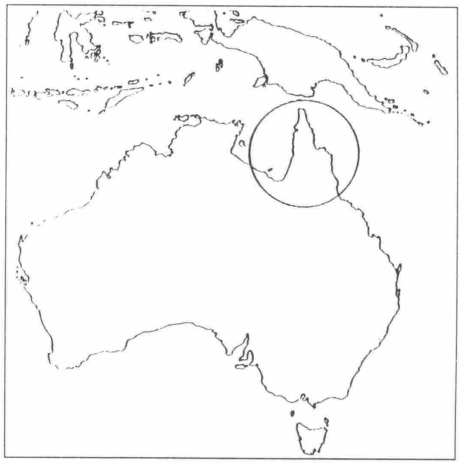
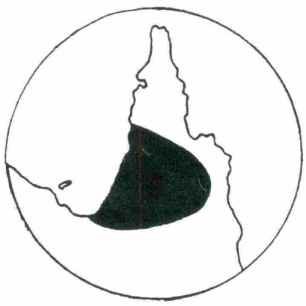
The Endangered Golden-shouldered Parrot in the Wild and in Captivity

by Joseph M. Forshaw
Wauchope, Australia

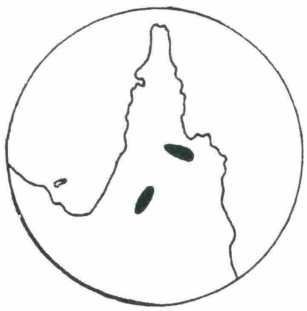
It has been claimed, and perhaps correctly, that numbers of Golden-shouldered Parrots *Psephotus chrysopterygius* in aviaries now exceed those remaining in the wild. Despite early setbacks, the species currently is well established in Australian collections, and consistent breeding successes are being achieved in some other countries. However, the initial establishment of aviary stocks involved significant illicit taking of chicks and adults from the wild, and almost certainly this had a serious adverse impact on local populations. These depredations assumed increased importance as a secondary factor, because the species already was declining as a consequence of habitat alteration, and I believe that a particularly dramatic decline during the 1960s and 1970s can be attributed to the combined effect of these primary and secondary pressures.

Similar in appearance to the better known and closely-allied Hooded Parrot *Psephotus dissimilis*, which sometimes is considered to be conspecific, the adult male Golden-shouldered Parrot is distinguished by the lemon yellow frontal band extending to the lores and below the eyes. Black on the crown, nape and hindneck merges into earth brown on the back and mantle, while the rump and upper-tail coverts are turquoise blue. Yellow on the upper wing-coverts is noticeably duller and less extensive than in the male Hooded Parrot, but brighter orange-red is more extensive on the lower underparts, from the under tail-coverts to the thighs and abdomen. The face, neck and lower underparts are predominantly turquoise blue. The dull green females and juveniles of the two species are much alike, but a pale buff-yellow frontal band and dull salmon pink markings on the thighs and abdomen identify Golden-shouldered Parrots.





Former range of the Golden-shouldered Parrot



Present range of the Golden-shouldered Parrot

In northernmost Australia, this species is restricted to Cape York Peninsula, where a continual contraction of the range has occurred since the early 1900s, and now it is known to survive in two, apparently isolated breeding populations. The first population is centered on Artemis and Dixie Stations and the Morehead River drainage, to the south-west of Princess Charlotte Bay, while the second occurs well to the south, in the upper reaches of the Mitchell River, to the north-west of Chillagoe. Only occasionally are sightings recorded from outside these two localities.

Habitat Preferences

Golden-shouldered Parrots frequent wet or dry, open *Eucalyptus-Melaleuca* woodlands with a groundcover of annual grasses, and seasonal preferences are determined by the presence of terrestrial termitaria required for nesting. There are early reports of sightings in other habitats, including at least one of birds being seen in coastal mangroves.

At Artemis Station, where extensive field studies have been undertaken, woodlands favored during the dry season are dominated by eucalypts, together with ironwood *Erythrophleum chlorostachys* and *Grevillea glauca*, while fire grasses *Schizachyrium fragile* and *S. pachyarthron* feature prominently in the groundcover vegetation. In the wet season, birds move into low open woodlands on alluvial flats along drainage depressions of permanent or seasonal watercourses, where the dominant canopy trees are broad leaved tea-tree *Melaleuca viridiflora*, *Petalostigma banksii*, and golden grevillea *Grevillea pteridifolia*, while *Schizachyrium* fire grasses, *Planichloa nervilemma* and *Hyptis suaveolens* are prevalent in the groundcover, and termitaria preferred for nesting occur primarily at the margins of these grassy flats.

