

Hunting behaviour and diet of migratory Woodchat Shrikes (*Lanius senator*) in Eastern Romania

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Abstract: The diet composition and hunting success of migrating Woodchat Shrikes (*Lanius senator*) observed during spring in SE coastal Romania is presented. Visual observations were made during 24–30 April 1997. The number of birds present ranged from 1 to 4. Altogether 71 hunting attempts were observed and 76% of them were successful. From successful hunting attempts, a total of 22 prey animals were identified, all were Tiger Beetles (*Cicindella lunulata*), which have bright metallic colour and are easily identifiable in sunshine. No impaling was observed. The pellets contained remains of 103 prey animals, mainly *C. lunulata* and *Gryllotalpa gryllotalpa*.

Key words: food, foraging, *Lanius senator*, migration

INTRODUCTION

Shrikes have been reported as declining in most of their breeding range throughout Europe. Some species are disappearing only in particular areas of their range, while others have become vulnerable all over Europe (TUCKER & HEATH 1994, LEFRANC & WOODREY 1997). One of these species is the Woodchat Shrike, which largely declined all over Europe (CRAMP & PERRINS 1993, TUCKER & HEATH 1994, HAGEMEIJER & BLAIR 1999). This decline of the shrike species may have several causes, e.g. agricultural intensification resulting in habitat loss, both in breeding and wintering grounds, changing land-use practices, the use of agro-chemicals, afforestation of open habitats, human development, shooting and trapping of birds during migration, nest predation, and climate change (CRAMP & PERRINS 1993, TUCKER & HEATH 1994, LEFRANC & WOODREY 1997, KRISTIN 1998). Although habitat destruction in the breeding grounds is likely to be the main cause, some authors believe that direct human interference and habitat alteration at staging and wintering areas may also have negative effects on the shrikes (YOSEF 1994, HERREMANS & HERREMANS-

TONNOEYR 1995, LEFRANC & WOODREY 1997, HERNANDEZ 1999). Thus a better knowledge of foraging behaviour and the diet of shrikes at migratory resting sites may improve conservation efforts.

The diet of the Woodchat Shrike was studied in detail in its breeding areas (Corsica – BONACCORSI & ISENMANN 1994; Germany – ULRICH 1971, BECKER & NOTTBOHM 1976; Spain – HERNANDEZ et al. 1993; Switzerland – SCHAUB 1996) and there are some studies from wintering areas, too (CRAMP & PERRINS 1993). SCHAUB (1996) studied in detail the hunting behaviour and the time budget of breeding Woodchat Shrikes in northern Switzerland. Although there are several studies on hunting behaviour, searching tactics, and diet of different shrike species (OLSSON 1984, 1985, CARLSON 1985, SONERUD 1989, YOSEF 1993, YOSEF & GRUBB 1993), there is no specific study on diet and hunting behaviour of shrikes on migration.

Here we present our results concerning the diet composition and hunting success of migrating Woodchat Shrikes (*Lanius senator*) observed during spring in SE coastal Romania. The results are compared to previous findings, regarding time budget, hunting efficiency, perch use, and predatory tactics.

STUDY SITE AND METHODS

Romania lies on the eastern border of the breeding range of the Woodchat Shrike, so the species occurs only in the S and SE part of the country (WEBER 1994). There are no proven breeding records for Romania but in recent years the species was regularly noted in the Danube Delta area in spring. There is no information about the breeding area of these individuals; a similar phenomenon occurred in S Ukraine as well (SMOGORZHEVSKY 1994).

Data were collected during spring in 1997, at a 3.4-km-long bush-line on Chituc sandbank, Danube Delta Biosphere Reserve (44°45'N, 28°57'E). The sandbank is 60–150 m wide (bordered by the Black Sea on one side and by Lake Sinoie on the other side) and 27.6 km long. Its north-south direction and the presence of the bush-line make the sandbank suitable as a resting site for migratory birds (pers. obs.). The most common bush species are the thorny *Eleagnus angustifolia* and *Hippophae rhamnoides*, both being suitable perching sites for shrikes. Another important perch type is the medium-voltage power-line, extending along the sandbank. Vegetation present in the area is formed by coastal reedbeds (*Phragmites* spp.), short grasses and sand dune vegetation. Along the bush-line there is a 2-m wide sandy patch with short vegetation (5–10 cm), which is highly preferred by the hunting shrikes.

Visual observations of shrike behaviour were made for every bird observed, noting the perch from which the hunting attempt was initiated, distance made during flights, hunting success, and prey type (if possible). The perch height was estimated by comparing to previously measured landmarks. To assess diet composition, pellets were collected from the ground below commonly used perch sites. Pellet analysis was made in laboratory under a stereoscopic microscope and the prey remains were identified with the use of reference material.

