

= Red @-@ winged fairywren =

The red @-@ winged fairywren (*Malurus elegans*) is a species of passerine bird in the family Maluridae . It is sedentary and endemic to the southwestern corner of Western Australia . Exhibiting a high degree of sexual dimorphism , the male adopts a brilliantly coloured breeding plumage , with an iridescent silvery @-@ blue crown , ear coverts and upper back , red shoulders , contrasting with a black throat , grey @-@ brown tail and wings and pale underparts . Non @-@ breeding males , females and juveniles have predominantly grey @-@ brown plumage , though males may bear isolated blue and black feathers . No separate subspecies are recognised . Similar in appearance and closely related to the variegated fairywren (*M. lamberti*) and the blue @-@ breasted fairywren (*M. pulcherrimus*) , it is regarded as a separate species as no intermediate forms have been recorded where ranges overlap . Though the red @-@ winged fairywren is locally common , there is evidence of a decline in numbers .

Bearing a nice narrow pointed bill adapted for probing and catching insects , the red @-@ winged fairywren is primarily insectivorous ; it forages and lives in the shelter of scrubby vegetation in temperate wetter forests dominated by the karri (*Eucalyptus diversicolor*) , remaining close to cover to avoid predators . Like other fairywrens , it is a cooperative breeding species , with small groups of birds maintaining and defending small territories year @-@ round . Groups consist of a socially monogamous pair with several helper birds who assist in raising the young . There is a higher proportion of female helpers recorded for this species than for other species of fairywren . A variety of vocalisations and visual displays have been recorded for communication and courtship in this species . Singing is used to advertise territory , and birds can distinguish other individuals on song alone . Male wrens pluck yellow petals and display them to females as part of a courtship display .

= = Taxonomy = =

The red @-@ winged fairywren was officially described by ornithologist John Gould in 1837 , who derived the bird 's specific name derived from the Latin term *elegans* ' elegant ' . He gave its location as the East Coast , but realised his error after further collections by John Gilbert from Southwestern Australia . Amateur ornithologist Gregory Mathews described birds from the southern karri forests as subspecies *warreni* in 1916 on the basis of darker female plumage . However , others have not observed this subsequently and the consensus is that no separate subspecies are recognized . In fact there is little variation in size or colour within the species between populations or individuals .

It is one of 12 species of the genus *Malurus* , commonly known as fairywrens , found in Australia and lowland New Guinea . Within the genus it belongs to a group of four very similar species known collectively as chestnut @-@ shouldered fairywrens . The other three species are the lovely fairywren (*M. amabilis*) of Cape York , the variegated fairywren (*M. lamberti*) found across most of the continent , and the blue @-@ breasted fairywren (*M. pulcherrimus*) of southern Western Australia and the Eyre Peninsula . Molecular study showed the blue @-@ breasted fairywren to be the most closely related to the red @-@ winged fairywren .

Like other fairywrens , the red @-@ winged fairywren is unrelated to the true wrens . Initially fairywrens were thought to be a member of the old world flycatcher family Muscicapidae or warbler family Sylviidae before being placed in the newly recognised Maluridae in 1975 . More recently , DNA analysis has shown the family to be related to Meliphagidae (honeyeaters) and Pardalotidae (peep @-@ wrens) in a large superfamily , Meliphagoidea .

= = Evolutionary history = =

In his 1982 monograph , ornithologist Richard Schodde proposed a northern origin for the chestnut @-@ shouldered fairywren group due to the variety of forms in the north and their absence in the southeast of the continent . Ancestral birds spread south and colonised the southwest during a warm and wetter period around 2 million years ago at the end of the Pliocene or beginning of the Pleistocene . Subsequent cooler and drier conditions resulted in loss of habitat and fragmentation of

populations . Southwestern birds gave rise to what is now the red @-@ winged fairywren , while those in the northwest of the continent became the variegated fairywren . Further warmer , humid conditions again allowed birds to spread southwards ; this group , occupying central southern Australia east to the Eyre Peninsula , became the blue @-@ breasted fairywren . Cooler climate after this resulted in this being isolated as well and evolving into a separate species . Finally , after the end of the last glacial period 12 @,@ 000 ? 13 @,@ 000 years ago , the northern variegated forms have again spread southwards . This has resulted in the ranges of all three species overlapping . Further molecular studies may result in this hypothesis being modified .

= = Description = =

The red @-@ winged fairywren is 15 cm (6 in) long and weighs 8 ? 11 g (0 @.@ 21 ? 0 @.@ 38 oz) , making it the largest of the fairywrens . The average tail length is 7 @.@ 5 cm (3 in) , among the longest in the genus . Averaging 10 mm (0 @.@ 4 in) in males and 9 @.@ 3 mm (0 @.@ 4 in) in females , the bill is relatively long , narrow and pointed and wider at the base . Wider than it is deep , the bill is similar in shape to those of other birds that feed by probing for or picking insects off their environs .

