

A POSSIBLE TERRITORIAL AND NESTING ASSOCIATION BETWEEN PIED AND GREY BUTCHERBIRDS *Cracticus nigrogularis* and *C. torquatus* AND THE YELLOW-THROATED MINER *Manorina flavigula*

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This study demonstrated that Yellow-throated Miners *Manorina flavigula* are aggressive birds that exclude other species of birds from their territories. However, they did not exclude Grey Butcherbirds *Cracticus torquatus* or Pied Butcherbirds *C. nigrogularis* from two widely separated sites in Western Australia. Concurrently active nests of Yellow-throated Miners and Pied Butcherbirds were found within 10–30 metres of one another at Westonia. Yellow-throated Miners, and Pied and Grey Butcherbirds perched close to each other without aggression. A territorial and nesting association between these species is unexpected since both genera are aggressive towards other species. Pied and Grey Butcherbirds may benefit from abundant arthropod resources that are not exploited by miners, and in return, miners may benefit from the aggressive ability of the butcherbirds to repulse larger nest-predators when miners cannot. The grouping of nests may aid all species in defending their territories and may enhance their nesting success.

INTRODUCTION

Species in the genus *Manorina* have been identified as birds that exclude other species from their territories, sometimes leading to sole occupancy of a site (Dow 1977; Loyn *et al.* 1983; Higgins *et al.* 2001). Inter-specific territoriality has been reported in Bell Miners *Manorina melanophrys* (Loyn *et al.* 1983; Clarke and Schedvin 1999), Noisy Miners *M. melanocephala* (Dow 1977; Grey *et al.* 1998), Yellow-throated Miners *M. flavigula* (Starks 1987) and Black-eared Miners *M. melanotis* (Starks 1987; McLaughlin 1990).

Despite the wealth of knowledge available on the Noisy Miner and Bell Miner, and the rapidly expanding data on the Black-eared Miner, there has been surprisingly little published on the agonistic behaviour of the Yellow-throated Miner, despite its wide distribution across Australia. Yellow-throated Miners have been described as aggressive to other birds (Mellor 1919), aggressive near the nest (Chandler 1937), or less aggressive than Noisy Miners (Jeffery 1955).

Butcherbirds *Cracticus* spp., catch live prey including birds as large as Common Blackbirds *Turdus merula* and Spotted Turtle-Doves *Streptopelia chinensis* (Pizzey and Knight 1997). They are nest-predators identified by photography (Major *et al.* 1999), and have been observed taking nestlings and adult birds (Hobbs 1981; Tarburton 1991).

This study recorded inter-specific aggression and nest positioning in two populations of Yellow-throated Miners, in Western Australia, to establish if they are less aggressive towards butcherbirds than other birds and to detect if nesting together might provide any mutual benefit.

METHODS

Field sites

Two field sites, Ejah and Westonia, were chosen with butcherbirds and Yellow-throated Miners present at each. The sites were 563 kilometres apart to test if any territorial associations, between the two genera, applied over a broad geographical area.

Ejah is an outcamp at Mileura Station, about 800 kilometres northeast of Perth; 26° 24' S, 117° 11' E. Mileura is a sheep and cattle station on the Murchison Plains in the (semi-arid) mulga zone of Western Australia (see Davies 1970, 1986). Ejah is a mesic area because of the runoff from an escarpment and is one of the few productive sites (with denser vegetation) in the area. Observations were made over a four-hectare area: upon and immediately adjacent to an escarpment (breakaway), up to and at a dry ephemeral creek. The creek was approximately 150 metres south of the breakaway and had denser vegetation than the surrounding area. The flora of the creek area comprised *Eremophila* spp., *Acacia* spp. and *Hakea* spp. The dominant vegetation near the breakaway consisted of *Acacia* spp. and *Eremophila* spp..

Westonia (31° 18' S, 118° 42' E) is located approximately 300 kilometres east of Perth on the eastern side of the central wheatbelt in Western Australia. It is situated in 5 600 hectares of remnant bushland, known as Westonia Commons. Observations were recorded, over a four-hectare area, on the edge of the small township in a suburban area and in adjacent Salmon Gum *Eucalyptus salmonophloia*, Gimlet *E. salubris* and Red Morrel *E. longicornis* woodland. Yellow-throated Miners nested at both ends of this study area and Pied Butcherbirds nested at one end with Yellow-throated Miners.

