

Effectiveness of censusing woodland birds of prey by playback

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Abstract — The use of tape-recorded calls, to locate woodland birds of prey, and its results are illustrated. This method has been tested on: Buzzard, *Buteo buteo*, 20 sites, Sparrowhawk, *Accipiter nisus*, 10 sites, Goshawk, *Accipiter gentilis*, 9 sites, Honey buzzard, *Pernis apivorus*, 4 sites, Black kite, *Milvus migrans*, 3 sites, Red kite, *Milvus milvus*, 2 sites, Short-toed eagle, *Circaetus gallicus*, 2 sites and Hobby, *Falco subbuteo*, 2 sites. The responsiveness of raptors to the playback is related to the different stages of the breeding period (pre-laying, incubation, nestling). The best period was the pre-laying period, and then the nestling period. All species showed a very low response to the playback during incubation and immediately following take-off. For Goshawk and Buzzard the most favourable period continued during the autumn, especially in the late autumn, when there is an intensive territorial activity, after the dispersal of the young which presumably marks the assertion of winter territories. This method represents a valuable tool for conducting specific research and surveys. It also permits the location of species which are difficult to identify during superficial or non-specific surveys (e.g. the Goshawk).

Introduction

Eliciting responses from Owls by playback of tape-recorded calls is an effective and widely used method for their detection (Barbieri et al. 1976, Fuller and Mosher 1981, Johnson et al. 1981, Smith 1987). The same censusing technique has also been effective for some species of hawks and falcons (Fuller and Mosher 1987, Hennésy 1979, Kimmel and Yahner 1990a, b, Mosher et al. 1990, Rogers and Dauber 1977, Rosenfield et al. 1985). The following report illustrate the method and the results of using playback as an aid in locating woodland birds of prey, which can be particularly difficult to locate because of their secretive behaviour near nests.

Methods

The check of the playback method was carried out from 1988 to 1990 in the Abruzzo Apennines, using the following species and numbers of nesting sites: Buzzard, *Buteo buteo*, 20 sites, Sparrowhawk, *Accipiter nisus*, 10 sites, Goshawk, *Accipiter gentilis*, 9 sites, Honey buzzard, *Pernis apivorus*, 4 sites, Black kite, *Milvus migrans*, 3 sites, Red kite, *Milvus milvus*, 2 sites, Short-toed eagle, *Circaetus gallicus*, 2 sites and Hobby, *Falco subbuteo*, 2 sites. The experiments were carried out during the period of the presence in the

area of each species, with a minimum frequency of 2 playbacks a months for each site: in all, 153 stimulations were made, with a total number of stimulations for each site varying from 9 to 35 (Table 1).

Very windy or exceedingly rainy days were skipped. At each broadcasting and listening stop, which was located no further than 1 kilometer in line of flight from a nesting site, 5 calls were broadcasted with the same volume; each call lasted just 1 minute. The period of listening and observing lasted 1 minute after each of the first four calls, and five minutes after the fifth one.

An index of Detectability was developed to check the effectiveness of this method for each species and to determine the periods in which they are more receptive to this of simulation; the index is based on:

A - The specie's responsiveness to stimulations, expressed in a 5 to 1 point scale: 5 points are given if the bird responds to the first call, 4 points for the bird response to the second call, 3 points for the bird response to the third call, 2 points for the bird response to the fourth call and 1 point for the fifth. In the case of no constant value during a given month, the average of the obtained values was used.

B - The kind of behaviour reaction to the call: 1

	Nest sites (N)	Total playbacks in each site	Month playbacks (mean)	Range (N)
<i>Buteo buteo</i>	20	35	2,92	2-5
<i>Accipiter nisus</i>	10	30	2,5	2-6
<i>Accipiter gentilis</i>	9	29	2,42	2-3
<i>Pernis apivorus</i>	4	9	2,25	2-3
<i>Milvus migrans</i>	3	11	2,2	2-3
<i>Milvus milvus</i>	2	16	2	2-2
<i>Circaetus gallicus</i>	2	14	2,33	2-3
<i>Falco subbuteo</i>	2	9	2,25	2-3

Table 1 - Number of playbacks carried out during the research.

point for the bird emitting sounds, 1 point for the bird taking flight and 2 points for the bird that does both; in the case of no constant value during a given month, the average of the obtained values was used.

