



# FALCO

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## IN THIS

## ISSUE:

### Page

4. Saker Falcon laying seven eggs in Mongolia
5. A rough guide to the raptor trade in Yemen
8. Additional data on raptor migration in Yemen and some aspects of raptor trapping in Yemen and North African countries
10. The Peregrine Fund, falconry and conservation
13. Wildlife forensics as a tool for raptor conservation
16. Vultures at risk. The story of Diclofenac, Meloxicam and other NSAIDs
17. Egg hardness, eggshell thickness and membrane thickness in a variety of falcon taxa
21. Successful treatment of severe bumblefoot in a Peregrine Falcon utilizing Intralesional Doxycycline
23. Digital radiography – an important technique to diagnose musculoskeletal disorders in falcons. Part One: General considerations
25. Digital radiography – an important technique to diagnose musculoskeletal disorders in falcons. Part Two: Techniques
28. Books/What's New in the Literature?
30. Course review
31. News and Announcements



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A central body for the co-ordination of research activities related to falcons and falconry.  
A common forum for the exchange of information and for promoting collaborative research programmes.

### To promote:

Research on health and disease in falcons, falcon moulting in the Middle East, falcon nutrition, domestic breeding.  
Field studies on falcon migration, taxonomy, morphometrics, reproductive biology and behaviour.  
Improved management conditions for captive falcons through educational awareness programmes.  
Greater understanding of falconry as a part of Arab cultural heritage.

### To hold:

International workshops and conferences on veterinary aspects, falcon biology topics, falconry and conservation issues.

### To publish:

Papers on aspects of falcon conservation, falcons and falconry.  
A biannual newsletter/journal containing contributions on medical, biological and conservation topics of common interest, new developments and recent medical advances.

### Membership:

Membership is open to any veterinary surgeon, biologist, conservationist or falconer working in the Middle East or any other person interested and contributing in the fields of medical, biological and conservation aspects of falcons and falconry worldwide.

## Photographs:

**Front Cover:** Saker Falcon in Central Mongolia  
(Photo: Andrew Dixon)

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Previous issues of FALCO as well as instructions for authors can be downloaded from:

<http://www.mefrg.org>



**Inside Cover:** Rick Watson of the Peregrine Fund with a trained Harpy Eagle used for public education, Panama (Photo: Peregrine Fund)

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## Editorial

Autumn heralds another falconry hunting season. Nowadays, for most falconers the hunt is recreational but nevertheless it still has great social and cultural significance in many parts of the world. Falconry has survived down the ages yet still has its place and a role to play in the modern world. But the modern world creates new challenges for falconers, which need to be addressed if falconry is to have a future. Falconers need falcons and quarry to hunt. This obvious statement of fact is the crux of many of the conservation issues which face falconry today, especially in the Middle East.

The demand for falcons in the Middle East is high. Why? Firstly, falconry is popular so there are many falconers (though we do not know how many), and often, each falconer will hunt with several birds. Secondly, there is a very high turnover of falcons as some are lost during hunting and some are released or gifted to others after the season, whilst some of those that are retained die during the moulting period over the summer months. Consequently, prior to each hunting season there is a demand for new falcons. Captive breeding meets a significant part of this demand, especially in the UAE, but the use of wild-caught falcons is still an integral part of Arabic falconry. The consequent trade in wild falcons is a serious conservation issue, especially for Saker Falcons whose population has diminished markedly in parts of Central Asia.

It is perhaps not so much the level of demand for wild falcons that fuels the trade but the monetary value of these birds. The falconer's money funds a supply chain through the dealer and various intermediary traders to the original falcon trapper. The trapper may live and operate in a region far from the Arabian Peninsula, in North Africa, Central Asia, Russia or China, and his reward may only be a few dollars per bird. Nevertheless, in many parts of the world, falcon trapping presents a rare opportunity for impoverished locals to earn some money. These '*local trappers*' often cannot identify different raptor species and may not even be able to sell the birds they catch, but each year they keep catching raptors and trying to sell them because it is their only chance to earn some money.

Other falcon trappers are by no means impoverished and some can travel widely in search of the best places to catch birds. These '*professional trappers*' know the value of the birds and may also act as traders. Trapping is seen as part of their tradition and some localities are renowned for the expertise of their falcon trappers. In addition, there is a class of trappers who have no tradition in catching falcons and can be regarded as '*opportunistic trappers*', intent on making easy money

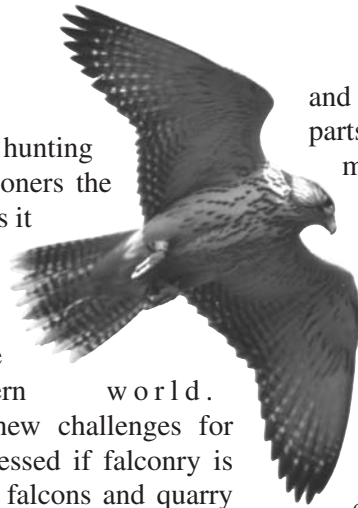
and who often work in organised gangs. In different parts of the world all or some of the 'classes' of trappers may operate, whilst the motives that drive these three 'classes' of falcon trappers can be very different.

In this issue we have published two articles relating to falcon trapping, concentrating on Yemen and North Africa. Here, trapping is largely carried out by locals, though in some areas professional trappers are also active. It is not easy to document or measure the extent of this trapping, and even harder to take action to ensure that trapping has no impact on the falcon populations. In recent years we have published articles in *Falco* on trapping of Gyrfalcons in Russia (issue #33) and raptor trade in Afghanistan (#31) and China (#30). In each case the end result is the same i.e., the uncontrolled exploitation of raptors, but the 'classes' of those engaged in the trapping and trade differs. If we are to tackle the problem of trapping and trade then we need to understand the background, social circumstances and motives of those involved.

The quarry species in Arabic falconry are limited to a few species found in the arid deserts: mammalian quarry comprise hares and gazelles (which are hunted in association with salukis), whilst avian quarry comprises the migratory Houbara Bustards and Stone Curlews. In the Middle East there are precious few areas available for falconers to hunt, and those places where they can hunt have been over exploited and are now largely devoid of prey. So falconers travel in search of hunting grounds and quarry. This hunting 'tourism' can create conservation problems, as highlighted in our News & Announcements section but also conservation opportunities, as exemplified by the reintroduction and management of Houbara in Morocco.

In order to ensure the survival of falconry for future generations a balance needs to be struck between the modern day demands of its adherents and the sustainable use of falcons and their quarry. Increasing awareness of the issues is a small step in this direction. The essay by Tom Cade of the Peregrine Fund highlights the immense contribution that falconers and falconry have made and continue to make to conservation. Falconry has many spin-offs that can benefit conservation. For example, Aurora Castilla and co-workers describe how they have worked with falcon breeding facilities to obtain valuable data on eggs.

Veterinarians working on falcons are able to use forensic techniques as a conservation tool as described by Elena Obon and Rafael Molina in this issue. Other articles on the veterinary front relate to the treatment of bumblefoot and the use of new digital radiography technology.



# Saker Falcon Laying Seven Eggs in Mongolia

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## Summary

This article documents the exceptional occurrence of a wild Saker Falcon laying seven eggs in Mongolia. This large clutch was laid in a nesting territory with a high availability of small mammals. None of the eggs hatched because the nest was deserted shortly after clutch completion. We discuss the significance of food supply in determining clutch size in Saker Falcons.

## Introduction

The Saker Falcon *Falco cherrug* is one of four closely related large-falcons, the Hierofalcons, which includes the Gyrfalcon *Falco rusticolus*, Lanner Falcon *Falco biarmicus* and Lager Falcon *Falco juggar*. These four species have largely allopatric breeding ranges and are thought to have diverged from a common ancestor some 120 to 200 thousand years ago. Sakers differ from the other Hierofalcons in that a significant proportion of their diet comprises small mammals, whereas the other species mainly feed on avian prey. Nevertheless, Sakers show a high degree of plasticity in their diet and can feed on wide range of prey species including insects, reptiles, birds and mammals.

In Central Mongolia, small mammals such as Brandt's Voles *Microtus brandti* and Mongolian Gerbils *Meriones unguiculatus* are an important component of the breeding season diet. These animals are active in early spring during the pre-laying phase of the Saker breeding cycle, along with large flocks of larks which also form an important part of the diet.

## Methods and Results

We have been monitoring the breeding biology of Saker Falcons at the Bayan Artificial Nest Experimental Area in Central Mongolia since 2007. The nest documented in this study was located in a 4 x 4 km<sup>2</sup> grid comprising 24 artificial nests spaced at 1 km intervals. It was one of three Saker nests within this particular grid, along with 12 pairs of Common Kestrel *Falco tinnunculus*, five pairs of Upland Buzzards *Buteo hemilasius* and three pairs of Ravens *Corvus corax*. In total 16 pairs of Sakers bred at our study area in 2009.

The artificial nest with a clutch of seven eggs was occupied for the first time in 2009, thus there was no prior history of Sakers breeding in this nesting territory. The nest was first inspected on 12<sup>th</sup> April 2009 and monitored at intervals thereafter (Table 1).

Date	Contents
12 <sup>th</sup> April 2009	One cold egg
21 <sup>st</sup> April 2009	Four eggs, adult on nest
30 <sup>th</sup> April 2009	Seven eggs, female incubating
11 <sup>th</sup> May 2009	Seven eggs, cold, no adults seen
25 <sup>th</sup> May 2009	Seven eggs, cold, no adults seen

**Table 1.** Nest record data for Saker nest with 7 eggs

There was one cold egg in the nest on the first visit and nine days later there were four cold eggs in the nest, which means the average laying interval was 54-72 hours for the 1<sup>st</sup> to 4<sup>th</sup> eggs. The third visit was made six days later when the nest contained seven eggs, which were being incubated by the female. The average laying interval was again 54-72 hours for the 4<sup>th</sup> to 7<sup>th</sup> eggs. Consequently, it would have taken the female 14 -18 days to complete this clutch of 7 eggs.

All the eggs in the clutch were a distinctive pyriform shape and had similar pale, sandy shell markings, strongly suggesting that they were laid by the same female (Picture 1).



**Picture 1.** Clutch of 7 Saker Falcon eggs; note similar coloration and unusual pyriform egg shape. The large mammal bones, wire and twigs would have been brought to the artificial nest previously by Ravens or Upland Buzzards (Photo: D. Ragyov).

The nest failed sometime between the 30<sup>th</sup> April and 7<sup>th</sup> May. On the 25<sup>th</sup> May the eggs were removed and broken but there was no visible sign of embryo development and the contents were not rotten. Nest failure would have occurred 5-20 days after the last egg was laid. The cause of the nest failure is not known, but the nest was not deserted as a result of our monitoring visit on the 30<sup>th</sup> April as subsequent photographs showed that the eggs had been further incubated after this visit.

## Discussion

This is the first documented record of seven eggs in a Saker Falcon nest that we could trace. In captivity Saker Falcons can lay 12 or more eggs in sequence, with a typical interval of 48-52 hours between eggs, if they are removed sequentially (i.e., “pulled”) after laying. Unmanipulated clutches in captivity typically comprise 4-6 eggs, whilst the modal clutch size at our Bayan study area in 2009 was five eggs (Table 2).

Egg laying, both in terms of the timing and the number of eggs laid can be strongly influenced by the availability of food. Birds of prey that feed mainly on small mammals, which often exhibit fluctuating population cycles, tend to have highly variable reproductive rates (Newton, 1979). Our work in two study areas with different levels of rodent availability has shown that Saker Falcons lay larger clutches in areas where rodents are abundant compared to areas where rodents are scanty and the raptor hunts mainly on birds. (Unpublished Data; Table 2). In this regard Saker Falcons in Mongolia respond to high-density rodent populations by increasing the number of eggs they produce in a similar manner to specialist rodent predators such as Common Kestrels (Korpimaki, 1984) and Montagu’s Harrier *Circus pygargus* (Salamolard, 2000).

Rodent Density	c/3	c/4	c/5	c/6	c/7	Mean
High	0	1	14	0	1	5.1
Low	3	10	4	0	0	4.1

**Table 2.** Clutch sizes at Saker nests in Artificial Nest Experimental Areas with high and low density rodent populations in 2009.

Unfortunately, this exceptional nest was abandoned during incubation. We have not previously recorded egg desertion at 31 other Saker nests, which we have monitored at our Bayan Artificial Nest Experimental Area over the period 2007-09. It is possible that one of the adult birds died during this phase of the breeding cycle as no birds were observed at the territory during two nest visits after 30<sup>th</sup> April.

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# A Rough Guide to the Raptor Trade in Yemen

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## Summary

Although Yemen is not generally considered a major link in the international falcon trade, an undocumented number of large falcons, i.e. Sakers, Peregrines and Lanners *Falco biarmicus* are captured on passage annually, principally at the Southern Red Sea migration bottleneck at Bab al Mandab. Additionally, resident Lanners are taken from nests with a resulting population decline having been noted for this species (Mike Jennings, pers. comm.). Although the more desirable birds are captured by professionals who know their prey and the market, it is widely understood throughout Yemen that raptors *can* be valuable. The widespread belief that any raptor can be sold for a potentially hefty price drives a largely opportunistic domestic wildlife trade which we have informally documented since March 2009. This trade occurs at roadsides and intersections, and at specific outlets including the Nuqum animal *suq* (market) in Sana’a. No fewer than 14 species of raptors (including owls) have been documented at Nuqum, with eight additional species having been recorded for sale at other outlets, and a further five locally caught species displayed at Sana’a Zoo and in restaurant menageries. Not only is this trade in contravention to international treaties to which Yemen is a signatory, but there are significant animal welfare issues at stake because of the appalling conditions in which many of these birds are held prior to sale and the circumstances in which captive birds are displayed to the public.

## Introduction

The image of a *bedu sheikh*, robes flowing in the desert wind as a falcon sits alertly on his fist, is partly a western fantasy but also typifies a widespread and popular sport within Arabia. However, the supply chain that feeds this sport, in its worst manifestation, plays havoc with wild raptor populations worldwide. While regional demand for the most desirable birds is centred in the Arabian Gulf, Yemen’s role in the pernicious trade is that of supplier. Every year dozens of trappers congregate at Bab al Mandab in a rough and tumble competition to catch passage birds. The most sought after species: Peregrines and Lanners are CITES Appendix I listed and Sakers are Appendix II. Although Yemen is a signatory to the Convention on the International Trade in Endangered Species of Flora and Fauna (CITES) and the Convention on Migratory Species (CMS), buyers from neighbouring countries have no difficulty in moving their purchases out of the country. Long

gone are the days when Yemeni middlemen in Sana'a dealt with the logistics of smuggling birds across the border. In the last ten years good asphalt roads have linked the Gulf directly through to Bab al Mandab, and overseas buyers can simply drive to the source and buy their falcons direct from the trappers. The "formalities" these smugglers face at the border must not be overly prohibitive or the trade would quickly dry up.