Field observations

A combined total of 27 hours of observations was made at both field sites. Four hours of observations were made at Ejah (from 29 June through 2 July 2004) – one hour each on four mornings ranging from 0745 hours and finishing at the latest by 1030 hours. Twenty hours of observations were undertaken at Westonia (21 and 23 April, and from 22 to 24 September 2004). In September, ten hours were undertaken in both the morning and evening between 0630 – 0900 hours over four days and 1500 – 1700 hours on five days. In April surveys were undertaken for one hour on 21 April and two hours 23 April; all were in the morning after sunrise. Old nests were identified because they were identical to the nests that were either being used or being built by Pied Butcherbirds. In addition, (Stephen Davies pers. comm.) identified the old nests at Ejah as these he knew were built and used by Grey Butcherbirds. He also advised me that Yellow-throated Miners and Grey Butcherbirds had occupied this same site for 45 continuous years. Yellow-throated Miners were considered acting aggressively if they made deliberate contact with another species; swooped and caused another species to leave the site, chased another species from the immediate area; or if one or more birds perched close to another species and harassed it by squawking, calling or by making short flights toward it.

Yellow throated Miner's territories were thoroughly searched for all nests. Nests were detected by either following birds that made repeated flights to the same location, or while surveying. Distances between nests in the inter-specific group of nests at Westonia were measured with metre long strides. The distance of the two miner nests greater than 100 metres distant from the inter-specific group of nests were estimated. A nest was considered active if it contained eggs, the female was laying or incubating.

An abundance index was calculated by taking the mean of hourly bird counts. To avoid double-counting of any individuals in the hour, the total hourly count was taken only from the maximum number of birds that could be seen at any one time. This figure is likely to underestimate the true totals of larger groups of birds that are constantly moving about the study area.

RESULTS

Grouped nests

A group of four concurrently active nests, two Pied Butcherbirds and two Yellow-throated Miners, were detected in Westonia Commons. Two Yellow-throated Miner nests (one with a bird laying and the other 90% built) were positioned ten metres apart and were situated within 30 metres of two Pied Butcherbird nests (one with an adult on eggs and another 70% built). Two more Yellow-throated Miner nests, under construction, were located approximately 120 metres and 150 metres from the inter-specific group of nests, but within the four-hectare area defended by Yellow-throated Miners. No other active nests of any species were detected in this area. Disused butcherbird nests were detected within the area defended by Yellow-throated Miners at Ejah ($n = 3$) and Westonia ($n = 4$).

Aggression

Yellow-throated Miners were aggressive to all birds (14 species) except butcherbirds that entered the study areas (Table 1). They also mobbed the Galah *Cacatua roseicapilla*, Australian Ringneck *Barnardius zonarius*, Red Wattlebird *Anthochaera carunculata*, Spiny-cheeked Honeyeater *Acanthagenys rufogularis*, Australian Raven *Corvus coronoides* and Little Crow *C. bennetti*.

A Grey Butcherbird chased off an Australian Ringneck (at Ejah), which had been harassed by Yellow-throated Miners but not displaced. At Westonia, a Red Wattlebird and a Western Corella *Cacatua pastinator* that had not been deterred by Yellow-throated Miners, within 15 metres of the inter-specific group of nests, were subsequently chased away by Pied Butcherbirds.

DISCUSSION

An association between *Manorina* spp. and the Grey Butcherbird is supported by a considerable amount of anecdotal data (Table 2), but there is little evidence of miners associating with Pied Butcherbirds (Table 2). Piper and Catterall (2003) reported Pied and Grey Butcherbirds, along with other large species, may be tolerated to some degree by Noisy Miners. Arnold (2000a) did not see either Grey or Pied Butcherbirds mobbed by Noisy Miners, although other potential predators were. In the present study, Yellow-throated Miners excluded other species from their own territories and they did this selectively, while exhibiting tolerance or acceptance of Grey and Pied Butcherbirds (Table 3).

