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Authors: Petrovan, Silviu O., and Leu, Mihai

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Hunting and Consumption of Passerine Birds by Wild Mallards (*Anas platyrhynchos*)

Silviu O. Petrovan[1,*] and Mihai Leu[2]

[1]Department of Zoology, University of Cambridge, The David Attenborough Building, Cambridge, England, CB2 3QZ, U.K.

[2]Veterinary and Food Safety Authority, Strada Timisoarei, 15, Resita, 320232, Romania

[*]Corresponding author; E-mail: sop21@cam.ac.uk

Abstract.—Predation of vertebrates by Mallards (*Anas platyrhynchos*) has rarely been documented and only in relation to fish and amphibians. Mallard foraging behavior was observed at a reservoir bordering Semenic-Caras Gorges National Park in southwest Romania. A group of Mallards comprising one adult female and 10 subadults was recorded hunting, killing and consuming hatching year passerine birds of two species, a Grey Wagtail (*Motacilla cinerea*) and a Black Redstart (*Phoenicuros ochruros*). These are the first records of hunting of birds by wild Mallards. This extraordinary new behavior represents substantial diet expansion for this widespread and abundant duck species. *Received 23 February 2017, accepted 4 March 2017.*

Key words.—*Anas platyrhynchos*, avian prey, Black Redstart, Grey Wagtail, Mallard, *Motacilla cinerea*, *Phoenicuros ochruros*, vertebrate predation.

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The Mallard (*Anas platyrhynchos*) is one of the largest and most abundant and widespread duck species in the world, and also the most hunted waterfowl species in Europe with around 4.5 million birds shot annually (Hirschfeld and Heyd 2005). Mallards are widely adaptable, from sedentary or dispersive to fully migratory, and they inhabit almost every wetland type from natural to man-made, including reservoirs, urban parks and irrigation canals (Carboneras 1992). Due to their importance as a game species and as the wild relative of the domestic duck, Mallard diet has been well described. They are regarded as omnivorous, feeding by dabbling in shallow water under 1 m in depth and by grazing on land (Snow and Perrins 1998). Their diet primarily consists of aquatic and terrestrial plants as well as various terrestrial and aquatic invertebrates (Dessborn *et al.* 2011), but may occasionally include amphibians or fish (Carboneras 1992; Olsen *et al.* 2011). The digestible protein content of the food, especially animal protein from insect larvae, appears to be a major factor for the survival and growth rate of the ducklings (Street 1978). High-protein food is also required by Mallards during egg-laying, whereas other energy-demanding phases rely on food of plant origin to increase fat deposits (Pehrsson 1984). Experimental work on nutrient-poor lakes in Sweden suggested that food limitation and adverse weather are major factors for high duckling mortality and why some lakes have low abundance or even absence of dabbling ducks (Gunnarson *et al.* 2004). However, even during periods when the requirement for animal protein is at its highest, Mallards focus on aquatic invertebrates, and information on vertebrate predation is generally rarely reported. We report the first documented cases of hunting and consumption of birds by wild Mallards.

Methods

The Trei Ape reservoir (45° 12′ N, 22° 08′ E), bordering the Semenic-Caras Gorges National Park (Natura 2000 ROSCI0226 site) in southwest Romania, was visited over 6 days in July 2016. The reservoir, created in 1970, is a large, 53-ha freshwater body at 850-m altitude, with a maximum depth around 30 m and a relatively complex structure following river valleys in three main directions. It has moderate usage for tourism activities including camping, rowing and angling, primarily for European chub (*Squalius cephalus*), European perch (*Perca fluviatilis*), brown trout (*Salmo trutta fario*) and Zander (*Sander lucioperca*). The edges of the reservoir are largely covered by woodland, mostly deciduous, with beech (*Fagus sylvatica*) and alder (*Alnus glutinosa*), scrub, and conifers, mainly Norway spruce (*Picea abies*). Sheep (*Ovis aries*) summer pastures cover the higher slopes of the northern shore. Most of the reservoir is deep, open water with little or no aquatic vegetation. However, dense and tall riparian vegetation areas exist where the three main streams feed into the lake, and large populations of amphibians, primarily common frog (*Rana*

temporaria) and common toad (*Bufo bufo*), breed in these sections (Petrovan *et al.* 2006). Small numbers of Mallards (30-50 pairs), Grey Herons (*Ardea cinerea*) and Moorhen (*Gallinula chloropus*) are typically encountered on the water's edge during March-October, together with more occasional observations of species such as Black Stork (*Ciconia nigra*). During May-September, large numbers of summer migrants, especially Black Redstarts (*Phoenicuros ochruros*), Barn Swallows (*Hirundo rustica*), House Martins (*Delichon urbicum*), and Red-backed Shrikes (*Lanius collurio*), as well as other resident passerine birds such as Blackbirds (*Turdus merula*), breed and raise their young on the edges of the reservoir. The Mallards are not fed by people and generally maintain a large flight distance.