While most Yemenis do not know the difference between a Saker and a Shikra *Accipiter badius*, it is generally known that *saqoor* (Arabic plural for 'falcon' and a common general term for raptors) can fetch high prices. Therefore, many birds of prey are opportunistically captured in Yemen and sold by the roadside. Over the years I have observed Yellow-billed Kites, Dark Chanting Goshawks, Common Kestrels, Hobbies *Falco subbuteo*, Steppe Buzzards, Steppe Eagles in addition to a multitude of other wildlife species being offered for sale at byways and intersections.



Dark Chanting Goshawk (above) and Black-winged Kite (below)

Slightly more organized than this diffuse, opportunistic trade is the marketing of wildlife through Sana'a's Nuqum animal *suq*. Having been alerted in March, 2009 that a considerable stream of wildlife passed through the *suq*, I contracted a student to monitor the traffic at Nuqum and the results have revealed a horrendous situation. In the first year this student documented with lists and photographs an amazing 48 species of birds, 15 species of mammals, and at least seven reptile

species moving through the *suq*. Of the birds, no fewer than three species of owls and 11 species of diurnal raptors have been put up for sale. Many die miserably in the appalling conditions that prevail at Nuqum. While Kestrels and Yellow-billed Kites predominate, the trade is not limited to these commoner species. For example, on May 22, 2009 a Verreaux's Eagle nestling was on offer; it died within the week. A month later, a recently fledged Hume's Tawny Owl hit the market and was quickly snapped up by an expatriate 'enthusiast.' The following September five Lesser Kestrels appeared in the *suq* where two of them quickly succumbed to the frightful conditions of their captivity.

#### Raptor species for sale at Nuqum

- Yellow-billed Kite *Milvus aegyptius* (LC)
- Dark Chanting Goshawk *Melierax metabates* (LC)
- Sparrowhawk *Accipiter nisus* (LC)
- Tawny Eagle *Aquila rapax* (LC)
- Steppe Eagle *Aquila nipalensis* (LC)
- Verreaux's Eagle *Aquila verreauxii* (LC)
- Lesser Kestrel *Falco naumanni* (VU)
- Kestrel *Falco tinnunculus* (LC)
- Black-winged Kite *Elanus caeruleus* (LC)
- Lanner Falcon *Falco biarmicus* (LC)
- Barbary Falcon *Falco pelegrinoides* (LC)
- Barn Owl *Tyto alba* (LC)
- African Eagle Owl *Bubo africanus* (LC)
- Hume's Tawny Owl *Strix butleri* (LC)

#### Additional species sold in other venues

- Pallid Harrier *Circus macrourus* (NT)
- Steppe Buzzard *Buteo buteo vulpinus* (LC)
- Long-legged Buzzard *Buteo rufinus* (LC)
- Hobby *Falco subbuteo* (LC)
- Saker Falcon *Falco cherrug* (VU)
- Peregrine Falcon *Falco peregrinus* (LC)
- African Scops Owl *Otus senegalensis* (LC)
- Little Owl *Athene noctua* (LC)

#### Raptors displayed in Zoos

- Lammergeier *Gypaetus barbatus* (LC)
- Egyptian Vulture *Neophron percnopterus* (EN)
- Griffon Vulture *Gyps fulvus* (LC)
- Imperial Eagle *Aquila heliaca* (VU)
- Bonelli's Eagle *Hieraetus fasciatus* (LC)

**Table 1.** Raptors documented in the wildlife trade and on display in Yemen (Global Conservation Status in brackets does not necessarily reflect Local Conservation Status\*); LC = Least Concern, VU = Vulnerable, NT = Near Threatened, EN = Endangered). \*Data taken from BirdLife International's "Data Zone"  
<http://www.birdlife.org/datazone/species/index.html>



Nestling Verreaux's Eagle for sale in Nuqum animal suq.

While the results of this study are alarming in terms of the sheer number of species and individuals affected, the conditions in which these creatures are kept prior to sale are positively heartbreaking. Animals are crammed into whatever containers are available, handled roughly, and given the bare minimum (or less!) needed to keep them alive. Three factors contribute to the traumatic circumstances of their captivity: 1) ignorance of each species' specific requirements, 2) the desire to maximize profits by expending the minimum on upkeep, and 3) a callous disregard for the comfort/care of the animals. As a result, injured, diseased, dead, and dying raptors are a common sight at the *suq*.

In addition to the 22 raptor species that we have documented for sale in Yemen, a further five species have been observed on display at Sana'a Zoo and in restaurants with private menageries. As an indication of how these captive birds often fare, a juvenile Lammergeier was displayed at Sana'a Zoo in such a small cage that the bird was unable to completely spread its wings. When the Lammergeier was transferred to a more capacious enclosure, it was promptly killed by its new roommate, an adult Verreaux's Eagle. Other raptor species documented on display at the zoo and elsewhere include Egyptian Vulture, Griffon Vulture, Imperial Eagle, and Bonelli's Eagle. These birds are not acquired as part of an enlightened conservation strategy implemented by an insightful and professional staff. They are captured and sold by opportunists looking to turn a quick profit and purchased without regard for their conservation value or husbandry needs.

As the poorest nation in the region, Yemen faces some difficult economic challenges. Approximately 40% of the population lives on less than a dollar a day and the wildlife trade is just one response to this untenable situation. Yemen's Minister for Water and the Environment, HE Abdulrahman Al-Eryani, states that enforcement of the wildlife laws is out of his hands and that raising the public's awareness is the only way to stop the wholesale marketing of Yemen's precious

wildlife. Since we started this investigation we have published articles on Yemen's wildlife trade in *Wildlife Middle East News*, *Yemen Today*, and it has received coverage in the *Yemen Times*. However, these outlets reach a relatively small, mostly English-speaking audience, and though our articles *may* influence some policymakers, much more needs to be done. Because the roots of this trade include poverty, greed, and ignorance the problem must be attacked from several angles. Yemen's poor must be provided with opportunities to make a decent living while being encouraged to value the biodiversity that makes this country so unique in the Peninsula. For high-demand species that are traded internationally, all signatories to CITES must honor their commitments and prevent the import of illegally captured and traded birds from Yemen.

Much like the wildlife trade in Yemen, this report is somewhat opportunistic. When we started monitoring the trade at Nuqum, it was a step towards a more systematic appraisal of wildlife trafficking in the country although we concede that it is wildly inadequate. With more information, perhaps the government can be stimulated into action and Yemen will begin enforcing the laws that were written to protect this country's wildlife. In the meantime we will just keep counting.

#### Acknowledgements

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Map of Yemen showing Sana'a and narrow Bab al Mandab strait between Yemen and the North African coastline of Eritrea and Djibouti

# Additional data on raptor migration in Yemen and some aspects of raptor trapping in Yemen and North African countries

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## Raptor migration

The two goals of our field trip to southern Yemen were, firstly to get information about the existence and intensity of raptor trapping and secondly to gather some information about the raptor migration at the Bab Al Mandeb Straits, which is 28 km wide and situated between the Arabian Peninsula and Africa. The first published report came from Madarász (1915) he wrote of 'many thousands' of Black Kites over the island of Perim on 05 March 1907. There is only one comprehensive survey work about the region (Welch & Welch, 1988). The Welch's surveyed the pattern of raptor migration at the coast of Djibouti in 1985 and 1987 with 80,732 and 246,478 individuals counted.

Unfortunately, the available time and possibilities were limited for us, thus our census of raptors is far from comprehensive. We spent *ca.* 10 hours on direct observation on 27-28 October 2010 at the Bab Al Mandeb region during southeasterly winds of 15-30 km/hr. The daily peak of the migration was between 09:00-10:30; after 12:30 the migration became infrequent and slow and the number of birds seen petered-out. One interesting characteristic pattern of the migration was experienced in the desert 20-25 km before the Straits along the Red Sea coast. The migration, before the Straits comprised massive flocks of Steppe Eagles flying at relatively high altitudes (*ca.* 150-200 m), compared with Steppe Buzzards, Sparrowhawks and Booted Eagles which flew relatively low altitudes (*ca.* 30-50 m). We observed very few Steppe Eagles (mainly juveniles) flying at low altitude. There were no observations of Steppe Eagles on the ground, but in contrast there were numerous Steppe Buzzards on the ground of the coastal desert between 07:35 and 08:45.

Observed raptors in Yemen 17 -31 October 2009:

1. Black Kite *Milvus migrans* (numerous)
2. Egyptian Vulture *Neophron percnopterus* (several)
3. Griffon Vulture *Gyps fulvus* (numerous)
4. Marsh Harrier *Circus aeruginosus* (several)
5. Pallid Harrier *Circus macrourus* (1 juv.)
6. Dark Chanting Goshawk *Melierax metabates* (3)
7. Sparrowhawk *Accipiter nisus* (numerous)
8. Levant Sparrowhawk *Accipiter brevipes* (1)

9. Steppe Buzzard *Buteo buteo vulpinus* (numerous)
10. Tawny Eagle *Aquila rapax* (numerous)
11. Steppe Eagle *Aquila nipalensis* (numerous)
12. Imperial Eagle *Aquila heliaca* (1 juv.)
13. Booted Eagle *Hieraaetus pennatus* (14-17)
14. Honey Buzzard *Pernis apivorus* (1)
15. Short-toed Eagle *Circaetus gallicus* (5)
16. Osprey *Pandion haliaetus* (numerous)
17. Common Kestrel *Falco tinnunculus* (numerous)
18. Black-winged Kite *Elanus caeruleus* (1)
19. Hobby *Falco subbuteo* (1)
20. Peregrine *Falco peregrinus* (1)



View of Bab al Mandeb (I. Balázs)

Observed raptors in Bab al Mandeb 27-28 October 2009:

1. Sparrow-hawk (10-100)
2. Steppe Buzzard (100-1000)
3. Steppe Eagle (>1000)
4. Booted Eagle (12-15)
5. Honey Buzzard (1)
6. Short-toed Eagle(1)
7. Peregrine (1)
8. Saker or Lanner (1)
9. + Black Stork (1)

## Falcon trapping in Yemen and north African countries:

The first trappers we encountered were seen near the main road between Al Mocha and Bab al Mandeb, some kilometers after Dhubab. There was a large number of falcon trappers concentrated along this 20-25 km stretch of the southwestern corner of the Arabian Peninsula; their standing posts are *ca.* 200-250 m apart and seem to have a good relationship with one another. Some spend one month or more in the region for trapping raptors, especially falcons. The trappers use pick-ups and small 4WD vehicles and spend most of their time on the coastal region of the Red Sea. The most frequently used decoys we saw being used were feral/hill pigeons. There are no estimates available for how many raptors and falcons are trapped in the region, but several hundred trappers operate in the area. For declining species such as the Saker Falcon, excessive trapping poses a serious conservation problem.



Cages used to store pigeon decoys used by Yemeni falcon trappers (*I. Balázs*)

The Saker Falcon exists in the wider region not just as migrating bird but also as wintering bird in Yemen. There are recent records of wintering juvenile Sakers from the Tihama coastal region on 17th January 2007 and 22nd January 2008 (pers.com. János Oláh).

There are four records of ringed Saker Falcons which were caught by trappers in Libya in the last 15 years (three from the last six years). Three of the four ringed birds were trapped on their autumn migration and one was caught during spring migration (Bagyura & Szitta, 2009; Hungarian Bird Ringing Centre). In addition, two satellite-tagged Sakers may have been trapped as the transmitters stopped sending signals near the Libyan coast (MME/Birdlife Hungary, 2010). All of the marked birds that crossed the Mediterranean from Central Europe were females i.e., five satellite tagged juveniles and one ringed juvenile (weight 868 g before fledgling). The sex ratio of the satellite tagged juveniles in the EU Saker LIFE project is ca. 50:50; suggesting that females are more likely to make longer migrations than males. This deserves further investigation and could potentially mean that females are at greater risk from trappers than males.



Pigeon with noose-harness ready to be released to trap falcons in Yemen (*I. Balázs*)

Falcon trapping also occurs elsewhere in other Mediterranean countries of North Africa and the Middle East (see [birdlife.org/action/change/sustainable\\_hunting/](http://birdlife.org/action/change/sustainable_hunting/)). For example, there are also no precise estimates of the number of falcons in Egypt trapped but during October and November thousands of people want to catch falcons in Egypt. There are two favoured areas: The Western Desert from the Nile to the Libyan border and the Red Sea coast especially the Gulf of Suez and along the Mediterranean coast in North Sinai. The intensity and scale of the trapping (particularly in the Western Desert) has increased since the mid 1980's (Baha El Din, 2005).

It is not known how many Sakers migrate through or winter in the Middle East and North Africa, nor do we know where most of the migrants originate from (European and/or Asian breeding populations). The 720-810 breeding pairs of Sakers in Europe can annually produce ca. 1706-1912 juveniles (using 3.0 as the average number of fledglings/successful broods and 79% breeding success i.e., successful/incubating pairs; based on Hungarian data from 2004- 2009). A rough estimate, based on satellite-tagged Sakers and ring recoveries, ca. 20% of European juveniles (mainly females) reach North Africa i.e., ca. 360 birds. According to the reported information on the activity and number of trappers in the region, significant numbers of migrating Sakers would be trapped. Nevertheless, despite the trapping activity in the North African region and other mortality factors the Hungarian Saker population is still increasing, though perhaps not a rate that could be achieved. The situation is significantly different in Central Asia and some other European countries, especially in Russia and Kazakhstan, where rapid and large population declines have been documented (Karyakin, 2008; Levin & Dixon, 2008). One of the possible reasons for this decline is widespread, uncontrolled trapping to supply a demand for wild falcons in Arabic falconry.