C - The product of the number of positive stimulations (N^P) divided by the number of monthly stimulation (N^m) $\times 10$; (N^P/N^m) $\times 10$. N^P/N^m is multiplied by 10 so that result will turn out to be greater than 1, therefore obtaining results similar to that of A and B.

The index of Detectability is defined as follows: $I.D. = A + B + C$.

The device used for playback was a portable tape recorder, a 30 watt amplifier (RCF - AM 540), and a directional loudspeaker (RCF). The vocalizations used for the call are those provided by the F.I.R. (Fond d'Intervention pour les Rapaces).

Results

Data obtained from the few sites of Honey buzzard, Red Kite, Black kite and Hobby are included in the results because they are considered helpful in order to describe the woodland birds of prey reaction to the playback; these data can also be used for more precise research because the playback has never been used before with these species.

The graphs in Figures 1 and 2 show the months of the greatest effectiveness of the playback method for each species, highlighted with various grids according to the different stages of the breeding period (pre-laying, incubation, nestling) in the Central Apennines, where the research took place.

The seasonal differences in playback effectiveness

turned out to be highly significant for Goshawk ($\chi^2 = 16,86$; d.f. = 3; $P < 0,001$), Sparrowhawk ($\chi^2 = 44,77$; d.f. = 1; $P < 0,001$), Buzzard ($\chi^2 = 21,60$; d.f. = 4; $P < 0,001$), and Honey buzzard ($\chi^2 = 12,46$; d.f. = 1; $P < 0,001$), and significant for Hobby ($\chi^2 = 5,67$; d.f. = 1; $P < 0,02$), Short-toed eagle ($\chi^2 = 5,54$; d.f. = 1; $P < 0,02$), Red kite ($\chi^2 = 10,61$; d.f. = 2; $P < 0,01$), and Black kite ($\chi^2 = 9,29$; d.f. = 1; $P < 0,01$). For all the species, the period of the greatest detectability was that of the display flights and the assertion of breeding territory (the pre-laying period), and then during the nestling to fledging period (Figure 3); during incubation, all species showed a very low response to the playback, as they did in the period immediately following take-off (Figure 3). A favourable period to detect Goshawk and Buzzard is also the autumn (Figure 4). The contact with stimulated individuals took the following forms:

- a bird at rest answered near his nest;
- a breeding pair answered near their nest;
- a bird moved in the wood close to the nest (typical for Goshawk and Sparrowhawk);
- a bird answered, then came out of the wood, and continued to answer to the call while flying;
- a bird answered, then came out of the wood;
- a bird came into the open and flew over the nesting area;
- a bird came into the open and executed display flights, sometimes with answering calls;
- a breeding pair came into the open.

The response and/or appearance in flight of the individuals of different species always occurred just close to the nest.

