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FALCO is published biannually and contains papers, reports, letters and announcements submitted by Middle East Falcon Research Group Members. Contributions are not refereed: although every effort is made to ensure information contained within FALCO is correct, the editors cannot be held responsible for the accuracy of contributions. Opinions expressed within are those of the individual authors and not necessarily shared by the editors.
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.

Contributions can be sent to the Editors of FALCO: 
Dr Nigel Barton and Dr Tom Bailey.

Editorial address:

Dr Nigel Barton
P.O. Box 19, Carmarthen
SA33 5YL, Wales, UK
Tel: (0044) 1267 253742
Fax: (0044) 1267 233864
E-mail: nigel-barton@easynet.co.uk
drtombailey@hotmail.com

FALCO online

Previous issues of FALCO can be referred to at:

www.falcons.co.uk/MEFRG/

FALCO relies on articles being submitted by people working in many different areas. We have had great support over the years and would like to encourage continued submission of papers, abstracts, letters and photographs for publication. The newsletter now has a wide readership in many different countries and because of its practical and up-to-date subject matter, it is a useful source of information. It targets those people directly involved in falcon research and management and more importantly it reaches those people who make the decisions. Writing about conservation issues is all very interesting, but unless it influences country representatives at the highest levels, then it remains an interest rather than a priority in the worlds current economic and political climate.
Editorial

Issues relating to the international trade in wildlife are complex and transcend biology and consequently we start with the biggest news story carried in this issue of Falco, the decision by The Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) to suspend trade with the United Arab Emirates.

The international movement of wildlife is big business and may also contribute to the global spread of infectious diseases. Unfortunately, no firm estimates can be given for the size of the illegal trade either in the Middle East or globally. The disease risks of the illegal trade are well known, particularly in birds where outbreaks of Newcastle disease in poultry have been linked to the importation of wild birds. In the Middle East Newcastle disease is an important cause of death in illegally traded houbara with all the potential to cause economic damage to the regional poultry industry. The world annual trade in captive birds is estimated at between two and five million birds and almost half of the 358 species of parrots are threatened by trade. In the Middle East the illegal trade in houbara bustards may also be contributing to the decline of the species, indirectly having an effect on the future of falconry in the region.

Monitoring illegal wildlife trade is a good example where veterinary and conservation issues are directly linked. The Environmental Research and Wildlife Development Agency (ERWDA), Abu Dhabi and the National Avian Research Centre (NARC) Abu Dhabi have been at the forefront of efforts to deal with the rehabilitation of confiscated illegally traded wildlife in the Emirate of Abu Dhabi (see article on page 3 of Falco 18). The falcon PIT scheme of the Middle East Falcon Research Group (MEFRG) and the houbara bustard population ecology programme of NARC are the only programmes monitoring the exploitation of wildlife in Central Asia and the Middle East. With the exception of the Environment and Protected Areas Authority of Sharjah, it is a shame that other countries in the region and other Emirates in the UAE are not pulling their weight to convince the international community that these issues are taken seriously and are dealt with appropriately. Many of the issues related to the trade in wildlife were dealt with at the MEFRG conference in Mongolia in 2000 and readers can refer to these in the conference proceedings available from the Falcon Research Facility of ERWDA. Local and regional action is now needed to convince CITES that the illegal trade is being brought under control.

This issue is packed with observations on falcons from the mountains of Central Asia to the hospitals and laboratories of the Arabian Gulf. Yet, we must not forget that political, social and economic factors also affect the well-being of falcons and other wildlife species by influencing the environment under which exploitation and trade are influenced.

There are several field reports in this issue highlighting the need for continual work across the countries of Central Asia. We have a report on preliminary surveys in China where it seems that estimates of falcon numbers may be considerably less than previously thought. Once again ERWDA is leading the way in the conservation of wild falcons through its support of the teams in the field in Central Asia. In this issue we see how studies in Mongolia and China are providing basic information, which could be used to establish measures to protect the Sakers from being exploited in an unsustainable manner. It is also encouraging to note that human development can actually bring benefits to falcons - consider the preference for artificial nest sites, such as electricity poles by Sakers. In Mongolia new development projects that will double the length of powerlines in the country may consequently double the number of Saker nests in the country. If such a scenario occurs, could a country like Mongolia, which through good management increases Saker numbers, offer a model to other Central Asian countries through legal and sustainable harvesting of falcons?

We were interested to read the results of a pharmacokinetic study in buzzards on the widely used antibiotic, marbofloxacin, indicating that lower doses than are currently used in clinical situations may also be effective. Results such as these demonstrate the large margin of uncertainty in the use of medicines and vaccines in exotic animals such as falcons and the urgent need for more scientific studies in this area by the falcon hospitals in the region. In comparison to the large investment in biological research on wildlife ecology in the region, there has been a noticeable under-investment in veterinary research, which needs to be addressed.

ERWDA has achieved a great deal since it began and we would like this year to try and encourage more involvement from other regions in the Middle East. Saudi Arabia is providing a lot of useful information with Dr Jaime Samour and his team leading the way in areas of veterinary research and the clinical treatment of falcons. There is still a lack of information from Qatar, Bahrain and Kuwait. In 2002 we would like to encourage veterinarians, biologists and falconers working in these regions to contribute to the work of the Middle East Falcon Research Group.

We wish our readers a happy New Year and would like to thank all of our friends and colleagues who have contributed articles over the last year. Keep up the good work and we wish you a productive year in 2002.

The Editors
Migration studies of the Saker Falcon

E. Potapov1, N.C. Fox1, D. Sumya2 and B. Gombobaatar2
1The Falcon Research Institute, NARC, P.O. Box 19, Carmarthen SA33 5YL, UK, Email: office@falcons.co.uk
2Mongolian National University, Zoology Department, Ulanbaatar, Mongolia, Email: gomboo-2000@yahoo.com

The Saker Falcon (Falco cherrug) is widespread in Eurasia and has been used in falconry for thousands of years. In recent years the pressure on Saker populations has become more intense due to persistent, but not always justified, reports of high prices for this species, and widespread poverty in Asian countries. As a result the Sakers are caught and sold, and many perish due to lack of knowledge of basic management procedures. Most of the legal and illegal trapping takes place in autumn and early winter when the birds migrate. Knowing the migration patterns is essential for establishing protection measures for Saker Falcons.

Although the breeding and wintering ranges significantly overlap, there had been no data to suggest that Sakers stay in their Mongolian breeding areas throughout the winter in the same way that Peregrines do in some parts of their range. The Sakers were therefore thought to be either migratory or nomadic. However, in 1999-2000 using conventional radiotracking, we discovered some Mongolian Sakers that did not migrate in winter, staying throughout the winter season close to their nests (Sumya et al. 2001; Potapov et al. 2001). In 2000 we decided to use the Argos satellite telemetry system to track seasonal movements of Sakers in Mongolia to try and define the border between the sedentary and migratory parts of the population.

In summer 2000 we fitted 5 PTT tags (three 35 g solar PTT-100 Microwave tags, and two 20 g PTT-100) on Sakers: one on an adult male, three on adult females and one on a juvenile female (PTT 29668). In summer 2001 we fitted one more PTT (35 g solar PTT100, Microwave) on a female breeding north of Ulanbaatar. The PTTs were fitted on the birds using the ‘backpack’ technique. The tags were fitted on birds in locations strategically spread across Mongolia from northerly regions in the forest-steppe zone to semi-desert in the south. We also incorporated data from the tracking of a Saker (Altai1) we tagged in the Russian Altay close to the Mongolian border in our project there in 1998 (Potapov et al. 2001).

The small 20 g PTTs did not do well. Although the adult male was seen alive and flying with the transmitter, the signal faded away. We have no sightings of the juvenile female (PTT 29668) whose 20 g PTT stopped transmitting in August. The PTT fitted on the adult male (PTT 29667) sent erratic low reliability fixes in June-July 2000, and a few B class fixes from the nesting area on 17 September 2000, 26 February 2001 and 2-19 May 2001. The birds did not breed in the same nest and a search of the nesting area at the beginning of May produced no results.

The birds fitted with 35 g solar panel PTTs were tracked throughout the winter and showed an interesting migration pattern. One bird (PTT 29042) made a sudden shift some 300 km south from the place she was originally caught and stayed in this place in the south of the Khangay mountains for almost a month. In September she made a spectacular loop to the south, crossing the Gobi desert and visiting the Quilian Shan mountains (Gansu province of China). Then she returned back to Mongolia and stayed in the same area in the Khangay mountains until late November. According to the temperature sensor readings and erratic movements, we believe that this falcon was probably caught illegally by trappers. The last transmission was heard in early December and her movements are described as migratory.

