

## BEHAVIOR OF THE GRASSLAND SPARROW AND TWO SPECIES OF SEED-FINCHES

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The behavior of many of the predominantly granivorous neotropical bird species conventionally grouped under the familial heading Fringillidae in field guides is poorly known. Documenting it may help promote a better understanding of the phylogeny and systematics of these birds and clarify the evolution and adaptive significance of their social systems. It thus seems worthwhile to report some brief observations I made on the territorial behavior and feeding habits of Grassland Sparrows (*Myospiza humeralis*), Large-billed Seed-Finches (*Oryzoborus crassirostris*), and Lesser Seed-Finches (*O. angolensis*) during a short field trip to Guyana in July 1971. The behavior of these species seems not to have been reported in any detail. These observations were an extension of a socioecological investigation of the "finches" of Trinidad and Tobago to be published elsewhere. I use "finch" and "Fringillid" as convenient terms for species listed under the family heading Fringillidae in Meyer de Schauensee (1970a). I spent 35 hours observing these species with the aid of 10 × 50 binoculars at four locations in Guyana.

### GRASSLAND SPARROW

The Grassland Sparrow is known from both tropical and subtropical zones of South America. Meyer de Schauensee (1970a) lists it as a species inhabiting grassland, Haverschmidt (1968) records it from open sandy savanna with low grasses and scattered bushes in Surinam, and Snyder (1966) notes its habitat in Guyana as grassland and savanna. The species was common on the campus of the University of Georgetown, a flat, rather damp tract at sea level comprising grassland with some sedges (notably *Cyperus articulatus* L.), which was apparently mowed at intervals. The only related species commonly observed there was the Chestnut-bellied Seedeater (*Sporophila castaneiventris*). Grassland Sparrows were also abundant near the Manari River on the Rupununi Savannas of the interior where they occurred in exactly the same habitat as Haverschmidt (ibid.) lists for Surinam. Cohabiting related species here were the Wedge-tailed Grass-Finch (*Emberizoides herbicola*) and the Grassland Yellow-Finch (*Sicalis luteola*), but both these species mainly occupied completely open, bushless savanna adjacent to grasslands the sparrows occupied. I spent 15 hours watching the sparrows at these two locations, mostly in the early morning and late afternoon.

In both areas Grassland Sparrows fed exclusively on the ground. They walked, or more rarely hopped along, stabbing downwards to take seeds of mown or growing short-stemmed grasses and sedges, and also stretched up to seize seeds growing a little above head height. At the Georgetown site they did not exploit the tall sedge, *Cyperus articulatus*, by perching directly on the raceme to feed, as *Sporophila castaneiventris* frequently did. This is a common feeding technique of the lighter *Sporophila* species, but may be difficult or impossible for the heavier and stockier sparrows to perform. On the university campus I recorded sparrows eating the seeds of the grasses *Echinochloa colonum*, *Eriochloa ramosa*, and *Axonopus attenuatus*, and also of the sedge *Eleocharis mutata*. They may occasionally feed on seeds on taller stems by an essentially ground-feeding technique, for I watched one male jump up and try to pull a taller seed-bearing stem of *Eriochloa* down to the ground. Several predominantly ground-feeding neotropical finch species, notably yellow-finches of the genus *Sicalis*, commonly pull tall grass stems down to the ground where they anchor them with the feet while feeding on the raceme. Twice I saw individuals take arthropods, one a small moth and the other an unidentified insect, which they caught after short running chases. Chestnut-bellied Seedeaters also fed on the three identified sparrow food-plants, but their main food on the university campus was *Cyperus*. The Grassland Sparrow seems to be adapted for the exploitation of habitats of short grasses and sedges seeding close to ground level. Its bill, like those of some other predominantly ground-feeding neotropical Fringillids, such as the Blue-black Grassquit (*Volutinia jacarina*) and certain species of *Sicalis*, is more pointed and less conical than those of the largely granivorous seedeaters. This could be an adaptation enabling the species both to take more arthropod food and to probe efficiently among low-seeding grasses and for fallen seeds.

