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Responses of nesting Meadow Pipits *Anthus pratensis* and White Wagtails *Motacilla alba* to a stuffed Sparrowhawk *Accipiter nisus*

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Abstract. I examined responses of nesting Meadow Pipits and White Wagtails to a mounted Sparrowhawk. The birds flew to and circled above the predator, apparently to inspect it, and then landed some distance away. Both species approached the predator, but wagtails approached it closer during "inspection" flights and landed much closer to it after flights than did pipits. The birds may inspect the predator to obtain useful information; the difference between species may be related to flight capacity and nesting habitat.

Much is known about the reproductive behaviour of birds, but other aspects of their behaviour remain largely unexplored. Anti-predator behaviour is such an aspect; a check in a handbook such as *Birds of the Western Palearctic* reveals that in many species surprisingly little is known about how individuals respond to and avoid predators. This applies especially to predators of adults and juveniles, such as *Accipiter* hawks, which are difficult to detect and observe for ornithologists in woodland. Stuffed specimens of predators (e.g. owls and raptors) have been used to study responses and mobbing behaviour in passerines (e.g. Curio 1975, Curio et al. 1983, Alatalo & Helle 1990). Responses seem to depend on the species of predator (the danger it poses) and the distance to the prey. However, to date only a few common passerines have been studied.

In this study I examined responses of two quite closely related passerines, the Meadow Pipit *Anthus pratensis* and the White Wagtail *Motacilla alba* (Cramp 1988), to a stuffed, perched Sparrowhawk *A. nisus*. An earlier study suggested that Spar-

rowhawks show no preference for any of these two prey species: in paired trials, mounted pipits were attacked as often as mounted wagtails. Further analysis indicated that the plumage of the two species may be about equally conspicuous, as judged from the appearance of mounted specimens in the wild (Götmarm, *submitted*). However, the two species seem to differ in anti-predator behaviour: the wagtail is known to mob flying hawks with a special mobbing-song, a behaviour which has not been recorded in the pipit (Bergmann & Helb 1982, Cramp 1988). To study their behaviour in more detail, I compared responses to a stuffed Sparrowhawk placed in nesting territories of the two species.

I conducted the study in April and May 1991 near Göteborg. Meadow Pipits were studied at a bog (Rambo mosse) 2 km southwest of Mölnlycke, and on grazed meadows 1 km southeast of Kungälv. I studied wagtails at lakes, streams, and near human habitation in the same area. Experiments were performed before or during egg laying (a few pairs may have had started incubation). The stuffed Sparrowhawk (a juvenile female) was mounted on a 1 m-pole that was pressed down into the ground. I used singing or displaying males or birds giving alarm calls as indications of a nesting territory. The mounted Sparrowhawk, covered with a grey plastic bag, was placed in what seemed to be the centre of the territory (singing and neighbouring males were observed briefly before each experiment). Only one experiment was conducted in each territory. I monitored each territory from a hide about 30 m from the mount, and started observations when the birds showed normal, undisturbed behaviour or when I could no longer hear any alarm calls. The wagtails were then usually visible on the ground some distance from the mount, while it was more difficult to watch pipits in the higher grass or herb vegetation that characterizes their nesting territories. With the mount hidden in the bag I first recorded the behaviour of (visible) territory owners during 10 min. Then, with the aid of a string, I pulled the bag off the hawk, and recorded responses to the mount during at least 10 min.

No bird showed a response to the pole or mount covered by bag, suggesting that these artifacts did not influence the behaviour of the prey species. A few birds were recorded passing the bag in flight without noticing it. No bird was closer than 15 m from the mount. When the bag was pulled off the mount, the wagtails and pipits soon detected it, but wagtails detected it earlier (mean = 3.8 min \pm 2.2 (SD), n = 10 experiments) than pipits (10.1 \pm 9.8, n = 11 experiments; P = 0.04, Mann -Whitney U-test, two-tailed). Both species responded in a similar manner after they had detected the mount. They flew to it and circled it several times for about a minute, then they landed on the ground or in low bushes some distance away, watching the mount for some time. The birds sometimes called as they flew over the mount.

However, in flight wagtails approached the mount closer than did pipits. The closest distance to the mount during "inspection" flights was on average 3.1 m (\pm 2.1) for wagtails and 10.1 m (\pm 8.4) for pipits (P=0.002). Moreover, the average landing distance from the mount after inspection flights was much shorter for wagtails (8.9 \pm 1.1 m) than for pipits (57 \pm 29 m; P=0.0005). This was probably not due to differences in territory size, since wagtail territories appeared to be larger than those of pipits (Götmark, pers. obs.)

