

First nesting records of the Black-legged Dacnis *Dacnis nigripes*, with notes on field identification, ecology, conservation and recent records from Espírito Santo, Brazil

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Apresentamos as primeiras informações sobre a reprodução do saí-de-pernas-pretas *Dacnis nigripes*, incluindo descrições detalhadas de sete ninhos, informação sobre época de reprodução, período de incubação, tempo de permanência dos filhotes no ninho, cuidado parental, comportamento alimentar e os itens alimentares oferecidos aos filhotes. Comparamos os dados do campo de *D. nigripes* com dados publicados sobre os congêneres, especialmente da espécie mais comum saí-azul *Dacnis cayana*. Discutimos ainda registros inéditos e recentes de *D. nigripes* no Estado do Espírito Santo, os quais ampliam a distribuição conhecida da espécie. Finalmente, são descritos os problemas de identificação desta ave endêmica da Mata Atlântica brasileira, principalmente em comparação com a subespécie simpátrica *D. cayana paraguayensis*.

Black-legged Dacnis *Dacnis nigripes*⁸ is a rare and little-known endemic of south-east Brazil, being found locally from coastal lowlands to adjacent montane Atlantic Forest (0–1,700 m). Its known range extends from Espírito Santo to Rio de Janeiro, São Paulo, Paraná (five recent records¹²) and northern Santa Catarina, and it is considered Vulnerable¹. A specimen from Lagoa Santa, Minas Gerais² is generally considered to be incorrectly labelled with respect to locality^{3,13}. However, Black-legged Dacnis probably does occur in southernmost Minas Gerais, given that it is known from the Rio de Janeiro portion of Itatiaia National Park, which extends into Minas Gerais. Erratic seasonal concentrations of the species at fruiting and flowering trees (in some years but not others⁴) suggests more than 'mere' altitudinal movements, but a complete lack of breeding data has further complicated our understanding of the ecology of *D. nigripes*.

Here, we present the first published information on breeding and nesting behaviour; discuss field separation of male Black-legged Dacnis from the very similar male Blue Dacnis *D. cayana*; note new records from Espírito Santo; present data on foraging behaviour (including feeding in association with Blue Dacnis); and comment on the conservation status of this endemic.

Breeding

There is no published breeding data for Black-legged Dacnis. The gonad condition of specimens collected in late July and early August at Santo Aleixo, Rio de Janeiro, and in early July in Paranapiacaba, São Paulo, indicated that none of these birds were in breeding condition⁴. We report below the first nests of Black-legged Dacnis. In the following descriptions, all references to distance, height above ground and other measurements

are estimates, except those at nests 5–6, at which precise measurements were taken.

Nest 1.—Found at Fazenda Capricórnio, Ubatuba, São Paulo (23°25'S 45°05'W; c.200 m) on 16 October 1994 by AW & KJZ. A pair was observed constructing a nest in a large (30-m tall), emergent *Schizolobium parahyba* (Fabaceae) shade tree, within an extensive cacao plantation. The nest was c.20 m above ground, and halfway (c.12 m from the trunk) along an epiphyte-covered, main limb (1 m diameter). It was a partially completed cup, c.5–8 cm in diameter, situated just below the limb. Directly above, on the limb's upper surface, were two small bromeliads. The birds had woven together strands from frayed blades of the bromeliads, forming a looping, basket-like connection slung below the branch and linking the bromeliads. The nest was woven into this 'sling' below the branch. Both sexes made repeated trips together to weave strands of pale material into the nest, although the female did more of the building, and also made more solo visits than the male. Some time after leaving the nest site, we encountered presumably the same pair 50–100 m away, collecting pale, thin fibrous material (probably a lichen) from the tips of twiggy branches in the midstorey. The nest site was c.500 m from intact Atlantic Forest within Serra do Mar State Park. Within the cacao plantation there were many old emergent shade trees, as well as a line of planted mature mango and jackfruit trees lining the bank of a nearby river.

