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FOOTEDNESS IN THE GLOSSY BLACK-COCKATOO: SOME OBSERVATIONS AND A REVIEW OF THE LITERATURE WITH A NOTE ON THE HUSKING OF *Allocasuarina* CONES BY THIS SPECIES

DAVID I. MAGRATH

29 Gingana Street, Aranda, ACT 2614

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A survey of the literature on the use of a particular foot to hold food by Australian parrots suggests that most of the few species that have been studied are left-footed. Most, but not all, Glossy Black-Cockatoos *Calyptorhynchus lathami* observed have been left-footed. I present some field observations on the footedness of this species; all birds but one were left-footed. I conclude that the right-footed bird was unusual, and that the species is primarily left-footed.

Most Glossy Black-Cockatoos have been reported to husk *Allocasuarina* cones from the stem end. I suggest that the husking of cones from the free end may be a distinguishing characteristic of the discrete population of Glossy Black-Cockatoos inhabiting inland New South Wales.

INTRODUCTION

Many parrots use the foot to hold food while eating, and some show preferences for a particular foot, usually the left (Forshaw 1989). Footedness in parrots has been compared with handedness in humans (Friedmann and Davis 1938; Rogers 1980; Harris 1989) and put forward as evidence for the occurrence of lateralization in the avian brain (Smith 1972; Rogers 1980). Harris (1989) provides a fascinating review of the literature on the subject, from which it is clear that a lot more observational work has yet to be done before much can be concluded about the extent and nature of footedness in parrots.

Apart from isolated observations, such as the use by a Crimson Rosella *Platycercus elegans* of its right foot when eating Christmas beetles (Davey 1989), there is little published information on footedness in Australian parrots. The Gang-gang Cockatoo *Callocephalon fimbriatum* may be exclusively left-footed (Rogers 1980; Prendergast 1985), and observations by Joseph (1989) suggested that the Glossy Black-Cockatoo *Calyptorhynchus lathami* is exclusively, and the Red-tailed Black-Cockatoo *C. magnificus* is predominantly, left-footed. Rogers (1980) presents data on the footedness of nine species of Australian parrots in relation to the question of lateralization in the avian brain. All species were predominantly or exclusively left-footed except the Crimson Rosella which was significantly right-footed. However, the data for some species were meagre and their overall significance is difficult to assess as the number of birds is not given. As part of a study of the foraging behaviour of Eastern and Pale-headed Rosellas *Platycercus eximius* and *P. adscitus*, Cannon (1983) found both to be predominantly right-footed.

Joseph (1989) suggested 'that the exclusive use of the left or right foot for holding food will be found most commonly in species or populations that feed either while perched, or by employing specialized feeding techniques, or both'. The Glossy Black-Cockatoo is arboreal and feeds almost exclusively on *Allocasuarina* seeds. The birds nip off the cone with the bill, transfer it to the foot and then extract the tiny seeds in an intricate manner (Muller 1974; Lendon 1979; Harman 1981; Joseph 1982, 1983; Saunders and Pedler 1986; Clout 1989; Sindel and Lynn 1989; Crome and Shields 1992).

The aim of this note is to present some observations on footedness in Glossy Black-Cockatoos, as well as to survey the literature on footedness in this species. I also comment on their technique of husking *Allocasuarina* cones.

OBSERVATIONS

Throughout the total of 20.5 hours of observation of feeding Glossy Black-Cockatoos it was possible to watch the birds at close quarters, at times from less that 4 metres.

Observations of Glossy Black-Cockatoos at Wonboyn Lake, on the far south coast of New South Wales, were made in 1987, 1988, 1992 and 1993. In early July 1987 a family of three birds, a male, a female and a juvenile, was encountered on two successive days. The adult birds were feeding on *Allocasuarina littoralis* cones, taking 1–3 minutes to dispose of each. Throughout four hours of observation, the male was seen to use only his right foot for feeding, the female only her left. The juvenile was in an adjacent eucalypt, moving unsteadily to and fro along a short stretch of branch, occasionally removing small pieces of bark with its bill and transferring them to its left foot before chewing them. It seems unlikely that the juvenile was a recent fledgling, as fledging usually takes place in August (Forshaw 1981; Courtney 1986; Clout 1989).

The 1988 observations, totalling about 9 hours, were made in late October over five successive days at the same site as in 1987, and were of four adults and two juveniles, comprising two families in a loosely associated feeding group (a common pattern: Forshaw 1981, 1989; Clout 1989; Sindel and Lynn 1989).

One of the juveniles (left-footed) was always seen feeding with a right-footed male and his left-footed mate. I assume that this was the same pair of adults encountered in 1987, as they were seen in the same spot and as right-footed Glossy Black-Cockatoos are uncommon (see Discussion). Only left-footed birds have been reported from this district (Clout 1989; Thatcher 1988). The accompanying juvenile could have been a more recent fledgling than the one seen the previous year.

The other juvenile, a left-footed bird, also appeared to be more closely associated with this family than with the other adults, which were both left-footed. It was not seen feeding in the same tree as any of the adults and was once chased from an adjoining *Allocasuarina* tree by the right-footed male. It is known that an adult male can at times show aggression towards its offspring (Sindel and Lynn 1989), so it could have been the juvenile seen the previous year.

In September 1992, a male, a female and a juvenile and in February 1993, a male and a female, were watched feeding for 2 and 0.5 hours, respectively, at a site about 1 kilometre from the site of the earlier observations; all used the left foot exclusively to hold the cone.

At Taronga Zoo, Sydney, in August 1987, two adult birds, a male and a female, were watched feeding on *A. littoralis* cones for about 45 minutes from within their aviary; both used the left foot exclusively to hold the cone. In late August 1992, three families of Glossy Black-Cockatoos, two consisting of a male, a female and a juvenile, one of a male and female pair, were watched for about 3 hours feeding in *A. verticillata* trees on Mt Majura in the ACT. In each case, family members were feeding together in the same tree; all birds consistently used their left foot to hold the cones.

