

The Grey Falcon *Falco hypoleucos*: A Summary of Information

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Summary

Historical and recent literature data on the Grey Falcon *Falco hypoleucos* are assembled and supplemented by field observations. Data on field characters, physique, diet, hunting behaviour, displays and breeding biology are reviewed and compared with other *Falco* species. It is concluded that in physique and feeding ecology, including its ability to take many fast-flying birds, the Grey Falcon has much in common with the Barbary Falcon *Falco pelegrinoides* and other desert falcons such as the Lanner Falcon *Falco biarmicus*. In breeding biology, including the lack of hard evidence on its alleged nest-building habit, the Grey Falcon resembles the larger falcons.

Introduction

Cade (1982) summarised the little information on the Grey Falcon *Falco hypoleucos* that was available to him. However he apparently overlooked some not widely known but none the less worthwhile data scattered through books and periodicals that are rather inaccessible to overseas workers. This note is an attempt to draw together such obscure information on the Grey Falcon, to make it more widely available, and to place recent work (Cupper & Cupper 1981, Hollands 1984) within the context of Cade's treatment of the genus *Falco*. Literature data are here supplemented by our field experience, especially that of GVC (first reported in Czechura 1981).

Field recognition

GVC has made extended observations on Grey Falcons, particularly in south-central Queensland. A most conspicuous feature of these birds in flight is the black wing tip, which contrasts strongly with the blue-grey upperparts. The flight silhouette appears to be distinctive, though somewhat reminiscent of the Peregrine Falcon *Falco peregrinus*. The wing tip is more rounded than the Peregrine's. When soaring, the trailing edge of the wing is straight but the leading edge of the outer wing is held somewhat stiffly forward, thus giving the wing a more elliptical outline. In active flight, probably as a consequence of different wing proportions, the Grey Falcon has a more flexible wing beat—not so stiff as compared to the Peregrine or Australian Hobby *Falco longipennis*.

A Grey Falcon observed by SD near Ernabella in north-west South Australia, January 1980, was perched on a dead roadside tree in the early-morning sun. A male by size, it flushed on the approach of a vehicle, flew very rapidly and strongly at right angles to the road for perhaps 200 m, and then turned and flew parallel with the road for a short distance. During this time

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its flight, with rather deep and powerful wing strokes, was quite Peregrine-like though both in silhouette and profile it was somewhat less heavily built than a Peregrine.

Morris (1979b) reported that Grey Falcons may soar high, while McGilp (1934, p. 276) noted that they may soar 'finely well up in the heavens'. Observations (GVC) support this view. For example near Coorabulka, west-central Queensland in March 1984, a pair of these falcons was observed soaring at altitudes between 300 and 600 metres. Observations elsewhere indicate that soaring between 100-300 metres is common. Soaring seems to be most frequently conducted from mid to late morning, ie. 1000-1200 h. The distinctive flight silhouette is seen to its best advantage at these times. McGilp's comments regarding tail flicking in flight require closer investigation.

The photographs and descriptions in Hollands (1984) confirm the Grey Falcon's Peregrine-like silhouette and flight. Hollands has found the Grey Falcon to have relatively slightly longer and broader wings and shorter tail than the Peregrine.

Body weight

Records of body weight for Grey Falcons are only available for one male and one female. The male Grey Falcon weighed 335 g (Hall 1974), and the female 624 g (Price-Jones 1983); the male is apparently the one quoted as 12 oz in Serventy & Whittell (1976) and 336 g in Cade (1982). These weights suggest (a) that the Grey Falcon is as strongly sexually dimorphic in size as the Peregrine and other swift bird-eating falcons; (b) that although approaching the Peregrine in dimensions it is considerably lighter (see Baker-Gabb 1984), which would give it a lower wing loading and hence greater manoeuvrability. The female Grey Falcon's wing loading is 0.43 g/sq. cm, rather than Cade's figure of 0.35 g/sq. cm based on his underestimated weight of 500 g (see Cade 1982, Table 4).

Diet

The diet of the Grey Falcon has been subject to some controversy. Early reports (Keartland 1896, North 1896) suggested that reptiles were the dominant prey. The view that this falcon preys largely on insects and reptiles has found support in subsequent accounts and in the experience of some field observers (Slater 1978). In contrast, a number of sources suggest a more varied diet consisting of birds, mammals, reptiles and insects (North 1912, McGilp 1934, Brown & Amadon 1968). Slater (1978), in an attempt to reconcile such divergent views, suggested that birds may be taken more frequently in the north of the continent and other prey in the south.