Many birds will tolerate most other birds perching close by, except for nest-predators and carnivores (Pavey and Smyth 1998; Arnold 2000b; Fulton unpub. data). Close perching and tolerant behaviour described here are unexpected between such aggressive species as Yellow-throated Miners, and Grey and Pied Butcherbirds. Birds as predators of other birds typically use stealth or surprise to attack (e.g. Wood 2000). When a bird turns its back on a known predatory species it invites opportunistic predation, or at the very least an aggressive attack. Breeding Yellow-throated Miners turned their backs on Pied Butcherbirds after perching by their sides and while foraging on the ground together. It is doubtful that breeding Yellow-throated Miners would be naive about the danger of this action; it seems reasonable to interpret this behaviour as 'trusting' and more than simply tolerant.

The two most significant factors affecting nest success are food and predation (Collias and Collias 1984; Martin 1988a, 1988b, 1992, 1995; Collias 1997). Butcherbirds take a variety of prey, which is dominated by larger invertebrates and supplemented with small vertebrates such as small lizards (Rose 1999). Butcherbirds, as predators and nest-predators, may confer an advantage to miners by helping them maintain territories and defend nest sites. In turn butcherbirds may gain a nutritional benefit from miners controlling populations of large insects by excluding other birds (Loyn 2002).

In this study, Pied and Grey Butcherbirds built nests and foraged within territories defended by Yellow-throated Miners and the Pied Butcherbirds nested close to the nests of Yellow-throated Miners. In 2003, Grey Butcherbirds were detected

TABLE 1

Aggression by Yellow-throated Miners. Abundance = mean of hourly counts. Hourly count = maximum number of birds that were present concurrently in an hour. Aggression rate index = incidents / abundance. This index is not presented where abundances were <1.0 because these resulted in unrealistic measures of aggression. The asterisk (*) indicates a common nest-predator (see Brown and Brown 1986; Major *et al.* 1999; Berry 2002; Fulton 2006a, b).

Species	No. of incidents	Abundance	Aggression rate index
Galah <i>Cacatua roseicapilla</i>	11	1.5	7.3
Western Corella <i>C. pastinator</i>	1	0.1	-
Regent Parrot <i>Polytelis anthoepus</i>	2	0.1	-
Australian Ringneck <i>Barnardius zonarius</i>	15	1.3	11.5
Red Wattlebird <i>Anthochaera carunculata</i> *	22	2.5	8.8
Spiny-cheeked Honeyeater <i>Acanthogenys rufogularis</i>	7	1.0	7
Singing Honeyeater <i>Lichenostomus virescens</i>	2	2.0	10
Rufous Whistler <i>Pachycephala rufiventris</i>	1	0.3	-
Grey Shrike-thrush <i>Colluricincla harmonica</i> *	2	0.3	-
Magpie-lark <i>Grallina cyanoleuca</i>	7	1.0	7
Willie Wagtail <i>Rhipidura leucophrys</i>	1	1.3	0.8
Grey Butcherbird <i>Cracticus torquatus</i> *	0	1.3	0
Pied Butcherbird <i>C. nigrogularis</i> *	0	2.8	0
Grey Currawong <i>Strepera versicolor</i> *	1	0.3	-
Australian Raven <i>Corvus coronoides</i> *	13	1.2	10.8
Little Crow <i>C. bennetti</i> *	9	1.0	9

TABLE 2

Published and communicated accounts of an association between Grey and Pied Butcherbirds with *Manorina* spp.

