

Singing by wintering Great Grey Shrikes (*Lanius e. excubitor*): Are bird hunting frequency or success affected?

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Singing by wintering Great Grey Shrikes (*Lanius e. excubitor*): Are bird hunting frequency or success affected? - Experimental data showed that playbacks of nearctic Great Grey Shrikes' (*Lanius excubitor invictus*) song attract small birds. It was suggested that shrikes might use this attraction for hunting avian prey. Consequently, we tested this hypothesis using long-term field observations from Austria and Finland. Our studies revealed that singing by wintering nominate Great Grey Shrikes was not connected to their predation of small birds. In no case birds were caught „out off“ or within one minute after singing (n = 153). In six cases only, birds were attacked immediately after singing at all. However, hunting frequencies of these particular shrikes did not differ between singing and non-singing periods.

Key words: avian prey, hunting success, *Lanius excubitor*, Great Grey Shrike, prey luring, winter song.

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1. Introduction

Vocalization in birds serves different functions (e.g. THORPE 1961, BEZZEL & PRINZINGER 1990). However, few authors have addressed the possibility of prey being lured by avian predators using their calls or songs (but see POLLARD 1930, SMITH 1969,

WATSON & ASOYAMA 2001). Experimental data suggested that the raptor-like Great Grey Shrike (*Lanius excubitor*) employs its song to attract small birds (ATKINSON 1997). More songbirds approached a tape player when broadcasting the shrikes' song than during a control and an American Robin (*Turdus migratorius*) treatment.

Costly signal production should reveal benefits for the sender (BRADBURY & VEHCAMP 1998). If singing in fact targets to attract avian prey, we can hypothesize that an increased bird hunting frequency and, in particular, hunting success are to be expected when attacking „out off“ or shortly after performing strophes. In this paper we test this hypothesis using long-term field observations from Austria and Finland.

The Great Grey Shrike is holarctically distributed and inhabits semi-open habitats, such as forest edges of bogs, clear-cuttings or non-intensive types of farming landscapes (PANOW 1996, LEFRANC & WORFOLK 1997). In winter males and females defend individual territories and may sing. The purpose of this song remains rather unclear (i.e. the territorial function is doubted, HARRIS & FRANKLIN 2000).

Great Grey Shrikes feed on a large spectrum of prey taxa with arthropods and small vertebrates (mostly *Microtus* sp.) being most frequently taken. Small birds usually contribute less than 10% of the total prey biomass (e.g. OLSSON 1986, STRAKA 1991, but see LOREK et al. 2000). Birds that are taken are typically recently fledged juveniles, exhausted migrants and conspicuous males during display. It appears reasonable that in winters when snow cover protects voles, Great Grey Shrikes shift towards avian prey (OLSSON 1986, HROMADA & KRIŠTIN 1996, but see KARLSSON 2001).

2. Material and Methods

Data were collected during studies of wintering nominate Great Grey Shrikes in eastern Austria (about 47°47'N, 16°07'E; 1994 to 2000; by R. P.) and the coastal region of southwest Finland (60°19'N, 22°15'E; 1992 to 2001; by S. K.). More detailed descriptions of the study areas can be found in BIERINGER & SAUBERER (2001) and KARLSSON (1997) for Austria and Finland, respectively. We performed observations with timings recorded to the second (211,7 h and 186,3 h, respectively). Data encompass a total of nine territories and a minimum number of 11 individuals.

Singing was easily witnessed, as shrikes are not particularly shy when observed from cars. We considered attacks „out off“ but also within one minute after singing to be connected to a possible attraction of small birds by the shrikes' song. Interactions with various species of *Turdus*-thrushes and the Great Spotted Woodpecker (*Dendrocopos major*) were excluded from the analysis because of possible mingling with „inter-specific territorialism“ (SCHÖN 1979).