Photo by Cyril Laubscher

A beautiful pair of Golden-shouldered Parakeets.

Effects of Habitat Alteration

With a total population estimated at about 1600 pairs, the Golden-shouldered Parrot certainly is endangered. Alteration of burning regimes and consequent effects on vegetation communities have been identified as the most likely causes of declines in the numbers of parrots. Traditional burning practices employed by Aboriginal hunters maintained a mosaic of areas burnt at different times of the year, as well as unburnt areas protected from fires late in the dry season, and this favored the parrots by providing open areas for feeding through the dry season. Also, spread of the broad leaved ti-tree *Melaleuca viridiflora* into grassy woodlands was checked by the regular burning. Late fires in the early wet season were particularly beneficial because they exposed seeds on the ground and prompted growth of some wet season food plants, while at the same time retarding regrowth of ti-trees. Altered burning regimes put into practice by pastoralists, together with grazing of grasses by cattle, have enabled ti-trees to spread into grassy woodlands, and under current fire regimes these woodlands are being lost to ti-trees at a rate of approximately 5 percent per decade.

In addition to impacting on food resources, colonization of these woodlands by ti-trees seems to bring about significantly increased predation by butcherbirds of both adults and fledglings. Opportunities for butcherbirds to take parrots appear to be less in open grassy woodlands, especially where Black-faced Woodswallows *Artamus cinereus* provide effective warnings, but in denser thickets of ti-trees nesting parrots are more vulnerable. Losses of adults appear to be the major threat to remaining populations of Golden-shouldered Parrots, and Pied Butcherbirds *Cracticus nigrogularis* are the major predators.

On Artemis Station, probably the last stronghold of this species, management practices are being implemented to assist the parrots. Paddocks will be spared periodically from cattle grazing and will be subjected to beneficial burning regimes. On an experi-

mental basis, the surrounds of nests are being cleared to reduce predation by butcherbirds, and supplementary food is being provided in an effort to increase nesting success rates and to assist young birds in surviving through the wet season, when there is a shortage of natural food; both measures seem to be successful.

As an endangered species, the Golden-shouldered Parrot is afforded special legislative protection in Australia, and is listed on Appendix I to the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES).

Defensive Woodswallows Safeguard Parrots

Much of what is known of the habits of Golden-shouldered Parrots comes from the findings of longterm field investigations undertaken on Artemis Station by Stephen Garnett and Gabriel Crowley. These researchers have determined that the parrots are monogamous, apparently forming lifelong pair bonds, and during the breeding season a pair may be accompanied by an auxiliary young male. Outside the breeding season, young birds and second year males associate in loose flocks of from 15 to 30 birds, and breeding pairs join these flocks immediately after nesting, but subsequently are seen with the flocks only infrequently.

Flocks remain together while feeding, drinking, or resting during the middle of the day. When feeding, birds flutter to the ground in small groups, but then run about independently so that individuals or small groups often become separated. Likewise, approaches to waterholes are by small groups, with individuals independently walking to the waters edge. When disturbed, all birds fly up from the ground simultaneously to seek shelter amidst the foliage of a nearby tree, where they await the passing of danger before returning to the ground to resume feeding.

During the middle of the day, they can remain undetected while at rest below the canopy in a shady tree. Nightime roosts occupied by pairs or flocks are in the outer foliage of broad leaved trees, usually *Eucalyptus conferflora* or *Melaleuca viridiflora*, and departure in the early morning usually is by small parties which follow each other through the treetops. After first rains of the wet season there is a gradual dispersal of flocks, with pairs moving back to the proximity of their nesting mounds.

An association of Golden-shouldered Parrots and Black-faced Woodswallows *Artamus cinereus* is closest during the late dry season and early wet season. Each year, woodswallows nest in the same patches of woodland scattered at regular intervals approximately 3 km apart, and flocks of young Golden-shouldered Parrots, together with other seed-eating birds, can be found with most of these nesting groups. It is suggested that the parrots benefit from vigorous defense by the woodswallows of their nests against predators; any butcherbird or kookaburra that approaches the nests immediately is set upon by mobs of woodswallows and chased from the area. Whether woodswallows benefit from the association is not so obvious, though they may take insects flushed from the ground by the foraging parrots.

No Largescale Movements

The flight is rather swift and with only slight undulation. The birds are strong flyers and when travelling longer distances they fly above the treetops, but shorter flights usually are through or below the canopies.

