

Breeding The Houbara Bustard in the United Arab Emirates

by Bryant Tarr, Abu Dhabi,
United Arab Emirates

It is 4:25 A.M. as I wake to the ancient sounds of Islam. The tonal qualities of the call to prayer echoing from the nearby mosque have not changed for fifteen hundred years. This ritual, which takes place at regular intervals throughout the day, lends a certain ambience and an unmistakable rhythm to life here in Arabia. My neighborhood's Mosque, like most today, features a modern amplification system. As luck would have it, this one has speakers aimed directly at my bedroom window, lending an unmistakable decibel level to life here as well. I used to wake to the calls of cranes as an aviculturist at the International Crane Foundation (ICF) in Baraboo, Wisconsin. I am still an aviculturist, but now at the National Avian Research Center (NARC) in Abu Dhabi, United Arab Emirates. The sweet sound of cranes is just a memory, five degrees below zero is just a memory too, and on days when the mercury tops out here at 120° F., even a fantasy.

I am here largely because the Houbara Bustard *Chlamydotis undulata* is not. At least not in the same numbers that occurred in the past. Houbara Bustards are taxonomic cousins to the cranes (both are Gruiformes) and exist as three distinct subspecies: *C. u. undulata* in North Africa, *C. u. macqueeni* in Asia, and *C. u. fuerventurae* in the Canary Islands. This shy and somewhat bizarre bird of steppes and deserts might go largely unnoticed if it were not of such great significance to the falconers of Arabia. NARC is concentrating on breeding the *macqueeni* subspecies as part of an overall strategy to bolster the wild population of this bird that winters in the Emirates, while continuing to promote its sustainable use as the favored quarry for falconers.

Falconry and Houbara

Falconry (the pursuit of wild quarry with a trained bird of prey) has a long and rich history in Arabia. The hunting partner of choice for falconers here has always been the rugged and beautiful Saker Falcon, and the favored quarry the Houbara Bustard (although desert hares and Stone Curlews are hunted with falcons as well). For tens of centuries a stable and sustainable relationship existed between falconers and the Houbara wintering here. Bringing game to the bag with a falcon is no easy task. For this reason over-hunting by falconry had never been a concern, least of all for the wary Houbara which is well adapted to escaping a falcon's attack.

Since the relatively recent flood of wealth from oil, however, falconers from Arab countries have been able to pursue their passion for falconry with greatly improved efficiency. Suffice it to say that one can catch many more Houbara with the benefit of dozens of falcons, full-time bird trainers, customized all-terrain hunting vehicles, GPS navigational equipment, trackers to find game, telemetry to find lost falcons, satellite telephones to link them all together, and months of free time to spend "hawking", than one can with a couple of falcons and a trusty camel. Add modern firearms to this equation, along with widespread habitat degradation, and it is no surprise that Houbara populations have suffered a decline and that continued over-exploitation of Houbara is now a concern.

The National Avian Research Center

The National Avian Research Center is an organization dedicated to the

ecologically sustainable use of wildlife. Crown Prince and Deputy Ruler of Abu Dhabi, His Highness Sheikh Khalifa bin Zayed Al Nahyan, brought NARC into existence through Royal Decree in September 1989. While NARC's overall goals include gaining a broader ecological understanding of the UAE's wildlife in general, and birds in particular, one of NARC's primary objectives is to increase the number of Houbara wintering within the Emirate of Abu Dhabi. The motivation for this objective is clearly to make more Houbara available in the future for hunting by falconry. But the greater scientific understanding of Houbara population ecology and captive breeding/release techniques that are a prerequisite for success will, in the long run, benefit the species as a whole. There are many facets to the challenge which will incorporate programs such as wild bird studies, habitat improvements, and establishment of protected areas...but the aspect of most interest to *Watchbird* readers is, of course, captive breeding.

Captivity Presents Unique Challenges

Breeding Houbara Bustards in captivity and releasing them to the wild is a fairly straightforward approach to the task at hand, and like most things avicultural, it is easier said than done! NARC inherited about 150 Houbara from captive stocks already held in the UAE. The majority of these birds were wild-caught by falcons and recovered alive. These were kept for later use to train more inexperienced falcons, a common practice in this region. Unfortunately the birds had been kept in substandard conditions for long



NARC aviculturist, Nigel Jarrett, releasing wild-caught adult male Houbara Bustard in Kazakhstan, May, 1995, after being fitted with satellite transmitter by NARC Ecology Department staff for migration study.

periods of time, some were in poor physical condition, and most were terrified of people. There were no records kept for any of these birds. To professional aviculturists the situation was totally unacceptable and its legacy still presents many difficulties. How old are these birds? Where do they come from? Are they related? Before any thoughts of large-scale breeding could begin the birds needed to be individually marked, sexed, examined by veterinarians, moved to better facilities, and assessed as potential breeding stock.

