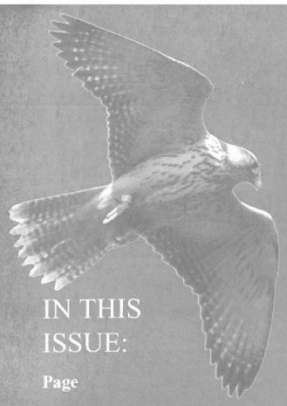

FALCO

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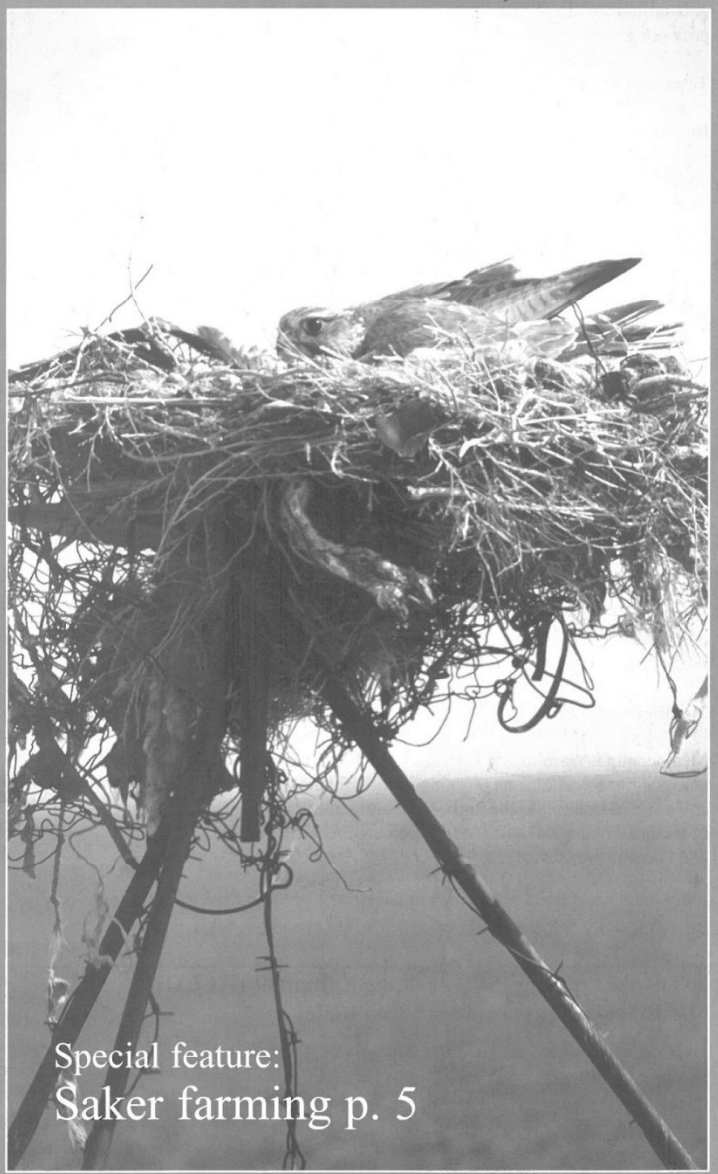

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MEFRG Objectives:

To provide:

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:

Regional and 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.

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Previous issues of **FALCO** can be read at:

www.falcons.co.uk/MEFRG/

Saker chicks at artificial nest platform.
Photo by E. Potapov

Photo at the front cover by E. Potapov. In this issue photos are made by the authors of articles unless stated otherwise.

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Editorial

There have been several important events so far in 2003. Probably the most catastrophic has been the massive secondary poisonings of predators in Mongolia. Sakers, buzzards, eagles and cranes have all been affected, as have the mammalian predators. In an effort to control vole plagues the Pest Control Agency of the Ministry of Agriculture applied 0.5% bromdialone rodenticide. The Saker has crashed in Mongolia and parts of southern Siberia, perhaps to only 10% of its former level. These were the last strongholds for the species. It will clearly have a major implication for the conservation of the species in the wild, and for the harvest of the species into Arab falconry. We hope to report on this in more detail in the next issue. On the bright side, the artificial nest project, reported on in this issue, shows promising results and may offer a partial biological solution to both Saker and vole problems.

Sad news came from Mongolia in February: longtime MEFRG supporter D. Batdelger passed away after suffering a heart attack. Batdelger made a tremendous contribution as he reviewed the Mongolian press and TV for falcon conservation-related problems for the MEFRG.

Articles in this and in previous issues provide firsthand reports of surveys across the saker breeding and wintering ranges. There has been an alarming decrease in numbers in most countries, however in Kazakhstan, due to increased public awareness and measures taken by the government, numbers seem to be increasing slightly. With a concerted effort this trend may continue but it requires further efforts from authorities in both the exporting and the importing countries. Reports from the Hungarian biologists at the World Working Group Bird of Prey Conference in Budapest in May showed that the Hungarian Saker is also on the increase. So we cling on to these glimmerings of encouragement in what is otherwise a very gloomy picture.

Last year saw the publication by ERWDA of the Emirates Falconers Association magazine 'Al Saggar '. This has been several years in the planning and has been long awaited by falconers in the Middle East. The publication is in full colour and in Arabic and contains many articles on falcons and falconry in the Middle East. There is also a children 's supplement for the younger generation of falconers. It is available to falconers through the UAE Falconers Association at the Abu Dhabi Falcon Hospital. For the first time we have a route of written access to Arab falconers and already material from Falco has been used to promote awareness of falcon conservation and health issues among falconers.

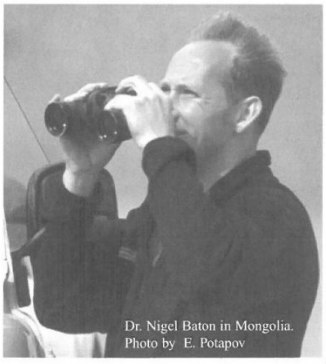
The UAE instituted falcon registration last year and we hope soon to obtain some basic data on numbers of falcons and falconers in UAE falconry. Moves are afoot to bring key Arab falconers together to support CITES and establish some multi-national approaches to mitigating falcon problems. There is also an exciting new development – the Houbara Initiative – aimed at tackling and resourcing ways to reverse the decline in the Houbara Bustard.

The falcon vets in the UAE have been meeting regularly throughout the 2002-2003 season through a positive initiative organised by Peter McKinney and hosted at various times throughout the year by ERWDA, CVRL and the Emirates Falcon Hospital. The absence of an official veterinary body in the UAE, (and other regional countries) means that professional ethics and standards of medicine vary widely, often to the detriment of both our patients and our relationships with colleagues. The informal and friendly nature of the meetings has helped to improve communication and cooperation between the veterinarians and exchanges of ideas and experiences has certainly encouraged new thinking on raptor health issues.

Dr. Nigel Barton, the editor of Falco from 1999, has stepped down due to a new posting in Ulanbataar, Mongolia. He and his partner Dr Kate Oddie have gone to teach ecology and wildlife surveying techniques for three years under a grant from the Darwin Initiative (UK). We wish them the best of luck and look forward to hearing stories of their adventures. Nigel is replaced by Dr Eugene Potapov, who joins Dr Tom Bailey on the editorial board. Many of the articles in this issue have been edited by Nigel.

Four new modules in the Bird of Prey Management Series, Captive Breeding (sections 1-4) are now out in English and shortly in Spanish. Details of these and how to order can be found at www.falcons.co.uk/faraway/ffp/. There are now 8 modules and it is developing into a comprehensive series. It should soon be available in Arabic. In conjunction with the UK Hawk Board we are looking at ways of establishing an internationally recognised qualification for people involved in the management of captive raptors, be they falconers, rehabilitators, veterinary nurses or members of animal welfare organisations. Anyone interested in being involved with this, please contact the editors.

The Editors



Dr. Nigel Baton in Mongolia.
Photo by E. Potapov

Peregrine Falcons In Pribaikal Region

V.V. Ryabtsev
Pribaikalsky National Park
Irkutsk
Russia

There is relatively little literature about Peregrine Falcons (*Falco peregrinus*) in the Pribaikal region of Russia. During the nesting season the species is seldom encountered, but during the migratory season it is frequently seen. There is rather out-dated information about four nests on the rivers Lena and Iya (Sonin 1962) and the river Selenga basin (Ismailov & Borovitskaya 1973). Nests were located on the steep banks. In the first region (Lena and Iya) there were: 2 fledged nestlings (22nd of July 1958) and 3 half-fledged nestlings (11th of July 1957); in the second region (Selenga): one egg and nestling (13th of June 1962) and 2 nestlings (4th of July 1964).

In 1999 during a survey of rare species of birds of prey and owls in the western part of Pribaikal region, I found three Peregrine Falcon nests. The first I found on 14th of June on the right bank of Bratsk reservoir that had steep rocky slopes. There were 4 unfledged nestlings (about 1-7 days old) in a small stone recess 30-35cm high. The pair of mature falcons was very aggressive, the male falcon stooping at me (approaching closer than 10 meters). A second nest was found on 30th of June in the river Upper Lena basin, not far from the place where nesting Peregrines were found by Sonin (1962). The nest was in a rocky recess 50cm high and there were 4 nestlings 15-20 days old. The third nest was found between rivers Lena and Angara, on a stone ledge and on 1st July there were 3 nestlings 5-10 days old. All three nests were accessible to people and predators. In the second region a badger set (*Meles meles*) was on a slope 400 meters from the nest. All nests were in the vicinity (200-1500 meters) of small Buryat villages. Such tolerance of mature falcons is amazing. They behaved very loudly. Calls of territorial birds made it easy to find nests.

All 3 nests were situated in forest-steppe landscape, habitat typical for Saker. I have been studying birds of prey in western Pribaikalye forest-steppe regions since 1978, but I have never before found Peregrine nests since they were very uncommon even in the summer. In 1998 a Peregrine nest site on the right bank of Bratsk reservoir was thoroughly inspected, but no falcons were found there. It is most likely that the first nesting attempt was in 1999.

The food being used by these Peregrines was very surprising. Peregrines normally feed almost exclusively on avian prey. In 1962 Sonin analyzed 10 pellets, 2 stomachs and some food remains and found only birds (100% in pellets) and insects (40%). Bird species identified included: Rock Dove (*Columba livia*), Carrion Crow (*Corvus corone*), ducks, one small sparrow, one duckling. I have collected 87 pellets and 11 food remains from near to nests containing the remains of 137 vertebrates. Avian parts comprised 39.1% and mammalian 60.9%. Almost all of the material was collected from nests and a small part from near the nest. Average size of pellets was 1.8 (1.3 – 2.2) x 4.0 (2.5 – 7.2) cm. The three nests contained various samples (58 pellets and 6 food remains; 24 and 2; 5 and 3) and mammals are found in pellets from all 3 pairs (83.5%, 14.3% and 50%) respectively. The overwhelming majority in food remains was *Microtus gregalis* (53.6% of all prey). Field-voles comprised 4.3%, *Microtus oeconomus* (0.7%), *Cricetulus barabensis* (2.1%). Medium-sized birds (such as doves) comprised 15.9% of all prey, small birds 13.8%. In addition there was lapwing (*Vanellus vanellus*) 2.1% of all prey, Rock dove (*Columba livia*) 2.1%, Shoveler (*Anas clypeata*), Curlew (*Numenius arquata*), Marsh Sandpiper (*Tringa stagnatilis*), Wood Sandpiper (*Tringa glareola*), some of the *Gallinago* species, Jackdaw (*Corvus monedula*), Hawfinch (*Coccothraustes coccothraustes*).

