



FALCO

**The Newsletter of the Middle East Falcon Research Group
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Objectives of the MEFRG (www.mefrg.org):

Provide a forum for information exchange on matters relating to falcons and falconry in the Middle East

Promote and/or improve the understanding of:

- The cultural heritage of Arabic falconry
- The utilisation and management of quarry species
- The conservation of wild falcons used in Arabic falconry
- The management of falcons in falconry
- Advances in veterinary and aviculture care of falcons
- International issues impacting on, or arising from, Arabic falconry

The objectives of the MEFRG will be achieved by

- Holding regional workshop meetings and international conferences
- Publishing and distributing a paper and electronic Newsletter (**FALCO**) on issues of common interest to the MEFRG
- Coordinating and hosting a website and maintaining an online subscribers database

We welcome the submission of articles for **FALCO**. Please bear in mind that **FALCO** is not a scientific journal and we would like authors to remember that articles should be accessible to a diverse readership comprising falconers, biologists, veterinarians and policy makers. We are interested in authoritative, accurate and informative articles related to the subject areas listed below

Falconry

articles about the practice of falconry of interest and relevance to Arabic falconers

Falconry Heritage

articles about Falconry Heritage of interest and relevance to Arabic falconers

Quarry Management

articles on the conservation and management of quarry species utilised in Arabic Falconry or of interest to Arabic falconers

Raptor Conservation

articles on the conservation and management of raptors used in Arabic falconry, but also more generally of any raptors in the Middle East

Avian Health and Management

articles on veterinary and avicultural issues specifically originating from work carried out in the Middle East, but external studies that are relevant to improving the health of raptors in the Middle East will be considered

Research Biology

articles on biological research of falcons used in Arabic falconry, to cover issues such as migration, taxonomy, genetic research, etc

International Issues

articles and updates on international policy decisions and discussions relating to falconry, conservation, trade and animal health that is of relevance and interest to Arabic falconry

Public Awareness and Education

articles on initiatives that can contribute to a better understanding of Arabic falconry and the wider issues surrounding it

Technical Updates

reviews and updates on new products/equipment etc. that may be useful for biologists, falconers and vets working with raptors

Photo Section

interesting images of relevance to subjects covered by the MEFRG

Raptors in the News

summary of recent press releases relating to subjects covered by the MEFRG

What's New in the Literature

Review of recently published scientific literature relevant to the objectives of the MEFRG

We also accept and publish Book Reviews and Letters. If you are in doubt about whether or not an article fits any of the above categories please contact the editors:

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Cover picture

Juvenile Saker Falcons at hack release in Bulgaria
by Tsvetan Tenev

Back Cover picture

Young falconers at the 5th Qatar International Falcon and Hunting Festival 2014 in Doha, Qatar. Photo courtesy of Souk Waqif Falcon Hospital

In this issue of *Falco* we report on the falcon research and conservation projects being implemented on behalf of the Environment Agency-Abu Dhabi (EAD). Falcons are an integral part of the cultural and natural heritage of the Arabian Gulf, and the work described here is in line with the EAD vision of a sustainable environment for a sustainable future in Abu Dhabi. These falcon projects should be seen in context with the range of international programmes and entities supported by EAD, such as:

The International Fund for Houbara Conservation (IFHC), working to protect bustards against extinction through breeding and careful management of their population; the African Wildlife Foundation (AWF), working to preserve natural resources and wildlife in Africa for economic growth and human wellbeing; WILDSCREEN, which manages the ARKive project, a global initiative gathering films and photographs of the world's threatened species into one centralized digital library; United Nations Environment Programme/Convention on Migratory Species (UNEP/CMS), with offices in Abu Dhabi, to oversee the implementation of two agreements: the MoU on the Conservation of Migratory Birds of Prey in Africa and Eurasia, and the MoU on the Conservation and Management of Dugongs and their Habitats; the International Union for Conservation of Nature (IUCN), whose work includes implementation of the IUCN Species Survival Commission's strategic plan; the Global Footprint Network (GFN), whose work aims to accelerate the use of the Ecological Footprint, a resource accounting tool that measures how much nature we have, how much we use, and who uses it.

This is just a small sample of the international environmental work supported by Abu Dhabi, and there are many other important initiatives too, such as the Mohamed bin Zayed Species Conservation Fund. All too often we hear people question the motive of EAD for funding the falcon projects - these critics assume that there is an ulterior motive, and the main objective is to take falcons. They simply do not see how the falcon projects fit with the broader range of activities supported by Abu Dhabi. Whilst *Falco* concentrates primarily on issues related to Arabic falconry, it is important to understand that the work described in our newsletter is just a small part of the numerous conservation projects supported by Abu Dhabi.

In this issue, Dr Nyambayar Batbayar and colleagues report on the results of a Houbara and Saker study



in the Gobi Desert of Mongolia - this project was implemented with the collaborative support of EAD to fund satellite tracking costs. Dimitar Ragyov provides an example of how EAD funding has been dispersed across projects in several countries to better understand the status and conservation issues facing Saker Falcons in Southeast Europe.

Dr Dama presents an important update on the decline of vultures in Asia caused by the use of the drug diclofenac in livestock by veterinarians. To alleviate the vulture crisis, the governments of India, Pakistan, and Nepal banned the manufacture and veterinary use of diclofenac in 2006. Unfortunately while the manufacture is officially banned, diclofenac is still used because it is comparatively cheap and consequently it remains a threat to remnant vulture populations. Dr

Dama considers that more awareness programmes are needed to persuade veterinarians, paraveterinary staff, and the livestock farmers in the region to use drugs such as meloxicam that are not toxic to vultures. While diclofenac toxicity in vultures has not been reported in the Middle East to our knowledge, biologists and vets in the region need to remain vigilant to this threat to vultures.

"Veterinary Medicine for Falconry into the 21st Century" was the title of a meeting held in Doha, Qatar by the International Association for Falconry and Conservation of Birds of Prey (IAF), the Qatari Society of Algannas and the Souk Waqif Falcon Hospital (SWFH) from 29th January to 1st February. The veterinary conference was organised by Professor Tom Richter and the IAF team and was well attended by veterinarians from the region. The presentations were of high quality covering a range of raptor health topics, many of which have been presented in previous issues of *Falco*. Topics included aspergillosis therapy, reproductive medicine, novel diseases diagnosed by advanced PCR testing, updates on Peregrine Wasting Syndrome and lead poisoning of eagles in Japan.

An appeal for contributions

We would like to see more MEFRG subscribers share their opinions, experience and knowledge through *Falco*. We can accommodate articles written in Arabic and English that fit within the subject areas listed opposite.

International falcon research on behalf of the Environment Agency-Abu Dhabi in 2013

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Research on Peregrine Falcons in northern Eurasia

Research partners and organization: Aleksandr and Vasilij Sokolov (Inst. Plant & Animal Ecology, Ural Branch, Russian Academy of Sciences).

This was the fifth and final year of fieldwork in the Russian Arctic and our work in 2013 involved collecting blood samples and deploying satellite transmitters on birds. Blood samples were collected from Peregrines on the Kola and Yamal Peninsulas by Sergey Ganusevich and Aleksandr Sokolov, and from birds breeding along the Lower Kolyma River. These sampling regions represent Arctic breeding populations in western, central and eastern Eurasia respectively, and the DNA extracted from these blood samples will be used in a genomic population analysis undertaken by Cardiff University and BGI, Hong Kong.

During fieldwork in the Lower Kolyma River we deployed nine satellite transmitters on female Peregrines (Picture 1). We used three different types of solar-powered transmitters, all manufactured by Microwave Telemetry: 12 g Argos, 18 g Argos and 22 g Argos/GPS. The three 18g transmitters were already widely travelled, as they had been recovered from Peregrines in the Yamal Peninsula in 2012 having already travelled three times on the backs of migrating Peregrines to wintering sites in Saudi Arabia, Portugal and Krasnodar in SW Russia! The satellite tagged birds all headed for wintering grounds in SE Asia and one of these birds crossed the equator to spend the winter at an urban location in Surabaya, Java (Figure 1). One bird either died or lost its transmitter before leaving the Lower Kolyma, and another died or lost its transmitter in SE Russia. The remaining seven birds reached their wintering ranges but in December 2013 one of these birds was reported to us by the Vietnamese military having been recovered by a local farmer and handed in to the authorities.



Figure 1. Migration pathways of Peregrines fitted with satellite transmitters in five regions of Arctic Eurasia.



Picture 1. Female Peregrine with satellite transmitter (E. Duthie)

Our field team in Kolyma included two assistants, Steve Davies and Ed Duthie, experienced raptor workers from the UK and all our logistic requirements were provided by Sergey and Nikita Zimov at the Northeast Research Station in Cherskiy. We located 10 occupied Peregrine nests, five on riverside peat exposures, four on rocks and one unusual nest site inside the roof of a derelict building. All nests contained eggs during our visit (Mean clutch size 3.7; Mean egg size 51.9 x 40.2 mm) and we used a candling light to estimate laying dates, which showed that laying was highly synchronous as in other Arctic Eurasian regions, with a mean first egg date of 01 June (± 2 days).

Saker Falcon research and conservation management in Mongolia

Research partners and organization: Wildlife Science and Conservation Center (WSCC; Director - Nyambayar Batbayar); Batbayar Galtbalt (Project Manager; WSCC), Batmunkh Davaasuren, Bolormaa Tsooj (Project Assistants; WSCC), Sarangerel Ichinkhorloo (School Links Project Manager; WSCC) and Shijirmaa Damdinsuren (General Manager).

In the third year of monitoring for the '5000 Artificial Nests Project', we recorded a further increase in the number of breeding Saker Falcons, with 528 egg-laying pairs observed across 20 districts and a further 46 pairs occupying nests in our two

experimental grids. Breeding success was very good, with 88% of nests producing at least one chick and an estimated 1,914 chicks fledged at the artificial nests (95% confidence limits = 1,828-1,980 fledglings). We marked 1,999 nestlings with implanted microchips and/or individually coded colour rings. In addition to the Saker Falcons, we recorded 1,364 pairs of Common Kestrels (*Falco tinnunculus*), 383 pairs of Upland Buzzards (*Buteo hemilasius*) and 386 pairs of Ravens (*Corvus corax*) breeding in the artificial nests.