In the wild, Houbara breed on open steppes and utilize a type of lek mating system a bit like an expanded version of our prairie grouse species. Males occupy a displaying area, make a spectacle of themselves (as only males can do) to declare themselves to other males and/or to attract females. In most avian lek systems males gather at a specific location (display grounds) and the female selects a mate, copulates with him, and continues on her way having no further need of the male. With Houbara, displaying males are dispersed over many kilometers and when they see a female in their area they chase her and attempt to copulate (she either accepts the overture or runs/flyes away). Perhaps the female purposely places herself in the territory of desirable males, or perhaps she just walks along looking for food and finds herself in a male's territory; either way, the neces-

sary task is eventually completed and genetic material are passed on to the next generation in a 2-4 egg clutch. Eggs are subsequently incubated, and the resulting chicks reared, by the female alone.

This lek-like mating system presents some interesting difficulties when applied to captive birds. For example, will these birds form pairs if given the opportunity? If not pairs, then what is the correct sex-ratio for a group of captive Houbara? How big should their pens be? How big should the groups in each pen be? Should there be mounds for males to display on? If there is more than one male/female in a pen will one dominate the other? Will one stimulate the other? Should you give females a choice of more than one male—and if so, how do you do that and keep males separated? Inevitably these questions lead to still more questions...if you think you know the answers please pick up the phone and call me, we are still working it out!

NARC is not the only institution to attempt to breed Houbara in captivity. Most notably, The National Wildlife Research Center (NWRC) near Taif, Saudi Arabia, has done very well with Houbara and provides at least partial answers to some of the questions above. They have also discovered much valuable information about the species both in captivity and in the wild.

The NWRC relies almost entirely on artificial insemination (AI) to bypass many

of the problems raised by the lek type mating system. The key to their success lies in having hand-reared human-imprinted breeding stock. As with many species bred in captivity, these birds will often direct their sexual attention to their human keepers. Imprinted males display for humans but can easily be coaxed to mate with a dummy female Houbara and the semen produced can be collected and inseminated into real females prior to egg laying. When I visited the Center in March 1995, to study artificial insemination techniques, there were 100 displaying male Houbara of two different subspecies simultaneously doing their hilarious jig. A displaying male Houbara is indeed a sight to behold, but 100 of them is beyond description!

NARC aviculturists still mainly face the challenges posed by encouraging natural breeding, as most of our stock are wild-caught and not suitable for AI. We have done our utmost to provide favorable conditions for these highly-strung birds and still have hopes of production from them, even if limited. Many different combinations of pen sizes and sex ratios are being tested to discover what set of conditions will inspire breeding in these difficult birds. Some groups of birds have access to shelter, some do not, some have dense vegetation in the pens, some have sparse vegetation, some even have air-conditioned indoor/outdoor pens (it is very hot here, with temperatures well over 100° F. being the norm by mid-late spring). Statistics from the NWRC at Taif are not encouraging with regard to natural breeding of Houbara caught as wild adults—they have found that males will display, but only one such female has ever laid an egg in captivity there.

With this bit of reality in mind, NARC has begun a joint project with the Institute of Zoology in Kazakhstan to study wild Houbara, as well as collect a limited number of eggs (under the authority of local and CITES permits) for the establishment of hand-reared founder breeding stock. Kazakhstan is thought to be a likely breeding area of wild Houbara migrating through the UAE. My colleagues and I spent nearly two months in the Taukum desert alongside Russian and Kazakh biologists observing Houbara, attaching satellite trans-

mitters (for migration studies), and searching for nests. Six nests were located and these yielded sixteen chicks after all but one egg hatched. We fully expect our captive breeding program to take-off exponentially when these chicks mature into imprinted adults better suited to artificial insemination techniques.

Facilities

In addition to the Sweihan Desert Research Center—a purpose-built facility complete with breeding aviaries, quarantine center, veterinary hospital, and ecology and physiology laboratories—facilities became available to NARC at the Al Ain Zoo; Al Ain city lies on the eastern Abu Dhabi border with Oman. The zoo had much to offer including room to build additional breeding pens and support facilities. An arrangement was made for NARC to assume care of all bustards housed at the zoo. These include: Houbara Bustard *Chlamydotis undulata*, Kori Bustard *Ardeotis kori*, White-bellied Bustard *Eupodotis senegalensis*, Rufous-crested Bustard *Eupodotis ruficristata*, Black

Bustard *Eupodotis afra*, and Heuglin's Bustard *Neotis heuglinii*, making life a bit more interesting in the aviculture department! NARC also maintains Houbara on a private island just off the coast of Abu Dhabi in what we Americans call the Persian Gulf (here it is referred to as the **Arabian Gulf**).

