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Use of fish nets as a method to capture small rails

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ABSTRACT. We used a modified fish trap called a "single strip Dutch sleeve" to capture small rails in Spain. During 94 trap-days, we captured 29 individual Water Rails (*Rallus aquaticus*), three Spotted Crakes (*Porzana porzana*), and nine Common Moorhens (*Gallinula chloropus*). Use of bait such as fruits, vegetables, or cat food increased capture rate by 93%, whereas inclement weather (heavy rain or wind) decreased capture rate. We had greater rates of capture and recapture compared to other studies using different methods. Advantages include ease of transport and placement, low injury rates to birds, the possibility of simultaneous captures, and a wide spectrum of target species. As improvements, we propose the use of playback rail vocalizations to increase capture of individuals and species, and the use of rigid, inaccessible receptacles to protect captured rails from predators.

SINOPSIS. **Utilización de nasas de pesca como método de captura de pequeños rálidos (géneros *Rallus*, *Porzana* y *Gallinula*)**

Analizamos los resultados de la utilización de una modificación de la "manga holandesa de una banda" como método para la captura de pequeños rálidos (géneros *Rallus*, *Porzana* y *Gallinula*). A lo largo de 94 días-trampa se realizaron 45 capturas de *Rallus aquaticus* sobre 29 ejemplares, 4 capturas de *Porzana porzana* sobre 3 ejemplares y 9 capturas de *Gallinula chloropus* sobre 9 ejemplares. Un 60.9% de *Rallus aquaticus* fueron capturados en más de una ocasión. La utilización de cebos aumentó significativamente la tasa de captura; por el contrario, en los períodos de clima adverso disminuyó significativamente el número de capturas. Frente a otros métodos utilizados en estudios similares observamos tasas de captura y recaptura superiores a la mayoría de ellos. Otras ventajas encontradas hacen referencia a la facilidad de transporte y colocación, a la baja frecuencia de revisión de las mismas, a la minimización de los daños en las aves, a la posibilidad de efectuar varias capturas simultáneas y al amplio espectro de especies capturables. Como mejoras, proponemos el uso de reclamos en algunas épocas para aumentar el número y selectividad de las capturas y, en zonas con posibilidad de predación, la colocación de receptáculos rígidos inaccesibles a los depredadores.

Key words: Capture techniques, methodology, northern Spain, traps

Rails are poorly studied because of their nocturnal habits, secretive behavior, and inaccessible habitats (del Hoyo et al. 1996). The genera *Rallus* and *Porzana*, the smallest in the family, have the most elusive habits, and thus we know even less about them. Other rails, such as gallinules (*Gallinula* spp. and *Porphyrio* spp.) and coots (*Fulica* spp.), have received more attention (Cramp and Simmons 1980), yet even for these, basic questions about their migratory behavior remain unknown (Flegg and Glue 1973; de Kroon 1978; Cramp and Simmons 1980; Jenkins et al. 1995). Perhaps not surprisingly, rails are one of the least banded groups of birds in Spain (Cantos and Manzaneque 1999).

In this paper, we describe a new method for the capture of rails.

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METHODS

Study area. The study area was Villadangos' Marsh, located in the natural region of El Páramo Leonés, northwestern Spain, at an altitude of 940 m. Villadangos' Marsh is surrounded by agricultural lands, where irrigation is widely used. This area is included in the Inferior-Supramediterranean Belt of the Mediterranean region (Rivas-Martínez 1987), with an annual average rainfall of 550 mm and an annual average temperature of 11°C. The marsh has an 18-ha elongated region divided into a zone with a permanent water level (10 ha) and one with variable water levels (8 ha). We placed rail traps in the 8-ha zone that consisted of flooded meadows. Traditionally used as a cattle holding area, the meadows still remain delimited by live hedges or "sebes." The sebes consisted primarily of black poplars (*Populus nigra*), willows (*Salix atrocinerea*, *S. fragilis*), wild rose