A large proportion of mammals was found in the diet of Peregrines in central Yakutia (north eastern Siberia). In various materials (n = 495), collected in the Middle Lena valley, between Lena and Amgina rivers (Borisov 1978; Larionov, Degtyarev & Larionov, 1991), the proportion of *Citellus undulates* was 15.1% of all prey, *Microtus gregalis*

– 10.1%; *Arvicola terrestres* and *Lepus timidus* were also frequently found. There is similar data from a nest found on 1st July 1935 in steppe Dauria – eastern part of Pribaikal region (Skalon 1936). Wool and bones of *Microtus maximowiczii* were found in 80% of all pellets collected here (n=26) and bird feathers in not more than 20%. It is interesting that the nest was also situated in a rocky recess, which was very easy to access.

What is the subspecies of nesting falcons in the Pribaikal region? There is a boundary between *Falco peregrinus peregrinus* and *Falco peregrinus japonensis* in Baikal region (L.S. Stepanian 1990). The falcons that I observed near the nests had brightly coloured red on the under side of the body, typical for *Falco peregrinus japonensis*. J.I. Melnikov (2001) confidently defined the falcon he met at the Irkutsk reservoir as *F. p. japonensis*. It is possible that V.D. Sonin observed (judging by nutrition) nesting *F p. peregrinus*. The number of Peregrine falcons sharply decreased here in following years. I visited a nesting site at Upper Lena in 1989 but did not observe any Peregrines. During the second half of 1990s it started nesting not only here, but in forest-steppe regions between rivers Lena and Angara. But it was *F. p. japonensis* with a large proportion of rodents in the diet. It could get to Pribaikalye along river Lena's valley from Yakutia. But it is not clear why there are no remains of *Citellus undulates* in pellets of Peregrine falcon living at all 3 nesting places.

It is possible that the appearance of Peregrine falcon nests in forest-steppe landscape in the western part of Pribaikal region is explained by a sharp decrease in numbers of the larger and stronger Saker *Falco cherrug* (Ryabtsev 2001). The situation might be explained by competitive mutual exclusion. This problem is of scientific interest and at present, the western part of Pribaikal region is the perfect place for studying it.

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Saker farming in wild habitats: progress to date.

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Introduction

There are large areas of Mongolia that are open steppe, with short vegetation as far as the eye can see. In many places there are good densities of small mammals and birds, but nest sites are limited for birds of prey. Although Saker Falcons (*Falco cherrug*) and Upland Buzzards (*Buteo hemilasius*) will sometimes nest on the ground in these places (Fomin and Bold 1991, Potapov *et al.* 2001), effectively about 30 % of Mongolia is unproductive through lack of nest sites.

In some parts of the steppe, Brandt's vole numbers (*Microtus brandtii*) build up and peak on a three or four - ten year cycle, leaving the ground stripped bare. These vole plague areas may be about 150 kilometres across and are plainly visible from the air at 30,000 feet. Livestock grazing is impossible in these areas until the vole numbers crash again. Therefore it has been a policy to poison voles to stop these peaks occurring.

In 2002, with permits from the administration of Darkhan and Bayanmunkh somons, we erected artificial nest sites in one of these areas. The idea was to test whether the sites would attract raptors to nest there, and, if so, whether their food requirements would be sufficient to impact and perhaps even depress vole numbers so that their populations stabilised rather than cycled. The nests also had to be constructed in such a way that as the vole plague shifted across the steppe, the nests could also be moved to follow it.

The obvious sequel to this would be the creation of 'new' breeding populations of raptors. As the Saker is a significant species in trade, it might thus be possible to create wild falcon 'farms' without the need for taking birds into captive breeding programmes. This could thus provide alternative income to local grazing communities and give them an incentive not to use poisons.

Methods

In the spring of 2002 we set up 97 artificial nest sites in a high-density vole area (Sumya et al. 2003). The nests were based on scrap iron tripods, approximately 2 metres high (Figure 1), at 2 km spacing. They were built partially in Ulanbaatar, and assembled in the study area. The nest structures were designed to be transportable over long distances, cheap and, if necessity arises, movable at little extra cost. The nest structures were standard and consisted of interchangeable parts. The three legs were made of 30mm plumbing pipe 3 m long. The lower part of the legs were bent at the erection spot and dug into the ground for 0.5 m (See Figure 1). In the ground the legs were fixed with rocks, scrap metal or any other material at hand. At the top the legs were kept together with a welded collar. This supported a welded metal square 30 by 30 cm carrying a 50 by 50 cm plywood square. A central wire from the nest square to the ground was tensioned to provide extra stability. A 'starter' nest was built of twigs, bones and scraps of skin on the plywood base. Additional barbed wire was wrapped around the tripods to discourage camels and cattle rubbing themselves and thus damaging the structure.

The nest structures were placed 2 km apart in a completely flat area of the steppe on the border of the Darkhan and Bayanmunkh somons of Khentei aimaq (province). The choice of the area was predetermined by the distribution of vole peak areas and the topography. The trial area is a polygon 20 x 23 km. It takes 300 km by car to check all nest structures.

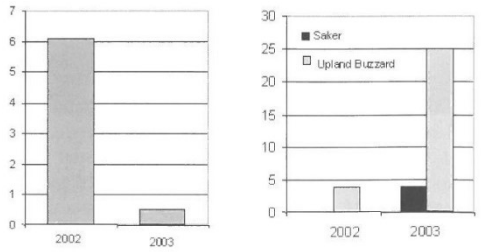
Vole density was estimated by counting vole colonies in a 50 m radius around the nest structures located evenly across the study area. The counts were repeated in 2002 in May once, in June 3 times, in October once, and in 2003 throughout the breeding season. The counts thus represent the number of colonies in an area of 0.785 ha. Assuming that there are 5.3 individual voles on average living in a colony (Bannikov 1954), one can estimate the vole density as individuals/ha.

Results

The total density of voles in the study area was very high (Figure 2) in the season 2002 and reached about 150 individuals per ha. The voles spread to this study area from the south in mid-March 2002, and were still arriving and establishing new colonies.

The summer 2002 was a pivotal in the practices of the Pest Control Agency at the Ministry of Agriculture of Mongolia. They have abandoned zinc-based chemicals to control the Brandts Vole, and started to apply poisoned grain both manually and from airplanes. The grain was treated with 0.5% Bromdialone (Report to the Ministry of Agriculture 2001). The treated grain proved to be an effective rodenticide, but it accumulates in the trophic chain and gets passed on to raptors. The latter die almost instantly on the spot. The contaminated grain was distributed amongst the Darkhan and Bayanmunkh

Figure 2. Left: Vole index in the study area in 2002 and 2003. Vertical Axis: Number of active colonies in 50 m radius. Right: Number of pairs (vertical axis) of Upland Buzzards and Sakers breeding in the experimental plot.



Female saker brooding her chick at an artificial nest. Photo by E. Potapov

somons at different times, and this virtually saved the experiment. Darhan somon was spreading the poison in summer and autumn of 2002 in the western part of the artificial nest study area, i.e. mostly after the breeding season, whereas Bayamnunkh somon started to apply the rodenticide in small patches around the eastern side of the area. There were only few casualties: we recovered corpses of a Golden Eagle and two Upland Buzzards.

In general, due to the application of the rodenticide and to natural decline, the vole numbers crashed to almost zero in the year 2003. Only a few colonies survived, forcing most resident raptors to feed on birds.

Nest occupancy

We managed to erect the nests by 20 April 2002, too late for the Saker Falcons to start breeding on the nest platforms, but the occupancy of the pioneering species such as Ravens and Upland Buzzards was surprisingly high. Almost all the nests were used as perches by Upland Buzzards, Saker Falcons, Ravens and Steppe Eagles. Four nests were occupied by Upland Buzzards in 2002, two of which had eggs. Ravens showed interest in 2 nests but the nests were erected too late for both Ravens and Sakers. Out of 2 Buzzard nests only one produced chicks. In the other nest, the eggs were overcooled and never hatched. It is suspected that they were disturbed during a snowstorm by a family of herders camped for a night nearby.

In the season of 2003 there were 4 Saker pairs breeding on the artificial nest platforms (Figure 2), thus forming a density of 8.6 pairs per 1000 km^2. They produced a total of 10 chicks (3 pairs with 3 chicks and one pair with one chick). However it was the Upland Buzzard who dominated the scene. A total of 25 buzzards successfully bred in the area producing 41 chicks. The density of the Buzzards breeding in the artificial nests reached 54.4 pairs per 1000 km^2. There were no Steppe Eagles breeding in the area in 2003, in contrast to the situation of the 2002. Thus the numbers of the Upland Buzzards increased from 4 pairs in 2002 to 25 pairs in 2003, and Sakers from 0 pairs in 2002 to 4 in 2003. Breeding rate per unit area in 2003 was 21.7 chicks per 1000 km^2 for Sakers and 89.1 chicks per 1000 km^2 for Upland Buzzards.

Discussion

The idea of attracting birds of prey to artificial nest platforms is not new. There are known designs of artificial nest platforms for a variety of species (e.g. Dewar and Shawyer 1996 and references therein). In Mongolia, the Saker was known to occupy artificial nest sites erected on existing nesting structures, e.g. electric poles (Ellis, 2000, Ellis, D. Unpublished report to the EPA, Ministry of Nature and Environmnent of Mongolia). The fundamental difference of this study is that we provided not only the nests themselves, but also nest structures in habitat which is completely flat and has no suitable places for raptors. In theory, the grid of artificial nest sites is dense enough to estimate maximum potential density of Sakers and Upland Buzzards.

In our previous correspondence (Sumya et al. 2003) we predicted that some 15 -20 of the nest platforms might be occupied by raptors. The reality exceeded our expectations: a total of 29 pairs of raptors bred in the area despite of the dramatic decline in the numbers of voles. The density of Sakers of 8.6 pairs per 1000 km^2 in the trial area by far exceeds the figure 2.5 pairs per 1000 km^2 - the average density for Mongolian typical steppes measured in several study areas monitored in 1998-2000 (Shagdarsuren et al. 2001). It is also surprisingly higher than the density recorded in an adjoining study area in 2003 – below 1.3 pairs per 1000 km^2.