3. Results

A total of 153 attacks towards small birds were recorded (Austria: 60,1 %; Finland: 39,9 % of the observations; Table 1). The outcome was known for all but two cases in Austria (97,8 %) and one in Finland (98,4 %). Hunting success was rather low (Austria: 1,1 % of $n = 90$; Finland: 6,6 % of $n = 60$ observations with known outcome). In Austria only one Wren (*Troglodytes troglodytes*) and in Finland only one each of Blue tit (*Parus caeruleus*), Great tit (*Parus major*), Greenfinch (*Carduelis chloris*) and Bullfinch (*Pyrrhula pyrrhula*) were caught. Finnish shrikes were significantly more effective (confidence intervals not overlapping in a Poisson distribution model). Frequency of bird hunting was similar in the two areas, with 0,43 attacks per hour found in Austria and 0,33 in Finland (confidence intervals overlapping in a Poisson distribution model, i. e. no significant difference between Austria and Finland).

In no instance was a bird caught „out off“ or within one minute after singing. On only four occasions in Austria (4,3 %) and two in Finland (3,3 %) were shrikes observed hunting birds after reciting their song. Furthermore, all attacks after singing were undertaken by two individual shrikes (Austria: October 1994; Finland: March 1993). However, the attack frequency after singing did not differ from the frequency of attacks on birds during periods of non-singing for both, the bird in Austria (October 1994; confidence intervals overlapping in a Poisson distribution model) and the Finnish individual (March 1993; confidence intervals overlapping in a Poisson distribution model).

4. Discussion

Our results indicate that singing by Great Grey Shrikes is unrelated to bird hunting. We did not study the luring capabilities of songs recited by wintering Great Grey Shrikes, however, our investigations do not support the view that shrikes might use their song to hunt avian prey (ATKINSON 1997).

The overall very low hunting success in Austria and Finland is possibly influenced by the mild winters during the study period. Compared to Austrian individuals, Finnish shrikes, facing longer and more snow-rich winters, were more eager to press home their attacks and / or attacked birds were more vulnerable due to their weak condition. Additionally, different hunting successes between shrikes might be the result of different experiences and individual specialisations (MESTER 1965).

Disadvantageous reactions of receivers to illegitimate signallers are explained by the *novel environment theory* and the *exploitation theory* (ALCOCK 2001). The first, stating that maladaptation is caused by modern conditions being very different to that in the past and that insufficient time has passed for advantageous mutations to appear, is unlikely to be an explanation as shrike – songbird interactions are not a new phenomenon. The *exploitation theory* stresses that what appear to be maladaptive responses are

Table 1. Songbirds attacked by Great Grey Shrikes in Austria and Finland during winter 1992 - 2001. – Tab. 1. In Österreich und Finnland während der Winter 1992 - 2001 beobachtete Singvogeljagden des Raubwürgers.

	Austria (Österreich)		Finland (Finnland)	
	<i>n</i>	%	<i>n</i>	%
Skylark - Feldlerche - <i>Alauda arvensis</i>	0	0	2	3,3
Meadow pipit - Wiesenpieper - <i>Anthus pratensis</i>	0	0	1	1,6
White wagtail - Bachstelze - <i>Motacilla alba</i>	2	2,2	0	0
Wren - Zaunkönig - <i>Troglodytes troglodytes</i>	1	1,1	0	0
Robin - Rotkehlchen - <i>Erithacus rubecula</i>	1	1,1	0	0
Goldcrest - Wintergoldhähnchen - <i>Regulus regulus</i>	1	1,1	1	1,6
Blue tit - Blaumeise - <i>Parus caeruleus</i>	1	1,1	7	12
Great tit - Kohlmeise - <i>Parus major</i>	10	11	6	9,8
Blue tit - Blaumeise - <i>P. caeruleus</i> /				
Great tit - Kohlmeise - <i>P. major</i>	3	3,3	1	1,6
Coal tit - Tannenmeise - <i>Parus ater</i>	0	0	2	3,3
Undetermined tit - Meise indet. - <i>Parus indet.</i>	0	0	5	8,2
Tree sparrow - Feldsperling - <i>Passer montanus</i>	4	4,3	0	0
Chaffinch - Buchfink - <i>Fringilla coelebs</i>	1	1,1	2	3,3
Chaffinch - Buchfink / brambling -				
Bergfink - <i>Fringilla montifringilla</i>	0	0	3	4,9
Siskin - Erlenzeisig - <i>Carduelis spinus</i>	0	0	3	4,9
Greenfinch - Grünling - <i>Carduelis chloris</i>	2	2,2	10	16
Goldfinch - Stieglitz - <i>Carduelis carduelis</i>	1	1,1	3	4,9
Common redpoll - Birkenzeisig - <i>Carduelis flammea</i>	0	0	2	3,3
Linnet - Bluthänfling - <i>Carduelis cannabina</i>	1	1,1	0	0
Bullfinch - Gimpel - <i>Pyrrhula pyrrhula</i>	2	2,2	6	9,8
Yellowhammer - Goldammer - <i>Emberiza citrinella</i>	13	14	2	3,3
Songbird undetermined - Singvogel indet.	49	53	5	8,2

