



Saker Falcon: Hard to Be Magnificent.

E. P. SHNAYDER, I. V. KARYAKIN, E. G. NIKOLENKO

The name 'baloban' by which the saker falcon is called in Russian is of Turkic origin, meaning 'big' or 'fighter'. Until the 1970s, this generalist predator, distinguished by its high fertility and amazing adaptability, occurred in a vast territory – from Eastern Europe to the Far East and from the steppe belt of Eurasia to the Himalayas and the deserts of Iran. Today large populations of the saker falcon have survived only in the most sparsely populated and hard-to-reach corners of its former range, i.e., in the border areas of Russia, China, Kazakhstan, and Mongolia. What happened to this magnificent predator? It itself became prey to man's greed and passion for falconry...

Key words: saker falcon, population collapse, poaching, conservation, reintroduction, fostering method

On the left are the participants of the project to restore the saker falcon genetic diversity in South Siberia: Elena Shnayder, Elvira Nikolenko, and Igor Karyakin. Photo by M. Khorvat

This publication uses photographs taken by Elena Shnayder



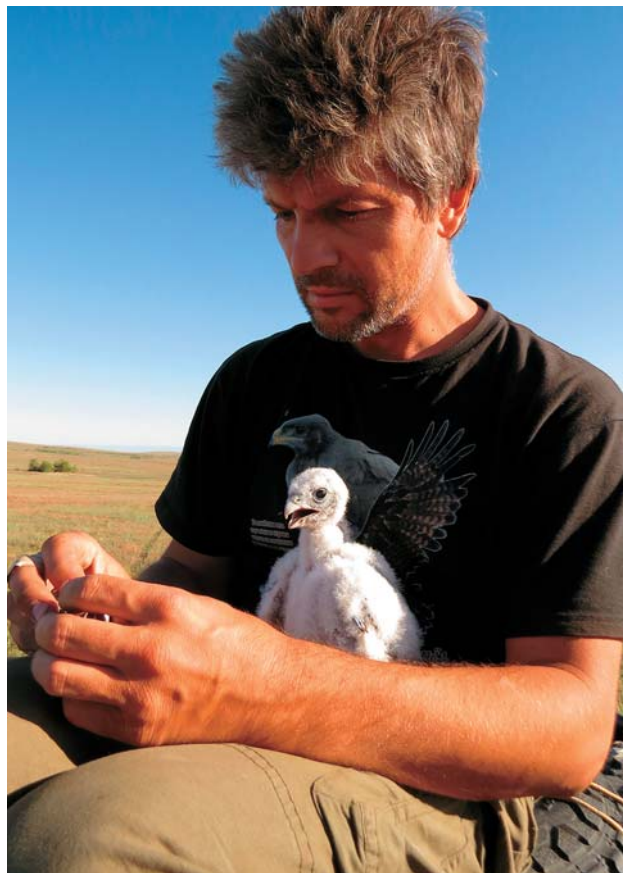
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The *saker falcon* once spread over a huge territory in Eurasia. It lived in forest-steppes; in steppes, including those in high-mountain areas; and in semi-deserts. Easily adapting to different conditions, it grew accustomed to nesting on rocks and trees, on man-made structures, and even on the ground. The reason is that the saker falcon, like other falcons, cannot build its own nests and prefers to occupy those made by other birds. The nest may be abandoned or new, if its owner allows itself to be evicted. Most often, these are the nests of ravens or raptors such as kites, buzzards, and even large eagles. However, if the saker falcon finds a snug place without a ready-made nest, it can lay eggs right in a rock niche or on a cliff ledge.

These falcons are not picky in their diet either. They are equally successful in taking partridges and larks, various lagomorphs and rodents, and also reptiles. They can even snatch fish from their neighbors, i.e., ichthyophagous birds (Berezovikov and Shmygalev, 2008). Although each individual bird develops with age a favorite hunting tactic and, accordingly, prefers a certain type of prey, these falcons remain generalist predators.



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The saker falcon (*Falco cherrug*) is a large falcon of the subgenus *Hierofalco*, which also includes another three closely related species: the gyrfalcon (*Falco rusticolus*), found mainly in the arctic and subarctic zones of Eurasia and North America; the lanner (*Falco biarmicus*), common in Africa and the Balkans; and the laggar (*Falco jugger*), found in Hindustan and Indochina. The largest one of them is the gyrfalcon, whose weight reaches 2.1 kg. The weight of an adult saker falcon is about 0.7–1.4 kg; its body length is 40–60 cm and wing length is 42 cm; the females are larger than the males. Its life expectancy can reach 18–20 years in the wild and 30 years in captivity

The saker falcon is quite prolific. It is not uncommon for this bird to have 4–6 eggs, sometimes 7, in a clutch. Other raptors of similar size usually have fewer eggs: the *booted eagle* has 2; the *peregrine falcon* has 4 or less; and the *goshawk* has 5 or less. Large clutches, like those of the saker falcon, are typical of smaller raptors, such as the *common kestrel* or the *sparrowhawk*, which hunt for small-sized prey, including insects. Nevertheless, the saker falcon, which weighs more than 1 kg, turns out to be just as prolific as the common kestrel with its weight of less than 300 g!