Evidence from stomach and gizzard contents (Lea & Gray 1935, Hall 1974) provides evidence for a catholic diet. Lea & Gray examined the stomach contents of two birds from Oodnadatta, South Australia. One contained the feathers of a small bird, the seeds of a berry saltbush (*Rhagodia* sp.) and fine grit. The other contained a small bird and an earthworm. Hall reported that the gizzard of a bird from Warburton, Western Australia, contained mammal fur and a quartz stone. The presence of the stone indicates that Grey Falcons utilise rangle as do other falcons.



Grey Falcon *Falco hypoleucos* in flight.

Plate 3

Photo: Lindsay Cupper



Grey Falcon on ground plucking its prey.

Plate 4

Photo: Lindsay Cupper

There is a growing body of evidence that Grey Falcons not only include birds in their diet but also take a number of large- to medium-sized species as well. The unsuccessful attacks by a Grey Falcon on Black-tailed Native-hens *Gallinula ventralis* reported by Hobbs (1973) indicate a possible upper size/weight limit for prey. Ripley (1977) gave a weight of 385 g for one male *G. ventralis*, consequently these birds would represent quite large prey for a Grey Falcon (114.9% wt of male, 61.7% of female). Macgillivray (in North 1912) described a determined attack by a Grey Falcon on an Australian Raven *Corvus coronoides*. In the Kimberleys, Western Australia, Slater (1978) observed Grey Falcons chasing doves, Cockatiels *Nymphicus hollandicus*, Flock Bronzewing *Phaps histrionica* and Galahs *Cacatua roseicapilla*. DeRavin (1973) observed a Grey Falcon stoop on and strike an Australian Magpie *Gymnorhina tibicen*. Cupper & Cupper (1981) recognised Crested Pigeons *Ocyphaps lophotes*, Galahs and Richard's Pipits *Anthus novaeseelandiae* among birds brought to a nest. Hollands (1984) recorded Crested Pigeons, Galahs, Rainbow Bee-eaters *Merops ornatus*, Fairy Martins *Cecropis ariel*, Yellow-throated Miners *Manorina flavigula*, Red-browed Pardalotes *Pardalotus rubricatus* and Richard's Pipits as prey. Other small birds taken by Grey Falcons include Zebra Finches *Poephila guttata* and Black-fronted Plovers *Charadrius melanops* (Smith 1983, Bristowe et al. 1971). Very little information is available either on the identity or size of non-avian prey taken by Grey Falcons. In south-western New South Wales, Weston (1982) observed a Grey Falcon attempt to take a goanna (probably Gould's Monitor *Varanus gouldii*), c. 1 m long, which successfully defended itself by rearing up and lashing out with its forelegs. McGilp (1934) identified rabbits *Oryctolagus cuniculus*, mice, grasshoppers and 'flying insects' among prey items. Keartland (in North 1912) listed lizards, snakes, 'jerboas' (hopping-mice *Notomys*), mice and rats.

GVC has made several observations on Grey Falcons hunting in south-western Queensland. On one occasion, a large (c. 0.5-0.75 m) lizard, either a dragon *Lophognathus* sp. or pygmy monitor *Varanus* sp., was captured after one of four birds (adult pair and two young) left its perch and descended to the ground in a slow, shallow dive. On other occasions, Grey Falcons were observed to cause distress to flocks of parrots, pigeons and passerines at a waterhole, and to stoop at a group of corvids. In south-central Queensland, a Grey Falcon was observed to stoop on a group of Yellow-rumped Thornbills *Acanthiza chrysorrhoa* feeding on the ground among scattered Queensland Bean Trees *Bauhinia carroni*. In south-western New South Wales, the Grey Falcon frequently preys on Red-rumped Parrots *Psephotus haematonotus* and Blue Bonnets *Northiella haematogaster* (N. Schrader, pers. comm. to SD).

Hunting and feeding behaviour

Available evidence indicates that Grey Falcons hunt in a manner characteristic of the 'great' or 'desert' falcons such as the Lanner *Falco biarmicus* and Prairie Falcon *Falco mexicanus* (Cade 1982). There is little evidence to support the contention that Grey Falcons are particularly slow or sluggish hunters. This view (Cayley 1958, Hill 1976) appears to rest largely on a misinterpretation of the records of Keartland (1896) and McGilp (1934). In addition, little attention appears to have been paid to a number of important references.