It thus seems possible to successfully manage the

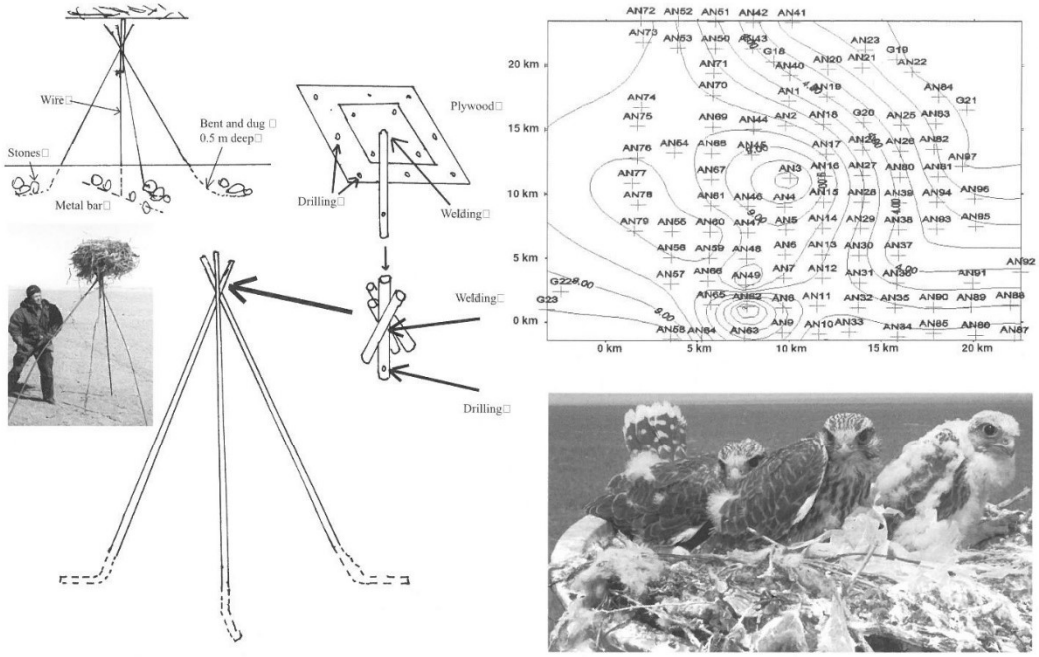


Figure 1. Design of the artificial nest platforms. On the inserts: left - view of assembled artificial nest; right top: Example of Brandt's vole density map. Crosses with indexes (e.g. AN78) show position of the artificial nests; and contous show density of vole colonies as on 15 October 2002. Left bottom: Saker chicks at the artificial nest.

Saker population and create natural farms in wild areas that are nest site limited for breeding falcons. Such 'farming' on one hand could increase the overall falcon breeding rate per unit area, and on the other hand can create a biological means of control of the vole numbers, provided, of course, that there are no harmful chemicals involved. Until the environment is clean of contaminants we cannot tell what the ultimate density of raptors could be, nor can we assess the potential impact of such a population on vole numbers. But clearly the potential is there and the local human population has been co-operative in not disturbing the nests.

Acknowledgements

We would like to thank administration of the Darkhan and Bayanmunkh somons for permits to carry out the experiment in their lands and the administration of the Mongolian State Universtity (Ulanbataar) for their help in arranging the permits and prepare the logistics. We thank our drivers Mr. Batsaikhan and Batbayar as well as students and graduates of the Mongolian State University for their inventive help.

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The Microchipping Scheme

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Introduction

A research programme was initiated in 1989 by the National Avian Research Center in Abu Dhabi and the headquarters of its falcon programme in the U.K. One of the primary goals was to research aspects on the biology of the Saker Falcon (*Falco cherrug*) in the wild and to monitor population levels across the breeding range. The Saker is distributed from Austria and Hungary in the west to Mongolia and China in the east and from southern Russia in the north to Iraq and Pakistan in the south. The logistics of monitoring the species over such a huge area are therefore complex. Due to the large amount of co-operation, co-ordination and exchange of information required between scientists in a project such as this, the Middle East Falcon Research Group (MEFRG) was established in 1994 as part of the National Avian Research Center Falcon Programme of the Environmental Research and Wildlife Development Agency in Abu Dhabi. One of its projects is the microchipping scheme (Barton & Fox, 2000).

Sakers and Peregrines (*Falco peregrinus*) are trapped in the range countries and sold to the Middle East for falconry either directly, or through markets. There is concern that the numbers being taken might be jeopardising wild populations. Without a means of monitoring the numbers of falcons being trapped and exported and relating this to the results of population surveys, we cannot say whether the harvesting levels at present are sustainable. Ringing schemes have previously been the typical method of choice for marking and detecting avian species. However, rings do not serve as permanently identifiable markers, being easily removed by trappers and dealers. Passive Induced Transponders (PITs) or microchips are a good alternative to rings. They are implanted as 'invisible markers' in the source country (Barton, 2001) and can be detected at any subsequent monitoring point. Microchipping of falcons allows us to monitor the movement of legal and illegal falcons from one country to another, as well as providing biological data on natural movements.

Most of the veterinary hospitals of the Middle East, particularly those in Abu Dhabi, Dubai and Riyadh routinely implant falcons on their first visit to a hospital as part of their veterinary records procedure. To date around 20,000 have been implanted in falconry birds providing information on movements, mortality, longevity and most importantly species, age and sex of trapped falcons. Results from previous seasons have been reported in Barton (1999; 2002).

Methods

During surveys of wild populations, microchips are implanted in falcons at the nest by field biologists across the breeding range. At the end of the season, the microchip data are sent from each country to a central database maintained at the Falcon Research Institute, UK. The database updates all microchips implanted by MEFRG veterinarians and fieldworkers as well as those microchips detected by veterinarians. PIT numbers from the field are crosschecked each year with hospital PIT detections.

Each spring, Sakers and Peregrines that have been flown in falconry are released in the Sheikh Zayed Falcon Release Scheme (Table 2). All have PITs at the time of release and these numbers are also crosschecked with hospital detections

Results

Out of the 913 sakers that have been implanted by fieldworkers during the study (Table 1), 25 (2.74%) have been recovered. Additionally, one Saker was recovered from the Sheikh Zayed Release Scheme. Six from 138 Peregrines (4.35%) have been recovered and one individual from the Sheikh Zayed Release Scheme was recovered (Table 3).

Movements within the Middle East

Since September 1998 in the Fahad bin Sultan Falcon Center in Riyadh, 4.1% (228 from 5537) of the falcons admitted already had microchips implanted from elsewhere. Four of the 228 had been implanted in the field (three in Kazakhstan, one in Taimyr) 13 had been implanted in Abu Dhabi and 92 (41%) in Dubai. 52% of the 228 falcons with microchips remain unaccounted for.

Since the Abu Dhabi hospital opened in 1999, 275 from 3168 falcons (8.7% of the total seen in Abu Dhabi) were recorded as having visited both Dubai and Abu Dhabi hospitals.

Discussion

Monitoring imports and exports of microchipped falcons is entirely dependent on receiving regular updates from the Middle East falcon hospitals. Although a certain

Table 1. Species and number of microchips implanted in the field (S - Saker; P - Peregrine)

Region	2002		2001		2000		1999		1998		1997		1996		1995		1994		1993	
	S	P	S	P	S	S	P	S	P	S	P	S	P	S	P	P	S	P	S	P
Mongolia	152	0	0	0	70	0	0	0	0	84	0	0	0	0	0	0	72	0	50	0
Kazakhstan	159	0	31	0	23	32	0	24	0	52	0	74	0	59	0	0	24	0	0	0
Siberia	0	24	0	0	0	0	26	0	19	0	0	0	0	0	0	0	0	38	0	30
Khyrgisia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	1	0	0

Table 2. Falcons released in the Sheikh Zayed Falcon Research Project.

Year	**Saker**	**Peregrine**
2002	27	75
2001	10	65
2000	33	78
1999	38	43
1998	37	12
	145	**273**

number of microchipped falcons are detected, the difficulty is in knowing how many falcons are trapped and imported to Middle East but which remain undetected. There are still large numbers of microchips that cannot be traced to field implants, or to the falcon hospitals. Since the field data is fully complete, this suggests that the hospital information provided is incomplete.

The data from Riyadh show that there is movement of falcons between the UAE and Saudi Arabia. The most likely explanation is that these falcons were purchased in the UAE as juveniles or adults and subsequently taken to Saudi Arabia where their microchip is detected when they are taken to the veterinary hospital for treatment or routine vaccination and examination. Movements between Abu Dhabi and Dubai (the two Emirates are only 120km apart) might be because they are bought and moved or because the falconers use both hospitals.

Table 3. Microchip recovery results. ADFH - Abu Dhabi Falcon Hospital, UAE; SZFRS is Sheikh Zayed Falcon Release Scheme Sp: species. S.- Saker; P. - Peregrine.

Microchip/	Country	Date	Place	Date	Sp	Sex
Ring number	implanted	implanted	detected	detected		
005793359	Kazakhstan	2/4/1993	Dubai	19/10/93	S	F
006059843	Kazakhstan	22/5/1993	Dubai	25/9/93	S	F
BTO ring recov	Kazakhstan	1993	Iraq	1993/94	S	F
BTO ring recov	Kazakhstan	1993	Pakistan	1993/94	S	F
BTO ring recov	Kazakhstan	1993	Syria	1993/94	S	F
BTO ring recov	Kazakhstan	1993	Turkey	1993/94	S	F
BTO ring recov	Kazakhstan	1993	Yemen	1993/94	S	F
001835299	S.C. Kazakhstan	8/6/1994	Dubai	5/11/94	S	F
111163754A	E. Kazakhstan	4/1994	China/Dubai	94	S	F
111154464A	C. Kazakhstan	4/1994	UAE	10/94	S	F
111149596A	Kazakhstan	6/1994	Almaty	8/98	S	?
Radio tag	N. Kazakhstan	1994	Saudi Arabia	94	S	M
111148226A	Mongolia	11/6/1995	Dubai	23/12/95	S	F
111162561A	Mongolia	31/5/1995	Dubai	23/12/95	S	?
111127264A	N. Kazakhstan	1995	Dubai	8/10/95	S	M
111136377A	N. Kazakhstan	1996	Dubai	10/96	S	?
112137574A	E. Kazakhstan	15/6/1997	Mongolia	26/8/97	S	F
111925135A	E. Kazakhstan	6/1997	Dubai	23/8/97	S	F
111956520A	E. Kazakhstan	17/6/1997	UAE	20/1/98	S	M
111136110A	E. Kazakhstan	24/5/1997	Abu Dhabi	9/11/97	S	M
HT56089	N. Kazakhstan	1997	Riyadh	23/10/97	S	?
HT54484	E. Kazakhstan	1997	Mongolia	97	S	?
015050032	Kazakhstan	1997	Riyadh	11/98	S	F
114922235	SZFRS	1999	Dubai	28/11/99	S	F
120976135A	Mongolia	1999	Dubai	12/12/99	S	F
131348477A	N. Kazakhstan	2002	Riyadh	26/11/02	S	F
121111270A	Russia	8/1997	ADFH	97	P	F
121536280	Russia	1997	SZFRS	1998	P	F
121435795	Russia	1998	Dubai	3/9/98	P	F
023573862	Russia	8/1999	Riyadh	11/99	P	F
023586321	Russia	1999	SZFRS	2000	P	F
023813281	Russia	5/8/1999	SZFRS	2000	P	F
005382035	SZFRS	1999	Dubai	11/6/2000	P	M

The data indicate that most of the falcons that were detected originated in Kazakhstan, a country that has seen dramatic declines in the Saker population. However, few microchips were being implanted elsewhere. Since 1997 there have been very few Saker recoveries from anywhere. From Mongolia there have been only 3 recoveries, despite 428 Sakers being implanted. Maybe these falcons are not being trapped or they are not being reported by falcon hospitals or they are imported and never taken to a hospital for treatment. We also do not know the mortality rate of these microchipped falcons prior to trapping.