Another bird (PTT 29041) stayed all winter in the area where she was originally caught, making short trips within 100 km. This bird clearly demonstrated a non-migratory pattern. The transmitter was last detected on 5 December 2000, however it was picked up again by the satellite between April and early June. The bird remained in the same area, with the last fix on 12 June 2001.

A clear migratory pattern was shown by female PTT29040. From her nest, where she was fitted with the transmitter, she flew south in mid-September and stayed for almost the entire winter in Qinghai province in China along the Bayan Har Shan which is a snow free area. There she made several nomadic trips within the Qaidam depression and in March she flew north arriving at her nest site in the Central Province of Mongolia at the end of March. There she bred again and still (October 31, 2001) remains in the breeding area close to the original breeding location. Interestingly, the wintering location of this bird coincided with the wintering place of the female (Altai1) fitted with a transmitter in the Russian Altay in 1997 by Chris Eastham and collaborators (Potapov et al. 2001). That bird moved along the Altay Mountain range, crossed the border and stayed during the winter months along the northern slopes of the Bayan Har Shan mountains in Quanghai province, China. Later she returned to the place where she had been caught.

The summer locations of the bird were identical.

The bird with PTT29666 marked north of UB was breeding on powerlines. During the breeding season it had 2 fledged chicks. The latest dataset suggests that the bird remained in the breeding area until 19 October 2001 and then moved 120 km west where it was roaming along a powerline of the same kind as in its breeding site.

The pattern of movements of Mongolian Saker Falcons suggests that they can be either nomadic, migratory or sedentary as supported by some of the individuals which stayed at their breeding sites all winter and which was...
confirmed by conventional telemetry. The migratory birds from the north move extensively exposing themselves to the risks of being caught by trappers along the Chinese border. Clearly the non-migratory part of the population is less exposed to such risks, and they face more danger from local pressure.

References:


Acknowledgements:
We thank Mohamed Al Bowardi and Majid Al Mansouri of the Environmenal Research and Wildlife Development Agency, UAE for support of the project and Dr. Fred Launay and Olivier Combreau for technical advice on data processing.
China 2001

Ye Xiaodi and Ma Min
Zoological Institute of the Chinese Academy of Sciences
Beijing, China

Research in China 2001 had the following objectives:
1. To build a team which would be capable of implementing research and conservation plans up to NARC standards, train personnel and establish good and long-term links with the conservation authorities in China.

2. Establish several study areas in China (starting in the west of the country) which would allow easy access in the future and repeatability of the surveys.

3. Work out future feasibility of survey work in the country.

Teams and team building:
Good relationships have been established with Dr. Ye Xiaodi of the Zoological Institute of the Chinese Academy of Sciences and with Chief, Wan Ziming of the Forestry Commission, Ministry of Forestry, who is the head of CITES authority in China. Dr. Ye Xiaodi subcontracted Dr. Ma Min of the Institute of Zoology in Urumqi, Xinjiang Province. The field teams led by Dr. Ye Xiaodi and Dr. Ma Min were given on-site training by Dr. E. Potapov who visited them in April and initiated the actual surveys in Xinjiang. The teams were given instructions on climbing, falcon identification, search patterns in the semi-desert and mountains, GPS technique and microchipping procedures. A formal agreement was signed with the Institute of Zoology, Chinese Academy of Sciences, Beijing. At the moment NARC has 2 trained teams, one from Beijing another from Urumqi capable of doing surveys without supervision. They include: Dr. Ye Xiaodi (project leader and team leader Beijing group), Dr. Ma Ming (Urumqi team leader), Liang Mengyuan (field assistant), Zhang Jinsheng (field assistant and a trained climber), Liu Jinsheng (driver), and Liu Haibo (driver).

Study areas and surveyed territories:
The surveys of 2001 were concentrated in the Xinjiang province. This is the westernmost province of China bordering with Kazakhstan, Tajikistan, Kyrgyzstan, Afghanistan, Pakistan and India. Geographically it consists of two basins, Tarim and Dzhungar basin. Both basins have their rivers flowing into sandy deserts which are not good habitat for falcons. However, the surrounding mountains, Tijan San and Altay Mountain ridge (surrounding Dzhungar depression) and Tijan San Ridge and Tibetan Plateau (surrounding Tarim basin known as Takla-Makan desert) are believed to be suitable for falcons.

April - May surveys were concentrated on the southern foothills of the Tijan San range overlooking the Takla-Makan desert. The teams surveyed all exits of the rivers from the mountains to the plains and went as far upstream as possible. In May-June the surveys were carried out in the foothills of the Altay range overlooking the Dzhungar depression. The teams have surveyed some large valleys there and checked some forested areas.

At the end of June beginning of July 2001 Dr. Nick Fox accompanied by Drs. Eugene Potapov and Ye Xiaodi surveyed part of Inner Mongolia starting from Hothot, crossing the sands of Quangin plain, crossing Damaquin San mountains into the Beijing depression.

Results:
In April- May while surveying foothills of Tijan San we found an extremely low density of all raptors. Only one nest of Upland Buzzard (Buteo hemilasius) has been found, just 3 Black Vultures (Aegypius monachus) were spotted on the plains, however the Black Kites (Milvus migrans) were abundant. In the mountains raptor numbers were higher. Not only black Vultures were present, but also Lammergeiers (Gypaetus barbatus), Himalayan Vultures (Gyps himalayensis) and Golden Eagles (Aquila chrysaetos). Unfortunately the habitats most likely to be occupied by Sakers (Falco cherrug) were either densely occupied by humans or have had hydroelectric or military installations with lots of activity and disturbance. Local people are familiar with Sakers and catch them on migration in the autumn.

During May-June the teams were working under the supervision of Dr. Ye Xiaodi and Dr. Ma Min. There were 22 nests of Saker falcons and 5 Barbary falcons (Falco pelegrinoides) found in the area. Out of these nests a total of 9 Saker and 4 Barbary falcon nests contained chicks. A trip to Altay Mountains has been carried out in August after the breeding season. A total of 10 territories with adults and empty nests have been mapped.

Based on the overall knowledge of the territory and habitats
ince has been fenced recently, and the formerly nomadic Mongol population is now almost all stationary. Fencing is a recent phenomenon, which now covers almost 100% of semi-deserts and deserts. Even sand areas were fenced. The local population no longer use horses to look after herds, as the fencing now does the job for them. Generally the numbers of all birds in these areas is extremely low. The numbers of all birds, including passerines are higher in any village market than in the wild.

Feasibility of future study:
The high human population density and attitudes of people are generally not in favour of the Saker falcon. It is also beyond any doubt that the number of Sakers is not 64,000-102,000 individuals as was estimated by Xiaodi et al. (2001), but much lower, and perhaps does not exceed 500 pairs for the whole of China. The data given in the cited paper probably referred to all species of falcon, including Lesser and Eurasian kestrels. Generally, the sakers might breed in small numbers in Alashan mountains, along the Mongolian border, in Altay foothills and in Quinhai province. The latter also accommodate wintering falcons from Mongolia and Russia as satellite tracking has shown. It would be worth a thorough survey of these provinces in future surveys.

References:

Microchip recoveries from falcons in Mongolia and Taimyr Peninsula.

N.W.H. Barton, The Falcon Facility, Carmarthen, UK

Since 1996 in the Taimyr Peninsula region of Siberia, 113 Peregrines have been implanted with microchips. Since then there have been 6 recoveries. Five of these were detected in the United Arab Emirates (UAE) and one was detected at the Fahad bin Sultan Falcon Centre in Riyadh. Of the five detected in the UAE, three of these were released at the end of the season hopefully to return to Siberia to breed in the future. Other related articles on this project can be found in FALCO 16 where there are two reports.

Since 1997, a total of 153 Sakers and 222 Peregrines trapped and used for falconry in the UAE have been released at the end of each season in the Sheikh Zayed Falcon Release Project. A total of 375 falcons have now been released. From the released birds, a female Saker and a male Peregrine were later detected in Dubai suggesting that after release, they were trapped for a second time. In the Mongolian project, a female Saker of ‘Altai’ type was microchipped in 1999 as a juvenile in central Mongolia and detected at the Dubai Falcon Hospital that same year.

It is evident that there is considerable movement of falcons between the UAE and Saudi Arabia. At the moment, numbers of falcons entering Saudi Arabia can only be estimated but it is clear that a proportion of those counted in the UAE also appear in Saudi Arabia. From recent data, at least 50% of the falcons which were discovered with microchips (implanted at falcon hospitals in the UAE) at the Fahad bin Sultan Falcon Centre had also been in the UAE and the majority were originally in Dubai. Nevertheless the number of falcons detected with microchips in Saudi Arabia is very small which suggests that a large number of falcons enter the Kingdom directly or that they pass through Emirates such as Dubai and Sharjah without being seen by the veterinary hospitals.
The general interest in the mountain form of the Saker falcon indicated the necessity of a thorough survey of the Altai mountains. A preliminary excursion to the area was made in 1998. In 2001 we carried out a larger route and expanded the area initially surveyed in 1998. One of the general goals was to find out new data on ecology of the falcons and to gather information which can help to solve an enigmatic problem of the Altai falcon.