At the end of the 2013 breeding season, 3780 of our original 5000 nests were still standing, equating to an average annual attrition rate of 8%. Some artificial nests were taken to sell the metal or removed by locals to use in their camps, while others simply fell down. We estimate that replacing stolen and fallen nests would cost around US\$20,000 each year. Furthermore, minimal annual monitoring (three visits) would cost around US\$45,000 each year. As the 5-year Memorandum of Understanding between the Environment Agency-Abu Dhabi and the Mongolian Ministry of Nature, Environment and Green Development expires at the end of 2015 there is a need to clarify the long-term future of the artificial nests. The original concept was to fund their long-term maintenance and monitoring through the sustainable harvesting of Saker Falcons for falconry (US\$65,000 is equivalent to the



Picture 2. Saker perched on 'wrong side' of bush-type perch deflector (D. Scott)

fee charged for six Saker Falcons), but in early 2013 the Mongolian government announced that the commercial Saker trade was to be suspended for 5-years.

We have identified an issue of high mortality rates for Saker Falcons and other raptors in Mongolia due to electrocution on medium voltage electricity distribution lines. In 2013 we undertook studies to quantify electrocution mortality and understand the factors involved in determining these levels such as pole design, mitigation, location, time of year and local food supply (Picture 2). In addition we have embarked on a trial of a range of mitigation techniques to address the issue.

We employed, trained and equipped two local surveyors from villages at either end of a 56 km electricity distribution line running between the district centres of Uulbayan and Munkkhaan, in Sukhbaatar Province of eastern Mongolia. Over a five month period they found 235 freshly electrocuted Saker carcasses below the poles of this line. This is an extremely high rate of mortality, equating to two Sakers killed each week for every 10 km of line. There are "thousands" of kilometres of similar lines across Mongolia, each with the potential to kill Saker Falcons at the same rate. In August we began a trial of mitigation

techniques on the line, incorporating new designs of insulation pin mounts and insulation covers for the first phases at the top of poles, together with perch deflectors and insulation covers at phases 2 and 3 on crossarms. The trial has been established to compare the effectiveness of the different techniques. Initial results indicate that all three mitigation methods can reduce levels of electrocution mortality. The trial will run for 12 months until August 2014.

In order to assess the impact of electrocution of Saker Falcon populations we need to know more than just the number of birds killed, we also need to know their age, sex and breeding status. As yet, we do not know if the electrocution of thousands of Sakers in Mongolia each year causes any reduction in the breeding population. The increase of Sakers in our artificial nests suggests that it does not, and that a shortage of nest sites is the most important factor limiting the breeding population in Mongolia. However, the size of the non-breeding population could possibly be determined by electrocution mortality, which in turn can limit the number of potential recruits to the breeding population. We are collecting data to critically assess whether electrocution has an impact on the Mongolian Saker population.



Pictures 3 & 3a Students from the English School of Mongolia and Munkkhaan School linked with schools in UK and Abu Dhabi

Recoveries of our ringed/ microchipped birds provide some information on movements and survival. We have recovered many birds during surveys of power lines and several have been reported to us by locals in Mongolia and China. The rings have the message 'Please report to' in English, Mongolian and Chinese inscribed on them together with a mobile phone number for text messages and an email address. Our furthest recovery has come from Ningxia, China, a movement of 1135 km and another bird was reported from Inner Mongolia, China after becoming trapped inside a pigeon loft!

In order to develop community benefits as part of our strategy to protect artificial nests and breeding raptors, we have established a community-based project. During the academic year 2012/2013, the Artificial Nest Project School Links Programme joined eleven schools in Mongolia with schools in Abu Dhabi, USA and UK, enabling children to exchange knowledge, culture and language (Picture 4). Each school has nominated a class to learn about falcons, falconry and the artificial nest project. All classes used the educational resources available in Arabic, Mongolian and English. Students created their own PowerPoint presentations about their school and town. Presentations were translated and sent to link schools to enable students to

learn about other cultures and countries. Bayan School, Mongolia installed their internet connection though funds raised by their partner school in the UK and local fund raising. Craig Hendee, International Heritage Conservancy, has been instrumental in linking schools in Illinois, USA and has taken his falcons into the schools as part of this program.



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- Dixon, A., Purev-Ochir, G., Galtbalt, B. and Batbayar, N. 2013. The use of power lines by breeding raptors and corvids in Mongolia: nest-site characteristics and management using artificial nests. *Journal of Raptor Research* **47**: 282-291.
- Dixon, N. 2013. The Mongolian Artificial Nest Project School Links Programme. *The Falconers and Raptor Conservation Magazine* **95**: 28-29.

Reintroduction of the Saker Falcon in Bulgaria

Research partners and organizations: Dimitar Ragyov (Institute of Biodiversity and Ecosystem Research, Bulgarian Academy of Sciences; IBER), Ivailo Klisurov (Green Balkans).

In 2013 we extended our pilot 'breed & release' programme to develop the capacity and skills required to embark on a reintroduction project and to obtain further information on habitat use and survival of released birds. Three of the captive pairs of Sakers held at the Green Balkans facility in Stara Zagora produced eggs and seven chicks were reared to independence by two pairs. Of these, four were entered in the pilot release and the other three were retained at the Green Balkans breeding facility.

The four captive-bred Sakers were put into a hack box in early May when they were 26-29 days old. The chicks were fitted with satellite transmitters when they were 39-42 days old. The hack site was in lowland agricultural landscape in central Bulgaria.

The hack box was situated 7 m up a tree and built to resemble a stick nest 110 cm in diameter but with a sheltered roof 75 cm above the nest (Picture 4). It was screened from behind and food was delivered via a feeding tube. Each day, the chicks were fed two quails, two hamsters and two pigeons with food delivered to the hack three times (morning, midday and late afternoon). The prey was selected to represent the main available prey species in lowland areas of Bulgaria. After fledging, food was delivered at a similar rate to the nest and to four feeding stations placed around the hack site until five weeks after fledging when the rate of food delivery was decreased.

We continued to track one chick from the 2012 pilot release. This bird wintered in northern Turkey on the Black Sea coast and started its migration back to southeast Europe on 10 March, eventually reaching Bulgaria on 30 March after a brief stop-over in Istanbul where it was photographed by a birdwatcher. The bird passed through Bulgaria quickly and settled in southern Romania 10 km from the Bulgarian border and 160 km from the hack site in the Central Balkans where it was released. Unfortunately this bird was electrocuted at its summering area.



Picture 4. Sakers at hack site in lowland Bulgaria (B. Belchev)

Genetic research on falcons

Research partners and organizations: Prof. Mike Bruford and Dr. Xiangjiang Zhan (School of Biological Sciences, Cardiff University in collaboration with BGI Shenzhen/Hong Kong, China).

In 2013 we published the results the whole genome analysis of Peregrine and Saker Falcons (Figure 2). This study has been recommended by the prestigious Faculty of 1000: *"Genomic sequence papers of exotic species are becoming very common now and often have a rather standard presentation consisting of sequence characteristics, demographic history and a list of genes likely under selection. This paper on the genomic sequence of the peregrine and saker falcon, in addition to the standard presentation, has unique elements, as the two species are adapted for different environments (one more arid than the other) and have unique beaks adapted for predatory habits. The genome analysis identifies genes related to environmental differences and beak development, as well as contrasting demographic histories that are more convincing than previous genome sequence studies confined to a single species"*.

On-going research in 2013 involved using two approaches to examine genetic structuring in the global Saker Falcon population. The first approach using Single Nucleotide Polymorphisms (SNPs) has been completed. In this study we have examined SNP mutations, which have indicated that despite having a high degree of gene flow, Saker populations in some geographical regions show distinctive mutation frequencies. Most notable was the distinction between Saker Falcons breeding on the Qinghai-Tibetan Plateau compared to all other regions. Less distinctive was the distinction between western Sakers in Europe and eastern Sakers in Mongolia, supporting previous genetic and phenotypic studies indicating clinal variation over this large geographical area. Our study is based on widespread population sampling from across the global breeding range of the Saker.

The second approach is on-going and based on the Saker genome, and is concerned with investigating geographical differences in gene expression through analysis of transcriptomes. Using this approach it is possible not only to identify which genes differ across different populations but also differences in the way these genes are expressed i.e., how the DNA is coded into RNA to make proteins. Using samples obtained from developing chicks in central Europe (Slovakia), eastern Europe (Moldova), central Kazakhstan, central Mongolia and the Qinghai-Tibetan plateau, we have identified specific genes that differ in their expression across the regions.

Publications:

Zhan, X., Pan, S., Wang, J., Dixon, A., He, J., Muller, M.G., Ni, P., Hu, L., Liu, Y., Hou, H., Chen, Y., Xia, J., Luo, Q., Xu, P., Chen, Y., Liao, S., Cao, C., Gao, S., Wang, Z., Yue, Z., Li, G., Yin, Y., Fox, N.C., Wang, J. & Bruford, M.W. 2013. Peregrine and saker falcon genome sequences provide insights into evolution of a predatory lifestyle. *Nature Genetics* **45**: 563–566.

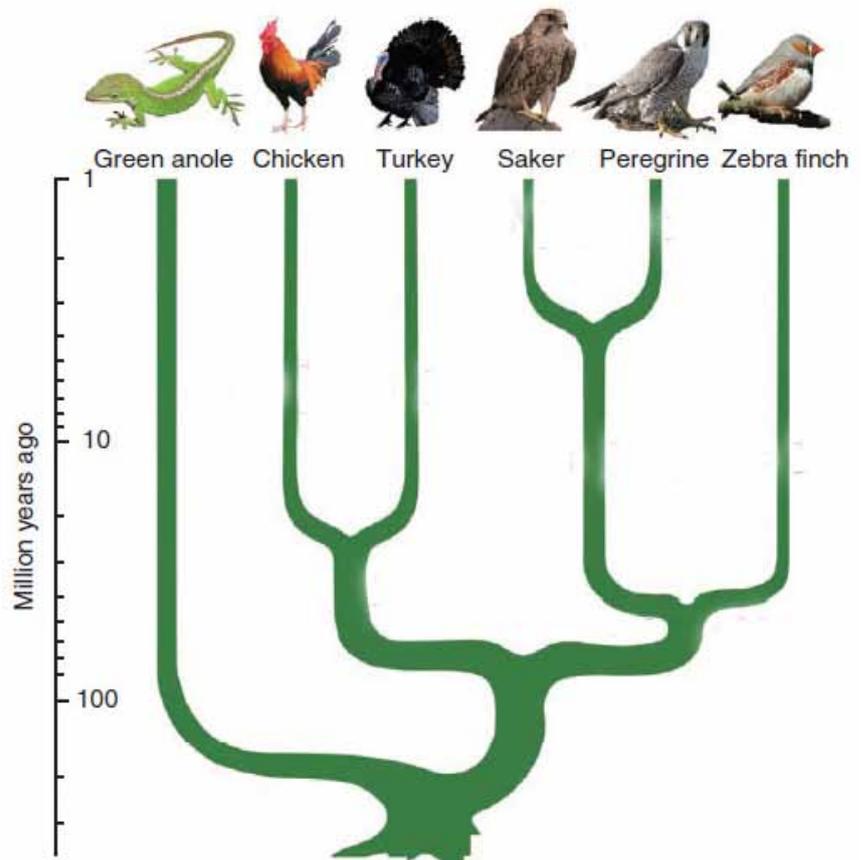


Figure 2. Phylogenetic tree constructed using genome data in five bird species and a reptile.