Despite the strong flying capabilities, Golden-shouldered Parrots do not undertake largescale seasonal movements. For up to three months after fledging, young birds remain within a few kilometers of the nest, and then join with other young birds and second year males in loose flocks that spend the dry season near to permanent waterholes. After the first rains, most young birds, particularly first year males, come to traditional nesting sites of Black faced Woodswallows *Artamus cinereus*, and breeding pairs return to their nesting sites. Post-breeding dispersal of the woodswallows brings about a dispersal of the attendant parrots with some young birds moving up to 30 km

or more. Females breeding for the first time have been found at nests near to their natal sites, while others were at nests at least 12 km away.

Purposeful Vocalizations

The normal contact call, which is given regularly in flight, is a disyllabic *fweep-fweep*, repeated two or more times in succession and sometimes prolonged to *few-weep . . .few-weep*. While perched, the parrots emit a sharp *weet*, often repeated two or three times, or a mellow *fee-oo. . . fee-oo*. A descending trisyllabic whistle is given by a female when separated from her mate and, when disturbed, the birds utter a soft, almost inaudible *chirrup* just before taking flight. The alarm call is a loud, high-pitched whistle.

When an adult alights at the nest entrance or enters the tunnel, nestlings respond by giving a harsh, grating screech repeated at intervals of about one second, but the more prolonged begging call of fledglings is higher in pitch.

Seasonal Changes in Diet

Golden-shouldered Parrots feed mainly on seeds of annual grasses. They extract unripe seeds from standing seedheads by pulling down stems and holding them under their feet or by reaching down to take the seeds while perching on a low overhanging branch. They switch to fallen seeds as soon as these become available, walking across the ground and pecking at a rate of 30 to 70 times per minute. Seeds of *Schyzachyrium* fire grasses are the staple food during the dry season, and parrots show a preference for feeding in burned areas where fire has removed standing grasses to leave fallen seeds exposed. So abundant are these fallen seeds that birds need to forage for only a couple of hours each day, spending the remaining time at rest in shady trees. With onset of the rains, seeds of glimmer grass *Planichloa nervilemma* become an important food, but are replaced late in the wet season by seeds of pendent milkdrop-sedge *Scleria rugosa*, which are taken when unripe and while germinating. Seeds of cockatoo grass *Alloteropsis semialata* also are an important item in the diet during the wet season, which is a time of food shortage, and at this time parrots have been observed chewing on flowers and new leaf shoots of melaleucas. Occasionally, birds were seen chewing bark, and this was more prevalent during the breeding season.

Pairs were seen foraging for seeds of *Eragrostis cumingii* and *Panicum mindanaese*, while seeds dropped by birds in and around an active nest included those of *Panicum* and *Seratia* grasses and unidentified monocotyledons. Roosting birds were observed chewing at flowers of golden grevillea *Grevillea pteridifolia*, and a female was seen nibbling at the bark of a broad leaved tea-tree *Melaleuca viridiflora*, but on both occasions the ingestion of material could not be determined. At Artemis and Dixie Stations, seeds of *Desmodium* legumes were present in most of the crops of chicks that were examined.

Nests in Termite Mounds

Onset of the breeding season is marked by an upsurge in activity in the vicinity of nesting mounds, often involving squabbling between adult males seeking to pair with widowed females or immature males chasing each other. During courtship, the displaying male makes short flights around the female and then, with the frontal feathers raised in a small crest and the breast feathers puffed out, he struts along the perch or the ground towards her. When extremely excited, females also may raise the frontal feathers. Copulation is initiated by the female sidling up to the perched male, raising her tail, drooping her wings and fluffing out the rump feathers; after several approaches, the male, with frontal feathers raised, struts past the female and inspects her rump prior to mounting her for approximately 50 seconds.

At Artemis and Dixie Stations, laying of the first egg was recorded between 1 March and 8 June, with the peak period being in early April, while the latest time for fledging of chicks was in mid August. The nest is in a chamber at the end of a tunnel excavated mainly by the female in a terrestrial termitarium. At the end of the wet season mounds remain damp for a considerable time, thus facilitating excavation, which is undertaken mostly in the mornings, the female digging with her bill and scraping out the loosened dirt with her feet. Excavation of the entire burrow lasts several days, and the first egg is laid within a week of completion. Preference is shown for conical mounds constructed by *Amitermes scopulus*, and these are dominant in vast areas of low open woodland, though they occur also with the less favored meridian mounds of *A. laurensis* along drainage depressions in the vicinity of Princess Charlotte Bay. Of a total of 148 nests found on Artemis and Dixie Stations, 96.7 per cent were excavated in conical mounds of *Amitermes scopulus*, 2.8 per cent in meridian mounds of *A. laurensis*, and 0.5 per cent in turreted mounds of *Nasutitermes*, with most nests being in mounds on or beside drainage flats, some on gravely slopes in hills, and a few on sand ridges. It has been suggested that the preference for conical mounds may be associated with temperature regimes different from those of meridian mounds, and especially the

longer retention of warmth in nesting chambers.

