

## Recording of Hoopoes *Upupa epops* by means of audio playback in the conditions of Latvia: a preliminary evaluation

Viesturs Ķerus\*

Latvian Ornithological Society, P.O. Box 1010, Rīga LV-1050, Latvia

\*Corresponding author, E-mail: viesturs@lob.lv

### Abstract

Playback is often used to improve recording of birds and therefore to gain more precise data on their numbers and distribution. The aim of this study was to evaluate the potential suitability of this method for survey of Hoopoes *Upupa epops* in Latvia. Playback was carried out in mornings between the end of April and beginning of July in a total of 36 routes, of which 33 routes (137 points) were used to analyse changes in Hoopoe activity. Hoopoes responded to playback at 11 (8 %) of the points. The results suggested that the most appropriate time for playback surveys on Hoopoes was in mornings in May. It is possible that the response behaviour of Hoopoes depends also on local breeding densities. More studies concerning their territorial behaviour are needed to fully evaluate the efficiency of the playback method for studying population size and distribution of the Hoopoe.

**Key words:** Hoopoe, playback, *Upupa epops*, territory.

### Introduction

It is generally well known that birds respond to imitation of their songs or calls. In the simplest case playback is used to improve the recording rate of birds (e.g. Yahner, Ross 1995; Rimmer et al. 1996). In Latvia, this method is most widely used to record Woodpeckers *Piciformes* (Bergmanis 1993) and Owls *Strigiformes* (Avotiņš 1990). Playback is often used also to study the behaviour of birds – the song itself (e.g. Martín-Vivaldi et al. 1999a; Sorjonen, Merilä 2000) and also other aspects of communication and behaviour (e.g. Prescott 1987; Krams 2001; Martin, Martin 2001).

Smith (1996) suggests that the birds that are pressed for time and have to form new social arrangements are more responsive to playback. He also points out that first of all this statement concerns migrants. This description matches also the Hoopoe *Upupa epops*. The research by Martín-Vivaldi et al. (1999a; 2000; 2004) carried out in Spain shows that Hoopoes respond to playback. I used playback mainly to test if the playback method could be used to improve data on the population size and distribution of Hoopoes in Latvia. The main objective of this paper is to present the first evaluation of this method.

Hoopoe *Upupa epops* belongs to the order *Coraciiformes* and has a very simple song consisting of repeated phrases with two to five (usually three) notes in each phrase (Cramp 1994). Song is produced only by males (Martín-Vivaldi et al. 1999b). In Latvia, Hoopoes start singing almost immediately after arriving from wintering grounds in the end of April (Latvian Ornithological Society, unpublished data). The singing activity reaches its

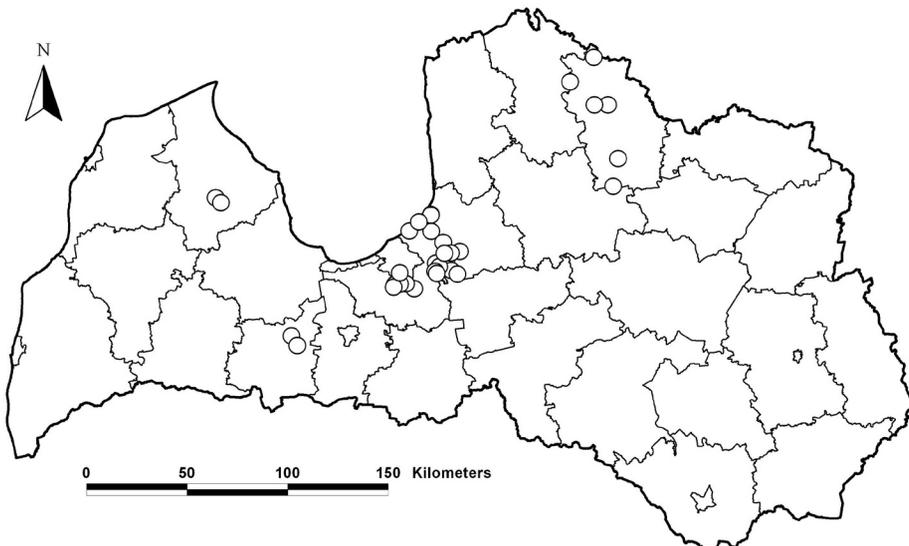
maximum in the prelaying period and decreases after the onset of laying (Martín-Vivaldi et al. 1999a).