At present it is not appropriate to use the data to accurately estimate trapping pressure from different regions since it appears that an unknown number of trapped falcons probably remain undetected thereby introducing a large error. Nevertheless the database is providing very useful information on species numbers being imported to the Middle East for falconry (Barton, 2000; Naldo & Samour, 2003).

Anyone implanting or detecting microchips are requested to submit details to the Falcon Research Institute (email: office@falcons.co.uk)

Acknowledgements

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Seroprevalence of Falcon Herpesvirus Antibodies in Captive and Free-living Raptors in the United Kingdom

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There have been sporadic reports of falcon herpesvirus infection (*Falconid herpesvirus*-1, FHV-1) in the United Kingdom since 1982, with an apparent increase in clinical cases in Southern England since 1996 (Forbes *et al.*, 2000), but the true prevalence of this typically fatal disease in falcons is still unknown. It is also unknown if the prevalence in the free-living population presents a potential infectious risk to captive populations in the event of taking injured free-living birds into care in falconry and rehabilitation centres. There have been conflicting data published regarding the seroprevalence of FHV-1 in Germany with 35.5% (Lierz, 2000) compared to 2.4% (Johannknecht *et al.*, 2001).

The aims of the present epidemiological study were to quantify and compare the seroprevalence of FHV-1 and owl herpesvirus (*Strigid herpesvirus* 1, StHV-1) antibodies in free-living and captive raptors within the United Kingdom. Furthermore, the data were analysed by age, species, sex and geographical areas to evaluate possible predisposing factors for transmission. Research has been carried out with respect to the co-existence of falcon herpesvirus and owl herspesvirus infection in raptors. This study was initiated to elucidate the significance of FHV-1 for captive and wild raptor populations in the United Kingdom.

Sera were collected from free-living and captive raptors presented to veterinarians, rescue centres, or falconry facilities in 2001 and 2002. The samples were tested for FHV-1 antibodies using previously published techniques (Zsivanovits *et al.*, 2003).

A total of 252 serum samples were tested for FHV-1 and 65 serum samples were tested for StHV-1. The seroprevalence for FHV-1 was 3.97% and the seroprevalence for StHV-1 was 12.3% (8/65). Of the free-living owls, 18.6% tested positive for StHV-1. The data did not show a significantly high incidence of FHV-1 within free-living and captive raptors (being 2.4% and 5.6%, respectively). When breaking down the data by family, *Falconidae* showed the highest seroprevalence with 6.7%. They also represent the most affected group when subdivided into free-living or captive groups with a seroprevalence of 8.8% and 4.9%, respectively. Free-living owls also showed a conspicuously high seroprevalence of 8.2%. The FHV-1 seroprevalence results are shown in detail in Table 1. However, those figures were not statistically significant. There was no statistically significant difference of FHV-1 titres between juvenile (birds younger than 10 months) and adult birds (birds older than 10 months). There was insufficient data to enable analysis of sex distribution.

The seroprevalence for FHV-1 found in this study of 3.97% is not considered high. However, this certainly does not justify neglect of disease control measures such as quarantine and basic requirements for appropriate hygiene control when introducing new raptors to collection or rehabilitation facility. One can speculate that the higher seroprevalence of FHV-1 in *Strigidae* might represent non-fatal infections with FHV-1, potentially triggered by previous non-fatal exposure to StHV-1. StHV-1 creates only mild cytopathic effects in cell culture compared to FHV-1, possibly reflecting lower virulence. The differential in the seroprevalence between captive and free-living owls may be due to restricted exposure of captive owls to StHV-1, and by a potential recrudescence of latent infection in wild owls experiencing stress. The low seroprevalence within the *Accipitridae* may be due to non-fatal infections, due to less contact with diseased birds, or due to true refractoriness to FHV-1. *Falconidae* demonstrated the highest seroprevalence in the current study. Disease transfer is thought to occur by digestion of prey species, in particular pigeons, or by direct contact (Remple, 2000).

It is acknowledged that false negative results may occur due to abnormal immune responses by individual birds. It was also noted that many of the samples which tested positive were haemolysed and it is considered that haemolysis in itself may lead to some false positive results.

Ideally a seroprevalence study should involve the collection of samples from randomly selected healthy birds, with an equal number of captive to wild birds and an equal species distribution between free-living birds presented to rescue centres and captive population groups as well as an equal age distribution between the two groups. Increasing the number of samples examined for antibodies may improve the statistical significance of the study, however,

Table 1: Seroprevalence of FHV-1 antibodies, summarised by family and captivity status

Family	Captive	Free-living	Total
Accipitridae	1.7% (1/59)	0% (0/45)	0.96% (1/104)
Falconidae	4.9% (2/41)	8.8% (3/34)	6.7% (5/75)
Strigidae	0% (0/24)	8.2% (4/49)	5.5% (4/73)
Total	2.4% (3/126)	5.6% (7/126)	3.97% (10/252)

due to the very small number FHV-1 sero-positive birds, this remains very challenging. Further, cross-reactions studies between FHV-1, StHV-1 and pigeon herpesvirus are required.

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News about amyloidosis

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In recent years the number of amyloidosis cases in UAE falcons has significantly increased, causing fatalities in very valuable birds, especially in Gyr falcons *(Falco rusticolus)* and Gyr hybrids. A similar phenomenon was also observed during the last year in Stone Curlew (*Burhinus oedicnemus*), causing major losses. In these species it is unknown, which type of amyloid occurs. However, this knowledge is necessary to establish *intra vitam* diagnostic methods. Therefore this small study was performed.

Amyloidosis is characterized by the deposition of amorphous eosinophilic extra cellular material, biochemically known as proteins, in various organs and tissues, e.g. liver, spleen, and kidney. These organs become enlarged and pale (Figure 1) and the liver becomes more greenish in colour. The cut surface of organs affected with amyloid has a waxy texture.

The ultra structure of all amyloid-proteins, independent of its type, consists of three components (Riede *et al.* 1995). One component is a mass of unbranched amyloid fibrils of variable length with a diameter of 10 to 1000 nm. These fibrils originate from different sources, i.e. the origin of amyloidosis type AA is the Serum Amyloid A (SAA). The single fibril consists of two helical intertwined filaments, which are producing a b-pleated structure. The second component is the amyloid P component, a glycoprotein, which develops from the acute phase protein (SAP) circulating in the blood (Westermark *et al.* 1976; Cohen and Connors 1987). The third component is the heparansulfate proteoglycane (Riede *et al.* 1995).

Amyloidosis is divided into primary and secondary amyloidosis. Primary amyloidosis occurs spontaneously in the absence of apparent predisposing illness. On the other hand, secondary amyloidosis occurs in association with chronic inflammatory diseases. In these cases, cytokines such as IL-1, IL-6 and TNF are increasingly produced and released into the circulatory system by local inflammatory cells. This process stimulates the hyper production of Serum Amyloid A (SAA), an acute-phase protein produced in the liver as the precursor protein of AA. Released SAA binds to HDL displacing Apo-A1 to become the predominant apoprotein in the class of HDL (Jensen and Whitehead 1998). The AA form of amyloidosis is typical for the secondary amyloidosis and is also the most frequently found in mammalian (Linke *et al.* 1984; Zschiesche and Jakob 1989) and avian species (Zoellner 1997).

Amyloidosis in falcons

Over the past 8 years there has been a tremendous change in falcon species/breeds used for hunting in the UAE, which is also represented in the post mortem statistic of CVRL (Gierse 2001). The number of pure Gyr falcon and Gyr-hybrids sent for post mortem increased significantly ($p<0.001$; chi-square-test) by 10 percent each in the past 4 years (Table 1), reaching a quota of together more than 50% since 1999.

At the same time, a massive increase in amyloid-cases has been observed as well (Table 2). This was significantly ($p<0.001$; chi-square-test) noticed in most species/breeds, except for Saker falcons *(Falco cherrug)*. Pure Gyr falcons were especially affected, with an increase in the prevalence of amyloidosis from 16.3 to 42 % between the periods 1995 - August 1999 and September 1999 - April 2003.

Formalin-fixed liver tissue was processed for histology. The samples included liver biopsies from seven live Gyr falcons or Gyr hybrids and liver samples from five post-mortem cases (three Peregrine falcons, one Barbary falcon, one Gyr Saker hybrid) and three Stone Curlews. Staining with Congo red (Puchtler *et al.* 1962) confirmed

Table 1: Numbers of falcon species submitted for post-mortem examination at CVRL since 1995.

Years	1995-August 1999 (Gie		September 1999 - April	
Species	No.	%	No.	%
Saker	50	**17.1**	26	**10.6**
Peregrine	80	**27.3**	45	**18.2**
Pure Gyr	49	**16.7**	66	**26.7**
Gyr-Hybrid	50	**17.1**	66	**26.7**
Unknown/other	64	**21.8**	44	**17.8**
Total	293		247	

amyloidosis in all cases, demonstrating amorphous eosinophilic extra cellular material (Figure 2) that shows a green birefringence under polarized light. However, with the Congo red staining it is not possible to differentiate the type of amyloid. Therefore a second slide of the same sample was pretreated with potassium permanganate and then stained with Congo red (Zoellner 1997) in order to identify the type of amyloid in the liver.

Protocol:

Deparaffination
Potassium permanganate for 1-2 min.
Washing
Oxalic acid for a few seconds
Washing
Sodium chloride for 1-2 min
Congo red staining

In cases of AA-amyloidosis the amyloid will lose more then 90 % of its affinity to Congo red and it therefore appears unstained (Figure 3). All tested samples from falcons as well from Stone Curlews showed this effect; hence all these cases were caused by **AA-amyloid**.

Very little is known about amyloidosis in falcons, and up to now diagnosis can only be confirmed by liver histology. No diagnostic tool is currently available which may diagnose this disease in live falcons.

Therefore efforts should be undertaken to establish a method for early detection of this ailment to prevent further losses and trials are currently underway at CVRL

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Figure 1: Enlarged, solid and pale liver from a Gyr falcon with severe amyloidosis showing also mild serofibrinous perihepatitis.