Nest 2.—Found by RP, at Águas Mornas, Santa Catarina (27°41'S 48°49'W; 70 m) on 11 December 2006, the nest was under construction in an 18-m fig tree (*Ficus* sp.) isolated in a pasture, 200 m from second-growth Atlantic Forest. The nest was sited within *Tillandsia usneoides* (Bromeliaceae), an epiphyte hanging c.30 cm below a short (c.40-cm) horizontal branch c.5.5 m above ground. The fig



Figure 1. Adult male Black-legged Dacnis *Dacnis nigripes*, September 2004, Ubatuba, São Paulo, Brazil (Tom Stephenson)



Figure 2. Adult male Blue Dacnis *Dacnis cayana*, Ubatuba, São Paulo, Brazil, 31 July 2002 (Arthur Grosset)



Figure 3. Adult female Black-legged Dacnis *Dacnis nigripes* near a nest, Intervales State Park, São Paulo, Brazil, 6 February 2009 (Andrew Whittaker)



Figure 4. Adult female Blue Dacnis *Dacnis cayana*, 18 August 2008, Itatiaia National Park, Rio de Janeiro, Brazil (Kevin J. Zimmer)



Figure 5. Female Black-legged Dacnis *Dacnis nigripes*, Intervales State Park, São Paul, Brazil, 8 November 2009; this is the female of the pair that constructed nest 9, here maintaining a lookout while the male weaves new material into the nest below (Kevin J. Zimmer)

was heavily leafed, but the branch supporting the nest had very few leaves with instead many clumps of *T. usneoides*. The pair of dacnis was weaving strands of *Tillandsia* sp. to form the small nest cup within the larger clump.

The following six nests were all found at Intervales State Park, São Paulo (24°15'S 48°10'W; c.900 m) by L. Avelino Ribeiro & G. Teixeira Rodrigues, park guides with extensive knowledge of the local flora and fauna. Nests were found in isolated clumps of mature trees sited within 200 m of Atlantic Forest, and variously adjacent to an artificial lake, a stream and a natural marsh, and centred on the park headquarters complex. AW subsequently examined each nest, and took detailed notes. AW & GTR collected two of them (nests 5–6) once the young had fledged; thereafter AW measured and deposited them at the collection of the Instituto Nacional de Pesquisas da Amazonia



Figure 6. Immature male Black-legged Dacnis *Dacnis nigripes* feeding on *Erythrina falcata*, 19 July 1998, Itatiaia National Park, Rio de Janeiro, Brazil (Dante Buzzetti)



Figure 7. Nest 7 of Black-legged Dacnis *Dacnis nigripes*, concealed within clump of *Usnea* sp., Intervales State Park, São Paulo, Brazil (Andrew Whittaker)

(INPA), Manaus, Brazil (INPA accession nos. 78–79). LAR & GTR provided all additional observations on these nests, particularly concerning post-hatching and fledging behaviour, unless otherwise stated.

Nest 3.—First found in late December 2008 under construction in a 10-m *Cassia carnival* (Fabaceae) tree. The pair brought strands of live lichen (*Usnea* sp.) and wrought them into a cup within a clump of hanging lichen (c.20 cm) suspended c.8 m above ground near the centre of the tree, below a small horizontal branch that supported many such lichen clumps. During this stage, the female spent much more time adjusting material inside the cup, and sitting for extended periods. Only the female was observed incubating, although the male occasionally fed the female while she incubated. Two nestlings fledged late in the month. No birds were observed to roost in the nest after the young had fledged. The nest tree was sited just 10 m from the park administration centre, and the pair was very confiding.

Nest 4.—Located in mid-late December 2007 in a mature (c.17-m) *Rapanea ferruginea* (Myrsinaceae), sited on a small man-made bank by a stream and adjacent to a well-used trail. It was a small cup suspended below a dead, 2.5 m-long, 45°-angled broken branch, and was woven into a clump of lichen (*Usnea* sp.) c.70 cm from the tip of the branch. It was in the centre of the tree, 1 m from the trunk and c.12 m above ground. The tree's branches held numerous clumps of *Usnea* sp. additional to that of the nest. The sides of the nest were rather transparent, making the incubating birds and two young visible with binoculars from below. At least one female-plumaged bird fledged.

