= Noisy miner =

The noisy miner (Manorina melanocephala) is a bird in the honeyeater family , Meliphagidae , and is endemic to eastern and south @-@ eastern Australia . This miner is a grey bird , with a black head , orange @-@ yellow beak and feet , a distinctive yellow patch behind the eye and white tips on the tail feathers . The Tasmanian race has a more intense yellow panel in the wing , and a broader white tip to the tail . Males , females and juveniles are similar in appearance , though young birds are a brownish @-@ grey . As the common name suggests , the noisy miner is a vocal species with a large range of songs , calls , scoldings and alarms , and almost constant vocalizations particularly from young birds . One of four species in the genus Manorina , the noisy miner itself is divided into four subspecies . The separation of the Tasmanian M. m. leachi is of long standing , and the mainland birds were further split in 1999 .

Found in a broad arc from Far North Queensland through New South Wales and Victoria to Tasmania and southeastern South Australia , the noisy miner primarily inhabits dry , open eucalypt forests that lack understory shrubs . These include forests dominated by spotted gum , box and ironbark , as well as in degraded woodland where the understory has been cleared , such as recently burned areas , farming and grazing areas , roadside reserves , and suburban parks and gardens with trees and grass but without dense shrubbery . The density of noisy miner populations has significantly increased in many locations across its range , particularly human @-@ dominated habitats . The popularity of nectar @-@ producing garden plants such as the large @-@ flowered grevilleas was thought to play a role in its proliferation , but studies now show that the noisy miner has benefited primarily from landscaping practices that create open areas dominated by eucalypts .

Noisy miners are gregarious and territorial ; they forage , bathe , roost , breed and defend territory communally , forming colonies that can contain several hundred birds . Each bird has an ' activity space ' and birds with overlapping activity spaces form associations called ' coteries ' , the most stable units within the colony . The birds also form temporary flocks called ' coalitions ' for specific activities such as mobbing a predator . Group cohesion is facilitated not only by vocalizations , but also through ritualised displays which have been categorised as flight displays , postural displays , and facial displays . The noisy miner is a notably aggressive bird , and chasing , pecking , fighting , scolding , and mobbing occur throughout the day , targeted at both intruders and colony members .

Foraging in the canopy of trees and on trunks and branches and on the ground , the noisy miner mainly eats nectar , fruit and insects . Most time is spent gleaning the foliage of eucalypts , and it can meet most of its nutritional needs from manna , honeydew and lerp gathered from the foliage . The noisy miner does not use a stereotyped courtship display , but copulation is a frenzied communal event . It breeds all year long , building a deep cup @-@ shaped nest and laying two to four eggs . Incubation is by the female only , although up to twenty male helpers take care of the nestlings and fledglings . Noisy miners have a range of strategies to increase their breeding success including multiple broods and group mobbing of predators . The noisy miner 's population increase has been correlated with the reduction of avian diversity in human @-@ affected landscapes . Its territoriality means that translocation is unlikely to be a solution to its overabundance , and culling has been proposed , although the noisy miner is currently a protected species across Australia .

= = Taxonomy = =

English ornithologist John Latham described the noisy miner four times in his 1801 work Supplementum Indicis Ornithologici , sive Systematis Ornithologiae , seemingly not knowing it was the same bird in each case : the chattering bee @-@ eater (Merops garrulus) , black @-@ headed grakle (Gracula melanocephala) , hooded bee @-@ eater (Merops cucullatus) , and white @-@ fronted bee @-@ eater (Merops albifrons) . Early notes recorded its tendency to scare off prey as hunters were about to shoot . It was as the chattering bee @-@ eater that it was painted between 1792 and 1797 by Thomas Watling , one of a group known collectively as the Port Jackson Painter . John Gould treated the name Merops garrulus as the original description , and renamed it Myzantha garrula in his 1865 work Handbook to the Birds of Australia , giving it the common name of garrulous

honeyeater , and noting the alternate name of chattering honeyeater . He noted the colonists of Tasmania called it a miner , and aboriginal people of New South Wales called it cobaygin . Que que gang was a local aboriginal name from the Blue Mountains .