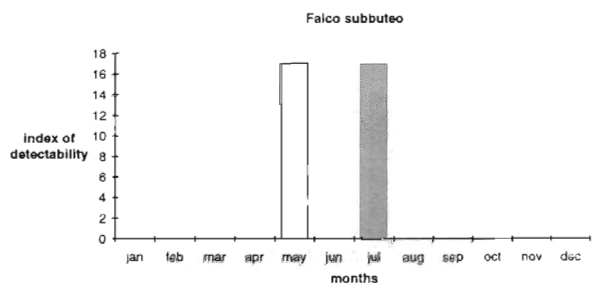
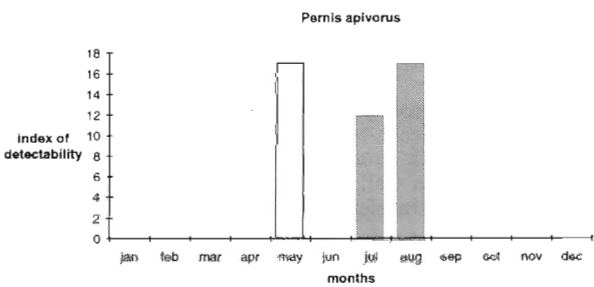
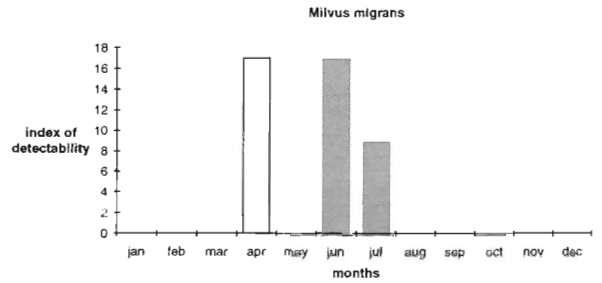
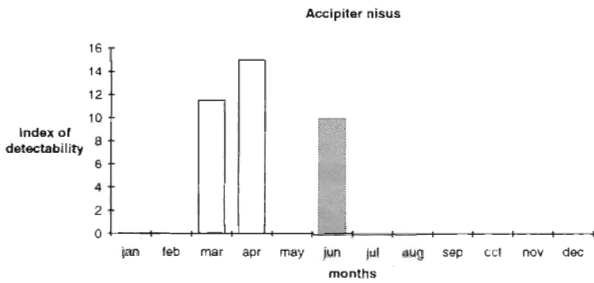
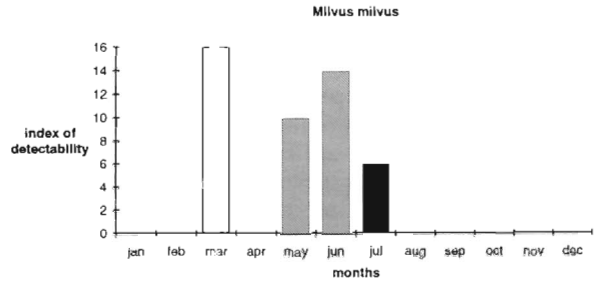
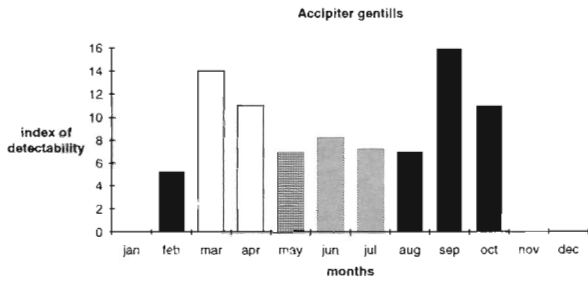
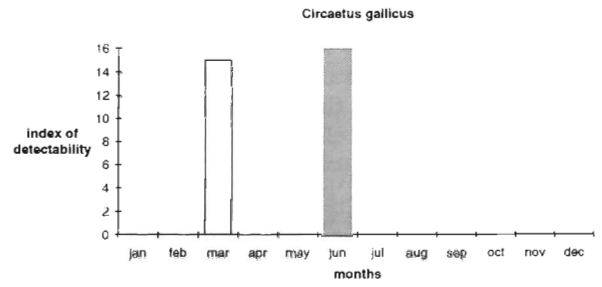
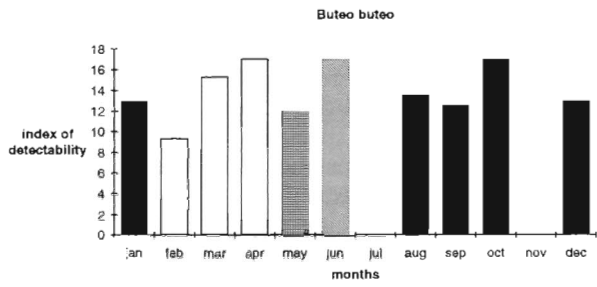


Figure 1 - Specific and periodic effectiveness of the playback method. (white = pre-laying period; squared = incubation period; ruled = resting period; black = non-breeding season).