Nest 5.—Found in the first week of December 2008, in a tree just 15 m from nest 4, which was under construction while this pair was feeding young. The nest was in the upper centre of a mature, 12 m-tall *R. ferruginea* tree, c.8 m above ground and <1 m of the trunk. According to



Figure 8. Nest 8 of Black-legged Dacnis *Dacnis nigripes*, concealed within clump of *Usnea* sp., Intervales State Park, São Paulo, Brazil; the barely protruding tail of the incubating female can be seen below the support limb, near the upper right corner (Kevin J. Zimmer)



Figure 9. Male Black-legged Dacnis *Dacnis nigripes*, constructing nest 9, Intervales State Park, São Paulo, Brazil, 8 November 2009 (Kevin J. Zimmer)

the terminology of Simon & Pacheco¹⁰, the nest was perhaps best categorised as 'high cup/lateral'. However, the nest had lichen walls completely sheltering the incubation chamber (with a side entrance) above the deep cup. Thus, the incubation

chamber was supported within the moss cluster on all sides. So, again following Simon & Pacheco¹⁰ the nest might also be classed as a basic type of elementary standard 'cup' or basic type of 'closed elementary standard'. The cup housing the nest was an irregular 23 cm-long, bag-shaped clump of large-stemmed lichen (*Usnea* sp.) firmly attached halfway along a c.90 cm-long, 2.5 cm-diameter horizontal branch. This dead branch had broken off naturally by February 2009, when the nest was collected. The branch had many small irregular clumps of lichen (*Usnea* spp.), including one very distinct dark brown species, and was located c.2.5 m from the tree's crown. The nest was neatly constructed, 10.5 cm below the top of the lichen clump. The dacnis pair had constructed the cup using a thin, pale green, lichen (*Usnea* sp.; the same as in nest 6), with no special material for lining. Internal dimensions were 4 cm deep (measured from the lowest side of the cup) and 2.5 cm wide. External dimensions of the cup were 6.0 cm × 5.0 cm × 7.5 cm deep. The nest had an oblong-shaped side entrance measuring 4.75 cm high (from the lowest part of the cup rim) and was 1.5–2.0 cm wide. The back comprised a vertical wall of lichen and was much denser than nests 6 or 7. An incubating bird would almost certainly not have been visible from outside (AW pers. obs.). Below the cup on the left side was a messy (5.5-cm) tail of the greenish-brown lichen, curling up below the nest and helping break-up the nest's outline. We are unaware if the nest was successful.

Nest 6.—Located in early December 2008 in a 6-m *Tipuana tipu* (Fabaceae) tree planted by the main entrance road adjacent to an extensive marsh. Just 3 m above ground, this was the lowest of our nests. It was slung below a 3-cm diameter horizontal branch c.1 m from the main trunk. Strands of *Usnea* sp. were woven by both sexes to form a tight cup, sited within a messy clump of lichen containing a dead branch. The pair was extremely confiding, permitting close study throughout the nesting. Initial nest construction was halted for a couple of weeks, during which the nest was thought to have been abandoned, perhaps due to human disturbance resulting from observers viewing an active nest of Swallow-tailed Cotinga *Phibalura flavirostris* nearby. However, the dacnis pair eventually completed the nest and two female-plumaged nestlings fledged. The cup nest was sited in an irregularly shaped, 21 cm-long 'beard' of fine, brownish-green *Usnea* sp., suspended below the horizontal branch and attached to its top. It was near identical to nest 5, entirely comprising a single species of fine, pale-green *Usnea*, tightly woven into the suspended lichen 'beard'. The nest sides formed a pronounced U shape, with a single oblong side entrance. The top of the nest was 7 cm below the top of the lichen clump, and the cup had dimensions

of 4 cm deep at the lowest part of the rim and 6 cm at the highest, with internal measurements of 2.0 × 2.5 cm. The nest's external width was 4.5 cm on both sides. The side entrance measured (from the lowest side of the cup) 5.5 cm high and 2.0–2.5 cm wide. No other material was used to line the cup. A 14 cm-long × 0.5 cm-wide piece of dead branch covered in lichen hung vertically entwined within the lower section next to the nest, along with other wisps of lichen, forming a messy, 9-cm 'tail' below the cup, which presumably helped camouflage the nest. The same distinctive species of dark brown lichen at the base of nest 5 was also present, measuring 2.5 × 1.5 cm and located 2 cm from the top of the clump next to the supporting branch.