In the early 20th century , Australian ornithologists started using the name Manorina melanocephala instead , because it was listed first by Latham in 1801 . This usage did not follow the letter of the International Code of Zoological Nomenclature , and in 2009 the International Commission on Zoological Nomenclature conserved the current name by formally suppressing the name M. garrula . The species name melanocephala is derived from the Ancient Greek words melas " black " , and kephale " head " , referring to its black crown . Other common names include Mickey miner and soldierbird . Four subspecies are recognised , including subspecies leachi found in eastern Tasmania . The mainland population was split into three subspecies in 1999 by Richard Schodde ? titaniota from Cape York Peninsula in Queensland as far south as Mareeba , lepidota from central Queensland and inland New South Wales west of Nyngan , and the nominate subspecies melanocephala from southeastern New South Wales , Victoria , and southern South Australia . There are broad zones where birds are intermediate between subspecies . Further study is required to settle the taxonomic status of these populations .

The noisy miner is one of four species in the genus Manorina in the large family of honeyeaters known as Meliphagidae , the other three being the black @-@ eared miner (M. melanotis) , the yellow @-@ throated miner (M. flavigula) , and the bell miner (M. melanophrys) . One of the most obvious characteristics of the genus is a patch of bare yellow skin behind the eyes , which gives them an odd ' cross @-@ eyed ' look . Within the genus , the noisy , black @-@ eared and yellow @-@ throated miners form the subgenus Myzantha . The noisy miner occasionally hybridizes with the yellow @-@ throated miner . Molecular analysis has shown honeyeaters to be related to the Pardalotidae (pardalotes) , Acanthizidae (Australian warblers , scrubwrens , thornbills , etc .) , and the Maluridae (Australian fairy @-@ wrens) in a large Meliphagoidea superfamily .

= = Description = =

= = = Appearance = = =

The noisy miner is a large honeyeater , 24 ? 28 centimetres (9 @.@ 4 ? 11 @.@ 0 in) in length , with a wingspan of 36 ? 45 centimetres (14 ? 18 in) , and weighing 70 ? 80 grams (2 @.@ 5 ? 2 @.@ 8 oz) . Male , female and juvenile birds all have similar plumage : grey on the back and tail and on the breast , and otherwise white underneath , with white scalloping on the nape and hind @-@ neck and on the breast ; off @-@ white forehead and lores ; a black band over the crown , bright orange @-@ yellow bill and a distinctive patch of yellow skin behind the eye ; a prominent white tip to the tail ; a narrow olive @-@ yellow panel in the folded wing ; and orange @-@ yellow legs and feet . A juvenile can be distinguished by softer plumage , a brownish tinge to the black on its head and the grey on its back , and a duller , greyish @-@ yellow skin patch behind the eye .

The noisy miner is similar in appearance to the yellow @-@ throated miner and the black @-@ eared miner ; it has a dull white forehead and a black crown , while the others have grey heads .

= = = = Geographical variations = = = =

Size variation in the noisy miner over its range follows Bergmann 's rule ; namely , birds tend to be larger where the climate is colder . Adults from central @-@ eastern and northern Queensland tend to have little or no olive @-@ yellow edging to the feathers of the back and wings , and have a wider white fringe on the feathers of the hind @-@ neck and back , giving birds from Queensland the appearance of having more distinctive scalloping than other populations . Wing length generally increases with latitude and M. m. leachi has measurably shorter wings than the nominate race , although no significant difference in wing length was found in a study of populations north of 30 ° S and south of the Murray River . The subspecies leachi also has finer scalloping on the hind @-@

neck than the nominate race , a more intense yellow tinge to the wing panels , and a slightly broader off @-@ white tip to the tail .

The far north Queensland subspecies titaniota has a shorter tail , paler crown , larger yellow skin patch , and paler upper parts without the yellow @-@ olive of the nominate race ; and lepidota , found in western New South Wales , is smaller than the nominate race with a black crown , and darker more mottled upperparts .