In addition to the visual observations of shrike behaviour, three visual counts of the main prey type were carried out in the area. The main foraging area was divided into three parts according to vegetation height: (A) bare sand with very short grass (<10 cm); (B) salty areas with medium grass and *Salicornia* patches; (C) tall

dry grass with scattered short bushes (neither grass nor bushes higher than 50 cm). Three 100-m-long transects (A, B and C) were arbitrarily selected in these patches, to evaluate the density of the commonest prey (the beetle *Cicindella lunulata campestris*). The census was made by walking slowly along the preferred perching sites and counting the roused beetles.

RESULTS

A total of 228 minutes of observations were made during 24–30 April 1997. The number of birds present ranged from 1 to 4. Altogether, 71 hunting attempts were observed and 76% of them were successful. A hunting attempt was termed successful if the observed shrike was seen consuming or carrying the prey. A total of 10 perch sites were identified, the most frequently used ones were 1.2, 1.7 and 2.2 m high (85% of total observation time). The perches could be divided into two groups: low perches (branches of thorny bushes, average height 2.2 m, range 0.8–3 m) and high perches (medium-voltage power-lines, 8–9 m high). Two types of hunting attempts occurred: (1) towards the ground ($n=61$ observations) and (2) hovering flights and chasing flying insects ($n=10$).

Hunting from low perches

A total of 56 attempts were observed, with a hunting success rate of 83%. The average distance of the hunting attempt from the perch was 4.7 m (see Fig. 1). Most of the hunting attempts initiated from low perches were directed towards the ground. The area used for ground hunting was mostly in plots A and B (see also Table 2). Only 8% of the hunting attempts initiated from low perches were directed at flying insects.

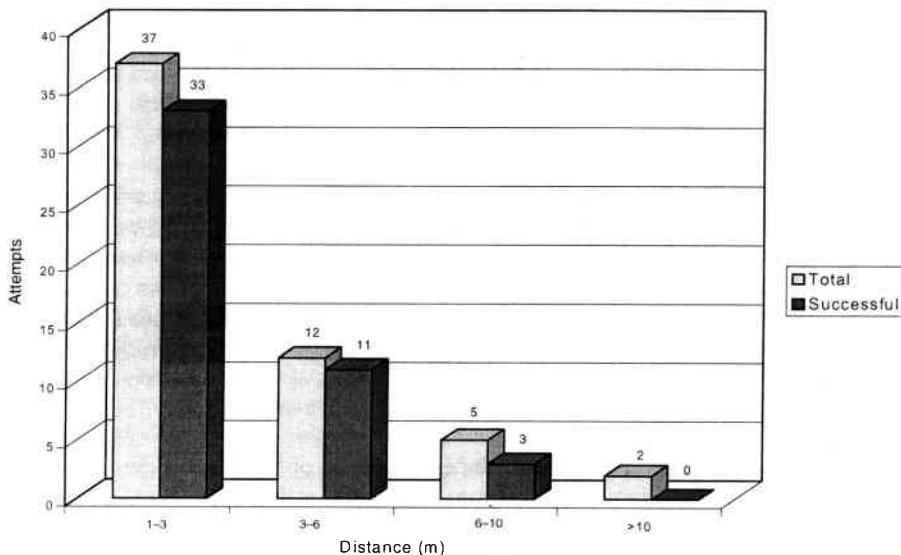


Fig. 1. The distance and success rate of ground hunting attempts for Woodchat Shrike at Chituc, coastal Romania, in the spring of 1997

Table 1. Species and numbers of prey remains from Woodchat Shrike pellet analysis at Chituc, coastal Romania, in the spring of 1997

Species	Number	Percent (%)
<i>Cicindella lunulata campestris</i>	77	74.7
<i>Gryllotalpa gryllotalpa</i>	9	8.7
<i>Scarytes terricola</i>	7	6.8
Fam. Hydrophilidae (spp. indet.)	6	5.8
Fam. Carabidae (spp. indet.)	3	2.9
Ord. Heteroptera (sp. indet.)	1	0.9
Total	103	-

Table 2. Numbers of perches, of hunting attempts, hunting success, and prey density in the three study plots for Woodchat Shrike at Chituc, coastal Romania, in the spring of 1997

Site	No. of perches	No. of hunting attempts	Hunting success (%)	Prey density (prey no./100 m)
Plot A	5	39	74	211
Plot B	3	22	50	144
Plot C	2	10	30	24

Hunting from high perches

A total of 15 attempts were observed, the average distance of the attempt from the perch was 5.7 m (see Fig. 1). All hunting attempts initiated from high perches were directed at flying insects. The hovering flights and chasing flying prey was characterized by a significantly smaller success rate (40%), as compared to ground hunting.

Diet

From successful hunting attempts, a total of 22 prey animals were identified by binoculars, all were Tiger Beetles (*Cicindella lunulata*), which have bright metallic colour and are easily identifiable in sunshine. No impaling was observed. The pellets contained remains of 103 prey animals. The dominant prey was *C. lunulata*, which was present in each pellet (Table 1). Another important prey was the Mole Cricket (*Gryllotalpa gryllotalpa*). The average prey length was 14.3 mm (8–34 mm).