Nest 7.—On 3 February 2009, while inspecting the same *R. ferruginea* tree where nest 4 was sited, a new active nest was located when a female flushed. It was c.7 m above ground, on a terminal limb, sparsely foliated with numerous epiphytes, including multiple bunches of *Usnea* sp. The nest was consistent with the others: a woven cup of *Usnea* sp. sited within a dense clump of *Usnea* that hung below the fork of a 2.5 cm-diameter, 45° branch, c.4 m from the trunk and 0.5 m from the tip of the branch (Fig. 7). AW made opportunistic observations at the nest totalling c.4 hours over the next five days. Only the female was seen incubating, and no male was observed near the nest, although another pair of dacnis visited a nearby tree while the female was incubating, and AW observed a lone male for short periods atop nearby secondary forest on several occasions. The incubating female was partially visible, her tail jutting vertically above the small cup, and her crown and bill resting atop the cup side at the entrance. The female sat tight on the nest, permitting close approach and tolerating human traffic along the trail. When leaving the nest she flew to nearby forest and second growth to feed. Twice, she returned with her throat full of food, perched in the tree crown then dropped onto a branch <30 cm from the nest before quickly entering. No vocalisations were heard. Two young hatched on 17 February. During the first five days after hatching, all feeding was by the male, after which both adults fed the young equally. On 25 February, both adults brought fruit of *Poueiro ramiflora* (Sapotaceae) on three occasions and *R. ferruginea* twice.

After 27 February, the male was no longer seen feeding the nestlings. Surveillance was increased with the aim of observing the fledging. At 12h32 on 27 February, the female landed 2 m from the nest and called constantly for c.15 minutes. Subsequent visits were made at 15h25, 15h55, 16h32, 16h35 and 16h52. Next day, the female made 15 visits between 06h10 and 10h30, during which she delivered fruit to the nestlings. On 1 March, observations commenced at 07h57 and the female

provisioned the young at 08h09, 08h39, 08h40, 08h42, 09h00, 09h02, 09h27, 09h30, 09h32, 09h57, 10h01, 10h03, 10h41, 10h43 and 11h00. After the trip at 09h32, the female drank water from a bromeliad. At 12h30 a male-plumaged nestling fledged, flying c.3 m away, where it perched until 16h00 before flying to a tree 25 m distant, where it remained until the following day. On 2 March, the second, female-plumaged, nestling fledged at 06h30, landing 3 m away. After 40 minutes it flew another 15 m within the same tree. The adult female appeared at 07h28 with fruit and again at 07h31 to feed the female fledgling. Presumably, the absence of the male from 26 February and the female from 11h00 on 1 March was to entice the nestlings to fledge. Seeds collected below the nest were identified as *R. ferruginea*, *P. ramiflora* and *Alchornea triplinervia* (Euphorbiaceae).

Nest 8.—Found by park guides in late October 2009 this nest (Fig. 8) was in a lightly foliated tree at the edge of a small clearing near the park headquarters. It was sited at the base of a hanging 'basket' of *Usnea* sp., suspended c.10 cm below a largely bare, horizontal limb (6–8 cm diameter) c.5 m above ground. The base of the 'basket' had numerous strands of trailing fibres that gave it a beard-like appearance and disrupted the outline of the nest. The top of the 'basket' was looped completely over the support branch. The nest was unoccupied but appeared complete when shown to KJZ on 12 November 2009. On 14 November, KJZ saw a female dacnis fly to the nest and commence incubation. In Fig. 8, the barely protruding tail of the incubating female is visible near the top right corner.