Survey for Houbara Bustards and Saker Falcons in the southern Gobi in Mongolia

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Development pressures on biodiversity in southern Mongolia

Mongolia is currently witnessing unprecedented levels of economic growth, in large part driven by growth in the extractive (mining, oil and gas) industries. Mongolian south Gobi has no way to avoid but to face it. A number of infrastructure facilities including roads, rail and power transmission lines will be developed to support mining activities in south Gobi (Walters et al., 2009, World Bank 2004, BirdLife Asia 2009). Some of these could have negative impacts on the Galba Gobi Important Bird Area (IBA) and its wildlife and biodiversity.

The Galba Gobi IBA is a desert landscape with sparsely vegetated rolling hills, sand dunes, saxaul stands and dry river beds with elm trees. It stretches between, and partly overlaps with the Small Gobi A and Small Gobi B Special Protected Areas and covers an area of 828,328 ha. It supports important breeding populations of three globally threatened bird species: Saker Falcon *Falco cherrug*, Houbara Bustard *Chlamydotis undulata macqueenii* and the Lesser Kestrel *Falco naumanni*, the latter considered Vulnerable, as well as two globally threatened mammals, Asian Wild Ass or Khulan *Equus hemionus* (Endangered) and Goitered or Black-tailed Gazelle *Gazella subgutturosa* (Vulnerable) (Nyambayar and Tsevenmyadag 2009). The easternmost distribution of the Houbara Bustard is found here (Tourenq et al., 2004).

To address those issues that may rise from mining and infrastructure development, there was a need for detailed data on the nesting distribution and seasonal movements of Saker Falcons and Houbara Bustards within the IBA. Such data would enable

a full assessment of the environmental impacts of the different routing options for both transport and power infrastructure and facilitate the selection of alignment options that could minimize negative impacts on nesting territories of these globally threatened bird species. In 2009, a project co-funded by the World Bank's Netherlands-Mongolia Trust Fund for Environmental Reform and the Rio Tinto-BirdLife International Programme was implemented with the support of the Ministry of Nature, Environment and Tourism of Mongolia.

Results

During the survey activities which we carried out from mid-April to early August, we recorded a total of 106 signs of Houbara Bustards. This included direct observations of 41 live birds, several dozens of feathers, droppings, tracks, and communications from local people, and notes from border guards or mine workers who happen to see bustards in this area. We estimated population densities for four survey periods. Density estimates ranged from a maximum of 0.22 houbara bustards per km², during June and to a minimum of 0.03 birds/km² in April. According to local people, the Houbara Bustard is sighted infrequently in this area. Also, in recent years, Arabs from Qatar started hunting expeditions to this area and one of their camp sites from last year was located during the survey. Locals reported that Qatari falconers hunted for Houbara Bustards and gazelles.

In total, 11 nests of Saker Falcons were located. All were in elm trees found in long valleys in the middle of desert. We monitored 30 nestlings and collected morphological measurements. Almost all nests, except one, successfully produced at least one chick that reached fledgling age. Their nesting was very much associated with woodland patches that are commonly found in Galba Gobi. Satellite tracking data shows that the hunting range of a female falcon that bred at Sukhain Toiruu overlapped with the existing road and planned road.

A total of 77 species of birds were recorded, including four globally threatened and one near-threatened species. GPS coordinates for all observations were taken by the team, and are



Figure 1. Houbara Bustard in the Galba Gobi, southern Mongolia

stored in the expedition's log. During the survey, the team discovered and photographed a male Rufous-faced Warbler *Abroscopus albogularis* at Ikh Bologijn Am near Khanbogd Sum on 12 April 2009. This observation constitutes a first record for Mongolia.

Although it was only a survey of one year, it yielded significant amounts of information on two focus species and on the biodiversity of Galba Gobi IBA in general. The preliminary survey results show that this particular IBA is a very important place for biodiversity conservation in the South Gobi region, as well as for Saker Falcons and Houbara Bustards. The full report is available at:

http://www.wsc.org.mn/pubs/Galba%20Gobi%20Project%20March%202011_FINAL.pdf.

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Southeast Europe Saker Network (SESN): activities and results 2006-2010

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Introduction

The Southeast Europe Saker Network (SESN) includes non-governmental and academic institutions working on raptor research and conservation in the western part of the Saker Falcon breeding range. The SESN was established in 2006 when information on Sakers in Eastern Europe was limited and the population size estimate was based on low quality data, as outlined in the European Saker Falcon Action Plan (Nagy & Demeter, 2006).

The main SESN goal is to implement science based conservation in order to prevent local extinctions, stop population declines and maintain a favourable population status. SESN objectives are:

- (i) bring together scientists and wildlife conservationists interested in Saker research and conservation in Southeast Europe,
- (ii) implement surveys for better understanding of Saker population status and ecology,
- (iii) identify and prioritize the factors responsible for population declines,
- (iv) implement adequate conservation measures and suitable management techniques.

Materials and methods

SESN operated through annual grants of up to £2000 but more expensive projects were also considered, and in some cases funding was continued in subsequent years. Funding for work on Saker research and conservation was coordinated by the Institute of Biodiversity and Ecosystem Research-Bulgarian Academy of Sciences (IBER) and funded by International Wildlife Consultants on behalf of the Environment Agency-Abu Dhabi.

Preference was given to funding studies that generate data to increase our understanding of the ecology and conservation of Sakers. During the period 2006-2010 SESN funded individuals,

scientific and nature conservation organizations in nine countries (Bulgaria, Croatia, Macedonia, Moldova, Romania, Serbia, Slovakia, Turkey and Ukraine), to undertake 27 projects costing ca. £100,000. In addition, awareness campaigns, organizing of meetings and workshops and artificial nest programs were also initiated. Detailed information of SESN work can be found at www.cherrug.org.

Results and discussion

Bulgaria

The Saker is on the brink of extinction, if not already extinct, with a population estimate of 0-3 breeding pairs. In 2009 a 'Feasibility Study' was undertaken to assess the potential conservation management option of reintroduction. The study concluded that natural recolonisation was unlikely within decades and identified suitable areas for initial release using the hacking method. Construction of a Saker breeding facility for six breeding pairs was started at the "Green Balkans" Rehabilitation and Breeding Centre-Stara Zagora (Picture 1).

Following IUCN guidelines, preparatory activities for Saker Falcon reintroduction were implemented including:

- (i) assessment of local opinion toward Sakers and other birds of prey,
- (ii) habitat management – improving conditions in a model European *Spermophilus citellus* colony,
- (iii) assessment of the electrocution risk in the proposed reintroduction area,
- (iv) consultations with relevant organisations regarding the reintroduction process.

Pilot releases of young captive bred Sakers have been conducted at two hack sites, one on a cliff in the Central Balkans Mountains (in co-operation with the Central Balkan National Park Directorate) and the other at a tree in lowland agricultural land. The birds have been fitted with satellite transmitters to track their post-fledging and dispersal movements, and to identify factors influencing survival.



Picture 1. First Saker bred in captivity in Bulgaria at the Green Balkans Rehabilitation and Breeding Centre – Stara Zagora.

Other measures supporting Saker conservation in Bulgaria implemented by SESN include developing an awareness campaign, organizing national species workshops and the erection of artificial nest platforms on high voltage power lines in Northeast Bulgaria where IBER has acted as a 'bridge' between the National Electricity Company and the conservation community.

Croatia

There was no specific Saker research in Croatia before 2006. Historical information about the species was scarce with only few breeding localities for the species in the country. SESN established cooperation with the "Drava" society and they started a Saker research program (see <http://saker.pd-drava.hr/?p=9>). A large scale power line survey in Podravina, Posavina, Slavonia and Srijem regions involved checking 3000 electric power poles and more than 1000 km of transmission lines. As a result the first two active nests on pylons in eastern Croatia were discovered. The Croatian population was estimated to be 3-5 breeding pairs. The survey revealed also 468 nests of different bird species.

Monitoring of the growth of the young birds was conducted as well as the first ringing of a Saker in Croatia.

The "Drava" society performs educational activities in Croatian schools in order to increase the awareness about the importance of Saker preservation as well as preservation of biodiversity in Croatia. The Saker activities of the society are coordinated with the Croatian Electric Company and have featured on Croatian Television. Thanks to the activities of the "Drava" society, two young Sakers were rescued in 2009 (Picture 2).

Macedonia

Historical data on Sakers in Macedonia is scarce and during the 20th Century, to our knowledge there has only been one observation of a single bird during the breeding season (April, 1958), with all other records occurring outside the breeding season. In the last decade or so there have been three further records of single birds during the breeding season. A field survey, in co-operation with the Institute of Biology and the Macedonian Falconers Association (JARAK), was conducted in



Picture 2. Young Saker at power line nest site in Slavonia, Croatia (Ivan Darko Grlica).

2007 aiming to clarify the status of breeding Sakers in the country, but only few Lanner Falcon *Falco biarmicus* and Peregrine *Falco peregrinus* territories were found.

Moldova

The Saker breeding population in Moldova declined in the latter half of the 20th Century, such that there were just seven records for the country over the period 2000-05. Since 2006 a small group of Sakers nesting on power lines in the south of the country has been monitored by researchers from the Institute of Zoology, and some areas in the rest of the country have been surveyed but no Sakers were found. It is possible that the only Sakers breeding in Moldova are those on the power line in South Moldova which is a western extension of the Ukrainian population.

Data on occupancy, breeding success and diet has been collected in order to improve the knowledge about Saker biology in the region. Additionally DNA samples were collected (moulted feathers) for further investigations of Saker genetics. Another SESN funded project in Moldova was a breeding habitat study, which described the habitats in Saker breeding territories in South Moldova.