The Altai falcon (*Falco altaicus*) has been described as a species by Menzbier (1891), by various authors as a subspecies, and as a colour morph by Dementiev and Shagdarsuren (1964). In the Mongolian Altai in June 2001 we trapped a breeding male of Altai type (see Fig 6) paired with a milvipes type female saker.

Alpine habitat above 2300 m is both interdigitated and contiguous with lower steppe habitat occupied by breeding milvipes sakers. There is no apparent genetic barrier, nor is the alpine area sufficient for a viable self-sustaining population. On the other hand gyrfalcons occasionally winter as far south as Kirghistan and Mongolian sakers winter as far north as 44°N depending on the snow cover. The two species intermingle in winter. The high altitude but low latitude Altai Mountains have habitat resembling the breeding habitat of gyrfalcons. It is likely that individual gyrfalcons remain in the Altai and interbreed with milvipes sakers from time to time. The subsequent generations would show phenotypic variation as found by Sushkin.

The Altai falcon, which can also include a range of colours, spans the gap in size and shape between gyrs and sakers. It is as if the Altai falcon is a natural hybrid incorporating varying proportions of gyr and saker in its ancestry.
It is possible that from time to time gyrfalcons remain to pair and breed with sakers in the Altai mountains, infusing gyrfalcon blood into the saker population and creating hybrid individuals of varying proportions. Because of lack of genetic isolation and small area of habitat, it seems unlikely that the Altai falcon is an emerging species in its own right. We therefore suggest that the Altai falcon is a natural hybrid of first or subsequent generations between gyr and saker, with saker predominating.

Fig 7. Female *milvipes* Saker at a nest where the male was the bird shown in Fig 6.

References:


In Mongolia, Sakers were found breeding in mountain, open steppe, semi-desert and forest-steppe habitats. A remarkable distinction of nest sites of Mongolian Sakers is that the number of nests found on artificial substrates (electricity poles, bridges, buildings) outnumber those located on natural substrates such as cliffs and rock ledges (Fig 1). This pattern existed during both years of monitoring. During 1998 and 1999, 55.3% of active nests were located on artificial structures, whereas 44.7% were on natural substrates (N=141).

Amongst artificial nests the falcons prefer poles of electricity lines of various kinds (Fig 2). Electricity poles are not the only nest sites available for falcons in flat steppe areas. It is not unusual to see falcons nesting on abandoned wells, metal and wooden electricity poles, even close to busy roads and railways on deserted concrete and log cabins.

Amongst natural substrates the Sakers preferred cliffs (niches and ledges) (Fig 3), although we did not carry out intensive surveys in wooded areas. The proportion of other types was much smaller.

Sakers also used nests built by other species and the most commonly used nests are shown in Fig 4.

According to the results of 1998, there was no significant difference between brood sizes of pairs breeding on artificial compared to natural sites ($F=0.968254$, $P = 0.5311$).

The total length of powerlines in Mongolia demonstrates a significant increase between 1950-1990, however no significant recent developments have been reported in the past decade. There are plans to build a new hydroelectric dam in the western Khangay mountains with the financial assistance of the UAE which will double the total length of the powerlines. This could double the total number of pylon nests within 5-10 years.

At present the total length of electricity lines in Mongolia is approximately 32,000 km. The total number of Sakers nesting on poles is an estimated 1100 pairs which together produce 3520 chicks per year. Direct mortality caused by electricity lines is estimated at 20 adults and about 200 young per year.
Generally it is possible to conclude that the number of nests found on artificial nest substrates (electricity poles, bridges, buildings) outnumber those nests located on natural substrates such as cliffs and rock ledges. This pattern existed during four years of monitoring. For 1998-2001 56% of the active nests were located on artificial structures, whereas 44% were on natural substrates. Breeding on electricity poles is beneficial for the Saker Falcons in Mongolia and it makes a lot of new hunting range available for the birds.

Clutch and brood size
In 1998 the average clutch size in Saker nests was 3.2±0.99, N=53. In 1999 the brood size was higher and reached 3.7±1.18 N=59. The brood size in 1999 was significantly larger than in 1998 (ANOVA: F=6.06, P=0.01).

Mortality
Causes of chick mortality were different in 1998 and 1999. In 1999 the number of unhatched eggs was relatively high, also there was a high proportion of chicks blown away from their nests by severe winds. Mostly this affected nests on electricity poles. No deaths were reported caused by chilling, whereas this factor was a significant contribution to mortality in 1998. Overall mortality does not appear to be high: in 1998 out of 172 hatched young, 153 (88.9%) fledged or reached fledgling age; in 1999 from 191 hatched chicks 186 (97.3%) fledged.

Editorial comment: Searching for nests along the electricity lines is straightforward compared to searching all possible natural substrates. This has no doubt incurred a certain amount of sampling bias.

Report on Tuva 2001

I.V. Karyakin
Field Studies Center for the Ural Animal Cons. Union
Ecocenter Dront, P.O. Box 631, Nizhniy Novgorod
603000 Russia. Email: ikar_research@mail.ru

In the field season of 2001 the group of the Center of Field Studies carried out surveys in the southern regions of the Krasnoyarsk District and Tuva Republic. The group consisted of 3 team members - Igor Karyakin, the group leader, Ludmila Novikova and Konstantin Orlenko. The surveys were carried out in the period from 19 May to 27 June. The work has been financed by the Falcon Research Institute, National Avian Research Center, ERWDA. Logistic support was provided by the Siberian Ecological Center and Sayano-Shushenkiy State Nature Reserve.

Survey area
The studies have been carried out in the forest-steppe regions of the foothills of the northern macro-slope of the Sayan range, in the Usinsk depression, Uyook Depression, eastern part of the Tuva depression, Sengilen mountains, Tuva-Mongolian border from Sengilen to Ubsunur lake. The search pattern included visits to all habitats suitable for saker breeding. All nests were logged on GPS and locations were used to calculate population size and density.

Weather conditions and food base in the surveyed regions
From 15 May, southern Siberia experienced a severe cyclone. In the Sayan mountains there was severe precipitation. In the upper parts of the mountains the precipitation was snow, whereas in the lower altitudes it was cold rain. The maximum temperature in the daytime was +5°C, in the nighttime the temperatures were below freezing going down to -10°C. From 20 May the weather became warmer and in the steppe depressions the temperatures were extremely hot reaching +40°C to +50°C from 1 June.

In the foothills of the northern macroslopes of the Sayan and in the Uyook depression the numbers of long-tailed Sousliks and Pikas were low. In the relatively small Usinsk depression located at the foothills of the Sayan range north of the Uyook depression a high density of Sousliks was recorded. In the Tuva and Ubsunoor depression the number of Sousliks was moderate, whereas the number of Pikas was very high. The counts based on the vocalisation calls returned the density of 212 to 297 individuals per km².

In the mountainous region of Sengilen the numbers of Sousliks and Pikas was low. The vocalisation call counts of the Pikas there gives the figure of 90 individuals per km².

Results
Krasnoyarsk District.
No Sakers were found during the four day survey of the forest-steppe zone at the foothills of the northern macro-slope of the Western Sayan. On 23 May we studied the Usinsk depression. The depression has smooth relief with a few cliffs. These cliffs were located along the north bank of the Us river and hold two Saker breeding territories. Both nests had incubating females at the time of the visits. Due to spring floods on the Us river we did not manage to climb the cliffs. In the southern part of the Usa depression we did not see any Sakers, however we found 3 Imperial Eagle (Aquila heliaca) nesting territories - the major provider of nests for the Sakers in Southern Siberia.
The next visit to the Krasnoyarsk district was made on 23 June. While surveying forested valleys of the Us river we found 2 breeding pairs of Peregrines. One nest contained chicks in down. The nest was located in the middle of a 200m high cliff. On 24-25 June we visited Sayan range pass and pinnacles on the Ergak range behind the rangers station of the Saya-Shushenskii Nature reserve. We did not see any sakers in this area. The foothills of the Sayan range between Tanzybey and Shushenskoe settlements we surveyed on 26 June where we found 3 occupied nests of Imperial Eagle with two, three and three chicks, 5 empty Imperial Eagle nests were found and only one Saker found.