Thus, both species clearly approached the predator, since no bird visited the site of the mount pole when the mount was covered. Why do these passerines approach a potentially dangerous predator so closely? One possible or likely reason is that prey species are selected to seek information about predators (Kruuk 1976, Curio 1978). Information about appearance, behaviour, and intentions of predators might be useful for prey, as they throughout their life need to avoid them in critical situations (in an evolutionary perspective, also humans are prey and are attracted to danger and violence, such as in films and in the media). Once a bird (prey) has detected a hawk, it is unlikely to be caught, as hawks are usually only able to catch prey that are unaware of the predator. Therefore the risk taken by wagtails and pipits during inspection flights might be relatively small. However, there are alternative explanations of the observed behaviours. I interpret them as a form of predator "inspection", but according to the definition of Curio (1978) the prey species are "mobbing" the predator, and then there are at least six alternative explanations for their behaviours (see Curio 1978).

Sparrowhawks seem to regard White Wagtails

and Meadow Pipits as equally profitable prey (Götmark, *submitted*). Given a clear risk of predation, why do flying wagtails approach a stuffed hawk more closely than do pipits (in addition, wagtails also mob flying hawks; Bergman & Helb 1982)? They do not seem to be more manoeuvrable in flight than pipits, because a comparison of wing loading (wing area divided by weight; a low wing loading implies improved manoeuvrability in flight) in the two species showed no significant difference (Götmark, *submitted*). However, wing loading is only one aspect of flight capacity, and the species may differ in, for instance, maximal flight speed. Wagtails occur in habitats devoid of or with only low vegetation, where visibility is good, whereas pipits occur in grassland with higher ground vegetation. Given that visibility is good, wagtails may detect approaching hawks early. The pipit, on the other hand, may have been selected to seek cover far away from a predator, as lower visibility makes it difficult to watch the predator continuously or detect a predator early. This interpretation is consistent with the earlier detection of the hawk mount in wagtails than in pipits. However, it does not explain why wagtails flew closer to the predator during inspection flights. Possibly, this difference reflects superior flight capacity in the wagtail.

References

- Alatalo, R. V. & Helle, P. 1990. Alarm calling by individual willow tits, *Parus montanus*. *Anim. Behav.* 40: 437-442.
- Bergmann, H.-H. & Helb, H.-W. 1982. *Stimmen der Vögel Europas*. BLV Verlagsgesellschaft, München.
- Cramp, S. (ed.) 1988. *The birds of the western Palearctic*, Vol V. Oxford University Press, Oxford.
- Curio, E. 1975. The functional organization of anti-predator behaviour in the pied flycatcher: a study of visual perception. *Anim. Behav.* 23: 1-115.
- Curio, E. 1978. The adaptive significance of avian mobbing. I. Teleonomic hypotheses and predictions. *Z. Tierpsychol.* 48: 175-183.
- Curio, E., Klump, G. & Regelmann, K. 1983. An anti-predator response in the great tit (*Parus major*): is it tuned to predator risk? *Oecologia* 60: 83-88.
- Götmark, F. *Submitted MS*. Are conspicuous birds unprofitable prey? Field experiments with hawks and stuffed prey species.
- Kruuk, H. 1976. The biological function of gull's attraction towards predators. *Anim. Behav.* 24: 146-153.

Sammanfattning

Häckande ängsbiplärkors och sädesärlors reaktioner på en uppstoppad sparvhök

Fåglars reaktioner inför predatorer, såsom rovfåglar, är bristfälligt kända. Hos vanliga arter (t ex talgoxe och svartvit flugsnappare) har man studerat så kallat mobbningsbeteende, där bytesarterna närmar sig, exponerar sig, och på olika sätt markerar sitt "missnöje" för predatorn. Reaktionen inför viktiga predatorer som sparvhök och duvhök är dock okända hos många av våra mindre vanliga tättingar.

I denna studie undersökte jag hur häckande sädesärlor och ängsbiplärkor reagerade inför en uppstoppad sittande sparvhök som placerats i deras revir. Då denna var täckt reagerade inte fåglarna (inför sittpinne och min närvaro). Då höken exponerades flög de mot höken, flög runt över den någon minut, och avlägsnade sig därefter. Sädesärlorna upptäckte höken tidigare, flög runt på kortare avstånd från höken, och landade avsevärt närmare höken än ängsbiplärkorna.

Jag tolkar båda arternas beteende som en form av inspektion av predatorn, genom vilken de kan informera sig om dess beteende och avsikter. Då de redan upptäckt predatorn löper de liten risk att attackeras av den, eftersom hökar normalt bara fångar byten som ännu inte upptäckt deras närvaro. Det finns emellertid alternativa förklaringar till bytesarternas beteende om man klassificerar det som "mobbing" (se Curio 1978).

Skillnaden mellan arterna kan delvis bero på olikartat habitatval; ängsbiplärkor föredrar miljöer med högre vegetation än sädesärlor. För ängsbiplärkor innebär detta att det kan vara svårare att upptäcka eller bevaka en predator i närheten och det kan därför vara fördelaktigt att landa långt ifrån den. En alternativ förklaring till sädesärlornas mer "oskygga" beteende kan vara att de är bättre på att undkomma sparvhökar (t ex genom bättre flygförmåga).

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