Romania

SESN-funded field surveys of Sakers have been focused on Dobrudzha and the Danube Delta, where three nest sites were known to the survey teams from the Association for Bird and Nature Protection "Milvus Group" and the Danube Delta National Research Institute. Six singletons and one pair with flying young were observed during survey work in 2007, suggesting probable breeding in the area. In addition, seven singletons were seen during breeding season surveys in 2008. During 2007 and 2008 two known breeding territories were active, but breeding success was very low, with only one pair producing two chicks.

Serbia

Riparian forests, wetlands and open spaces along the Danube and Sava Rivers were formerly important Saker haunts in Serbia, but the situation changed with erection of high voltage electricity lines in the 1970s. The pylons provided new nesting places for Ravens *Corvus corax* and in the early 1980s, Sakers were recorded breeding in Raven nests on pylons. Currently there are over 9000 km of high voltage power lines in Serbia and this has resulted in Sakers occupying lowland agricultural areas in the plains of Vojvodina Province.

For three consecutive years (2007-09) SESN-funded teams from the Association for Bird and Nature Protection, the Institute for Nature Protection of Serbia, the League for Ornithological Action of Serbia and the Provincial Secretariat for Environmental Protection and Sustainable Development undertook intensive surveys in North Serbia. They assessed the breeding population in Vojvodina to be about 50-55 breeding pairs. An artificial nest program was implemented in cooperation with the electricity company "Public Enterprise Elektromreza Srbije" and several dozen wooden nest boxes were erected in Vojvodina in order to provide stable nest sites for Sakers.

A diet study was conducted in the 2007 and 2008 breeding seasons, where pellets and prey remains were collected from the ground around nest sites. The analysis of the samples showed that Pigeons *Columba sp.* and European Hamster *Cricetus cricetus* are key prey species along with passerines (estimated as number of specimens found in pellets and prey remains).

Slovakia

The SESN-funded project was implemented in 2010, the main purpose of which was to carry out a survey of the Saker population in southwest Slovakia, to identify habitat conditions, nesting and feeding opportunities, potential threats and to ensure successful breeding if nesting Sakers were found in the area. The team from the Raptor Protection Society of Slovakia explored the possibility of connecting the Hungarian and Western-Slovak population by creating new nesting opportunities within the “empty” area between both populations.

Three Sakers were observed on the pylons of power lines in the area and 47 natural nests on trees, mostly in alluvial forests, were identified and recorded although only about 10% of these were thought to be suitable for Sakers. The assessment by the team was that there were feeding opportunities for several nesting pairs of Saker in the area, so 10 aluminium nest boxes were installed on the 400 KV pylons of power lines. Besides this action another

four pylons were selected for the installation of a special nesting platform on 110 KV power lines where the Saker Falcons were observed (Chavko, 2010).

Turkey

Given the vast area of potential breeding habitat in Turkey and the paucity of information on Sakers in the country, we undertook a review of historical and current records together with a survey of former breeding haunts in order to evaluate the current population status of the species. In 2007, during a survey conducted in co-operation with Hacetepe University, Istanbul University and the Istanbul Bird Watching Society, three active Saker nests were discovered in Central and Eastern Anatolia (Dixon et al., 2009). A second survey in 2009 confirmed that the Saker is a rare breeding species in Central and Eastern Anatolia despite there being much apparently suitable habitat and prey available in these regions (Picture 3).



Picture 3. Saker breeding habitat in Anatolia, Turkey.



Picture 4. Young Sakers at a nest site in Crimea.

In 2010 we initiated a project directed at combatting the illegal trapping of Sakers in Turkey called “Educational Outreach to Stop the Saker Falcon Trade in Turkey”. The aims of the project were to:

- (i) educate the law enforcement authorities about the critical status of the Saker in Turkey in order to encourage them to stop the illegal trapping activities,
- (ii) educate bird watchers and other researchers about the Saker to increase sightings of falcons and reporting of falcon trappers,
- (iii) educate falconers about the global decline of the Saker and the penalties for trading them.

A series of meetings with the target groups were implemented (especially with the law enforcement authorities), where educational printed materials were distributed and lectures were performed. Follow up meetings were held with the law enforcement officials after the trapping season

in order to collect detailed information about the illegal activities by regions. As a result of SESN-funded activities in 2010, four falcon trappers were captured by the Military Police. In one case a Saker was hidden under the bonnet of the car. They were fined ca. €1,100 as a group for illegal hunting and the Syrian citizens were fined ca. €2,100 for capturing a protected bird of prey. The Saker was released soon after it was identified by the police officers using the CITES Falcon Enforcement Handbook, which had been translated into Turkish as part of this project.

Ukraine

The Ukrainian Birds of Prey Research Center has been carrying out studies on the status of Sakers in Ukraine since the 1990s, and surveys over the period 2005-09 were funded within the framework of the SESN (Picture 4). Surveys located 218 breeding territories, 84% of which were located on electricity pylons, 15% on cliffs and 1% on trees. The population size was estimated to 270-345 pairs in Ukraine.

Conclusions

The SESN achieved the following results:

1. Better coordination in the Saker conservation and research through four workshops/conferences i.e., one international and three national meetings in Bulgaria.
2. The species population status was updated in several Southeast European countries
3. Three artificial nest programmes were supported in Serbia, Slovakia and Bulgaria.
4. A reintroduction programme in Bulgaria was initiated.
5. Four awareness campaigns were conducted in Bulgaria, Croatia, Serbia and Turkey.

6. 17 organizations were involved in Saker research and conservation work in Europe and Turkey. Knowledge and skills were transferred.

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Images of falconry in Uzbekistan from the Falconry Heritage Trust's image collection

Jevgeni Shergalin

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In January 2014 a new falconry club "Shaheen Uzbekistan" was formed in Tashkent – capital of Uzbekistan.

The ancient Uzbeki towns like Khiva, Samarkand, Khorezm and Bukhara are famous in the world history. Falconry heritage in this country is also very rich. Uzbeki falconers flew Peregrines, Sakers, Shaheens, Goshawks and the Golden Eagles at different types of quarry: ducks, partridges, pheasants, hares, gazelles, wolves and foxes.



Husein ibn Ali Al-Vaiz (Kashifi). Getting ready for the falconry. "Anvar-i Suikhaili". Manuscript of Institute of the East of Ac. of Sc. of Uzbekistan, 9109, l. 42 b. The 1520's. Shakhruhia (Tashkent).



(Left). Bird catches hare. (Right). Rider with the Golden Eagle. Glass medallions from Palace of rulers in Termez.

is a small city in the southernmost part of Uzbekistan near the Hairatan border crossing of Afghanistan. XII century.

From: <http://art-blog.uz/archives/2509>



Ulugbek with a family and suite on falconry. Miniature on sheet cut off from unknown manuscript. Freer and Sacker Galleries, Washington, 1441—1442. Samarkand.

From: <http://www.barabass.ru/4.php>

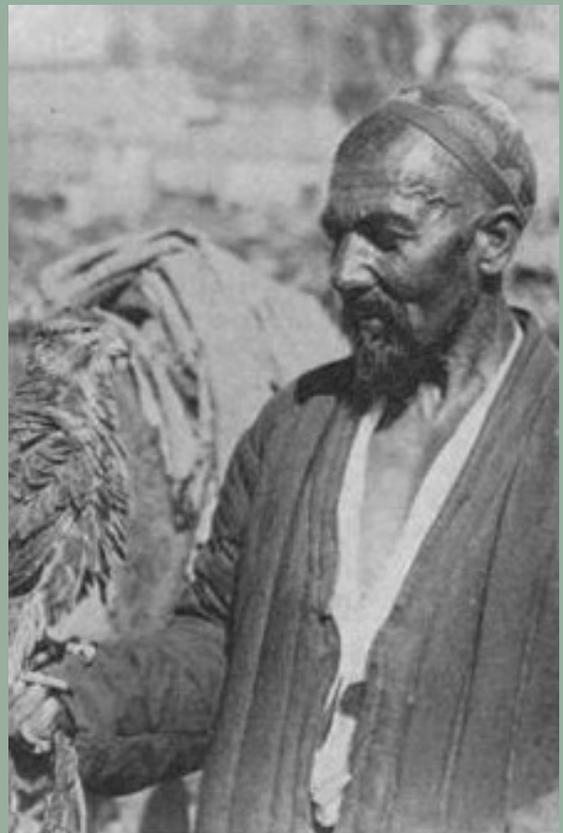


Khudaibergen Devanov (1879-1940) – the first Uzbeki photographer. Khoresm hunters, 1900-1917. From:

<http://bellaterra.uz/xudajbergen-divanov-pervyj-uzbekskij-fotograf/> (Right) – old photo of the Uzbeki falconer.



(Left) - Vintage original old postcard, approx. size: 6 x 4 inches (15 x 10 cm). Uzbek hunter with a hawk. Tashkent.



Old photo of the Uzbeki falconer.

Syr Darya Region in Uzbekistan. Tashkent and the types of people seen on its streets. Falconer during 1865-1872.



Mukhamedov U.D. Falconry. 2007. 36 x 51 cm.
From: http://artonline.ru/painting_info/14724

Pochchaev
Sadridin (1879-
1948). On Falconry.
Water-colour,
gouache.

From: <http://www.sanat.orexca.com/rus/archive/1-06/miniatures.shtml>



Karazin Nikolai
(1848-1908).
Falconry.
Museum of Arts
of Uzbekistan,
Tashkent.



Khakim Niyazov – one of the most experienced Uzbeki falconers during work on Tashkent airfield.



Many members of this club work at Tashkent airport for prevention of bird strikes between airplanes and birds.

Veterinarians for Vultures

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A group of convergently evolved birds of prey distributed across the old world as well as the new world regions are commonly referred to as 'vultures'. New World vultures are distributed in the Americas whereas old world vultures are found in Europe, Africa and Asia. Of the 23 species, at least one species of vulture is found on each continent except Australia and Antarctica.

Vultures are efficient scavengers; thereby play an irreplaceable role in the maintenance of ecological balance (Ruxton & Houston, 2004). Additionally, they have important cultural roles in many communities, especially in Parsi community which dispose of their dead by feeding them to vultures. This makes the vulture an important ecological, cultural and economic asset from the human perspective (Ogada *et al.*, 2012).

A keen eyesight, low gastric pH and soaring flight have made vultures nature's most successful scavengers (Ogada *et al.*, 2012). However, vultures have lowest reproductive rates among birds and are characterized by low productivity, delayed maturity, and relatively high adult survivorship. These features coupled with obligate scavenging and community feeding habits makes vultures highly susceptible to mass poisoning on exposure to contaminated carcasses (Ogada *et al.*, 2012). Further, due to a high position in the food chain, vultures are also vulnerable to bioaccumulation of toxins.