Since the saker falcon has so high fertility, it must be an amazingly efficient hunter. And it truly is. This falcon's hunting tactics are very diverse: it can track down prey from the air or from a perch (a high post, pole, or tree); it can attack, like a cat, from an ambush in the grass and watch for prey, sitting or even lying (!) on the ground; it can exhaust

At the top is an adult saker falcon (subspecies *Falco ch. cherrug*)

Saker falcon most often occupies other raptors' nests, but it can also lay eggs right in a rock niche or on a cliff ledge



its prey with a chase. The saker falcon is a great game-getter.

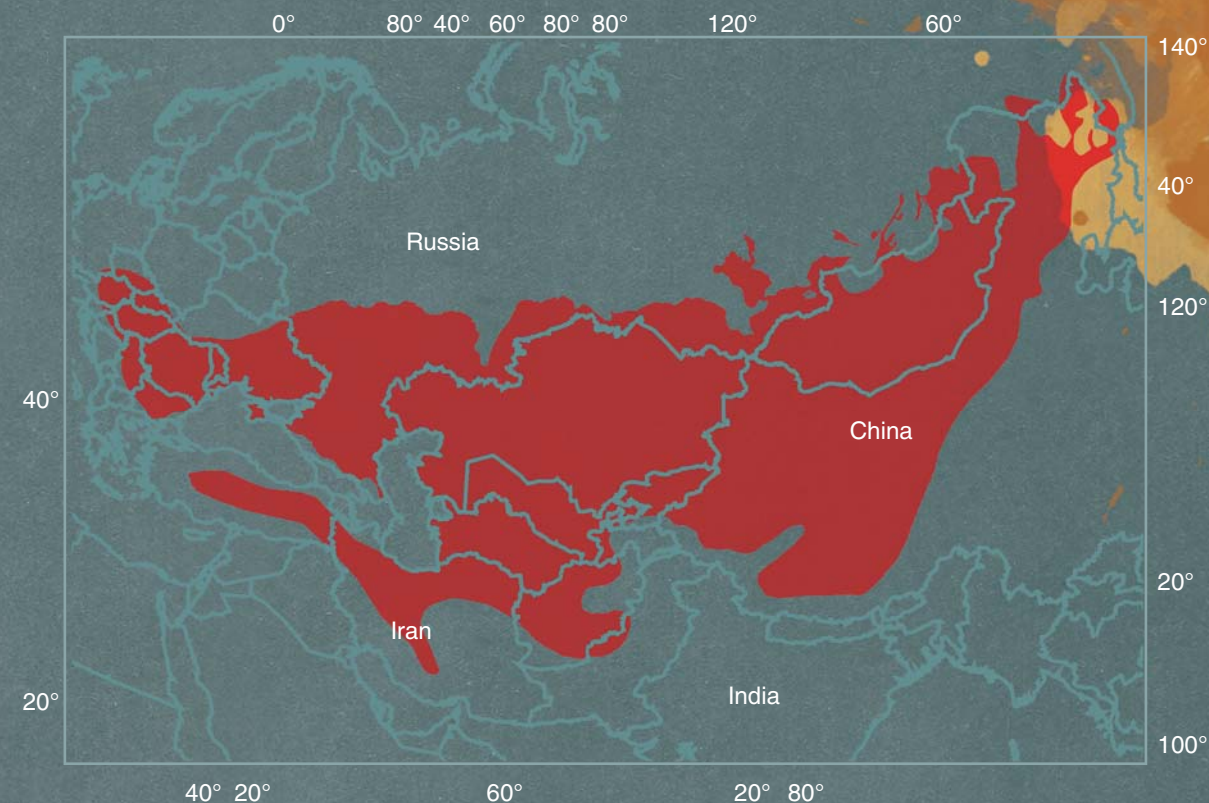
Other species of falcons are not such generalists. Some of them specialize in a particular hunting method and a certain type of prey, while others do not like to deviate from the usual nesting stereotype. But what all falcons are equally remarkable in is their attitude to offspring. Both parents take care of the nestlings and then teach the young birds hunting skills. As a rule, it is the male alone that completes the training while the female leaves the nesting area earlier, as is the case with most birds of prey.

Furthermore, all falcons participate in caring for their peers' offspring; this mutual assistance occurs both within one and between different species (Gallo, 1974; Tella *et al.*, 1997; de Nie, 2014). Adult birds will never





Top left: a female of the subspecies *F. ch. progressus* on a clutch in the former nest of a black kite



Until the 1970s, the saker falcon's range covered a vast territory from Eastern Europe to the Far East and from the steppe belt of Eurasia to the Himalayas and the deserts of Iran

