

# Molecular sexing of the Houbara Bustard, *Chlamydotis undulata*, and other arid-land species

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**Abstract:** One possible method to identify the gender of birds is the analysis of their DNA. Female birds are the heterogametic sex (ZW) and the males homogametic (ZZ). The DNA based sexing system used here is based on a gene which is W-chromosome linked in a range of bird species and has a highly conserved DNA sequence (CHD-W). Birds also possess a second Z-linked CHD gene (CHD-Z) which can be used as a positive control to ensure correct operation of the test. This paper demonstrates how we can use both CHD-W and CHD-Z to correctly sex Houbara, Rufous-crested, Kori and White-bellied Bustards as well as the Stone Curlew.

**Kurzfassung:** Eine Möglichkeit der Geschlechtsbestimmung stellt die Analyse der DNA dar. Individuen mit heterogametischen Chromosomen (ZW) stellen Weibchen dar, solche mit homogametischen (ZZ) Männchen. Das auf DNA-Analyse basierende Verfahren zur Geschlechtsbestimmung, das hier vorgestellt wird, basiert auf einem Gen, das bei vielen Vogelarten an das W-Chromosom gebunden ist, und das eine sehr konservative DNA-Sequenz hat (CHD-W). Vögel besitzen außerdem ein zweites Z-gebundenes CHD-Gen (CHD-Z), das als Kontrolle zur richtigen Anwendung des Tests herangezogen werden kann. In dieser Arbeit wird beschrieben, wie sowohl CHD-W, als auch CHD-Z zur korrekten Geschlechtsbestimmung von Kragen-, Rotschopf-, Riesen- und Senegaltrappe sowie beim Triel angewendet werden kann.

**Key Words:** Houbara, Bustards, Stone Curlew, captive breeding, sex identification.

## Introduction

At the National Avian Research Center (NARC), Abu Dhabi, United Arab Emirates (UAE), methods for the captive breeding of several avian species are being developed. This includes the Houbara, *Chlamydotis undulata*, Rufous-crested, *Eupodotis ruficrista*, Kori, *Ardeotis kori*, and White-bellied Bustards, *Eupodotis senegalensis*, as well as the Stone Curlew, *Burhinus oedienemus*. For NARC, the most important of these species is the threatened Houbara Bustard, which is in decline throughout most of its range over Central Asia and the Middle East (JOHNSGARD 1991, COLLAR 1996, GORIUP 1997). The main reasons for this decline are thought to be due to habitat destruction through over-grazing and intensive farming in countries where the birds breed, and over-hunting, human disturbance and over-trapping in countries through which they migrate (JOHNSGARD 1991, COLLAR 1996, GORIUP 1997). NARC aims to release captive-bred Houbara Bustard in order to supplement existing wild populations and also to provide an alternative source of Bustards to the Arabian falconers so as to decrease the pressure on the wild population.

One problem with this task is to perform accurate sex identification on these species. Adult Houbara, Rufous-crested, Kori and White-bellied bustards can be sexed through morphological differences (COLLAR 1996). Generally, the males are usually larger than females and there are subtle differences in the plumage between the two sexes (COLLAR 1996).