As it is in Texas, they like to do things BIG over here. There is a single open-topped Houbara pen on this island, for example, that measures 600,000 square meters (135 acres). There is also a completely covered pen at the Al Ain Zoo that is 600 meters long by 75 meters wide (about 10 acres). These have since been subdivided as there is little chance for effective management of individual birds in such big spaces (imagine trying to catch a specific pheasant-sized bird in a 135-acre fully vegetated pen!). These huge pens were a logical first approach, however, to providing a setting that might be perceived as "natural" to wild-caught captive Houbara. The big pen at the zoo has been divided into four sections, but it is still large enough that behavioral observations of birds are extremely

difficult and catches for health checks or treatments are an adventure, to say the least. It does, however, provide excellent semi-natural conditions for our shyest birds, and may be most conducive to natural breeding of wild-caught birds. This aviary may also be an excellent rearing area for parent-reared or pre-release birds in the future.

Most of our Houbara are kept in smaller communicating pens ranging in size from 13 ft. x 13 ft. to 33 ft. x 98 ft. Each pen has pop-holes (small doors) that connect it to adjoining pens. These doors can be opened should we wish to allow birds to have access to each other. The idea is that a male will display and a neighboring female's behavior will indicate her desire to enter his pen. The helpful aviculturist will open the pop-hole, and if the female wishes, she may go mate with the male. Currently only about half of our males display and only a few of our females lay eggs; unfortunately, they don't always do this within a synchronised time frame. So we are faced with the challenge of trying to figure out who will display and who will lay (and when) so

Special AFA Subscription Discount

Save up to **47% off** the cover price!

YES! Please send me *BIRD* as follows:

7 issues for only \$14.97

(Save 37% off the cover price)

14 issues for only \$24.97

(Save 47% off the cover price)

(US funds only—Canada add \$1.00 per issue; foreign add \$2.00 per issue)

Payment Enclosed Bill Me

Charge My Visa MasterCard Amex

Card Number

Expiration Date

Signature

(Please print)

Name

Address

City

State

Zip

Phone

(Allow 6-8 weeks for delivery)

Jul/Aug Watchbird

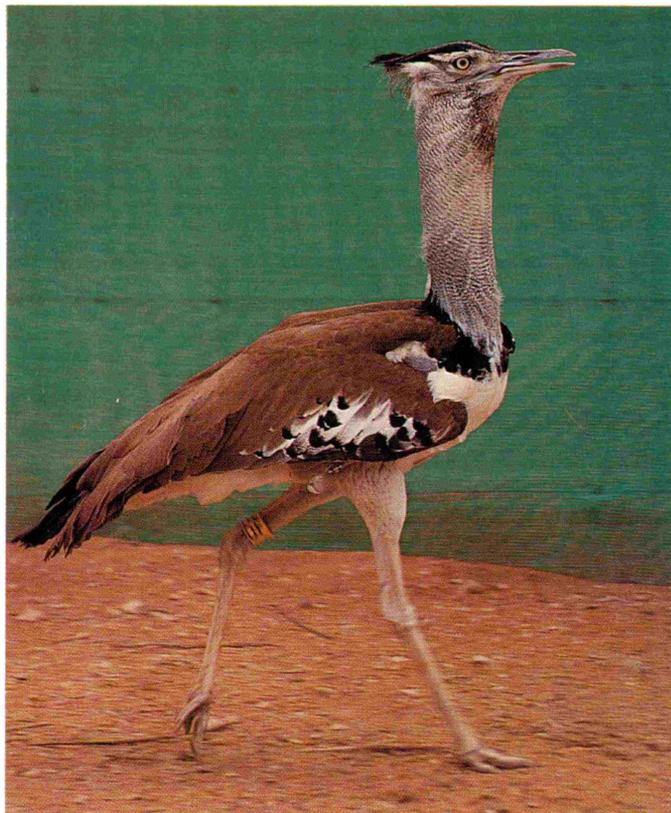
Please fax: (305) 592-9726 or mail to: Caged Bird Hobbyist, 5400 NW 84th Avenue, Miami, FL 33126



Imprint male Houbara Bustard displaying at the National Wildlife Research Center, Taif, Kingdom of Saudi Arabia.