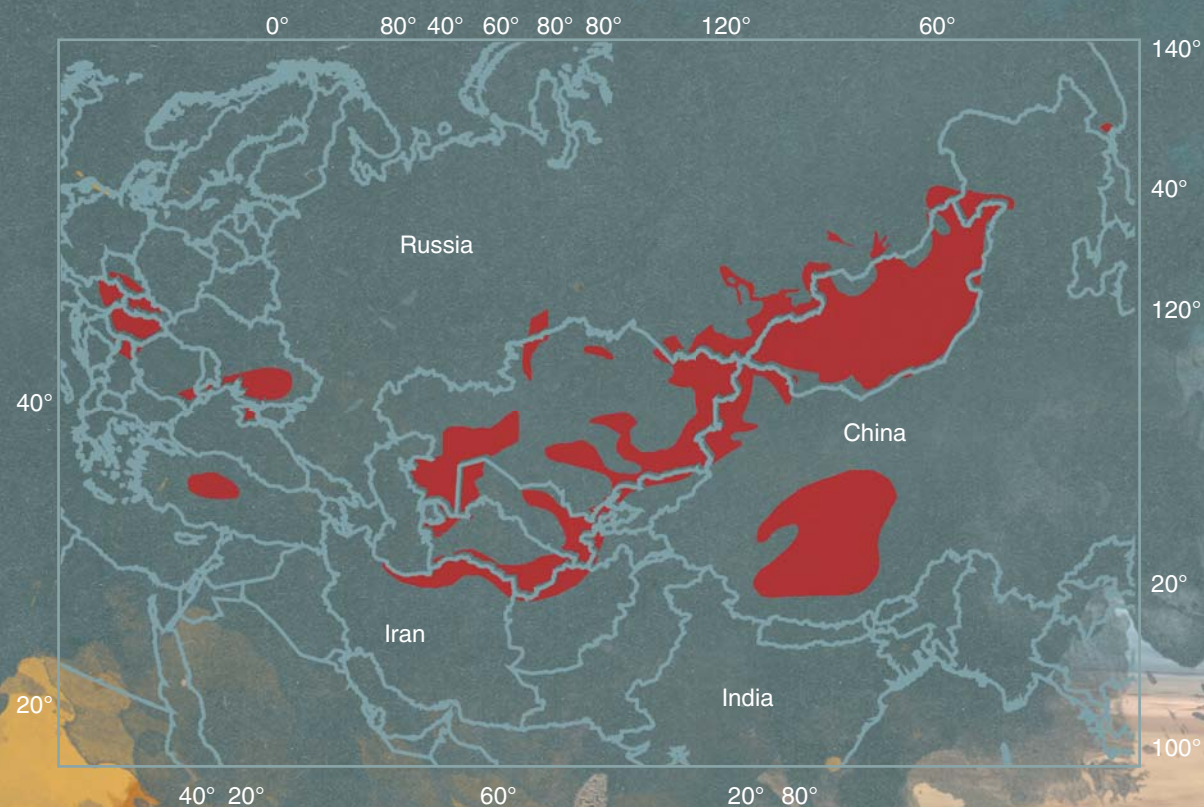
refuse to help young and inexperienced strangers – they will not only feed those younglings but also teach them survival skills. There are known cases when adult falcons of one species temporarily accept into their family young falcons of another species. For example, a kestrel can take care of young red-footed falcons (Yurko, 2019). Also, non-nesting birds can help family pairs take care of and bring food for their offspring (Monneret, 1983; James and Oliphant, 1986; Ananian, 2009). So, a young saker falcon can travel safely from family to family, learning different hunting methods, without any fear of territorial aggression.

Given its remarkable skills and abilities, the saker falcon ought to be a common predator across today's Eurasia. And so it was, until recently. However, over the three decades following the 1970s, the saker falcon's range contracted by half due to poaching in the wintering grounds, and its population numbers dropped even more heavily. Since the 2000s, its numbers have continued to decline due to poaching in the nesting and migration areas. The most optimistic estimates claim that there are now only 15,000 nesting pairs left worldwide, while the most pessimistic

one suggest no more than 6,000. Today, large populations of the saker falcon live only on the chinks (i.e., very high and hard-to-reach mountain ledges) of the uninhabited Ustyurt Plateau and in sparsely populated areas of Mongolia, Tibet, and the Altai–Sayan region.

Why is the population of this magnificent bird in such a deplorable state today?

Based on geographical features, it is customary to distinguish between six subspecies of the saker falcon: common, chink, Turkestan, Central Asian, Mongolian, and Tibetan. In Europe, these falcons nest in Hungary and Ukraine; in Asia, they do so in China, Mongolia, Kazakhstan, and Russia. Today the birds nesting in Asia make up 90% of the entire world population of saker falcons



Wild-born saker falcon fledgling (young bird that just left the nest) in juvenile plumage

Hunting with falcons

Falconry, or hunting with a falcon, originated about 4,000 years ago; its historical roots trace back to Mesopotamia (present-day Iraq, Kuwait, and Syria), China, and Mongolia. This activity had always been the domain of the nobility and a sign of wealth and high status. Today, the art of hunting with a raptor is maintained only as a tribute to a beautiful tradition, with the exception of falconry for bustards (i.e., large birds that live mainly in the steppe and semi-desert regions of Eurasia), which is now a favorite pastime of wealthy Arab sheikhs.

What is wrong with bustards? It all started when these birds discovered a way to quickly get rid of endoparasites, which is vitally important for them. During the mating season, male bustards slowly walk in front of females, with their wings lowered to the ground and their tails raised vertically. The potential girlfriends, instead of admiring the wooers' beauty from the front, come up from behind and carefully study the snow-white feathers in the cloaca area. If they see there any traces of excrement or blood, which may indicate infection with parasites, they immediately reject such a contender.

A vermifuge (and, accordingly, a means to increase reproductive success) for bustards is... blister beetles (*Meloidae*). Upon contact, these beetles secrete a poisonous substance called *cantharidin*, which, when ingested in large quantities, causes poisoning and even death in grazing animals. However, when ingested in small doses, it kills primarily intestinal parasites. During the mating season, male bustards eat a lot of blister beetles, especially since these birds have developed some resistance to cantharidin (Bravo *et al.*, 2014). So during the mating season, bustard meat is literally soaked with this substance.