Nest 9.—Found by KJZ and a tour group on 8 November 2009, when a pair of Black-legged Dacnis flew to the nest after gathering plant fibres in a shrubby thicket c.30 m away. The tree was at the edge of a large clearing near the dining hall, in a narrow strip of second growth that separated the clearing from a large marsh. The nest was c.3.5 m above ground, in the inner portion of a small, mostly bare tree with abundant lichens and other epiphytes. The nest (Fig. 9), which was in the early construction phase, was at the base of a hanging 'basket' of *Usnea* or *Tillandsia* sp. suspended below the base of a slender (c.2.5-cm diameter) branch, with strands of lichen looped atop the support branch. The base of the basket lay c.12–13 cm below the support branch. Both sexes constructed the nest. Typically, the pair would fly to the nest tree together, and the male would go to the nest first (Fig. 9) while the female (Fig. 5) remained overhead in the crown. When the male finished weaving fibres into the nest, he joined the female, at which point she descended and either added more material or rearranged the existing structure. During one observation by KJZ, both

adults visited the nest at 12h45, 13h30, 14h02 and 14h59 h, with each visit lasting 4–6 minutes. In each case, the pair flew more than 50 m out of sight on leaving the nest. No vocalisations were heard when the pair was together in the nest tree. The pair made subsequent visits on 9–10 November, but was not seen thereafter (on 11–14 November), nor were visible indications of further construction observed.

Comments on nesting

The natural history of the genus *Dacnis* in general is poorly known¹³. Of the nine currently recognised species, five—Black-legged, White-bellied *D. albiventris*, Turquoise *D. hartlaubi*, Viridian *D. viguieri* and Scarlet-breasted *D. berlepschi*—are extremely scarce and local. In fact, breeding data are available only for Blue Dacnis^{5,11}, Yellow-bellied Dacnis *D. flaviventer*⁹ and Scarlet-thighed Dacnis *D. venusta*¹¹.

Our data confirm that Black-legged Dacnis nests from at least mid October to mid February. Clutch size is two, and only the female incubates, occasionally being fed by her mate. Incubation lasts a minimum 14 days, with 13–14 days for fledging. Published data on the breeding of Blue Dacnis mirror ours for *D. nigripes*, in that incubation is by the female alone, with males occasionally feeding their mates, and the young fledging at 13 days¹¹. However, the observation that only the male Black-legged Dacnis fed the newly hatched young during the first five days seems unique.

All nests of Black-legged Dacnis were in second growth adjacent to large tracts of Atlantic Forest, between sea level and c.900 m. Nest trees were lightly foliated with a high density of epiphytes, including lichens, bromeliads, orchids and mosses, on the branches and trunks. Especially prominent were various species of *Usnea* (Usneaceae), which provided the main component in at least seven nests (Figs. 7–9). *Usnea* is very similar to *Tillandsia usneoides*, which was used to construct at least one nest (nest 1). All nests were extremely well camouflaged and cryptic (Fig. 7), being concealed within hanging clumps of *Usnea* sp. and woven with either a fine *Usnea* sp. or *T. usneoides*. The *Tillandsia* is used in nests of several species of south-east Brazilian birds, especially in colder regions, such as *Araucaria* forests where this plant is very abundant (F. C. Straube *in litt.* 2010). We suspect that the lichen's flexibility would permit the cup to expand as the nestlings grew.

Nests of Blue Dacnis were described as deep cups (almost pouch-like) of fine fibres and seed down compactly matted^{45,11,13}. Those of Scarlet-thighed Dacnis were exceedingly frail, open bowls of rootlets camouflaged with living ferns^{11,13}. Our nests of Black-legged Dacnis match those of the other two *Dacnis* species.

Interestingly all seven nests at Intervalles were clustered around the park headquarters, and three were active during December 2008. This, combined with observations of a building pair allowing two other pairs of Black-legged Dacnis to perch in their nest tree with no agonistic behaviour, suggests the species can nest in loose 'groups' close to abundant food supplies, like Swallow-tailed Cotinga (AW & KJZ pers. obs.). Contrary to this behaviour, territoriality was noted in Costa Rica by a male Blue Dacnis that vigorously guarded the nest area against intruders^{11,13}.