**Summary**

As we expected the Saker is a typical avian predator of the mountain-steppe landscapes of the Sengilel Mountains. It does penetrate into the taiga zone, but its density decreases even in the places rich with sousliks and pikas. We did not find Sakers breeding in the alpine zone of the Sengilen, but it might be because of poor coverage of the territory. In the surveyed regions the Sakers occupy nests of Upland Buzzards (*Buteo hemilasius*) and Ravens (*Corvus corax*).

Everywhere in the region there is a high density of Eagle Owls (*Bubo bubo*). It is normal for a pair of Eagle Owls to breed close to any Saker nest. Pairs of Eagle Owls outnumber Sakers 6 to 1. Little wonder that the Sakers suffer predation from Eagle Owls. On the Tas-Kem River we found the only group of nests located on electricity poles. It seems that the breeding success on pole nests is higher than that of pairs breeding on cliffs. The local people cut the poles for firewood and take away the wire in order to get cash for aluminium/copper. This eliminates the factor of electrocution. There were also cases of bird removal from the wild. We suspect that the staff of the Nature Reserve were involved in this activity, as they possess the information of the nest whereabouts.

Of known Saker territories, 43% were occupied in 2001, producing 2.33 chicks per successful pair (Table 1). There is insignificant variation in brood size in the 3 survey years. Amongst the original hosts of the Saker nest the Upland Buzzard is number one (75.2%) followed by Raven (16%). Other hosts include Golden and Imperial Eagles and Kites (Table 2). The majority of nests were on cliffs (91%), electricity poles (6%), and trees (2%).

<table>
<thead>
<tr>
<th>Year</th>
<th>Territories found.</th>
<th>Successful nests</th>
<th>Chicks per successful pair</th>
<th>Number of known nests revisited</th>
<th>Amongst known nests</th>
<th>Clutch size</th>
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<td>All occupied</td>
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<td>58</td>
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<td>2.25±0.08 (n=51) (1-3)</td>
<td>-</td>
</tr>
<tr>
<td>2000</td>
<td>81</td>
<td>20</td>
<td>20</td>
<td>1</td>
<td>2.38±0.12 (n=13) (1-3)</td>
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<tr>
<td>2001</td>
<td>61</td>
<td>31</td>
<td>29</td>
<td>12</td>
<td>2.4±0.28 (n=25) (1-4)</td>
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<tr>
<td>Total</td>
<td>242</td>
<td>104</td>
<td>101</td>
<td>16</td>
<td>2.3±0.08 (n=89) (1-4)</td>
<td>13</td>
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Table 1. Breeding characteristics of the Sakers in Tuva and Krasnoyarsk District.

<table>
<thead>
<tr>
<th>Year</th>
<th>Number of known nests</th>
<th>On cliffs</th>
<th>On trees</th>
<th>Utility poles</th>
<th>Upland Buzzard</th>
<th>Raven</th>
<th>Golden Eagle</th>
<th>Imperial Eagle</th>
<th>Kite and Buzzard</th>
<th>Others*</th>
<th>In a niche of cliff</th>
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<tbody>
<tr>
<td>99</td>
<td>38</td>
<td>38</td>
<td>0</td>
<td>0</td>
<td>81</td>
<td>4</td>
<td>0</td>
<td>1</td>
<td>0</td>
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<td>1</td>
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<tr>
<td>00</td>
<td>71</td>
<td>60</td>
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<td>42</td>
<td>20</td>
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<td>01</td>
<td>51</td>
<td>38</td>
<td>0</td>
<td>13</td>
<td>35</td>
<td>10</td>
<td>1</td>
<td>0</td>
<td>1</td>
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<td>0</td>
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<tr>
<td>Total</td>
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<td>192</td>
<td>5</td>
<td>13</td>
<td>158</td>
<td>34</td>
<td>3</td>
<td>2</td>
<td>6</td>
<td>4</td>
<td>1</td>
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* builders of 2 nests are not known.
CITES controls in UAE, Asia and Africa

N.C. Fox  
Director, The Falcon Programme. 
Environmental Research and Wildlife Development 
Agency. 
Abu Dhabi.

At its 45th meeting in Paris in July 2001 the Standing Committee of CITES (The Convention on International Trade in Endangered Species) accepted a report drawing attention to the illegal trade in wildlife involving the United Arab Emirates. A follow-up visit from the CITES Secretariat to the UAE in October 2001 was unable to verify that the Convention was being adequately implemented. Consequently, in November 2001 CITES suspended trade with the UAE due to inadequate border controls and non-adherence to CITES requirements. For further information on this refer to http://www.CITES.org/news. While the finger has been pointed at the UAE, it is important to note that many other countries in the region also pay little regard to fulfilling their obligations to CITES.

This means that other CITES countries cannot trade with UAE. Large numbers of captive bred falcons from Europe and North America are imported under CITES certificates into UAE each year and this supply is now effectively stopped. The farmed falcons had been replacing the supply of wild-caught falcons from Asia, some from CITES registered countries and some from non-CITES countries. Owing to their own financial problems and huge land-boundaries, these Asian countries are also unable adequately to fulfill CITES requirements. CITES in itself is a commendable aim, but is designed by and for the West. It is not practicable in many non-western countries.

Recent events in Afghanistan and Pakistan have pushed wildlife issues to the back of the priority lists. The huge economic imbalances between countries, the corruption, the unstable politics and the lack of trained personnel make CITES controls there nothing more than a western dream. In one Asian country in which we are now working with our fourth Minister for the Environment, the incoming minister’s first pronouncement was ‘Kill all these migratory birds that are coming here and eating our grass!’

In ERWDA we have been working on these international wildlife problems. First we are monitoring falcon production and movements from source to sink, from nests and breeding areas in Asia, through trade routes, to end-users. We use microchips and readers and we have worked on the trade routes from the high Arctic, to the plains of Asia. We have looked at smuggling through the Khyber Pass and the Khunjerab. We have checked (sometimes in disguise) traders in Almati, Bishkek, Peshawar, Lahore, Karachi, Ulan Baatar, Xinjiang, Qingai, Hothot, Beijing, Abu Dhabi, Dubai, Riyadh, Sharjah and elsewhere. But monitoring is still a far cry from controls. I do not see full CITES level controls for falcons being feasible in the foreseeable future across Asia and the Middle East. As conservationists, we have to look at the whole gamut of factors facing wildlife, not just international trade. Loss of habitat, loss of food base, persecution and internal trade are for most species far more important, and far harder to tackle.

The numbers of captive-bred falcons in the United Arab Emirates has increased considerably, which could account for the 43% decrease in wild-caught sakers between 1993 and 1998. This is not the case in Saudi Arabia where there are very few captive-bred falcons, there being a preference for wild-caught sakers. The import of captive-bred falcons into the UAE is considerably reducing the price of and demand for wild-caught falcons. Until it is physically possible to enforce CITES controls throughout the land borders of the central Asian and Arabian countries, CITES at ports will only impact on the legal captive bred specimens. Illegal traders will use alternative routes. It is common that these restrictions are ignored by VIPs from many countries and it is likely that CITES will slide into contempt, making it impossible for us to resuscitate it.

At present, market forces and availability are the only tools we have in place to make any impact on the illegal trade in falcons. It is time for CITES to take a less idealistic and more realistic attitude to wildlife trade and conservation issues in these regions. Almost all our falcon biologists on the ground have experienced illegal trapping in their study areas, most recently in December in Irkuts, Siberia, by Syrian trappers. Many biologists have experienced physical threats during the course of their work. CITES has as yet failed even to come up with a mechanism whereby our biologists working in remote regions can ship blood samples or egg contents to labs for analysis. We are given the choice of either smuggling the samples or not carrying out the work. While we all agree on the direction we are trying to go in, by setting the fences too high, CITES is preventing progress at all. The question for CITES in ostracising countries that fail to comply is - is it the country that is suspended, or is it CITES?
Molecular Sexing of Pale Chanting Goshawks 
*Melierax [canorus] canorus*

M. A. D’Aloia  
National Avian Research Center, Environmental Research and Wildlife Development Agency, PO Box 45553, Abu Dhabi, United Arab Emirates.  
Email: mdaloia@erwda.gov.ae

As part of NARC’s UAE bird rehabilitation program, a consignment of Pale Chanting Goshawks *Melierax [canorus] canorus* (Accipitridae) was received into the Sweihan Center Quarantine Center in 2000. The veterinary team conducted extensive health studies and the birds were brought back to a healthy condition. As part of a strategy to find homes around the world for these birds, and due to the fact that often these places require birds in sexed pairs, it was deemed necessary to accurately identify their sex. Although females are generally larger than males, it was difficult to identify their sex by reversed size dimorphism due to the large weight gain by a majority of the birds whilst they were in captivity in SCQC, and also that many of the birds’ weights appeared to be mid-range. Therefore, it was decided to try molecular DNA-based techniques as an alternative.