Beginning with the early 1990s, all the continents have witnessed a decline in their vulture populations (Mingozzi & Estève, 1997; Wilbur, 1978). The most dramatic vulture decline observed was an almost complete disappearance (>96% in some area) in India, Pakistan, and Nepal (Baral *et al.*, 2004; Prakash, 1999). The decline was caused by human persecution or poisoning, or both. However, the rapid decline in Indian subcontinent was triggered unintentionally by veterinary use of diclofenac. Diclofenac was a preferred and widely used nonsteroidal anti-inflammatory drug for



Figure 1. Egyptian Vulture in flight over Gamla nature reserve in Israel. Image by О Рухманн (Вых Пыхманн). Extracted from Wikimedia Commons for educational purpose.

analgesia in livestock in this region. Diclofenac residues in carcasses of treated livestock induced terminal renal failure in vultures. This coupled with community feeding behaviour created havoc in vulture populations (Oaks *et al.*, 2004).

Vulture decline is not to be taken lightly, as it triggers serious consequences like concurrent increase in the population of other scavengers that may facilitate the spread of disease. For instance, India has witnessed an unprecedented increase in the number of stray dogs as a consequence of vulture decline; and it is expected to cost billions to manage the consequences of deadly diseases like rabies.

To alleviate the vulture crisis, the governments of India, Pakistan, and Nepal banned the manufacture and veterinary use of diclofenac in 2006. This ban made it mandatory to replace diclofenac with meloxicam and ensured recovery of vulture from the brink of extinction. However, the problem still looms large as diclofenac is still used indiscriminately by veterinarians. Hence, to complement the diclofenac ban and conservation breeding program, it has been suggested that the price of meloxicam is reduced, and veterinarians, paraveterinary staff, and the livestock farmers should be encouraged to use meloxicam in the Indian subcontinent (Dama, 2013a, b). These efforts will go a long way and are absolutely necessary, in addition to conservation breeding programmes, to ensure reversal of the vulture population decline.

Vultures are also important in the Middle East. In this region, five species of vulture are found. The Egyptian Vulture (*Nephron percnopterus*), Bearded Vulture (*Gypaetus barbatus*), Cinereous Vulture (*Aegypius monachus*), and Lappet-faced Vulture are declining; whereas the population of Griffon Vulture (*Gyps fulvus*) is stable with some areas even witnessing an increase. Egyptian Vultures and Bearded Vultures have undergone a historical decline dating back to 1800s due to human persecution through hunting, poisoning or electrocution. The population of the Egyptian vulture, which is believed to be extinct in Southern Africa, is considered endangered in the Middle East. The Bearded Vulture was nearly extinct during 1950s in some regions, but fortunately is of least concern in the Middle East. The Griffon Vulture was significantly affected by human persecution;

especially due to wind turbine collision during recent times. Bearded Vulture and Griffon Vulture were among the most successfully conserved vultures in Europe by reintroduction and supplementary feeding. The Cinereous Vulture and Lappet-faced Vulture, which are near threatened and vulnerable respectively, are prone to extirpation and need to be conserved immediately along with the Egyptian Vulture in the Middle East.

It is evident that if conservation measures are not initiated in the Middle East, populations of at least three species of the threatened vultures could become critical in near future. Hence, there is a need to increase the awareness among people about the importance of vultures and simultaneously start conservation breeding programmes. The veterinarians have a large role to play in this endeavour starting from creating awareness to conservation breeding to advocacy for use pain killers in the livestock that are not toxic to vultures (Dama, 2013b). I take this opportunity to appeal the veterinarians of the Middle East to take these small steps for an ecologically balanced future of the region.

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Veterinary medicine for falconry into the 21st Century

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"Veterinary Medicine for Falconry into the 21st Century" was the title of a meeting held in Doha, Qatar by the International Association of Falconry and Conservation of Birds of Prey (IAF), the Qatari Society of Al Gannas and the Souq Waqif Falcon Hospital (SWFH) from 29th January to 1st February. Firstly thanks to the international team from IAF and the local organising committee from Algannas and SWFH. They arranged the logistics of my visit, organised a varied programme and provided the opportunity to meet old acquaintances and make new friends around communal meals of steaming rice and tender lamb.

The veterinary conference was organised by Professor Tom Richter and the IAF team and was well attended by around 80 delegates, many of them veterinarians from the region. Professor Richter introduced the conference commenting that advances in veterinary medicine contribute to the sustainable use of raptors. These were wise words. Thirty years ago the two pioneers of falcon medicine in the Middle East, Dr Ken Riddle and Dr David Remple established falcon hospitals in Abu Dhabi and Dubai and both made significant impact on reducing the morbidity and mortality of falcons used by Arab falcons in the UAE. Ken and David are rightly considered the fathers of modern falcon medicine in the Gulf.



The IAF can be proud that this meeting will have contributed to an exchange of information and the promotion of better medical care of falcons in the region. The ophthalmology, orthopaedics and endoscopy workshops held at the SWFH were excellent, conducted by Professor Rudiger Korbel, Neil Forbes, Lorenzo Crosta and Professor Michael Lierz, all internationally recognised avian medicine experts. The workshops also enabled the delegates to see first hand what is without doubt the most lavishly equipped avian hospital in the world.

The Middle East is probably home to the largest population of falconers and captive falcons in the world. The provision of regular veterinary meetings in the region therefore has the potential to raise standards of veterinary care and positively impact the greatest number of captive falcons in terms of improved health and lowered mortality. Having a 'long view' of history is important - just 15 years ago a diagnosis of aspergillosis was a death sentence to a falcon because there were no effective treatments. How times have changed and my former colleague, Dr Di Somma from Dubai Falcon Hospital showed in his talk how prompt modern diagnostics by endoscopy and new antifungal medicines such as voriconazole have made what was the most feared disease of Arab falconers into a readily treatable condition.

So in 15 years time what conditions will the next generation of falcon vets look back on with satisfaction, knowing they can readily cure conditions once feared by their predecessors? I would hope that amyloidosis would be one such condition? Given funding for research could a multidisciplinary team of scientists find solutions to this condition that currently has no effective treatment? While there are many well modern falcon hospitals with superbly equipped laboratories throughout the region, it is apparent that, with the odd exception, there is a paucity of quality research on any aspect of raptor biomedicine emanating from the Gulf. An initiative to solve a condition as complex as amyloidosis would need to be a collaborative venture between regional hospitals and an international veterinary university with a solid track record in researching raptor diseases.



Professor Lierz from the University of Giessen gave a concise overview of falcon breeding illustrated with results from research his team have conducted on falcon reproduction. The University of Giessen has a track record of initiating many raptor biomedicine projects including developing vaccination protocols against a number of important viral diseases in raptors. What opportunities are there to enable Universities such as Giessen to develop links with hospitals in the Middle East to further biomedical research and training opportunities? With regards to training opportunities, where are the Gulf National falcon veterinarians? To my knowledge there are none. Priority by regional education bodies should be given to training Gulf nationals to become the falcon veterinarians of the future. Again, this would need a link with universities in Europe with expertise in avian medicine.

Does falconry in the Middle East have an *'Inconvenient Truth'*? This issue was raised by Faris al Timimi, an Iraqi veterinarian who has worked for many years in the Middle East. What happens to all the wild and captive bred falcons that are shipped every year to the Gulf? Falconers, veterinarians and responsible falcon breeders should be concerned about this 'elephant' in the room. Traditionally Arabic falconry has a good history of sustainable practice. Wild falcons were trapped on passage, used for a season and released at the end of the season. The impact of this traditional falconry on wild falcon populations was probably negligible. Regional falconry associations should be concerned about this issue. Indeed they are

the only organisations that can gather the relevant data. How many falcons come into the region? What is the mortality rate and lifespan of falcons? What falcons are best suited to the hunting styles and environment of the region? What is striking is the lack of even basic information on the number of falconers and falcons kept in each country. Cynics may say that no one cares. If Arabic falconry wishes to promote a positive and sustainable image to the rest of the global falconry community then it must care.

Professor Robert Kenward, a biologist, gave a short presentation on a project he is coordinating on behalf of the CMS Saker Task Force entitled 'networking trappers and falconers'. One of the aims of the Saker Task Force is to develop a biological model for the sustainable harvest of Saker Falcons, an area that International Wildlife Consultants (IWC) has been working on in Mongolia for over a decade. To develop this model for the Saker Task Force information on population sizes and harvest rates of Sakers in their home range is needed. Professor Kenward reviewed data from 1993-1997 when the National Avian Research Center from the UAE initiated a Saker microchipping scheme in Central Asia. A number of falcon hospitals in the Middle East were involved in monitoring microchip records from Sakers and during this time 13 of 171 Sakers microchipped as nestlings in Kazakhstan were detected in hospitals in the UAE. This represented a minimal harvest rate of 8% during this time period. More up to date information is required and one project supported by the Saker Task Force is setting up an internet

website which will be linked to a mobile phone application so that falconers or falcon hospitals can report microchip numbers of wild Sakers. Professor Kenward appealed for financial support for this project from Gulf countries where Sakers are used in falconry. To date Abu Dhabi has provided much of the funding and impetus for conservation work on wild Sakers and unless Arabic falconry associations play an active role in this project there is a real danger that the international conservation community will lose patience and all trade in wild Sakers could be banned.

Space does not allow for all the talks to be comprehensively reviewed in this article. The presentations were of high quality covering a range of raptor health topics, many of which have been presented in previous issues of *Falco*. Dr Margit Muller from the Abu Dhabi Falcon Hospital presented work on novel diseases her laboratory has identified in falcons in Abu Dhabi. She commented that future challenges for veterinarians will be to work more closely with human medical professionals to identify emerging infectious diseases. Richard Jones (UK) presented a summary of his investigations on Peregrine

Wasting Syndrome. From his experience with this wasting disease it is clear that greater attention to the health status of the intensively reared prey that we feed to our falcons is required. Neil Forbes (UK) enthralled the audience with a comprehensive masterclass on raptor nutrition, based on a lifetime of experience working with raptors. Dr Keisuke Saito from the Institute for Raptor Biomedicine in Japan gave a powerful presentation on a subject he has been involved with for many years – dealing with lead poisoning of Steller's Sea Eagles and White-tailed Eagles in Japan. His work has not only involved clinical work to save and rehabilitate individual eagles, but it has also involved lobbying government bodies to control the use of toxic lead ammunition by hunters. Copies of the proceedings are well worth getting hold of and are available from Dr Ikdam Medan, Souq Waqif Falcon Hospital (Email: ikdammajid@yahoo.com).

