Short Communication

Patch use and exploratory movements of a resident houbara bustard in northern Saudi Arabia

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(Received 10 January 2001, accepted 12 July 2001)

Introduction

Saudi Arabia supports a single remnant breeding population of houbara bustards (Chlamydotis [undulata] macqueenii), which exists at very low densities (0.032–0.097 km⁻², Seddon & van Heezik, 1996). In 1987 a large reserve, Harrat al-Harrah, was created to protect these birds against over-hunting, and urban and agricultural development. However, annual variations in abundance suggest that movements of houbara might be occurring within the region, i.e. between small populations existing in Syria, Iraq, Jordan and even Oman (Seddon & van Heezik, 1996). We wished to learn more about movements of resident Saudi houbara bustards, but problems with capturing individuals for radio-tagging (Seddon et al., 1999) meant that only one individual was caught and tagged. However, we believe that the information generated from this individual should not be lost, and contributes to our understanding of reserve use, sensitivity to disturbance and potential movements within the region.

Methods

Harrat al-Harrah (12,150 km²) is the southernmost part of a large undulating basalt boulder field extending from northern Saudi Arabia into Jordan and Syria. Annual rainfall is in the range of 50–100 mm (a mean of 58.3 mm for the years 1985–1996; CV = 33%), with almost all rain falling between October and May. Ambient temperatures range between −8°C and 44°C. The vegetation is open xeromorphic shrubland. Vegetative cover of perennial plants and shrubs ranges from 0–4% in gravel plains to 18% in wadis (van Heezik & Seddon, 1999); however, spring annuals may increase ground cover up to 72% in areas that have received rainfall throughout winter and spring.

In July 1994, a sub-adult female houbara bustard was caught in a leg-hold snare, fitted with an AVM battery-powered radio-transmitter and released. We located the bird at a mean interval of 4 days (S.D. = 4.0, n = 78, range = 1–18 days), mainly from a light aircraft, until the transmitter stopped functioning 11 months later, in April 1995. A subsequent sighting confirmed that the bird was still alive. We calculated patch sizes

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using the kernel method, and distances between consecutive locations using RangesV (Kenward & Hodder, 1996).

**Results and discussion**

During 11 months, the houbara used a series of three patches (Fig. 1). Of the 78 moves recorded, 14 were long-distance moves (14.3–59.1 km) between consecutive locations, and the rest were short within-patch moves (mean = 2.05 km, S.D. = 1.6, n = 64). Size of patches, duration and timing of occupation and habitat are given in Table 1. The first patch was occupied while conditions were uniformly dry throughout the reserve and annual plants had not yet started to grow. A single exploratory move was made out of this patch.

In September, following rainfall, the bird established a new patch 13 km north, in habitat supporting abundant green annuals. After remaining in its second patch for over 4 months, the bird made a series of long-distance moves, including one that took it more than 50 km outside the reserve, thus covering a total of 1042 km². Concurrently, the reserve experienced high levels of human disturbance in the form of truffle collectors, who concentrated in well-vegetated areas, including the bird’s patch. Houbara bustards in Abu Dhabi are subject to continual disturbance by humans and stock, which may cause them to move on to new areas after shorter periods of time, resulting in smaller patches and shorter periods of occupancy (Osborne *et al*., 1997). Soon after the truffle collectors left the reserve the houbara returned to its second patch, and remained there until the transmitter battery failed.

This individual appeared to be constantly exploring its environment, and was quick to exploit new patches with better quality vegetation. Houbara distribution appears to

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**Figure 1.** Locations, directions and timing of movements made by a sub-adult female houbara bustard in the Harrat al-Harrah protected area, Saudi Arabia. (●) early locations, (○) locations after 12 Feb.
be dictated primarily by cover, density and phenology of vegetation (Combreau & Smith, 1997; van Heezik & Seddon, 1999). Habitat use may also be influenced by the presence of con-specifics: this individual was sighted with one or more houbara at 18% (n = 14) of locations. A high proportion of locations with con-specifics during its mobile period suggested that it was attracted to locations where other houbara bustards were present.

Houbara sensitivity to human presence has been suggested as a reason for declines throughout the species’ range (Collar, 1980). However, caution is necessary when interpreting the movements of a single bird. Captive-bred juveniles reintroduced into a reserve in central Saudi Arabia also made large moves during January and March in what appeared to be juvenile exploratory behaviour, some never returning and some re-establishing patches (R. Maloney, pers. comm.).

This individual was eventually shot on 26 October 1998 in the Gharafish area of the Tadmor Desert, Syria, south-east of Damascus, over 4 years, 4 months and 400 km away from the date and site of its capture in Harrat al-Harrah. This is the second record of a houbara ringed in Harrat al-Harrah and hunted in Syria (NCWCD, unpubl. data). These two recoveries suggest that the so-called resident population of Harrat al-Harrah may in fact consist of birds that can range widely throughout the region. Protecting this population in Saudi Arabia alone may not be enough to ensure its viability.

We thank HRH Prince Saud Al Faisal and Dr Abdulaziz H. Abuzinada, of the National Commission for Wildlife Conservation and Development, for supporting this work. Much appreciated assistance in the field was given by Hans Hemmingsen and Clark Dechant, and by Ali Hamad Al Murri and his staff of rangers.

**References**

