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## INTER-SPECIFIC AND INTRA-SPECIFIC INTERACTIONS AMONG BIRDS FEEDING ON NECTAR IN MALTA - WINTER AND SPRING 1978

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### Abstract

Observations of interactions among various species of birds which were feeding on nectar of *Antholyza aethiopica* and *Prunus domestica italica* revealed the following interspecific "peck order" among the avian nectarivores. High ranking birds evicted lower ranking ones from nectar sources: (1) male Blackcap *Sylvia atricapilla*; (2) Sardinian Warbler *Sylvia melanocephala* and Subalpine Warbler *Sylvia cantillans*; (3) female Blackcap and Chiffchaff *Phylloscopus collybita*. Sardinian Warblers are resident all the year round, while the Chiffchaffs were probably all winter residents. One of the Blackcaps was a winter resident while most of the rest were probably spring passage migrants. The Subalpine Warbler is a spring passage migrant and does not breed locally. Chiffchaffs employed hovering as a means of extracting nectar rapidly from the flowers, before they could be evicted by the other birds. They were also observed hovering in order to probe flowers which could not be probed easily by climbing the peduncle. When Chiffchaffs could feed at flowers undisturbed, they generally climbed the peduncle, hovering relatively infrequently only when flowers were in an awkward position.

### Introduction

Casual observations of nectar feeding produced a number of instances of interactions among birds which were using or trying to use the source of nectar. Most such interactions were recorded at large patches of *Antholyza aethiopica*. This is an alien African species which is the most prolific producer of nectar locally. Interactions were also observed among birds drinking nectar from Greengages *Prunus domestica italica*. An account of these observations is reported hereunder.

### Study Method

Observations were made during winter and spring 1987 at the following localities: Tal-Balal, Maghtab, San Anton Gardens, St Aloysius College, the Seminary at Tal-Virtù. Observations were made by standing or sitting some distances away from the nectar source and observing any happenings through binoculars, whenever birds were seen approaching the nectar source. Short notes were made in the field and these were rewritten in full in the evening. The best studied area was San Anton where on one occasion, a patch of flowers was watched continuously between 09.00hrs and 17.00hrs.

## Results

Tal-Balal (19.2.87): a pair of Sardinian Warblers *Sylvia melanocephala* were nectar feeding from a large patch of *Antholyza aethiopica* growing in their territory. A large flowering Almond Tree *Prunus dulcis* was not visited at all, even though it was partly surrounded by the *Antholyza* patch. Both the male and the female were seen visiting the *Antholyza* patch; four visits by the male and three by the female in two hours. No other species attempted to use this patch of flowers.

Maghtab (7.2.87, 9.2.87, 20.2.87): There were several plant species which were producing usable quantities of nectar. A large patch of *Antholyza aethiopica* about 50m away from a group of Carob trees *Ceratonia siliqua* was used most frequently by a male Blackcap *Sylvia atricapilla*, but a pair of Sardinian Warblers from the same group of Carob trees also used the *Antholyza* patch. Whenever the Blackcap's visits coincided with the presence there of a Sardinian Warbler, he would evict the Sardinian Warbler by means of a short chase in flight. This also happened on 20.2.87 when the birds had started using a smaller patch nearby. A pair of Sardinian Warblers from a nearby territory could be seen nectar feeding from Almond trees.

An interesting observation was made on 7.2.87. The author took up station close to the main *Antholyza* patch - too close as it turned out. This patch was in use by a male Blackcap and a pair of Sardinian Warblers. No birds visited the *Antholyza* patch. Instead, the male Sardinian Warbler was seen drinking nectar from Asphodel plants *Asphodelus microcarpus* in an adjacent field about 35m away from the observer! The male flew to a flowering spike and climbed the peduncle from close to the lowest flower. His feet were on the peduncle continuously, as he craned his neck and probed three flowers with his bill. He then wiped his bill twice on the peduncle and moved to another spike where the process was repeated. It seems as though the author's tactless proximity caused this Sardinian Warbler to drink nectar from the Asphodels instead. Asphodel nectar is very sweet but only small quantities are present and this nectar is protected by a palisade formed by the bases of the filaments of the stamens. Bees, the usual pollinators of the flowers, have to push one of the filaments aside in order to reach the nectar. The palisade of filaments seems to be an adaptation to slow down the evaporation of nectar.

San Anton Gardens (14.2.87): An *Antholyza* patch was watched between 09.00hrs and 17.00hrs This patch was within the territory of one of the resident pairs of Sardinian Warblers, and was used extensively by the female. Three other birds poached nectar at the *Antholyza* patch and were usually repulsed by the female Sardinian Warbler. Thus four birds were observed visiting the patch, making a total of 40 visits in 7.5 hours. The results are summarised in Table 1.