Table 2: Number of cases of amyloidosis in different falcon species submitted for post mortem examination at CVRL since 1995

Years	1995-August 1999 (Gierse 2001)		September 1999 - April 2003	
Species	Amyloid-cases	%	Amyloid-cases	%
Saker	4	**8**	2	**7.7**
Peregrine	5	**6.25**	9	**20**
Pure Gyr	8	**16.3**	28	**42**
Gyr-Hybrid	4	**8**	11	**16.6**
Unknown/other	3	**4.7**	4	**9.1**
Total	24	**8.2**	54	**21.8**

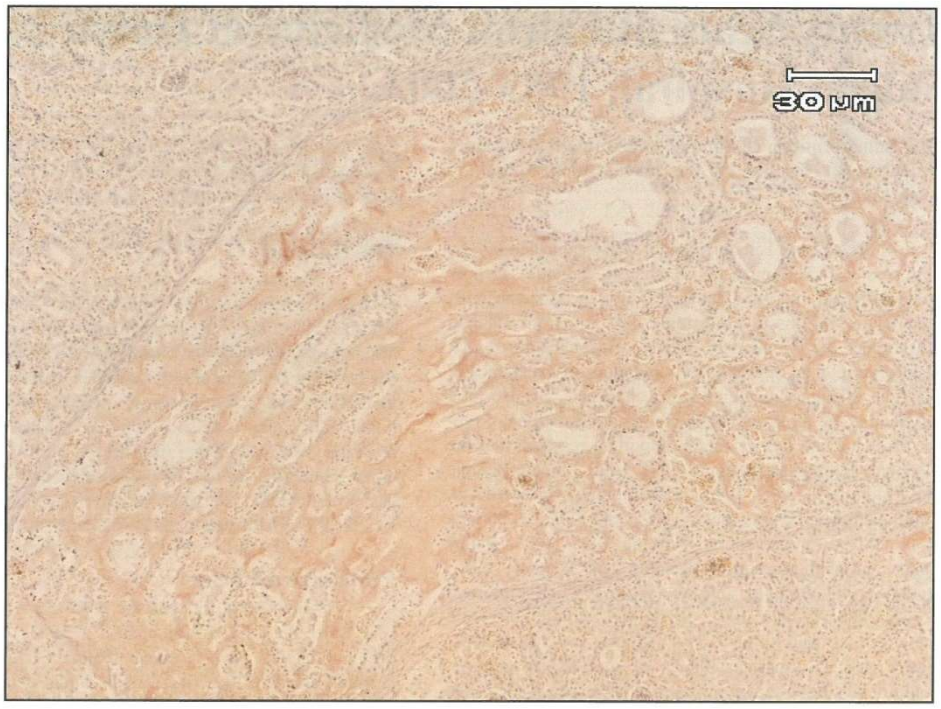

Figure 2: Kidney of Gyr-Saker hybrid with marked interstitial amyloidosis between the collecting tubules. Note the amorphous eosinophilic extracellular material. Congo red-staining

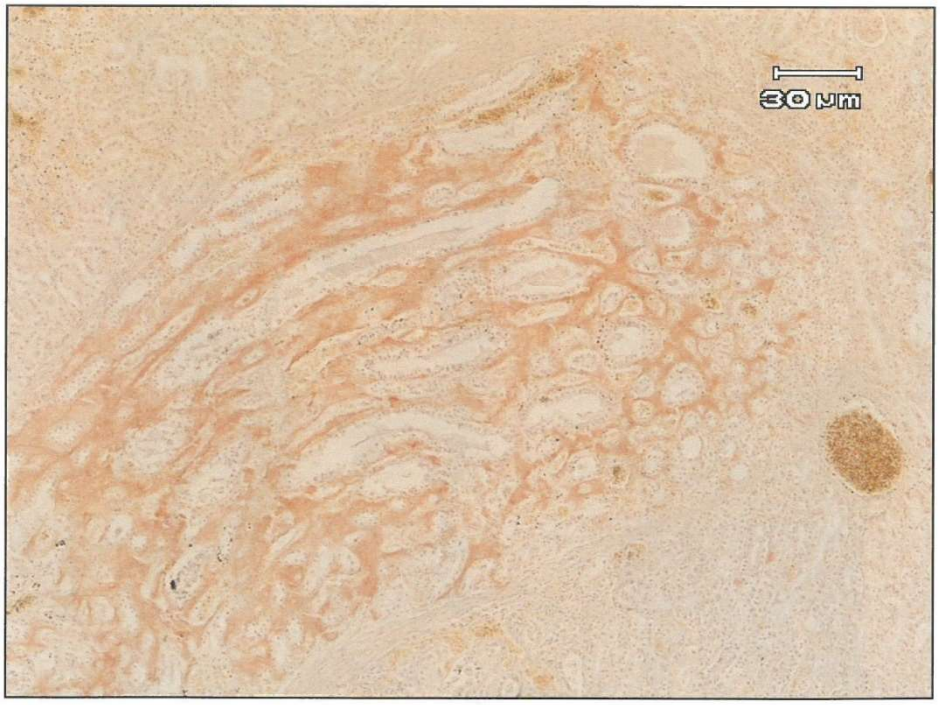

Figure 3: Same tissue as in Fig. 2 with potassium permanganate pretreatment. The amyloid-deposits have lost more than 90 % of its affinity to Congo red and appear nearly unstained

Twenty Years of Falcon Medicine at Dubai Falcon Hospital, 1983-2003.

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The Dubai Falcon Hospital was established by His Highness Sheikh Hamdan bin Rashid al Maktoum, Deputy Ruler of Dubai, in 1983. The facility was the first specialist hospital for falcons in the Middle East and from 1983 to 2001 under the direction of the first Hospital Director Dr David Remple, an international reputation for excellence in the field of falcon medicine was established. The Hospital has been at the forefront of developing the discipline of raptor medicine and has pioneered important research into the diagnosis (Lumeij and Remple, 1991, 1992, Lumeij, Remple and Riddle 1993, 1997, 1998), epidemiology (Verwoerdet al. 2000), pathology(Wernery et al 1992, Oaks 1993, Di Somma et al 2003a,b).), prevention (Remple 1995, 2000, Bailey 2000), surgical correction (Remple and Remple, 1987, Remple 1993, Remple, and Al-Ashbal 1993, Remple and Forbes 2000, Remple, 2001., Redig and Remple 2001) and therapy (Lierz and Remple, 1997, Molnar and Ptacek 2001, Bailey and Di Somma 2003a) of diseases of raptors. Additionally, important contributions have been made to the understanding of Arabic falconry (Remple and Gross, 1993, Remple 1988, 1989, Riddle and Remple, 1994), wildlife diseases (Molnar et al. 2001, Wernery et al. 2001) and to the management and conservation of captive and wild populations of raptors (Barton 1999, 2000, Bailey et al. 2003b).

The Hospital

The main focus of the Dubai Falcon Hospital is to provide a clinical service to the hunting falcons and the wildlife collection of HH Sheikh Hamdan bin Rashid al Maktoum. The hospital has been recently modernised and has facilities for surgical investigations, endoscopic examination and diagnostic imaging, including both conventional radiography and fluoroscopy, an in-house diagnostic laboratory, medical history recording system and a feather repair laboratory. Along with a quarantine unit the hospital has over 30 fully equipped hospitalisation wards where sick birds can be isolated and individually treated.

Preventive medicine

About 1,700 falcons are seen at the DFH each year. Since the hospital was opened in 1983, over 20,000 different falcons have received treatment. Dubai Falcon Hospital initiated the first falcon micro-chipping programme in the Middle East in 1987 and since this time over 17,000 birds have been implanted using the AVID microchip system. Microchipping falcons is now part of

Staff of the hospital with the general manager Mr Humaid Obaid

standard operating procedures in the large falcon hospitals in the region and is widely used by raptor biologists studying the population dynamics of free-living falcon populations (Barton 2000). Through the delivery of veterinary care in combination with raising the awareness of disease issues amongst the falconers the hospital has contributed to the improved health and longevity of captive falcons in the region.

Improving falcon healthcare through practical research

The DFH has been at the forefront of many of the advances in falcon medicine since its inception in 1983 and this work continues. Staff are currently working with specialists working at other regional and international laboratories and falcon hospitals to further scientific understanding of the important diseases of raptors. Special projects aimed at improving falcon health and welfare are being undertaken on the following topics. Currently the hospital is assessing new antifungal agents such as voriconazole to improve the treatment of important diseases like aspergillosis and we will be providing an update on this in the future

Thanks

We are particularly grateful to His Highness Sheikh Hamdan bin Rashid al Maktoum for his continued support of the Dubai Falcon Hospital and for his interest in falconry and wildlife issues in the region. He is a passionate falconer and was the catalyst for so many of the advances that have occurred in falcon medicine in the Middle East.

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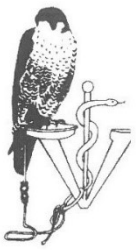

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Acid - base disorders in hunting falcons.

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Acid –base disorders of birds of prey have been described in the literature. In most cases acidosis is the most commonly reported disorder (Redig 1993). If the blood pH is outside the normal range an acid-base disorder is present. In some cases there can be mixed acid-base disorders present, e.g. metabolic acidosis and respiratory alkalosis and although the resulting pH is within normal ranges, obviously the patient would have an acid-base disorder. Plasma pH, bicarbonate (HCO-) levels and partial pressure of carbon dioxide (pCO_2) are considered the most useful parameters to determine acid – base status (Martin 1994)

Factors which may affect the blood acid-base levels include:

Reduction in food intake. Many newly acquired falcons experience a significant loss of bodyweight during the initial training period. Many injured wild birds presented for treatment at rehabilitation centers are emaciated. Such cases often have acid –base disorders. Low albumin levels may reduce the buffering capacity of the blood.

Water restriction. Nervous, unmanned falcons often fail to drink. Critically ill falcons which experience a sudden loss of body condition, may also fail to drink. Confiscated wild birds may be suffering from water deprivation due to ignorance or inhumane treatment.

Over – exertion. Excessive exercise can lead to acidosis if the buffering capacity of the body is overwhelmed. Panting, especially in a hot environment can lead to alkalosis (Glesson *et al* 1984). Gyr crossbred falcons appear to be highly susceptible to heat-stress and often develop alkalosis when exercised at high temperatures.

Infectious diseases resulting in loss of bicarbonate ions or chloride ions e.g. diarrhoea or vomiting will affect the blood acid-base values.

Stress. Consider a wild caught falcon. It is trapped,

Table 1. Blood pH values of clinically ill falcons.

Species	Observations	pH (reference range 7.37 - 7.55. n=70)
Peregrine	Emaciation - advanced trichomoniasis	7.29
Gyr hybrid	Heatstress - bacterial air sacculitis	7.72
Gyr hybrid	Heatstress - overtraining	7.82
Gyr hybrid	Heatstress - overtraining	7.92
Gyr hybrid	Advanced aspergillosis	7.73
Peregrine	Crop stasis - overtraining	7.78
Gyr hybrid	Coccidiosis, heatstress & raised Uric acid levels	7.78
Gyr hybrid	Overtraining - raised CK levels (myopathy)	7.68
Saker	Heatstress - uricaemia/myopathy	7.65

transported under highly stressful conditions to a "market". It is kept in unhygienic conditions, fed an unnatural diet with limited access to fresh water (hooded to prevent self inflicted feather damage). The shock to the system is intense and changes to the acid–base balance are only a small component of the physiological changes.

Investigations using the I-Stat blood analyzer (Abbott Laboratories S.A .USA) at the Al Safa Falcon Clinic, has shown that alkalosis, not acidosis is seen in the majority of critically ill and stressed falcons (McKinney, 2003).

Using the I-Stat analyser it has also been shown that some falcons with hypovolemia/dehydration also have hypernatraemia. In dogs it is recommended to restore sodium ion levels over a 24-48 hour period as sudden changes in sodium levels are dangerous (Bistner 1995). This may also be applicable to falcons.

Lactated Ringers solution is alkalinizing, while 0.9% saline is acidifying. The choice of fluid administered to critically ill falcons is important. By assessing the sodium ion levels, plasma pH, partial pressure of carbon dioxide and bicarbonate levels, clinicians can gain insights into the acid-base status of the patient. This information can be useful when deciding which type of fluid therapy is indicated. From observations of cases the use of saline and dextrose infusions mixtures appeared to be more beneficial than the use lactated ringers solution in these critically ill patients, but further research in this field is indicated. Acid-base disorders in falcons and other birds is important and should be of interest to avian veterinarians working with falconry birds, confiscated falcons and injured wildlife.