Figure 2 - Specific and periodic effectiveness of the playback method. (legend as Figure 1).

The effectiveness of the method was reduced or at least altered (especially with regards to voice contact and aerial activity near the nest) in the playback was made close to the nest (less than 100 meters) and/or if the researcher was standing in a visible point. All of the species answered to calls from non-conspecific woodland birds of prey. The playback method was also tried on Goshawks and Buzzard in an area where the precise location of nesting sites was not known. The use of this method quickened nest discoveries in comparison with scouting in forested areas and direct observation of individuals (in display flights, nest building, carrying their prey back to the nest etc.).

Discussion

The effectiveness of playback to locate breeding woodland birds of prey makes this method a valuable tool for conducting specific research on the biology of these species and for surveys such as Atlases, fauna maps, Environmental Impact Assessments, etc. This method also makes it possible to locate species which are identified with difficulty during superficial or non-specific surveys (e.g. the Goshawk).

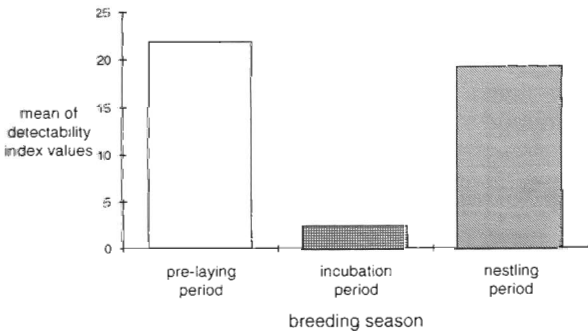


Figure 3 - Detectability of woodland birds of prey during the breeding season.

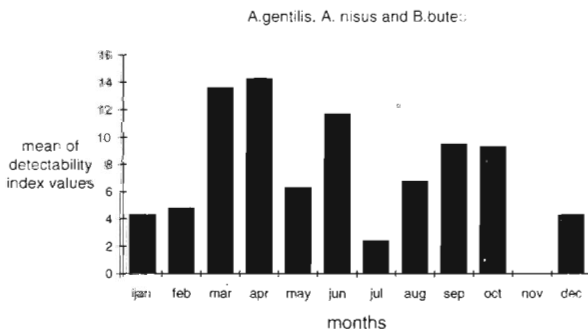


Figure 4 - Monthly cumulated detectability for *A. gentilis*, *A. nisus* and *B. buteo*.

Moreover, the playback can be used for long periods, requires a very simple device and allows quick coverage of large woodland areas.

In order to get continuous coverage of a woodland area, in relation to the spacing of birds of prey which might be present, stops should be spaced at 0,5 to 0,8 kilometer intervals.

It is expedient to execute playback calls in points located out of the woods and in conditions of ample visibility, especially if one wishes to locate the nest and not simply to check the presence of a species in the region. To exactly locate the site is indeed very important for precise identification of the point of the bird's exit from/re-entry into the wood, always taking care not to be seen. If the stimulated animals see humans, they become inhibited to response and their behaviour is altered: all these problems make contact with the species more difficult, and, consequently, locating of the nest is more difficult. It is better not to use this method during the incubation period, which is a delicate time of the reproductive season, in order to avoid causing stress to the birds; besides, the results obtained show that this method is extremely improductive in this period (Fig. 3 and 4). The pre-laying and the nestling periods, as verified for some other birds of prey by Kimmel and Yahner (1990 a, b) and Rosenfield et al. (1985, 1988), are the best for using playback because they coincide with the periods of the most intensive territorial activity. As concerns the resident species, another favourable time for playback is late autumn, where there is intensive territorial activity, after the dispersal of the young, which presumably marks the assertion of winter territories (Craighead and Craighead 1969, Newton 1979, Tubbs 1974). Each transect or stop point must be tested for a minimum of 2 times after defining the presence/absence of one or more species. Sometimes, the periodic use of such a method near a nest site can give some further information concerning the presence of a single bird, a pair and their reproductive success (above all for Buzzard, Honey Buzzard, Red kite and Black kite).