**Table 1**  
**Summary of observations at a patch of *Antholyza aethiopica* at San Anton Gardens between 09.00hrs and 17.00hrs on 14.2.87.**

	09.15 - 12.00	12.00 - 14.00	14.00 - 16.40
<b>Female Sardinian Warbler:</b>			
<b>No. of nectar feeding bouts</b>	8	12	8
<b>Average duration per bout</b>	1.5 min	1 min	1 min
<b>Female Blackcap:</b>			
<b>No. of bouts of nectar feeding</b>	1	0	0
<b>Chiffchaff (small):</b>			
<b>No. of nectar feeding bouts</b>	1	6	2
<b>No. of times chased away</b>	2	4	3
<b>No. of times undisturbed</b>	0	3	1
<b>Average duration per bout</b> (estimates, no stopwatch)	5 sec	25 sec	65 sec
<b>Chiffchaff (large):</b>			
<b>No. of nectar feeding bouts</b> (undisturbed)	0	0	1

Only the female Sardinian Warbler was observed to use the *Antholyza* patch. Her mate joined her once in her efforts to repulse intruders but did not drink any nectar. The female Sardinian Warbler was seen chasing away a female Blackcap and a Chiffchaff *Phylloscopus collybita*. The female Blackcap visited the *Antholyza* patch only once and was chased away immediately. The presence of a human observer close to the patch might have discouraged this bird; Blackcaps are more wary of humans than Sardinian Warblers and Chiffchaffs are. The Chiffchaff which visited the *Antholyza* patch during most of the day was slight in build and had an area of damaged plumage on one flank, where the feathers were permanently ruffled. A larger Chiffchaff visited the patch once at about 16.20hrs. The small Chiffchaff visited the *Antholyza* patch 13 times in the course of the observations. At first, it was repulsed on every occasion, but later in the day several of its visits brought no reaction from the female Sardinian Warbler which was foraging in the Citrus orchard nearby. On one such occasion, the Chiffchaff drank nectar undisturbed for almost 2mins.

The birds adopted two main methods of nectar feeding: (a) climbing the peduncle and probing individual flowers with the bill; and (b) hovering in front of a flower and probing the flower with the bill. Hovering was employed by Chiffchaffs only, and even this species preferred to feed by climbing peduncles. Harassment by the female Sardinian Warbler caused the Chiffchaff to adopt hovering in order to poach nectar rapidly before the Sardinian

Warbler could arrive. A short period with moderate gusts of wind during the afternoon made hovering in front of flowers more difficult for the Chiffchaff. The Chiffchaff had trouble hovering in position in front of a flower during a gust. Even climbing the peduncle had its difficulties. Apparently, the female Sardinian Warbler could not avoid spilling nectar all over her breast feathers and she looked quite untidy for most of the day.

The female Sardinian Warbler used a very characteristic threat flight when displacing intruders. She would fly very slowly, straight at the intruder. During this flight, she did not beat her wings continuously and parts of the flight consisted of a glide. During this glide, portion of the threat flight, the wings were slightly dropped and cupped slightly downwards. Male Sardinian Warblers have directed similar flights at the author during the breeding season when excessive proximity to the nest caused the males to become nervous. The male would fly straight at the author, turning away when about 3-4m away. The flight would be directed straight at the author's head. Male Blackcaps use a very similar flight when displacing intruders.

Remarkably, all these interactions were not accompanied by any loud vocalisations. Perhaps the birds wished to avoid disclosing the whereabouts of the patch of *Antholyza* to more distant birds.

St Aloysius College, private grounds (6.3.87 - 16.4.87): A pair of Sardinian Warblers was seen using a patch of *Antholyza aethiopica* regularly between 6.3.87 and 5.4.87. They were observed chasing Chiffchaffs away from the flowers several times. On one occasion, the male and female Sardinian Warbler combined to repulse three Chiffchaffs. At other times, the Chiffchaffs seem to have found the *Antholyza* patch unattended as they could be seen drinking nectar undisturbed. On 25.3.87 a migrant male Blackcap settled in a small Almond tree near the *Antholyza* patch and chased away all visitors, including the Sardinian Warblers. This bird had left by the 27 March.

The Seminary, Tal-Virtù (10.3.87 - 14.4.87): Nectar feeding was observed at a large patch of *Antholyza aethiopica* and at flowering Greengage trees *Prunus domestica italica*. Both resident birds and migrants used these flowers. Two pairs of Sardinian Warblers are known to have used the *Antholyza* patch until 19.3.87 when a migrant male Blackcap arrived and set up territory near the *Antholyza* patch. The Sardinian Warblers used a slightly different area of the patch and the Blackcap was never observed displacing them. Nevertheless, the Sardinian Warblers visited the *Antholyza* patch much less frequently after the Blackcap arrived. Later a female Blackcap spent much time in the area and was tolerated by the male, but she was not observed to feed on nectar. The male Blackcap departed (no more singing heard) on the night of 6-7 Apr 1987.

Nectar feeding from Greengages was first observed on 18.3.87. Subalpine Warblers *Sylvia cantillans*, Blackcaps and Sardinian Warblers were seen drinking the nectar of flowers of this species. The migrant Subalpine Warbler tended to occupy trees in more open situations than those occupied by Blackcaps. No Subalpine Warbler was ever seen nectar feeding in a tree simultaneously with a Blackcap. Both male and female Subalpine Warblers were observed nectar-feeding.