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A Novel Method for Repairing Fractures of the Metacarpus in Raptors

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Fractures of the carpo-metacarpus in raptors are among the most challenging to manage either surgically or non-surgically. For reasons that appear to relate to circulatory disturbance, these fractures are particularly difficult to manage in falcons. The carpo-metacarpal bone has very little associated soft tissue to contribute to fracture healing, and often much of the high energy force producing the fracture severely damages the soft tissue as well (Redig 2001). Circulation is often disrupted to the bone at the fracture site, and the associated edema, particularly in falcons, causes further ischemia and threatens the viability of the distal wing. To complicate the process, the quills (calami) of the primary flight feathers insert on the periosteum of the major metacarpal bone and its associated distal phalanges. Consequently, a fully feathered wing presents tremendous destabilizing stresses on distal fractures, particularly those involving the metacarpus. The stress on this small, blade-like bone during lift, acceleration and braking forces of active flight is often much greater than the weight of the bird. It is easy to see how healing is impaired by the forces placed on metacarpal fractures by even the slightest wing movement, and healing is often further compounded by extensive soft tissue damage. The complicating factors associated with carpo-metacarpal fractures have often necessitated immobilizing the wing for greater than 4 months (Orosz *et al*, 1992), yet this period of wing immobilization risks ptagial mem-

brane/ ligament contracture and a functionally useless wing (Redig 2001). It is known that limited wing-use exercise during fracture healing benefits wing function and promotes early return to flight. Carpo-metacarpal fractures are no exception to the benefits of early exercise, but the forces on the fracture imposed by a fully feathered wing necessitates wing immobility during the total healing period.

As potentially disruptive as the primary feathers are to carpo-metacarpal fracture healing, the feathers also have the potential to act as stabilizing splints for the fractures, since the quills (calami) of all the primary flight feathers insert on the periosteum of the carpo-metacarpal bone and its associated phalanges (King and McLelland 1984). Therefore, the primary feathers in the fracture area should NEVER be plucked in an attempt to relieve the forces on the fracture. Furthermore, every attempt should be made to align the calamus of each feather inserting in the fracture area and externally tying these together to form a rigid splint.

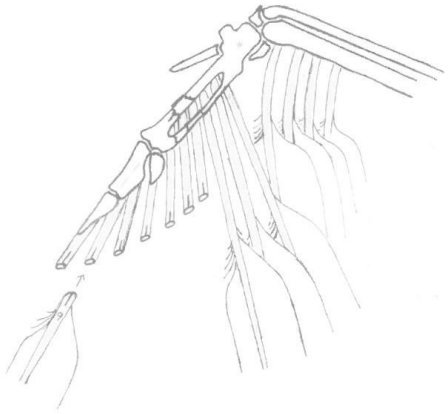
A new method of eliminating stresses imposed on the fracture by the feathers, while at the same time retaining splinting ability of the feather quills inserting on the fractured bone is presented below. The method offers a very brief period of wing immobilization and allows for early wing exercise to occur prior to the completion of healing. By cutting off only the vaned portion of the feathers distal to the fracture, the splinting ability of the periosteal insertions is utilized, but the stress forces imposed by the vaned part of the feathers is eliminated. Fracture healing time is dramatically shortened and wing function is greatly facilitated. The cut feathers are simply imped back in place at the completion of fracture healing.

Method for carpo-metacarpal fracture management (Remple 2003):

1. Radiograph the wing and determine the exact number of primary feathers that insert on the fragment(s) at and distal to the fracture.

2. After wound treatment and reduction of edema, apply a 'curved edge splint' (Redig 2001). The splint is most effective if it is made from a moldable thermoplastic material such as Hexalite®. The thermoplastic material can be molded to conform with the shape of the metacarpal bones, so as to form a perfectly conforming cast. The material can also be applied directly over the covert feathers. While in a warm moldable state, the material will stick to the feathers with the same approximate adhesiveness as surgical adhesive tape and can be easily removed without disrupting feathers. White adhesive tape placed on opposite sides of the wing holds the splint in place and is crimped together along the leading edge anterior to the splint and to the calami of the primary flight feathers caudal to the splint (Redig 2001). The wing is both extended and folded against the body prior to crimping the tape on the feather bases, so as to assure perfect alignment of the feathers on the bone.

3. Next all the feathers AT AND DISTAL to the fracture are numbered and marked with a longitudinal stripe extending down each calamus from the edge of the tape to the beginning of the rachis. The marks will be later used for rotational realignment of the feathers. Cut and remove each marked feather through each calamus midway through the longitudinal mark. Save the cut feathers.



4. The splinted wing is folded in a 'figure of eight wrap' for only one or two weeks. The 'figure of eight wrap' is removed at the end of this period, but the 'curved edge splint' remains on to the completion of healing. The bird is able to fully extend the wing with a full range of motion with the 'figure of eight wrap' removed, but the 'curved edge splint' remains on until the completion of healing. If the 'curved edge splint' is placed correctly, there should be no restriction in carpal movement, and the fracture will remain fully protected during wing flapping.

5. Radiograph the fracture at 14 and 21 days to evaluate healing.

6. At the completion the cut primary feathers are simply imped* back in their original shafts. Numbers on the feathers assure proper placement, and marks assure that all feathers are in correct rotational alignment.

*The imping of a primary flight feather is accomplished by cutting the feather shaft at a convenient part of the calamus and affixing the distal replacement piece by means of a bamboo shaft trimmed to fit snugly into the hollow feather components and glued in place with cyanoacrylate or quick setting epoxy glues. As the calamus is strong and inflexible, the repair lasts until the feather is replaced at the next molt, and the repair is aesthetically concealed under the wing covert feathers.

Utilizing this method of carpo-metacarpal fracture management, bone healing time is greatly shortened (often 21 days) with the advantage that the bird has full use of the wing during the latter stages of the bone healing period.

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F10: Some applications in Biosecurity, Preventative Health and Treatment of Clinical Cases Relevant to Raptor Veterinary Medicine

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Introduction

F10 was formulated in the UK for disinfection within pharmaceutical manufacturing plants, particularly aseptic fill areas (intravenous fluids, catheters etc). Manufacture started in 1994 and since then F10 has been tested against every significant/index animal/human pathogen.

F10 was introduced to the Falcon Hospitals of the Middle East in 1999 in an effort to augment current treatment plans against respiratory infections in hunting falcons, particularly *Aspergillosis* airsacculitis. This syndrome carries a poor prognosis and is particularly common in this part of the world due to a combination of species susceptibility (Gyrfalcons & hybrids), environmental conditions and poor husbandry practices during the summer /moulting period. (Verwoerd 2001; Bailey 2002). The successes achieved in both treatment of clinical cases as well as in preventative programmes, using a "fogging" approach have generated tremendous excitement further afield in the falconry and aviculture industries and the compound is now widely used by specialist avian veterinarians and breeders in Europe against a wide range of conditions (see website: www.healthandhygiene.co.za).

Clinical Uses

The combination of F10 characteristics has created opportunities to develop integrated treatment protocols; ie F10 usage significantly lowers the levels of pathogenic challenge from infectious organisms to mucous membranes, wounds, skin etc, while correct antibiotic usage reach target organisms inside the infected tissues so that, in conjunction with supportive therapy, therapeutic successes are achieved even in notoriously difficult cases. Note that the use of F10 in clinical cases will never take the place of appropriate antibiotic therapy or immunomodulation (through vaccination and/or immunostimmulation). The following examples illustrate this principle and will hopefully stimulate further uses (*F10 Products other than F10SC Veterinary Disinfectant):

- **Birds**: sinusitis, airsaccullitis , Newcastle Disease Virus outbreaks, wounds, [Fogging, irrigation]
- **Reptiles**: skin & oral cavity infections, wounds, sinusitis [Fogging, irrigation, barrier ointment*]
- **Dogs**: Sinusitis-tracheïtis ("Kennel Cough"), pyothorax, traumatic rupture of intestines , pyometra, dermatophytoses, pododermatitis, wounds [Irrigation, large volume lavage, instillation, shampoo*, barrier ointment*]

Fogging: (not to be confused with "fumigation", the dangerous and outdated practice of using formalin plus potassium permanganate to produce formaldehyde gas)

The particular design of the avian respiratory system that includes large spaces (airsacs) where air becomes humidified at body temperatures approaching 40°C and an absence of a rapid immune response due to the avascular nature of these structures, allows the establishment of bacterial &/or fungal growth when the bird is exposed to high spore concentrations in the inhaled air. This also occurs in highly stressed/sensitive individuals when only low numbers of spores are inhaled. The delivery of antibiotics or antifungal drugs by aerosol to such affected patients has been tried many times, usually with disappointing results. There are essentially three aspects to consider when evaluating the efficacy of such applications:

1. Efficacy of the compound in question against the target organism(s) i.e viral, bacterial & fungal.
2. Safety & tissue compatibility issues.
3. Mechanical, physical & environmental conditions that will determine whether this compound will reach the surfaces where the microorganisms reside.

Efficacy: Refer to Table 1 for efficacy on important avian respiratory agents (other specific results available on request).

Other methods of Evaluation

Several challenge models to study the pathology and immune response of the avian airsac system against bacterial agents, using commercial chickens and *E.coli* obtained from clinical avian airsacculitis cases, are discussed in the veterinary literature. However, no standard protocol for investigating airsacculitis exists due to the extremely variable nature of the syndrome. We therefore have to examine all relevant field performance data of any compound in order to evaluate efficacy, including performance under comparable environmental conditions (temperature, humidity, organic material as growth medium) such as exists in commercial poultry incubator facilities. Under these carefully controlled conditions a number of infectious agents, but particularly *Aspergillus* spp, create a constant challenge to the production of quality day-old chicks and A. *fumigatus* is used as an indicator organism as standard practice in such facilities worldwide. Fluff samples are taken regularly from hatchers and cultured as well as contact plates from specific surfaces.

F10 was recently evaluated in a South African facility that produces a million day-old broiler chicks per week. The trial period was for a total of 38 weeks and was compared to the preceeding 17 weeks when another disinfectant compound had been used (Total period under consideration = 55 weeks). Weekly fluff samples revealed the following pattern: Average colony forming units (cfu) = 43, varying from 0 – 77, over the first 17 weeks of 2001 (before F10 introduction). After the introduction of F10 fogging (20 min per day) this dropped to almost nothing (average cfu's = 0.05 , varying from 0-10) over the next 17 weeks, then the fogger broke and for the following 7 weeks no fogging took place while the *Aspergillus* spp. counts immediately rose to previous levels. When this was corrected the counts once again dropped to virtually 0. This demonstrates the efficacy of F10 in the control of *A. fumigatus* under these environmental circumstances.

Field efficacy of F10 fogging against respiratory syndromes under a range of production environment condi-

Table 1. Results of Internationally Accredited Laboratory Tests on F10.

Organism	Dilution	Contact Time
Newcastle Disease Virus	1:500	10 min
Pseudomonas aeruginosa	1:500	2 min
Staphylococcus aureus	1:1000	2 min
Aspergillus niger & A. fumigatus spores	1:250	30 min

tions as well as in Avian Hospital cases has now been established in the hands of several different workers (Forbes, 2001; Bailey & Sullivan, 2001; Bailey, 2002; Stanford, pers. comm.; Chitty, pers. comm; Samour, pers. comm).