= = = Vocalisations = = =

As the common name suggests , the noisy miner is an unusually vocal species . Previously known as the garrulous honeyeater , it has a large and varied repertoire of songs , calls , scoldings and alarms . Most are loud and penetrating , and consist of harsh single notes . It has two broad @-@ frequency alarm calls that are used when mobbing intruders into their territory , or when predators (including humans) are sighted ; and a narrow @-@ frequency alarm call that is primarily used when airborne predators are seen , such as the brown falcon (Falco berigora) , or other large flying birds including the Australian magpie (Cracticus tibicen) and the pied currawong (Strepera graculina) . The aerial predator alarm call is a series of high @-@ pitched , slurred whistling notes . The broad @-@ frequency alarm calls are a series of ' churr ' notes , low pitched and harsh , occurring at low and high levels of intensity . The narrow @-@ band call is used in situations where the bird signals the presence of a predator and restricts information about its own location , while the broad @-@ band alarm is used to attract attention , and can initiate mobbing behaviour . These churring calls vary between individuals , and laboratory tests show noisy miners can distinguish calls by different birds . Hence , this may be integral to the complex social structure of the species .

Contact or social facilitation calls are low @-@ pitched sounds that carry long distances . ' Chip ' calls are given by individual birds when foraging , and a similar call is given by nestlings that call at an increased rate as the mother approaches the nest . Where there is a high level of social activity , such as during territorial disputes with conspecifics , calls are a series of quick , regular , single notes . The noisy miner has a mating display flight song , a soft warble of low @-@ frequency notes , given during short undulating flights by the male , and responded to by the female with a low @-@ frequency whistle . The noisy miner is found in open woodland habitats , where it is an advantage to call from the air so as to overcome sound attenuation . Another display call , described as ' yammer ' , is a rapid rhythmical series of notes that is uttered during open @-@ bill , wing @-@ waving displays . The noisy miner has a song described as the ' dawn song ' ? a communal song of clear whistled notes emitted in chorus in the early hours of the morning from May through January . The dawn song , which is also sung at dusk , is audible over long distances and features duets that often involve antiphony .

A nestling begins to give the ' chip ' call soon after it emerges from the egg , and it calls frequently for the first two thirds of the nestling period and constantly for the last third . The call does not vary in the presence of an adult at the nest , so it seems likely that the call is not directed at the adult bird . The nestling becomes silent when an adult gives an alarm call , and makes a squealing sound when the adult delivers food . The begging call of a fledgling is similar to the call of the nestling , but significantly louder and covering a greater frequency range (which may make it more directional) . The rate of calling , on average , is 85 to 100 calls in a minute , and in open scrub the call can be heard up to a kilometre away . Subsong , a juvenile vocalization comprising elements of various calls , begins to be uttered when the fledgling is around thirty days old .

The noisy miner also produces non @-@ vocal sounds by clicking or snapping its bill , usually during antagonistic encounters with other bird species , or when mobbing a predator .

= = Distribution and habitat = =

The noisy miner is endemic to eastern and south @-@ eastern Australia , occupying a broad arc from Far North Queensland where there are scattered populations , to New South Wales where it is widespread and common from the coast to a line from Angledool to Balranald , through Victoria into

south @-@ eastern South Australia , and eastern Tasmania . Its range in South Australia has been steadily expanding since it was first recorded near Adelaide in the early 1890s . It is sedentary over its entire range . The noisy miner is territorial , and the territory of a colony is aggressively defended ? which has led to a significant reduction in avian diversity in areas occupied by the noisy miner , with smaller species excluded .

The noisy miner primarily inhabits dry , open eucalypt forests without understory shrubs . It is commonly found in open sclerophyll forests , including those on coastal dunes or granite outcrops ; forests dominated by spotted gum on mountain ridges and exposed slopes ; box and ironbark forests on the foothills of the Great Dividing Range ; mixed forests of eucalypts and cypress (Callitris) ; forests dominated by yapunya , mulga , gidgee , brigalow or emu bush ; in stands of belah and scattered clumps of boree ; on the edges of woodlands of river red gum including swamp woodlands bordering floodplains , and areas dominated by exotic species such as European ash and willow . It regularly inhabits degraded patches of forest where the understory has been cleared , including recently burned areas , and modified habitats such as lightly @-@ timbered farming and grazing areas , roadside reserves , bushland remnants in towns and cities , and suburban parks and gardens with trees and grass but without dense shrubbery .