<i>Manorina</i> spp.	Details of Association
Noisy Miner	mobbing with Grey Butcherbird (Low 1994)
Noisy Miner	not aggressive to Grey Butcherbird (Dow 1977)
Noisy Miner	abandoned sites, from which Grey Butcherbirds were removed (Grey <i>et al.</i> 1997, 1998; M. Grey pers. comm., cited in Loyn 2002)
Noisy Miner	Noisy Miners were more likely to be detected in small sites where Grey Butterbirds were present (Major <i>et al.</i> 2001)
Noisy Miner	Grey and Pied Butcherbirds along with other large artamids and corvids (and others) were tolerated within miner territories (Piper and Catterall 2003)
Yellow-throated Miner	exclude other birds, but not Grey Butcherbird (Fulton 2004)
Yellow-throated Miner	Grey Butcherbird breeding in their colony (Fulton 2004)
Yellow-throated Miner	identified that Grey Butcherbirds and Yellow-throated Miners clustered more closely to each other (in a correspondence analysis) than other woodland birds in road verges (Arnold and Weeldenburg 1990)
Yellow-throated Miner	Yellow-throated Miners and Grey Butcherbirds have co-occurred consistently at Ejah from 1959 to the present (Stephen Davies pers. comm.)
Yellow-throated and Black-eared Miner	in association with Grey Butcherbird, in mallee (E. Moysey pers. comm., cited in Loyn 2002)
Black-eared Miner	breed within close proximity (less than 50 m) to Grey Butcherbird (Rohan Clarke pers. comm.)
Black-eared Miner	fledglings perched with Grey Butcherbird (McLaughlin 1990)

TABLE 3

Observations of tolerant behaviour between miners and butcherbirds.
Abbreviations: juv. = juvenile, imm. = immature, YTM = Yellow-throated Miner,
PBB = Pied Butcherbird and GBB = Grey Butcherbird.

Site	Observations
Ejah	Three YTM's perched within 20 cm of an imm. GBB.
Westonia	<p>Three YTM's perched ~30 cm from, flew with, and then perched again 30 cm from the PBB.</p> <p>A YTM perched within 20 cm from a PBB on a clothes line and called softly with a two note call toward the PBB; I saw no other birds close enough to hear this call.</p> <p>A juv. PBB and a YTM from the inter-specific group of nests foraged, on the ground for 27 seconds, within 30 cm of each other. During this time, the juv. YTM turned its back on the PBB three times.</p> <p>A YTM perched 15 m from an incubating PBB. The PBB stayed on its nest, although when other species (e.g. Red Wattlebird) perched near its nest it would leave the nest and chase away the intruder.</p> <p>A PBB perched within 30 cm of a miner on powerlines for 15 seconds; each species appeared unconcerned with the other's close proximity.</p> <p>All four PBB's chased each other through and around trees near their nests, while a YTM perched quietly about 10 m from this activity.</p> <p>A nesting YTM perched 10 cm from a PBB for 20 seconds, without any display of aggression.</p> <p>Three PBB foraged between the two YTM's nests within the inter-specific nest group without attracting aggression; these nests were 10 m apart.</p> <p>A nesting YTM from the inter-specific group of nests perched within 10 cm of a juv. PBB and called softly, using a two note call; the YTM then stretched its head toward the juvenile PBB coming close enough to touch beaks, less than or equal to 1 cm apart. Neither bird reacted in alarm from the closeness and the YTM moved past the juv. PBB (within 10 cm) and with its back to it.</p>

building a nest, at Ejah, within the area defended by miners (Fulton 2004). Nesting Yellow-throated Miners may have benefited from Pied Butcherbirds that chased Australian Raven, Red Wattlebird, Western Corella and Galah from the inter-specific group of nests at Westonia, although the Pied Butcherbirds may have only been defending their own nests. All the birds chased from this area were large and the two former species are known nest-predators (Brown and Brown 1986; Major *et al.* 1999; Fulton 2006a, 2006b). Nest predators are not usually tolerated near nests of birds (e.g. Pavey and Smyth 1998; Arnold 2000b; Fulton unpub. data). On three occasions that birds had not been chased away by aggressive Yellow-throated Miners they were subsequently chased away by Pied Butcherbirds.

I propose that butcherbirds may benefit from larger invertebrates that are unused and controlled by miners through the exclusion of other insectivores and that both birds may benefit from grouping and jointly defending their nests. This assumption could be tested by correlating the nest-success of both genera to the distances between their nests. Miners, in particular, have been identified colonising and excluding other birds from many small forests remnants and roadside strips, which is a factor in the decline of many woodland species (Arnold and Weeldenburg 1990; Grey *et al.*

1998; Recher 1999, 2004; Ford *et al.* 2001; Fulton and Ford 2001; Piper and Catterall 2003). Further insights into a possible association between miners and butcherbirds might explain how one or both species exploit this habitat, an outcome that might assist in management of these small remnants for conservation.

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