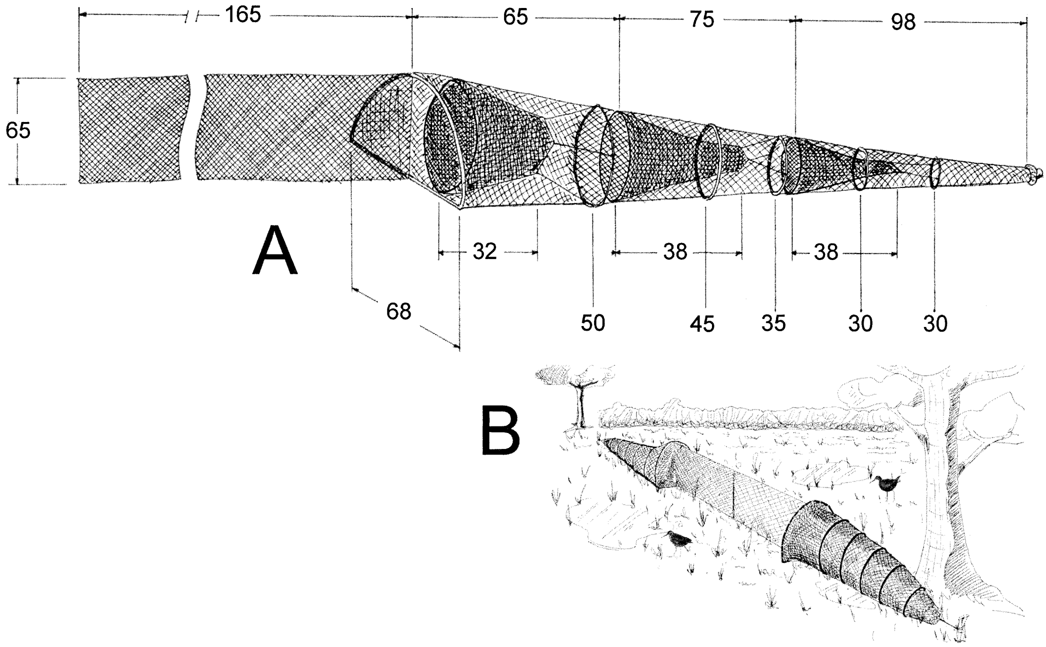

Fig. 1. Schematic diagram showing dimensions (in cm) of the fish net trap for capturing rails (A) and field placement of the trap (B). The trap must be covered with vegetation to conceal it slightly.

(*Rosa* spp.), and other thorny shrubs. Some meadows are occupied by diverse species of aquatic plants (e.g., *Juncus effusus*, *J. heterophyllus*, *Carex* spp., *Eleocharis multicaulis*, *Typha latifolia*) and willows (*Salix* spp.) in localized areas, as partial flooding (upto 40 cm) occurs in winter and spring.

Prior to our study, the presence of the Water Rail (*Rallus aquaticus*) had been documented in the area (Alegre et al. 1991; Purroy 1997; B. Fuertes et al., unpubl. data). The breeding population consisted of four pairs (Alegre et al. 1991). The Spotted Crake (*Porzana porzana*) had only been observed twice in the last five years, whereas the Common Moorhen (*Gallinula chloropus*) is a habitual resident of this marsh (B. Fuertes et al., pers. obs.)

Capture method. Our method of capture was a modification of a net traditionally used for fish eels, called a "single strip Dutch sleeve" (Melcón 1964), a device commonly used by fishermen south and east of the Iberian Peninsula. Such fish nets cause serious problems when they are used to catch red swamp crayfish (*Procambarus clarkii*), because aquatic birds, amphibians, and reptiles can be accidentally caught and drowned (Navarro and Robledano 1995; Green 1996).

We modified the single strip Dutch sleeve by changing the size of the mesh in the different sections. The trap consisted of four nylon nets in the shape of a funnel, and the apparatus was supported by a few hoops of plastic or aluminum (Fig. 1). The total length of the modified net was 2.38 m, and the entrance, in the shape of a semicircle, was 65 cm high and 68 cm wide at its base. To increase its effectiveness, a cloth-guide (65 cm high, 1.65 m wide) was inserted at an angle of 90° to the trap. We placed the fish nets in pairs, face to face, to form a double fish net. This created a total interception length of 8.06 m (Fig. 1). The size of the mesh incrementally decreased from the first body, 18 mm, to the last one, 10 mm.

We placed the traps along the birds known pathways (de Kroon 1979; Bub 1991). No type of rail vocalization playback was used, but different food was placed as bait. The traps were buried in mud (de Kroon 1979), and covered with vegetation to conceal them slightly. To avoid possible injuries or deaths from drowning or cold, the bottom of the device was always placed in a dry site. Two traps were used and were placed in 20 locations for a total of 94 trap-days. Bait (apples, carrots, bread, tomatoes, flour worms [*Tenebrio molitor*], or cat food) was used for 69 trap days. Traps were arranged every day from 3 March to 24 April 2000, and visited at an average frequency of 25 h. Capture success was analyzed according to weather and the use of bait. We considered weather important because there were periods of inclement weather conditions (snowfall, heavy rain, or strong wind) that may have influenced capture success.