Grey Falcons take prey in the air and from the ground (Brown & Amadon 1968). When hunting birds that are flying or perched high in vegetation, Grey

Falcons fly fast and low, typically about 3 m or so above ground, and take prey by surprise in a shallow stoop. Small birds such as Zebra Finches may be plucked from bushes (Smith 1983) and eaten on the wing (McGregor & McGregor 1983). The attacks on Black-tailed Native-hens observed by Hobbs (1973) were of this low-level type. The Grey Falcon, in this case, was eventually thwarted by the Native-hens crowding under cover. Fast-flying birds may be pursued and/or stooped on in a Peregrine-like manner (North 1912, Bristowe et al. 1971, DeRavin 1973, Slater 1978). Morris (1976b) has stated that Grey Falcons soar high, sometimes making rapid, almost vertical stoops. In view of these reports it is worth noting that McGilp (1934) commented that Grey Falcons could exhibit 'a fair turn of speed' but that they seldom indulge 'in the death-dealing dive or the devastating chase' of other falcons. Similarly Keartland (1896, p. 76) has recorded:

They [Grey Falcons] appear to be very fierce, and to behave in the same manner as the Black-checked [Peregrine] Falcon does near the coast.

Hollands (1984) reported that Grey Falcons employ a Peregrine-type stoop as well as hunting from a perch in a manner similar to the Australian Hobby. Hunting from a perch is often employed if prey are on the ground (e.g. reptile, mammal or squatting bird). McGilp (1934) observed the following hunting techniques employed in the capture of terrestrial prey: (a) skimming above cover and pouncing on prey, (b) flapping above cover then pouncing on prey, (c) diving on prey from an elevated perch. The Falcon observed by Weston (1982) while it was attacking a goanna was soaring at tree-top level and apparently hovered before parachuting groundwards, manoeuvring, then rushing the lizard.

Observations by GVC of hunting Grey Falcons include two instances where stoops were employed and one instance of an attack from an exposed perch. Both stoops were almost vertical and commenced from a relatively high elevation. The only difference between them was the attitude of the wings. In one case, the wings were partly folded alongside the body prior to being closed in the final stages. In the other instance, the proximal part of the wing was held perpendicular to the body and the distal part parallel to the body prior to being folded completely. The attack from the perch, on a lizard, simply involved the Falcon leaving the perch and descending on the prey in a slow, shallow dive.

Other observations suggest that Grey Falcons hunt co-operatively as do other bird-eating falcons. Morris (1976a) observed a pair hunting together, flying 20 m apart on the same course. Hollands (1984) reported a male Grey Falcon making a follow-up strike on a Crested Pigeon knocked to the ground by his mate; the male fed from the prey before the female carried it to the nest. N. Schrader (pers. comm. to SD) has observed Grey Falcons hunting in the vicinity of trains, with the implication that they may take advantage of trains flushing potential prey, as do other falcons such as the Peregrine (Bishop & Bishop 1972) and Australian Hobby (GVC unpubl. obs.).

To use the appropriate terminology (Baker-Gabb 1980), the Grey Falcon's hunting techniques include fast contour hunting, transect hunting, soaring and prospecting, perch hunting, and probably mediated flushing and co-

operative hunting. Although Grey Falcons sit on exposed dead branches, their consequently cryptic colouration probably renders this technique 'concealed' rather than 'unconcealed' perch hunting. The Grey Falcon's attack techniques include direct flying attacks, stooping, dive attacks and glide attacks.

Prey brought to the nest is usually plucked (Hollands 1984) before being presented to the young. Small prey (insects, small birds) may be eaten on the wing (McGilp 1934, McGregor & McGregor 1983). Other prey may be taken to a convenient perch for plucking and eating. McGilp (1934) reported a case where a female was feeding her mate from a carcass of a young rabbit as they perched together. Strips of meat were torn from the rabbit and transferred from beak to beak. At other times the Falcon may simply feed (or commence feeding) on the ground (McGilp 1934).

Courtship and advertisement displays

Hall (1974) reported an adult Grey Falcon soaring about and making a series of rapid, shallow dives; it frequently uttered a series of sharp disyllabic calls, and sometimes raised its wings high above the level of its body. Lowe (1960) reported a pair of Grey Falcons soaring and performing aerobatics together, during which their wing beats were like those of the Brown Falcon *Falco berigora* (high flapping above the back); one also gave a chittering call. DeRavin (1973) reported a pair in similar aerobatics and laboured flight, which culminated in talon grappling and both birds spiralling earthwards. Hollands (1984) has recorded stooping, rolling and foot-touching behaviour by a pair.

