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Authors: Zuberogoitia, Iñigo, MartÍnez, José Enrique, MartÍnez, José Antonio, Zabala, Jabi, Calvo, José F., et al.

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SHORT COMMUNICATIONS

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THE DHO-GAZA AND MIST NET WITH EURASIAN EAGLE-OWL (*BUBO BUBO*) LURE: EFFECTIVENESS IN CAPTURING THIRTEEN SPECIES OF EUROPEAN RAPTORS

IÑIGO ZUBEROGOITIA[1]
Estudios Medioambientales Icarus s.l. Aptdo, 106, 48940 Leioa, Bizkaia, Spain

JOSÉ ENRIQUE MARTÍNEZ
Departamento de Ecología e Hidrología, Universidad de Murcia, Campus de Espinardo, 30100 Murcia, Spain

JOSÉ ANTONIO MARTÍNEZ
Juan de la Cierva 43, 03560 El Campello, Alicante, Spain

JABI ZABALA
Sebero Ochoa, 45, 5°B, 48480 Arrigorriaga, Bizkaia, Spain

JOSÉ F. CALVO
Departamento de Ecología e Hidrología, Universidad de Murcia, Campus de Espinardo, 30100 Murcia, Spain

AINARA AZKONA
Estudios Medioambientales Icarus s.l. Aptdo, 106, 48940 Leioa, Bizkaia, Spain

ILUMINADA PAGÁN
Departamento de Ecología e Hidrología, Universidad de Murcia, Campus de Espinardo, 30100 Murcia, Spain

KEY WORDS: *Eurasian Buzzard*; Buteo buteo; *Eurasian Kestrel*; Falco tinnunculus; *Eurasian Eagle-Owl*; Bubo bubo; *capture success*; *dho-gaza*; *European raptors*; *mist net.*

Much current raptor research emphasizes understanding breeding biology, habitat selection, food requirements, sex patterns, molt, and body condition of marked individuals. Several excellent research projects lack this type of information on marked individuals (e.g., Krüger and Lindström 2001, Löhmus 2003, Sergio and Newton 2003), which would provide even greater relevance to the results. Unfortunately, the capture of raptors is one of the most expensive and time-consuming activities in research programs, often due to the low efficiency of most trapping techniques (Bub 1995). However, the aggressive relationship that exists between raptors and owls is widely known and has been exploited to trap several species of raptors (e.g., Gard et al. 1989, Bloom et al. 1992, Jacobs 1996, McCloskey and Dewey 1999). Although the use of this technique is widespread, almost all the published studies involve North American species with the use of a Great Horned Owl (*Bubo virginianus*) as the lure (e.g., Bloom et al. 1992, Rosenfield and Bielefeldt 1993, Steenhof et al. 1994, Jacobs 1996, McCloskey and Dewey 1999). In Europe, the most commonly used lure is the Eurasian Eagle-Owl (*Bubo bubo*), a top predator able to kill most raptors, including species such as the Egyptian Vulture (*Neophron percnopterus*) and Bonelli's Eagle (*Hieraaetus fasciatus*; Mikkola 1983, Real and Mañosa 1990, Tella and Mañosa 1993, Serrano 2000).

Over a period of 6 yr, we used several trapping models to capture adult raptors in Spain. Based on these efforts, we concluded that the combination of mist nets, dho-gazas and Eurasian Eagle-Owl was the best method to capture several species. Here we present the results of our trapping efforts on 13 species of European raptors.

METHODS

During the breeding season, attempts were made to capture birds by placing the nets and eagle-owl lure as close as possible to the nests, while at other times the nets were set in known hunting grounds. Trapping was conducted at the nest sites of different raptor species in Bizkaia (northern Spain) and Murcia (southeastern Spain) between April 2000 and August 2006. Trapping was not attempted when nestlings were <3 wk old, and only in favorable weather

[1] Email address: zuberogoitia@icarus.es

conditions (not rainy, windy, or hot). During the nestling period, males frequently forage away from the nest for long periods, while females remain relatively close to the nests and defend them aggressively against potential predators. We determined a maximum waiting period of 3–4 hr if raptors showed no aggressive behavior and a limit of 2 hr when the owl had been detected and caused a response but the target individual had not been captured.