The noisy miner has benefited from the thinning of woodland on rural properties , heavy grazing that removes the understory , fragmentation of woodland that increases the percentage of edge habitat , and urban landscaping practices that increase open eucalypt environments . It has been described as a ' reverse keystone ' species , as it is colonizing an ever @-@ increasing range of human @-@ dominated habitats , and aggressively excluding smaller bird species from urban environments . This phenomenon has been also observed in rural areas . A field study across the South West Slopes of New South Wales , showed that the noisy miner 's presence corresponded with reduced numbers of insectivorous birds such as fantails , whistlers , the restless flycatcher (Myiagra inquieta) , and other honeyeater species , and that this decrease was most marked in sites with better access to water and nutrients . While it has been hypothesized that the proliferation of large @-@ flowering grevillea cultivars has contributed to the abundance of noisy miners , recent research has identified the proliferation of lightly treed open areas , and the presence of eucalypt species as the most significant factors in the population increase . Large @-@ flowered grevillea hybrids such as Grevillea ' Robyn Gordon ' can benefit the noisy miner , in that an abundance of resources is usually dominated by larger aggressive honeyeaters , and a continuous nectar source could provide an advantage for the non @-@ migratory species . A field study in box @-@ ironbark country in central Victoria found miner numbers were correlated with the occurrence of yellow gum (Eucalyptus leucoxylon) , which reliably produces flowers (and nectar) each year . The abundance of the noisy miner is primarily determined by habitat structure .

While the range of the noisy miner has not significantly expanded , the density of the population within that range has substantially increased . High densities of noisy miners are regularly recorded in forests with thick understory in southern Queensland , 20 kilometres (12 mi) or more from the forest / agricultural land edge . Many of these sites have extensive road networks used for forest management , and picnic areas and walking tracks for recreational use , and it has been found that these cleared spaces play a role in the abundance of noisy miners in the forests . There is evidence to suggest that higher road densities correspond with higher noisy miner population levels . Field work in Victoria showed noisy miners infiltrated anywhere from 150 to 300 m (490 to 980 ft) into remnant woodland from the edges , with greater penetration occurring in less densely forested areas . This has implications for the size of woodland habitat needed to contain miner @-@ free areas ? around 36 hectares (89 acres) . Revegetation projects restoring buloke woodland , a species of she @-@ oak integral to the survival of the red @-@ tailed black cockatoo (Calyptorynchus banksii) , have been interplanted with a nurse species , usually fast @-@ growing eucalypts . Noisy miner populations were more likely in those buloke woodlands where eucalypts had been planted at densities of up to 16 per hectare (6 @.@ 4 per acre) . The presence of noisy miners was accompanied by a substantial difference in number and types of other birds found in the woodland .

= = Behaviour = =

= = = Social organization = = =

The noisy miner is a gregarious species , and the birds are rarely seen singly or in twos ; they forage , move and roost in colonies that can consist of several hundred birds

Within a colony , a male bird will occupy an ' activity space ' , which will overlap with the activity spaces of other males . Males with overlapping activity spaces form associations called ' coteries ' , usually consisting of 10 to 25 birds . Coteries are the most stable unit within the colony . The birds also form temporary flocks when engaged in the same activity . These flocks , called ' coalitions ' , usually comprise five to eight birds , although coalitions of up to 40 birds can occur when mobbing a potential predator . Membership of the coalition changes frequently as individuals leave the group as it passes beyond the boundary of their activity space , or the activity ends or changes , as when the breeding season begins . Females use activity spaces that overlap with those of male birds , but not other females , so that females will join coalitions with males in their area , but only rarely will there be more than one female in the coalition . The exclusivity of female activity spaces leads to young females being driven out of the colony in which they were born , and also makes it difficult for them to gain a place in a new colony . A study of banded nestlings that survived in one colony until the next breeding season , found that they were all male birds , suggesting that all female nestlings had died or left the colony . Emigration of males does not seem to occur until the population density of the colony reaches a critical level .

Looking after the young is communal , with males of the coterie bringing food to the nestlings and removing faecal sacs . Communal feeding increases after fledging , when males from nearby coteries may even bring food to the young birds if not driven off . Roosting is usually communal , with two to six adults and juveniles roosting in contact with each other , usually near the end of a hanging branch up to 20 metres (66 ft) above ground , within their activity space . They select a new site each evening , often selecting and rejecting several sites , and engaging in aggressive calling and chasing as other birds attempt to join the group . They are often the last birds to roost at night , but appear to sleep soundly , undisturbed by torchlight . Noisy miners drink together at the edge of lakes and dams , and from cattle troughs , often perching on a submerged branch . They bathe by diving head first into water and , when almost totally submerged , flapping their wings vigorously and ducking their heads under the water . They shake excess water off and then fly to a nearby branch to preen . They have been observed using rain- or dew @-@ soaked foliage to bathe , and in dry weather will dust @-@ bathe in dry soil or fine litter such as grass clippings . Bathing is communal , with birds stimulated to participate by observing others . They are occasionally observed anting .