At Artemis and Dixie Stations nest entrances were at an average height of 68 cm above the ground, and entrance holes averaged 4.5 cm in diameter. Total excavation from entrance to rear of the nesting chamber averaged 32 cm in depth, with tunnels to the chambers averaging 12.5 cm in length. Only 7.7 per cent of nests were in burrows excavated in previous years, and the remaining 92.3 per cent were in newly excavated burrows. Nests usually were colonized by *Trisyntopa scatophaga* moths, larvae of which eat feces of the chicks, and some nests were occupied also by green tree frogs *Litoria caerulea* and blowfly larvae. Host termites sometimes attack the chicks, but apparently without causing ill effects.

High Post fledging Mortality

A normal clutch comprises four to seven, usually five or six eggs, which are laid at intervals of two days, or sometimes up to four days between the first two or last two eggs. The eggs quickly lose their slight gloss and become heavily nest-stained. Average measurements of 20.6 (18.8-24.0) x 17.8 (16.3-18.9) mm were obtained from 80 eggs examined in nests on Artemis and Dixie Stations.

Incubation by the female commences after laying of the second or third egg and lasts between 19 and 21 days. The male comes to the nest at approximately hourly intervals to feed the sitting female. Hatching usually takes place over about three days, or occasionally up to a week. Chicks are brooded by the female for up to a week after hatching, and are fed by both parents, with roles of the sexes in sharing feeding duties varying between pairs. Either parent can rear a brood of up to five chicks if the other parent dies. Young birds leave the nest approximately five weeks after hatching, and departure of a brood can be synchronous or at varying intervals over several days, with each fledgling flying directly from the nest for distances of more than 100 meters. Fledglings remain with their parents in family parties and are fed by the parents for at least five weeks after leaving the nest.

Claims that two broods may be reared in a season have not been confirmed, though at Artemis and Dixie Stations a clutch of eggs lost during incubation was replaced by the same female after five weeks, and on one occasion a second female added to the abandoned clutch of a female that had disappeared. Also on Artemis and Dixie Stations, 695 eggs were laid in 148 nests, with 475 or 68 per cent hatching, and 311 of 562, or 67 per cent of chicks fledging. Predation by reptiles was the major cause of losses of both eggs and chicks. Predation by butcherbirds was presumed to be the major cause of high post-fledging mortality.

Not for Inexperienced Aviculturists

The Golden-shouldered Parrot remains one of the more difficult species to breed successfully in captivity, and is not considered suitable for inexperienced aviculturists. Being a tropical species it requires effective shelter from cold winds or driving rain, and most breeders favor fully-roofed aviaries with solid walls or partitions, and open only at the northerly-facing front. Breeding success has been achieved in these types of aviaries ranging in length from 1.8 m to 3.6 m., in width from 90 cm to 1.2 m, and usually with a height of 2 m.

Golden-shouldered Parrots are aggressive, especially during the breeding season, so should not be included in a mixed collection with other parrots, and are not suitable for colony breeding. Pairs have been housed with finches or small doves, but the best breeding results are achieved with single pairs held in separate aviaries. Some breeders claim that holding pairs in adjoining aviaries, so the neighbors can be heard but not seen, increases the interest of all pairs in nesting activities.

When housing these parrots in rather small, almost fully-enclosed aviaries, special attention must be given to the diet if obesity and consequent poor breeding results are to be avoided. I favor exclusion of sunflower seeds and hulled oats from the basic seed mix, though the latter can be offered in small quantities while chicks are being reared. My recommendation is to provide two seed mixes in separate containers, the first comprising two parts white (French) millet and one part plain canary seed, and the second comprising equal parts of red millet and panicum. This should be supplemented daily with a variety of greenfoods, including ripening seedheads of grasses or thistles, endives and fresh green peas, the last being particularly favored by many birds. Sprouted seeds are another preferred

food and, when rearing chicks, parents will take these before other foods. Some birds are fond of corn-on-cob, and will eat small amounts of apple. Providing a clean length of charred natural timber will enable the birds to nibble off pieces of charcoal and this seems to be particularly beneficial when chicks are being reared.