When one bird of a pair was captured, it was held only long enough to band and radio-tag it (depending on the research program) and to record the measurements and molt status. The bird was then released and we waited for up to 30 min in an attempt to trap the other member of the pair. If unsuccessful, we left the area. No mortality or obvious effects on adults or nesting success were noted.

Different dimensions of mist nets were used in Bizkaia, depending on the size of the raptor to be trapped. The nets for medium-sized raptors were 20 m long × 3 m high with a 70 or 90 mm mesh, whereas for small raptors the nets were 12, 10 or 5 m long × 2.5 m high with a 25 or 40 mm mesh. In Murcia, we used a dho-gaza net (net size 3 m high × 3 m long with a 50 mm mesh).

As a lure, we used human-imprinted Eurasian Eagle-Owls from local rehabilitation centers. These owls were docile and easy to handle, and were determined to be unsuitable for release to the wild. The owl lure was placed between 2 m and 400 m from the nests, depending on the topography and the density of the forest canopy. For example, nets were always placed within a few meters of the nesting tree of Northern Goshawks (*Accipiter gentilis*) and Eurasian Sparrowhawks (*Accipiter nisus*), which can fly under closest canopy, while clearings were sought for other forest raptors. When trapping cliff-nesting Peregrine Falcons (*Falco peregrinus*) or Golden Eagles (*Aquila chrysaetos*), net placement was sometimes restricted to locations up to 400 m from the nest due to steep topography. The owl was surrounded by nets to prevent raptors from striking the owl, and an observer hid within a few meters covered by camouflage netting or in bushes.

RESULTS

Overall, we attempted to trap raptors on 190 occasions during the breeding season (close to the nests) and 36 times outside of the breeding season (in known hunting grounds; Table 1), with capture rates of 63% and 39%, respectively, and an overall success rate of 59%. We captured 60 males and 73 females of 10 species.

For the Eurasian Buzzard (*Buteo buteo*), the capture success rate did not vary between the breeding season and the nonbreeding season ($\chi^2_1 = 0.17$, $P = 0.680$), and there were no significant differences in trapping success between sexes (Wilcoxon test for paired samples, $z = -0.16$, $P = 0.873$, $N = 62$).

Some raptors did not attempt to attack the Eurasian Eagle-Owl outside of the breeding season and, apart from the Eurasian Buzzards, we only captured one Eurasian Hobby (*Falco subbuteo*; Table 1). Moreover, during the breeding seasons we noticed the presence nearby of raptors other than the target species, which did not respond to the owl.

Of the 13 species tested, the capture frequency of Eurasian Kestrel (*Falco tinnunculus*) was the highest, both for males and females (Table 1; $\chi^2_8 = 60.69$, $P < 0.001$), followed by Eurasian Sparrowhawks, European Honey-buzzards (*Pernis apivorus*) and Eurasian Buzzards. Female Booted Eagles (*Hieraaetus pennatus*) were trapped significantly more often than males (Wilcoxon test for paired samples, $z = -2.84$, $P = 0.005$, $N = 31$).

Peregrine Falcons and hobbies showed aggressive displays against the Eurasian Eagle-Owl, but typically did not dive down close enough to the owl to be caught. However, three peregrines and four hobbies escaped from the net, so the trapping success could have been higher. None of these birds repeated the attack after escaping. Two female Northern Goshawks also escaped from the net. One was trapped again and the other did not attempt a second attack. Some Eurasian Sparrowhawks escaped from the net once, but immediately attacked again and were trapped. Some Eurasian Buzzards and Booted Eagles also escaped from the net, although they attacked again and most were captured.

DISCUSSION

This method seemed to be more effective than other reported trapping techniques (see Steenhof et al. 1994, Bub 1995) for obtaining rapid results with nesting raptors, although it does require that the nest be located. Species such as Eurasian Buzzard, Northern Goshawk, Eurasian Sparrowhawk and Eurasian Kestrel were easily trapped, within 30 min in most cases. European Honey-buzzards and Booted Eagles were also readily captured with this technique, but often left the nest for several hours at a time, especially the males, resulting in longer periods before capture. Other species, such as Northern Harriers (*Circus cyaneus*) were not adequately tested in this work, although our experience suggests that they might also be relatively easy to trap.