= = = = Flock behaviour = = = =

The noisy miner engages in most activities in a group . Roosting , foraging , preening , bathing and dust @-@ bathing or anting are communal activities . Dawn song is a communal chorus , particularly during the breeding season . The communal interaction is facilitated by ritualised displays that have been categorised as flight displays , postural displays , and facial displays . In ' long flight ' displays , initiated by either male or female birds , groups of up to twenty birds from more than one coterie fly about 40 metres (130 ft) above the canopy for distances of up to 1 @.@ 5 kilometres (0 @.@ 93 mi) from the colony , constantly calling and not returning to the colony for about twenty minutes . As they return the remaining birds show signs of agitation , and sometimes fly up to join them . The ' short flight ' display is performed by the male , and may be analogous to the territorial advertising displays of other birds . In a ritualised movement , the noisy miner flies out from a perch across an open area , in a rhythmic undulating pattern , usually calling in flight . At the end of the clearing it turns on an upward swoop and flies silently back to a perch near the starting point . The ' head @-@ up flight ' is performed by the female during the nesting period , and may function to attract male helpers . In its most intense form the body and tail are held almost vertically ,

with legs dangling and the head held up and back . It is performed by the female when she is selecting the nest site , and when carrying nest @-@ building material , and probably has the function of indicating the location of the nest to other group members .

Postural displays include tall and low poses , pointing , open bill , and wing waving . The ' tall posture ' is used when in close contact with another bird and is a mild threat . The bird holds itself upright with neck and legs stretched , and it faces the other bird . The ' low posture ' is a submissive gesture ; the bird sits low on the perch with legs obscured by fluffed feathers and often faces away from the other bird . Fledglings threatened by adult birds will adopt a low posture and open their bill widely . ' Pointing ' is a threat display where the bird stretches out horizontally , with feathers sleeked and the bill pointed at the target of the aggression . A bill snap will sometimes accompany pointing . An ' open bill display ' is used by subordinates in encounters between two birds , and by a female on the nest when other birds approach . The ' trident bill display ' involves a fully open bill with the tongue raised and protruding and is a higher @-@ intensity submissive display . ' Wing waving ' is often performed at the same time as an open bill display . The wings are flexed and held slightly away from the body , and flapped out and up around three to six times . Wing waving may be accompanied by a yammer call . ' Eagle ' displays involve holding the wings and tail spread out , in either a vertical or horizontal position .

Eye displays are made by exposing or covering the bare yellow patch behind the eye ? when the feathers are completely sleeked the entire patch is visible , and when they are fluffed the patch is hidden . Eye displays are used in conjunction with postural displays , with the yellow patch fully displayed by dominant birds using threat postures , and immature birds tending to reduce the size of the eye patch when under attack from other members of the coterie .

On occasion early in the breeding season , mass displays erupt , where twenty or thirty birds perform the various wing @-@ spreading displays , short flights , and constant calling . Displaying birds are attacked by others , and groups of silent but agitated birds watch the interactions . Mass displays are more common in the early morning , can last for up to 40 minutes , and seem to be a combination of sexual and agonistic behaviour .

A ' corroboree ' (from the word for a ceremonial meeting of Aboriginal Australians) is a group display where birds converge on adjacent branches and simultaneously pose hunchbacked , giving wing @-@ waving and open @-@ bill displays and the yammer call . A corroboree occurs when birds meet after a change in the social environment , such as a bird returning after an absence , or the repulsion of an intruder , or the coming together of different coteries . The corroboree appears to have a bonding function , and may involve all members of a colony .

= = = = Antagonistic behaviour = = = =

Described as " always at war with others of the feathered kind " in early notes , the noisy miner is one of the most aggressive of the honeyeaters . Much of the activity within a noisy miner colony is antagonistic with chasing , pecking , fighting , scolding , and mobbing occurring frequently throughout the day . The birds unite to attack predators and to defend the colony area against all other species of birds ; the species is also highly aggressive intraspecifically .