I had the opportunity to attend the falcon races held outside Doha as part of the 5th Qatar International Falcon and Hunting Festival 2014. The Haddad al-Tahadee competition where a falcon chased a homing pigeon was the most exciting. The audience was treated to a great display of drama





in developing techniques to monitor falcon fitness physiology. The organisers of these races will need to be mindful of the animal welfare sensitivities of their multinational audiences if such races are to be promoted as part of tourist and heritage events. However the ethics of these races will adapt, just as camel racing in the Middle East adapted to international pressure to use robotic riders rather than children.

On the last day of the meeting I attended my first falcon beauty competition in Doha. This was a very well organised and choreographed event that clearly demonstrated the importance of falconry and the Saker Falcon to local Qatari culture. In my own work I know the importance of grading the quality of pedigree falcons bred by IWC and it was fascinating to learn about the criteria used by Qatari falconers to select the most beautiful Saker Falcon. The prestige associated with falcons has contributed towards promoting high levels of care for individual birds, just as occurs in horse-racing. This can be seen in the excellent facilities and standards of care provided in the falcon hospitals and in competitions run by societies like Algannas to promote the best falcon mews. Can this prestige be used

as falcon and pigeon chased high over our heads. The Arabic commentary over the tannoy system provided the auditory excitement similar to that of a horse race. Despite the speed and stamina of the falcons, all the pigeons escaped. Being a true Englishman I was pleased that the underdog won the day each time! These races have exploded in popularity across the Gulf in the last 5 years and it is very apparent that this phenomenon will be an important driving force in the evolution of falconry in the Gulf. Falcon races will affect the demand for captive bred falcons, the manner these birds are trained and performance medicine will start to become an important discipline of falcon medicine. Falcon breeders will start to become more professional in their approach becoming more like horse stables where clients will be more discerning in the selection of their birds from winning lines. There is also tremendous scope for a young and enthusiastic veterinarian to make his or her name

to engage the users of wild falcons in the Gulf with the conservation of wild falcons and the promotion of a more sustainable falconry in the region? If the international conservation community bans the trade in wild Sakers because they perceive that falconers in Gulf countries are unable to manage a responsible and sustainable trade in falcons then events like the falcon beauty competition in Doha will be directly affected.

There is much to be proud of in the role that falconers, falcon biologists and falcon veterinarians have played in improving the public image of falconry and gatherings like this festival and others in Abu Dhabi and elsewhere play an important role in ensuring that falconry will have a healthy future in years to come.

What's New in Literature

Falcons pursue prey using visual motion cues: new perspectives from animal-borne cameras.

2014. *J. Exp. Biol.* 2, 225-34.
Kane, S. A. and Zamani, M.

This study reports on experiments on falcons wearing miniature video cameras mounted on their backs or heads while pursuing flying prey. Videos of hunts by a gyrfalcon (*Falco rusticolus*), gyrfalcon (*F. rusticolus*)/Saker falcon (*F. cherrug*) hybrids and peregrine falcons (*F. peregrinus*) were analyzed to determine apparent prey positions on their visual fields during pursuits. These video data were then interpreted using computer simulations of pursuit steering laws observed in insects and mammals. A comparison of the empirical and modeling data indicates that falcons use cues due to the apparent motion of prey on the falcon's visual field to track and capture flying prey via a form of motion camouflage. The falcons also were found to maintain their prey's image at visual angles consistent with using their shallow fovea. These results should prove relevant for understanding the co-evolution of pursuit and evasion, as well as the development of computer models of predation and the integration of sensory and locomotion systems in biomimetic robots.

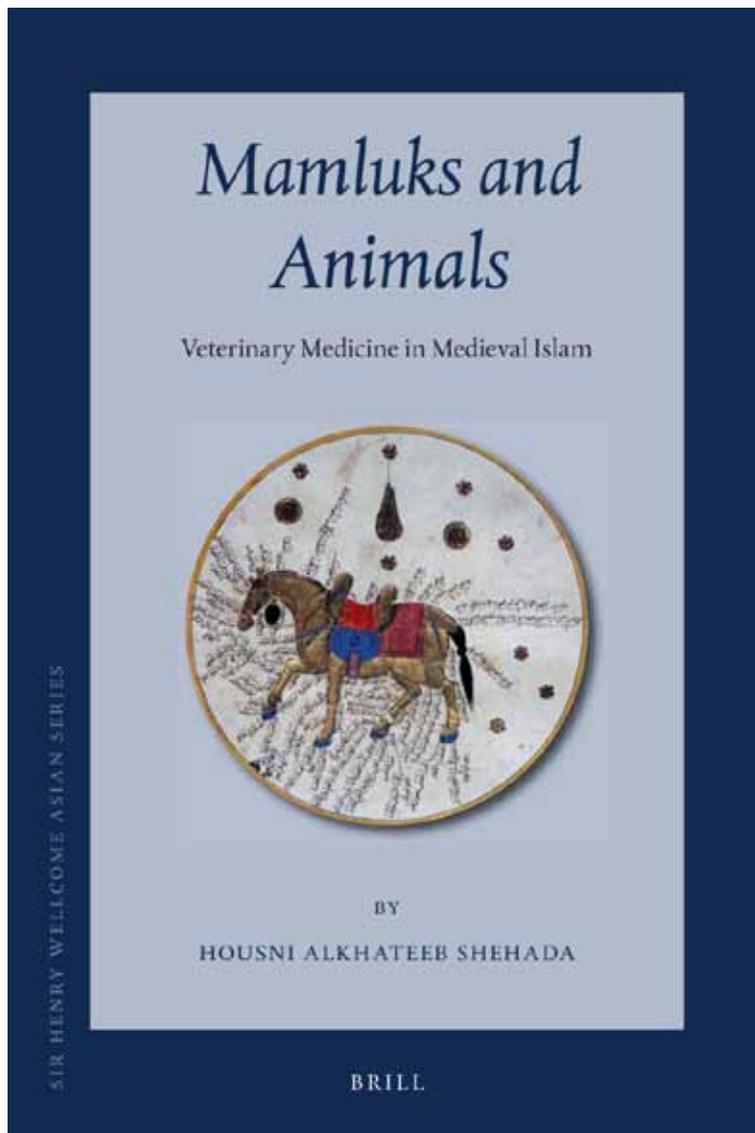
The potential use of artificial nests for the management and sustainable utilization of saker falcons (*Falco cherrug*).

2014. *J. Ornithol.* DOI 10.1007/s10336-014-1047-7
Rahman, M. L., Purev-Ochir, G., Etheridge, M., Batbayar N. and Dixon A.

Artificial nests are a commonly used management technique to increase the breeding population and/or productivity of birds with nest site limited populations. We compared nest survival of saker falcons breeding in artificial nests erected in a flat steppe landscape with those breeding in natural nests on rocks and cliffs in adjacent hills of central Mongolia. We found no significant difference in daily nest survival during the egg and nestling stages of the breeding cycle. Nest survival varied

across years and was higher at artificial than natural nest sites, primarily because of higher survival rates during the egg stage at artificial nests. However, fledgling productivity was not significantly different although artificial nests produced an average of 3.2 fledglings compared to 2.3 at natural nest sites. We found no significant differences in offspring sex ratios and fledgling mass at artificial and natural nest sites. Provision of artificial nests can increase the range, size and productivity of saker falcon breeding populations, a globally endangered species subject to high mortality and trapping for falconry. This management technique can be used for incentive-driven conservation initiatives, whereby sustainable harvest quotas can be generated from demographic models based on parameters derived from a managed and monitored population breeding in artificial nests.





Book Review

Mamluks and Animals: Veterinary Medicine in Medieval Islam by Housni Alkhateeb Shehada

Brill Academic Publishers ISBN-13: 9789004234055

Housni Alkhateeb Shehada's *Mamluks and Animals: Veterinary Medicine in Medieval Islam* is the first comprehensive study of veterinary medicine, its practitioners and its patients in the medieval Islamic world, with special emphasis on the Mamluk period (1250-1517).

Do not be put off by the scholarly layout, the heavy text and the bulkiness of this book. It is jam-packed with well researched information and historical curiosities. If you are interested in falcons, falconry, horses, camels, the development of the veterinary medicine, along with the intricacies of hunting

and how animals were intimately woven into the social fabric of the medieval Islamic society, then you will find something of interest in this book. Quite apart from the well-researched text this is also a beautiful book. The 48 colour plates at the end of the book are copied from many of the Medieval Islamic manuscripts and references and they transport the reader to a far off world in which one can imagine the splendour and excitement of Royal hunting parties and marvel at the craft of those early veterinarians who cared for the horses, falcons and camels. I was particularly taken by the detail drawn by the artist of Plate 20, *Shoeing a horse*, sourced from a Mogul Indian manuscript around 1595. Clearly a technical drawing to show students of farriery the equipment and techniques used to shoe a horse, but also a picture that captures the expressions and energy of the three human handlers involved with the procedure.

Based on a large variety of sources, this book is a history of a scientific field that is also examined from social and cultural perspectives. The book comprises 8 chapters:

1. Animals in Mamluk Society
2. The Pre-Mamluk Veterinary Traditions
3. Scholars, Equestrians and Veterinarians
4. The Veterinary Profession
5. Theoretical Aspects
6. Preventive Medicine and Diagnostics
7. Non-Invasive Practises in Veterinary Medicine
8. Invasive Methods of Treatment in Veterinary Medicine

I have had the good fortune to work in the Middle East as a falcon and wildlife veterinarian in modern veterinary hospitals and treated falcons and exotic animals belonging to most of the ruling families of the Gulf. The specialised falcon, camel and horse hospitals across the Arabian Peninsula are a modern expression of a passion to provide the best care for those species that were once closely associated with the traditions of Islamic rulers in the Mamluk period and are now just as close to the hearts of the modern ruling families.

