

An extraordinary feeding assemblage of birds at a termite swarm in the Serra da Mantiqueira, São Paulo, Brazil

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RESUMO. Uma notável concentração de aves se alimentando de cupins alados na Serra da Mantiqueira, São Paulo, Brasil. Em 29 de abril de 2001, durante 40 minutos em um trecho de cerca de 100 m ao longo de uma estrada na Serra da Mantiqueira, Estado de São Paulo, Brasil, coberta por floresta montana, observamos 23 espécies de aves atraídas por uma revoada de cupins (Isoptera). Várias espécies dessa agregação não são tidas como importantes caçadoras de insetos, mas estavam ativamente apanhando e devorando os cupins em pleno vôo. A espécie predominante, pela abundância e atividade era o Quete *Poospiza lateralis*, que normalmente forrageia no interior de arbustos.

PALAVRAS-CHAVE: Isoptera, revoadas de cupins, aleluias, aves montanas.

KEY WORDS: Isoptera, montane forest birds, termite swarm.

Swarms of emerging winged termites provide an ephemeral but temporarily abundant source of very rich food that is highly prized by birds, which may aggregate in numbers to take advantage of the abundance in both temperate (Blake 1941) and tropical environments in both the Old (Thiollay 1970, Dial and Vaughan 1987) and New World (Eisenmann 1961, Sazima 1989, Vasconcelos 1999, Gussoni and Campos 2003). Such aggregations are sporadic and short-lived and provoke much aberrant behavior in birds so that any observations of such phenomena deserve careful documentation. We report here a feeding assemblage that included species that may well never have been seen together before in such a manner. This took place in the mountains of the Serra da Mantiqueira that rise up on the northwestern side of the Taubaté Basin in the northeastern extension of the state of São Paulo, Brazil.

The site of our observations (22° 41' 09" S; 45° 35' 37" W, elevation 1,550 m) was on a narrow paved road running from the town of Campos do Jordão to Pedra do Baú, c. 4.9 km almost due north of Campos do Jordão, municipality of São Bento do Sapucaí, SP, Brazil. Vegetation is montane forest that constitutes part of the interior Atlantic Forest, with a predominance of gymnospermous trees such as *Araucaria* and *Podocarpus*. The period of observation was from 13:50 to 14:30 h on 29 April 2001. The weather was cool (c. 17° C) and completely overcast, sometimes with mist. Observations ended with a brief rain shower that coincided with the end of feeding activity.

We had been searching along the same road for most of the morning, but because of inclement weather we noted relatively little avian activity. We then encountered a large flock of

Streptoprocne swifts that were feeding on swarming insects and began to note other birds feeding on the same insects. The intensity of activity built up over a period of 40 minutes and then ended abruptly so that we consider that we must have arrived very near the beginning of the feeding swarm, which took place along no more than 100 m of the road.

The insects were winged termites (Insecta: Isoptera) with orangish bodies and black wings that appeared to be emerging from the ground in great numbers along one side of the road. The air was essentially still and the termites quickly rose to considerable heights. They were also quite fat to judge from the grease stains left on a paper envelope in which we saved a few specimens that were given to a specialist for identification but were subsequently lost.

Observations of the species of birds that were actively feeding at the swarm of alate termites are presented below: White-collared Swift *Streptoprocne zonaris*. These swifts were among the first to be attracted to the termites and their numbers built up until they filled the sky, actively gathering termites. There were between 100 and 150 individuals that eventually moved off, circled in the distance, and then moved on.

Surucua Trogon *Trogon surrucura*. At least two were actively flying out and catching termites over the road, being so intent that they allowed close approach.

Chicli Spinetail *Synallaxis spixi*. At least two birds were part of the assemblage but remained close to the ground catching insects.

Streaked Xenops *Xenops rutilans*. A single individual foraging in the normal manner was later joined by two others, at least one of which was seen actively flycatching.

Buff-fronted Foliage-gleaner *Philydor rufus*. Three to six individuals were present and actively flycatching.

Olivaceous Woodcreeper *Sittasomus griseicapillus*. Two or three were actively flycatching.

Black-capped Piprites *Piprites pileatus*. Three individuals of this rare and poorly known species were very actively engaged in the aerial capture of termites.

Gray-hooded Flycatcher *Mionectes rufiventris*. One was around for most of the time and was not particularly active, although it was definitely seen flycatching termites.

Mottle-cheeked Tyrannulet *Phylloscartes ventralis*. At least three spent most of their time in trees but were also seen hawking insects.

Shear-tailed Gray Tyrant *Muscipipra vetula*. A pair arrived rather late and actively engaged in aerial feeding on termites.

Blue-and-white Swallow *Notiochelidon cyanoleuca*. Perhaps as many as 20 or 30 passed by taking very high-flying termites, although we could not be sure if these numbers included individuals that visited more than once.

Eastern Slaty-Thrush *Turdus subalaris*. One or two individuals were seen to engage in flycatching. One or two individuals of Rufous-bellied Thrush *T. rufiventris* were also present and probably fed on termites as well although we did not specifically note it.