Field identification

Black-legged Dacnis males (Figs. 1, 9) strongly resemble males of the sympatric subspecies of the much commoner Blue Dacnis *D. c. paraguayensis* (Fig. 2). This similarity could result in *D. nigripes* being overlooked or, conversely, being incorrectly reported from areas where it does not occur. Females of the two are strikingly different. Female Black-legged Dacnis (Figs. 4–5) has a brownish-olive mantle, is tinged turquoise blue on the crown, cheeks, scapulars and rump, and is dull, pale buffy below, whereas female Blue Dacnis (Fig. 4) is mostly bright green with a contrasting bluish head and grey throat. Female Black-legged Dacnis is nearly identical in plumage to female Scarlet-thighed Dacnis, which occurs from Costa Rica south through the northern Andes of western Colombia and north-west Ecuador¹².

The most conclusive field mark separating male *D. nigripes* from male *D. cayana* is leg colour; black or dusky in Black-legged Dacnis (Fig. 1) versus reddish-pink in Blue Dacnis (Fig. 2). However, accurate discrimination of leg colour can be compromised by lighting and distance, which are frequent factors when dealing with these active, canopy-foraging birds. Under such circumstances, focusing attention on the accompanying female dacnis (assuming there is one) will be the quickest and surest path to identification. Identification of lone males can be problematic.

Apart from leg colour, there are a few other subtle field marks that separate males of the two species. In *D. nigripes* the black mantle is more neatly triangular and less extensive, and (most noticeably) does not extend to the carpal area, which is turquoise, while the black primaries lack blue fringes and thus contrast more sharply with the almost all-turquoise secondary-coverts and carpal (Fig. 1). In contrast, Blue Dacnis has a more extensively black mantle (reaching the shoulder), distinct black centres to the greater coverts (tipped and fringed turquoise), and often much more black in the carpal region, while the black primaries are conspicuously fringed turquoise (Fig. 2). Our field observations also suggest subtle differences between them in the extent of the black throat,

and of the black feathering on the lores and orbital region. In Blue Dacnis, the throat patch appears larger, and the black orbital feathering appears to extend further behind the eye (Fig. 2). However, the precise nature and reliability of these differences is nearly impossible to glean from specimens due to their preparation. Corroboration of these differences must await an extensive series of good photographs of live birds, involving multiple males of both species. Males of the two are so similar that even specimens have been misidentified⁴. In direct comparison, specimens of Black-legged Dacnis are more greenish-blue or turquoise, whereas Blue Dacnis is purer blue (e.g., compare the male Black-legged Dacnis in Fig. 1 with the male Blue Dacnis in Fig. 2). This distinction is probably of little use in the field, where, depending on ambient light, individuals of either species can appear at either the bluer or greener end of the spectrum. Structural differences are also evident in the hand (Black-legged Dacnis has a shorter tail and wings, and a shorter, more delicate bill⁴), but these are unlikely to assist in the field. Bare-part colours of the bill and eye are either not mentioned in field guides or are incorrect. The bill is entirely black in both sexes of Black-legged Dacnis (Figs 1, 3, 5), whereas both sexes of Blue Dacnis typically show some pink at the base of the mandible and the maxilla, primarily along the cutting edges (Figs. 2, 4). The irides are dark brown in Black-legged Dacnis and brown to reddish-brown or dark red in Blue Dacnis, but is never bright red as sometimes illustrated in field guides for both species.

Subadult male plumage (resembling the adult female, but with irregular patches of greenish blue or turquoise on the underparts) appears to be retained for the first year⁴. However, by mid July, one immature male was already showing some plumage characters typical of definitive male plumage, including extensive blue on the underparts and signs of a black throat and mask (Fig. 6).

Records from Espírito Santo

The occurrence of Black-legged Dacnis in Espírito Santo is based on four specimens collected in October 1941 and November 1942⁴ at Santa Teresa, and a conditional record⁶, all from montane Atlantic Forest at 850 m. We report the following sight records: a pair was observed by AW, Ana Venturini, Pedro Paz & Chris Parish at Caetés, Vargem Alta, southern Espírito Santo (20°30'S 41°00'W; 1,200 m) on 18 October 2007 and by AW, AV & PP on 17 October 2008. Both were at the border of Atlantic Forest, and they were observed feeding with Blue Dacnis in the canopy (c.18 m) of the same fruiting tree in consecutive years. These records confirm the continued presence of Black-legged Dacnis in Espírito Santo and represent a south-west range

extension of c.100 km from the only previous state records. The presence of *D. nigripes* in October in two consecutive years suggests the species breeds in montane Espírito Santo.