Safety

Traditional antifungal agents are extremely irritating (Amphotericin B, Ketoconazole), causing severe erosive lesions on the sensitive mucosal surfaces of the respiratory system. F10 has passed all Standard International Tests on eye/ocular mucosa irritation as well as Abraded & Intact Skin Irritation Tests and complies to EU Environmental Safety with a zero rating.

Mechanical/Physical

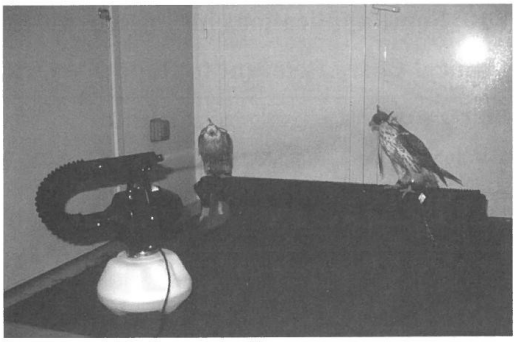
Explanations of therapeutic failures using a fogging approach usually focus on the physical nature of microdroplets needed to penetrate to the furthest recesses and diverticulae of the avian airsac system. Recommended optimal sizes usually vary between 5-10 microns, necessitating the use of "nebulising" systems. There are however many other variables that determine the integrity and size distribution of microdroplets in any fog, thus affecting their relative penetrating ability into the avian airsacs. Some of these include; 1) relative humidity of the inhaled air, 2) surface tension/chemical makeup of the droplets, 3) nozzle size, velocity of the air/compound pushed through the instrument & 4) still air vs air movement.

The practical realities of treatments in clinics, hospitals and farming environments dictate a pragmatic approach. Consequently we have used commercial "Foggers" suitable for the disinfection of rooms, incubators, hospital wards, etc, that produce a wide range of microdroplet sizes and rapidly create a "standing fog" under any environmental conditions. Patients or surfaces should be exposed to such a fog for approximately 20 - 30 min at a time to achieve effective contact times where the major challenge is *Aspergillus* sp, using F10 Superconcentrate at a dilution of 1:250.

Environmental disinfection

The full spectrum of efficacy of F10 against benchmark viruses, bacteria, bacterial spores, yeasts, fungi & fungal spores has been established during the course of its development (Table 1). Internationally Accredited Test results are available upon request from the Manufacturers and the following is relevant to the current debate on mortalities in hunting falcons in the UAE that are associated with *Clostridium perfringens*.

Clostridial enterotoxaemia is a multifactorial syndrome, with dietary changes, gastro intestinal microflora disturbances, stress, overeating, overconsumption of warm water,



and environmental contamination/build-up of these saprophytic organisms all relevant contributing factors. Clinical falcon cases usually die acutely due to the rapid dissemination of the toxins from the gastro intestinal tract, with only a few successes where affected individuals were successfully treated with (bovine) antitoxin serum i/v plus antibiotics and supportive therapy in the Falcon Hospitals of the UAE. The use of Clostridial toxoid vaccines is well established in cattle, sheep and ostriches, but remains controversial in falcons due to the practical difficulties of producing experimental data to validate and optimise current empirical vaccination recommendations in this avian group. Preventative management is therefore crucial to limit losses to the absolute minimum, and here lowering of the environmental Clostridium load (spores) in facilities constantly used by falcons, forms part of this component of an integrated approach.

F10 was recently (Oct 2002) tested in an Internationally Accredited Lab against *C. perfringens* spores and its vegetative form. An impervious surface was coated with 57000 cfu's, then fogged with F10SC @ 1:250 dilution, using a commercial fogger. After 10 min there was a 94% kill and after 20 min a 98% kill. This was the best result ever achieved in this lab, as very few disinfectant compounds can kill the highly resistant Clostridial spores within practical time limits. F10 can therefore be used in the role of environmental disinfection against this organism with confidence.

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Falcon Release and Migration

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Falconry has been practiced for hundreds of years in the Arabian countries. In former times, bedouins had trapped falcons on their migration routes over the Arabian Peninsula in autumn. They used these falcons for hunting to provide additional meat for their families. This helped considerably to secure their family's survival. At the end of the hunting season during the months of February to April, the falcons were released again and returned to their original breeding places. Preferred falcons for hunting were Saker falcons. As the life of the Bedouins changed towards our modern world, so did the life of those wild falcons. The falconers started to keep them during the summer time in order to use them again for falconry in the coming year. This contributed to an existential problem for the wild falcon population: the breeding cycle of wild females used for falconry was interrupted or even stopped completely. This resulted in a dramatic decrease of falcons in the wild. H.H. Shk. Zayed bin Sultan Al Nahyan realized the deteriorating situation and invented the Falcon Release Program in 1995. He encouraged falconers to donate their falcons for this program at the end of the hunting season and released those falcons back to the wild.

Falcon selection and identification

Only wild-caught or wild confiscated falcons, especially Saker falcons (*Falco cherrug*) and Peregrine falcons (*Falco peregrinus*) are released. Captive-bred falcons like Gyrfalcons (*Falco rusticolus*) or hybrid falcons are refused for the release program in general. Each falcon is identified by species, age, sex and coloration. Morphometric measurements of the wing, the primary

feathers and the leg are performed and noted on special data sheets. PIT (Passive Induced Transponder) for permanent and unique identification as well as special release rings (ring size N for peregrines and P for saker) are used for unique identification. These rings carry a unique four digit number after the N or P, name and address of ERWDA, the responsible organization for the release.

Veterinary health screening

A complete physical examination is performed with special emphasize on weight and pectoral muscle mass condition, stage of dehydration, mouth, eyes, nostrils, ears and sternum. The falcons have to undergo stress test, as well as check up of feet, feathers and coping of beak and talons. Parasitological tests of fecal and crop is performed routinely. Specialized laboratory tests include virology, *Chlamydophila* test as well as blood hematology and biochemistry. Medical examinations include radiography being performed in suspicious cases or in those falcons whose physical check-up showed symptoms requiring further examination. Endoscopic examinations are done following problems during the stress test or/and increase in certain blood parameters thus indicating a possible fungal or bacterial disease in the airsacs or internal organs. Apart from multivitamin substitution and fluid substitution all healthy falcons receive vaccination against Newcastle Disease Virus and pox virus twice with a 21 day interval.

Preparations for the Release

All falcons selected for release have to undergo extensive training on a daily basis preferably for a time period of minimum four weeks prior to the release. All selected falcons for the release program are fed a balanced quality diet on quails or healthy pigeons or, if available wild quarry. Sakers are eating rodents and small mammals as part of their natural diet. Therefore, mice and rats etc are integrated in their feeding plan.

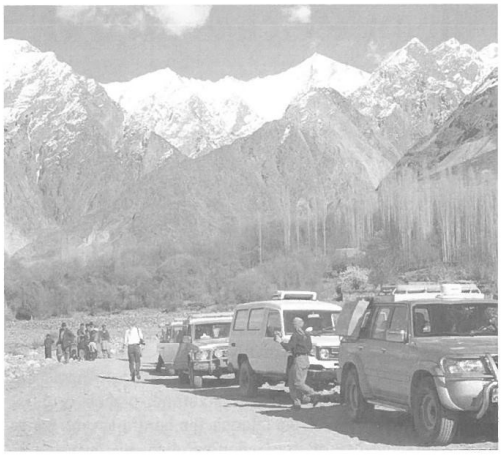
Migration

All falcons are released in area of known migration routes for falcons and their prey species. The migration or dispersion of the release falcons is somewhat difficult to assert with certainty as only a few birds every year are marked with satellites transmitters. A total of 50 transmitters have been put on falcons since 1995 (27 on Sakers and 23 on Peregrines).

After release the Sakers usually disperse dispersion on a west – east axis around the release sites, especially when the release site is in northern Pakistan. One Saker, released in Chitral, Pakistan went more than 12,000 km from the Aral Sea Shore to West Mongolia, before going back to the area of the release.

Peregrine tend to migrate North of the release sites, mainly towards Siberia in Russia.

The average duration for which we received transmission activity is 82 days for Sakers and 152 days for Peregrines (data analysed up to 2000).The maximum survival was in 1997 when the birds were release in the Issyk-Kul Lake in Kygyrstan (136 days for a Saker and 435 for Peregrine).



A total of 788 falcons have been released since 1995. 50 Satellite transmitters were fitted on the birds.

Scientific information Birds released:

Year	Location	Sa		Per	
			PTTs		PTTs
1995	Kharan, Pakistan	85	4	22	
1996	Gilgit, Pakistan	65	6	20	
1997	Issyk-Kul, Kirgistan	35	1	24	3
1998	Issyk-Kul, Kirgistan	37	4	30	2
1999	Gilgit, Pakistan	38	4	44	4
2000	Gilgit, Pakistan	33	2	78	2
2001	Chitral, Pakistan	10	1	65	5
2002	Chitral, Pakistan	27	3	75	3
2003	Gurgan, Iran	44	2	56	4
Total		374	27	414	23

How does satellite-tracking work:

The satellite tracking system used has four components: the transmitters, satellites, computer data processing in France and a modem/Internet link from France to Abu Dhabi.

The transmitter weighs 20g (Peregrine) or 30g (Saker), but only 3.5 g of this is the electronics: the vast bulk consists of the high-rate solar-powered lithium battery. Signals are pulsed from the transmitters every 60 seconds at a stable frequency of 401.65 MHz. Each pulse lasts 360 milliseconds and contains information on the identity of the transmitter, the activity of the bird, the ambient temperature and the battery voltage. Three National Oceanic Atmospheric Administration (NOAA) satellites receive signals, although several others are scheduled to become operational in the near future. The satellites orbit the earth from the North to South Poles once every 102 minutes. Each orbit is displaced from the previous by 25 degrees to the west, so that the satellite path covers the entire earth during the course of a single day. Data are collected from any of the registered transmitters and then stored by the satellite until it passes over France when the information is sent down to a receiving station. In France, the data are processed and the latitude and longitude of the transmitter, and hence of the bird, is calculated. The system is not perfect, but most locations are within 10 km of the true point, a remarkable accuracy for tracking migration routes. After processing, a modem or Internet connection sends the data to the NARC in Abu Dhabi.

What's New in the literature

Below is a list of some recently published papers and a thesis, which are directly relevant to articles, published in this or previous issues, or which may be of interest to working members of the MEFRG. It is not intended to be a comprehensive review of the literature. We once again acknowledge the help of the *delightful* Mrs Catherine Tsagarakis from NWRC, Taif for her continuing help conducting literature searches!

Carpenter, J. W.; Pattee, O. H.; Fritts, S. H.; Rattner, B. A.; Wiemeyer, S. N.; Royle, J. A., and Smith, M. R. Experimental lead poisoning in turkey vultures (Cathartes aura). Journal of Wildlife Diseases. 2003; 39(1):96-104.