There is much wisdom to be found in the Mamluk texts that has modern relevance. In these days of increased concern for the environment, hunting parties from Arabian Gulf countries are criticised for the wholesale destruction of wildlife and scant regard for the environment by the participants who treat the desert hunting grounds as if it was a rubbish bin. In Mamluk society writers of hunting literature quoted many of the sayings of the Prophet and verses from the Koran to argue that hunting trips were intended for *furusiyah*, sport and obtaining meat rather than for entertainment. *Furusiyah* was defined as the art of horsemanship and warriorship and social progress based on talents in *furusiyah* was a characteristic of the Mamluk period. Indeed in the Mamluk period hunting was sanctioned to obtain meat for eating, trading, feeding animals and birds and also to give it to the poor. Perhaps within this traditional Islamic wisdom are seeds for promoting more sustainable and ethical hunting practises by Gulf hunting parties in modern times? Certainly anyone who has had the opportunity to spend time with a modern hunting party in Pakistan or North Africa will find the descriptions of Mamluk hunting parties fascinating. Likewise the passion of the Mamluk sultans for falcons is not dissimilar to the current fashion to own falcons by the Rulers of the Gulf states. In Mamluk times gyrfalcons were supplied to the sultans by enterprising Venetian merchants and the prized falcons cost as much as good quality horses. Nowadays the demand for falcons from Arabia has created the financial stimulus for the creation of large projects breeding falcons in captivity, and the building of falcon hospitals that have pioneered veterinary research that has led to significant advancements in the field of avian medicine.

Horses, as well as birds of prey used for hawking and falconry, were at the centre of the veterinary literature of that period, but the treatment and cure of other animals was not totally neglected. There is also discussion of the care of cheetahs, postal pigeons, dogs, cats, songbirds and of the menageries kept by the Sultans. The tradition of private menageries is still maintained by ruling and wealthy families in the Middle East.

The treatises dedicated to the care of hunting birds emphasised the importance of preventing diseases by paying attention to good husbandry.

Falconers were given strict rules on the cleanliness and ventilation of the mews, and the importance of proper feeding was paramount to the health and performance of the falcon. Falconers in Mamluk times had to be logistical experts ensuring that the correct food would be available for their birds during long hunting trips or long sea voyages. In one of the earliest descriptions of a nutritional deficiency, Ibn Qushtumur describes the severe damage done to the feathers of gyrfalcons during a long voyage in the Caspian Sea in 1267 when the stock of live pigeons came to an end and the falcons had to be fed on fish.

The Mamluk period is presented here as the time when veterinary medicine reached its pinnacle in medieval Islam and often even surpassed human medicine. This book will appeal to falcon, horse and camel veterinarians and trainers, falconers and other agricultural and zoological specialists working in the Middle East. Indeed within the pages of this book are nuggets of wisdom that will interest anyone who earns their living from the current Golden age of horse and camel racing and falconry performed in the Middle East.

Reviewed by Dr Tom Bailey

أطباء بيطريون للنسور

د. مدهوكار شيفاجيراو داميا

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النسور هي أنواع رمامة كفؤة تلعب دورا هاما في المحافظة على التوازن البيئي. لكنها، مع الأسف، ذات أقل معدل للتكاثر بين الطيور وتتميز بانخفاض الكفاءة وتأخر البلوغ ومعدل عالي لحياة الأفراد البالغة. تتضافر هذه الصفات مع العادات المتأصلة لأكل الرمم والقمامة والأكل الجماعي لتجعل النسور عرضة للتسمم الجماعي بشكل عالي من أكل الجثث الملوثة. شهدت تسعينيات القرن الماضي انخفاضا في أعداد النسور في آسيا وانخفاضا متسارعا في شبه القارة الهندية نتج دون قصد عن الاستخدام البيطري لعقار ديكلوفيناك. كان ديكلوفيناك عقار معالجة الالتهابات غير الاسترويدي المفضل والأوسع استخداما لتسكين الآلام في قطعان المواشي في المنطقة. أدت بقايا ديكلوفيناك في جثث المواشي التي عولجت به إلى فشل كلوي كامل في النسور التي تغذت بها. أدى هذا وعادات الأكل الجماعية للنسور إلى عواقب وخيمة على أعدادها. لمعالجة الأزمة قامت حكومات الهند وباكستان ونيبال في عام 2006 بحظر تصنيع ديكلوفيناك واستعماله بيطريا. ستقطع هذه الإجراءات شوطا طويلا وضروريا للغاية سيؤدي بالإضافة إلى برامج التكاثر الصونية إلى عكس اتجاهات تناقص الأعداد. لا زال هناك حاجة لزيادة وعي الجمهور عن أهمية النسور بالتزامن مع بدء برامج التكاثر الصونية.

بيطرة الصقور في القرن الواحد والعشرين

توم بيلي

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"بيطرة الصقور في القرن الواحد والعشرين" كان عنواننا لاجتماع عقدته في الدوحة بإمارة قطر كل من الرابطة الدولية للصفارة والطيور الجارحة IAF، وجمعية القناص القطرية ومستشفى سوق واقف للصقور SWFH من 29 يناير - 1 فبراير. تولى البروفسور توم ريختر وفريق الرابطة الدولية للصفارة والطيور الجارحة تنظيم المؤتمر، وحضره قرابة 80 مندوبا كثير منهم هم من الأطباء البيطريين بالمنطقة. كانت العروض المقدمة على مستوى عالي وغطت العديد من قضايا صحة الجوارح، سبق عرض الكثير منها في الأعداد السابقة من فالكو. شرح د. دي سوما من مستشفى دبي للصقور كيف أمكن للتشخيص الحديث المبكر باستخدام التنظير واستخدام العقارات المضادة للفطريات، مثل فوريكونازول، أن يجعل مما كانت أكثر أمراض النسور إقلاقا أن تصبح حالة قابلة للعلاج. قدم البروفيسور ليرز من جامعة جيسين عرضا موجزا لإكثار الصقور ونتائج من الأبحاث التي أجراها فريقه في مجال تناسل الصقور. قدمت د. مارجيت مولر من مستشفى أبوظبي للصقور أمراضا جديدة جرى التعرف عليها في مختبراتها في صقور أبوظبي. عرض ريتشارد جونز (من المملكة المتحدة) إيجازا لبحوثه في متلازمة هزال صقر الشاهين. أسر نيل فوربس (من المملكة المتحدة) اهتمام الحضور بدرس متقدم شامل عن تغذية الجوارح يستند إلى خبرة حياته في التعامل مع تلك الطيور. قدم د. كيسوكي سايتو من معهد الطب الحيوي للطيور الجارحة في اليابان عرضا قويا عن موضوع اشتغل فيه لكثير من السنوات يتعلق بالتسمم بالرصاص للنسور البحرية والنسور الذيل الأبيض في اليابان. لا شك أن وقائع المؤتمر تستحق المطالعة ويمكن الحصول على نسخة منها من د. إكدام ميدان بمستشفى سوق واقف للصقور ikdammajid@yahoo.com.



مسح للحبارى وصقور الشاهين في صحراء جوبي في منغوليا

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منطقة جلبا جوبي للطيور المهمة هي مسطح صحراوي بتلال ذات غطاء نباتي شحيح وكثبان رملية وقيعان أنهار جافة وبعض أشجار الغضا والدردار. تمتد المنطقة، وتتداخل جزئياً، بين المنطقتين المحميتين جوبي 1 الصغيرة وجوبي 2 الصغيرة لتغطي مساحة 828,328 هكتاراً. تدعم المنطقة أعداداً متكاثرة هامة لثلاثة أنواع من الطيور المهدة عالمياً هي صقر الشاهين وطير الحبارى والعوسق الأصغر، بالإضافة إلى نوعين من الثدييات المهدة عالمياً هما الحمار البري الآسيوي والغزال الدرقي (الريم). تعتبر المنطقة أقصى موقع شرقاً للحبارى، وقد سجل خلال المسح 106 علامات لوجودها: 41 منها مشاهدة مباشرة لطيور حية، إضافة لعشرات مشاهدات للريش والفضلات والمسارات، ومعلومات من السكان المحليين، وملاحظات من حرس الحدود وعمال المنجم الذين تصادف رؤيتهم للطيور في المنطقة. قمنا بعمل تقديرات لكثافة الأعداد في فترات المسح الأربعة، وتراوحت تقديرات الكثافة بين 0.22 إلى 0.03 طير حباري لكل كلم². بدأ القطريون القيام برحلات صيد في هذه المنطقة في السنوات الأخيرة وأفاد الأهالي أن الصقارون القطريون كانوا يصطادون طير الحبارى والغزلان. أما صقور الشاهين فقد تم تحديد 11 عشا لها خلال المسح، وكانت جميعها في أشجار الدردار في الوديان الطويلة في وسط الصحراء.

شبكة صقر الشاهين لجنوب شرق أوروبا: نشاطات ونتائج 2010-2006

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تضم شبكة صقر الشاهين لجنوب شرق أوروبا SESN نشاطات صون وعلوم الطبيعة، ومنظمات غير حكومية وأكاديمية تعمل في مجال أبحاث الطيور الجارحة وصونها. أنشأت الشبكة في عام 2006 حين كانت المعلومات عن صقور الشاهين في شرق أوروبا محدودة، وكانت تقديرات الأعداد تستند إلى بيانات منخفضة الجودة. الهدف الرئيس للشبكة هو تطبيق إجراءات الصون للحيلولة دون انقراض صقور الشاهين المحلية، وإيقاف المزيد من التدهور في أعدادها والمحافظة لأعداد النوع في وضع موثوق. جرت نشاطات الشبكة في 9 دول أوروبية وشاركت فيها 17 منظمة. كان التركيز على الحصول على فهم أفضل لأعداد صقر الشاهين والتهديدات التي تواجهها. شملت نشاطات الصون تطوير برنامج إعادة الإطلاق؛ ومسوحات للأعداد؛ وحملات التوعية، وبرامج لإقامة الأعشاش الاصطناعية؛ وإنفاذ القوانين؛ وتنظيم ورش العمل والاجتماعات المتخصصة.

صور للصقارة في أوزباكستان من مجموعة صور صندوق تراث الصقارة

يفجيني شيرجالين

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تقع دولة أوزباكستان في وسط آسيا على تقاطعات طريق الحرير القديم وبها مراكز حضارية شهيرة مثل خيفا وسمرقند وخوارزم وبخارى. تتمتع الدولة بتراث غني للصقارة، وقد استخدم الصقارون المحليون منذ قديم الأزل الصقور والعقبان والنسور لصيد مختلف أنواع الطرائد: البط وطيور الدرج والأرانب البرية والغزلان والذئاب. تظهر هذه السلسلة من صندوق تراث الصقارة صوراً لصقارو أوزباكستان من الوثائق القديمة والميداليات وصور قديمة فريدة وأعمال فنية حديثة. تختتم السلسلة بصورة جماعية لصقارين معاصرين من أوزباكستان يضمهم نادي الصقارة الجديد "شاهين أوزباكستان".