Food sources and foraging behaviour

Fruit.—*Rapanea ferruginea* is not only an important nest tree but its fruits are regularly fed to nestlings (L. A. Ribeiro & G. T. Rodrigues pers. comm.). Another important food source is the red fruit of *Trema micrantha* (Ulmaceae) (L. Ribeiro pers. comm.). G. Buzon (pers. comm.) regularly observed a pair feeding on bananas at a feeding station in Florianópolis, Santa Catarina, on 16 August–6 September 2004. A male Black-legged Dacnis was photographed on 24 August 2004, as it fed on bananas at a feeding station at Ubatuba, São Paulo (T. Stephenson pers. comm.; Fig. 1). Other fruits eaten by Black-legged Dacnis include *Miconia* sp. (Melastomataceae) berries, arillated seeds of *Xylopia* sp. (Annonaceae), *Clusia* sp. (Clusiaceae) and *Schinus* sp. (Anacardiaceae) berries^{3,4}.

Nectar.—On 16 October 1994, KJZ & AW encountered two separate groups of *D. nigripes* along the entrance road to Fazenda Capricórnio, Ubatuba, São Paulo. The first group appeared to be a family comprising two males and two females, with one member of each sex conspicuously duller. They fed in the crown of a mid-sized flowering legume in the middle of a large pasture for a few minutes, before flying 150–200 m to the canopy of another larger flowering legume. The second group was a close flock of 8–9 birds (males and females) feeding in a large, flowering *Schizolobium parahyba* in the same pasture complex. The dacnis probed the yellow flowers, seemingly feeding on nectar, for c.10 minutes before flying off together.

At the same site, on 10 October 1999, AW & KJZ observed a group of five Black-legged Dacnis (three males and two females) feeding in the yellow flowers of a 30 m-tall *S. parahyba*. A pair of *D. nigripes* observed by AW & KJZ at the Hotel Simon, Itatiaia National Park, on 20 October 2000, feeding on nectar of the yellow flowers of an unidentified legume.

On 11 July 2002, a pair of *D. nigripes* was observed feeding on the nectar of *Spirotheca passifloroides* (Malvaceae) flowers at Canavieiras, Paraná (F. C. Straube *in litt.* 2010). The pair's crown and throat feathers were tinged with reddish pollen. *D. cayana* were also observed feeding on the nectar of the same flowers.

The red flowers of the exotic *Callistemon rigidus* (Myrtaceae) from Australia have been noted as a source of nectar at Intervales, where several times pairs of *D. nigripes* have been observed feeding, even returning to the same trees on consecutive days (L. Ribeiro, G. Rodrigues & J. Minns pers. comm.). Black-legged Dacnis is also reported to feed

on flowers of *Mabea brasiliensis* (Euphorbiaceae)⁴ and even introduced *Eucalyptus*³. *Erythrina falcata* (Leguminosae) might also be an important nectar source for Black-legged Dacnis (Fig. 6; see RP records below; D. Buzzetti pers. comm.).

Insects.—On 29 September 2007, KJZ observed three Black-legged Dacnis (two males and a female) foraging in a large mixed-species flock at Intervales. The flock, which comprised both insectivores (including foliage-gleaners, woodcreepers and tyrannulets) and frugivores (tanagers), was concentrated in the crown of an emergent tree within continuous forest. The dacnis appeared to be gleaning insects from leaf and branch surfaces while working their way rapidly through the tree at heights >25 m. On leaving the tree, they followed a pair of Rufous-headed Tanagers *Hemithraupis ruficapilla* to a smaller adjacent tree with conspicuous clusters of white flowering vines c.15 m above ground. The dacnis and tanagers moved rapidly through these vines, pausing only briefly at a few flowers before flying from view. No Blue Dacnis were seen in the flock. At Intervales, on 6 February 2009, AW observed a lone male Black-legged Dacnis for five minutes as it foraged for insects in the terminal branches of a 12-m flowering *Cassia carnival* in a forest clearing. It searched leaves (often near clumps of flowers) and gleaned small prey from their substrates. Twice the male made a series of 6–8-m vertical sallies downwards in pursuit of larger unidentified insect prey it had flushed. Among insects recorded in stomach contents of *D. nigripes* are coleopterans, dipterans, hymenopterans and small caterpillars^{4,13}.