Breeding biology

Cade (1982) stated that little had been recorded of the Grey Falcon's breeding cycle, a rather surprising statement since he actually cited Cupper & Cupper (1980) on the Grey Falcon's incubation period; he neglected the other data in this paper. There is now a reasonable amount of detail on the Grey Falcon's breeding cycle (Cupper & Cupper 1981, Hollands 1984). Suffice it to say here that both sexes share incubation (which lasts 35 days) and the brooding and feeding of downy chicks; the male provides the prey until the female resumes hunting when the young are c. 10 days old; the nestling period is 42-49 days; both sexes vigorously defend the nest against humans if the nest tree is climbed. In these and other minor details (e.g. the female's food call to the young) the Grey Falcon resembles the better known falcons; its long incubation and nestling periods are characteristic of the large falcons (Peregrine and 'great' falcons) rather than the medium-sized or small falcons (see Cade 1982).

Discussion

Compared with the Peregrine Falcon, the Grey Falcon's physical features (dimensions, body weight) are consistent with observed differences in the size and type of prey taken by these two falcon species, and mode of capture: the Grey Falcon readily takes lizards and mammals, its bird prey apparently averages a smaller size and is more frequently taken on or near the ground in

a low-level attack. In many ways the Grey Falcon seems to be the Australian equivalent of the Barbary Falcon *Falco peregrinoides* of Middle East deserts (Cade 1982). The latter is a small, pale bird of Peregrine stock, relatively longer winged and shorter tailed than the Peregrine. The weight of the Barbary Falcon is very similar to that of the Grey Falcon, and both should theoretically be faster than the Peregrine. The Grey Falcon's wing loading is very similar to the Barbary and Lanner Falcons, and like the Lanner and its relatives it has somewhat broader wings than the Peregrine (see Cade 1982). Recent work (Cupper & Cupper 1981, Hollands 1984) has highlighted the great similarity of the Grey Falcon's calls and behaviour to the Peregrine, and its plumage to the 'desert' falcons; these groups are closely related, and there seems little doubt that the Grey Falcon belongs firmly with them.

The Grey Falcon is now known to be a swift and capable predator of birds. Its diet is catholic, including mammals and large lizards, and is typical of falcons that occupy desert habitats elsewhere in the world. Slater (1978) speculated that it might take birds in the north and other prey in the south, but recent works by Cupper & Cupper (1981) and Hollands (1984), as well as observations cited herein, have shown that it preys on birds in the south as well. However many of these observations were made during the breeding cycle, and it is likely that non-breeding birds and especially immatures take less demanding prey. The possibility of prey-switching behaviour (Curio 1976), particularly during drought periods, also must be considered. What is needed now is a detailed study providing quantitative data on its diet.

Slater (1978) and Hollands (1984) regarded the Grey Falcon as hardly inferior to the Peregrine in the air, and R. Weatherly (pers. comm. to SD) considers that the Grey Falcon may be the fastest of the Australian falcons. According to the laws of physics (see Cade 1982), the Grey Falcon should theoretically achieve faster acceleration in level flight than the Peregrine (assuming that their weight difference is not solely due to their respective pectoral muscle mass). Great speed and manoeuvrability are to be expected in a falcon that lives in a harsh environment where quick capture of prey is crucial. The apparent slowness of the Grey Falcon when not hunting is probably an energy-saving device, and its low body weight would further reduce metabolic demands. The ability to take a wide range of prey is also a useful survival strategy in a habitat where food shortages may occur frequently.

From the limited data available on its aerial displays, it appears that the Grey Falcon performs diving displays, aerobatics, exaggerated wing beats, and mutual soaring and chasing displays common to many falcon species; the types of calls used during these displays are also similar to those of other falcons (Cade 1982).

It is clear from an examination of the literature that many contradictory opinions have been expressed concerning Grey Falcon hunting ability and behaviour at the nest, e.g. defence of the nest. These contradictions do not simply involve 'recent' versus 'early' records. Many early reviews (e.g. North 1912, Mathews 1916) clearly show that marked differences of opinion on these matters already existed at the turn of the century. The problem now facing researchers is the separation of fact from myth, misinterpretations and errors. Negative attitudes towards raptors in general, even among naturalists (see

Barnard 1931 for example), almost certainly represent a significant source of error. In the absence of original research and documentation, it would be most unwise to uncritically accept many early views not only of the Grey Falcon but other raptors as well. An issue particularly relevant to falcons is nest building: do they construct their own stick nests, as often alleged, or is this simply another myth? The answer to this question is important from both biological and conservation/management viewpoints. If falcons exclusively utilise deserted stick nests of other species, the availability of such nest sites would be a major limiting factor and source of inter-specific competition.

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