Lead-induced mortality appears to have been a major factor in the decline of the California condor (*Gymnogyps californianus*). We orally dosed turkey vultures (*Cathartes aura*) with BB-sized lead shot from January 1988 through July 1988 to determine physiologic response (delta-aminolevulinic acid dehydratase inhibition, erythrocyte protoporphyrin levels, anemia), diagnostic tissue lead concentrations (blood, liver, and kidney), and comparative sensitivity of this species. Two turkey vultures died and two became so intoxicated they were euthanized. Overall, responses of measured parameters were comparable to other species exposed to lead although there was considerable individual variation. Survival time (143-211 days), even with the large numbers of shot and constant redosing, was much longer than reported for other species of birds, suggesting considerable tolerance by turkey vultures to the deleterious effects of lead ingestion. Based on these observations, turkey vultures appear to be poor models for assessing the risk of lead poisoning to California condors or predicting their physiologic response.

Blood lactate levels in Spanish vultures undergoing rehabilitation: Assessing flight capability.
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Ten Black Vultures (*Aegypius monachus*) and six Griffon Vultures (*Gyps fulvus*) were presented to Rehabilitation Centres in Central Spain for different reasons, including toxicity and trauma. Factors influencing the time for release and the amount of exercise were wing long bones fractures and long convalescence time, since these birds have undergone muscle damaged and/or a decline in flight fitness. As part of the rehabilitation protocol, blood samples were withdrawn at 2 and 15 minutes, following outdoor standardised exercise, to measure lactate levels, in order to establish reference values for the species and assess flight fitness for the individual bird. Untrained vultures showed lactate peaks about 300 mg/dl 2 minutes postexercise, and 150 mg/dl at 15 minutes. Mean pre-release baseline lactate values for well-conditioned birds were 151.25 mg/dl (± 10.53) for Black Vultures and 144 mg/dl (± 8.9) for the Griffons at two minutes post training, and 38.12 mg/dl (± 7.5) for Blacks and 54 mg/dl (± 11.4) for Griffons, 15 minutes postexercise. There was a strong correlation between blood lactate values and flight fitness, and this parameter could be used to predict how much training would be needed for the vulture.

Clark, A. J. and Scheuhammer, A. M. Lead poisoning in upland-foraging birds of prey in Canada. Ecotoxicology. 2003; 12(1-4):23-30.

We examined the degree of lead exposure, based on tissue-lead concentrations, in 184 raptors of 16 species found dead across Canada. The most prevalent species available for examination were Red-tailed hawks, Great homed owls, and Golden eagles (n = 131). The majority of individuals examined had very low lead accumulation, however 3-4% of total mortality in these 3 most commonly encountered species was attributed to lead poisoning. In addition, 1 of 9 Bald Eagles found dead far from aquatic environments was lead poisoned; and a single Turkey Vulture had a highly elevated bone-lead concentration (58 mg/g dry weight). Evidence from our study, along with other published research, indicates that upland-foraging birds of prey and scavengers that typically include game birds and mammals in their diets, are at risk for lead poisoning from the ingestion of lead projectiles from ammunition used in upland hunting. The use of non-lead ammunition for hunting upland game would effectively remove the only serious source of high lead exposure and lead poisoning for upland-foraging raptors.

Fernie, K.; Smits, J., and Bortolotti, G. Developmental toxicity of in ovo exposure to polychlorinated biphenyls: I. Immediate and subsequent effects on first-generation nestling American kestrels (*Falco sparverius*). Environmental Toxicology and Chemistry. 2003; 22(3):554-560.

We determined that in ovo exposure to polychlorinated biphenyls (PCBs) alters growth of first-generation nestlings during and one year after parental exposure. Captive American kestrels (*Falco sparverius*) laid eggs with environmentally relevant total PCB levels (34.1 mg/g whole-egg wet wt) when fed PCB-spiked (Aroclor® 1248, 1254, and 1260) food (7 mg/kg body wt/ d) for 100 d in 1998. In 1999, the same adults laid eggs with estimated total PCBs of 29.0 mug/g. Nonsurviving PCB-exposed chicks were small (mass, bones) in 1998. Survivors showed a strong sex-specific growth response (mass, bones) compared to respective sex controls: Only female hatchlings were larger, and only male nestlings had longer feathers (1998); maximal growth and bone growth rates also differed (males were advanced, faster; females delayed, slower) (1999); and male nestlings fledged earlier and were smaller, while females were larger (1998, 1999). However, regardless of sex, PCB-exposed nestlings generally grew at faster rates in both years. In 1998, greater contaminant burdens and toxic equivalent concentrations in sibling eggs were associated with nestlings being lighter, having longer bones and feathers, and growing at faster rates (mass, bone) for

females but slower rates (mass) for males. Both physiological-biochemical and behavioral changes are likely mechanisms. This study supports and expands on the Great Lakes embryo mortality, edema, and deformities syndrome: While PCB exposure alters nestling size, maximal growth and growth rates also change immediately, are sustained, and are sex specific.

Gill, C. E. and Elliott, J. E. Influence of food supply and chlorinated hydrocarbon contaminants on breeding success of bald eagles. Ecotoxicology. 2003; 12(1-4):95-111.

Food supply and contaminants were investigated as possible causes of low bald eagle productivity near a bleached kraft pulp and paper mill at Crofton on Vancouver Island, British Columbia. Over a seven year period, 1992-1998, average productivity of five eagle territories situated south of the pulp mill at Crofton was significantly lower (0.43 young/occupied territory) than six territories north of the mill (1.04 young/occupied territory). A reference population of 32 territories located in Barkley Sound on the west coast of Vancouver Island demonstrated intermediary mean productivity (0.75 young/occupied territory). Measures of prey biomass delivered to nests were lowest south of the mill, and correlated significantly with nesting success. On average, measures of energy delivered to nests and a parameter determined to be related to prey availability, adult nest attendance time, accounted for about 70% of variability in nest success. Contaminant concentrations, including pulp mill derived polychlorinated dibenzo-p-dioxins (PCDDs) and polychlorinated dibenzofurans (PCDFs), as well as dichlorodiphenyldichloroethane (DDE), polychlorinated biphenyls (PCBs), and calculated tetrachlorodibenzo-p-dioxin toxic equivalents (TEQs) were significantly greater in plasma samples of nestlings from south of the mill compared to the other two sites, but did not correlate significantly with individual nest success data. Nests south of the mill concentrate around Maple Bay, which appears to be a deposition area for contaminants transported by tides and currents from sources such as the pulp mill. Concentrations of DDE and PCBs in plasma of nestling eagles from south of the mill were less than the critical values estimated to affect production of young. For TEQs, there are no published critical values for plasma by which to compare our results. We conclude that less than adequate energy provisioning to nests, presumably related to low prey availability, was likely the main cause of poor nest success south of the mill site at Crofton. However, higher concentrations of both DDE and PCDD/F derived TEQs may have acted in concert with food stress to further reduce bald eagle productivity.

Reche, M. P.; Jimenez, P. A.; Alvarez, F.; delosRios, J. E. G.; Rojas, A. M., and dePedro, P. Incidence of salmonellae in captive and wild free-living raptorial birds in central Spain. Journal of Veterinary Medicine Series B Infectious Diseases and Veterinary Public Health. 2003; 50(1):42-44.

A total of 595 faecal samples from raptorial birds, either captive or free-living, residing in GREFA Wildlife Hospital were bacteriologically examined using various selective media and an Automated Diagnostic Assay System for Salmonella detection. Serotype and phage type of the strains identified as Salmonella was determined. In the captive group, of the 285 samples examined, 21 (7.36%) were positive for Salmonella. Serotyping revealed that most of the individuals were infected by Salmonella serotype Havana. This result suggested that there could be a source of contamination in the Hospital although it could not be established. In the wild free-living group, over 310 samples examined (4.19%) were positive for Salmonella . The Salmonella isolates showed a major variety of serotypes: Enteritidis, Adelaide, Brandenburg, Newport, Typhimurium, Hadar, Saintpaul and Virchow. Most of them are similar to those commonly described in isolates from human and domestic animals. These results indicate that wild birds could be involved in the dissemination of Salmonella in humans or domestic animals or vice versa.

Letters to the Editor

Dear Sir

In Falco issue No 18 (July 2001), we described the recovery of nematodes during a stomach flushing of a saker falcon. The parasites recovered were sent to Dr L. Gibbons at the Royal Veterinary College, London, for identification. Originally, Dr. Gibbons proposed that the parasites could belong to the genus *Procyrnea*. However, she mentioned that there were several differences between parasites of this genus and the specimens submitted. After re-examining the specimens, she suggested that the closest genus in which the parasites examined could be assigned was the genus *Spiralatus*. However, this genus comprises only one species identified in the cuckoo roller from Madagascar. Our specimens were the subject of further studies to confirm if these could be designated as a new species under the genus *Spiralatus*. Finally, it was decided that the specimens were too different to any previously known parasite and have now been designated as a new species from a new genus. The new species is the nematode parasite *Paraspiralatus sakeri*, in honour of the species from which the specimens were originally recovered. In addition, larvae of this same species were identified in houbara bustard post-mortem material submitted by Tom Bailey previously based at the National Avian Research Center in Abu Dhabi.

Jamie Samour
Fahad bin Sultan Falcon Center, Saudi Arabia

Editors note: This work is currently in preparation as the following article.

L. M Gibbons , P.K. Nicholls , T. Bailey and J. Samour (in press) *Paraspiralatus sakeri* n. g., n. sp. (Nematoda: Spiruroidea,Spirocercidae) from Saker Falcons, *Falco cherrug* in Saudi Arabia and the first report of larvae from the subcutaneous tissues of Houbara Bustards, *Chlamydotis undulata macqueeni* in Pakistan. Journal of Helminthology.

Announcements

MEFRG email group launched

The Middle East Falcon Research Group (MEFRG) launched its email group on July 1st 2003 with its email address **mefrg@erwda.gov.ae** to form a network between the veterinarians, biologists, ecologists, falconers and falcon-interested people working with falcons in the Middle East and abroad.

The email group is open for contributions, research notes, know-how exchange, questions and problems by all veterinarians, biologists, ecologists, falconers and falcon-interested people world wide who are interested in medicine, husbandry, ecology, breeding and keeping of falcons.

As MEFRG objective is to build an up-to-date data base in order to forward all your queries to the specialist concerned, your assistance is needed. If you are interested to take part in this future-oriented project, please mail your current email address, your special interest in falcon and falconry related topics to:

mefrg@erwda.gov.ae

We are looking forward to your participation in this new forum for a lively and interesting exchange of knowledge, opinions and views of the MEFRG members.

Falcon hospital medical records system

We have just released a software package designed to manage records for falcon hospitals, although it will work for all animals. The system records full details of each falcon, visits to the hospital, physical examination, symptoms, diagnosis, treatment, radiography findings, endoscopy results and vaccinations

It has extensive laboratory analysis recording including; bacteriology, cytology, electrophoresis, endoscopy, haematology, immunology, mycology, parasitology, toxicology, histopathology, virology and post-mortem results.

The system is fully network enabled with as many workstations as required able to connect to the server and use the same data source simultaneously. It has an extensive security system, allowing the system administrator to control access to the forms and data at user level.

The system records the data in a systematic format allowing users to see the full history of the bird at glance and record important data that can later be analysed for research.

The first version of the program is currently in use with the Dubai Falcon Hospital and we will be extending the program to allow invoicing and stock control. The program can be customised to client's specific needs.

If you would like further details of the system please contact me at:

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