a flock of ducks of a different species: rather it blinked more frequently than immediately adjacent conspecific ducks.

Introduction

In this research, I am interested in the manner in which ducks blink when they are sleeping. This is an area that has received relatively little scholarly attention although blinking whilst asleep has been suggested as a behaviour that offers a degree of vigilance whilst sleeping and simultaneously conserves energy (Amlander and Ball, 1983). Slightly more research activity has been directed at studying blinking in mammals (see for example: Wood and Saunders, 1962, Zametkin, etal, 1979). The small literature on sleeping in avian species has been restricted to a limited number of species (see for

example: Burrowing Owls - Berger, etal, 1971, Berger and Walker, 1972; Pigeons - Tradardi, 1966; Van Twyer, 1972, Walker and Berger, 1972; in general – Klein, etal, 1964). It is of particular pertinence to the present research that studies and publications that are concerned with the sleeping behaviour of wildfowl are similarly sparse.

Rather than adopting a general perspective in my investigation into avian sleep, I concentrate upon one aspect of sleeping behaviour in ducks, that of eye blinking. Kirsten and Kirsten (1983) have reviewed how different avian species blink whilst they are sleeping. They made several conclusions including that light and shade (photo stimulation) did not appear to be a significant factor in determining blinking. These authors even reported observing a blind Screech Owl, which blinked at approximately the same rate as normal sighted nonspecific birds.

An early account of duck blink rate is given in the Harlequin Duck species by Michael and Michael (1922). They observed how a breeding pair of ducks of this species took turns sleeping and that whilst sleeping the male's nictitating membrane engaged in "eye-winking about twice every second" (Michael and Michael, 1922, p17). Kirsten and Kirsten (1983) viewed the frequency of blinking in eighteen species of diurnal birds. They found the average frequency of blinks to vary widely, from 11.8 sad=1.6 in Red Shouldered Hawk (*Buteo lineaus*) to Ruby-Throated Hummingbird (*Archilochus columbris*) that blinked at the average per-minute rate of 53.4 sd=4.6. They also measured Mallards (*Anas Platyrhynchos*) and discovered them to blink at an average rate per-minute of 28.3 with a standard deviation of 3.1. Blink rate has also been investigated in Herring Gulls (*Lars Argentatus*) by Amlaner and McFarland (198

The subject bird of this study is the Ferruginous Duck (Aythya nyroca), which is a diving duck from Eastern areas of the European continent that occurs as a rare vagrant in the United Kingdom. It is likely that in the UK, the wintering sightings of wild birds from this species of duck are supplemented by escape birds from private collections and that the identification from which of these two populations a bird comes may be impossible. A large proportion of the English sightings of Ferruginous Ducks (Aythya nyroca) have been made in the Fenlands of East Anglia, and this region is the location of the present observations. The Fenlands occupy a position in the Western region of East Anglia that is relatively near to the birds' more typical home of Continental Europe. The Fenland region is also one of the most important locations for wintering wildfowl (ducks, geese and swans) in England.

It has been noted that one of the reasons for birds to flock is to provide security. Another reason is that being in a flock also reduces the amount of vigilance a bird must engage in if it is located within a flock as compared to when the bird is alone. Furthermore, a flock of birds is more likely to notice and approaching predator and the movement and sound made by a flock of birds is more likely to confuse a predator than when a bird acts alone. As being a member of a flock results in the sharing of vigilance when ducks sleep amongst participants in the flock, I have noted that ducks at the edge of the flock blink more frequently than ducks located more centrally within the flock. However, little has been written about the general effects of an isolated duck being a member of a flock of conspecific ducks or upon the specific relationships between an isolate's position in the flock and its blink rate.

Research was therefore undertaken of a lone Ferruginous Duck (Aythya nyroca) to investigate the possible relationship between being an isolated duck of a very uncommon species which was sleeping with apparently similar looking ducks (Mallard (Anas Platyrhynchos)). This small study was especially interested in the investigating whether being a member of a con-specific flock would affect the blink rate of the solitary Ferruginous Duck (Aythya nyroca).

Method

The research reported here was undertaken in the autumn of 1983. Observations were made of the individual Ferruginous Duck (Aythya nyroca) whist it was sleeping amongst a flock of more than 100 Mallards (Anas Platyrhynchos). A colleague accompanied the author into a portable hide that had been previously erected approximately 10-15 metres from the sleeping birds. The accompanying person then left the hide, which was pitched amongst reeds in knee-deep water. The author observed the bird flock through 8x40 binoculars and with a 20-45 magnification tripod mounted spotting scope, over a period of several hours during daylight. At no time during the observations were other people present and the ducks were not disturbed.

Initial observations were made of the rate at which the flock of mainly Mallard (Anas Platyrhynchos) blinked. I then performed the same observations upon the sole Ferruginous Duck (Aythya nyroca).