Humans, too, had long shown interest in blister beetles, which were believed to be an aphrodisiac. Powder from dried blister beetles was said to increase male potency. But the meat of a bustard caught during the mating season turned out to be preferable over dried beetles. Since there were no firearms in antiquity, humans used hunting birds to catch the desired prey. Before the era of technological progress, a balance was maintained between humans,

Saker falcon's historical range has now contracted by more than half. The map is based on the data for 2015–2019

Female of the subspecies *F.ch.cherrug* with nestlings. Photo from a camera trap, Sibecocenter/RRRCN



Saker falcon
fledgling born
in the wild

It was the saker falcon, a hardy generalist predator with a variety of attack tactics, that became very popular in comparison with the other large falcons. For example, the *gyrfalcon*, which lives mainly beyond the Arctic Circle, does not tolerate the hot and dry climate of Arab countries, and its immunity, formed in the sterile conditions of the Arctic, cannot cope with the abundant pathogens typical of the arid zone. The *peregrine falcon*, the world's fastest bird, lags behind the saker in the range of hunting tactics; in addition, the former specializes in hunting from the air while the bustard either runs on the ground or flies very low. The *lanner* and *laggar* are smaller in size than the saker; like the peregrine falcon, they are not so versatile hunters, which is why their value is lower. As a result, human pressure on the saker falcon populations became so strong that they could not resist.

Hunting for falcons

The first to fall was the European population of the saker falcon. You will see why it happened if you look at the map showing the falcon's former distribution. Its nesting range was never part of the territory of Arab countries, so the local sheikhs' needs in these birds could only be satisfied by import. Libya, Syria, Iran, Afghanistan, and Pakistan became the exporters. Here one would catch not only nesting birds but also those that arrived for the winter, mainly from European countries, the European Russia, and western Kazakhstan.

According to official data, the annual export of these falcons from Pakistan alone was in those years 1700 individuals, while the local nesting population of saker falcons was about a dozen pairs only. Literally in a quarter of a century, 96% of the European population of saker falcons, as well as the "resources" of the importing countries, were exhausted.

By the 1990s, virtually no one was left to catch in the wintering areas. Saker falcons had survived only in the east of their range, i.e., wherefrom the birds did not fly to the "dangerous" countries for the winter. Unlike the western population that lives in the forest-steppe, the eastern one lives in the steppes, semi-deserts, and highlands, where the birds can lead a sedentary lifestyle or migrate within their nesting range. But even that did not save them. Having lost their profitable business in the homeland, the hunters turned their attention to China and Mongolia as well as Kazakhstan and Russia, which opened their borders to foreigners after the collapse of the Soviet Union.

In the 1990s, the years of severe economic hardship, rumors spread that Arabs were paying hundreds of thousands of dollars for a saker falcon. People began poaching birds, nestlings, and clutches from nests. Moreover, they caught not only saker falcons but all birds of prey: kestrels, harriers, kites... Poachers dreamed of getting huge sums of money

for feathered predators, but they lacked experience and knowledge about the birds' needs and the intricacies of their catching and keeping, so most of the birds died either during the capture or initial homestay.

Less than half of the birds taken from the wild would reach the dealers, most of them being in a deplorable state. Such "goods" were sold for next to nothing; only a few birds reached the end customer (Nikolenko and Karyakin, 2007). During that period, the nesting populations of the saker falcon in the CIS countries suffered the maximum damage; i.e., about 90% of the breeders were lost. Many other raptors suffered, too, along with the saker falcon.

Finally, in 2004, the saker falcon was put on the IUCN Red List as a threatened species. However, the pressure on the population did not go down; one would only switch to selling wild-caught falcons in the shadows. Estimates based on data from falcon veterinary clinics in the Gulf States suggest that even after the ban on international



bustards, and falcons. Furthermore, falconers used to adhere to certain traditions and taboos, which prevented them from causing substantial harm to bird populations.

Everything changed in the 1970s, when the Gulf oil boom began, followed by a massive economic growth. Falconry flourished again in the Arab world, where it became an even more elite activity. Modern falconry for bustards, as well as capturing raptors themselves, used such means as private aircraft and high-speed cars, thus putting at risk birds worldwide. Ancient traditions transformed into rituals deprived of their original meaning.



Adult Siberian saker falcon (subspecies *F. ch. saceroides*)

trade, their annual import amounted to 5,000–9,000 birds. Of these, only 2,000 individuals were officially purchased from breeding centers and about 500 birds were caught under license. All the rest were exported illegally from countries where there still were populations of nesting falcons.

The year 2014 saw the announcement of the 10-year Saker Falcon Global Action Plan (SakerGAP). However, by that time, almost half of the bird population that remained at the beginning of the 21st century had vanished.

The most vulnerable

Poaching to serve the needs of falconry hunters poses a threat not only because of the overall population decline. Poachers pursue targeted capture, which removes the best individuals from the population, impoverishes the gene pool, and changes the sex ratio.

Big money is paid for birds with rare plumage colors, such as pure black or white. White saker falcons were always few in number (about 2%), but now they have almost disappeared. The last Russian white falcon was

seen in Tyva in 2002, and the very last white falcon was caught in Mongolia around 2012–2014. Rich sheikhs treat these birds simply as an exclusive rarity, but for the saker falcon, these are unique genetic variants that could help this species adapt to changing conditions, occupy a new ecological niche, or survive a possible natural disaster.