Feeding association with Blue Dacnis

Feeding associations between Black-legged Dacnis and Blue Dacnis have been noted twice previously, both involving nectar feeding^{4,7}. The two species were observed together on nectar at the flowers of *Mabea brasiliensis* (Euphorbiaceae) in the coastal lowlands of Magé, Rio de Janeiro⁴, and on flowers of *Erythrina falcata* (Fabaceae) at Itatiaia National Park, Rio de Janeiro⁷. We noted the following associations during opportunistic observations.

1. Bairro da Posse, Teresópolis, Rio de Janeiro (22°22'S 42°51'W; 1,200 m). On 31 August 1996, RP observed two male and five female Black-legged Dacnis foraging with two pairs of Blue Dacnis for 15 minutes in a patch of secondary Atlantic Forest in a 4-m *Solanum* sp. (Solanaceae), taking invertebrates in the leaves and around clumps of fruit.
2. Itatiaia National Park, Rio de Janeiro, at 1,100 m. On 10 June 2001, RP saw two females and one male Black-legged Dacnis with three Blue Dacnis feeding on the nectar of a 13 m-tall

Erythrina falcata (Fabaceae). Both dacnis species were observed poking their bills quickly into the flowers to extract the nectar, visiting 5–12 flowers per minute. After 20 minutes all the dacnises flew together to a *Spathodea campanulata* (Bignoniaceae) in the garden of the Simon Hotel, where they spent c.8 minutes feeding on nectar at the flowers.

3. Serra dos Órgãos National Park, Guapimirim, Rio de Janeiro, at 440 m. On 23 June 2001, RP observed a pair of Black-legged Dacnis, accompanied by two male and three female Blue Dacnis, feeding on nectar of the red flowers of a 15 m-tall *Spirotheca passifloroides* (Malvaceae).
4. Itatiaia National Park, Rio de Janeiro at 1,050 m. On 13 September 2001, RP saw four Black-legged Dacnis (one male and three females) foraging in second growth with a pair of Blue Dacnis. They were frequenting a yellow flowering *Tabebuia* sp. (Bignoniaceae), in which both species were observed piercing the base of the flowers to extract nectar.
5. Itapicu, Perequê, Angra dos Reis, Rio de Janeiro (23°00'S 44°19'W; 40 m). On 10 September 2006, RP watched three Black-legged Dacnis (one female and two males) and five Blue Dacnis taking arillated seeds of *Alchornea glandulosa* (Euphorbiaceae). Golden-chevroned Tanager *Thraupis ornata* and Palm Tanager *T. palmarum* were part of the same feeding assemblage.
6. Itatiaia National Park, Rio de Janeiro, at 1,250 m. On 14 September 2008, RP observed a pair of Black-legged Dacnis foraging with two female Blue Dacnis on small insects gleaned from the small leaves and dried fruit of a *Cassia* sp. (Fabaceae).
7. Fazenda Capricórnio, Ubatuba, São Paulo. On 9 October 1988, AW & KJZ observed a pair of Black-legged Dacnis foraging side-by-side in disturbed Atlantic Forest with several pairs of Blue Dacnis, probing the yellow flowers of *Schizolobium parahyba*.

Conservation

Our data provide encouraging news for the conservation of Black-legged Dacnis. First, confirmation that *D. nigripes* breeds during mid–late summer in coastal and montane Atlantic Forest (to c.900 m) means that the species is not an altitudinal migrant dependant on separate elevational ranges for breeding and wintering. Secondly, recent field records from Espírito Santo, where the species may even breed in the montane region around Caetés, extends the species' known

contemporary range north from Rio de Janeiro state.

We hope this note will encourage additional careful observations on dacnis identification and natural history from the growing number of visiting foreign birders and Brazilian ornithologists. Field data on Black-legged Dacnis could broaden our understanding of its movements, distribution and habitat requirements.

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