Hungarian Saker Falcon caught in Libya in its 1st calander-year November (*Hakim Shahin*)

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# The Peregrine Fund, Falconry and Conservation

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## Summary

This essay is a slightly modified version of a paper first presented at the special symposium of the International Association of Falconry held in Abu Dhabi in October 2005 to consider petitioning the UNESCO to recognize falconry as a part of the World's Intangible Cultural Heritage. It describes the development of the Peregrine Fund from an organisation established to restore the much diminished North American Peregrine population in 1970 to broader raptor conservation organisation of today. This essay describes how the conservation work of the Peregrine Fund remains closely interwoven with falconers and falconry.

The Peregrine Fund is a nonprofit organization that works worldwide to conserve birds of prey in nature through research and management. Our guiding principle is that conserving raptors provides an umbrella of protection for entire ecosystems and their biodiversity. We began in 1970 with the single purpose to restore the Peregrine Falcon to its lost range in North America but expanded our efforts in the 1980s to include other threatened species such as the Mauritius Kestrel, Bald Eagle, Philippine Eagle, Harpy Eagle, Aplomado Falcon, and California Condor. Our goals are now achieved not only by restoring and maintaining viable populations of species in jeopardy but also by basic research on little-known species, conserving habitat, educating students, building local capacity for science and conservation in developing countries, and providing factual information to the general public, all of which we administer from our headquarters, The World Center for Birds of Prey, in Boise, Idaho. In the past 40 years we have assisted raptor conservation projects in more than 40 countries. One of our long term goals is to establish at least one professionally trained raptor biologist in every country of the world.

As a representative of this organization, I appreciate the opportunity to participate in this symposium to consider falconry as an "Intangible Human Cultural Heritage," because The Peregrine Fund is deeply rooted in both the practice and the culture of falconry. All five of our original, founding directors have been practicing falconers for most of their lives; several other directors and officers and many of our staff are also falconers. We trace many of our operating principles and methods

back to the Emperor Frederick II of Hohenstaufen in the 13<sup>th</sup> Century—the first modern man to sit on a throne in Europe and the first to introduce scientific thinking into the practice of falconry in his great Latin treatise *De Arte Venandi cum Avibus*.

Falconry has been referred to as a sport, as an art ("the noblest of arts"), and as a science. It is all of those things, and more. We at The Peregrine Fund value falconry for several reasons. First, it is a practice that provides an intimate and personal relationship with another creature—to learn to see and to feel and to respond to nature as the falcon or hawk does—to know how to anticipate the actions of the falcon and the reactions of its quarry under various field conditions—these are unique and deeply felt experiences. To be a successful falconer one has to develop all the skills of a keen naturalist. Such close man-to-animal relationships can lead to deep insights into the nature of wild creatures, as ethologists such as Konrad Lorenz and Niko Tinbergen understood very well. At a time when human beings are increasingly separated from nature and wild creatures and have limited opportunities for direct, hands-on experience with animals, falconry remains one of the few accepted endeavors in which people can establish a close relationship with wild animals.



Tom Cade with a Gyr Falcon (*Kate Davis*)

A second value of falconry is that it provides an array of methods for handling birds of prey that have many applications for scientific research and management. The ancient devices for restraining raptors, such as the hood, jesses and leash, the berail and guba, have proven

useful in modern veterinary practice and in field research involving procedures such as banding and marking, and blood sampling. The various methods falconers use to capture birds of prey are also useful. Hacking eyasses has played a major role in the reintroduction of raptors back into vacated range, and training and flying to the fist or lure are important in conditioning rehabilitated birds for return to the wild. Modern falconers have also pioneered the adoption of new techniques such as tracking by radio telemetry and many other kinds of gear and methods that were unknown prior to the 20<sup>th</sup> Century.



Apomado Falcon hack tower, West Texas (*Christina Kleberg*)

A third value is that falconers tend to be single-minded and zealous in pursuit of their relationship with birds of prey, and they often develop a camaraderie or fellowship that can give them great strength of purpose to prevail in common causes that concern their beloved hawks and falcons. In no case have these values of falconry been put to a better test than in the international effort to restore the Peregrine Falcon in the 1960s to 1990s, and I want to describe briefly how they helped in the joint efforts of The Peregrine Fund and our many colleagues in recovery of the Peregrine Falcon in North America.

Following the drastic decline of the Peregrine in the 1950s and 60s in both Europe and North America owing largely to the effects of synthetic chemical pesticides, captive breeding and the reintroduction of captive-bred falcons were methods adopted for the restoration of Peregrines over much of North America from southern Canada to Mexico, as well as in parts of Europe, particularly northern and eastern Germany and southern Sweden. For example, under the leadership of Prof. Dr. Christian Saar and his colleagues in the Deutscher Falkenorden, the German project proved to be highly successful, and today Peregrines are again breeding and increasing in number throughout most of the region in Germany where they had been totally wiped out by pesticides, including the re-establishment of a tree-nesting population in eastern Germany.

In North America, four major institutional programs and numerous private individuals were involved. All of the institutional programs, The Peregrine Fund, the Canadian Wildlife Service program at Wainwright, Alberta, the Raptor Center at the University of Minnesota, and the Santa Cruz Predatory Bird Research Group in California, were supervised and largely staffed by falconers, and hundreds of private falconers assisted these programs in various ways. Details can be found in a book, which William Burnham and I edited, entitled *Return of the Peregrine, a North American Saga of Tenacity and Teamwork* (2003), written by 69 authors who were directly involved in the effort.

Eventually nearly 7,000 captive-bred Peregrines were released, and by 1999 the species had recovered sufficiently throughout North America so that it could be removed from the United States list of endangered species. It continues to increase and to spread into habitats where falcons never bred before—especially into urban and industrialized areas, where about 200 pairs nest on buildings, bridges, and other manmade structures. The restoration of the Peregrine on two continents has been the largest and one of the most successful efforts ever mounted to save a species from impending extinction over a huge portion of its range. The population increase in North America has been so spectacular that in the fall of 2009 it became legally possible for falconers once again to trap a limited number of passage Peregrines for the first time in 40 years.

When these Peregrine recovery projects began in the late 1960s, little was known about how to breed raptors in captivity. Falconers of previous centuries had given little consideration to the possibilities. Fewer than two dozen species of diurnal raptors were known to have produced in captivity, mostly in zoos, and none had been bred in any kind of predictable and large-scale manner. Birds of prey were generally considered to be extremely difficult, if not impossible, to breed in confinement.

Those early years of learning were a marvelous period of unprecedented cooperation and free exchange of information among both the institutional breeding programs and numerous private breeders, which were loosely organized under the Raptor Research Foundation, the North American Falconers' Association, and The Peregrine Fund. There were also overseas communications with various groups in Great Britain, Germany, France, Spain, the former Soviet Union, and the Arab states.

A great deal had to be learned quickly about proper pairing and mating procedures, the use of sexual imprinting, artificial insemination, egg incubation, nutritional and feeding requirements of hatchlings, and many other aspects of husbandry suited to the breeding

of raptors. By the mid-1970s Peregrines were being produced consistently and in significant numbers in several breeding establishments. The Peregrine Fund eventually produced and released more than 4,000 falcons. A number of other species favored by falconers were also being produced—Gyrfalcons, Prairie Falcons, Lanners, Harris’s Hawks, and even some Goshawks. In the mid-1980s commercial breeding developed, primarily for sale of birds to falconers, and it greatly increased the total number of raptors being produced each year. An accurate estimate of the worldwide effort is no longer possible, but it is known that nearly 100 species of diurnal raptors have been bred successfully in captivity (a third of all species in the Order Falconiformes). A dozen or so species have produced hundreds of offspring in captivity, and at least four and possibly five have produced thousands - the Peregrine, Gyrfalcon, Harris’s Hawk, American Kestrel -not to mention numerous falcon hybrids. The Peregrine Fund produced the first Gyrfalcon X Peregrine hybrids in 1976.

Although frowned upon by some people and their use is now illegal in Germany, hybrids have been accepted by Arab falconers of the Gulf Coast with great eagerness, for reasons well explained by Ken Riddle in his new book, *The Art of Falconry from Arabia Westward*” (2009).

The propagation of raptors in captivity succeeded far beyond the expectations of the 1960s and 70s and is almost entirely attributable to the dedicated efforts of falconer-breeders who were determined that their favorite hunting birds would survive—at least in captivity, if not also in the wild. There is no question that captive breeding is the greatest contribution that falconers made to the perpetuation of their sport in the 20<sup>th</sup> Century. In most of Europe only propagated raptors are now used in falconry. In North America use of these birds is now greater than the use of wild-caught birds, although the latter are still legally available to falconers in most states and provinces.

Even in the Middle East, where it was at first claimed that there would never be any interest in the use of such birds because they were unsuited to the Arab style of training, there is now a burgeoning market for domestically produced Sakers, Peregrines, Gyrfalcons, and their hybrids. The first propagated falcon to appear in the Arab world was a Peregrine that The Peregrine Fund presented as a gift to H. H. Shaikh Zayed bin Sultan in 1973. In 1976 at the International Conference on Falconry and Conservation held in Abu Dhabi I predicted that Arab falconers would learn to love domesticated falcons just as they love their Arabian horses and their saluki hounds, and subsequent events appear to have borne out that belief.

The other important conservation use of raptors produced in captivity has been for the reintroduction or supplemental stocking of rare and endangered species in vacated or depopulated habitat. More than 60 such efforts have been reported since the early 1970s, involving some 25 species of diurnal raptors. In addition to the Peregrine Falcon, other notable success stories include the Mauritius Kestrel, once reduced to only two wild pairs, making it the rarest bird in the world (it now numbers several hundred individuals in the wild), the Bald Eagle and Osprey in several parts of the United States, the Aplomado Falcon in South Texas, the California Condor in Arizona and California, the White-tailed Sea Eagle in Scotland, the Goshawk and Red Kite in England and Scotland, Griffon Vulture in France, and the Bearded Vulture in the European Alps. Again, falconers and falconry techniques played major roles in most of these restoration efforts.



Chris Parish (right) and Eddie Feltes vaccinating a California Condor for West Nile virus (*Peregrine Fund*)

Finally, I should mention the role that veterinarians with a strong interest in falconry have played in the development of avian medicine in the past 40 years. Prior to their entry on the scene, avian veterinary knowledge was largely restricted to domestic poultry and cage birds such as parrots. Men such as Dr. Pat Redig at the Raptor Center associated with the veterinary school at the University of Minnesota, and Drs. Dave Remple and Ken Riddle, who directed the first falcon hospitals in Dubai and Abu Dhabi—and their successors at those and several other falcon hospitals in the Middle East—have brought avian veterinary care to an entirely new level of breadth and technical excellence. The Peregrine Fund is pleased to have had a hand in helping to establish the original facilities in Dubai and Abu Dhabi.

As I said at the beginning, The Peregrine Fund is proud of its falconry heritage. It is what has motivated us to succeed, it has provided us with many useful methods and tools for propagating and reintroducing birds of prey, and it has often been the means by which we could establish good working relations with other

people of like-minded interest. These are reasons why we established the Archives of Falconry to preserve the written history and artifacts of falconry, under the guidance of Col. Kent Carnie.

The passion for falconry and birds of prey has always transcended national, ethnic, and cultural differences and has often led to understanding and cooperation among people with quite disparate backgrounds—sometimes even between enemies. One recalls the bloodless crusade that Frederick II of Hohenstaufen carried out. Instead of engaging the enemy on the battlefield, he engaged the Arabs intellectually and diplomatically. He made friends with the Sultan of Egypt El Kamil, and by doing so he accomplished more by treaty than crusaders before him had accomplished by war. He not only learned new things about falconry, including use of the hood, but he brought back to his court scholars and teachers who reintroduced the writings of Aristotle and other Greek philosophers back to Europe through the translation into Latin of Arabic manuscripts that copied and preserved the original Greek writings. It has also been said that during the Hundred Years War, the French and English armies sometimes relaxed for a few days, during which their nobles engaged each other in friendly contests with their trained falcons. The exchange of falcons between monarchs and rulers was often a prelude to political negotiations.



Sheikh Zayed Arab Falconry Heritage Wing at the Archives of Falconry (*Peregrine Fund*)

At a time when peace and stability in the world are severely threatened by factional hatreds of one sort or another, the strong bond of comradeship and cooperation forged by our international falconry heritage stands as a pillar of unity and hope for future good relations among people with different ethnic and cultural backgrounds. It is for this reason, more than any other, that falconry should be recognized as a worldwide, intangible cultural heritage, which is also documented by a rich body of historical writings in many languages, by artwork, and hawking paraphernalia, all of which should be preserved for the benefit of future generations.

## Wildlife Forensics as Tool for Raptor Conservation

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### Summary

Investigations into the deaths of wild animals are gaining importance in wildlife rehabilitation centres. Individual to mass mortalities frequently arise from human malevolence and prosecutions are ultimately pursued through the courts. In our wildlife rehabilitation centre, investigations commence with suspicious deaths or dying wild animals. This entails species identification, cause of death, age and sex of the animal(s), determining time of death and the use of supporting diagnostics such as radiography, histopathology, microbiology and toxicology. Most human-related deaths are due to illegal hunting, electrocution, intentional use of pesticides, animal abuse and collisions with man-made structures. Other less prevalent but important causes, are due to infectious disease. Forensic veterinary medicine is becoming more and more an important conservation tool, the corrective measures of which may be of benefit to wildlife populations on a whole.

### Introduction

Forensic veterinary medicine has gained great importance in the last two decades (Cooper and Cooper, 2008). Nowadays, requests for veterinarians as professional witnesses or as experts in legal cases are not uncommon. Due to the increase in laws and regulations governing wildlife protection and the appearance of specialized public bodies, the role of veterinarians in wildlife rehabilitation centres now encompasses investigations of dead wild animals. Special procedures are necessary during these post-mortem studies to ensure that the collected information is valid for a court case (Wobeser, 1996; Stroud, 1998). One of the most important aspects to consider is the maintenance of a chain of custody, which will give certainty that the specimen or derived samples have not been interfered with. It is mandatory to keep a record of the necropsy findings with detailed and clear notes. Photographic documentation is imperative. This report describes two particular forensic investigations carried out in Catalonia, Northeast Spain, for the period 2007-2009.

## Electrocutions

The forestry police department in the autonomous region of Catalonia (Northeast Spain) has been involved with the investigation and recovery of carcasses under a few suspicious medium and high voltage electrical power lines. Dead birds are deposited in hermetic plastic bags and closed with special seals to guarantee the chain of custody. A formulary to record all the relevant information about the location, date and type of line or power pole suspected to be involved in the incident is written at collection. The animals are stored at -20°C until submitted to our wildlife rehabilitation centre for post-mortem analyses, in order to ascertain the cause of death.