Female noisy miners are aggressive towards each other , and one cause of a male @-@ biased sex @-@ ratio in colonies may be the females ' greater intolerance for each other , driving immatures out of the colony and preventing the immigration of new females . Aggression at the nest is common between males . Adult males begin attacking juveniles when they are around 11 weeks old , and attackers can include males that previously cared for the fledgling . Adult females are less aggressive towards young birds , although mothers do occasionally attack their own offspring , and infanticide has been recorded . There is little male to female aggression other than the ' driving flights ' that form part of the mating ritual . In direct attacks of young birds pecks are directed at the eye patch . Agonistic behaviour has been observed among nestlings , with aggression intensifying after fledging and at times resulting in the death of a sibling .

The noisy miner colony unites to mob inter @-@ specific intruders and predators . The noisy miner will approach the threat closely and point , expose eye patches , and often bill @-@ snap . Five to

fifteen birds will fly around the intruder , some birds diving at it and either pulling away or striking the intruder . The mobbing continues until the intruder remains still , as with a tawny frogmouth (Podargus strigoides) , or it leaves the area . Mobbing of snakes and goannas is particularly intense , and most species of bird , even non @-@ predators , entering the territory are immediately chased . The noisy miner has been recorded attacking an Australian owlet @-@ nightjar (Aegotheles cristatus) during the day , grebes , herons , ducks and cormorants on lakes at the edge of territories , crested pigeons (Ocyphaps lophotes) , pardalotes , and rosellas . Non @-@ predatory mammals such as bats , cattle , sheep , and wallabies are also attacked , though less vigorously than birds .

Noisy miner attacks are not limited to chasing the intruder , and aggressive incidents often result in the death of the trespasser . Reports include those of two noisy miners repeatedly pecking a house sparrow (Passer domesticus) at the base of its skull and killing it in six minutes ; one noisy miner grasping a striated pardalote (Pardalotus striatus) by the wing while another pecked it on the head until it died ; and a sacred kingfisher (Todiramphus sanctus) being chased and harassed for over five hours and then found dead with a fractured skull .

= = = = Response to threats = = = =

Noisy miners make louder alarm calls in noisier sections of urban environments , such as main roads . The most common initial response to alarm calls is to stay in the area and scan for threats , rather than withdraw . A study conducted in Melbourne and a nearby rural area found that noisy miners in urban areas were less likely to take flight , and when they did they flew shorter distances . It is unclear whether this is an adaptation or bolder miners had been the ones to settle in the city . A field study in Canberra found that superb fairywrens (Malurus cyaneus) that lived in areas frequented by noisy miners recognised miner alarm calls and took flight , and had learnt to ignore their non @-@ alarm calls , while those that live in areas not frequented by noisy miners did not respond to miner alarm calls . This suggests the species has adapted and learnt to discriminate and respond to another species ' vocalisations .

= = = Feeding = = =

The noisy miner primarily eats nectar , fruit and insects , and occasionally it feeds on small reptiles or amphibians . It is both arboreal and terrestrial , feeding in the canopy of trees and on trunks and branches and on the ground . It forages within the colony 's territory throughout the year , usually in groups of five to eight birds although hundreds may gather at a stand of flowering trees such as banksia . The noisy miner collects nectar directly from flowers , hanging upside down or straddling thin branches acrobatically to access the nectar ; it takes fruit from trees or fallen on the ground ; gleans or hawks for invertebrates ; and picks through leaf litter for insects . It has been recorded turning over the dried droppings of emu (Dromaius novaehollandiae) and eastern grey kangaroo (Macropus giganteus) searching for insects .

In a study of birds foraging in suburban gardens , the noisy miner was seen to spend more time in banksia , grevillea and eucalypt species , and when in flower , callistemon , than in other plants including exotics . Most time was spent gleaning the foliage of eucalypts , and noisy miners were significantly more abundant in sites where eucalypts were present . The noisy miner can meet most of its nutritional needs from manna , honeydew and lerp gathered from the foliage of eucalypts . Lower numbers of noisy miner were recorded at banksias and grevilleas than other large honeyeaters such as little wattlebird (Anthochaera chrysoptera) and red wattlebird (Anthochaera carunculata) .