*Myospiza* males were territorial at both study sites, occupying territories whose diameters I estimated very roughly to be 30–50 yards, which they defended against conspecific males, and on which they sang, rested, and fed extensively. At the Georgetown site they occasionally seemed to feed outside of their territories also. Typical songs of Grassland Sparrows at Georgetown were tripartite, falling in pitch on the last note, but some included two additional terminal syllables. Most males at a locality sang a similar song pattern, but song was audibly different at the two locations, which are about 260 miles apart. The syllabic structure of the song at Manari can be rendered “zaa-zi-zee-zaa-zee-zaa,” rising on the first three and falling on the last three syllables; it had a plaintive, whistling quality. Males sang from a number of repeatedly used, prominent song posts, such as earth clods, bushes,

termite nests, and telephone wires from 1–40 feet above the ground, and also on the ground while foraging. Crest-raising during song was usual and autopreening common between songs of a bout. Most males seemed to be paired and spent much time foraging with single individuals, presumed to be females. Four agonistic encounters between adjacent territory owners involved (a) silent supplanting; (b) supplanting succeeded by a chase in which one or both birds uttered chattering “zeek-zeek-zeeks”; (c) fighting with associated chattering calls; and (d) silent fighting, after which the territory owner gaped with opened mandibles and emitted several “tsip” calls. On another occasion a member of a presumed bonded pair gave this latter call after supplanting its partner.

Interactions between presumed territorial pair members included a dancing display observed twice, in which a territorial male ran to and fro in front of the presumed female, facing her and shaking or flicking his lowered primaries. During one of these displays the female also danced a little and adopted a gaping posture with extended neck and opened mandibles. The dance was apparently a courtship display. Gaping postures occurred also at other times in response to approach by a pair member and elicited retreat. This type of gaping is a threat display characteristic of several species of *Sporophila* seedeaters and grassquits (genera *Volatinia* and *Tiaris*). Other agonistic interactions between members of presumed heterosexual pairs were fighting and supplanting-plus-chasing with the pursuer chattering or uttering “tsip-tsip-tsip” calls. Following a possible low aerial sexual chase, pair members gave a different, multisyllabic, bubbling call upon landing. Other vocalizations noted were a grating “kee-kee-kee” and a sharp, monosyllabic “chip.” The former was given by one member of a presumed pair perching close together on their territory and also by a male foraging alone on his territory. The “chip” was emitted by solitary birds, integrated pairs, and a family group; it resembled alarm “chips” of certain grassquits and yellow-finches and may well have been elicited by my presence. The “tsip” call was also given by flying birds. While these observations on vocal communication in Grassland Sparrows are merely preliminary, it was evident that the species has a sizeable vocal repertoire and uses vocal communication in agonistic, sexual, and other social contexts. No group larger than a three-bird family unit was seen, and the birds’ behavior at dusk indicated that, unlike many other neotropical Fringillids that gather in large communal roosts even during the breeding season, the Manari Grassland Sparrows roosted solitarily or in pairs or family groups on their territories.

## LARGE-BILLED SEED-FINCH

Snyder (1966) describes the habitat of the Large-billed Seed-Finch in Guyana as forest edge and clearings. I found it in Ité palm (*Mauritia flexuosa*) swamps adjoining lowland forests much disturbed by Amerindian cultivation along the Nappi River in the Rupununi savannas of the interior. Standing water was 28 inches deep at that time in the rainy season, and the dominant emergent sedges were *Scleria pratensis* and *Fuirena umbellata*, with the hydrophyllic grass *Panicum zizanioides* also fairly common. Related cohabiting species were the Lesser Seed-Finch, Blue-black Grassquit, and Gray, Lined, and Ruddy-breasted Seed-eaters (*Sporophila intermedia*, *S. lineola*, and *S. minuta*). I judged the birds to be *O. crassirostris* and not *O. maximiliani* by the shiny, smooth bill, bluish horn in color (cf. Meyer de Schauensee 1970b), but I took no specimens and did not compare the two species in the field. Both occur together at Annai only 40 miles away (Meyer de Schauensee 1970b). Sight identifications can only be regarded as tentative in distinguishing these two recently separated sibling species. I spent about 5 hours watching the species on two mornings.

