15. Disease as a Consideration in Translocating and Reintroducing Houbara Bustards

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Abstract: *Translocation and reintroduction programmes of wild animals raise many veterinary problems. In this paper we deal with two major medical aspects of the houbara bustard* Chlamydotis undulata macqueenii *reintroduction programme in Mahazat as-Sayd. The first concerns disease management during reintroduction: main prophylactic measures taken and monitoring at the release site are discussed. The second concerns the risk to other wildlife following reintroduction. Although absolute assurances are difficult to achieve, the aims of veterinary work in reintroduction are to reduce the likelihood of accidentally translocating diseases and parasites to potential wild hosts. Further studies on wild populations of houbara bustards are necessary to help clarify an appropriate "sanitary standard" for the reintroduction process.*

Introduction

Veterinary input into the houbara bustard reintroduction programme includes:

1. disease management during reintroduction, including the development of standardized protocols for pre-release evaluation of captive houbara to determine overall health, and the identification of particular disease states potentially affecting the success of the release programme;
2. the disease risk to wildlife following reintroduction.

Disease management during reintroduction

The need for disease management programmes effective in producing healthy birds is evident at all stages of the reintroduction process, i.e. from the controlled environment of the breeding unit to the release phase, and finally to birds in free-ranging populations. Disease management for reintroduction involves preventative measures such as vaccination and de-worming of birds destined for release, ensuring such individuals are free of exotic pathogens, monitoring and treating birds for infectious diseases or trauma (as a result of their fenced environment and/or the attachment of radio-transmitters) during their acclimatization period at the release site, and autopsy of birds that die during the release process. Finally, surveys of indigenous species at the release site should be carried out to detect signs of infectious diseases (Shima & Gonzales 1991; Woodford & Kock 1991).

Rearing facilities

Houbara are raised in isolation facilities designed to prevent the introduction of exotic pathogens (human or animal), and all birds are clinically healthy when translocated. People entering the breeding and rearing units are required to follow basic hygiene rules: washing of hands, changing clothes (or wearing overalls) and shoes, and entering through a foot-dip

of disinfectant. Staff who are unwell are required to stay away.

Because of their assumed contribution to the epizootiology of some dangerous infectious diseases, the introduction of domesticated birds into the Center is strictly forbidden. However complete isolation of the breeding unit is still difficult to achieve, as Passerines, rodents and some insects, all of which are potential carriers of pathogens, are able to enter the unit through some parts of the perimeter fence.

Prophylactic events

Each translocated sub-adult houbara is vaccinated with a live canary poxvirus vaccinal strain, and an inactivated Newcastle Disease vaccine at one month of age. A booster vaccination is carried out two weeks before transport. The main problem with these vaccinations is determining whether they are actually effective. Recent research has shown that vaccination with an inactivated strain of Newcastle disease virus causes a late seroconversion, and vaccination with a living lentogenic strain (Hitchner B_1) seems to be less risky and more effective (S. Ostrowski, unpubl. data).

Many other viruses have been isolated from houbara (Gumboro virus, herpes virus, Adenovirus CELO, PMV-1 pigeon; Greth *et al.* 1990), but none have been shown to pose a significant threat to the birds. Other vaccination protocols are planned.

Systematic de-worming is performed twice a year on all breeding birds, as houbara are known to suffer from infestations of cestode and nematode worms in their digestive tract (Greth *et al.* 1990). Each sub-adult destined for translocation is de-wormed two days before being moved, a period short enough to avoid reinfestation (especially with nematode eggs), but sufficiently long so that infested faeces are not shed in the pre-release enclosure. A coproscopy is carried out on the day of translocation. No studies have been undertaken on infestation rates of wild houbara, however, it is probably safe to assume that in sedentary conditions (breeding and rearing enclosures) the reinfestation rate is high. Although while in good environmental conditions (food *ad libitum*, reduced stress, reduced disturbance) birds are usually able to tolerate parasitological infestations, when translocated into the semi-wild environment provided by the pre-release enclosure such infestations may become critical (Euzeby 1966).

Monitoring at the release site

During their initial period of acclimatization translocated houbara are monitored daily while their enclosures are cleaned and food is provided. Occasionally it is necessary to transfer released or pre-released birds back to the Center, or into an acclimatization cage for medication. These are subsequently re-released. Birds sustaining broken wings or major diseases are returned to the Center. After treatment and a period of quarantine they join the breeding flock.

Diseases such as poxvirus, Newcastle disease and PMV-1 pigeon disease are endemic within Saudi Arabia (Al-Zein 1986). Domestic pigeons *Columba livia* and house sparrows *Passer domesticus* are sampled within the vicinity of the release area because of their assumed importance in the epizootiology of these diseases (Mbuga & Karstad 1985; Pearson *et al.* 1986). Continued monitoring of released birds includes autopsy of recovered carcasses to determine cause of death, as well as the degree of exposure to infection by indigenous pathogens.

Disease risk to wildlife following houbara bustard reintroduction

Houbara bustards reintroduced into a wild environment following rehabilitation may pose a significant disease risk to free-ranging populations of either the same or different species. When birds are translocated or reintroduced their infectious diseases and parasites often move with them. In some cases translocation sites may have a combination of susceptible hosts, transmission factors and/or life cycle components that allow introduction of a novel pathogen into new habitats, and host populations. Such a disease introduction could have serious biological consequences.

In captive breeding facilities, where the spread of infectious agents is facilitated by the promiscuous breeding system, birds may be exposed to new infectious agents, and then act as carriers when released. In order to minimize this risk a sub-sample of the breeding population is examined regularly to serologically detect a potential outbreak of a sub-clinical disease.

Infectious diseases may also be transmitted to a wild population when captive animals with endemic diseases are translocated for release to sites where the disease is unknown in the resident population (Haebler 1992). Sub-clinical diseases in captive-bred houbara bustards have the potential to devastate portions of the wild population. Disease risk rises in the presence of confounding stress factors, such as pre-existing diseases, poor nutritional status, age (very young or very old), environmental stress and exposure to susceptible species (Haebler 1992). However, very little is known about the medical status of wild houbara.

Occasionally birds have exhibited iatrogenic reactions when poxvirus vaccination was performed at the release site, suggesting a pre-release immuno-deficiency. Stress and environmental disturbance is known to diminish immunological response to pathogens. Therefore, veterinary examination must be as quick as possible to limit exposure to stress and contact with humans.

Conclusions

Studies on wild birds (sampling and autopsies) are needed to evaluate the medical status of wild birds, and to clarify a "sanitary standard" to which the breeding programme can work towards. Disease management must continue to be an integral part of the captive-breeding and reintroduction programmes for houbara bustards.

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