Detailed studies of the diet of the noisy miner record it eating a range of foods including : spiders ; insects (leaf beetles , ladybirds , stink bugs , ants , moth and butterfly larvae) ; nectar (from Jacaranda mimosifolia , Erythrina variegata , Lagunaria patersonia , Callistemon salignus , Callistemon viminalis , eucalypts Argyle apple , sugar gum , yellow gum , grey ironbark , and grey gum , Banksia ericifolia , B. integrifolia , B. serrata , Grevillea aspleniifolia , G. banksii , G. hookeriana , G. juniperina , G. rosmarinifolia , and flowering quince) ; seeds from oats , wheat and

pepper tree ; fruit from saltbush , mistletoe and crabapple ; frogs and skinks ; and other matter such as bread , pieces of meat and cheese , and food scraps .

In the first study to demonstrate different learning techniques in a single species , the noisy miner was found to employ different cognitive strategies depending upon the resource it was foraging . When searching for nectar , which does not move but is readily depleted , the noisy miner uses a spatial memory @-@ based strategy , identifying characteristics of the environment ? a strategy that is efficient in new environments and is not affected by changes in the bird 's activities . When searching for invertebrates , it appears to employ a different strategy based on learned rules of insect movement (they improve at finding invertebrates with practice) . The two different strategies imply the existence of adapted cognitive mechanisms , capable of responding appropriately to different foraging contexts .

= = = Breeding = = =

The noisy miner does not use a stereotyped courtship display ; displays can involve ' driving ' where the male jumps or flies at the female from 1 ? 2 metres (3 @.@ 3 ? 6 @.@ 6 ft) away , and if she moves away he pursues her aggressively . The female may perform a ' bowed @-@ wing display ' where the wings and tail are spread and quivered , with the wings arched and the head pointing down . The male may adopt a vertical or horizontal ' eagle display ' with wings and tail spread wide and held still for several seconds . Copulation is frequent and conspicuous , with both males and females copulating with several birds , while other members of the colony display or otherwise interfere with the mating pair . Copulation usually occurs on larger , exposed branches close to the nest site and can occur at any time of the day , although slightly more often between 11 : 00 and 13 : 00 when communal activities are less frequent . The frenzied courtship activity had led to speculation that the female mates promiscuously to recruit males to help care for the young , but recent genetic testing shows that 96 @.@ 5 % of noisy miner broods result from monogamous mating and that multiple paternity is rare . An observation of banded birds noted that while females copulated repeatedly , it was always with the same male . Mate switching between broods is uncommon , with pairs staying together over several years .

The noisy miner breeds all year long , with most activity from July through November , though the peak period is subject to seasonal variations with sharp peaks in laying activity when conditions are particularly favourable for raising young . The nest is built in prickly or leafy trees , and the noisy miner is often recorded nesting in eucalypts , and also in wattles , Araucaria , Banksia , Bursaria , Hibiscus , mistletoe , Melaleuca , Pittosporum , Schinus and jacaranda . It seems to prefer moderately dense foliage for nesting , often near the end of drooping horizontal branches . Support for the nest may be the primary criterion of a suitable nest site , rather than characteristics of the vegetation or location . The female alone builds the nest , which is deep and cup @-@ shaped , woven of twigs and grasses with other plant material , animal hair and spider webs . Occasionally the nest will include man @-@ made materials such as twine , scraps of material , and tissue paper . It is lined with wool , hair , feathers , flowers or plant down , and padded with a circular mat woven from fibres pulled from the cocoons of the processional caterpillar . The female noisy miner walks around on the ground close to the nest site , picking up material . She gathers material from disused nests of other birds , or dismantles its most recent nest to build a new one . The female completes the nest in five or six days . On average nests have an external diameter of 15 ? 17 @.@ 8 centimetres (5 @.@ 9 ? 7 @.@ 0 in) and an external depth of 9 ? 11 @.@ 4 centimetres (3 @.@ 5 ? 4 @.@ 5 in) . The internal depth of the nest is around 5 @.@ 5 centimetres (2 @.@ 2 in) .

