

GROUP-SIZE IN SEVEN SPECIES
OF *SERINUS*
(AVES: FRINGILLIDAE) IN THE
SOUTHWESTERN CAPE

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This paper reports on group-size for the protea seedeater (*Serinus leucopterus*) and, at a more general level, six congeners sympatric or partly sympatric with it, viz. Cape siskin (*S. iottus*), Cape canary (*S. canicollis*), yellow canary (*S. flaviventris*), streaky-headed seedeater (*S. gularis*), white-throated seedeater (*S. albobularis*) and bully seedeater (*S. sulphuratus*), at 31 study areas in the southwestern Cape during January 1974–October 1976. The data used here were obtained incidentally during a study (Milewski 1976) of the feeding ecology and habitat of the protea seedeater, a rare and threatened species whose biology is virtually unknown (Siegfried *et al.* 1976).

Group-size was assessed by noting the number of conspecific seedeaters seen together, or heard interacting vocally with contact calls, at each encounter. Two separate encounters were recorded when previously undetected birds flew into view, joining a bird or birds already under observation. The number of protea seedeaters observed feeding was also recorded at each encounter.

Typical group-size ("typical number of birds per encounter") was computed for the protea seedeater, using the formula $\Sigma y^2 / \Sigma y$ where y is the group-size for any particular encounter (Jarman 1974). Mean and modal group-sizes for each species were calculated on the basis of all encounters with each species (sufficient data were unavailable for a detailed analysis for species other than the protea seedeater). Typical and mean group-size were calculated separately

for feeding protea seedeaters.

Typical and mean group-size for feeding protea seedeaters were 1.65 and 1.43 respectively. The commonest group-size in 115 encounters with feeding protea seedeaters was one; the maximum number of birds seen feeding together was three (Table 1). However, on one occasion a group of 20 birds was recorded in association with recently loosened seed of *Protea neriifolia*, 38 days after fire. Typical and mean group-size for all protea seedeaters encountered, irrespective of activity, were 2.72 and 1.57 respectively. The commonest group-size in 273 encounters with this species was one. Encounters with groups of more than three birds comprised only 1.8% of all encounters (Table 1).

Five of the six congeners of the protea seedeater were encountered mainly as singletons or as groups of 2–4 birds (Table 1). The Cape siskin and yellow canary also occurred as groups of 5–10 birds relatively frequently (20–30%). The sixth species, the Cape canary, was encountered frequently (20%) as groups of more than 10 birds. Modal group-sizes were one for the bully seedeater, two for the streaky-headed and white-throated seedeaters, Cape siskin and Cape canary, and three for the yellow canary. Large groups (15 and more birds) of all the *Serinus* species were associated with concentrated food-sources. For example, six bully seedeaters were observed feeding together in a stand of fruiting *Diospyros glabra*; and Cape siskins and white-throated seedeaters, as groups of more than 20 birds, were noted at stands of recently-burnt *Leucadendron* sp. and the annual weed *Salsola kali* respectively; both plants were shedding copious seed at the time.

The protea seedeater is usually observed singly, whether feeding or not. However, the species occurs characteristically in loosely cohesive groups of two or three birds, many apparently single birds proving to be associated with other individuals after more than 15 minutes of observation. Birds 10–100 m apart appear to maintain sporadic vocal contact, reuniting periodically during the day. The protea seedeater occurs in groups of more than four birds chiefly in association with temporarily abundant food-sources, such as dehiscing seeds in scorched stands of *Protea* spp. These observations agree

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with the statement: "Usually found scattered in pairs or as individuals" (McLachlan & Liversidge 1970). It is not clear, however, whether Skead's (1960) observations, "a party of 9 or 10 was once seen . . . a party of 20 was seen . . . in May, and feeding flocks of 30-40 occur", pertain to recently-burnt or to mature vegetation.

The Cape siskin, yellow canary and, particularly, Cape canary tend to occur in larger groups than those of protea, white-throated, bully or streaky-headed seedeaters. The species which occur in large flocks are relatively small-bodied, have small beaks and feed on a relatively restricted range of small seeds (Winterbottom 1973; Milewski 1976). The chief foods, such as composite achenes, of these small *Serinus* species are characteristically found patchily in space and time, making it advantageous for many individuals to share an abundantly but ephemeral seeding stand of plants. Large groups in the other *Serinus* species apparently also tend to be associated with similarly patchy resource events. "The occurrence of food in quantity at any one place is the deciding factor in the presence or absence of flocks. This is especially the case with birds of a roving nature such as Cape canaries in their winter flocks" (Skead 1960). These findings for *Serinus* lend weight to Crook's (1965) sugges-

tion that animals associated with specialized, patchy food resources appear to be more gregarious than others.

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TABLE 1.

Percentage frequency of group-sizes for *Serinus* species. Numbers in parentheses for *S. leucopterus* refer to feeding birds.

Species	1	2	3	4	5	6	7	8	9	10	over 10	Mean group-size to nearest integer	No. encounters
<i>S. leucopterus</i>	58 (26)	31 (15)	6 (2)	2		2					1	2	273 (115)
<i>S. sulphuratus</i>	40	34	10	7	3	6						2	57
<i>S. gularis</i>	19	52	20	1					2		6	3	41
<i>S. tottus</i>	10	45	16	6	6	4	4	1	1	1	6	3	69
<i>S. flaviventris</i>	8	27	28	8	7	7	4	3			8	4	26
<i>S. albogularis</i>	8	35	14	12	11	11	4				5	4	26
<i>S. canicollis</i>	12	23	12	12	7	5	4	2	1	3	19	4	81