RESULTS

A group of Mallards (n = 11) was observed on 17 July 2016 in the eastern part of the lake, in overcast weather with a temperature of 18 °C, starting at 17:30 hr. The group consisted of one adult female with 10 subadults of consistent size, ~2/3 of the adult size and with incompletely formed plumage. Using binoculars and telephoto lenses, we observed the Mallards for ~15 min during their foraging activities at the water's edge. They were vigorously shaking the riparian and scrub vegetation on the bank. Following this activity, the adult Mallard was observed repeatedly shaking its head laterally and compressing a passerine bird in its bill. The bird was identified from pictures and recording video as a Grey Wagtail fledgling with almost complete plumage (Fig. 1). The adult Mallard was repeatedly mobbed by the vocalizing subadults trying to remove parts of the bird carcass, but the adult defended it. The adult Mallard had obvious difficulties with swallowing the whole bird, partly due to the extended wings of the Grey Wagtail. The female Mallard repeatedly submerged the carcass, repositioned it in its bill and tilted its head backward, a process lasting over 10 min until the Grey Wagtail was eventually entirely consumed. During this time, a second bird was flushed from the bankside vegetation by the activity of the subadults shaking the long undergrowth, and landed on the water surface, some 30 m from the bank and 12 m away from the Mallard group. The bird, identified from pictures as a fledgling Black Redstart (Fig. 2), opened its wings

Figure 1. Adult Mallard defending and consuming a Grey Wagtail.

Figure 2. (A) Subadult Mallard chasing a juvenile Black Redstart after flushing it from the bank vegetation. Note the very rapid approach by the Mallard. (B) Subadult Mallards attacking and killing the juvenile Black Redstart (bottom).

and started thrashing on the water's surface giving out distress calls. The Black Redstart was chased by several subadult Mallards and was repeatedly attacked, grabbed and submerged as the ducks tried to swallow it or remove parts of it. Following continuous attacks by between two to five Mallards positioned in a circle, the Black Redstart disappeared, either drowned and submerged or consumed by one or more of the subadults. During the attack, which lasted less than 3 min, the subadult Mallards continued to vocalize in short, repeated calls while trying to take control of the prey. The entire group of Mallards, including the adult female, then emerged onto a floating tree trunk for basking and preening as the group entered a phase of rest.

DISCUSSION

Remarkably for such a widespread and well-studied species, these are, to our knowledge, the first observations of avian hunting and predation by Mallards. The completely new behavior exhibited by this group is even more significant considering that vertebrate consumption has rarely been described in this species and almost only on fish (Carboneras 1992; Olsen *et al.* 2011). Even Pekin (domestic) ducks (*A. platyrhynchos domesticus*) do not exhibit a tendency for aggressive and predatory behavior in commercial farming compared to other species such as Muscovy Ducks (*Cairina moschata*) (Riber and Mensh 2008). Also, comparing wild and domesticated Mallards in an experimental setting demonstrated that wild Mallards show significant avoidance and reticence toward novel food (Desforges and Wood-Gush 1975), possibly as an indication of either dietary conservatism or neophobia. This fits the wider literature observations of avian predators often avoiding novel insect prey (Coppinger 1969) or reduced predation rates by birds of prey of songbird species with conspicuous plumage (Götmark 1994). However, Mallards

have recently been shown to learn to exploit new food sources, such as entering the sea to predate Pacific sand crabs (*Emerita analoga*) in multiple locations in California (Lafferty *et al.* 2013).

The fact that one predation event was conducted solely by the subadults, with great speed and with no hesitation, suggests they were experienced enough in such bird attacks to overcome any dietary conservatism. Yet, it seems unlikely that Mallards would have much success at capturing birds outside of the bird breeding season when fledglings are abundant, both on land and at the water's edge. Innovation during foraging can result in the development of new behaviors or the modification of existing ones to take advantage of new opportunities in the environment, such as the exploitation of new food sources (Overington *et al.* 2011). If Mallards were limited by the lack of animal protein, for instance due to intense competition for insect larvae by fish introduced for angling (Hill *et al.* 1987), it is possible that the inclusion of a new, energy-rich food source would offer a significant advantage at a critical time of the year. However, behavior innovation can increase risks, and predation of birds by Mallards could increase transmission of pathogens such as parasites or Salmonella, which has been found to be associated with raptors that predate other bird species (Tizard 2004).

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