Eggs vary greatly in size , shape and markings , but are generally elongated ovals ; white to cream or pinkish or buff coloured ; freckled , spotted or blotched with reddish brown to chestnut or a purplish red , sometimes with underlying markings of violet or purplish grey . The clutch consists of two to four eggs . Incubation is by the female only , and the incubation period is around sixteen days . Hatching is asynchronous , with up to six days being recorded between the hatching of the first and last chicks in a clutch . Young are naked at hatching , and develop a cover of down within two to three days . The fledging period is around sixteen days , and young begin to find food for

themselves between twenty @-@ six and thirty days after fledging , but are still regularly fed by adults to thirty @-@ five days . The young leave the nest before they are fully fledged , and only able to fly downwards , and scramble up . They do not go far from the nest , return to it at night , and take some weeks to completely leave the nest . Many fledglings are found on the ground and in low shrubs during this period , where they continue to be cared for until they can make their way up into the trees . These birds are often mistakenly " rescued " . The fledglings seek out siblings if separated , and huddle together for up to three weeks after fledging .

The noisy miner has some of the largest group sizes of any communally breeding bird , with up to twenty males and one female attending a single brood . Only males help with a nest , and while many birds may be associated with a particular brood , some males devote all their time to a single nest , while others spread their helping efforts across five or six nests . Behavioural evidence and genetic testing indicate that helpers are male offspring of the breeding pair , or full siblings of the male parent . Males nearly always bring food to the nestling singly , and if several arrive at once one will pass food to a nestling while the others wait . The female leaves the nest quickly when a male bird arrives , and never takes food from one of the helpers . Communal feeding of the young increases after fledging , and the young beg for food with constant ' chip chip ' calls and gaping mouths . The female rarely feeds the young birds after they have fledged .

= = = = Nest predation = = = =

Cooperative breeding has been described as a strategy for decreasing nest predation , although one study found no relationship between the number of helpers visiting a nest site and its success or failure . Noisy miners were seen to have a range of strategies to increase their breeding success including multiple broods , laying eggs early in the season , nesting low in the canopy and group mobbing of predators ; these measures did not guarantee against nest failure due to the diversity of potential predators in the noisy miner 's open woodland habitat .

= = Conservation status = =

Being abundant throughout its significant range , the noisy miner is considered of least concern for conservation , and its extreme population densities in some areas actually constitute a threat to other species . The strong correlation between the presence of noisy miners and the absence of avian diversity has been well documented . The role played by the noisy miner in the steep decline of many woodland birds , its impact on endangered species with similar foraging requirements , and the level of leaf damage leading to die @-@ back that accompanies the exclusion of insectivorous birds from remnant woodlands , means that any strategy to restore avian diversity will need to take account of the management of noisy miner populations . Some habitat restoration and revegetation projects have inadvertently increased the problem of the noisy miner by establishing the open eucalypt habit that they prefer . A focus of many regeneration projects has been the establishing of habitat corridors that connect patches of remnant forest , and the use of eucalypts as fast @-@ growing nurse species . Both practices have sound ecological value , but allow the noisy miner to proliferate , so conservation efforts are being modified by planting a shrubby understory with the eucalypts , and avoiding the creation of narrow protrusions , corners or clumps of trees in vegetation corridors . A field study conducted in the Southern Highlands found that noisy miners tended to avoid areas dominated by wattles , species of which in the study area had bipinnate leaves . Hence the authors proposed revegetation projects include at least 15 % Acacia species with bipinnate leaves if possible , as well as shrubby understory plants .

Translocation of noisy miners is unlikely to be a solution to their overabundance in remnant habitats . In a Victorian study where birds were banded and relocated , colonies moved into the now unpopulated area but soon returned to their original territories . The translocated birds did not settle in a new territory . They were not assimilated into resident populations of miners , but instead wandered up to 4 @.@ 2 kilometres (2 @.@ 6 mi) from the release point , moving through apparently suitable habitat occupied by other miners ? at least for the first 50 days following

translocation . Two birds with radio tracking devices travelled 18 kilometres (11 mi) back to their site of capture . Although noisy miners are protected across Australia , and a permit is required to cull them , culling has been proposed as the most humane and practical method of reducing their impact , particularly where combined with rehabilitation of the habitat to suit a wider variety of bird life . An unsanctioned cull took place on private rural property over 1991 and 1992 , which reportedly resulted in an increase in species diversity .