Overall from 258 forensic bird necropsies, electrocution was diagnosed in 77 cases. Results are compiled in Table 1. Mortality due to electrocution has been detected in many protected raptors and other large birds as storks.

Species common name ( <i>Scientific name</i> )	Total forensic cases	Confirmed electrocution (%)
Common Buzzard ( <i>Buteo buteo</i> )	46	13 (28%)
Common Kestrel ( <i>Falco tinnunculus</i> )	38	4 (10%)
Eagle Owl ( <i>Bubo bubo</i> )	37	12 (32%)
White Stork ( <i>Ciconia ciconia</i> )	30	22 (73%)
Northern Goshawk ( <i>Accipiter gentilis</i> )	25	9 (36%)
Bonelli's Eagle ( <i>Aquila fasciata</i> )	17	2 (12%)
Griffon vulture ( <i>Gyps fulvus</i> )	11	2 (18%)
Peregrine Falcon ( <i>Falco peregrinus</i> )	10	2 (20%)
Grey Heron ( <i>Ardea cinerea</i> )	9	1 (11%)
Short-toed Eagle ( <i>Circaetus gallicus</i> )	7	4 (57%)
Booted Eagle ( <i>Hieraaetus pennatus</i> )	1	1 (100%)
Non-protected species	27	5 (18%)
TOTAL	258	77 (30%)

Gross post-mortem examinations reveal thermal burns in the skin and the feathers as the most common macroscopic finding. These burns are located in areas of the body that were presumably in contact with the electrical source. Thermal burns in the skin of birds appear as dry blisters, especially on the scales of feet and legs. Burnt feathers are recognised as barbules edges adopt a typical curled appearance, or are totally charred. In some cases partial loss of limbs and skin gangrene have also been recorded.

Internally, congestion is noted in most organs (lungs, liver, spleen, brain). Internal haemorrhages or bone fractures are considered secondary lesions, potentially produced after the fall from the power mast. Death is usually rapid; thus the animals are found nearby. However, it is important to rule out other causes of death; e.g., gunfire (with radiography).

Corrective modifications have been implemented where electricity structures were confirmed to be dangerous. These consisted of wire insulation and adequate earthing.



**Thermal burn in wing of a Common Buzzard (*Buteo buteo*)**



**Burnt feathers in wing of Eagle Owl (*Bubo bubo*)**

## Intentional poisoning

Chemical compounds can cause mortality in wild animals when applied following recommended instructions, whether with intent to kill, or through improper application. Identification of the offending toxin often proves difficult. Identification of poisoned bait or large amount of the toxin in the digestive tract is highly incriminating.

In our wildlife rehabilitation centre we have a budget dedicated to investigation of poisoning in collaboration with the forestry police department. As stated by other authors (Mateo and Guitart, 2000) we have found that domestic dogs are good sentinels to locate rural areas where intentional poisoning of wildlife is occurring. Affected wild animals are usually located in the vicinity.

Relevant investigation samples include whole carcasses, baits, clinical specimens (vomitus and faeces), in addition to soil from underneath the carcass. During post mortem examination, particular attention is paid to the stomach or crop contents which, in acute poisonings, probably represent the last meal and the source of the toxic product. Samples are collected in duplicate from digestive contents, liver and brain, are labelled, and placed in sealed bags in order to keep the chain of custody until they reach the accredited toxicology laboratory.

Toxic compounds have been positively identified in a total of 34/68 cases from 2007 to 2009. The most commonly identified poisons have been carbamates (13), organochlorine (8) and organophosphate (4) insecticides and alphachloralose (4), although barbiturates (3), coumarin rodenticide (1) and strychnine (1) were also detected.

Following successful toxin/bait identification, forestry police investigations can proceed with procurement of authorized searches of private properties. Positive findings of incriminating materials may lead to prosecution of parties responsible for the intentional poisoning of protected species. Penalties range from fines to imprisonment.

## Discussion

Forensic medicine has proven to be a useful tool in the identification of the causes of animal deaths. Wildlife veterinarians should be familiar with forensic methodology especially the chain of custody and detailed record keeping. A final written report informs the relevant authorities of the cause of death, where possible. However, there are limitations to the extent of forensic medicine studies when working with wild animals. Decomposition of the carcass or partial predation post-mortem often precludes determination of a final diagnosis. Additionally, toxicology results may be falsely negative owing to labile and rapidly degrading compounds.

Power lines and power poles present a threat to many wild birds, especially raptors. Affected bird species perch on elevated sites such as power poles while hunting, breeding or roosting (Janns, 2000). As outlined in the action plan for the Bonelli's Eagle (*Aquila fasciata*) electrocution is a major threat to the conservation of this endangered species (Arroyo and Ferreiro, 1999). Thoughtful location of dangerous electric power-lines and relevant modification would result in habitat improvement and is an important move from a conservation perspective. In the past many animals received the diagnosis of electrocution just because they were found under an electrical power line, without a post-mortem study to confirm it (Lehman et al., 2007). This must be avoided because it has a low sensitivity.

Although the use of poison to kill wild predators has been banned for a long time in Spain, it continues to occur. Banned products like organochlorine pesticides or strychnine are still used. Baits can affect endangered species whose populations are already in decline. Forensics can act as conservation tool by helping to locate hot spots where toxic compounds are used. Efforts can then be focused in these areas leading to prosecution of perpetrators.

## Acknowledgements

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Two dead Peregrines (adult male and juvenile female). Found in July 2010 at a breeding site in South Wales along with two dead Racing Pigeons that both had their legs removed (presumably to remove identification rings). An ongoing case for wildlife forensics to prove intentional poisoning. (Peter Leek)

# Vultures at Risk. The story of Diclofenac, Meloxicam and other NSAIDs

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In a period of less than 15 years beginning in the early 1990s, the Asian White-backed vulture (*Gyps bengalensis*) suffered a catastrophic population collapse throughout the Indian subcontinent from very numerous to highly endangered.

Belatedly in 2004 it was established that the cause was secondary exposure to diclofenac, a non-steroidal anti-inflammatory drug (NSAID) when the vultures consumed carcasses of cattle that had received diclofenac therapy before death. In an effort to protect the remaining birds, vulture conservation groups around the world identified three crucial points of action: establish viable captive populations, ban the veterinary use of diclofenac and identify other alternative non toxic NSAIDs.

The ban on the manufacture and sale of diclofenac proved to be difficult as the Indian government declined to mandate this until a suitable alternative NSAID, both vulture safe and still effective in cattle, had been identified. A survey by the Royal Society for Protection of Birds among wildlife veterinarians, zoos and rehabilitation centres around the world resulted in reports on the treatment of over 870 vultures and scavenging birds encompassing 79 species. From these diclofenac, carprofen, ibuprofen, phenylbutazone and flunixin were identified as potentially toxic. In contrast, meloxicam appeared to be completely safe in over 700 raptors and scavenging birds representing 60 different species.

With the three affected Asian species now being rare, the African White-backed and Cape vultures were chosen as alternative models for confirming the safety of meloxicam after being shown to be as susceptible to diclofenac as their Asian cousins. From extensive and statistically robust tests carried out in 35 White-backed and 8 Cape Griffon vultures at VULPRORLWC and the University of Pretoria, meloxicam was shown to be non-toxic to vultures at the maximum residual levels found in meat from cattle treated with this drug before death. Conclusive proof was thereby generated that meloxicam is a safe alternative to diclofenac for use in cattle.

The triumph resulting from this work has been the ban in India, Nepal and Pakistan on the manufacture, importation or use of veterinary diclofenac in these countries. The story does not quite end there. There are a very large

number of NSAIDs available, many of which may be administered in combinations. Since most vulture species now fall into the category of endangered, toxicity and safety tests on every drug or combination of drugs in vultures is unfeasible and undesirable. Searches for alternative models have included chickens, crows and tissue culture cell lines from these species but so far nothing sufficiently sensitive and specific has come to light underscoring the urgent need to understand much better the physiology and metabolism of NSAIDs in avian species.

Recent and forthcoming publications related to this article are:

Naidoo V et al. 2007 Validating the domestic fowl as a model to investigate the pathophysiology of diclofenac in Gyps vultures. *Environmental Toxicology and Pharmacology* 3: 260-266.

Naidoo V et al. 2008 The pharmacokinetics of meloxicam in vultures. *Journal of Veterinary Pharmacology & Therapeutics*. 31:128-34.

Naidoo V et al. 2009 Veterinary diclofenac threatens Africa's endangered vulture species. *Regulatory Toxicology and Pharmacology* 3: 205-208.

Naidoo V, Swan GE. 2009 Diclofenac toxicity in Gyps vulture is associated with decreased uric acid excretion and not renal portal vasoconstriction. *Comparative Biochemistry & Physiology. Toxicology & Pharmacology*. 149: 269-74.

Naidoo V et al. 2010 The crow is insensitive to environment levels of diclofenac: Further evidence that diclofenac toxicity is related to species specific metabolism. In preparation".



Vinny Naidoo dosing an African White-backed Vulture in Namibia

# Egg Hardness, Eggshell Thickness and Membrane Thickness in a Variety of Falcon Taxa

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## Background

Falcons are extremely sensitive to insecticides and contamination. Population collapse in falcons has occurred in many parts of the northern hemisphere from about 1950 onwards, and has often been attributed to the use of biocides in agriculture and forestry management. Eggs laid by falcons exposed to toxic persistent compounds causes eggshell thinning, embryo mortality and reproductive failure. Because eggshells are very sensitive to pollutants, falcon eggs are considered to be good indicators of the health of females and the quality of the environment. Consequently, their eggshells are considered to be good indicators of pollution and can be used to monitor the health of populations over long periods.

However, apart from contamination, many other factors are involved in eggshell thinning (e.g., genetics, environmental stress, the type of food consumed by females, the health of females, body condition and age of the female, and the developmental stage of the embryo). For this reason it is very important to examine each factor separately, to get a clear picture of the causes that may originate eggshell thinning and collapse.

Falcons are vulnerable species that are strictly protected by law, and are included in the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES). For this reason their nests, chicks and adults cannot be disturbed in their natural habitats. Moreover, their nests are usually located in dangerous and vertical cliffs of very difficult access and visibility. Consequently, very little information is available about the reproductive biology and egg characteristics of falcon species. The best way to compensate for this limitation is to collaborate with falcon breeders, since they can offer the greatest opportunity to improve the scientific knowledge, just by providing hatched, infertile and eggs with dead

embryos, together with information about the adults, food supply and breeding conditions.



**Photo 1.** The study has been possible thanks to the large sample of falcon eggs and eggshells used. We have examined 300 eggs from 70 different females (Aurora M. Castilla)

Our international team is directed by the Spanish National Research Council (CSIC), and includes members from the Weill Cornell Medical College in Qatar (Qatar Foundation, Education City) among other institutions, has collaborated with the biggest falcon breeder in the world (Roc Falcon). Our main goal has been to examine for the first time in falcons 1) which are the determinants of eggshell hardness or strength in different taxa, 2) how embryo development influences eggshell thickness variation, and 3) to provide the first data on membrane thickness values and their variation with developmental stage.

## Results and Discussion

We have explored for the first time the detailed characteristics of eggshells and egg membranes in several falcon species and their hybrids in association with female age (from 3 to 13 years) and body mass, egg size (length, width, mass), egg colour, and laying sequence. The falcon species examined have been: the Peregrine Falcon (*Falco peregrinus peregrinus*), the “red shaheen falcon” (*Falco peregrinus babylonicus*), the Saker Falcon (*Falco cherrug*), the Gyrfalcon (*Falco rusticolus*), the intraspecific hybrid “peregrine x red shaheen”, and the interspecific hybrid between the Saker Falcon and the Gyrfalcon.



c



a



b



d

**Photos 2a, b, c, d.** Equipment used to measure the eggs. Egg length and width was measured with the calliper (a), egg mass with an electronic balance (b), egg hardness with an isometric Kistler force transducer (c) and eggshell thickness with a micrometer (d) (Aurora M. Castilla)

### Determinants of egg hardness

Variation in egg hardness has to our knowledge, not been reported for any falcon species, except for two eggs of Lesser Kestrel (*Falco naumanni*) and nine eggs of Common Kestrel (*Falco tinnunculus*). We thus have provided the first baseline data for egg strength in different falcon taxa to the scientific community (Castilla *et al.* 2009).

In our study, we also examined the effect of different factors on egg hardness of falcon species maintained under constant food quantity and quality, and not subjected to environmental contamination. The factors examined included egg characteristics (egg size: length, width, mass; membrane thickness, egg shell thickness, egg design and colour), female characteristics (individual identity, age, body mass), and egg laying sequence.

We found that small (< 1000 g) falcons of the peregrine group have eggshells that are significantly softer and thinner than large (> 1000 g) falcons of the gyr-saker group. Our study also provides quantitative evidence of several factors, other than levels of contamination,

which may affect egg hardness in falcons. We found that eggshell thickness explained a high percentage of the variation in egg hardness for all falcon taxa. Also, eggs produced by older females and eggs laid later in the laying sequence, were relatively smaller and softer and had relatively thin egg membranes and egg shells. Individual females, irrespective of their age, contributed significantly to the observed variation in egg strength.

Egg colour or pattern had no effect on egg hardness.

Another interesting result is that egg size and hardness of hybrid eggs was similar to that of the pure species suggesting that hybridization in falcons does not affect egg shell hardness or thickness.

### **Effect of developmental stage on eggshell thickness**

We compared eggshell thickness of totally developed hatched eggs, with that of non-developed eggs to explore the effect of embryo development on eggshell thinning. This was never examined before in falcons, despite the fact that eggshell thinning due to pollutants and environmental contamination is often considered the most common cause of egg failure in falcons.



**Photo 3.** Ovoscope used to detect infertile eggs and the developmental stage of failed eggs. Infertile eggs have no embryo and do not show any dark spot, while eggs with dead embryos show a dark spot with a size depending on the age of the embryo (Aurora M. Castilla).

