

BEHAVIOR AND BIOLOGY OF THE HAWK-HEADED PARROT, *DEROPTYUS ACCIPITRINUS*, IN SOUTHERN VENEZUELA¹

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The Red-fan or Hawk-headed Parrot, *Deroptyus accipitrinus*, is a little known member of the New World Psittacidae. Publications on this species are scarce, and its taxonomic status in relation to other genera remains unclear (Forshaw 1978, McLoughlin and Burton 1976). Isolated observations on the diet, nesting, and behavior of *Deroptyus* can be found for Brazil (Schubart et al. 1965), Suriname (Haverschmidt 1968) and Guyana (McLoughlin and Burton 1976). Published accounts suggest that this species is rare throughout its recorded range (Forshaw 1978), yet it is not an uncommon export in the international pet trade from some countries (Nilsson 1985). The purpose of this note is to provide additional data on the status, habits and biology of *Deroptyus* from several study sites in southern Venezuela. We document courtship, copulation and nesting of the species, and compare our observations with those of others.

STUDY SITES AND METHODS

Hawk-headed Parrots were observed in three lowland (20–125 m above sea level) forest study sites in Bolívar State, southern Venezuela. Two of the sites were located in the Caura River drainage, and a third near the Cuyuni River close to the Guyanan border. Rainfall patterns at all three study sites are seasonal, with peaks between June and September, and a semi-dry period between mid-January and mid-April.

Site 1 was on the northern border of the continuous southern forests in the Caura Forest Reserve at 7°10'N, 64°53'W along the Urbani River, 12 km N of Puerto Cabello. Field observations on courtship and diet of *D. accipitrinus* were made at the site in December 1985. Vegetation along the Urbani was seasonal closed-can-

opy primary forest of medium height (25–30 m canopy), with emergents reaching 35 m.

Site 2 was located in the remote foothills of the Serranía de Maiguelida along the Tabaro River (a tributary of the Nichare River) at 6°20'N, 65°5'W, 120 km south of the nearest large-scale habitat disturbance by humans. Observations on flock sizes, diet, courtship and nesting were made on the Tabaro during December 1988, May and September 1989, and January and July 1990 from dugout canoes and observation points. The Nichare drainage is characterized by medium-dense (>75% cover) and medium-high (20–30 m canopy) vegetation of the Guayana-alta biotype (Huber 1986).

Site 3 was located in lowland forest in the Imataca Forest Reserve, roughly 70 km south of the Cuyuni River at 6°15'N, 61°30'W along the El Dorado-Santa Elena de Uairen roadway. Observations were made on a courting pair of *Deroptyus* at this site during August 1988. Vegetation at the site was mostly primary closed-canopy forest with a 35 m canopy and emergents to 40 m. Some human disturbance was present in the form of small scale agriculture along the roadway.

At sites 1 and 2, estimates of the relative abundance of *Deroptyus* were made using walking or floating transects. At site 1, a roadway of 10–12 m width was used for walking transects, at a constant speed of 1 km/hr. At site 2, transects were made from dugout canoes floating at the speed of the river (1–3 km/hr). The Tabaro River varied in width from 50–80 m. Hawk-headed Parrots are quite vocal and active, and all sightings were of birds flying across the transects. The number of birds sighted per hour was used to estimate relative abundance between these two sites using the data from transect counts.

RESULTS AND DISCUSSION

ABUNDANCE

The Hawk-headed Parrot is considered rare throughout southern Venezuela by veteran ornithologists (M. Lentino, M. L. Goodwin, C. Rodner, pers. comm., Ridgely 1980). Our data also indicate that *Deroptyus*

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is one of the least abundant of the Psittacidae in its Venezuelan range, as reported also for Guyana (Snyder 1966). We have not observed the species in savannah forests or sandy-belt forests in Venezuela, as reported by Haverschmidt (1968) for Suriname and Hilty and Brown (1986) for Colombia.