Black Bustard at NARC, Abu Dhabi, 1995.



Kori Bustard at NARC, Abu Dhabi, 1995.

Photos by Bryant Tarr

on virtually the same diet without any calcium-related bone problems at all, however, so the problem may be species specific. NARC has developed protocols for diet, food preparation, sanitation, incubation, feeding, and chick-rearing, that are among the highest standard of any avicultural facility in the world, so you may find some comfort in knowing that Murphy's-law-of-aviculture applies equally to the Arab Sheikh as it does to the basement-breeder: if you have serious problems, it will be with the rarest and most important birds.

In the wake of this rocky beginning we have undertaken a comprehensive breakdown of our bustard diet and live food items to analyse nutrient levels and we are carefully monitoring bone development in bustard chicks through radiography.

1995 has seen improvements on many fronts. 86 eggs were laid this year by the same six females. More males (including an imprinted 1993 male) came into breeding condition and we had our first artificial insemination success. The main limiting factor for NARC's captive breeding program at the moment is lack of semen donor males—only two males displayed for human keepers this year, and only one of those produced quality semen samples, but it's an important start!

Through AI, fertility improved to 45.1% of possible eggs (eggs laid after AI began). Of these 14 fertile eggs, 10 hatched and eight chicks are still surviving at the time of writing. The jury is still out on the calcium-related bone problems as one of the two chicks that died did incur two broken wings from unknown cause (and died later from resulting complications), but no other related problems have occurred.

As mentioned earlier, we also successfully collected eggs from the wild under permit in Kazakhstan which resulted in 16 more Houbara chicks being added to our captive stock. These have been reared on the same diet, with the same calcium supplements, and are strong and vigorous, more so it seems than the captive bred birds. This leads me to suspect that inbreeding may be a problem with our captive-bred chicks (again we are haunted by the legacy of poor record keeping, but all the breeders are likely to have been

captive-bred themselves and may indeed be siblings). I look forward to infusing some of this "wild-vigor" into our captive flock through artificial insemination.

Future Challenges

These 24 hand-reared, human-imprinted Houbara will mature over the next one to three years time and will become important founders in the captive breeding program at NARC. Wild stock from egg collections should continue to grow as our permits allow additional limited collection over the next two field seasons (thereby increasing genetic diversity of our captive stock). As our new stock matures we should experience a significant increase in fertility and in number of eggs produced as males become semen donors for AI and females begin to lay. The NWRC in Saudi Arabia has achieved fertility of 85% with Houbara through AI (Saint Jalme, 1994) and we expect to achieve similar levels when we have more than one semen donor male to work with.

When significant numbers of chicks are being produced (hundreds per season) the next challenge will be to

develop release techniques which result in captive-bred chicks being able to survive in the wilds of Abu Dhabi and beyond. It is hoped that habitat improvements, protected areas, and designated hunting areas will contribute to the survival of both wild Houbara migrating through Abu Dhabi and captive-bred chicks released into these environments.

NARC is also studying response to predators (Red Fox *Vulpes vulpes*) of hand-reared bustard chicks vs. parent-reared chicks. Foxes are a major source of predation for captive-bred chicks released into protected areas in Saudi Arabia by the NWRC (Seddon et al., 1995). Some predator aversion training may be necessary to help captive-bred chicks survive those critical first months in the wild. This is the ironic reality of many captive breeding programs with the aim of releasing animals back to the wild: you must first get the "wildness" out of the parent stock so they are tame enough to breed in captivity, then you must attempt to instill the same "wildness" (e.g. appropriate response to predators) back into the cap-

tive-bred generation so it can survive in the wild. It certainly does make for interesting work!

The United Arab Emirates is a stark and beautiful land, a fascinating mix of the ancient and the modern. When the call to prayer wakes me in the morning it takes a second to remember where I am and what century it is. As an American aviculturist and a dedicated falconer, I could not imagine a more interesting challenge!

Acknowledgements:

I would like to thank the Crown Prince of Abu Dhabi, H.H. Sheikh Khalifa bin Zayed Al Nahyan, the President of the National Avian Research Center, as well as H.H. Sheikh Mohammed bin Zayed Al Nahyan, the Chairman of the Board, and Mr. Mohammed Al Bowardi, the Center's Managing Director, for their support and interest in the work carried out by the Aviculture Department at NARC. I would also like to thank Mr. Ian Sleight, Prof. John Cooper, Dr. Richard Hornby, and Mrs. Theri Bailey for comments and suggestions which resulted in improvements to this manuscript.