DISCUSSION

The spring migration of passerine birds is a period of high-energy demand under a time constraint. Each individual migrant has to select the most efficient foraging behaviour to minimize the stopover period and to arrive at the breeding grounds as soon as possible. In optimal cases individuals will select the most profitable prey or the most efficient preying technique (WEBER et al. 1998). The overall hunting efficiency of the Woodchat Shrikes present in the study area was higher than results

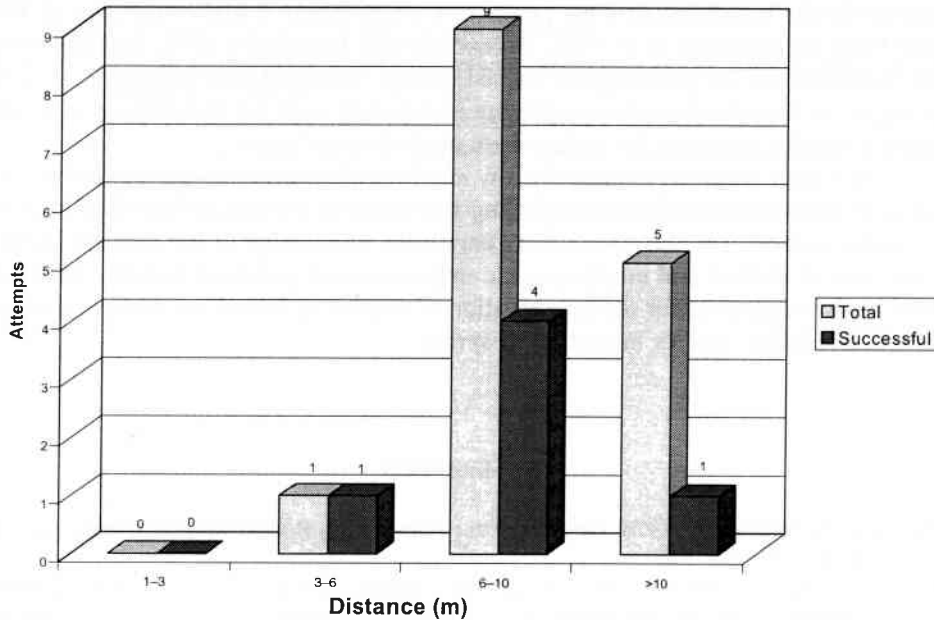


Fig. 2. The distance and success rate of hovering flights towards flying insects for Woodchat Shrike (*Lanius senator*) at Chituc, coastal Romania, in the spring of 1997

reported by SCHAUB (1996) for a breeding population in Switzerland. There are differences between the results in hunting success of attempts directed towards the ground. These were more successful and outnumbered hovering flights at our study site (Chituc). The situation presented by SCHAUB (1996) is different: in his study the hovering flights were more productive and outnumbered the ones directed towards the ground. The use of different habitat types may be the cause of the differences found. The Chituc sandbank is characterized in early spring by short, thick vegetation and dry sandy patches, in opposition to the habitats with denser and tall vegetation used by the shrikes in Switzerland. The low numbers of hovering flights in the present study may be caused by a low number of flying insects and by the fact that the flying individuals of *C. lunulata* are fast and hard to catch, in contrast to those moving on the ground (pers. obs.). There are differences between the average distances of hunting flights as well. SCHAUB (1996) found larger distances in his study both for ground hunting and for hovering flights. The use of habitat patches with different vegetation heights is similar in both areas: it seems to be an overall pattern of the species' habitat use to favour the open areas with short vegetation (1–5 cm). YOSEF & GRUBB (1993) made similar observations for Loggerhead Shrikes (*L. ludovicianus*), which were more successful hunters in areas with short vegetation (mowed grassland), and the percent of ground hunting was also higher than in areas with tall vegetation. In the case of our study there is direct evidence that areas of short vegetation (plot A and B) also hold larger prey densities (see Table 2).

The diet of the Woodchat Shrike in the present study area is dominated by coleopterans. The studies of shrikes conducted in breeding areas present a different

pattern. In the breeding areas the percent of orthopterans is higher (CRAMP & PERRINS 1993, HERNANDEZ et al. 1993, BONACCORSI & ISENMANN 1994, SCHAUB 1996). The apparent lack of grasshoppers caused the low percentage of Orthoptera. In early spring no orthopteran larvae were present in the study area. HERNANDEZ et al. (1993) found a similar situation for spring diets of shrikes in Spain.

The short study period and the low numbers of shrikes present prevent us from drawing important conclusions regarding the foraging ecology of the species in the migration season. Yet, our results may enrich the knowledge of the diet and hunting behaviour of shrikes and emphasize the importance of grassland habitats with scattered bushy vegetation for the conservation of migratory Woodchat Shrikes and perhaps other shrike species migrating in spring.

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