Derophtus was rare in all of our study sites. Along the Urbani, only five birds were seen in over 300 km (=300 hr) of walking transects between 1985 and 1987. The average number of individuals sighted per hour at this site was 0.02 (or <0.01 flocks/hr). At the Cuyuni site, only three pairs were seen in five days of casual observations. At the Tabaro site, 1.2 Hawk-headed Parrots (0.4 flocks) were sighted per hour during river transects. Although these data are not statistically comparable due to variations in speed and width of the transects, the 40–60 fold difference in data from the Tabaro site tends to indicate a higher overall abundance.

The sightings on the Tabaro may be subject to local and seasonal abundance: *Derophtus* was not recorded during 12 days of river transects on the nearby Nichare River during 28 November–3 December 1986 and 26 February–5 March 1987, and was also less common along the Tabaro during rainy-season transects during the month of July. We have also not recorded it during river travel along the Nichare to and from the Tabaro site. The higher abundance of *Derophtus* at the Tabaro site may be due to the remoteness of the study site (1.5 days by dugout from the nearest settlement and road), and its undisturbed continuous primary vegetation. Possibly the area, which is located among the foothills of the Serranía de Maiguelida, offers more diverse food or habitat resources owing to its altitudinal heterogeneity. Ye'kuana (Makiritare) Indians in the Nichare watershed confirm that the birds are seasonal in abundance, patchy in overall distribution, and prefer the foothills of the Maiguelida range to lowland forests.

Derophtus was also quite rare in comparison to other Psittacidae at all of our study sites. *Amazona farinosa*, *Pionus menstruus*, *Ara macao* and *A. chloroptera* were seen at frequencies between 2–5 individuals/hr of transect at the Urbani site (J. L. Silva and Strahl, unpublished data). *Touit huetti* was the only psittacid seen at a lower frequency at that site (.02 birds/hr). Seven of the 15 other Psittacidae recorded along the Nichare and Tabaro Rivers were far more abundant than *Derophtus* during all observation periods (Desenne and Strahl, unpublished data).

FLOCK SIZE

Most sightings of Hawk-headed Parrots in Venezuela and Guyana are of pairs or small flocks of 3–4 individuals (M. Lentino, personal communication, McLoughlin and Burton 1976). At our study sites, flock sizes ranged from 1–10 individuals, with a mean of 2.9 birds/flock (Table 1). Groups of 2–4 were observed most frequently, and 75% of all sightings were of three or less individuals. On the Tabaro River, we observed what was apparently a single flock of 9–10 individuals on three occasions from 9–18 December 1988, and had several sightings of smaller flocks (1–4 individuals). Flocks of two, three, four and five *Derophtus* were observed on five, two, one and one occasions, respec-

tively, during the breeding season (between 11–18 May 1989). Our sightings of a flock of 10 individuals on the Tabaro were unusual. This group may have been a feeding aggregation of several separate groups, and was repeatedly sighted in the same location along the river. Forshaw (1978) mentions that Hawk-headed Parrots are rarely found in flocks of up to 20.

DIET AND FORAGING BEHAVIOR

At the Urbani site, a group of three birds was observed feeding on the new terminal buds and shoots and meristematic tissues of the petiolules of a *Bombacopsis* sp. (Bombaceae). The birds perched along the basal portion of the 30 cm leaf petiolule, stripped away the outer covering with the point of their upper mandible and tongue, and fed on the moist inner tissues. All tissues were ingested completely. New buds were snipped off directly and ingested. Along the Tabaro, the flock of 10 *Derophtus* seen in December 1988 was observed feeding on unripe fruits of a *Dialium guianense* (Leguminosae) tree growing along the river's edge. *Pionus menstruus* was also seen feeding on this species. In July 1990 on the Tabaro, two flocks of *Derophtus* were observed feeding on the 12 mm diameter fruits of the "Waju" palm (*Euterpe* sp.). The birds turned upside down on the infructescence of the palm, picking off fruits to ingest the pulp and dropping the seeds. Both *Ara macao* and *A. manilata* fed on this species in a similar manner.