Rufous-crowned Greenlet *Hylophilus poicilotis*. Two birds stayed mainly in the vegetation but occasionally sallied out for flying termites.

Rufous-browed Peppershrike *Cyclarhis gujanensis*. One or two were very actively flycatching.

Golden-crowned Warbler *Basileuterus culicivorus*. At least two were most active in shrubbery close to the ground but were also seen actively flycatching.

Chestnut-headed Tanager *Pyrrhocomma ruficeps*. At least two males were present and very actively catching termites in the air.

Diademed Tanager *Stephanophorus diadematus*. Despite its being very common in the area we saw only three individuals of this species and those were not present the whole time. When they were, they were very actively hawking termites.

Fawn-breasted Tanager *Pipraeidea melanonota*. One was present for a short period only, but was actively flycatching.

Burnished-buff Tanager *Tangara cayana*. A single bird stayed for only a short period but was actively flycatching.

Red-rumped Warbling-Finch *Poospiza lateralis*. These were the most avid feeders on termites of all the birds present. They must have come from far and wide as there were 50 to 70 individuals present. The loud whirring of their wings was the dominant sound during the feeding frenzy and dozens were constantly in the air over our heads for the whole period of activity.

Rufous-collared Sparrow *Zonotrichia capensis*. Two or three were very active on the ground in the vicinity of the emerging termites, especially where these had become entangled in spider webs. Vasconcelos (1999) and Gussoni and Campos (2003) also reported this species feeding on winged termites.

Green-winged Saltator *Saltator similis*. One or two were active and flycatching in the early part of the feeding activity.

Golden-winged Cacique *Cacicus chrysopterus*. Only a single individual arrived even though it called almost constantly. This bird was extremely vigorously engaged in catching termites out of the air.

The following birds appeared to be part of the feeding assemblage but were not observed catching termites. Their presence, usually for an extended period, may have been due to flocking behavior stimulated by the large number of other species actively engaged in feeding.

Red-breasted Toucan *Ramphastos dicolorus*. A pair stayed in evidence for about half the period of observation. We later saw one cross the road and hesitate in flight as though catching an insect, but this was not repeated.

White-spotted Woodpecker *Veniliornis spilogaster*. A single female remained in the area the whole time we were present.

Scaled Woodcreeper *Lepidocolaptes squamatus*. First observed singly but then up to three were seen together in the area of main feeding activity of which they appeared to be a part.

Variable Antshrike *Thamnophilus caeruleus*. One pair was active in the area for most of the period of observation but were not seen to take termites, despite the fact that the Slender Antbird *Rhopornis ardesiaca* and several other species of Thamnophilidae have been seen preying on winged termites (Teixeira 1987).

Rufous-bellied Thrush *Turdus rufiventris*. See *T. subalaris*, above.

Tropical Parula *Parula pitiayumi*. One bird seemed to be part of the general activity.

The presence of single individuals of three other species appears to have been entirely incidental to the termite swarm and its predatory assemblage: Yellow-headed Caracara *Milvago chimachima*, Brazilian Ruby *Clytolaema rubricauda*, and White-throated Woodcreeper *Xiphocolaptes albicollis*.

It is most interesting to compare our observations with those made by Gussoni and Campos at a termite swarm also in the state of São Paulo, only about 100 km to the SW but at a lower elevation (c. 750 m). They observed a similar number of species (26) but only two of these *Notiochelidon cyanoleuca* and *Zonotrichia capensis* were shared between the two assemblages. Over half of the species (16) observed by Gussoni and Campos belong to families that ordinarily capture flying insects (Tyrannidae and Hirundinidae), in contrast with the assemblage we observed.

Thiollay (1970:273) reported that in West Africa each of some 150 species of birds seen feeding at termite swarms "maintains in the swarms his particular hunting habits, strata and even preferred feeding hours, so that any interspecific competition is avoided." This is certainly different from the behavior reported by Dial and Vaughan (1987) in East Africa and what we saw in Brazil. The feeding aggregation we observed took place at a time of day when avian feeding activity is usually minimal, as was also observed by Eisenmann

(1961) and many of the species observed departed markedly from their normal feeding habits and ecological strata.

As with the aggregations seen by Eisenmann (1961), Dial and Vaughan (1987), and Gussoni and Campos (2003), aerial insectivores (swifts, swallows, flycatchers) were present, but they were joined by scansorial, frugivorous, and granivorous species, as well as terrestrial and arboreal insectivores. Unlike African assemblages, raptors were not present. Interspecific competition would probably not have been a factor due to the abundance of the emerging termites.

As noted by Dial and Vaughan (1987), termite emergences are unpredictable and predators must respond immediately in order to benefit from a hatch. Wide-ranging aerial species such as swifts and swallows would be expected to be the first to detect a swarm, as appeared to be the case in our instance. These might then attract other aerial feeders such as flycatchers. The most assiduous, indeed almost frenetic, predator at the swarm we observed was *Poospiza lateralis*, and this may have been the “nucleus” species whose large numbers and constantly whirring wing beats may have drawn the attention of understory and canopy dwelling species.

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