Although not ideal, the two heaviest birds were used as female controls, and the two lightest birds as male controls (under advice from Dr. Tom Bailey, personal communication). In order to sex the remaining unknown birds, two methods were applied: first, the newer P2-P3 PCR-SSCP technique (Cortes et al. 1999), and secondly, the P2-P3 PCR-RFLP method (Griffiths et al. 1996).

Total DNA was isolated from 25µl of blood taken from each of 16 Pale Chanting Goshawks in SCQC using a standard DNA extraction protocol. Standard PCR reactions of 25ml were set up using Amersham Pharmacia Biotech Ready-to-Go PCR beads and the primers P2 and P3. For SSCP analysis, 1.5ml of the PCR products were mixed with 4.5ml of a denaturing solution, heated to 95°C for 5 minutes and then immediately snap-chilled on ice for 10 minutes. Samples were loaded onto a 15% polyacrylamide gel containing 7.5% glycerol. Electrophoresis was carried out at a constant temperature of 14°C at 600V for 50 minutes on a GenePhor System. The gels were silver stained using a DNA Silver Staining Kit.

The second sexing method used is based on that described by Griffiths *et al.* (1996) with some slight modifications in reaction conditions. The two PCR primers P2 and P3 were also used. This reaction yields PCR products that are the same size in both males and females (110 base pairs). Fragment-specific restriction can be carried out which will cut the control CHD-Z fragment but not the female CHD-W. Therefore, distinctive patterns for each sex are visible on the gel. For fragment-specific restriction, HaeIII was used to cut 8 ml of PCR product in a total volume of 10ml. The digests and uncut products were electrophoresed in a 0.7% agarose/1.2% Synergel gel and stained with Ethidium bromide.

The PCR reactions for all 16 birds were successful, with a product visible at 110 BP. Following SSCP analysis, no clear discrimination could be seen between males and females using the conditions described above. However, following restriction digestion with HaeIII, some of the PCR products were digested, suggesting the technique was successful in cutting the control CHD-NW bands. This was supported by the fact that the bands for the two supposed male controls were digested and no longer visible on the gel, whereas the bands for the two supposed female controls were not digested and were still visible. Following this logic, all the unknown samples could be sexed. Overall, there were 9 females and 7 males (one questionable male).

Up to now, the determination of sex in birds using direct visualization of the amplified product from a unique primer pair has been impossible to universalize, needing an optimization for nearly each species involved. The highly conserved CHD-W gene has previously been used successfully as a universal tag for avian sexing using PCR and a simple quick SSCP protocol (Cortes *et al.* 1999). However, as is the case with SSCP, this method is extremely sensitive to reaction conditions and as this report describes, this method was not successful on this occasion. Therefore, a previous method was tested - RFLP. Although this technique is a little longer to perform and relies on finding the right restriction enzyme to cut the CHD-NW product, I have found it to be extremely reliable and successful (D’Aloia and Griffiths 1999; D’Aloia 1999; D’Aloia and Eastham 2000).

Using the restriction enzyme HaeIII, which is one of the most common base cutters when applying this technique, it was possible to identify the sex of all the birds tested. Once again, this test has proved to be an important tool, in this case for conservation purposes, but it can also be essential in the design of breeding programs for industrial
and conservation purposes, and it can help aviculturists, avian veterinarians, poultry scientists, ecologists, and diagnosticians to understand sex differences in developmental rates and susceptibility to diseases (Cortes et al. 1999).

References:


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**Bumblefoot - a historical introduction to a common falcon foot disease (Part 2 - continued from Falco 18)**

M.G. Müller, U. Wernery and J. Kösters
Zeppelinstr. 9
89264 Weissenhorn,
Germany

Therapeutic methods (continued)

**Plaster**
In veterinary medicine plasters are a highly unusual form of drug application. In gout cases the MOAMIN (1240/41, acc. to TJERNELD 1945) recommends to stick a plaster onto the falcon foot containing an ointment made of aloe, gum arabic, milk, saffron and verdigris. According to D’ARCUSIA (1617/1980) plasters of Armenian soil, dragon-blood and white of egg are helpful in the fight against swollen feet. In similar cases DANKUS recommends the following two remedies: the first is made of pork cheek-bone’s bone-marrow, beaver tallow, rose-water and pitch, the second of aloe and white of egg (DANKUS ca. 1490-1510, acc. to GERDESSEN 1956).

**Poultice**
Until the 19th century poultices were a widely used therapeutic against various falcon foot problems. In cases of swollen feet with black spots GAH-I-SHAU-KATI (acc. to HARCOURT 1962) favours poultices made of pepper, natron, turmeric and ground opium having been soaked in human urine. The composition of mustard, cotton-seed, willow juice and figs is said to have the same healing effect. Also against swollen feet MIRZA (1868, acc. to PHILLOTT 1968) describes a mixture of snakeweed’s milk and the marrow of salted pork’s cheek-bone. For two days the falcon shall be put on a linen cloth soaked with this remedy. The poultice is to be removed on the third day. In the 19th century a poultice of aloe, pigeon’s dung, red arsenic and ox-gall has been recommend against podagra. Then they are mixed with black naphtha, applied to the ill falcon foot and bandaged. Further poultice compositions are clarified fat with saffron, warm red beet applied to the wound, a mixture of ground tragacanth, mastix soaked in vinegar or the mixture of the blood of a fat black hen and lychee semen (HAMMER-PURGSTALL 1840).

**Cauterisation**
Throughout the centuries cauterisation is a highly popular method in the fight against swollen feet and podagra. This therapeutic burning served especially in medieval times as an instrument against ill humours in cases of podagra, foot pad inflammation and foot tumours. It is also used after powders, ointments, plasters and poultices failed completely. ALBERTUS MAGNUS (acc. to LINDNER 1962a) describes the cauterisation with a lit cotton wick. After this procedure the patient is placed on a rock full of fat or grease. In AL GITRIF (8th cent., acc. to MÖLLER and VIRÉ 1888) cauterisation with glowing myrtle stick on the foot tumour in punctuation-like forms is described.

**Blood-letting**
In case that above-mentioned conservative treatments fail, blood-letting becomes the method of choice against podagra, swollen feet and foot tumours until the 19th century. D’ARCUSIA (1617/1980) describes in detail the two most popular procedures of blood-letting being performed until the end of the 19th century.

**Drainage, incision and surgery**
For drainage the wound can be kept open with a piece of bacon (WOLFF 1584, acc. to CZAPALLA 1936) or some horse tail...
hairs (MIRZA 1868, acc. to PHILLOTT 1968). Incision means the cutting of a tumour and the removal of hardenings, calllosities or spots. The most diverse mixtures are rubbed into the open wound, which then will be bandaged. An open wound healing will be sometimes preferred (KRAENNER 1925). For rubbing into the wound GAH-I-SHAUKATI (acc. to HARCOURT 1968) uses either an indigo leaf-urine-tincture or a mixture of cupric sulphate, Persian lilac and Lycium Europeum. In case of continued growth of the swelling at the falcon’s foot LATHAM (1615/1976) is the first to explicitly describe the foot surgery as the treatment of choice. Hereby, both the avian skin and the destroyed and necrotic foot tissue are cut not too deeply and in upward direction while protecting the tendons.

Effect of Medieval medication components

Most of the remedies used since the Middle Ages are based on the healing effect of medicinal herbs as well as on the chemical compositions that are included into alchemy at that time. In order to analyse Medieval drug components in their relationship with bumblefoot, they are categorised into curing and non-curing substances when applied externally.

Components with no healing effect include wall-rue (Adiantum capillus veneris) and anise (Pimpinelle anisum) serving as expectorant (HUNNIUS 1993; BRAUN 1987). Turmeric (Krokuma spp.) (HUNNIUS 1993) and immortelle (Helichrysum arenarium/Antennaria dioica) (BRAUN 1987; HUNNIUS 1993) although effective in cases of bile diseases do not show any curing results against bumblefoot. The same applies to the laxatives sloe-tree (Prunus spinosa) (HUNNIUS 1993) and figs (Ficus carica) (BRAUN 1987). Peas (Pisum sativum) and Lycium Europeum serve as contraceptives, but a healing effect against bumblefoot can still not be proven from available literature. This can be also said about the hallucinogenic Arabian box thorn juice (Lycium halimifolium) (GESSNER 1974) as well as for the aromatic and stomachic orange (Citrus aurantium) and the stomachic and diuretic ginger (Zingiber officinale) (HUNNIUS 1993). The sea-leek (Urginea maritima) is used multifunctionally as diuretic, cardiotonic (BRAUN 1987), expectorant, cardiotonic and rat-poison (HUNNIUS 1993). In former times roses (Rosa spp.) have been used in diarrhoea cases, whereas today they are processed in the production of cosmetics and perfume (HUNNIUS 1993). Red beet (Beta vulgaris spp.) is used in cases of liver and kidney diseases as well as tumour treatments (HUNNIUS 1993). Naphtha (HUNNIUS 1993) used in folk medicine is still applied as embrocation against bumblefoot on the Arabian peninsula although no curative effect can be proven. The effect of fruit trees cannot be followed up due to a lack of precise information.