RESULTS

We captured a total of 29 Water Rails on 45 different occasions, three Spotted Crakes on four occasions, and nine common Gallinules on nine occasions. In addition, we captured amphibians (two Iberian painted frogs [*Discoglossus galganoi*] and four Iberian water frogs [*Rana perezi*]), other birds (two Bluethroats [*Luscinia svecica cyanecula*] and two Winter Wrens [*Troglodytes troglodytes*]), and mammals (2 European hedgehogs [*Erinaceus europaeus*] and 2 shrews [*Crocidura* sp.]). We observed one case of predation inside the traps and four birds with minor skin abrasions at the base of the bill.

The rate of capture was 0.48 captures/trap-day for the Water Rail, 0.04 captures/trap-day for the Spotted Crake, and 0.08 captures/trap-day for the Common Gallinule. The overall rate of capture was one rail every 37 h. The rates of recapture were 60.9% of birds caught more than once, 30.4% more than twice, 21.7% more than three times, 4.3% more than four times, and 4.3% more than five times. When bait was used, one Water Rail was caught every 42 h, whereas the rate of capture dropped to one Water Rail every 81 h without bait ($\chi^2_1 = 22.50$, $P < 0.001$).

In 18 days of inclement weather, the rate of capture was one Water Rail every 98 h, whereas in 77 d of good weather, one was caught every 29 h ($\chi^2_1 = 58.61$, $P < 0.001$).

DISCUSSION

The use of this capture method resulted in an increased number of captures of Water Rails and Spotted Crakes for Spain. From 1973–1998, an average of 12 Water Rails and 3.8 Spotted Crakes were banded per year for the entire country (Cantos and Manzaneque 1999). Captures in the brief period of this study showed an increase of about 141% for Water Rails. The capture rate for Water Rails (0.48 captures per trap-day) was higher than that obtained with the use of "riddles claptraps" (0.25 captures per trap-day; de Kroon 1979) and similar to the rate (0.47 captures per trap-day) that Jenkins et al. (1995) obtained with Potter traps (Davis 1981).

One of the biggest advantages of our capture method is the low frequency of trap visits (once or twice a day) needed, in contrast to previous techniques. For example, Jenkins et al. (1995), using Potter traps, checked the traps every two hours, whereas Zembal and Massey (1983), using drop-door traps, did so every hour.

One young Water Rail died during our study, probably preyed upon by a stoat (*Mustela erminea*). However, it is unclear whether this was directly attributable to its being caught in our device. Nevertheless, predation is one factor that can affect the capture method used for rails, because they share habitats with mustelids, rodents, crayfish and other aggressive animals (Kearns et al. 1998). The death rate observed in a study on Virginia Rails (*Rallus limicola*) and Soras (*Porzana carolina*) was 1.6% of the captured birds. Predation by mammals, drowning, stress, and traumatism were the main causes (Kearns et al. 1998). The construction of capture receptacles must be made with rigid materials to prevent the access of predators in areas of high predation risk.

Traps that are made of soft, non-abrasive material allow birds to remain in the trap for several hours without injury. In addition, the extension of the final receptacle prevents injuries, as birds can move around in the trap more easily. Zembal and Massey (1983) observed that many captured Clapper Rails (*Rallus longirostris*) showed signs of abrasion at the base of the bill, despite having been checked every hour. The same situation occurred with Virginia Rails and Soras when using cloverleaf traps (Kearns et al. 1998). In both cases the fish nets were constructed with metallic materials, and in some cases the injuries were reduced by covering the metallic mesh with rubber or vinyl (Kearns et al. 1998).

Other advantages of net traps are the ease of transport and placement and (at times) the many aquatic species they can catch. Disadvantages include increased effort in maintenance due to the breaking of the net by rodents and mustelids. In view of our results, we offer the following recommendations to increase the efficiency of the traps and reduce the problems we encountered. Bait seemed to increase the rate of capture, at least for the Water Rail, although other studies (Zembal and Massey 1983; Tenreiro, pers. com.) did not find this to be the case. We could not analyze if the rate of capture depended on the type of bait used, because all were used together. Playback of rail vocalizations is effective in censusing rails (Glahn 1974; Johnson and Dinsmore 1986; Manci and Rusch 1988) and can be useful in improving the capture rate (Kearns et al. 1998). Although we did not use playbacks, we recommend that they be tried with our capture method.

Captures of Water Rails diminished on days with adverse weather. It appears that rails are less active during unfavorable weather conditions. Jenkins et al. (1995) did not obtain any Water Rail captures after periods of rain, and Kearns et al. (1998) described how Virginia Rails looked for refuge in high vegetation during strong wind. Climatic conditions probably influence the mobility of rails and thus will affect any capture method.

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