Two or three males held adjacent swamp territories they defended, sang and fed on, though song frequencies were not high in mid-July. A territory defense encounter between two males involved chasing and supplanting. Singing occurred at song posts high in the Moriche palms, also in emergent saplings 2 or 3 feet above the water during solitary feeding. Snyder (pers. comm.) describes the song as comprised of six notes rising in pitch. I saw one cock perform a song flight display with a high trajectory over his territory; the song emitted during it contained terminal trills and warbles not heard in song given statically. The display closely resembled that of many *Sporophila* seed-eaters. Males seemed to be associated with single presumed females on their territories and at times fed in an integrated manner with them. I saw one presumed hen supplant her mate foraging close by and noticed a possible sexual chase. Two adjacent, territorial, presumed pairs jointly mobbed a large anaconda (*Eunectes murinus*), a species known to prey on such swamp birds as the Wattled Jacana (*Jacana jacana*) (Haverschmidt 1970). The two territorial males intensively studied held overlapping territories with Lesser Seed-Finches and Gray and Ruddy-breasted Seed-eaters, and the only interspecific aggression noted was the chasing of a territorial male *O. crassirostris* by a female-plumaged *Sporophila minuta*, possibly an immature male.

Solitarily feeding males emitted a variety of simple calls that I transcribed as "chint-chint," "chwit," "chweeo," "choo," and "peep." Presumed females feeding alone also gave the "chwit" call interspersed with

longer "wit-wit-wit-oo" vocalizations. I was impressed by the resemblance of the "chint," "peep," and "wit" calls to vocalizations given by Gray and Variable (*S. americana*) Seedeaters in similar nonsocial, but also in social, contexts. The monosyllabic vocalizations may possibly serve to maintain contact with the mate out of sight elsewhere on the territory.

#### LESSER SEED-FINCH

All the Lesser Seed-Finches I saw in the Lethem area of the Rupununi savannas had maroon-chestnut lower breast and belly plumage. This species is called the Chestnut-bellied Seed-Finch by those who regard a predominantly black form found west of the Andes as a distinct species, *O. funereus* (Snyder 1966). Possible intermediates between the two have been reported from Colombia (Meyer de Schauensee 1970a). Meyer de Schauensee lists the species' habitat as woodland edge, wasteland, and shrubbery; I found it at Nappi in the swamp and abandoned forest cultivation clearings and also in a partly grassy, partly cultivated clearing in, but near the edge of, forest along the Mocomoco River at the foot of the Kanuku Mountains. The species utilized the forest fringe as well as the adjacent open areas. In addition to the cohabiting species listed for the Nappi study site above, *Sicalis luteola* was present in large numbers at Mocomoco. I spent 15 hours on three mornings and one afternoon watching this species.

Territorial behavior closely resembled that seen in *O. crassirostris*. Males sang in low bushes, high trees, and while feeding on their territories, erecting the throat feathers during singing and interspersing the songs with bouts of autopreening. The song, which Snyder (1966) renders "hwee-hwee-hwee-HWEE-hwee-hwee," was often augmented by long terminal trills and warbles, exactly as in some statically emitted songs and all song flight displays of some *Sporophila* seedeaters. Similar trilled songs were emitted by a solitary cock during a territorial song flight display and by a male chasing a female-plumaged bird across his territory. Some seedeaters, such as *Sporophila americana* also give extended, trilled song during sexual chasing (Lill MS). Though I heard this type of song only during song flight display in *O. crassirostris*, it may not constitute a real difference between the two congeneric species, as sexual chasing and singing frequencies were low in *O. crassirostris* during my observations.