DISCUSSION

Of the six to eleven birds seen at Wonboyn, one used the right foot exclusively to hold the cone, all others the left. The two birds observed at Taronga Zoo and the eight birds seen on Mt Majura all consistently used the left. Henry Nix (pers. comm.) has over a number of years observed many Glossy Black-Cockatoos in New South Wales, including five birds at Cabbagetree Creek at the base of the Clyde Mountain (feeding on *A. littoralis*), and in Queensland in the Clarke Range, Eungella district *(A. littoralis)*, in the Carnarvon Ranges *(A. torulosa)*, on the Blackdown Tableland and at Kroombit Tops near Gladstone *(A. torulosa)*. In every case the birds used their left foot to hold the cone. David Secomb (pers. comm.), who has observed about 25 Glossy Black-Cockatoos yearly in the Nambucca Heads district of New South Wales (Secomb 1987), has seen only the left foot being used for

food-holding; the birds were feeding on *A. littoralis* and *A. torulosa*. Anna Sambain (pers. comm.) has watched birds feeding in *A. littoralis* at Mudgeeraba, south-east Queensland, using only the left foot for eating.

Published references to footedness in Glossy Black-Cockatoos indicate that most birds so far observed have been left-footed. Hyem (1933) states that 'it is a remarkable fact that they always use the left foot to hold the cones' and Saunders and Pedler (1986) say that the birds 'bite off a cone from a branchlet, transfer it to the left foot, and bring it up to the lower mandible'. Joseph (1982, 1989), in observations totalling about 45 hours of Glossy Black-Cockatoos on Kangaroo Island, feeding on *A. verticillata,* and at three New South Wales sites — in the Pilliga Scrub (at least one bird), west of Dubbo (three birds) and north-west of Dorrigo (two birds) — observed food-holding in the left foot only. This was still the case at 26 May, 1992 (Joseph, pers. comm.). Thatcher (1988), in her observations of at least three birds feeding at Tathra on the New South Wales south coast, noted them to be left-footed, as did Clout (1989) in his extensive study of Glossy Black-Cockatoos in the forests just south-west of Eden, *A. littoralis* being the food tree in both instances. Crome and Shields (1992) state that 'a perched bird bites off a cone and passes it to the left foot'.

Against these reports of left-footed birds, there are only two references in the literature implying the existence of right-footed birds and two reporting their occurrence. Forshaw (1981) states that the bird 'transfers (the cone) to the foot, almost invariably the left foot' and Eastman and Hunt (1966) state that the cone is 'held in foot (usually left foot)'. Sindel and Lynn (1989) say that 'all the birds of this species which I have been able to observe closely when feeding, held the cone in the right claw', and Muller (1974) writes that the cone is 'held firmly at the bottom in one foot, usually the right one'.

It seems likely that the observations of Muller (1974), who was then curator of birds at Taronga Zoo, were made on the captive population at the zoo (15 birds at that time, 'all captive raised but one'). The population originated in the collection of Sir Edward Hallstrom (Muller 1974), most birds of which are said to have been bred from one pair (Lendon 1979). One might ask, were either or both of these right-footed? It is interesting that the two birds I observed at Taronga Zoo both used the left foot to hold the cone; these were old birds and may well have been part of or derived from Hallstrom's original collection.

It is possible that many of the observations of Sindel and Lynn may also have been made on captive birds: both were aviculturists. Footedness of some caged parrots can be influenced by the offering of food more often from one side (Jordan 1895; Smith 1972).

On the basis of the observations detailed and literature surveyed in this note, it seems reasonable to conclude that the Glossy Black-Cockatoo is primarily left-footed. The occurrence of a right-footed bird at Wonboyn shows, however, that right-footedness in the Glossy Black-Cockatoo is not solely associated with captivity.

Examination of cone remnants dropped by feeding Glossy Black-Cockatoos showed that all the Wonboyn birds, which were feeding on *A. littoralis,* husked the cones from the stem (proximal) end, as did the birds on Mt Majura, feeding on *A. verticillata.* This is in agreement with Clout (1989), for birds feeding in *A. littoralis,* and Secomb (pers. comm.), for birds feeding on *A. littoralis* and *A. torulosa,* both working in coastal areas of New South Wales. Statements by Muller (1974), Forshaw (1981) and Eastman and Hunt (1966) are ambiguous on this point.

Joseph (1982, 1983) found that the Glossy Black-Cockatoos on Kangaroo Island, feeding on *A. verticillata,* also husked cones from the stem end, whereas three birds seen 20 kilometres west of Dubbo, New South Wales, again feeding on *A. verticillata,* husked from the free (distal) end. He raised the possibility that this difference may be representative of a general difference in husking technique between those eastern Australian birds feeding on *A. verticillata* and the birds of Kangaroo Island. The husking technique of Glossy Black-Cockatoos feeding on *A. verticillata* cones on Mt Majura rules out this possibility. However, Joseph's observations, taken together with information on the distribution of Glossy Black-Cockatoos (Blakers *et al.* 1984), raise another possibility. There appear to be three distinct populations of Glossy Black-Cockatoos, the main one inhabiting the Great Dividing Range and eastern coast north to Shoalwater Bay and the

Eungella district, another based on Kangaroo Island, and the third in the Pillaga and Round Hill area in the Murray-Darling region. The Dubbo observations of Joseph fall within the latter area: could it be that the husking of cones from the free end is a general and distinctive characteristic of the foraging behaviour of this third population of Glossy Black-Cockatoos? Only further observations will tell.

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