Also outstanding was the virtually extinct population of saker falcons from the European forest-steppes. These falcons differ in plumage color from their eastern counterparts; i.e., the color of the upper part of their body is uniform, without speckles. Fortunately, the western saker falcon did not fully disappear. Previously, this falcon nested throughout the north of its former range; further to the east, it was mixing partially with other subspecies. It is right there, in northern Kazakhstan and southern Siberia, where this falcon survived. Some populations also survived in Europe, e.g., in the Pannonian Lowland and on the Crimean Peninsula. Here the birds switched to a sedentary lifestyle and thus escaped the terrible fate of their migrating counterparts.

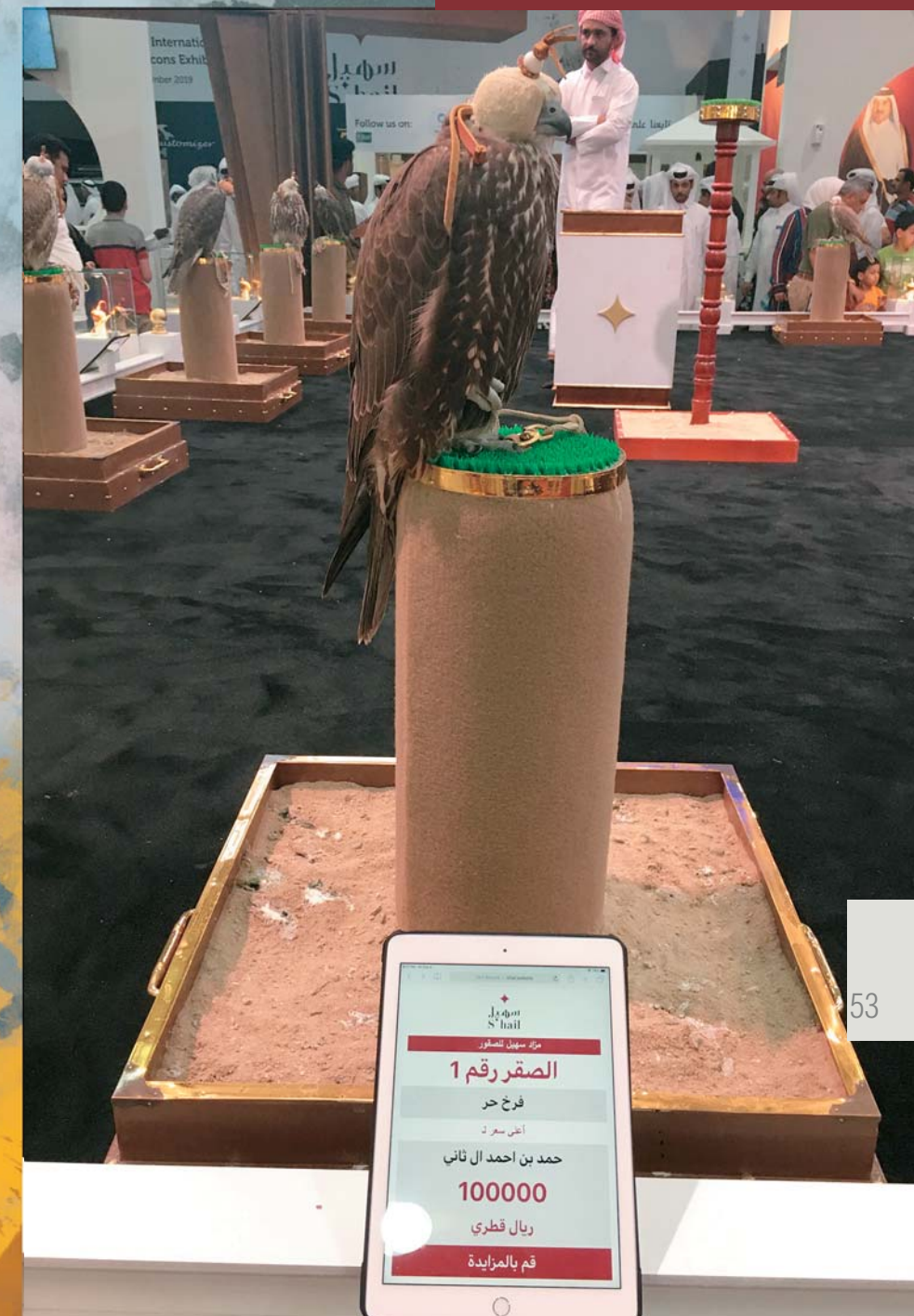
It should be noted that poachers primarily catch females, which are substantially larger in size than males, like in all birds of prey. About 93% of falcons imported to Arab countries are females (Fox *et al.*, 2003); hence the heavy imbalance in the sex structure of the modern population of saker falcons. Many nesting sites are occupied by single male birds, which sometimes cannot find a mate for years. Adult birds with no partner attract adolescents for nesting; i.e., attempts were recorded of breeding in pairs with two-year-old females and one-year-old males (Nikolenko *et al.*, 2018). Normally, saker falcon males begin to breed at the age of 3 years, and females at the age of 4.

The change in the sex structure of the saker falcon population would not raise so much concern if it led

to the predominance of females. This species is flexible; the surviving males could form *polygamous* groups with

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Saker falcon at a raptor auction in the Emirate of Qatar. September 2019.
Photo by N. Ongarbaev





Raptor auction in Qatar.
September 2019.
Photo by N. Ongarbaev



These poached saker falcons
were seized during transportation
in the city of Kant (Chui region,
Kyrgyzstan). 2004.
Photo by A. Kovshar



several females and thus increase the population numbers (Karyakin *et al.*, 2007). But in a situation of only one female per several males, the population does not reproduce itself.