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تضمن العمل الميداني في صقور الشاهين في القطب الشمالي الروسي جمع عينات الدم وتثبيت أجهزة الإرسال الفضائية على الطيور في دلنا كولوما في أقصى الشرق. توجهت جميع الطيور الحاملة لمرسلات الأقمار الاصطناعية إلى جنوب شرق آسيا لقضاء فصل الشتاء لكن واحدا من هذه الطيور عبر خط الاستواء لقضاء فصل الشتاء في منطقة حضرية في سورابايا، جاوا. سجلنا في السنة الثالثة من رصد مشروع إنشاء "5000 عش اصطناعي في منغوليا" زيادة أخرى في عدد صقور الشاهين المتكاثرة، فشاهد 528 زوجا وضعت البيض عبر 20 مقاطعة، إضافة إلى 46 زوجا احتلت أعشاشا في منطقتين تجريبيتين أقماهما.

كانت تجربة التكاثر ناجحة للغاية، حيث أنتج فرخ واحد على الأقل في 88% من الأعشاش، ونبت الريش على 1,914 فرخا في الأعشاش الاصطناعية. حددنا مشكلة تؤدي لمعدلات وفيات عالية بين الصقور والطيور الجارحة الأخرى بسبب الصعق الكهربائي على خطوط الجهد المتوسط لتوزيع الكهرباء، وبدأنا في عام 2013 مجموعة من التجارب التقنية لمعالجة هذه المسألة.

من ناحية أخرى أسسنا مشروعا مجتمعيا ضمن نشاطاتنا لتقديم الفوائد للمجتمعات كجزء من استراتيجيتنا الرامية إلى حماية الأعشاش الاصطناعية والطيور الجارحة المتكاثرة في منغوليا. فقد انضمت إحدى عشرة مدرسة من منغوليا خلال العام الدراسي 2012/2013، إلى برنامج روابط المدارس للأعشاش الاصطناعية للتواصل مع مدارس في أبو ظبي والولايات المتحدة الأمريكية والمملكة المتحدة، مما يتيح للأطفال تبادل المعرفة والثقافة واللغة. في بلغاريا، وسعنا برنامجنا التجريبي "أكثر وأطلق" لتطوير القدرات والمهارات اللازمة للشرع في برنامج إعادة تقديم صقر الغزال (الحر) إلى البرية والحصول على مزيد من المعلومات حول استخدام الموائل وبقاء الطيور التي تطلق على قيد الحياة. أنتجت ثلاث أزواج محتجزة في مركز البلقان الأخضر في ستارا زاجورا البيض، وقام زوجين بتربية سبعة أفراخ إلى مرحلة الاستقلال. ضمت أربعة من تلك الأفراخ إلى برنامج الإطلاق وأبقي على الثلاثة الأخرى في منشأة البلقان الأخضر للإكثار. قمنا في عام 2013 بنشر كامل نتائج تحليل الجينوم لصقور الغزال وصقور الشاهين وتضمنت أبحاثنا الجارية منهجين لدراسة الهيكلة الجينية لصقر الشاهين على مستوى العالم.



Photo: D. Scott

لاستخدام عقاقير لا تسمم النسور مثل ميلوكسيكام. في حين لم يتم على حد علمنا الإبلاغ عن سمية ديكلوفيناك لنسور منطقة الشرق الأوسط، فإن على علماء الأحياء والأطباء البيطريين في المنطقة اليقظة لهذا الخطر الذي يهدد النسور.

"بيطرة الصقور في القرن الواحد والعشرين" كان عنوانا لاجتماع عقدته في الدوحة، قطر، كل من الرابطة الدولية للصقارة والطيور الجارحة IAF، وجمعية الفئاص القطرية ومستشفى سوق واقف للصقور SWFH من 29 يناير - 1 فبراير. تولى البروفسور توم ريختر وفريق الرابطة الدولية للصقارة والطيور الجارحة تنظيم المؤتمر وحضره عدد كبير من الأطباء البيطريين من المنطقة. كانت العروض المقدمة على مستوى عالي وغطت العديد من قضايا صحة الجوارح، كان الكثير منها قد عرض في الأعداد السابقة من فالكو. شملت المواضيع علاج داء الرشاشيات والطب التكاثري وتشخيص بطرق مبتكرة للأمراض عن طريق الفحص المتقدم لتفاعل البليمرز التتبعي وتحديثات عن متلازمة هزال صقور الشاهين وتسمم النسور بالبرصاص في اليابان.

دعوة لتلقي المساهمات

نتمنى أن نرى المزيد من مشاركة المشتركين في مجموعة الشرق الأوسط لأبحاث الصقور MEFRG بأرائهم وخبراتهم ومعارفهم من خلال فالكو. يسعدنا تلقي المقالات المكتوبة باللغتين العربية والإنجليزية التي تتعلق بالمواضيع المدرجة في الصفحة المقابلة.

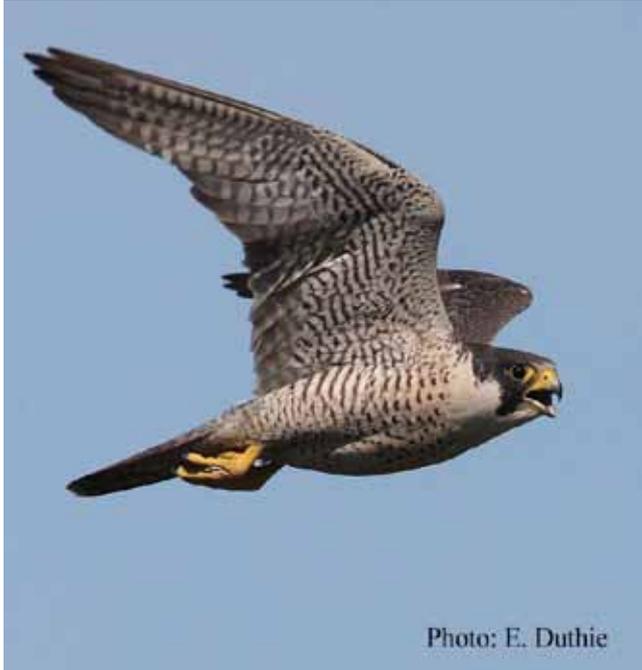


Photo: E. Duthie

نطلعكم في هذا العدد من فالكو على مشاريع البحث والصون في الصقور التي يتم تنفيذها نيابة عن هيئة البيئة-أبوظبي. تمثل الصقور جزءاً لا يتجزأ من التراث الثقافي والطبيعي للخليج العربي، وتندرج النشاطات المذكورة أدناه ضمن رؤية هيئة البيئة لبيئة ومستقبل مستدامين في أبوظبي. ينبغي النظر لتلك المشاريع المتعلقة بالصقور في سياق مجموعة من البرامج والكيانات الدولية التي تدعمها الهيئة، ومنها على سبيل المثال:

هناك مثلاً الصندوق الدولي للحفاظ على الحبارى يسعى لحماية تلك الطيور من الانقراض عبر برامج الاكثار والإدارة الجيدة لأعدادها؛ ومؤسسة الحياة البرية الإفريقية التي تعمل على صون الموارد الطبيعية والحياة البرية في أفريقيا للنمو الاقتصادي والرفاه البشري؛ ومنظمة "وايلدسكرين"، التي تدير مشروع سجل "أركايف"، وهي مبادرة عالمية لجمع الأفلام والصور لأنواع المهددة في مكتبة رقمية مركزية؛ وبرنامج الأمم المتحدة للبيئة / اتفاقية الطيور المهاجرة UNEP/CMS الذي يشرف، من خلال مكتب أبوظبي، على تطبيق الاتفاقيتين: مذكرة التفاهم لحماية الطيور الجارحة المهاجرة في أفريقيا وأوراسيا، ومذكرة التفاهم بشأن حماية وإدارة بقر البحر وموائله؛ والاتحاد العالمي لحفظ الطبيعة (IUCN) الذي تضم أعماله تطبيق الخطة الاستراتيجية للجنة بقاء الأنواع للاتحاد؛ والشبكة العالمية للبصرة GFN الذي تهدف جهودها لتسريع استخدام البصرة البيئية، وهي أداة محاسبة للموارد لقياس ما لدينا من طبيعة، وكم نستخدمها، ومن يستخدمها.

ما سبق هو مجرد عينة صغيرة للجهود البيئية العالمية التي تدعمها أبوظبي، وهناك العديد من المبادرات الهامة الأخرى ومنها صندوق الشيخ محمد بن زايد الدولي لحماية الأنواع. كثيراً ما نسمع البعض يتساءلون عن دوافع هيئة البيئة-أبوظبي لتمويل مشاريع الصقور - يفترض هؤلاء المشككون أن هناك دوافع خفية لذلك وأن الدافع الحقيقي هو الحصول على الصقور. لكن هؤلاء لا يعلمون كيف تتطابق مشاريع الصقور مع سياق التشكيلة الواسعة من النشاطات التي تدعمها أبوظبي. في حين تركز فالكو في المقام الأول على القضايا المتعلقة بالصقارة العربية، فإن من المهم أن نفهم أن ما نصفه في هذه النشرة هو جزء صغير من أنشطة الصون العديدة التي تدعمها أبوظبي.

يقدم لنا د. نيمايار باتاياار وزملائه تقريراً عن نتائج مسح الحبارى وصقور الشاهين في صحراء جوبي في منغوليا - وهو مشروع نفذ بدعم تعاوني من هيئة البيئة - أبوظبي لتمويل تكاليف التتبع بالأقمار الصناعية. يقدم ديميتار راجيوف مثلاً عن الكيفية التي وزع بها تمويل الهيئة عبر مشاريع نفذت في عدة بلدان من أجل الوصول لفهم أفضل للأوضاع والقضايا التي تواجه صون صقور الشاهين في جنوب شرق أوروبا.

تجدون هنا أيضاً تحديثاً هاماً من الدكتور داما عن الانخفاض في أعداد النسور في آسيا الذي نجم عن استخدام الأطباء البيطريين لعقار ديكلوفيناك للثروة الحيوانية. للتخفيف من حدة أزمة النسور، حظرت حكومات الهند وباكستان ونيبال التصنيع والاستخدام البيطري لديكلوفيناك في عام 2006. لكن وللأسف، فإنه في الوقت الذي حظرت تصنيعه رسمياً، فلا زال يستخدم لرخصه النسبي ولا يزال بالتالي يشكل تهديداً لأعداد النسور. يعتبر الدكتور داما أن هناك حاجة إلى مزيد من برامج التوعية لإقناع الأطباء البيطريين والموظفين والمساعدين البيطريين ومربي المواشي في المنطقة



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