## Materials and methods

The recording used in the playback survey was taken from the CD-set “Tous les Oiseaux d’Europe” (Roché 1996). All but the first 16 seconds of the Hoopoe *Upupa epops* track was deleted using Cool Edit Pro 2.0 software. The final sound track contained five distinct phrases of song, each consisting of three notes, and two alarm calls – after the first and the fourth phrase. One side of 60-minute audio tapes was recorded with repetitions of this track.

Playback study was carried out in 2003 and 2004. Seven observers covered a total of 36 playback routes (including a number of separate points). Routes that were covered more than once were counted as different routes. The number of playback points was recorded for only 33 of the routes. These 33 routes contained 137 playback points. Most of these points (95) were located in the district of Riga (Fig. 1) where the breeding density of Hoopoes was thought to be the highest (Transehe, Sinäts 1936, Priednieks et al. 1989; Lipsbergs 2000). Six playback points were in the district of Valka, seven in the district of Talsi and 29 in the district of Dobele. There had been no records of Hoopoes in the district of Dobele for at least the last five years. Playback was carried out mostly in areas of small gardens, which probably are a highly important breeding habitat for Hoopoes (Latvian Ornithological Society, unpublished data).

Playback was carried out between the end of April and the beginning of July (Fig. 2). Most of the playback points were surveyed in May, which is the month of the highest Hoopoe activity level (Latvian Ornithological Society, unpublished data). During the day, playback was carried out from 5:21 until 14:06 (local time). In one exceptional case



**Fig. 1.** Distribution of routes in the territory of Latvia in which Hoopoe *Upupa epops* playback survey was carried out. The circles on the map represent the central point of each route.

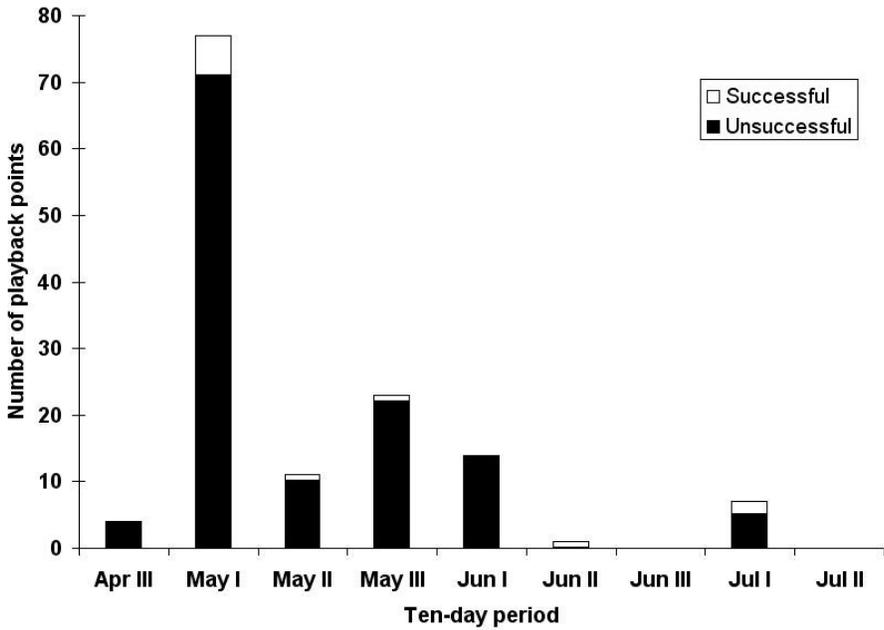


Fig. 2. The number of points in which playback on Hoopoes *Upupa epops* was carried out in ten-day periods. The points in which response of Hoopoe was achieved are considered successful (see details in the text).