References

- Saint Jalme, M., 1994. *Houbara, The Saudi Arabian Project*. Arabian Wildlife Vol 1, No 2, pp. 6-8.
 Seddon, P.J., Saint Jalme, M., van Heezik, Y., Paillat, P., Gaucher, P. and Combreau, O., 1995. *Restoration of houbara bustard populations in Saudi Arabia: developments and future directions*. Oryx Vol 29, No 2. pp. 136-142.

Feedback is Welcome

The Houbara Bustard is not a bird that many of you will likely encounter in your avicultural pursuits, but breeding it in captivity presents some interesting challenges that I thought *Watchbird* readers might enjoy hearing about. I would love to hear your ideas, opinions, and suggestions.

Correspondence or requests for additional information about NARC may be directed to the author:

Bryant Tarr, *Aviculturist*
 National Avian Research Center
 P.O. Box 9903
 Sweihan, Abu Dhabi
 United Arab Emirates

This article was submitted for publication with the authority of the National Avian Research Center. ➔

Advertiser's Index

| | |
|--|--------------------|
| Bob's Rare Birds | 8 |
| Caged Bird Hobbyist Magazine | 59 |
| Cuttlebone Plus | 39 |
| Everybody's Bird Mart (Pomona, CA) | 48 |
| Finch and Canary World Magazine | 29 |
| Firethorn Supply | 51 |
| Followill Aviaries | 12 |
| Gateway Parrot Club | 14 |
| Gold Crown Macademia Association | 48 |
| Grubco | 5 |
| Hagen, Rolf C. (USA) Corp. | 21 |
| Humidaire Incubator Company | 9 |
| Judee K/Crazy Corn | 13 |
| Lima's Exotic Birds | 38 |
| L/M Animal Farms | inside back cover |
| L & M Bird Leg Bands | 50 |
| Lyon Electric Company, Inc. | 45 |
| Magnolia Bird Farm | 36 |
| Nekton U.S.A., Inc. | 17 |
| Pet Warehouse | 49 |
| Prememium Nutrition/Zupreem | inside front cover |
| Pretty Bird | 41 |
| Raintree Macaws | 36 |
| Raintree Publications | 47 |
| South Coast Palms | 46 |
| Specialized Pet Products | 40 |
| Sun Seed Co., Inc | back cover |
| Sunshine Bird Supplies | 37 |
| Timberline Fisheries | 15 |
| The Wright Roost | 48 |

HEY CHICK!



neo-nate™

HAS BABY BIRDS SINGING

That's because **neo-nate's** brand new formulations are easy to mix and easy to digest. Blending all the essential nutrients for growth and development, **neo-nate** is professionally formulated, researched, extensively field tested and has excellent miscibility.

For the hand feeding formula that beats all other formulas, wings down, ask for **L/M neo-nate** today.



neo-nate is available in 15 oz. and 32 oz. recloseable canisters and 5 lb. recloseable zippered poly bags

L/M Animal Farms

Pleasant Plain, Ohio 45162
1-800-332-5623 • MADE IN THE USA
100% SATISFACTION GUARANTEED

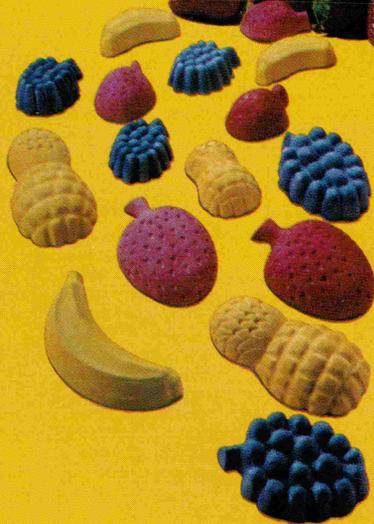
SUNTHING™ NEW!

FRUIT SCENTED & SHAPED SUNSCRIPTION™ MINERAL TREATS

New, SUN SEED "SUNSCRIPTION™" Mineral Treats are prescribed to provide essential calcium and minerals to supplement your bird's diet. Their unique shape is designed to encourage chewing exercise and help maintain proper beak condition. Your bird will find these colorful, fruit scented Mineral Treats attractive and a bright addition to its environment. The fruit scent helps keep your bird's cage smelling fresh. Choose from a variety of flavors. Two sizes are available for large and small birds.



OFFICIAL
SPONSOR OF THE
AMERICAN FEDERATION
OF AVICULTURE



IT'S SUNTHING SPECIAL™

SUN SEED GUARANTEE
If you're not totally satisfied
with a SUN SEED product,
simply return the unused
portion for replacement,
substitution or a full refund.