As binding agents and emulsifiers sugar, eggs, pork cheekbones, ox-marrow, coarse meal, white bread, strong glue, pulverised marble, gum arabic, tragacanth and blood were used. Brandy and white wine serve as alcoholic disinfectants. Bacon, clarified chicken fat, goose grease, beaver tallow, linseed-oil, butter, olive-oil, wax and aloe are the bases for ointments. Aloe is still popular in the United Arab Emirates under its Arabic names ‘sabr’ or ‘sabir’ and is botanically the pulverised form of Socotra Aloe (RENAUD and COLIN 1934).

Salt has an anti-inflammatory, analgesic, anti-septic and keratolytic effect. Additionally, it possesses anti-pruritic and skin regenerative qualities. In medicine it is therefore used against exanthema, dermatophytooses, rheumatoid pains and sores. Besides hyperaemia and local stimulation salt also helps to achieve shrinkage of the upper cutaneous layers (WORMER 1995).


Apart from the medicinal herbs mentioned below the historic sources describe the usage of further chemical substances such as lime, alum, copper, verdigris, red arsenic and natron. Lime in the form of caustic lime (= burnt lime = calcium oxide) serves as caustic agent (HUNNIUS 1993), disinfectant and anti-septic whereas it has locally adstringent (constrictive) effects as a liquid solution. Quicklime leads to a dry localised escharosis (WIESNER 1975). Alum (aluminium potassium sulphate) is also used as caustic agent (HUNNIUS 1993), adstringent (BREUER 1983) and disinfectant (WIESNER 1975). In former times copper was used in its form as cupric sulphate and crystallloid verdigris (=copper-(III)-acetate) as an adstringent and caustic agent in the treatment of wounds (HUNNIUS 1993). Cupric sulphate furthermore prevents an increased granulation during the wound healing process by its caustic qualities (WIESNER 1975). Verdigris as alkaline copper-(II)-acetate used to be part of ointments and plasters (HUNNIUS 1993). In former times red arsenic (= arsenic disulphate) has been used in fighting dermatoses (HUNNIUS 1993), whereas natron or bicarbonate of soda (= Natrium hydrogen carbonate) serves as antacid (HUNNIUS 1993).

The plants or their parts mentioned above which had been used in Medieval medical prescriptions against bumblefoot will be summarised in chart 1 and 2 with their English and Latin botanical genus.

Indication of authorities used in chart 1:  
   a) Draggendorf 1967; b) Gessner 1974; c) Duke 1985;  
   d) Hsu 1986; e) Braun 1987; f) Hunnius 1993; g)  
   Pahlow 1993; h) Heilpflanzen 1997
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<thead>
<tr>
<th><strong>CHART 1</strong></th>
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<th>Anaesthetic</th>
<th>anti-inflammatory</th>
<th>Antiseptic</th>
<th>anti-therapeutic</th>
<th>Carotolytic</th>
<th>Hyper purely</th>
<th>Granulation stimulating</th>
<th>against dermatoses</th>
<th>against gout</th>
<th>Antiparasite</th>
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<td>e/g</td>
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16
## Chart 2: Components of medicinal plants in chart 1

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### Indication of authorities used in chart 2:

- a) Gessner 1974
- b) Duke 1985
- c) Hsu 1986
- d) Braun 1987
- e) Hunnius 1993
- f) Pahlow 1993
- g) Heilpflanzen 1997

References:
Hammer-Purgstall, J v (Hrsg) (1840) Falknerklee bestehe-nd in drey ungedruckten Werken über die Falknerey. Pest.
Blackhead in Arabian Red-legged Partridge, Stone Curlew and Spotted Thick-knee (Dikkop)

U. Wernery and J. Kinne
Central Veterinary Research Laboratory,
P.O. Box 597, Dubai, U.A.E.

Two Arabian Red-legged Partridges (Alectoris melanocephala), Stone Curlew (Burhinus oedicnemus) and one Spotted Thick-knee (Burhinus capensis) were sent to the Central Veterinary Research Laboratory (CVRL) for necropsy. The birds showed severely swollen livers with multiple yellow spots of different size (Fig. 1 and 2) as well as some necrotic foci in the caecum.

Histology revealed a necrotizing hepatitis with a large number of PAS-positive organisms surrounding the necrotic foci (Fig. 3). There was also a mild focal infiltration with lymphocytes and macrophages. Severe acute to subacute necrotizing inflammation was observed in the caecum containing large numbers of PAS-positive organisms. The submucosa was oedematous and infiltrated by mononuclear cells, involving also the muscularis (Fig. 4).

PAS-positive organisms were identified as *Histomonas meleagridis* trophocytes.

This protozoal disease affects different avian species including turkeys, peafowl, quail, grouse, and sometimes chickens. To the authors’ knowledge *H. meleagridis* has not been reported to occur in the 3 avian species mentioned here. The parasite is transmitted most often in embryonated eggs of the caecal nematode *Heterakis gallinarum*, and sometimes directly by ingestion of contaminated faeces. Histomonads are released from *Heterakis* larvae in the caeca where they rapidly replicate in caecal tissue. The parasite migrates into the submucosa and muscularis where it causes intensive and severe necrosis. Histomonads reach the liver either by the vascular system or via the peritoneal cavity, and rounded necrotic lesions quickly appear on the liver surface.
Pharmacokinetics of marbofloxacin in Eurasian buzzards

Garcia-Montijano, M. (*); Waxman, S. (***); Sánchez, C. (**); Quetglas, J.(****); San Andrés, M.I.; González, F. and Rodríguez, C.


Marbofloxacin is a new, safe and broad-spectrum bactericidal agent developed exclusively for veterinary medicine. In previous clinical studies, a safe use and antibiotic efficacy were observed after oral administration of marbofloxacin to raptors (Chitty & Eyett-Burton, 1997). However, the disposition of this drug is unknown in birds of prey. The pharmacokinetic behaviour of this fluoroquinolone was studied after intravenous (i.v.) administration (2 mg/kg body weight) in four adult wild Eurasian buzzards (Buteo buteo) of unknown sex. The plasma concentrations of marbofloxacin were measured by a high-performance liquid chromatographic (HPLC). The birds remained in good health throughout the study. Behavioural alterations and regurgitation were not observed.

The mean distribution half-life was 7.76 minutes and the elimination half-life of marbofloxacin was 4.11 hours in Eurasian buzzards. In our study we observed that marbofloxacin plasma concentrations were lower than those reported in dogs when the same dose was used (Schneider et al. 1996). This could be related to the larger clearance values found in birds. In our study the clearance was 3.34 ml/min/kg, a value similar to that obtained in broilers (Martínez et al., 1997), and significantly higher than that found in mammals (1.53-2.16 ml/min/kg) (Thomas et al., 1994; Cester et al., 1996; Schneider et al. 1996).

Marbofloxacin can reach a high plasma peak concentration and maintain concentrations higher than the minimal inhibitory concentration (MIC) values for the main pathogenic bacteria throughout the administration period. The mean marbofloxacin plasma concentrations at 10 hours and 12 hours after i.v. administration at a dose of 2 mg/kg were 0.27 and 0.21 µg/ml, which are above, or very close to, the MIC90 against most gram-negative bacteria, except strains of Pseudomonas spp. (Spreng et al. 1995). In order to maintain plasma concentrations above the target MIC of most pathogenic bacteria, marbofloxacin should be administered intravenously every 12 h at 2 mg/kg. However, further studies are necessary before an accurate dosing interval and others routes of administration can be proposed for this drug. The pharmacokinetic parameters obtained in our study should be considered preliminary, but could be used as a guide for the clinical use of marbofloxacin in Eurasian buzzards.