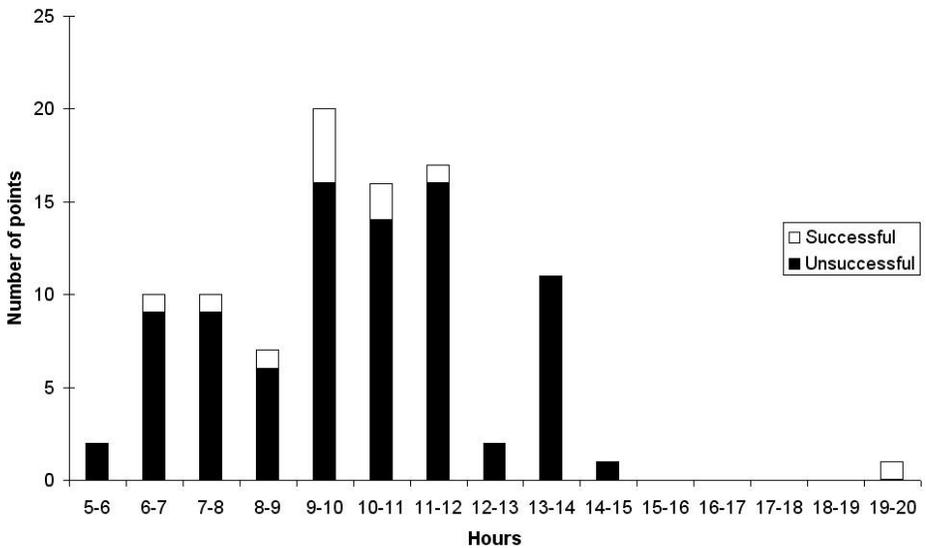


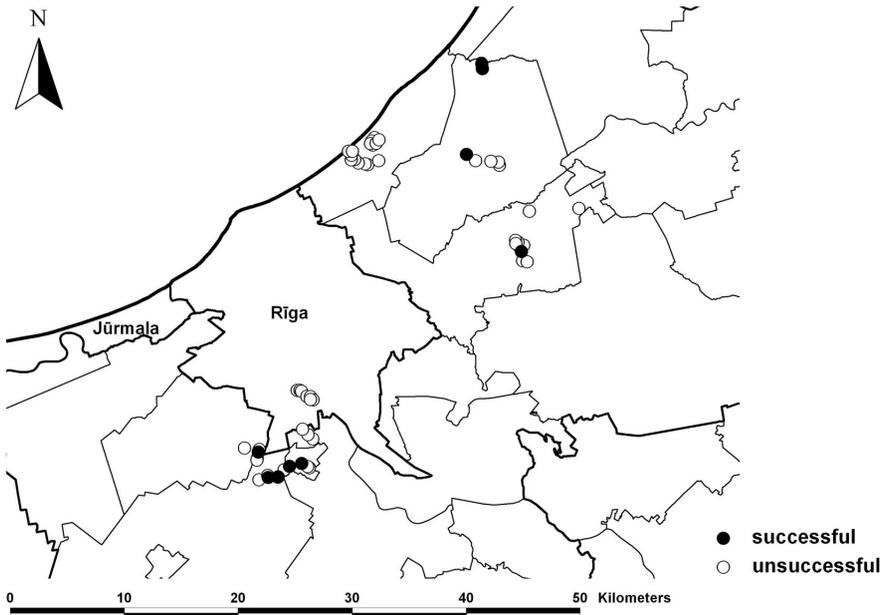
Fig. 3. The number of points in which playback on Hoopoes *Upupa epops* was carried out in terms of time of the day (local summer time). The points in which response of Hoopoe was achieved are considered successful (see details in the text).

playback was carried out also at 20:00 (Fig. 3).

Portable tape recorders were used for playback, with loudness at full volume. At all points a series of 20 distinct phrases was played back (ca. 1 min) followed by listening for a response for about a minute. If there was none, the tape was played for the second and the third time following the same procedure. On average, the time spent in each playback point was about six to seven minutes. As the survey was carried out mainly in areas populated by humans, it was not always possible to follow the described scheme of playback.

Birds from different pairs responding to playback at the same point were counted as separate cases. If the same pair (birds within the same territory) was observed more than once, these were also considered as separate cases of successful playback. Birds were considered responding to the playback if they approached the observer, produced alarm calls or started singing (or any combination of these). One case, when Hoopoe stopped singing after the playback, was not considered successful.

In most cases, irrespective of response, weather conditions (air temperature, cloud cover, precipitation and the strength of wind), precise time of playback and the number of playback series were recorded. In most cases, playback points were mapped, but in the beginning of the study only the successful playback points were mapped. If Hoopoe responded to playback, the series of playback after which it happened, precise time of response and distance to the bird from observer were noted. The exact location of Hoopoe after playback was mapped, mostly using GPS receiver. All data were filled in specially designed forms.