We have demonstrated for the first time in falcons that eggshell thickness decreases during embryo development, in the absence of environmental contamination (Castilla *et al.* 2010a). Thus, the eggshells are much thicker after egg laying than before hatching. This is because, the eggshell provides the embryo with minerals and calcium needed for the development of the skeleton, muscles and brain. Because of that, the eggs are less protected and vulnerable to breakage or the entrance of micro organisms near the end of their development. However, we have also demonstrated that to compensate for such eggshell thinning, egg membranes play an important protective role in the later stages of development by getting relatively thicker.



**Photo 4** Membranes in falcon eggs are very thick; this is why they have to be removed to measure eggshell thickness (Aurora M. Castilla)

### **Membrane thickness variation**

Egg membranes have received very little attention by the scientific community, and membrane thickness variation during development had never been examined before for any wild bird. We have provided the first quantitative data on membrane thickness variation during development in falcons.

We have demonstrated that egg membranes play an important protective role in the later stages of development by getting relatively thicker (Castilla *et al.* 2010b). Our data have also shown that thicker membranes are associated with larger, heavier and relatively wider eggs. Egg laying sequence or female age did not explain the observed variation of membrane thickness in the falcon taxa studied.

As we provide quantitative data on membrane thickness variation during development in falcons not subjected to contamination or food limitation (*i.e.*, bred under captive conditions), our data may be used as a reference for studies

on eggs from natural populations. Considering the large variation in membrane thickness and the multiple factors that can affect on it, we encourage other researchers to include measurements on membrane thickness in studies exploring eggshell thickness variation.

Another important aspect of egg membranes is that they constitute a useful tool to gain insights into many aspects of the ecology and biology of falcons and their habitats. Increased attention paid to membranes would be beneficial, and we suggest that field researchers should collect and storage membranes and eggshells for further research when possible. Eggshells and membranes are non-invasive indicators of environmental or microbial contamination, the nutrient source of females during egg formation, a source of DNA for genetic studies, and an excellent source for the detection of viral infections.

### Working with local communities

Scientists and falcon breeders have to work together to improve the long term conservation of falcons worldwide. This study has been possible thanks to a falcon breeder who provided the eggs and all necessary information about the females and the eggs. We consider of great relevance to explore the eggs and falcons from desert arid zones (e.g., breeding centres from the Gulf countries), where the birds are subjected to conditions of low altitude, high ambient temperatures, different food and water sources, and different stress. This will allow making comparisons with the results obtained from Spain at higher elevations and lower temperatures. The collection of such data will allow us to produce mathematical models and predict the response of the falcon's reproductive parameters to global warming. Educational initiatives and linking students to the development of future research in this direction, will considerably improve the conservation of falcons worldwide.

### Acknowledgements

We thank the collaboration of our research team, Anthony Herrel (Harvard University, USA and CNRS, France), Stefan Van Dongen (University of Antwerp, Belgium), Hugo Robles (University of León, Spain), Juan Martínez de Aragón (Forest Technology Centre of Catalonia), Amadeu Francesch (IRTA, Catalonia, Spain), and Naoki Furio (Centre of Sociological Research, Spain). We also thank the staff at Roc Falcon especially to Harald and Stania Kuespert, Oscar Oliva Piferrer and Sandor Sebestyen for providing detailed information about the falcons, for helping to collect the eggs and measuring the birds. To Benno Böer (UNESCO Office Doha, Qatar) for his support to improve our knowledge about the biology and conservation of endangered falcons, and to Eusebio Jiménez Arroyo (CSIC) for continuous encouragement. This work was conducted with the support of the Project MICIIN-CGL 2009-10652 (BOS).

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**Photo 5.** Spanish children love falcons, and they like to help researchers during egg classification according to egg laying sequence. They can do it because the numbers have been previously written on the eggshells by falcon producers or scientists (Aurora M. Castilla)

# Successful Treatment of Severe Bumblefoot in a Peregrine Falcon (*Falco peregrinus*) Utilizing Intralesional Doxycycline

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## Summary

Pododermatitis is a very common chronic disease in captive raptors and various treatment options have been developed over the past years. This case presents the successful treatment of severe bilateral bumblefoot lesions in a Peregrine Falcon (*Falco peregrinus*) with a combination of systemic and local antibiotic therapy and a flexible, pressure-relieving bandaging technique. Doxirobe™ dental gel was used to both mechanically protect the secondary healing process by granulation and beneficially influence the process by nonantimicrobial effects of tetracycline.

## Introduction

Pododermatitis is a very common chronic disease in captive raptors initiated by trauma to plantar skin surfaces causing devitalization and subsequent entry of pathogens (Remple and Al-Ashbal 1993). Clinical challenges in treating this condition include difficulty achieving therapeutic levels of antimicrobials in the lesion with systemic therapy and poor wound healing due to constant weight bearing and reduced vascular perfusion (Remple 1993). Recommendations for treatment include a combination of systemic antibiotic therapy, direct intralesional antibiotic delivery, surgical debridement, and protective foot casting (Remple 2006).

## Case Report

A one year old, wild peregrine was presented with bilateral grade 3 bumblefoot lesions (Remple 1993) of 9 months duration (Figure 1).

After initial surgical debridement of the proliferative, crusty lesions, the wound had to be left open to secondary healing by granulation due to lack of sufficient healthy adjacent skin. Doxirobe™ Gel (Pharmacia & Upjohn Company, Kalamazoo, USA) was applied intralesionally to seal the wound. Doxirobe™ Gel is a biodegradable polymer containing doxycycline (88mg/ml) for periodontal use in dogs. Once solidified, Doxirobe™ remained in the lesion for several weeks, serving to both protect the tissue and provide local antibiotic delivery.

A special lightweight, flexible bandage was applied and changed every two days under general anesthesia. The

first layer consisted of a small round pad of nonadhesive wound dressing (Telfa, Quality Medical Supplies, Las Vegas, USA), covering the Doxirobe™ crust. The structure of the bandage was given by a footshaped pad carved out of flexible, foamy plumbing insulation material with a central hole over the bumblefoot lesion and individual indentations according to secondary pressure sores. Only as many layers of bandaging gauze and Vetrap (3M Animal Care Products, St. Paul, USA) as necessary for support were applied to keep the bandage as flexible as possible. The toes were freely sticking out to allow perching and handling food. Additionally, the bird was put on systemic antibiotic (Amoxicillin, 125mg/kg SID PO) and antifungal treatment (Itraconazole 10mg/kg, SID PO; Sporanox, Ortho Biotech Inc, Raritan, USA). Newly in growing epithelium that was not covered by the Doxirobe™ crust anymore, was protected with a thin layer of a hydrolysate of type I collagen (Collasate, PRN Pharmacal, Florida, USA).



**Figure 1.** Left foot (above) and Right foot (below) of the Peregrine Falcon on admission before treatment (Maya Kummrow).

With the flexible bandages, the bird was able to perch and feed on food normally and therefore accepted the bandaging very well. Four weeks after initial treatment, the Doxirobe™ crust loosened along the edges with newly epithelialized skin growing in underneath. After approximately four months, the wound was completely closed by new but very thin epithelium and bandaging was applied for additional four weeks until thickening, keratinisation and forming of plantar papillae were observed (Figure 2). The bird could be given into falconry training for pre-release rehabilitation six months after the initial treatment.



**Figure 3.** Left foot (above) and right foot (below) of the Peregrine Falcon 5 months after treatment (Maya Kumrow).

### Discussion

In this case, we basically followed the recommendations of a combined therapy with systemic antibiotic therapy, direct intralesional antibiotic delivery, surgical debridement, and protective foot casting (REMPLE 2006). However, in cases of secondary healing, using Doxirobe™ for intralesional antibiotic delivery has the advantage of not only sealing the wound from further contamination but also preventing granulation tissue from overgrowth and allowing new layers of epithelium to grow underneath and gradually close the wound. The normal anatomy of the foot is therefore closely mimicked and additional postsurgical pressure on the lesion by excessive granulation tissue is avoided. If left alone, Doxirobe™ scabs seem to peel off gradually as

the epithelium closes underneath and therefore do not pose the problem of intralesional foreign material that might interfere with the healing process.

Bacterial infections cause tissue damage but it is the host response that subsequently triggers a cascade of destructive inflammation. In chronic periodontal disease, inflammatory processes have been reported to induce the pathologic overproduction of destructive matrix metalloproteinase, resulting in the degradation of collagen fibres (Golub *et al.*, 1998). The local application of doxycycline does not only have an antimicrobial effect in initial higher concentrations but also takes advantage of its beneficial actions of modulating the host's immune response by long-term, local release of subantimicrobial doses. One of the multiple nonantimicrobial actions of tetracyclines is the direct inhibition of matrix metalloproteinases (Rifkin *et al.* 1993). Treatment with subantimicrobial doses of doxycycline has been demonstrated not to lead to the emergence of tetracycline-resistant microorganisms (Thomas *et al.*, 2000).

The treatment success in this case was undoubtedly due to the combination of antimicrobial wound management and the constant bandage changes. Carving new feet pads every time according to new sores spots resulted in constantly varying pressure distribution on the plantar surface. The advantages of using Doxycycline dental gel for avian bumblefoot lesions are reported here in only one case and will have to be assessed in further cases. Specifically the host modulating effects of Doxirobe are extrapolated from other medical indications in humans and will need specific evaluation in the pathogenesis of avian pododermatitis.

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# Digital Radiography – An Important Technique to Diagnose Musculoskeletal Disorders in Falcons.

## Part One: General Considerations

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### Digital Radiography: general considerations

Radiography is an important diagnostic technique in avian medicine. It is an important non-invasive tool to assist in the diagnosis of skeletal, abdominal and thoracic diseases, some of which exhibit similar non-specific clinical signs. The advent of digital radiography offers significant advantages over conventional radiography, although it is not yet widely used in general practise due to the high cost of purchasing a unit.

Two types of digital radiography systems are currently available: the Indirect Digital Radiography (IDR) and the Direct Digital Radiography (DDR).

In Part 2 of this article, we will present a variety of radiographs from healthy falcons and from birds with musculoskeletal disorders, taken with IDR, at the Dubai Falcon Hospital.

The advantages and disadvantages of digital radiography over conventional radiography are listed below:-

### ADVANTAGES

- Low running costs: no film, no processing solutions
- No films to archive and lose, saving space and time
- Lower exposure to X-rays: a lower dose of radiation is needed compared to traditional radiography
- Reduced number of retakes
- Digital images directly available on computer
- Digital processing of the images to optimize the assessment of detail

- More information on soft tissues due to the image post-processing
- Images can be viewed at the same time on different workstations
- Possibility to transfer digital images from one location to another, easily forwarded electronically to referral radiologist
- Manipulation of the contrast levels and the negative contrast improves fine details of the image
- Elimination of exposure errors as those can be corrected handling the image, adjusting the level/brightness and the contrast. Wider dynamic range.

### DISADVANTAGES

- Cost of equipment
- Constant progress makes your system rapidly outdated
- Acquaintance of the system can be complicated

The technical details of traditional radiography, IDR and DDR are summarised in Table 1.

### Acknowledgements

We thank H.H. Sh. Hamdam bin Rashid al Maktoum and Mr. Humaid Obaid al Muhairi, Dubai Falcon Hospital Director, for their support of the work of Dubai Falcon Hospital, and all of the falcon hospital team for their assistance with cases. Parts of the paper have been published as D. Quilquini, Tom Bailey, Antonio Di Somma, and Ahmed Kutty. (2008) Use of Digital Radiography for Diagnosis of Selected Musculoskeletal Disorders in Falcons. *Exotic DVM.* 10; 1: 27-37.

**Table 1. Technical details of traditional radiography, IDR and DDR**

	<b>TRADITIONAL RADIOGRAPHY</b>	<b>INDIRECT DIGITAL RADIOGRAPHY</b>	<b>DIRECT DIGITAL RADIOGRAPHY</b>
<b>Components</b>	<ul style="list-style-type: none"> <li>- X-ray unit</li> <li>- Film and cassette</li> <li>- Autoprocessing machine or manual processing in tanks</li> </ul>	<ul style="list-style-type: none"> <li>- X-ray unit</li> <li>- ID terminal and Review Workstation with image management system</li> <li>- Radiology information system</li> <li>- Communications network (DICOM output)</li> <li>- Image plate and cassette</li> <li>- Image reader (or Digitiser)</li> </ul>	<ul style="list-style-type: none"> <li>- X-ray unit</li> <li>- Workstation</li> <li>- Image management system</li> <li>- Radiology information system</li> <li>- Communications network (DICOM output)</li> <li>- Image sensor</li> </ul>
<b>Compatibility with traditional radiography</b>		Compatible with existing traditional radiography systems	Not easily adapted to traditional radiography systems
<b>Cassette</b>	Screen film formed by an emulsion consisting of dispersed grains of silver bromide	Imaging plate with photostimulable phosphor layer	Digital imaging sensor fixed to x-ray table or connected to the DR computer by a wire cable. No cassette.
<b>Exposure</b>	Photons of different energy come into contact with the film emulsion to produce the image Exposed grains of silver turn black after film development	X-ray energy is absorbed and stored by the phosphor layer of the image plate Digitiser scans image plate with a laser beam determining the emission of visible light that is quantified by a photomultiplier tube and registered to produce the image	X-ray photons are directly converted to electronic signals Imaging sensor automatically transmits signal to the workstation
<b>Image processing</b>	Film processing, automatic or manual	Image sent to the workstation connected to a Picture Archiving and Communication System (PACS) equipped with a storage device and printer	Image sent to the workstation connected to a PACS equipped with a storage device and printer
<b>Interpretation</b>	Interpretation of the radiograph	Digital processing of the image on the computer and interpretation	Digital processing of the image on the computer and interpretation

# Digital Radiography – An Important Technique to Diagnose Musculoskeletal Disorders in Falcons.

## Part Two: Technique

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### Introduction

Radiography is an important diagnostic tool to evaluate the general health of a patient. It is also used to monitor the progression of a condition, the regression or healing of a lesion, and can enable the effects of therapy to be monitored. Radiography is useful to diagnose both musculoskeletal and celomic cavity disorders. It is widely applied in avian medicine because it is a relatively safe and non-invasive procedure.

In this article we present the positioning techniques used to obtain radiographs at Dubai Falcon Hospital (DFH). Digital radiography images of normal falcons and of selected musculoskeletal disorders in falcons examined at the DFH will be presented in two following articles.

### Resources at a glance



Figure 1. Indirect digital radiography system.