Males seemed to be paired with single females, but twice I saw feeding associations of a territorial male and two female-plumaged birds on stands of *Scleria*. Males joined mixed species fringillid flocks feeding on their territories, and I noted some interspecific aggression with

*S. minuta* in such aggregations, but interspecific territoriality towards related species was lacking. *O. angolensis* males and female-plumaged birds gave monosyllabic "chint" calls like those of *O. crassirostris* when feeding both solitarily and in pairs. A presumed hen feeding alone and members of an integrated feeding pair also gave a multisyllabic chattering call.

At Nappi seed-finches fed predominantly or exclusively on the sedge *Scleria pratensis*. If food resources impose a limit on population density in neotropical fringillids, one would expect to find some divergence in diet selection and/or feeding behavior among coexisting species. Brief observations like mine might well not reveal any such differences, especially because they were made when several of the coexisting species were apparently breeding, a time when one would expect food resources to be optimal. It is interesting therefore that during my limited observations at Nappi none of the seedeaters fed on *Scleria*, but two (*S. intermedia* and *minuta*), took *Panicum zizanioides* seeds, a rare element in the diet of only the smaller of the two seed-finches (*O. angolensis*), and one (*S. minuta*) took *Fuirena umbellata* seeds not eaten by the seed-finches. It is also interesting to compare the feeding behavior patterns employed by the two seed-finch species on *Scleria*. Table 1 classifies the feeding methods they used and estimates their frequency.

The Lesser Seed-Finch had a broader repertoire of feeding behavior patterns (12 as opposed to 4) than the Large-billed Seed-Finch, including some in which adjacent supporting vegetation was not used. Whereas *O. crassirostris* used exclusively adjacent woody plants as support while feeding, *O. angolensis* also used *Scleria* and employed feeding postures demanding great agility more commonly than did *crassirostris*. While some of these differences may prove to be less marked on more extensive observation, they may also relate to the two species relative sizes; Haverschmidt (1968) gives wing chord ranges of 66–67 mm for *crassirostris* and 56–59 mm for *angolensis* in Surinam.

If the observed dietary differences between seed-finches and seedeaters at Nappi is a real one, it could be related to generic differences in morphology and feeding behavior patterns and/or food preferences. Seedeaters have smaller bills, but I doubt if that precluded their feeding on *Scleria* seeds, which are significantly shorter but not wider than *Fuirena* seeds; the mean lengths of six collected seeds of these species were 2.6 mm (*Scleria*) and 5.8 mm (*Fuirena*) ( $P < 0.001$ ) and the mean widths 2.0 and 1.8 mm ( $P > 0.05$ , *t*-test, two-tailed). It is possible that *Scleria* seeds are harder to husk than those of the seedeater food plants, and that the greater weight of the seed-finches, especially *O. crassirostris*, (see Haverschmidt 1968 for figures) restricts their ability

TABLE 1  
FEEDING BEHAVIOR PATTERNS OF LARGE-BILLED AND LESSER SEED-FINCHES ON THE SEDGE *SCLERIA PRETENSIS* IN GUYANA, 1971