Results

The first point to note is throughout the observation the Ferruginous Duck (Aythya nyroca) changed its position in the flock and was frequently to be found at the very edge of the flock and occasionally the bird appeared to actually leave the flock. All of the ducks (both Mallard (Anas Platyrhynchos) and Ferruginous Duck (Aythya nyroca)) spent a large proportion of their time apparently asleep. During previous occasions on which I have watched Mallards (Anas Platyrhynchos) blink during their sleep, these ducks blinked at a slower rate if they were sleeping towards the centre of the flock when compared with con-specific birds that were sleeping in a more peripheral location.

In the present research Mallards (Anas Platyrhynchos) on the periphery of the flock blinked approximately, once every two seconds and there was little variation between birds in terms of this frequency. Birds that were located away from the flock's edge were found to blink half as frequently (approximately once every 4 seconds). However, whilst there appeared to be little variation between peripheral birds' blink rate, central birds displayed considerable variation with some individual's blinking less frequently.

The single Ferruginous Duck (Aythya nyroca) blinked at a faster rate than adjacent Mallards (Anas Platyrhynchos) regardless of the isolate's position in the flock: blinking approximately once a second when peripherally positioned in the flock.

Conclusions

In this small observation study, I confirmed the previously made observation that the rate at which Mallards (Anas Platyrhynchos) blink to vary in relation to the specific position a bird occupies within a con-specific flock. In this situation, I observed the birds sleeping at the edge of the flock to blink approximately twice as rapidly when compared to con-specific birds that are sleeping in a more central position in the flock.

The Ferruginous Duck (Aythya nyroca) is a bird of similar size to the Mallard (Anas Platyrhynchos) and in the autumn is of similar appearance. However, the isolated Ferruginous Duck (Aythya nyroca) appeared to blink at a constantly fast rate (approximately twice as frequently) relative to the Mallards (Anas Platyrhynchos) to which it was adjacent. Consequently, it may be suggested that blinking for vigilance did not appear for this isolated bird to be mediated by the presence of ducks of a different

species. These findings are only suggestive and much further research is required. It is also important to note that I had no measure of base-rate sleep blinking in Ferruginous Duck (Aythya nyroca) when sleeping with conspecific birds. It may be the case that the Ferruginous Duck (Aythya nyroca), when sleeping in conspecific flocks, has a faster and greater duration blink pattern than the Mallard (Anas Platyrhynchos) when it is sleeping in conspecific flocks.

Mallards (Anas Platyrhynchos) were the overwhelmingly most common species of duck in the flock observed. However, Teal and the two non-duck species of Moorhen and Coot were also present but these birds were not specifically observed.

The research reported was made using the very crude assessment tool of a second-hand on a watch. Other research has employed measures that are more sophisticated and doing this to assess blink rates in conspecific groups of ducks would likely be beneficial. As well as blink frequency, a measure of how long the duck keeps its eyes open is an important factor in the effectiveness of blinking vigilance. However, no measure of this was taken and this remains a question for further research.

References

Amlander, C.J., and Ball, N.J. (1983) A Synthesis of Sleep in Wild Birds, **Behaviour, 87**(1), 85 – 119.

Amlander, C.J., and McFarland, D.J. (1982) Sleep in the herring gull (*Larus argentatus*), **Animal Behaviour, 29**(2) 551–556.

Berger, R.J., and Walker, J.M. (1972) Sleep in the Burrowing Owl (*Speotyto cunicularia hypugaea*). **Behavioral Biology, 7**: 183-194.

Berger, R.J., Walker, J.M., and Scott, T.D. (1971) Characteristics of sleep in the burrowing owl and the tree shrew, **Psychophysiology, 7**: 303.

Kirsten, S.J., and Kirsten, E.B. (1983) Spontaneous Blink Rates of Birds, **The Condor, 85**(1), 92-93.

Klein, M., Michel, F., and Jouvet, M. (1964) Polygraphic study of sleep in birds, **Comptes Rendus des Séances de la Société de Biologie et de ses Filiales 158:** 99–103.

Michael, C.W., and Michael, E. (1922) An Adventure with a Pair of Harlequin Ducks in the Yosemite Valley, **The Auk, 39**(1), 14-23.

Tradardi, V. (1966) Sleep in the pigeon, **Archives Italiennes de Biologie - a Journal of Neuroscience, 104:** 516–521.

Van Twyer, H. (1972) A Polygraphic and Behavioral Study of Sleep in the Pigeon (*Columba livia*), **Experimental Neurology, 35**: 138–153.

Walker, J.M., and Berger, R.J. (1972) Sleep in the Domestic Pigeon (*Columba livia*), **Behavioral Biology, 7**: 195-203

Wood, L.A., and Saunders, J.C. (1962) Blinking Frequency: A Neurophysiological Measurement of Psychological Stress, **Diseases of the Nervous System 23**: 158-162.

Zametkin, A.J., Stevens, J.R., and Pittman, R. (1970) Ontogeny of Spontaneous Blinking and of Habituation of the Blink Reflex, **Annals of Neurology 5**: 453-457.