The bitter irony of the situation is that it cannot be resolved naturally. Arabs do not keep the falcons till the end of the birds' lives, following the custom to replace them with new ones after each hunting season. This tradition comes from the times when falconry was not a barbaric pastime for the rich but a way to survive. Back then, people caught two- or three-year-old adolescent falcons but never fledglings, which have a lower survival rate, or adult birds, which could participate in reproduction. Now, poachers target primarily first-year falcons; also they often catch adult, reproductively active birds.

After being kept in captivity for a long time, the saker falcons are literally thrown out into the desert, which gives them almost no chance of survival. 95% of the released birds die because of the unusual climate and stress. In these conditions, the falcons, which were taught nothing but killing, start to exterminate each other. But even those few that manage to survive have little chance of returning to normal life. Former hunting birds with a broken psyche, which have lost the ability to understand their kin, can pose a big threat after becoming wild.

This is especially true for individuals who were raised in captivity. Since birth they have known no other representatives of their species. Consider a female raised to orient on humans, which treats them as its sexual partner and has been killing other birds throughout its life, do you think it will perceive wild males as partners? Or as prey? If so, does the male have a chance to escape from an aggressive and larger individual? Most often, the answer is no.

There are but very few examples of released falcons adapting successfully in the wild. Increasing the efficiency of returning falcons to wild life requires huge funds and a large number of specialists in a very narrow field, i.e., zoopsychology and ornithology combined. Moreover, all the efforts need to be coordinated at the international level. However, even the above-mentioned SakerGAP does not provide any instructions on what to do with the "used" birds.

Mutilated gene pool

As already mentioned, by removing pointedly from the population the most unique and rare birds, poachers have undermined the genetic diversity of the saker falcon species. By the way, the genetics of this falcon remains insufficiently understood, except for the *mitochondrial genome*, and the research results did not show any significant differences between the currently distinguished subspecies (Nittinger *et al.*, 2007). Obviously, one should look for these differences at the level of the nuclear genome, but while the studies continue, the world population of the saker falcon is rapidly losing living carriers of the genes. Many regional populations can only be studied using museum specimens.

Subspecies of the saker falcon differ from one another not only in their habitat but also in their morphological



Unique dark-colored Altai saker falcons, distinguished by their increased resistance to hunger and stress, occur in the Altai–Sayan region only. The photo shows nursery-born saker falcons of the Altai morph, which were released into the wild. The falcons were born in the nurseries Vitasfera (Moscow) and Altai-Falcon (Barnaul)

characteristics, primarily their coloration. However, "pure" populations of one subspecies are virtually nonexistent, with the possible exception of the *Ustyurt* and *Tibetan* ones. Other populations include mixed pairs; in addition, a huge zone exists in South Siberia with three main types of coloration and a whole range of transitional variants. It is here, in the region where different forms mix to generate various combinations of features, that one should expect the highest genetic diversity of saker falcons.

Indeed, the Altai–Sayan region gave birth to a unique black Altai saker falcon, which is found nowhere else. Dark younglings appear in the offspring of mixed pairs of different subspecies. It is believed that this morphological form

is a manifestation of the archaic features of the falcon' ancestral form, which are common to the saker falcon and the gyrfalcon (Potapov and Sale, 2005).

However, science does not yet know exactly which genes are responsible for this coloration and what *pleiotropic* (multiple) genetic effects are associated with it. Studies on other melanistic bird species showed that such individuals usually possess a number of physiological advantages. The pleiotropic effect of the genes associated with dark coloration influences the birds' immune function and social behavior; carriers of these genes are more resistant to stress and more efficient in regulating their energy balance, which allows them to better tolerate hunger (Galvan *et al.*, 2010; Roulin and Ducrest, 2011; Johnson *et al.*, 2012; Kim *et al.*, 2013). All these traits may enable them to be pioneers in the development of new, harsh habitats and lead the survival race.

It is these unique birds that became the main poaching target in the Altai–Sayan region. Buyers in the black falcon market prefer them not only for their beauty but also for the resilience with which they endure difficult transportation conditions. As a result, in 2018, saker falcons of the black Altai morph accounted for only 3% of the total population in South Siberia while in 1999–2010, a dark color was observed in about a fifth of all falcons nesting there.

Such a loss of genetic diversity may cause a decrease in the overall adaptability of the population. Today's rapidly changing climate makes the issue even more acute. In addition, the level of *inbreeding* is growing rapidly due to the fragmentation of the bird's range, which is why small nesting populations, especially in Europe, are now isolated from the main one. If you add to this the widespread gender imbalance, you will clearly see that unless the situation changes, the saker falcon may soon come to the notorious evolutionary bottleneck. Will the species get through it? This is hard to predict.

Stemming the tide

Since 2017, the Russian Raptor Research and Conservation Network (RRRCN), with the participation of the World Around You Foundation and the new Russian environmental foundation Nature and People (*Природа и Люди*), has been implementing a project to restore the saker falcon gene pool in the Altai–Sayan region. Within the project, it is planned to release nursery-raised Altai morph younglings into the wild.

Since the very beginning, there were no controversy about the release method; i.e., nestlings from the nursery were to be placed into the nests of wild pairs. Knowing how carefully falcons treat their offspring, there was no doubt that not a single foundling would suffer and the pair of wild sakers falcons would put all their skills



Project to restore the saker falcon gene pool in the Altai–Sayan region was launched in 2017 at the RRRCN experimental sites





Construction of an artificial nesting platform

into raising the young raptor and teaching it to survive in the natural environment.