**Fig. 4.** The points in which playback on Hoopoes *Upupa epops* was carried out in the district of Riga. The points in which response of Hoopoe was achieved are considered successful (see details in the text). The thick line marks the borders of Riga, Jūrmala and the district of Riga. The borders of parishes are marked with the thin line.

## Results

Hoopoe responded to playback at 11 points (8 % of the total). Two of these points almost precisely overlap with other two points, but they were counted as separate points as they were surveyed at different times. All successful points lie within the district of Riga (Fig. 4): three of them in military training grounds near Ādaži, one in the nature reserve 'Garkalne forest', and the remainder ( $n = 7$ ) in the vicinity of Baloži, town south of Riga. Altogether, 22 cases of playback were successful.

Hoopoe males were singing before playback in only two of the successful cases. In one case, which was not considered successful, a Hoopoe male ceased singing after the playback. In all but one case the birds were not seen before playback.

In 59 % ( $n = 13$ ) of the successful cases Hoopoes responded to playback after the first playback series, in 36 % of the cases ( $n = 8$ ) after the second, and in one case (5 %) – after the third series. In all cases, when birds from different pairs were attracted to the same playback point, it is not known if the response was triggered by the behaviour of the first bird or by the playback.

Hoopoes approached the observer in 82 % of the successful cases. The mean approaching distance was 31.3 m (0 - 77 m; SD = 24.88,  $n = 18$ ).

Male Hoopoes responded to playback in 11 cases (50 % of the successful cases), while in three cases (14 %) pairs were apparently responding. In eight cases (36 %) the sex of bird was unknown as no song was heard, and birds of both sexes are very similar in appearance (Cramp 1994).

The percentage of the successful playback points was used to measure changes in Hoopoes' response activity to playback. With unreliable data excluded (see "Discussion"), the results show that the Hoopoe activity reaches its maximum seasonally in May (Fig.

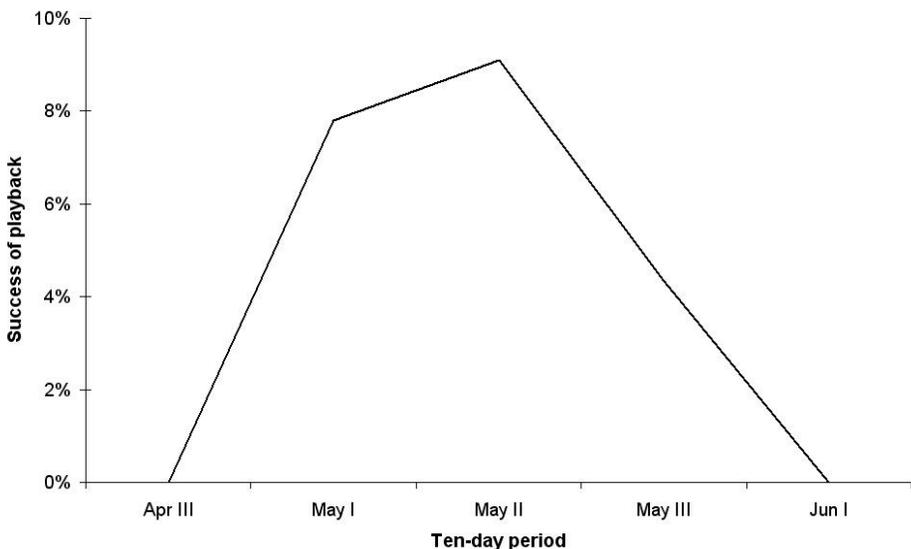
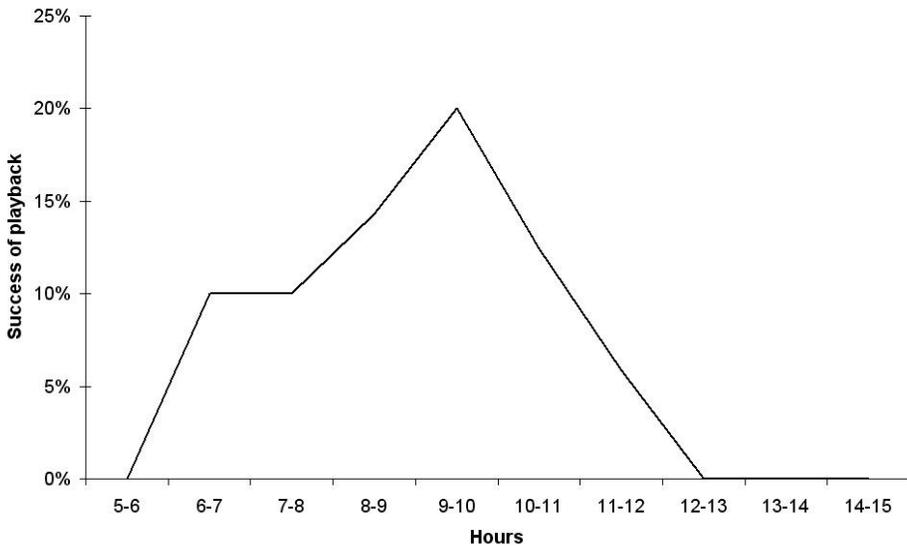