- Indirect Digital Radiography system, CR 25,0 DIGITIZER, Agfa, Agfa-Gevaert Group, Belgium (www.agfa.com). It is equipped with an integrated Computed Radiography (or Indirect Digital Radiography) user station. Single cassette feed.
- Minxray HF 80 portable X-ray unit (X-ray Co. Ltd., Tokyo, Japan). The X-ray tube has a fixed 15 mA current, a 50-80 kV voltage and a 0.02-1.98 seconds exposure time.



Figure 2. Minxray HF 80 portable X-ray unit

- 35 x 43 cm MD4.0 general imaging plates that offer a 2320 x 2826 pixel matrix size and a spatial resolution of 6 pixels/mm



Figure 3. MD4.0 imaging plates

### Settings

The exposure time used was 0.04 seconds, and the X-ray tube voltage was 54 kV, on a permanent 15 mA current. The same setting was used for all of the studies presented in this article.

## Restraint and Positioning

Restraint and positioning are important to obtain correct projections. In the standard procedure, the anaesthetised patient (anaesthesia methods used are described by Molero, 2007) is positioned in ventro-dorsal and lateral recumbency for whole-body survey radiographs using the tabletop technique. Different views/angles are used in specific cases.

### WHOLE-BODY RADIOGRAPHS



**Figs 4a (above ) and b (below).** Positioning technique for ventro-dorsal view of a Gyr x Peregrine (*F. rusticolus* x *F. peregrinus*) hybrid under isoflurane anaesthesia.

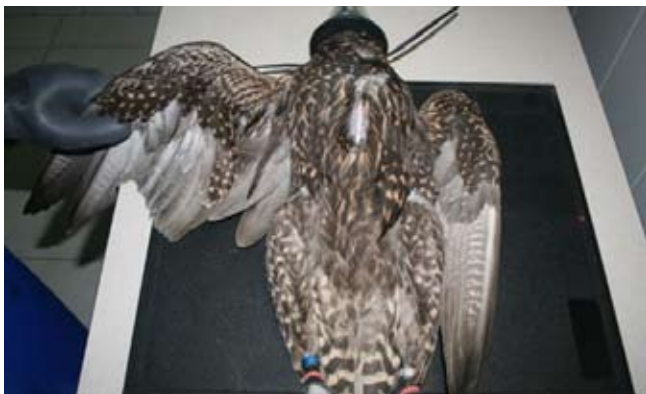


**Fig 5.** Positioning technique for lateral radiograph of a Gyr x Peregrine hybrid under isoflurane anaesthesia.  
**a (above):** traditional positioning.  
**b (below):** legs are not overlaid, allowing better visualisation of the pelvic limb.

### DETAILED RADIOGRAPHS



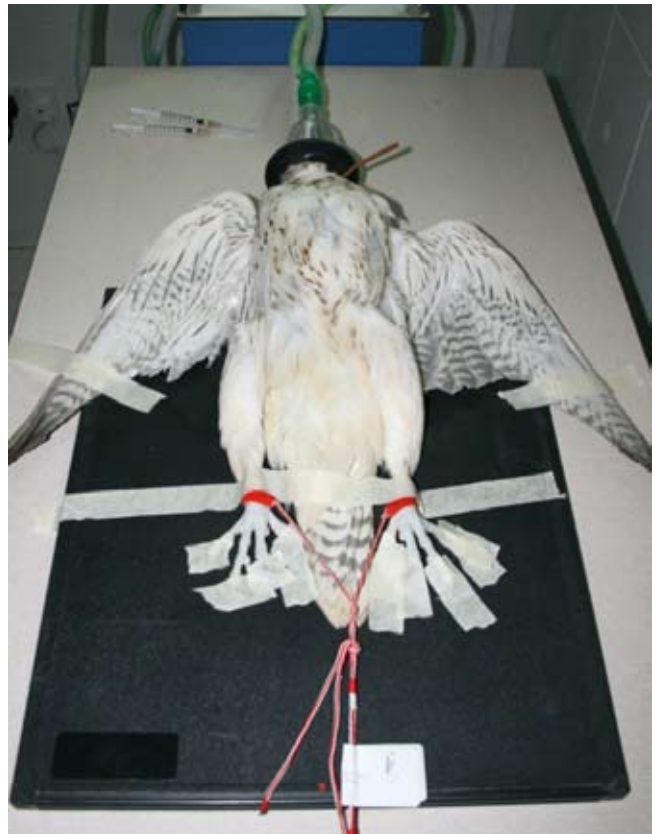
**Fig 6.** Positioning technique for a shoulder radiograph of a Gyr x Peregrine falcon hybrid under isoflurane anaesthesia. The extension of the wings gives a good view of the clavicle, scapula, coracoid and humerus, and is very useful to diagnose fractures and other lesions of the shoulder.



**Fig 7a (above) and b (below).** Positioning technique of a shoulder radiograph of a falcon under isoflurane anaesthesia. The craniocaudal view of the shoulder facilitates the diagnosis of fractures and lesions to the clavicle, scapula, humerus and coracoid.



**Fig 8 a (above) and b (below).** Positioning technique for an extended wing radiograph of a Gyr x Peregrine hybrid under isoflurane anaesthesia. The ventrodorsal radiograph of the extended wing allows a detailed view of the thoracic limb and in particular of the wing extremities.



**Fig 9.** Positioning technique for an extended legs radiograph of a Red-naped Shaheen under isoflurane anaesthesia. This projection gives a good view of the hips, with the head of the femur within the acetabulum, of the femur and the tibia. It allows the comparison between the right and the left pelvic limbs, useful to evaluate the presence of a lesion and its severity.



**Fig 10a/b.** Positioning technique for a feet radiograph of a Gyr x Peregrine hybrid under isoflurane anaesthesia. These two projections are very useful to evaluate the phalangeal bones and metatarsophalangeal joint.

## Books

### The Art of Falconry from Arabia Westward

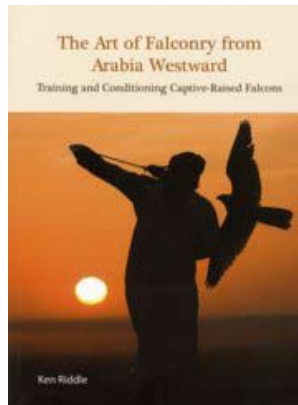
Author: **Ken Riddle**

Hardback, with dust jacket; 258 pages.

Publisher: Abu Dhabi Authority for Culture and Heritage in association with Motivate Publishing, 2009

Available from: [www.booksarabia.com](http://www.booksarabia.com)

This book is a must-have for those interested in the fascinating art of falconry. Ken Riddle, a master falconer, shares explicit detail, invaluable techniques and insights unique to Arab falconry, practices based



on experience and on a tradition uninterrupted since the very origins of the sport.

With remarkable insight into the world of falconry Ken Riddle offers information of inestimable value to anyone who flies, or aspires to fly, any bird of any species – wild taken or captive-bred.

## What's new in the literature?

### Does nest box location and orientation affect occupation rate and breeding success of Barn Owls *Tyto alba* in a semi-arid environment?

Charter M., Meyrom K., Leshem Y., Aviel S., Izhaki I., Motro Y. 2010. *Acta Ornithol.* 44: 115–119.

To date, nest orientation and location in hole-nesting birds have been studied mainly in temperate regions and in diurnal cavity breeders. Here we studied the effect of exposure, orientation, and habitat on nest box occupation and breeding success of Barn Owls in a semi-arid environment. The occupation of nest boxes varied with exposure and orientation. A higher percentage of occupation and more Barn Owl nestlings per breeding attempt were found in nest boxes located in the shade than in the sun, and in those facing east/north rather than other directions. The temperature in the nest boxes varied, being lowest in those located in the shade and in those facing east. Nest boxes located in crop fields fledged more young per breeding attempt than those located in date plantations. We suggest that the higher nest box occupation and number of nestlings fledged was probably due to the lower temperatures in those boxes, an important factor in a hot/arid environment, although alternative explanations are also considered.

### Autumn migration of juvenile Short-toed Eagles *Circaetus gallicus* from southeastern Spain.

Pavón D., Limiñana R., Urios V., Izquierdo A., Yáñez B., Ferrer M. and de la Vega A. 2010. *Ardea* 98 (1): 113-117

This study provides the first description of autumn migration routes of juvenile Short-toed Eagles *Circaetus gallicus* tagged in southeastern Spain. Three nestlings were tagged with Argos/GPS satellite transmitters, of which two reached their wintering grounds in Mali, close to the Inner Niger Delta. Onset, duration and routes of migration differed between the two individuals, but both eventually settled in approximately the same area (c. 170 km apart). The wintering grounds were located more than 2500 km away from the breeding sites, although the birds covered some 3800–4700 km to reach the wintering area. The observed differences in migration strategies may be related to juvenile eagles migrating, or not, in mixed flocks with adults; the latter depart earlier from the breeding grounds and follow a more direct route to the wintering grounds.

### First successful breeding of reintroduced ospreys *Pandion haliaetus* in mainland Spain

Muriel, R., Ferrer, M., Casado, E. and Pérez Calabuig, C. 2010. *Ardeola* 57(1), 175-180.

In 2003 a reintroduction program of osprey started in the region of Andalusia, SW Spain, in order to recover the former breeding population in mainland Spain and to improve the situation of the species in the Mediterranean basin. From 2003 to 2009, 129 young ospreys were released by means of hacking. In 2009, the first breeding pair reared successfully three chicks in the Odiel Marshes for the first time in mainland Spain since 1981, when the species became extinct. The first breeding pair constitutes a significant indicator for the evaluation of the project and the beginning of a future population.

### A general Bayesian hierarchical model for estimating survival of nests and young

Schmidt, J. H., Walker, J. A., Lindberg, M. S., Johnson, D. S. and Stephens, S. E. 2010. *The Auk* 127 (2), 379-386.

Models for estimating survival probability of nests and young have changed dramatically since the development of the Mayfield method. Improvements in software and a steady increase in computing power have allowed more complexity and realism in these models, allowing researchers to provide better estimates of survival and to relate survival rates to relevant covariates. However, many current analysis methods utilize fixed-effects models with the implicit assumption that the covariates explain all of the variation in the data, other than random variation within a specified family of distributions.

This is generally a strong assumption, and, in the presence of heterogeneity and lack of independence, these estimates have been shown to be negatively biased. Others have begun to explore random-effects models for these situations, but a readily applicable Bayesian approach has been lacking. We present a general Bayesian modeling framework appropriate for survival of both nests and young that simultaneously allows for the inclusion of individual covariates and random effects and provides a measure of goodness-of-fit. We used previously published data on survival of Common Goldeneye (*Bucephala clangula*) ducklings in interior Alaska and on nest survival in three species of prairie-nesting ducks that nested in the Missouri Coteau region of North Dakota to demonstrate this approach. The inclusion of a brood-level random effect in the Common Goldeneye example increased point estimates and credible interval [CI] coverage from 0.62 (95% CI: 0.49–0.73) and 0.66 (95% CI: 0.58–0.74) for 2002 and 2003, respectively, to 0.69 (95% CI: 0.42–0.88) and 0.74 (95% CI: 0.57–0.88) for 2002 and 2003, respectively.

### ***Cryptosporidium baileyi* infection associated with an outbreak of ocular and respiratory disease in otus owls (*Otus scops*) in a rehabilitation centre**

Molina-Lopez, R.A., Ramis, A., Martin-Vazquez, S., Gomez-Couso, H., Ares-Maza, E., Caccio, S.M., Leiva, M. and Darwich, L. 2010. *Avian Pathology* 39 (3), 171–176.

Cryptosporidiosis has been reported in more than 30 avian species worldwide. Although some cases of cryptosporidiosis have been described in captive birds of prey in the order Falconiformes, to date there have been no reports of the disease in wild raptors. Here we describe for first time an ocular and respiratory disease associated with *Cryptosporidium baileyi* in wild scops owl (*Otus scops*, order: Strigiformes). Sixteen otus owl fledglings born in the wild during the summer of 2008 were admitted to the Torreferrussa Wildlife Rehabilitation Centre (Catalonia, northern Spain) in July and August of the same year. In the middle of September, blepharodema, conjunctival hyperaemia and mucopurulent ocular discharge were diagnosed unilaterally in 75% (12/16) of the birds and bilaterally in 25% (4/16). Moreover, five birds (31%) developed diffuse epithelial corneal oedema, one owl (6%) displayed mild anterior exudative uveitis and another developed rhinitis (6%). Two birds were euthanized because of the severity of disease. The histopathology demonstrated cryptosporidia-like structures in the conjunctival cells and in the nasal respiratory epithelium of one owl. *Cryptosporidium* spp. oocysts (6.5 to 7.0 x 5.0 to 5.5 µm) were identified by immunofluorescent antibody test (IFAT) in histological sections from eyelids, trachea and respiratory sinuses and in swab

samples from the glottis, choanal slit and conjunctival sac. Polymerase chain reaction and DNA sequence analysis confirmed the presence of *C. baileyi*. Birds were treated orally with azithromycin (40 mg/kg) once a day for 15 days, and by the end of the treatment all owls tested negative for the parasites, by IFAT, and did not display further signs of disease.

### **Pharmacokinetics of Terbinafine after single oral dose administration in Red-Tailed Hawks (*Buteo jamaicensis*).**

Bechert, U., Christensen, Poppenga, J. M. R., Fahmy, S. A. and Redig, P. 2010. *Journal of Avian Medicine and Surgery* 24 (2), 122–130.

#### **Abstract**

To determine pharmacokinetic parameters of orally administered terbinafine hydrochloride for potential treatment of aspergillosis in raptors, 10 adult red-tailed hawks (*Buteo jamaicensis*) were used in single dose trials by using 15, 30, and 60 mg/kg doses with a 2-week washout period between trials. After administration of 15 mg/kg terbinafine, mean ( $\pm$  SD) plasma concentration peaked in approximately 5 hours at  $0.3 \pm 0.24$  µg/mL, whereas a 30 mg/kg dose resulted in peak mean ( $\pm$  SD) plasma concentration of  $1.2 \pm 0.40$  µg/mL in 3 hours and a 60 mg/kg dose resulted in mean ( $\pm$  SD) concentration of  $2.0 \pm 0.75$  µg/mL in 5 hours. The volume of distribution decreased with increasing doses, averaging  $76.8 \pm 38.06$  mL/kg for the 15 mg/kg dose and falling to  $55.2 \pm 17.4$  mL/kg for the 30 mg/kg dose. This suggests that terbinafine accumulated in deep tissues, limiting further distribution at higher doses. The harmonic mean ( $\pm$  SD) half-life was biphasic, with initial values of  $14.7 \pm 6.67$  hours,  $17.5 \pm 8.7$  hours, and  $13.3 \pm 5.03$  hours for 15, 30, and 60 mg/kg doses, respectively. A rapid first-elimination phase was followed by a slower second phase, and final elimination was estimated to be  $161 \pm 78.2$  and  $147 \pm 65.6$  hours for 15 and 30 mg/kg doses, respectively. Linearity was demonstrated for the area under the curve but not for peak plasma concentrations for the 3 doses used. Calculations based on pharmacokinetic parameter values indicated that a dosage of 22 mg/kg terbinafine q24h would result in steady-state trough plasma concentrations above the minimum inhibitory concentration of terbinafine (0.8–1.6 µg/mL). This dosage is recommended as a potential treatment option for aspergillosis in raptors. However, additional research is required to determine both treatment efficacy and safety.