Choosing the Altai birds guaranteed that descendants of the falcons once taken precisely from that place would be returned to their native habitats. Since there are yet no finalized methods of genetic certification for the saker falcon, this was the only way to ensure that the birds would be fully consistent genetically with the natural population.

However, before sending a streamlet of “fresh genes” into the population, one had to consider other factors, such as power lines, habitat destruction, pesticides, etc., that could compromise the project.

As early as at the end of the last century, some steppe regions of Russia and Mongolia began to experience, with the collapse of the Soviet infrastructure, an apparent lack of good nesting conditions for raptors. Birds had to nest in one place and hunt in another, which increased the mortality rate in the offspring of those parents that spent much time away from the nest in search of food.

This was precisely the time when the first experimental sites were set with RRRCN artificial nesting platforms. These structures allowed raptor populations to penetrate

To feed the nestlings, you do not need to wear a special outfit or use tweezers, you just need to place the food into the nest and leave. This what the male usually does too. It brings the prey and throws it onto the nest unless the female is nearby. It is the mother that feeds the nestlings if they are too young to tear the prey themselves. *The photos show females with their own offspring and foster young on the nesting platform (right) and in a nestbox (bottom). Photos from camera traps, Sibecocenter/RRRCN*



WHEN STEPPES ARE GREEN

In the late 2010s, adverse effects of the global climate change began to manifest themselves ever more conspicuously in the populations of steppe raptors, primarily due to the increased frequency of storms and thunderstorms during the nesting period. In the recent past, June thunderstorms lasted no longer than 2–3 days, and downy nestlings, sheltered by the mother, could wait out the bad weather. However, for several years in a row, June has seen prolonged thunderstorms, often with hail, and adult birds have to leave their offspring to find food. Left alone, nestlings die from hypothermia and injuries caused by hailstones.

In July, when birdlings have feathered, another misfortune comes. At this time, the steppes suffer from drought, and the burnt and dried vegetation cannot provide reliable shelter for rodents and small birds. These are the circumstances conducive for young raptors to take flight and learn to hunt independently. However, due to the increased humidity in July–August in recent years, the steppe is overgrown with a fresh grass cover, which effectively conceals potential prey.

This makes hunting so difficult that even if skilled parents manage to feed their offspring before they leave the nest, the young raptors can no longer master the intricacies of hunting. The outcome is starvation and increased interspecific aggression between raptors, which begin to hunt one another. Saker falcons attack kestrels and can themselves fall prey to eagles and eagle owls. All this leads to huge losses among all raptors, which still have not enough prey

into the very heart of the steppe and nest in very rich feeding grounds. At first, the nesting platforms attracted kites and buzzards, which were followed by saker falcons. As a result, the density of nesting raptors on the experimental sites increased by a factor of 3–5 compared with the neighboring areas. For this reason, these

Altai-morph saker falcon nestlings aged 25–30 days from the Altai-Falkon nursery (*bottom*). They are tagged with permanent rings indicating their pedigree, with colored ornithological rings for easy identification in the field, and with transmitters to track their movements



Wild-born saker falcon nestling tagged with an ornithological ring

The saker falcon usually settles on a nesting platform 3–5 years after another raptor, i. e., the upland buzzard, builds there a nest. But when it comes to nestboxes, falcons do not wait that long; sometimes, they occupy them the very next year. Since the SakerGAP project in the Altai–Sayan region is only four years old, we started it with the old, already exiting experimental sites with nesting platforms. After the success with nestboxes in 2019, we began to expand the pool of artificial nests. Thus, we hung about a hundred nestboxes outside the initial sites. Unfortunately, due to the coronavirus epidemic, we were unable to put nestlings there in 2020



Altai-morph saker falcon nestlings from the Vitasfera nursery, aged 28–34 days

sites were chosen for the implementation of the saker falcon gene pool restoration project.

When planning the project to release falcon nestlings, the developers thought out in detail all the measures to achieve their maximum survival in foster families in an area with a high density of raptors. First of all, in addition to the nesting platforms, it was decided to use special bedded nestboxes, which safeguard the nestlings from bad weather. The nestboxes can fully protect them from rain, hail, wind, or the scorching sun. Moreover, it is impossible for an eagle owl to get inside the box and harm the nestlings without risking that the enraged parents will attack the penetrator from the back.

Moreover, every season, a stock of “delicacies” – from laboratory rats and hamsters to chickens from a poultry farm – is made for the nestlings. This supplementary feeding is placed in the nests of the foster families until the young birds begin to hunt on their own. Basic supplementary feeding is given regardless of weather conditions; the portions are made bigger during prolonged rains.

These measures, i. e., nestboxes and extra feeding, helped the project team achieve 100 % survival of nestlings in foster families, which is at least 20–30 % more than in neighboring pairs not participating in the project. Unfortunately, after leaving the nest, young birds are faced with problems they have to cope with on their own. Here our team can only rely on the experience of the parent falcons, which must teach the young to hunt and avoid danger. This explains yet another project principle, i. e., to select for participation only those families that live far from other large raptors. The absence of dangerous neighbors has a positive effect on the survival of young birds as long as they stay within the boundaries of their “native” area.