Little other data on the diet of *Derophtus* is available. McLoughlin & Burton (1976) observed it feeding on three species of palms in Guyana (*Attalea fagifolia*, *Astrocaryum tucumoides* and *A. tucuma*), as well as an *Inga* spp. and Guava (*Psidium guajava*) in agricultural areas. Schubart et al. (1965) found Annonaceae seeds in *Derophtus* stomach contents.

VOCALIZATIONS AND COURTSHIP BEHAVIOR

The Hawk-headed Parrot has a distinct vocal repertoire among the New World psittacids (Forshaw 1978). We have heard the *tak-heeya* calls described by McLoughlin & Burton (1976) most frequently, and in the Caura drainage the Ye'kuana Indians call the species *Keeya-keeya*. The *yaag*, *slit* and *musical whistles* described by McLoughlin and Burton (1976) were other common calls. In the observations below we provide insights to the significance of some of these calls. In particular, the musical whistle appears to be associated with courtship and copulation, as do the *bugle-like* and *raspy yaag* notes.

Courtship and copulation behavior were observed at the Cuyuni site on 7 August 1988. At 1600 hr, after heavy afternoon rains, a (presumed) male Hawk-headed Parrot was observed on a 15 m dead tree. The bird emitted long, sharp whistles (2 sec duration), simultaneously erecting the feathers of his neck and crown. The bird repeated this behavior for three min, at which time a second individual of noticeably smaller size flew from the dense vegetation behind the dead tree to perch 20 cm to the side of the male. The second bird (presumed to be a female) began to erect its crest following the movements of the male. The birds then began to *bill-wrestle*, moving and rotating their heads rapidly from side to side. As they did this they gave intermittent, sharp *bugle-like* and *raspy yaag* calls with si-

TABLE 1. Frequency of numbers of *Deropterus accipitrinus* in flocks observed at three sites in southern Venezuela.

	Flock size									
	1	2	3	4	5	6	7	8	9	10
Urbani (site 1)										
Dec. 1985			1							
Nov. 1986		1								
Nov. 1987		none seen								
Tabaro (Site 2)										
July 1987		none seen								
Dec. 1988	3	2	4	3		1			1	2
May 1989		5	2	1	1					
Sept. 1989	1	8	1	2	1	1				
Jan. 1990	2	6	3	2						
July 1990		1	1							
Cuyuni (Site 3)										
Aug. 1988		3								
Totals	6	26	12	8	2	2			1	2

multaneous erection of crests. The male then shuffled sideways to put his body in contact with the female, facing the same direction, and copulated (without mounting the female's back) by joining cloacas. Copulation lasted roughly 60 sec, during which time the female maintained a nearly horizontal posture with her tail raised and rotated laterally, while the male held his body at roughly a 30° angle, depressing and rotating his tail under that of the female. The birds departed with typical *tak-heeya* calls immediately after copulation.

A flock of three *Deropterus* were observed foraging at the Urbani site at dusk on 3 December 1985. The birds were quite tame and could be approached to within 10 m. Two of the birds were actively feeding, while the third was emitting *yaag* notes at a frequency of three calls per 10 sec, erecting its crest simultaneously with each call. This bird, which appeared slightly larger, shuffled sideways towards one of the foraging birds. It then *allopreeened* the latter bird twice for 15 seconds each and *Bill-wrestled* twice with it over the course of 6 min. No copulation was seen and the birds departed with *tak-heeya* calls.