Fig. 5. Percentage of successful playback points (response achieved; see details in the text) from the total as the indicator of seasonal changes in the activity level of Hoopoes *Upupa epops*.



**Fig. 6.** Percentage of successful playback points (response achieved; see details in the text) from the total as the indicator of diurnal changes in the activity level of Hoopoes *Upupa epops*. Hours are presented according to local summer time.

5). In most cases, Hoopoes were responding between 6:00 and 12:00 (local time). An exceptional case of playback at 20:00 was also successful, but it was not taken into account when describing the diurnal changes of Hoopoe response activity (Fig. 6).

The distance between the bird and observer before playback, estimated approximately, is known only in three cases. Although knowing this distance might be useful in judging the bird's ability to hear the recording, the acquired data are not reliable, not only because of the rough estimate of the distance but also since the Hoopoe's song sounds farther than it really is. Therefore these estimates of distance might be overrated. In one particular case the distance (140 m) in which Hoopoe obviously responded to playback was noted precisely.

## Discussion

The current study confirms that Hoopoes in Latvia can be recorded using audio playback, which can increase the chances of recording them, compared to 'passive' surveys, as in most of the cases the birds would have been unnoticed unless playback was performed. However, there are certain limitations of this study regarding assessing the efficiency of this method: sample size, representativity of the time of season and the time of day, as well as the insufficient knowledge about the species territorial and social behaviour.

Some knowledge has been gained on the most appropriate time for playback surveys of Hoopoes in the conditions of Latvia, both in terms of season and time of day. However, due to the rather small sample size, some exceptional records may still distort the overall result. For example, the results of this study show high levels of Hoopoe activity in mid-June and July. Both of these peaks are obviously caused by the small amount of data

(only one playback point in mid-June and seven points in July). A rise of activity in July might be due to an increase in singing activity of Hoopoe males after the end of breeding attempts (Martín-Vivaldi et al. 1999a). However, this maximum should not exceed the activity before pair formation, in the end of April and beginning of May. If both of these exaggerated peaks of activity are omitted, the most appropriate time to carry out playback surveys on Hoopoes in Latvia appears to be in May (Fig. 5).

The results seem to better illustrate the diurnal changes in the response activity of Hoopoe. Apart from one successful case of playback at 20:00, the activity of Hoopoes appears to be highest in the morning hours, reaching its maximum between 9:00 and 10:00 (Fig. 6). Despite the small sample size, this maximum closely fits that recorded in Spain: 8:00 to 9:00 (Martín-Vivaldi et al. 1999a). However, there were no attempts of playback made after 14:06 in this study.

In further playback studies on Hoopoe in Latvia, at least three playback series, one minute each (ca. 7 min of discontinuous playback), are necessary at each point to maximize the possibility of recording response. Shorter playback times may lead to underestimated numbers of birds.

In the future the recording used for playback should be changed by excluding the alarm calls and indistinct song phrases. Although alarm calls should not greatly influence the playback results, as these calls are commonly a part of territorial disputes (Çerus, unpublished data), the comparison with other studies might be easier if only song is used.

In order to fully assess how successful the playback method is for Hoopoe, and how to improve it, the response behaviour of this species to playback need to be understood.