## Course review

### Exotic Nursing Open Learning Course for Veterinary Nurses (City & Guilds Certificate in Veterinary Nursing of Exotic Species)

*Reviewed by Sarah Gough*

Dubai Falcon Hospital, PO Box 23919, Dubai

The course is provided by Edinburgh's Telford College on an open learning basis, it was written by Simon Girling, RCVS Specialist in Zoo Animal and Wildlife Medicine. Simon graduated from Glasgow Vet School in 1994. He has his own first opinion and referral exotic practice in Edinburgh and is honorary treasurer to the British Veterinary Zoological Society and Zebra Foundation. Simon has also authored and co edited many publications and texts such as Veterinary Nursing of Exotic Species, BSAVA Manual of Exotic Pets. He also lectures veterinary students and nursing students throughout the UK, Improve CPD, Glasgow and Edinburgh university veterinary schools to name a few.

The species the course covers is very extensive, on checking each group I was amazed at the information for each species the course has gone into.

**Avian** – Parrots, raptors, owls, perching birds, pigeons, ducks, swans, toucans.

**Reptile & Amphibians** – snakes, lizards, tortoises, terrapins, turtles, even the crocodile species and amphibians.

**Small mammals** – rabbits, rats, mice, hamsters, gerbils, guinea pigs, chinchillas, chipmunks, ferrets.

**British Wildlife** - Red foxes, badgers, hedgehogs, bats, deer, wild mustelids, otters, squirrels, hares, seals and wild birds.

While a section on British wildlife may not seem relevant to those of us working in the Middle East, the majority of veterinary nurses within the UAE are exposed to numerous types of Arabian wildlife (including foxes, hares, hedgehogs and wild birds) so we can relate the knowledge covered in this part of the course to our own UAE wildlife collections.

Each species group are each split into 5 categories:

1. Biology / Husbandry / Reproduction.
2. Nutrition.
3. Handling / Anaesthesia.
4. Fluid therapy
5. Common diseases and their treatments.

The course material is very well laid out, and the majority of the information that is needed is within the packs, so no extra books required unless you so wish. A recommended reading list is provided. Throughout each pack there are self assessment questions to ensure you are grasping the studies. At the end of each pack there is an assignment of short answer and multiple choice questions which require completing and sending or emailing to your UK tutor.

You have 18 months to complete the course. At the end if you so wish you can sit the City and Guilds examination to obtain the certificate component, currently held in September annually in Edinburgh UK. At this time they are looking into whether overseas students can carry out the examination in their resident countries.

So far I have completed the avian unit and I have learnt so much background knowledge on this group of animals. I now truly understand just how unique birds are physiologically. In the hospital where I work I treat many falcons with aspergillosis, but now I know exactly why and what we are doing rather than just doing. We all know as nurses how to help nurse every animal we see, but to understand the anatomy physiology, nutritional requirements and diseases specific to each species is even better. Let's face it in our studies to obtain our exclusive qualified veterinary nurse status, I can only remember very briefly scratching the surface of exotic species so this course bridges the gap left in our studies.

I personally started this course to improve my background knowledge and it's a course I've always wanted to do, but never had the exotic case load to undertake the course in my previous practices. Now out here I see all manner of species ranging from small geckos to large giraffes.

To be able to undertake the course you must be a qualified veterinary nurse and provide written evidence you deal with at least 10-15% exotic species. The website states you have to be working in a UK veterinary practice but this is fine. To date they have had a student from Hong Kong and now me in the UAE, along with numerous UK students.

To find out more information about the course, enrollment:

Edinburgh's Telford College,  
350 West Granton Road, Edinburgh, EH51 1QE.  
United Kingdom  
Tel: +44 (0) 131 559 4000  
Fax: +44 (0) 131 559 4111  
<http://www.ed-coll.ac.uk/content.asp?ArticleCode=30&ID=592>

## News & Announcements

### Hunting Houbaras over Iraqi Soil

#### **Nature Iraq Press Release:**

In the winter of 2009, a group of falconers from the Gulf entered Iraq from the Iraqi –Saudi border near Nugratt Al Salman in Al Muthana (Samawa) province heading for Al Muntafq Desert in Thi Qar Province and Al Nekheab Desert in Anbar. Guided by local Bedouin, their objective was the hunting of Houbaras in their wintering areas of Iraq, which are considered one of the most important wintering grounds in the Middle East.

The open shrubby steppes and flat arid habitats in Iraq are a favored wintering grounds of the migrant Asian Houbara Bustard or McQueen's Bustard (*Chlamydotis macqueenii*), after their fall migration from breeding grounds in northeast Asia. These areas have also witnessed the classical hunting activities of Iraqi and foreigner hunters and falconers coming from all over Arabia as they gathered for one combined purpose: to chase and hunt down this ultimate and elusive game bird of the Arabian hunter.

Though conducted in the past from horse and camel-back, using Saker Falcons, Peregrines and other birds of prey trained to hunt the Houbaras, now the hunters come with four-wheel drive, high-speed vehicles and high-powered optics and hunting equipments such as binoculars and rifle monoscopes that allow them to easily pursue their prey of choice.

This, and the lack of hunting laws and conservation enforcement, has led to the decline in Houbara populations throughout their range. They are now considered a species threatened with global extinction by the World Conservation Union, which has led ornithologists and wildlife researchers to develop action plans to try to rehabilitate this bird and elevate its population in the wild again, especially in its wintering grounds such as in Iraq.

Because of the absence of wildlife protection legislations under the newly established Iraq government, many areas around the country are witnessing over-hunting activities on different birds and mammal species, some of them endangered such as the Houbara.

In this hunting expedition over 100 birds were reported killed and results such as this mean that large numbers of Houbaras are finding themselves on dinner tables and in memorial photographs of the hunters instead of feeding in protected areas governed by proper legislations. This is the situation for this bird all over Arabia as its numbers are decreasing in the wild, alarming conservationists and wildlife protection societies. Hunters taking advantage of the unstable situation in Iraq can only accelerate these declines.

### Nature Iraq recommends:

- Foreign nations and Iraqi border officials should restrict or, in some cases, ban the transport of hunting birds entering or leaving Iraq, as many of these species represent endangered or threatened species themselves. For example, the Saker Falcon is an endangered species. Also, Nature Iraq is aware of an extensive animal trade of endangered and threatened species such as the Houbara crossing Iraq's borders on a regular basis. Thus Iraq should sign on to and enforce the Convention on International Trade in Endangered Species (CITES) as well as other international conservation agreements (such as the Convention on Migratory Species & the Agreement on the Conservation of African-Eurasian Migratory Waterbirds).
- Iraqi government should enact and put into force wildlife protection legislation and establish hunting limits and/or bans as appropriate for specific species. These laws should be based and informed by an active campaign of conservation research and field study on the status of these species within Iraq and education of the general public.
- More support and education is needed to help the Iraqi security forces move to a more active role in controlling these activities.



**Houbara hunted by Gyrfalcon or Gyrfalcon hybrid in Iraq. (Ahmad Al Alwani)**

#### **Nature Iraq Update:**

The winter of 2010 witnessed more large hunting campaigns in western and southern Iraq. During Nature Iraq's latest winter surveys in the west two hunting camps were encountered belong to falconers and Houbara (Macqueen's Bustard) hunters who had traveled from neighboring Arabian Gulf countries to these areas of Iraq. The first camp was based in the area of Anah and Rawa Island along the Euphrates River northwest of Baghdad. The second camp seen was based in Al Nekheab Desert far to the west near the Iraqi – Saudi border.

According to one local witnesses each hunting convoy that entered Iraq this winter had between 10 – 20 cars each, sometimes holding between 4-6 trained captive-bred Gyrfalcon hybrids, which are used for hunting Houbaras. This witness estimated that the number of Houbaras hunted per day was between 4-8 and the foreign falconers had been hunting throughout the area since October 2009 until the date the latest actions were observed on 10<sup>th</sup> of January 2010.

The action of these foreign hunters is causing increasing local anger particularly with Iraqi falconers in western Anbar. One described that he was no longer able to see any Houbara in his hunting grounds during the daylight while in the past it was normal to count 10 or 12 of them in the same area. The tyre trails of the foreigners' 4x4 modern chase vehicles were seen everywhere around their base camp.

“Their negative effect reflects also on the other biota in the Iraqi desert”, the witness said, “they even hunted the foxes and small desert mammals to be able to feed their falcons.”

This fragrant destruction to the Iraq's natural wealth is not limited to western Iraq. A few weeks before another non-governmental environmental organization, Iraqi Observer for Environmental Protection, from Missan Governorate of southern Iraq sent an alert regarding a large number of foreign hunters who entered into Iraq. These hunters brought with them many falcons and birds of prey in long protected convoys to the steppes and marshlands of the area and killed hundreds of Houbaras and other endangered birds and mammals. Nature Iraq took the alert and published an article in the local newspapers and also alerted government officials of these activities.

Nature Iraq and its survey teams are concerned by the actions of these foreign hunters that appear to be taking advantage of the current situation in Iraq to damage and abuse Iraq's natural resources, during a time when these resources are vulnerable and need greater protection.

*Nature-Iraq is an Iraqi Environmental Non-Governmental Organization registered in Iraq. Nature-Iraq builds civil society networks to protect the environment of Iraq and develops capacity within Iraq, both in private and publicly-owned industries, to help clean and protect the environment.*



[www.peregrinefund.org/gyr\\_conference/index.html](http://www.peregrinefund.org/gyr_conference/index.html)

This international conference will explore evidence for a range of environmental changes in arctic ecosystems affecting the Gyrfalcon, its competitors, and its prey, ptarmigan, waterfowl, seabirds and others, to predict effects and outcomes of global climate change, identify areas of uncertainty, and develop global strategies for measuring and mitigating them. We will publish a conference proceedings in what we expect will be a landmark publication of information, ideas, and strategies.

The conference will take place in the Simplot Ballroom at Boise State University in Boise, Idaho, USA, beginning on Tuesday 1 February and running through Thursday 3 February 2011. It will feature three days of invited and contributed scientific papers and posters, as well as strategy workshops and tours of The Peregrine Fund's World Center for Birds of Prey.

**Convened by:** The Peregrine Fund, Boise State University (the Raptor Research Center and the Biological Sciences Department), and the US Geological Survey (Snake River Field Station).



Gyrfalcon, Lena Delta, Russia (A. Dixon)

## الطب الشرعي كأداة لصون الجوارح إلينا أوبو ورفائيل مولينا

تكتسب التحقيقات في وفاة الحيوانات البرية أهمية متزايدة في مراكز إعادة التأهيل الحياة البرية إذ أن حالات النفوق الفردية أو الجماعية تنتج في كثير من الأحيان عن ضغائن بشرية وتتم الملاحظات القضائية في نهاية المطاف من خلال المحاكم. تبدأ التحقيقات في حالات النفوق المشبوهة للحيوانات البرية في مركزنا لإعادة تأهيل الحياة الفطرية وتتضمن تحديد الأنواع وسبب النفوق وعمر وجنس الحيوانات وكذلك تحديد وقت الموت، وتستخدم فيها أدوات دعم التشخيص كالأشعة والتشريح والميكروبيولوجيا وعلم السموم. تحدث معظم حالات النفوق ذات الصلة بالبشر بسبب الصيد غير المشروع والصعق الكهربائي والاستخدام المقصود لمبيدات الآفات وإساءة معاملة الحيوانات والاصطدام مع منشآت من صنع الإنسان، وهناك أسباب أخرى أقل شيوعاً لكنها مهمة ومنها الأمراض المعدية. يزداد دور الطب الشرعي البيطري أكثر وأكثر كأداة مهمة للصون وقد تكون لتدابيرها التصحيحية فائدة لكافة أعداد الحياة الفطرية.

### صلابة البيض وسماكة قشرة البيض وسماكة الغشاء في مجموعة من أنواع الصقور المختلفة

أورورا كاستيلا، ج. مالون، ر. ريتشر، جي.جي. نجرو

تم الربط بين المستويات العالية للمبيدات الحشرية وقلة سماكة قشرة البيضة وانخفاض قابلية البيض في الصقور، ومع ذلك فإن هناك فجوة كبيرة في معرفتنا عن العوامل المتعددة التي تؤثر على اختلاف سماكة قشرة البيضة في الطيور. في ما نعلم، فإنه لم يسبق استكشاف ذلك في أنواع الصقور قط. لقد قمنا بفحص صلابة البيض وسماكة قشرته وسماكة الغشاء في أنواع مختلفة من الصقور المهددة بالانقراض التي لم تتعرض للتلوث بالمبيدات أو ندرة الغذاء (أي تلك التي ولدت في ظل ظروف الأسر، كما قمنا باستكشاف تأثيرات خصائص البيض والإناث وتسلسل وضع البيض في سماكة قشرة البيضة، ونقدم هنا البيانات الأساسية الأولى المتاحة لأنواع الصقور التي جرى بحثها. تمثل هذه البيانات معايير قيمة للدراسات المستقبلية لآثار التلوث على سماكة قشرة البيضة في الأعداد البرية من الطيور. إن هذه هي مساهمة مهمة في الحفاظ على الصقور.