retained because they are still advantageous for the population as a whole. So, information about the shrike could contribute more to the fitness of a population of potential prey species on average, even if some individuals are caught when approaching the predator.

Investigations on shrikes do not provide conclusive data to address benefits for the receiving songbirds (this study; ATKINSON 1997). In fact, singing by the shrike could indicate a period of relative safety for potential prey species and attract them (cf. MØLLER 1992). However, it is unknown how often shrikes are visited by songbirds in non-singing periods.

Moreover, non-mimetic calls of predators have been shown to increase its early detection and avoidance by prey species (HAUSER & WRANGHAM 1990, HAUSER & CAFFREY 1994, MOUGEOT & BRETAGNOLLE 2000) and aggressive mimetic deception (i.e. to attract potential prey by imitating signals) is only anecdotally reported in birds (POLLARD 1930, SMITH 1969, WATSON & ASOYAMA 2001). We did not record mimetic elements in the repertoire of wintering nominate Great Grey Shrikes in Austria and Finland. In contrast, Atkinson (1997) noted vocal elements reminiscent of alarm calls given by chickadees (*Parus* sp.) and nuthatches (*Sitta* sp.) when studying Great Grey Shrikes (Northern Shrikes) of the subspecies *invictus* in March and April in Idaho, USA.

In sum, the discrepancy between our results and a well-made experiment (Atkinson 1997) remain rather unexplained and further investigations are necessary. Not only is the exact purpose of the shrikes' winter song unknown (ATKINSON 1997, HARRIS & FRANKLIN 2000) but also why it is an attractant to small birds.

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Zusammenfassung

Gibt es einen Zusammenhang zwischen dem Wintergesang der Nominatform des Raubwürgers (*Lanius e. excubitor*) und der Häufigkeit und dem Erfolg von Vogeljagden? – In einer Untersuchung an nordamerikanischen Raubwürgern (Unterart *invictus*) konnte gezeigt werden, dass sich Singvögel beim Abspielen des Raubwürger-Gesangs der Schallquelle (Kassettenrekorder) annähern. Es wurde vermutet, dass diese Anlockung vom Raubwürger zur Kleinvogeljagd genutzt wird. Diese Hypothese wurde an europäischen Raubwürgern (Nominatform) in österreichischen und finnischen Überwinterungsgebieten überprüft. Es konnte kein Zusammenhang zwischen dem Singen überwinternder Raubwürger und der Vogeljagd gezeigt werden. In keinem Fall

wurde ein Vogel direkt aus dem Singen oder innerhalb einer Minute danach gefangen (n = 153). Nur sechs Angriffe wurden überhaupt unmittelbar nach dem Singen festgestellt, doch war die Häufigkeit von Vogeljagden dieser Raubwürger-Individuen in Perioden ohne Gesang gleich hoch.

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