Blackcaps usually visited Greengage trees singly, but some of the trees are known to have been visited by more than one bird. Blackcap numbers reached a peak on 3.4.87 when at least 13 birds of both sexes were present in the areas occupied by Greengage trees. Most of the Blackcaps left on the night of the 6th-7 April and all had left by the 13 April. The trees were still in full bloom when the Blackcaps left.

Relations among Blackcaps were generally amicable except on 3-6 Apr when there were many Blackcaps in the area. At this time some aggressive interactions were noted. A male whose black cap was very dark was seen evicting a male whose cap was duller. It might be wise to monitor cap colour in any future studies of aggressive interactions among Blackcaps. Another male was seen chasing a female Blackcap out of "his" tree. Yet another male Blackcap threatened a female Sardinian Warbler which had been nectar feeding in "his" tree. This was the only occasion when Sardinian Warblers were observed nectar feeding from the Greengage trees. They might have avoided the trees because of the presence of the Blackcaps. Peach *Prunus persica* flowers on trees close by were probed for nectar by Sardinian Warblers on a few occasions and these were not used by the Blackcaps which usually fed higher above ground level. Elsewhere in the grounds, relations seemed amicable. On 2.4.87 four Blackcaps (2 males and 2 females) were seen in close proximity pecking at the dried berries of *Melia azederach* which had been hanging on the tree since the autumn. Several birds continued to use this fruiting tree for several days. A relatively unusual occurrence was recorded on 22.3.87. A female Blackcap was seen drinking rainwater from a drop which hung beneath a *Melia azederach* berry. These berries ripen in October - November but are not usually eaten and tend to dry on the tree, remaining there for several months. It may be that the rainwater had dissolved sugars or amino acids from the dried fruit and this might have made the water hanging beneath the berry sweet.

Sardinian Warblers and Subalpine Warblers were never observed to quarrel despite close proximity on several occasions. Subalpine Warblers appeared to avoid the areas occupied permanently by Blackcaps, and the Sardinian Warblers behaved similarly. Nectar feeding by Subalpine Warblers was observed frequently but never in areas occupied by Blackcaps.

## Discussion

The interspecific "PECK ORDER" in disputes at flowers appears to be as follows (decreasing order of dominance): (1) male Blackcap; (2) Sardinian Warbler (and Subalpine Warbler?); (3) female Blackcap and Chiffchaff. No interactions were observed for the following combinations: female Blackcap - Chiffchaff; Sardinian Warbler - Chiffchaff; Subalpine Warbler - Blackcap; and Sardinian Warbler - Subalpine Warbler. The status of the Subalpine Warbler has been deduced tentatively from the facts that it avoids Blackcaps and is not displaced from Greengage trees by the territorial Sardinian Warblers.

The above peck order is interesting because of the low status of female Blackcaps. It might be that female Blackcaps have a milder disposition which makes it easier for them to share a territory with a male Blackcap during the winter. Such sharing of a territory is very frequent among Blackcaps at San Anton Gardens in winter. The birds might not be permanently mated, in which case it might be advantageous for the female to accept inferior social status in order to avoid eviction by the dominant male.

Subalpine Warblers were never observed feeding at patches of *Antholyza*. At the Seminary, Subalpine Warblers were seen occupying Greengage trees within the territory of a Sardinian Warbler pair, while the territory owners used the *Antholyza* patch. The relationship between these two species might not be a simple one. Relations between these closely related species might be dictated by considerations of friendliness rather than aggression and dominance. The Sardinian Warblers seem to treat the Subalpine Warblers as "guests".

The use of hovering while nectar feeding is interesting. Chiffchaffs hover quite well both while foraging on foliage and while nectar feeding. The author has observed Subalpine Warblers hovering while picking the fruits of *Pistacia atlantica* in autumn but not while nectar feeding. It seems that some *Sylviidae* have a reasonable proficiency at hovering which they use while foraging on foliage. Hovering enables them to take items which would otherwise be out of reach. Chiffchaffs which were feeding on nectar used hovering in two contexts. Hovering was employed in order to enable the Chiffchaff to reach inside a flower which could not be probed otherwise (see Thake in press). A much more interesting use of hovering was observed when Chiffchaffs attempted to poach nectar from *Antholyza* patches which were being defended by Sardinian Warblers. The Chiffchaffs would not attempt to climb the peduncles at all but would move from flower to flower in flight, hovering briefly in front of each flower long enough to probe the flower for about a second. Apparently, this type of behavior enables Chiffchaffs to extract nectar from the flowers rapidly, before the Sardinian Warbler can evict it. When left undisturbed, the Chiffchaffs preferred to climb peduncles and probe flowers by craning their necks. Perhaps hovering is too energetically expensive or too tiring to employ for long. Hovering of exquisite quality is employed by hummingbirds while nectar-feeding.

It seems possible that the evolution of nectar feeding by hovering in hummingbirds might have been conditioned by the need to reach awkwardly placed flowers as well as the need to avoid harassment while poaching nectar from the territory of a more dominant bird.

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*Sylvia melanocephala*