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Riassunto — *Efficacia del metodo del playback nel censimento degli Accipitriformes di ambienti forestali.*

- Vengono riportati i risultati dell'applicazione del metodo del playback alle popolazioni di Accipitriformes forestali dell'Appennino centrale.

- Per la verifica del metodo sono stati testati 20 siti di nidificazione di Poiana, *Buteo buteo*, 10 di Sparviero, *Accipiter nisus*, 9 di Astore, *Accipiter gentilis*, 4 di Pecchiaiolo, *Pernis apivorus*, 3 di Nibbio bruno, *Milvus migrans*, 2 di Nibbio reale, *Milvus milvus*, 2 di Biancone, *Circaetus gallicus*, e 2 di Lodolaio, *Falco subbuteo*.
- In ogni punto di emissione/ascolto venivano emessi 5 richiami registrati della durata di 1 minuto ciascuno; il periodo di osservazione/ascolto al termine di ogni periodo di stimolazione era di 1 minuto per i primi 4 e di 5 minuti per l'ultimo di questi.
- Per valutare l'efficacia del metodo è stato utilizzato un indice di Efficienza basato su: A) numero del richiamo a cui la specie ha risposto (secondo una scala da 5 ad 1 punti in relazione ad una risposta ricevuta dal primo all'ultimo richiamo emesso); B) tipo di reazione alla stimolazione (risposta = 1 punto, comparsa in volo = 1 punto, risposte e comparsa in volo combinati = 2 punti); C) rapporto tra stimolazioni positive (N^P) e stimolazioni mensili (N^M) moltiplicato 10. L'indice così definito risulta pari a: $A + B + C$.
- I grafici in Figura 1 e 2 mostrano per ogni specie i mesi in cui il metodo risulta più efficace, con particolare riferimento alle varie fasi del periodo riproduttivo.
- Per tutte le specie i periodi di maggiore efficacia del metodo risultano essere quello delle parate nuziali e della definizione dei territori di nidificazione, precedente la deposizione, e quello dei giovani al nido (Figura 3); per le specie residenti un altro periodo favorevole è quello autunnale, in corrispondenza del periodo di demarcazione dei territori invernali (Figura 4). L'efficacia del metodo risulta molto bassa per tutto il periodo della cova (Figura 3).
- Dal momento che la risposta e/o la comparsa in volo dell'individuo stimolato avviene nelle immediate vicinanze del nido, questo metodo permette una facile localizzazione di questi ultimi.
- Il metodo, utilizzato per la localizzazione di Astori e Poiane in un'area in cui non era conosciuta l'ubicazione dei siti, ha aumentato l'efficacia media nel ritrovamento dei siti rispetto alla localizzazione tramite ricerca diretta del bosco ed osservazione degli individui.
- Le caratteristiche di applicabilità e funzionalità del metodo lo rendono uno strumento di valido aiuto in Progetti Atlante, Carte faunistiche, Valutazioni di Impatto Ambientale ed ogni altro tipo di indagine non specifica che richieda tempi di esecuzione talora inadeguati alla verifica della presenza di alcune specie forestali come l'Astore.
- Per ottenere una copertura sufficiente delle aree forestali da indagare, i punti di emissione/ascolto devono essere spazati di 0,5-0,8 km in linea d'aria e devono essere indagati per un minimo di 2 volte prima di poter definire la presenza/assenza di una o più specie.

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