Like other fairywrens , the red @-@ winged fairywren is notable for its marked sexual dimorphism , males adopting a highly visible breeding plumage of brilliant iridescent blue and chestnut contrasting with black and grey @-@ brown . The brightly coloured crown , ear tufts and upper back are prominently featured in breeding displays . The male in breeding plumage has a silvery blue crown , ear coverts and upper back , a black throat and nape , bright red @-@ brown shoulders , a long grey @-@ brown tail and wings , and greyish @-@ white belly . Non @-@ breeding males , females and juveniles are predominantly grey @-@ brown in colour , though males may retain traces of blue and black plumage . All males have a black bill and lores (eye @-@ ring and bare skin between eyes and bill) , while females have a black bill , rufous lores and pale grey eye @-@ ring . Immature males will develop black lores by six weeks of age and generally moult into an incomplete breeding plumage the first breeding season after hatching . This has a patchy or spotty appearance , with a mixture of blue and grey feathers on the head , and black and grey on the breast ; birds born early in the breeding season will gain more nuptial plumage initially than those born late . Most perfect their nuptial moult by their second spring , though some may need another year . Several males have been observed in breeding plumage in a single group at the same time , although it is unknown if or how this is related to dominance or breeding status .

Both sexes moult in autumn after breeding , with males assuming an eclipse non @-@ breeding plumage . They will moult again into nuptial plumage in winter or spring . Body feathers are replaced at both moults while wing and tail feathers are in spring only , though the latter may be replaced at any time if damaged or worn . The blue coloured plumage , particularly the ear @-@ coverts , of the breeding males is highly iridescent due to the flattened and twisted surface of the barbules . The blue plumage also reflects ultraviolet light strongly , and so may be even more prominent to other fairywrens , whose colour vision extends into this part of the spectrum .

= = Vocalisations = =

Vocal communication among red @-@ winged fairywrens is used primarily for communication between birds in a social group and for advertising and defending a territory . They are able to distinguish different individuals on the basis of song alone , which is integral to the identification of group members and strangers . The basic , or " type one " , song is a one to four second high @-@ pitched reel consisting of 10 ? 20 short elements per second ; it is sung by both males and females , particularly when there is a dispute over territory boundaries . Singing occurs most frequently before and just after dawn . Foraging birds maintain contact with each other by soft , repeating see @-@ see @-@ see descending tones , while a loud , sharp tsit serves as an alarm call .

= = Lifespan = =

Survival of fairywrens from one season to the next is generally high for such small birds , and the red @-@ winged fairywren has the highest rate of all ? with 78 % of breeding males and 77 % of breeding females surviving from year to year . It is not unusual for red @-@ winged fairywrens to reach 10 years of age , and the oldest known individual to date attained an age of 16 years .

= = Distribution and habitat = =

The red @-@ winged fairywren occurs in the wetter , southwest corner of Western Australia , from Moore River north of Perth south through to the Margaret River region and east to Albany . It is common in parts of its range , though there is some evidence of decline from draining of swampland . It lives in the understorey of karri (*Eucalyptus diversicolor*) and jarrah (*Eucalyptus marginata*) . Older forests appear to be less favourable habitats , while birds appear to be attracted to disturbed areas after logging . Fire also results in populations disappearing , returning after a period of two years . Forestry plantations of pine (*Pinus* spp .) and eucalypts are generally unsuitable as they lack undergrowth .

Within the forest habitat , the red @-@ winged fairywren prefers wetter gullies and riverside sword sedge (*Lepidosperma effusum*) . It borders the range of the variegated fairywren on the northern limit of its range , and the blue @-@ breasted fairywren in the eastern limit , with the latter two species occupying dryer scrub while the red @-@ winged fairywren is restricted to wetter forests . The lack of intermediate forms reinforces the status of all three taxa as separate species .

Sites identified by BirdLife International as being important for red @-@ winged fairywren conservation are Araluen @-@ Wungong , Jalbarragup , Mundaring @-@ Kalamunda , North Dandalup , the Stirling Range , Two Peoples Bay and Mount Manypeaks .

= = Behaviour = =

Hopping , with both feet leaving the ground and landing simultaneously , is the usual form of locomotion , though birds may run while performing the " rodent run display " detailed below . Its balance is assisted by a proportionally large tail , which is usually held upright and rarely still . The short , rounded wings provide good initial lift and are useful for short flights , though not for extended jaunts .

The red @-@ winged fairywren is a cooperative breeding species , with a pair or small group of birds maintaining and defending a territory year @-@ round . These territories average around 0 @.@ 4 ? 2 @.@ 4 hectares (1 ? 6 acres) in optimal habitat of tall karri forest , although are smaller and restricted to dense riverbank undergrowth in less favourable habitats . The area maintained is large enough to support the group in poor years or to accommodate new members after a good breeding season . Groups range from two to nine members in size with an average of four birds , the largest for any fairywren studied to date . This is thought to be due to a very high annual survival and occupancy of suitable territory . Though reproduction rates are low , young birds still have few vacancies available for them to disperse into . Pairs are socially monogamous , with relationships ending for the most part when one partner dies . The survivor in this case selects a new partner , often a helper bird in the group . Though not directly studied , paired red @-@ winged fairywrens are likely to be sexually promiscuous , with each partner mating with other individuals . Female helpers are much more common in this species than the other species intensively studied , the superb fairywren (*M. cyaneus*) . Over half of the groups have two or more helpers , often female , which feed nestlings and reduce the workload of breeding females . Helpers have been shown to improve reproductive success in this species by increasing the number of young raised successfully per year from 1 @.@ 3 to 2 birds . There is some evidence that groups with male helpers may enlarge the territory boundaries with a subsequent " budding @-@ off " of a new territory by a helper .

