Wintering *Sporophila* seedeaters in an Amazonian–Cerrado ecotone in central Brazil

Sporophila seedeaters often occur in small groups or large flocks, except during the breeding season[4,5]. Some forest species, e.g. Buffy-fronted *S. frontalis* and Temminck's Seedeaters *S. falcirostris*, follow bamboo mast-seeding events in the Atlantic Forest, while short-range[3], regional and long-distance migrations are known for several other species[7,8]. Sick[6] mentioned the presence of large numbers of migrant *Sporophila* in the Pantanal and witnessed several hundreds of birds of 11 species in mid-September on an island in the upper São Francisco River, Minas Gerais, Brazil.

Fazenda Fartura (09°40'S 50°23'W), whose headquarters are in the municipality of Santana do Araguaia, Pará, Brazil, harbours one of the few remaining natural tracts of vegetation in the south-east of this state, in the Araguaia Basin. Of its 53,078 ha, some 35,108 ha are *terra firme* and *várzea* forests, *cerrado* or marshes; the remaining 17,970 ha comprise pasture for cattle[9]. During ornithological surveys at Fazenda Fartura, we observed large mixed-species flocks of *Sporophila* on 1–5 September 2009, 4–5 September 2010 and, most recently, 20–22 August 2013. The birds were in pastures >20 km from the nearest undisturbed *cerrado* and foraging on cattle manure, which was filled with seeds of signal grass *Urochloa* (*Brachiaria*) *decumbens*, an East African species cultivated as livestock feed.

The flocks mainly comprised Copper *S. bouvreuil* and Plumbeous Seedeaters *S. plumbea*, which accounted for 90–95% of individuals, based on the proportion of adult males. We also observed Marsh Seedeater *S. palustris* as well as smaller numbers of Dark-throated *S. ruficollis* and Tawny-bellied Seedeaters *S. hypoxantha*, representing some of the northernmost records for these migrants in Brazil[2,9]. Flocks were often seen in the late afternoon, and comprised >1,000 birds. We recorded five additional *Sporophila* species in the area[9] (Rusty-collared *S. collaris*, Lined *S. lineola*, Yellow-bellied *S. nigricollis*, White-bellied *S. leucoptera* and Chestnut-bellied Seedeaters *S. angolensis*), but none was seen in these mixed-species flocks.

Birds fed on the ground but moved to the top of nearby small trees to rest. The crop and stomach contents of those specimens we collected (now at the Museu de Zoologia da Universidade de São Paulo, MZUSP; voucher numbers available on request) were full of signal grass seeds. A few Grassland Sparrows *Ammodramus humeralis* and Blue-black Grassquits *Volatinia jacarina* fed with the seedeaters, but did not follow the flock when flushed by our presence. At least twice near dusk, in 2010 VQP & FS observed many dozens of *Sporophila* leaving the feeding area in the direction of the closest forest fragment (1 km away), apparently to roost.

Consumption of seeds of exotic grasses has also been reported for *capuchino* seedeaters in the Araguaia Valley[2], and we believe the birds have learned to use this food source via the same manner that other granivores take seeds that they are otherwise unable to process unless first ingested by cattle. On 12 December 2013, VC observed the same behaviour in Common Waxbill *Estrilda astrild* in an anthropogenic field in São Paulo (23°24'S, 46°33'W), south-east Brazil. Our observations suggest these birds may use exotic grasses as a primary food source, at least in the austral winter (perhaps year-round in Common Waxbill). *Sporophila* are suggested to decline once native grasslands have been modified, due to invasion by exotic grasses, as well as cattle trampling and overgrazing[10]. Species of conservation concern, such as Marsh and Dark-throated Seedeaters, were generally uncommon in mixed-species flocks at Santana do Araguaia. However, we have witnessed no apparent declines among other species, at least for Copper and Plumbeous Seedeaters, which are generally resident year-round in some locations[3]. Therefore, we suggest that further research is needed to understand the ecology, requirements and population dynamics of many species of *Sporophila*.

Acknowledgements

We thank Wilson L. M. Neto, Inabel, Edson Lima, Tomas Sigrist, Gerard Baudet, Belém, José Leite, Fabio and Raimundo for support at Fazenda Fartura. Marcos M. Costa invited VC to survey birds in São Paulo state. Guy M. Kirwan and an anonymous reviewer made important suggestions concerning the submitted manuscript.

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Received 25 March 2014; final revision accepted 30 October 2014; published online 10 March 2015