NESTING

The behavior of the parrots at the Urbani site in early December may indicate an early stage of courtship during this period on the lower Caura. However, no records of its nesting occur for that region. During the same period on the Tabaro River, two birds were observed exploring a nest hole. Also at the Tabaro site, *Deropterus* was observed nesting in a woodpecker hole (probably *Campephilus rubricollis*) along the riverbank in May 1989. The SW-facing nest hole was 8 m high in an exposed dead trunk which had broken off 2 m above the nest, and was situated 12 m from the water's edge. Our Ye'kuana Indian guides informed us that this was a traditional nest, and was used on an annual

basis. They also confirmed the nesting season as extending from March through June along the Tabaro River.

Young were in the late nestling stages in mid-May on the Tabaro, indicating a laying date of mid-February in the region based on the 23 day incubation and 63 day nestling periods reported by Howard (1972). While some large flocks of *Deropterus* were observed in the month of December at that site, on a January visit most sightings were of pairs and trios. This suggests that *Deropterus* may associate in larger feeding aggregations prior to the breeding season, but that the birds separate into smaller nesting groups and pairs between December and January.

McLoughlin and Burton (1976) found the nesting season for Hawk-headed Parrots in northern Guyana to be January–March and perhaps beyond, with young present in nests in mid-March. This is consistent with our observations. The copulatory behavior documented in eastern Venezuela in August is difficult to interpret, given that the main breeding season appears to be during the first half of the year.

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EFFECTS OF OIL DEVELOPMENT ON PROVIDING NESTING OPPORTUNITIES FOR GYRFALCONS AND ROUGH-LEGGED HAWKS IN NORTHERN ALASKA¹

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Key words: Rough-legged Hawk (*Buteo lagopus*); Gyrfalcon (*Falco rusticolus*); raptors; nesting sites; arctic Alaska; oil development.

The construction of the Trans Alaska Oil Pipeline System (TAPS) and the development of a transportation corridor in arctic Alaska created numerous man-made structures that may be used for nesting by raptors and has modified the physical properties of otherwise flat tundra, thus providing some unusual nesting opportunities for cliff-nesting birds of prey. Examples of structures include elevated pipelines, buildings, and communication towers. Physical changes associated with these developments include numerous quarries and early snow melt caused by vehicle-generated dust. Here I summarize records of unusual nests of Rough-legged Hawks (*Buteo lagopus*) and Gyrfalcons (*Falco rusticolus*) on modified and artificial substrates associated with oil development in northern Alaska, including the first records of Rough-legged Hawk nests on the ground and buildings in Alaska, and a Gyrfalcon nest on an oil pipeline.

ROUGH-LEGGED HAWK

On 17 August 1985, I located the recently abandoned nest of a Rough-legged Hawk on the ground, approx-

imately 60 km south of the Arctic Ocean and 150 m west of the Dalton Highway (69°45'N, 148°45'W; Fig. 1). Traditional cliff habitat used by nesting Rough-legged Hawks occurred approximately 3 km to the east along the Sagavanirktok River; the nearest vertical relief included the sloping shoulder of the highway, which was approximately 1.5 m above the surrounding tundra. Fledged Rough-legged Hawks were perched nearby on snow depth markers, and adults had been seen on these poles and at the nest throughout the summer (A. Richey, Alyeska Pipeline Service Company, pers. comm.). The nest was built directly on tussock tundra and was composed of willow (*Salix* spp.) twigs lined with grass.

In arctic North America, Rough-legged Hawks typically nest on cliffs or on river banks and occasionally nest in trees or on flat ground (Godfrey 1986, Palmer 1988). In northern Alaska, nests generally are on riparian cliffs or scree slopes (White and Cade 1971), whereas records of tree-nesting are limited (Palmer 1988), and ground nests have not been described. Many nests in Alaska are on gentle slopes or at the tops of escarpments, however, and for all practical purposes are similar to ground nests elsewhere in the species' range: Siberia (Cramp 1980, Flint et al. 1984) and Canada (Godfrey 1986).

The above nest was unusual because of its position on the tundra and proximity to traffic on the Dalton Highway. The Alaska Department of Transportation (ADOT) estimated a traffic rate of 150/day trucks (including heavy equipment) during summer of 1984;

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