Our results show low capture frequencies for hobbies, which may be partially explained by the density of the forest canopy. Hobbies nest in the tree tops of pine and eucalyptus plantations in our northern study area (Zuberogoitia et al. 2003, Iraeta et al. 2005), where it is difficult to find clearings close to the nests. Although hobbies flew under the canopy, they did not attack the owl when the canopy was thick.

The success frequency for Black Kites (*Milvus migrans*) was also low. Although they regularly attacked the owl, their ability to fly slowly presumably increased their ability to see and avoid the nets. The use of other methods such as ground nets at rubbish dumps may yield better results (R. Alonso, J. De la Puente, and L. Palomares pers. comm.). For Short-toed Snake-Eagle (*Circaetus gallicus*), Egyptian Vulture (*Neophron percnopterus*), and Golden Eagle, we made only a few attempts (Table 1), but the adults did not show any aggressive behavior.

Peregrine Falcons demonstrated highly aggressive behavior toward the Eurasian Eagle-Owls, but with individual

Table 1. Capture frequencies for 13 raptors species using Eurasian Eagle-Owl lure, during the breeding and nonbreeding seasons.

	ATTEMPTS	MALES	%	FEMALES	%
Breeding Season					
Egyptian Vulture (*Neophron percnopterus*)	1	0	0	0	0
Peregrine Falcon (*Falco peregrinus*)	43	6	14.0	6	14.0
Eurasian Kestrel (*Falco tinnunculus*)	14	9	64.3	11	78.6
Eurasian Hobby (*Falco subbuteo*)	15	2	13.3	4	26.7
Eurasian Buzzard (*Buteo buteo*)	47	18	38.3	19	40.4
European Honey-buzzard (*Pernis apivorus*)	7	4	57.1	3	42.9
Black Kite (*Milvus migrans*)	5	1	20	0	0
Booted Eagle (*Hieraaetus pennatus*)	31	4	12.9	9	29.0
Short-toed Eagle (*Circaetus gallicus*)	1	0	0	0	0
Northern Goshawk (*Accipiter gentilis*)	5	1	20	3	60
Eurasian Sparrowhawk (*Accipiter nisus*)	17	7	41.2	11	64.7
Golden Eagle (*Aquila chrysaetos*)	2	0	0	0	0
Northern Harrier (*Circus cyaneus*)	2	0	0	1	50
Nonbreeding Season					
Peregrine Falcon	8	0	0	0	0
Eurasian Hobby	6	1	16.7	0	0
Eurasian Buzzard	17	7	41.18	6	35.29
Black Kite	5	0	0	0	0

variations. Sometimes, as soon as the falcon spotted the owl, it would attack quickly and be captured within a few minutes. At other times, the falcons vocalized noisily, flying around or perching close to the nest, but did not attack the owl. In such cases, trapping was abandoned in order to avoid causing further disturbance.

EL USO DE DHO-GAZA Y REDES CON *BUBO BUBO* COMO SEÑUELO: EFICACIA EN LA CAPTURA DE 13 ESPECIES DE RAPACES EUROPEAS

RESUMEN.—La captura de aves rapaces resulta fundamental para el desarrollo de proyectos de investigación, aunque no siempre resulta una tarea fácil. Durante seis años (entre abril de 2000 y agosto de 2006) realizamos diferentes pruebas para capturar aves rapaces en dos zonas de España, Bizkaia y Murcia. Como señuelo se utilizaron búhos improntados de la especie *Bubo bubo*, procedentes de centros de recuperación, que eran colocados cerca de las redes en las proximidades de nidos activos de aves rapaces. Durante los seis años realizamos 190 intentos durante el periodo reproductivo y 36 intentos durante el periodo no reproductivo. El éxito de captura fue del 58.8%, capturándose 60 machos y 73 hembras de 10 especies. Las rapaces forestales fueron las más fáciles de capturar, principalmente las de la especie *Buteo buteo*. No obstante, *Falco tinnunculus* fue la especie más propensa a ser capturada con este método. Las especies *Falco peregrinus* y *Falco subbuteo* fueron capturadas en escasas ocasiones debido al ocasional comportamiento de impasibilidad hacia el búho.

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