Major nest predators include Australian magpies (*Gymnorhina tibicen*) , butcherbirds (*Cracticus* spp .) , laughing kookaburras (*Dacelo novaeguineae*) , currawongs (*Strepera* spp .) , crows and

ravens (*Corvus* spp .) , and shrike @-@ thrushes (*Colluricincla* spp .) as well as introduced mammals such as the red fox (*Vulpes vulpes*) , cat and black rat (*Rattus rattus*) . Like other species of fairywrens , red @-@ winged fairywrens may use a " rodent @-@ run display " to distract predators from nests with young birds . While doing this , the head , neck and tail of the bird are lowered , the wings are held out and the feathers are fluffed as the bird runs rapidly and voices a continuous alarm call .

Observed in this species , the wing @-@ fluttering display is seen in several situations : females responding , and presumably acquiescing , to male courtship displays , juveniles begging for food , by helpers to older birds , and immature males to senior ones . The fairywren lowers its head and tail , outstretches and quivers its wings and holds its beak open silently .

= = = Feeding = = =

Like all fairywrens , the red @-@ winged fairywren is an active and restless feeder , foraging in bracken (*Pteridium esculentum*) and low shrubs , as well as in leaf @-@ litter on the ground near shelter . It will occasionally ascend trees up to 5 m (16 ft) above the ground in the understorey , particularly in the late summer and autumn as the flaking eucalypt bark is a rich source of arthropods . However , birds are exposed to potential predators and forays are therefore brief . They consumes a wide range of small creatures , mostly insects , eating ants and beetles year @-@ round , and adding spiders , bugs and caterpillars to their diet during breeding season . During spring and summer , birds are active in bursts through the day and accompany their foraging with song . Insects are numerous and easy to catch , which allows the birds to rest between forays . Groups often shelter and rest together during the heat of the day . Food is harder to find during the winter and they are required to spend the day foraging continuously . Ants in particular are an important food source during this period , constituting a high proportion of the diet .

= = = Courtship and breeding = = =

Like other fairywrens , male red @-@ winged fairywrens have been observed carrying brightly coloured petals to display to females as part of a courtship ritual . In this species , the petals that have been recorded have been yellow or , rarely , white . Petals are displayed and presented to a female in the male fairywren 's own , or another 's , territory . The " face fan " display is commonly seen as a part of aggressive or sexual display behaviours ; it involves the flaring of the blue ear tufts by erecting the feathers . The silvery blue upper back feathers are also used more prominently in display than other species .

The breeding season is shorter than that of other fairywrens , occurring from October (rarely September) through to December . Constructed solely by the female , the nest is generally situated in thick vegetation and around 20 cm (8 in) above the ground . It is a round or domed structure made of loosely woven grasses and spider webs , with an entrance in one side . The interior may be lined with finer grass and material from *Clematis pubescens* and *Banksia grandis* . One or , rarely , two broods may be laid in a season , the second being laid on average 51 days after the first . A clutch consists of two or three matte cream @-@ white eggs , tapered oval in shape with reddish @-@ brown splotches and spots , measuring 12 x 16 mm (.45 x .6 in) . The female incubates the eggs alone for around an hour at a time , after which the male calls her and she will leave to forage urgently for 15 ? 30 minutes before returning . Her long tail is often bent from the cramped nest space and is a useful field indicator of nesting . Incubation takes 14 to 15 days , a day less in later broods , and an estimated 94 % of eggs hatch successfully . The newly hatched nestlings are altricial ? raw red in colour , naked and blind . Within a day , their skin darkens to blue ? grey colour as their feathers develop underneath . Sheathed primary feathers emerge through the skin by the third day and eyes begin to open on the fifth day and fully open on the next . Young are fed and their fecal sacs removed by all group members for 11 ? 12 days , by which time they are fledged . Though fully feathered , their tails and wings are not fully grown and they are poor fliers . Their wings take another 10 days to develop fully , during which time they generally stay well hidden in

cover near the nest . Parents and helper birds will feed them for around one month after fledging . Young birds often remain in the family group as helpers for a year or more before moving to another group . Birds reach sexual maturity at one year of age , but females tend not to breed until their third year as breeding vacancies are scarce . The nests of red @-@ winged fairywrens rarely play host to brood parasites , though parasitism by the Horsfield 's bronze cuckoo (*Chrysococcyx basalis*) and the fan @-@ tailed cuckoo (*Cacomantis flabelliformis*) has been recorded .