Once the young birds fly away and set out on their post-nest migrations, the project team is faced with an increasingly urgent task of protecting them from



In mixed falcon families, supplementary feeding enabled much higher survival rate of the young than in the neighboring pairs not participating in the project. The photos show foster falcon families with their own offspring and Altai fosterlings of different ages (about 26 to 37 days)

poachers lying in wait for the birds at their rest stops and also from bird-hazardous power lines. The latter still stretch for many hundreds of kilometers in the steppe regions of Russia, although Russian law forbids their use. Our team has long been working to combat this threat and achieved success in such regions as the Altai krai and the Altai Republic, where dangerous power lines have been reequipped. The next target region is the Republic of Khakassia.

A more difficult task is to deal with foreign catchers who enter Russia to illegally catch young birds. They hire agents from the local population, who collect information about the birds' migrations, participate in catching the birds, and organize bird homestays on their farms. It is not easy to catch these people red-handed, but it is possible to interfere with their actions. Volunteer crews vigorously patrol the areas where the catching is supposed to take place, constantly scaring off poachers; all the data collected

by the volunteers are delivered to the police and operational customs.

Russian authorities take very serious measures to prevent illegal exports of animals. They even put together a list of especially valuable species, the smuggling of which is as dangerous as the illegal trade in weapons or drugs. This list includes falcons – the saker falcon, gyrfalcon, and peregrine falcon – and the golden eagle.

However, birds themselves fly freely everywhere, disregarding state borders. So when our falcons fly out of Russia, all we can do is to keep our fingers crossed, watch the signals from the beacons set on the birds, and hope that they will return to their homeland safe and sound. Observations of tagged birds have shown that, starting from the age of two, saker falcons from South Siberia can lead a sedentary life. This observation is encouraging – if so, the chances that our “alumni” will survive to reproductive age increase significantly.

In 2018, news spread around the world about a sensational sale that took place on the black market in Pakistan.

A saker falcon of the Altai morph, caught on the wintering grounds, was sold for an exorbitant price. It was our falcon, from South Siberia. In that very year, the bird was tagged with a colored ring D-037 and fixed up with a tiny radio transmitter.

According to the tracker signals, D-037 successfully left the nest, stayed for while within the nesting area, and then slowly flew through Mongolia, Kazakhstan, Kyrgyzstan, Tajikistan, and Afghanistan to Pakistan. As soon as it got there, it was caught. This became immediately clear when it first “made a stop” in a village and then “flew” back north, making stops in residential buildings and at gas stations...

We immediately contacted our colleagues in Pakistan and began the chase, and our partners from Nature and People engaged the staff of the Pakistani branch. But the rescuers were too late. The falcon ended up on the black market in the city of Kulachi, where it was sold to an Arab buyer. Law enforcement officials failed to prevent the deal, but the reseller was taken into custody. He returned the tracker removed from the bird and named the price for which he sold the falcon. Being a record breaker, it was featured in many media outlets, astonishing the minds of people who were far from the topic.

We also know other details about the falcon that was sold. It was born in a nursery; moreover, it was a male falcon, not a female. Is it at all possible that an Arab would pay such a high price for a bird one could purchase legally in Moscow for 30,000 rubles (i.e., a hundred times cheaper!) with a full document package? Or is it an advertising ploy to entice as many people as possible into illegal hunting? The truth is there are now almost no birds left to catch...

Altai fledgling born in a nursery and raised in the wild



References

Karyakin I.V. Subspecies population structure of the saker falcon range // *Raptors Conservation*. 2011. N 21. P. 116–171.

Karyakin I. V., Kovalenko A. V., and Novikova L. M. Registration of polygamy for the saker falcon, Kazakhstan // *Raptors Conservation*. 2007. N 8. P. 79.

Karyakin I. V., Zinevich L. S., Rozhkova D. N. et al. The first results of the project on restoration of genetic diversity of the saker falcon populations in the Altai-Sayan region, Russia // *Raptors Conservation*. 2017. N 35. P. 176–193.

Nikolenko E. G. and Karyakin I. V. Falcon trade on the border of ages: myths and facts // *Raptors Conservation*. 2007. N 8. P. 12–21.

Fox N., Barton N., and Potapov E. Conservation of the saker and falconry // *Steppe Bulletin*. 2003. N 14. P. 28–33 [in Russian].

Shnayder E. P., Nikolenko E. G., Karyakin I. V. et al. The results implementation of a foster parents adoption method for restoration of the saker falcon population in Russia (with the results of GPS/GSM tracking of fledglings) // *Raptors Conservation*. 2018. N 37. P. 66–94.

Bravo C., Bautista L. M., García-París M. et al. Males of a strongly polygynous species consume more poisonous food than females // *PLoS ONE*. 2014. V. 9(10): e111057.

Kim S. Y., Fargallo J., Vergara P. et al. Multivariate heredity of melanin-based coloration, body mass and immunity // *Heredity*. 2013. V. 111. P. 139–146.

de Nie H. Replacement and adoption in a Hobby *Falco subbuteo* nest // *De Takkeling*. 2014. V. 22. P. 133–147.

Nittinger F., Gamauf A., Pinsker W. et al. Phylogeography and population structure of the saker falcon (*Falco cherrug*) and the influence of hybridization: mitochondrial and microsatellite data // *MolEcol. Apr*. 2007. V. 16(7). P. 1497–517.

Potapov E., Sale R. *The Gyrfalcon* // T&A Poyser. A. C. Black/Yale University Press. 2005. 360 p.

Roulin A. and Ducrest A. L. Association between melanism, physiology and behaviour: a role for the melanocortin system // *Eur. J. Pharmacol*. 2011. V. 660. P. 226–233.