Difficulties in Breeding

Two problems encountered in breeding Golden-shouldered Parrots are incompatibility in pairs and early cessation of brooding of nestlings by the female. Incompatibility can be addressed by allowing an unrelated young pair to mature in the aviary, and the use of artificial heating in nestboxes effectively reduces losses of nestlings during cold weather.

In courtship display the male adopts an upright stance with shoulders of the folded wings thrust forward and away from the body, the frontal feathers raised to form a small crest and feathers of the breast fluffed out, all to the accompaniment of disyllabic whistling notes as he advances toward the female. A response from the female often involves a similar, though less intense display directed at the male.

To be accepted for nesting, the nestbox must be fitted with an entrance spout or artificial tunnel approximately 10 cm in length, for most pairs will refuse to enter through normal entrance holes and are not interested in hollow logs. Success has been achieved with a horizontal nestbox with internal dimensions of 25 cm in length, 15 cm in width, and 15 cm in height, and constructed from 25 mm thick softwood to provide better insulation.

Artificial heating of the nestbox often is necessary to provide warmth for nestlings after early cessation of brooding by the female. In temperate climates, sufficient warmth may be provided by a 25 watt light bulb fitted behind a false wall at the back of the box, or perhaps merely by encasing the entire nestbox in an outer insulated shell, but more elaborately insulated, thermostatically heated nestboxes may be required in colder climates. One European breeder has achieved good results with a heating regime that commences with the temperature being set at 25°C three days before the eggs are due to hatch, then raised to 29°C on the following day and to 33°C on the day prior to hatching; a temperature of 33°C is maintained for three weeks after hatching, being reduced to 31°C for the fourth week, to 29°C for the next week, and then to 26°C from which a gradual reduction is made to 18°C for the final days before fledging, but if the outside temperature falls below 8°C at night the fledged youngsters are returned to the nestbox, now being maintained at 13°C.

A layer of decayed heartwood, uncontaminated sawdust, or peatmoss should be placed to a depth of 50 mm at the bottom of the nestbox, and on this layer is laid the normal clutch of four to six eggs, although clutches of up to eight eggs have been recorded. Laying is at intervals of two or occasionally three days and incubation by the female usually commences with laying of the second or third egg, but may not commence until laying of the fourth or fifth egg in large clutches. Incubation periods of 19 to 21 days have been recorded, and newly-hatched chicks possess wispy, pale grey down. At nine days the eyes are opening and early pin-feathers are emerging. At 21 days the chicks are half feathered, with full feathering being attained at 30 days, and fledging has been recorded at 32 to 37 days after hatching. The brighter plumage coloration of males usually can be detected quite easily in juveniles, and even in nestlings. Parents continue to feed the youngsters for about three weeks after fledging, but a close surveillance should be maintained to detect any signs of aggression, particularly from the adult male, toward the young birds. Adult plumage normally is attained early in the second year, and sexual maturity is reached at two years.

In captivity, the Golden-shouldered Parrot has hybridized with other *Psephotus* species and with the Eastern Rosella *Platycercus eximius*. Hybrids produced with the Mulga Parrot *Psephotus varius* bear a superficial resemblance to the Paradise Parrot *Psephotus pulcherrimus*, and unscrupulously have been traded as specimens of that presumably extinct species. A fallow mutation, which is diluted in plumage coloration with bright red eyes and pale bill and feet, is present in European collections, and is the only known mutation of this species.

Aviculturists are urged to safeguard the strong captive populations of Golden-shouldered Parrots now being established. It is to be hoped that viable aviary stocks will be maintained, despite falls in market value, for ready availability of aviary-bred birds should eliminate the possibility of further interference with the declining wild populations.

Literature

Garnett, S., and G. Crowley, 1994. The plight of the parrot with gold on its wings, *Wingspan*, no. 16: 21-23.

Garnett, S., and G. Crowley, 1997. Golden-shouldered Parrot Psephotus chrysoperygius, *Psittascene*, 9 (2): 4-5.

Sindel, S., and J. Gill. 1996. *Australian Grass Parakeets: the Psephotus and Northiella Genera*, Sydney: Singil Press.

Weaver, C. M., 1982. Breeding habitats and status of the Golden-shouldered Parrot Psephotus chrysopterygius in Queensland, *Emu* 82: 2-6