Support used while feeding	Basic feeding method	Posture and movements involved	Species and sex of birds <sup>1</sup>	Frequency of occurrence
None The food plant Adjacent plant of same species	Hover feeding	Seeds plucked while hovering	O. a. male and female	Fairly rare
	Perching on raceme	Upright posture	O. a. female	Rare
	Reaching across to food plant	Perching upright on support plant Clinging inverted on support plant	O. a. male and female O. a. male	Common Rare
	Anchoring food plant to support with feet	Food plant secured by fluttering wings while clinging to support so as to grasp raceme in bill Food plant secured by free flight from support, grasping raceme in bill and flying back	O. a. male and female O. a. male	Fairly rare Rare
Adjacent stronger woody plant of different species	Reaching across to food plant	Perching upright on support plant	O. a. male and female O. c. male	Fairly common Common
		Perching with long axis of body at 90° to support stem	O. a. male O. c. male	Rare Rare
	Anchoring food plant to support with feet	Food plant secured by fluttering and grasping (as above)	O. a. female	Rare
		Food plant secured by free flight + hovering + grasping (as above)	O. a. male	Rare
		Food plant secured by free flight + grasping + flying back (no hovering)	O. a. male	Fairly rare
		Food plant secured by reaching from support plant to grasp raceme in bill and pull it in while perching upright	O. a. female O. c. male and female	Fairly common Common

<sup>1</sup> O. a. = *Oryzoborus angolensis* and O. c. = *O. crassirostris*. Female = a bird in female-plumage (i.e. a female or immature male).

to feed on less sturdy and more procumbent food plants, which the seedeaters, with their ability to feed directly at the raceme and use acrobatic feeding postures, can exploit. The reality and causation of the observed dietary difference and the competitive relationships between these two groups will emerge only after a long-term, detailed comparison of their feeding ecology.

#### DISCUSSION

Although these brief observations merely scratch the surface of the behavior and ecology of Grassland Sparrows and seed-finches, a few interesting facts emerged from them. They indicated territorial breeding systems similar to those of many other neotropical (and temperate) fringillids. Males defended territories apparently containing a substantial percentage of their food requisites at that season against conspecific males. These areas were probably nesting territories, for most males occupying them seemed to be paired or, in *Myospiza humeralis*, associated with family units. The social behavior of the seed-finches closely resembled that of *Sporophila* seedeaters, particularly in the lack of agonistic and courtship displays other than sexual chasing and song flights and in the form and context of vocal communications. The behavior of these two genera suggests that they are probably closely related. Contrastingly the Grassland Sparrow had an apparent courtship display but, perhaps because of the greater risk of predation in its more open habitat, lacked an aerial, territory advertisement display.

Three types of behavior reducing interspecific competition and facilitating coexistence among these and related finches were tentatively identified. Some coexisting species had slightly differing habitat preferences (*Myospiza humeralis*, *Emberizoides herbicola*, and *Sicalis luteola* in the Rupununi savannas). Other cohabiting species were partially ecologically isolated at the time of observation by dietary differences (*Myospiza humeralis* and *Sporophila castaneiventris* at Georgetown; seed-finches and seedeaters at Nappi), and the two species of seed-finches differed in their methods of feeding on the same food plant and thus in the portions of stands of the plant they could exploit. Differences in feeding ecology seemed in all cases to be related to morphological differences that permitted the use of different feeding methods. Ecological isolation through differences in feeding ecology is particularly common among fringillids (Lack 1971). The morphological adaptation of the Grassland Sparrow to its ground feeding niche in short grass savanna evidently enabled it to exploit man-made short grass habitats of recent origin such as the Georgetown university campus.



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## SUMMARY

Brief observations on the social organization, habitat, and feeding ecology of the Grassland Sparrow, Large-billed Seed-Finch, and Lesser Seed-Finch in Guyana during July 1971 showed all three species territorial, with males singing on and defending probable nesting territories. The form and context of sexual and agonistic interactions and vocal communication are described. Grassland Sparrows occupied open, short grass habitats and were ground feeders on the seeds of short stemmed grasses and on insects. The seed finches occupied forest fringe habitats and fed on the seeds of tall sedges and grasses by perching on the raceme or using adjacent supporting vegetation. The feeding ecology and behavior of the two seed-finch species and cohabiting *Sporophila* seedeaters was compared; I tentatively concluded that differences in diet and feeding behavior patterns may facilitate coexistence among these species.

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