References:


Editors note:
Marbofloxacin is a frequently used antibiotic to treat falcons at Abu Dhabi Falcon Hospital, and no doubt in other avian hospitals too. Doses of 5-10 mg/kg are administered twice daily by the oral, intravenous or intra-muscular routes and similar to the observations of this study, no side-effects have been observed. The results of this study on buzzards indicates that lower doses than are currently administered in clinical situations may also be effective. Certainly further pharmacokinetic studies to optimise doses of marbofloxacin in falcons are warranted.
Pasteurellosis in falcons

J. Kinne and U. Wernery
Central Veterinary Research Laboratory
P.O.Box 597
Dubai
UAE

*Pasteurella (P.) multocida* is the causative agent of avian cholera, a disease of importance in the commercial poultry industry (Heidenreich, 1997). Pasteurellosis in falcons is rare, and is always linked to ingestion of contaminated food. The bacteria are easily transferred to the mucous membranes of the mouth or eyes in birds of prey (Haliwell and Graham, 1986; Williams *et al.*, 1987). Depending on the virulence of the strain, the level of exposure and resistance of the bird, it develops into either an acute disease (endotoxin shock) or a chronic form with eyelid swelling and conjunctivitis (Heidenreich, 1997). In the latter the lower respiratory tract as well as tendon sheaths and joints may be involved. Pathological findings in acute cases are associated with septicaemia. However, in chronic cases pneumonia and airsacculitis as well as hydropericardium may be observed (Heidenreich, 1997).

Pasteurellosis in falcons has a low incidence. Keymer (1972) found no case of pasteurellosis in 125 dead captive raptors. Morishita *et al.* (1996) screened 398 healthy raptors, including 20 falcons for *P. multocida*. No *P. multocida* organisms were isolated from the pharynx, choana, or cloaca of these birds. However, *P. multocida* was isolated from 10 sick raptors, including 2 falcons with avian cholera. Morishita *et al.* (1997) found 22 cases of avian cholera in raptors. Besides septicaemia-related lesions, oesophageal abscesses were found in 8 of the 11 (73%) rough-legged buzzards (*Buteo lagopus*) that succumbed to avian cholera. Oesophageal abscesses were not noted in owls and falcons.

Between 1987 and 1999 only 11 out of 4,897 falcon samples (0.2%) submitted for bacteriology at the Central Veterinary Research Laboratory (CVRL) were positive for *Pasteurella* sp. (Gierse, 2000). Between 1987 and 1999, six of 293 (2%) necropsied falcons at CVRL were confirmed to have died of pasteurellosis. The following *Pasteurella* species were identified: *P. multocida* (4), *P. haemolytica* (1) and *P. aerogenes* (1).

Because the ingestion of infected prey is the main mode of transmission (Heidenreich, 1997), the incidence of *Pasteurella* sp. in the prey was also investigated. *Pasteurella* sp. were isolated from 18 of 752 prey species (2.39%) investigated at CVRL between 1987 to 1999 (4 houbara, 8 pigeon, 6 quail).

Between 1999 to 2000 five pasteurellosis cases (4.6%) were diagnosed in 108 falcons submitted for necropsy at CVRL. Three falcons showed marked serofibrinous pericarditis and perihepatitis (Fig.1), including enlarged liver and spleen. Two falcons had either pneumonia or airsacculitis and one falcon had a serositis (Table 1). *P. multocida* was isolated from lung, liver and spleen of all 5 falcons. In four falcons heavy growths of *Clostridium perfringens* were also cultured from the small intestine. In 3 falcons histology revealed necrosis/microabscesses containing bacteria in the spleen (2x; Fig. 2), liver (2x) and lung (1x; Fig. 3).

![Fig. 1: Liver: marked serofibrinous perihepatitis with extensive acute inflammation](image1)

![Fig 2: Spleen: microabscesses containing numerous bacteria. Note the extensive inflammatory reaction around the bacteria](image2)

![Fig. 3: Lung: infectious thrombus within a vessel](image3)
Over the last two years CVRL has experienced an increase of fatal pasteurellosis in hunting falcons. It is believed that the ingestion of contaminated food is the main source of infection. Investigations should also be conducted to elucidate the importance of stress or concurrent disease like chlostridiosis, chronic aspergillosis and viral infections in the initiation of pasteurellosis in falcons.

References:

Falcon Herpesvirus in a Gyrfalcon (Falco rusticolus)

P. McKinney
Wildlife Protection Office
P.O. Box 27942
Dubai, UAE

Inclusion body hepatitis associated with herpesvirus in gyr falcons is well documented. This report describes an apparent transient “recovery” of a gyrfalcon following therapy.

A two year-old female gyrfalcon , which had been present in the UAE for four months was presented with acute onset of anorexia with dark green coloration of the urate portion of the mutes. Endoscopic examination revealed characteristic necrosis of the liver and spleen. A liver biopsy was submitted for histopathology and revealed inclusions in hepatocytes. No virology was carried out.

Haematology showed a normal total white blood cell level but a mild heteropenia and relative monocytosis, AST (273) and Bile acid levels (>200) were high indicating liver dysfunction. Serum was tested for herpesvirus antibodies and was positive (SNT1:16). Previous attempts at treating IBH in the Al Safa Falcon Clinic have proved unsuccessful but was initiated in this case using a modified treatment regime:

142mg /kg po sid acyclovir (Zovirax 200mg:Wellcome) the liver protectant silymarin 280mg sid po:Legalon 70 MADAUS AG Germany Lactulose 5ml (3,35g) po bid for five days only.

The falcon was crop-tubed with blended quail and electrolyte solution for five days after which it began to eat voluntarily The green coloration of the mutes resolved in seven days. A follow-up endoscopic examination ten days later showed several small active Aspergillus lesions in the left caudal thoracic airsac but a dramatic reduction in the degree of hepatic necrosis. Itraconazole was initiated at 10 mg/kg po sid.

Haematology at this stage showed a leukopenia (TWBC 3.9). AST and bile acid levels were lower but still above normal. Treatment with acyclovir, itraconazole and silymarin was continued for a further four weeks. Six weeks after the initial diagnosis a follow-up examina-
tation was carried out. Endoscopy showed an *Aspergillus* granuloma on the ventral surface of the lung. A follow-up serum neutralisation test for herpesvirus gave a titre of 1:32. The liver appeared normal on endoscopic examination. The falcon was eating normally and appeared clinically healthy so it was released in a moulting aviary and treated with itraconazole 10 mg/kg sid for a further six weeks. Three months after the initial diagnosis the falcon suddenly developed anorexia and green discoloration of the urates. It was removed from the aviary and re-assessed. Endoscopic examination showed chronic *Aspergillus* granulomas with small amounts of inflammatory exudate. This was not considered to be life threatening. The liver surface appeared normal. The falcon was euthanased.

**Post mortem findings included:**
Severe serofibrinous pericarditis and perihepatitis, yellow miliary spots in the liver, greenish, swollen kidneys, yellow spots in the lungs and a mass in the cranial thoracic airsac. Histopathology demonstrated numerous fungal granulomas in the lung and airsacs. The liver contained some granulomas but no inclusions were seen.

**Microbiology:**
Herpesvirus was isolated from the liver, lung and kidney. *E. coli* was isolated from all organs. *Aspergillus* was isolated from lungs and airsac. *Chlamydia* tests were negative.

**Diagnosis:**
Herpesvirus infection and secondary colisepticemia and aspergillosis.

**Comments:**
The interesting aspect of this case is the fact that despite an apparent “recovery” from IBH, the virus was isolated at post-mortem three months after initial diagnosis. Does this mean the virus remained latent in the falcon only to emerge when secondary infections developed? Although the falcon seemed to respond to intensive treatment, the fact that it died three months later, would suggest that it is not realistic to expect a full recovery from herpesvirus infection. It would be interesting to compare this herpesvirus strain to other falcon herpesvirus isolates. Perhaps this is a less pathogenic form? I would be interested to know if any colleagues have had any similar cases.

**References:**


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**Letters to the Editor**

**Medical Malpractice and Falcon Health in the Middle East**

Dear Sir

I wish to encourage debate amongst falcon veterinarians and the relevant health authorities in the Middle East on the topic of the misuse of veterinary medicines by non-veterinarians to treat falcons.

It is apparent that many birds presented for examination at the specialist falcon hospitals have received previous treatment. Many birds are suspected to have been treated by technicians at facilities belonging to VIPs where there is no resident veterinarian. At Abu Dhabi Falcon Hospital we have observed the following problems in these type of cases;

- Alimentary and respiratory tract infections with multiple antibiotic resistant bacteria.
- Cases of aspergillosis that are resistant to itraconazole.
- High numbers of cases of candidiasis with suppressed normal bacterial flora from certain facilities.

Unfortunately, because information on the previous medical history is often incomplete, absent or erroneous, such cases are currently impossible to prove without the support of a forensic laboratory. However, having visited many farms and camps where falcons are maintained in the absence of a resident veterinarian and observed the wide spectrum of medicines (anti-inflammatory steroids, anabolic steroids, antibiotics, antifungals, antiparasitics) on the shelves, it is obvious the medicines are used. Therefore, it is reasonable to conclude that a cocktail of treatments have been tried before many birds reach the hospitals. Steroids are apparently a favourite treatment because of the short-term improvement that is seen. To the non-veterinarians reading this letter steroids are now known to have to have a profound immunosuppressive effect on the avian immune system and are currently used cautiously for specific indications by avian clinicians.