Playback was successful in territories (near Ādaži and Baloži; Fig. 4) that are known to support relatively high densities of Hoopoes (Latvian Ornithological Society, unpublished data). Nevertheless, there were several unsuccessful playback points in locations where Hoopoes had been observed either before or after the survey (Latvian Ornithological Society, unpublished data). There might be several reasons for this and none of them can be evaluated directly from this study. According to Smith (1996), birds living in an unstable social situation (forced to form new relationships with mates and neighbours in a short time) are likely to be more responsive to playback. This may imply that breeding density is an important factor contributing to the response level of birds: if the population is not saturated, the intensity of territorial relationships may be less and there may be no need to engage in territorial disputes. Only one of the successful playback points (in the nature reserve 'Garkalne forest') might not be attributed to the effect of high breeding density, but in this case playback was carried out at a close range (33 m) to an occupied nest.

Another problem to understanding the potential use of the playback method for studying habitat requirements, population size and distribution of Hoopoes in Latvia is posed by a question: is the Hoopoe response of to playback actually associated with its territory? Martín-Vivaldi et al. (2000) suggest the contrary. They refer to their own findings (Martín-Vivaldi et al. 1999a) and a summary by Cramp (1985): "Size and nature of territories in west Palearctic uncertain; only defence of nest-site and immediate vicinity perhaps involved." This issue requires more study. Breeding densities are known to be significantly higher in the Iberian Peninsula than in the northern periphery of Hoopoe breeding range in which Latvia lies (Hagemeijer, Blair 1997). Differences in the amount of the available resources and breeding densities lead to differences in territory size (del Hoyo

et al. 2001), which means that the level of territory defence behaviour might also differ between the countries. Before drawing any conclusions about the territories of Hoopoes in Latvia, studies of territoriality by analysing successful playback cases in connection with known nest-sites should be carried out.

## Acknowledgements

I am grateful to Edmunds Račinskis for his consultations on this study and improvement of the paper, Indriķis Krams and Manuel Martín-Vivaldi for the help in obtaining publications, and all those who took part in playback survey: Edijs Haberkorns, Laura Jukāme, Mareks Kilups, Andris Klepers, Edmunds Račinskis and Mārtiņš Vimba.

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## **Pupuķu *Upupa epops* konstatēšana ar provocēšanas metodi Latvijas apstākļos: pirmais novērtējums**

### **Viesturs Ķerus\***

Latvijas Ornitoloģijas biedrība, a.k. 1010, Rīga, LV-1050, Latvija

\*Korespondējošais autors, E-pasts: viesturs@lob.lv

### **Kopsavilkums**

Provocēšanas metodi izmanto, lai palielinātu putnu konstatēšanas iespējas un iegūtu iespējami precīzāku informāciju populācijas lieluma, izplatības u.c. novērtēšanai. Šī pētījuma mērķis bija noskaidrot, cik sekmīga un lietderīga ir provocēšanas metode pupuķu *Upupa epops* konstatēšanai Latvijas apstākļos. Provocēšanai izmantoja dabā veiktu pupuķu tēviņa dziesmas ierakstu. Veikti 36 provocēšanas maršruti. Lai novērtētu pārmaiņas pupuķu aktivitātes līmenī, izmantoti 33 maršruti (137 punkti). No tiem, 11 punkti (8 %) bija sekmīgi – pupuķis reaģēja uz ierakstu. Provocēšanu veica dienas pirmajā pusē, no aprīļa beigām līdz jūnija sākumam. Pētījums pierāda, ka Latvijā provocēšanas metodi var izmantot pupuķu konstatēšanai. Iegūtie rezultāti apliecina, ka optimālais laiks pupuķu provocēšanai ir rīta stundas maijā, kad pupuķu aktivitāte ir vislielākā. Iespējams, ka provocēšanas sekmes ir atkarīgas arī no pupuķu blīvuma konkrētajā vietā, jo provocēšana bija sekmīga tikai tajās vietās, kur pupuķi sastopami lielākā blīvumā nekā citur. Lai spriestu par provocēšanas rezultātu iespējamo izmantošanu pupuķu skaita un izplatības novērtēšanai, nepieciešami papildus pētījumi par pupuķu teritoriālo uzvedību.