### علاج ناجح لانتفاخ حاد لأسفل القدم في صقر شاهين *Falco peregrinus* باستخدام دوكسيسايكلين داخل الآفة *Intralesional Doxycycline* مايا كمروف، ومايكل مَرِي، وتوم بيلي

التهاب جلد القدم مرض مزمن شائع في الطيور الجارحة في الأسر وقد تم تطوير عدة خيارات علاجية له خلال السنوات الماضية. تصف هذه الحالة علاجاً ناجحاً لآفات انتفاخ حاد ثنائي الجانب لأسفل القدم في صقر شاهين *Falco peregrines* باستخدام مزيج من العلاج بالمضادات الحيوية الجهازية والموضعية وتقنية استخدام رباط مرن لتخفيف الضغط. استخدم معجون الأسنان الهلامي دوكسيروب *Doxirobe™* لغرضي الحماية الميكانيكية لعملية الشفاء الثانوية عن طريق البرغلة والتأثير الإيجابي على العملية بفضل آثار التتراسايكلين *tetracycline* غير المضادة للميكروبات.

### التصوير الشعاعي الرقمي -- تقنية هامة لتشخيص الاضطرابات العضلية الهيكلية في الصقور. الجزء الأول - الاعتبارات العامة ديانا كويليكويني، توم بيلي، انطونيو دي سوما، احمد كوتي

التصوير الشعاعي أسلوب تشخيصي هام في طب الطيور. وهو أداة هامة غير غازية للمساعدة في تشخيص أمراض الهيكل العظمي والبطن والصدر، التي يحمل بعضها أعراضاً سريرية مماثلة غير محددة. أتاح تقدم التصوير الشعاعي الرقمي مزايا هامة تفوق التصوير بالأشعة التقليدية، على الرغم من أنها لم تستخدم في ممارسة عامة على نطاق واسع بسبب التكلفة العالية لشراء وحدة منها. نستعرض التفاصيل الفنية للتصوير بالأشعة التقليدية، والتصوير غير المباشر الرقمي، والتصوير الشعاعي الرقمي المباشر، وناقش مزايا وعيوب التصوير الشعاعي الرقمي عبر التصوير بالمقارنة التصوير بالأشعة التقليدية.

## أنثى صقر غزال تضع 7 بيضات في منغوليا

أندرو ديكسون، و جانهويان بيرف-أوتشير ، و ديميتار راجيوف

توثق هذه المقالة الحدث الاستثنائي لأنثى صقر غزال برية وضعت سبع بيضات في منغوليا . وضعت هذه المجموعة الكبيرة من البيض في منطقة تعشيش تتميز بتوافر عال للتدبيبات الصغيرة. لم تقف أي من البيضات لأن العش كانت قد هجر بعد وقت قصير من وضع البيض . نناقش أهمية توفر الإمدادات الغذائية في تحديد عدد البيض الذي يضعه صقر الغزال.

## دليل مختصر للتجار بالطيور الجارحة في اليمن

دافيد ستانتون

رغم أن اليمن لا يعتبر إحدى الحلقات الهامة في الاتجار الدولي بالصقور، إلا أن عددا غير موثق من الصقور الكبيرة أي الصقر الحر *Falco cherrug* وصقر الشاهين *F. Peregrines* وصقر الغزال *F. Biarmicus* تصاد أثناء مرورها السنوي خاصة في نقطة عنق الزجاجة لهجرتها جنوب البحر الأحمر في باب المندب، كما أن صقور الغزال المقيمة تؤخذ من أعشاشها بشكل أدى لتناقص تعداد هذا النوع ( *Mike Jennings, pers. comm.*). رغم أن الطيور الأكثر طلبا تصاد من قبل محترفين على دراية بالفريسة والأسواق، إلا أنه من المعتقد بشكل واسع في اليمن أن الجوارح قد تكون ذات قيمة، وهذا الاعتقاد المنتشر بأن أي طير جارح قد يمكن بيعه لقاء سعر عال محتمل هو المحرك لتجارة محلية انتهازية جرى توثيقها بشكل غير رسمي منذ مارس 2009. تجري هذه التجارة على جوانب وتقاطعات الطرق وفي أماكن بيع محددة منها سوق نغم للحبوانات في صنعاء تم توثيق ما لا يقل عن 14 نوعا من الجوارح (ومنها البوم) في نغم، وأربعة أنواع أخرى معروضة للبيع في أماكن أخرى، وخمسة أنواع اصطيبت محليا معروضة في حديقة حيوان صنعاء وفي معارض في المطاعم. إن هذا الاتجار، إضافة إلى تعارضه مع المعاهدات الدولية التي وقعتها اليمن، يتضمن قضايا هامة من الرفق بالحيوان بسبب الظروف المروعة التي تحفظ فيها الطيور قبل بيعها والظروف التي يتم عرض هذه الطيور الأسيرة للجمهور.

## بيانات إضافية عن هجرة الطيور الجارحة في اليمن وبعض جوانب الصيد بالفخاخ في اليمن ودول شمال افريقيا

أي. بالز

أقدم بيانات من زيارة قصيرة لدراسة هجرة الطيور الجارحة في اليمن في خريف عام 2009. تمثل منطقة باب المندب نقطة هجرة هامة بين آسيا وأفريقيا وتقوم عشرات الآلاف من الطيور الجارحة خلال هجرتها في كل عام بالانتقال عبر مسافة المضيق البالغة 28 كم. إن معظم هذه الطيور الجارحة هي من نسور السهوب وصقور العسل الحوامة، إلا أن صقورا كبيرة كصقور الغزال والشاهين والصقر الركري تعبر أيضا من خلال هذا الممر الطبيعي في منطقة باب المندب حيث يعتبر صيد الصقور المهاجرة بالفخاخ أمرا مألوفًا. يدل الاسترجاع بالرنين وتحركات صقور الغزال الهنغارية الموسومة بالأقمار الصناعية على أن الطيور وأغلبها من الإناث الأحداث تهاجر إلى شمال أفريقيا، وبافتراض وجود نمط هجرة مماثلة لكافة الأعداد الأوروبية فإن قرابة 360 من صقور الغزال تصل إلى شمال أفريقيا في كل عام. ينشط صيادو الفخاخ في ليبيا ومصر وليس هناك أي رقابة على نشاطاتهم المدفوعة إلى حد كبير بارتفاع الطلب والأسعار المدفوعة للصقور البرية من الصقارين العرب.

## صندوق الشاهين والصقارة والصون

توم كاده

هذا المقال هو نسخة منقحة بشكل طفيف من تقرير قدم أولا في الندوة الخاصة للجمعية الدولية لرياضة الصيد بالصقور التي عقدت في أبو ظبي في أكتوبر 2005 للنظر في تقديم التماس إلى اليونسكو للاعتراف برياضة الصيد بالصقور كجزء من التراث الثقافي غير المادي في العالم . يصف التقرير تطور صندوق الشاهين من مجرد منظمة أنشأت في عام 1970 لإعادة إحياء أعداد صقر الشاهين التي تقلصت كثيرا في شمال أمريكا، ليصل اليوم إلى منظمة أوسع لصون كافة الطيور الجارحة. يصف هذا المقال كيف يتشابك عمل صندوق الشاهين بشكل وثيق مع الصقارين ورياضة الصيد بالصقور.

## كلمة العدد



الأماكن لصيد الطيور. إن هؤلاء الصيادين المحترفين يعرفون قيمة الطيور وقد يقومون أيضا بالعمل كتجار، وهم يعتبرون الصيد بالفخاخ جزءا من تقاليدهم، وتشتهر بعض الأماكن بخبرة صياديها. هناك أيضا فئة من الصيادين الذين ليس لديهم تقاليد في صيد الصقور ويمكن اعتبارهم الصيادين الانتهازيين" وهم يسعون إلى الحصول على المال السهل وغالب ما يعملون ضمن عصابات منظمة. يجوز في أجزاء مختلفة من العالم أن ينشط كل أو بعض فئات الصيادين المذكورة في العمل إلا أن الدوافع التي تدفع هذه الفئات الثلاث يمكن أن تكون مختلفة جدا.

نقدم في هذا العدد مقالين يتعلقان بصيد الصقور بالفخاخ، مع تركيز على اليمن وشمال أفريقيا حيث يتم صيد الصقور عموما من قبل السكان المحليين كما أن الصيادين المحترفين قد ينشطوا في ذلك أيضا. ليس من السهل تسجيل أو قياس حجم الصيد بالفخاخ، وأصعب من ذلك اتخاذ الإجراءات اللازمة لضمان عدم تأثير الصيد على أعداد الصقور. سبق أن نشرنا في فالكو في السنوات الأخيرة عدة مقالات عن صيد صقر الجير بالفخاخ في روسيا (العدد 33) والاتجار بالجوارح في أفغانستان (العدد 31) والصين (العدد 30)، وفي كل من تلك الحالات فإن النتيجة النهائية هي نفسها، وهي الاستغلال غير المنضبط للطيور الجارحة على رغم تفاوت فئات العاملين في الصيد بالفخاخ أو المتاجرة، وعلينا إذا أردنا التصدي لمشكلة هذا الصيد وهذه التجارة فهم خلفية العاملين بهما ودوافعهم وظروفهم الاجتماعية.

تتحصر أنواع الفرائس في الصقارة العربية في عدد قليل من الأنواع الموجودة في المناطق الصحراوية القاحلة: تضم الفرائس من الثدييات الأرانب البرية والغزلان (التي تصاد باشتراك كلاب السلوقي)، في حين تتكون فرائس الطيور من دجاج الحبارى المهاجر الحبارى والكروان الحجري. هناك القليل من المناطق المتاحة للصيد بالصقور في الشرق الأوسط، وهي مناطق استغلت بشكل جائر وبانت خالية إلى حد كبير من الفرائس، الأمر الذي يضطر الصقارون للسفر بحثا عن أراضي الصيد والفرائس. إن هذا الصيد "السياحي" يخلق مشاكل صور كما هو مبين في قسم "أخبار وإعلانات" ولكنه يخلق في نفس الوقت فرصا للصون أيضا كما يتضح من إعادة توطين وإدارة الحبارى في المغرب.

من أجل ضمان بقاء الصقارة للأجيال المقبلة على التوازن يجب المحافظة على التوازن بين متطلبات العصر الحديث وإتباعه للاستخدام المستدام للصقور والفرائس، وتمثل زيادة الوعي بهذه القضايا خطوة صغيرة في هذا الاتجاه. تلقي مقالة توم كاده عن صندوق الشاهين الضوء على المساهمة العظيمة التي قدمها ويقدمها الصقارون والصقارة في مجال الصون. إن للصيد بالصقور تداعياته الكثيرة التي يمكن أن تفيد المحافظة على البيئة، ومنها على سبيل المثال ما تصفه أورورا كاستيلا وزملاءها عن ما قاموا به بالتعاون مع مرافق إكثار الصقور للحصول على بيانات قيمة عن البيض. يستطيع الأطباء البيطريون العاملين مع الصقور استخدام تقنيات الطب الشرعي كأداة صون كما تصفها ايلينا أوبون ورافاييل مولينا في هذا الشأن. هناك أيضا مقالات أخرى في مجال الطب البيطري ومنها معالجة انتفاخ أسفل القدم واستخدام تكنولوجيا جديدة للتصوير الشعاعي الرقمي.

يبشر فصل الخريف

بموسم جديد للصيد

بالصقور. يعتبر معظم

الصقارين في الوقت

الحاضر الصيد رياضة ترفيهية ومع ذلك فإنه لا يزال أمرا بالغ الأهمية الاجتماعية والثقافية في أجزاء كثيرة من العالم. استمر الصيد بالصقور على مر العصور وما زال حتى الآن ذو مكانة ودور في العالم الحديث، إلا أن هذا العالم الحديث يخلق تحديات جديدة للصقارين تحتاج إلى معالجة إذا كان هناك مستقبل للصيد بالصقور. يحتاج الصقارون الصقور والفرائس للصيد، وهذه العبارة الواضحة هي في الواقع جوهر العديد من قضايا الصون التي تواجه الصيد بالصقور اليوم، وخصوصا في منطقة الشرق الأوسط.

هناك طلب عالي على الصقور في منطقة الشرق الأوسط.

لماذا؟ أولا لأن للصيد بالصقور شعبية كبيرة وهناك بالتالي

العديد من الصقارين (على الرغم من أننا لا نعرف عددهم)،

ويقوم كل صقار في كثير من الأحيان باستخدام عدة صقور أثناء

الصيد، كما أن هناك استهلاك عالي جدا للصقور إذ يفقد

بعضها أثناء الصيد أو يطلق أسر بعضها أو تهدى لآخرين بعد

انقضاء الموسم، في حين ينفق بعض من تلك التي يتم الاحتفاظ

بها خلال فترة الرمي في أشهر الصيف. وعليه، فإن كل موسم

صيد يسبقه طلب على الصقور الجديدة. تقوم التربية في الأسر

بتوفير جزء كبير من هذا الطلب، لا سيما في دولة الإمارات،

إلا أن استخدام الصقور التي تصاد في البرية لا يزال يشكل

عنصرا أساسيا في الصقارة العربية، ويترتب عليه تجارة في

الصقور البرية تمثل قضية صون خطيرة وخاصة بالنسبة

لأعداد صقور الغزال التي تضاءلت بشكل ملحوظ في أجزاء

من آسيا الوسطى.

لعل ما ينمي هذه التجارة ليس مستوى الطلب على الصقور

البرية بل المردود المالي لهذه الطيور. تمول أموال الصقارين

سلسلة تمويل تصل من خلال الوكلاء ومختلف التجار الوطاء

إلى الصياد الأصلي للصقور. قد يعيش الصياد ويعمل في منطقة

بعيدة عن شبه الجزيرة العربية، في شمال أفريقيا أو آسيا

الوسطى أو روسيا أو الصين، وقد لا يزيد ما يتقاضاه عن

بضعة دولارات لكل طائر ومع ذلك، وفي كثير من أنحاء

العالم، فإن صيد الصقور بالفخاخ يقدم فرصة نادرة للسكان

المحليين الفقراء لكسب بعض المال. إن هؤلاء "الصيادين

المحليين" لا يستطيعون في كثير من الأحيان تحديد الأنواع

المختلفة للجوارح وقد لا يتمكنوا من بيع الطيور التي يمسون

بها، إلا أنهم يستمرون في كل عام في اصطياد الطيور الجارحة

ومحاولة بيعها لأنها فرصتهم الوحيدة لكسب بعض المال.

إلا أنه لا يمكن اعتبار فئة أخرى من صيادي الصقور فقراء

إذ يستطيع بعضهم السفر على نطاق واسع بحثا عن أفضل



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