This is I believe a serious issue in the United Arab Emirates, and one that compromises the health and welfare
of the falcons, as well as bringing the medical practice of the region into disrepute. It would be interesting for a forensic laboratory to collaborate with a falcon hospital to determine the scale of this problem, in the same way that forensic laboratories have helped to improve the image of the camel and horse racing communities in the region.

Dealing with this issue remains problematic. Legislation by the animal health authorities is needed to restrict the availability of veterinary drugs and no doubt such restrictions will be passed in the long term. In the short-term however, this problem will only be solved by improving the awareness of the managers of the camps to this problem so that clear working guidelines within which the resident falcon technicians operate can be introduced.

I appreciate the comments from a number of colleagues working in the Middle East and I would encourage other colleagues, veterinarians to air their views on this subject in future issues of FALCO.

Yours sincerely,

Dr Tom Bailey
Wildlife Health MSc Student
Zoological Society of London, London

Dear Sir

An adult saker falcon was brought to the hospital for general examination. The clinical history included reduced appetite and passing blood with faeces. Routine examination was carried out. In parasitology examination, numerous red blood cells were found. Radiograph showed airsacculitis and increased radiodensity of intestinal tract. The bird was admitted for observation, several tapeworms were passed together with faeces. All the worms were collected, washed with normal saline and fixed with a mixture of ethanol and glycerin. These worms were sent to Dr. Lynda Gibbons at the Royal Veterinary College London for identification to Dr. M. A. Peirce, at MP International Consultancy, England. The organism was identified as Cestodes belonging to the Genus Cladotaenia (Cohn, 1901). They are nearest to the species Cladotaenia armigera (Volz 1900) This species has been reported from Falco nuodicus in Egypt. Unfortunately a detailed description of this species could not be traced to confirm the species identification. To our knowledge the only other Cestode species reported in falcons from the Middle East has been Cladotaenia globifera.

Dr Jaime Samour
Fahad bin Sultan Falcon Centre
P.O. Box 55
Riyadh 11322
Kingdom of Saudi Arabia
Email: :falcon@shabakah.com

Thyroid cystadenocarcinoma in a saker falcon - Samour,


The thyroid glands are paired structures situated at the thoracic inlet. The thyroid hormones perform various functions in birds, including control of basal metabolic rate, growth and development, control of reproductive function and moulting. Thyroid neoplasms are relatively rare in birds, particularly in raptors and only two cases involving the thyroid gland have been found. Both cases were incidental findings at postmortem examination and no clinical evidence of disease was found.

A two-year old female saker falcon was presented for postmortem having been killed by another falcon. During postmortem examination it was noticed that the left thyroid was grossly enlarged. The glands were dissected and the sections examined at the Central Veterinary Research Laboratory, Dubai. The histopathology report confirmed the existence of a cystadenocarcinoma on the left thyroid gland.

Most thyroid enlargements represent thyroid hyperplasia which may be associated with iodine deficient diets, excessive dietary iodine, ingestion of goitrogenic plants such as Brassica species or exposure to iodine-containing disinfectants. Thyroid hyperplasia usually results in bilateral glandular enlargement, whereas thyroid adenomas are usually unilateral.

Dear Sir

A newly caught, two year-old, adult female saker falcon (Falco cherrug) was presented to the hospital on 5th December 2001 for general examination. The bird was not eating and showed marked depression. Routine haematology and blood chemistry analyses were performed. Relevant blood chemistry results were: CK: 1820 (u/l), GOT: 301 (u/l), GPT: 124 (u/l), Alkaline phosphatase: 675 (u/l), Potassium: 3.51 (mmol/l). Relevant haematology results were: Hb: 7.2 (g/dl), WBC: 22.8 (X 109/l), Heterophils: 12.99 (X 109/l), Lymphocytes: 3.64 (X 109/l), Potassium: 3.51 (mmol/l). Examination of a blood smear included mild poikilocytosis, moderate hypochromia and megathrombocytes and numerous reactive lymphocytes and toxic heterophils. In addition, an intraerythrocytic organism was found. Blood smears were fixed in methanol for ten minutes and sent for identification to Dr. M. A. Peirce, at MP International Consultancy, England. The organism was identified as Babesia shortti. Three days after admission the falcon died as a result of the advanced stage of parasitism. To our knowledge this is the second time this haemoparasite has been found in falcons from the Middle East. This parasite was previously reported from Abu Dhabi (J. H. Samour and M. A. Peirce, 1996 - Veterinary Record 139: 167-168).

Dr. Jaime Samour,
Medical Director,
Fahad bin Sultan Falcon Centre
Conference announcements

The World Association of Wildlife Veterinarians will be co-ordinating the wildlife sessions at the above meeting in the Kram Exhibitions Park and InterTrade Centre, Tunisia, at which it is proposed to have a general theme of health issues of wildlife in North Africa and the Middle East.

Provisional Program
1. Health Issues of Captive Breeding and Re-introduction Programmes - veterinary issues related to captive breeding, wildlife rehabilitation and wildlife re-introductions will be covered including issues in North Africa and the Middle East.

2. Wildlife Health Issues - topics related to wildlife health of free-living species in North Africa and the Middle East.


4. Wildlife Trade Issues - topics relating the wildlife trade in North Africa and the Middle East.

5. Free Communications - this session will be for any topic.

6. Poster Session

Programme of the main Conference:
www.worldvetunisia2002.com

For more information please contact:
Dr Francis Scullion
Chairman WAWV
16 Cranlome Road
Ballygawley
Co. Tyrone
N. Ireland. BT70 2HS
E-mail F.Scullion@zoo.co.uk

At the Loro Parque, the world largest parrot collection Puerto de la Cruz - Tenerife - Canary Islands - Spain.

Deadlines for the Proposal Submission: August 31st 2002

The Canary Islands are a small Archipelago formed by seven major islands and several small ones. Tenerife, the largest island, is characterized by its impressive volcano “el Teide”, which with its 3,800 mts (12,500 feet) is the highest Spanish mountain. The archipelago supports species such as the Giant lizard of el Hierro (Gallotia simonyi), considered extinct until the early seventies and the Blue finch (Fringilla teyidea). There is also the canary which originates from these islands.

Loro Parque is the world’s largest parrot collection, by number of represented species. Some 3500 birds are kept here, representing more than 300 different taxa. The Parque also has one of the worlds largest penguinarias: completely closed and climatized, it houses more than 200 penguins, belonging to 4 different species. Further Loro Parque hosts a large aquarium, displays gorillas, chimpanzees, tamarins, marmosets, tigers, jaguars, alligators and giant Galapagos tortoises. Finally there are dolphins’, sea lions and naturally parrot shows.

Tenerife is served by two Airports with regular flights from Madrid and most Spanish and European cities.

Deadline for paper submissions is August 31 2002.

Your faithfully,
Lorenzo Crosta, DVM.
Veterinary Director - Loro Parque

For information:
Lorenzo Crosta, DVM
Loro Parque - Clinica
C. Teide s/n
38400 - Puerto de la Cruz - Tenerife - España
Fax: 0034 - 922 - 385021
Email: lorenzo_birdvet@yahoo.com
Video Review - ANATOMY
The Bird of Prey Management Series
www.falcons.co.uk/faraway/FFP/

This is MODULE 3 in the Bird of Prey Management Series. Available in PAL and NTSC it has a running time of 67 minutes. Available in English and Spanish and soon in Arabic.

There is also a 32-page handbook of supplementary notes which provides the viewer with a more detailed description of some aspects of the video.

Details of Module 1 - NUTRITION and Module 2 - BASIC TRAINING can be found on the above website.

For anyone working with raptors, whether as falconers, breeders, veterinarians, veterinary assistants, rehabilitators, avian biologists or zoologists, a knowledge of ANATOMY is essential to understanding many different aspects of raptor biology, health and management.

This is a practical, hands on video and uses a falcon dissection to show the viewer where the different organs are in the body and what their function is. It begins by giving an overview of the raptor skeleton and its requirements for flight and a predatory lifestyle. It sets out to explain and answer clearly questions most often asked by people and explains the respiratory system, circulation, digestion and the role of glands and hormones in a straightforward and informative manner.

One of the most important mechanisms is the respiratory system and the function of air sacs and lungs in the role of breathing. Without this understanding, it is difficult to appreciate the complexities of respiratory disease and disease prevention which will be looked at in subsequent videos. The function of the immune system, kidneys, liver and heart are all explained.

There is so much information in this video that you will need to watch it time and again.

Copies are available from:
The Falcon Facility, P.O. Box 19, Carmarthen, UK, SA33 5YL. Email: office@falcons.co.uk