MAKING LOVE IN KRKONOŠE

KRKONOŠSKÝ NÁRODNÍ PARK
MAB

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Making Love in Krkonoše a Look under the Covers of Breeding

Sexuality, especially in humans, is a never-ending topic. Evidence for this includes thousands of songs, from the serious to the vulgar and the tens of thousands of hours of romantic films and serials, always on the theme of she wants him, but he doesn't want her, or vice versa. As soon as any study on this subject is published it fills the pages of tabloid and broadsheet newspapers. Have you never read articles of the type: Does alcohol help during lovemaking? Which jobs carry the highest risk of cheating? Psychology of infidelity – 10 tips on behaviour which will give you away..

To claim that none of us had seen such an article would be the same as to claim that only one pair of each terrestrial species survived the mythical flood of the world, and they all fitted on a single ship. Hardly anybody would have believed that.

We humans do not think about animal sexuality so much (as we are too busy thinking about sex with our own species), but the fact is that we can find interesting, or even bizarre animal sex stories to tell. Mating lasting dozens of hours (door snails), rape (chimpanzees), reproductive organs on the neck (snails), group sex (toads and frogs) – all of these would be hits.

When the leading Czech natural scientist and promoter of natural science Julius Komárek wrote his book "Milování v přírodě" (Lovemaking in Nature) in 1947 he certainly never expected that his book would be in demand in libraries more than two decades later. The reason was in the name, which plenty of pubertal boys, including the author himself, misinterpreted and reached for it. Lovemaking in nature, but this time limited to Krkonoše, still has its charm. Let's have a look under the lid of the reproductive strategies of a selection of representatives of the Krkonoše fauna.

We humans can imagine sex between certain animals, especially mammals, quite clearly. If we are lucky we can even see dog reproduction on the street from time to time, usually accompanied by the owner running around, waving their arms and screaming "Stop it! It's disgusting!", when neither the dog nor the bitch think "it" is disgusting at all. Other creatures have, from a purely human and anthropocentric perspective, extremely bizarre reproduction, which hardly anybody has witnessed, partly because the creatures are extremely rare. It is not rare to observe their reproduction because of its short duration (often the opposite is true), but because few people would think of "spying" on a 17-millimetre-long snail living under the bark of a tree. This is the case with the Krkonoše door snail, which we describe below. In other cases you cannot avoid hearing the sounds of lovemaking in the forest. What about the rutting red deer in the autumn, when the sound of the combined bellowing of the stags carries for miles and miles?

Different colouring on the beetles is an indicator of their age

Damned Bark Beetles – The Icon of Conflict between Conservationists and Foresters

It is only fair to say that the spruce engraver beetle (Ips typographus) is famous for causing "calamities" in the Šumava mountains (Bohemian Forest), the "ecological activists" who chained themselves to the centuries-old spruce trees and the politicization of the whole case. The bark beetles did not only stay in the wood, but entered into discussions in the parliamentary benches. This passionate discussion is led by people, many of whom have never seen the subject of their "interest".

In the 1970s when large parts of Krkonoše were "decorated" by hectares of dead, dry forests and emission clearcuts, nobody tied themselves to a tree because of a creature called

a bark or engraver beetle. However, this does not mean that they did not live in Krkonoše. A few decades earlier the engagement chambers of the engraver beetles would be shown as proof of the existence of an “evil imperialist beetle” that would not originate in the US like the Colorado beetle, but was certainly spread by “wicked imperialists from West Germany”. Not many people know that the spruce engraver beetle is not the only bark beetle “devastating” our forests. Foresters are also monitoring the double-spined bark beetle (*Ips duplicatus*), the bark beetle *Pityokteines spinidens*, small spruce bark beetle (*Ips amitinus*) and a whole range of their relatives. But it is still true, that the spruce engraver beetle has taken the most hits.

When the cold winter temperatures leave, roughly at the end of April, the bark beetles begin to swarm. The basic conditional factor is the ambient temperature, so the higher the elevation where the beetles live, the later they swarm. The signal that the right time has arrived is when the temperature of the bark and leaf litter reaches 14 °C

Spruce Bark Beetle

Trees cut after bark beetle attacks

Galleries chewed out by Spruce Bark Beetle

and higher. Until this occurs the beetles happily rest hidden away under the bark of the trees, before emerging and searching for weakened trees in the surroundings, where they start work on the first of several steps necessary for preserving their gene fund: drilling engagement chambers.

The beetles avoid attacking dry and dead tree stumps as they need to get into trees with sufficient sap. From the perspective of movement, they are lazy creatures, with an adult flying no more than one kilometre in its lifetime. All stages are capable of hibernating, including those which did not complete their feeding into adults in the autumn. To catch up on what they didn't manage to do last autumn, they emerge 1–2 weeks earlier and feed themselves up on the fresh bark on the trunks or broken tips of trees. The main task is to hollow out a chamber and throw out the pulp. This is not a safe or easy job, because the tree defends itself by releasing resin and many male bark beetles get trapped and die in this sticky "amber", which changes the originally balanced gender ratio. Thus it is not surprising that those which survive have a chance to gain more than one partner. So do you already know why some of the grub holes have more than one engagement chamber? The engagement chambers are also carved out of the bark, so that when the bark is stripped off, they are not visible in the sap.

As well as preparing a chamber, the male must find a fiancée; otherwise his work would go to waste. For this he uses his beetle perfume, or pheromone attractor. The idea of having two beetles hidden from the outside world beneath the bark and locked in loving desire is funny, but that is the case. Well, almost. A loving connection occurs in hiding, the beetles turn their abdomens to each other, because in one chamber under the bark it is rather a tight fit for two beetles. The female then starts to carve out tunnels, where she lays her white, oval-shaped, less than 1-millimetre-long eggs in notches along the sides. There are usually around 60, but a female lays around 200 in her lifetime. After 6–18 days the curved, legless, white larva with a distinctive brownish, protective case on its head, hatches from the egg. Development of the larvae through all phases may take up to 3 months, with the speed of development again depending on the temperature. If the larvae increased in size several times over, they would look like the huge sago grubs, which aborigines from Papua New Guinea love to feast on. However, these are barely 2 mm long and even in their third and last instar they are no giants, measuring 5–7 mm. Their further development in a 5–6 mm-long chrysalis lasts around a week. It is white and if you look closely you can see their future external organs plus two extra spikes on the end of the abdomen. Then all that is left is the final miracle of birth – the little beetles are white at first, before turning brown and starting to eat. It is clear that after such a complicated and energetically demanding development they must be very hungry now!

Even Insects, from Geometrid Moths to the Marbled White Butterfly, Have a Right to Love

One of the phenomena in the Krkonoše nature is the rich meadows, on which millions of perfect transformations take place every year. We will not brag about the perfection of nature, but only describe "ordinary" types of transformation, from egg, through larva and pupa, to an adult imago. This is called a perfect transformation by biologists. In an imperfect transformation there is no pupation stage.

The Geometrid Moth *Psodos quadrifaria* ssp. *Sudetica*

Mating Marbled Whites

Yes, in our selection of sexual practices the butterflies are next in line. In 1918 J. Sterneck described a subspecies of butterfly with yellow stripes. The geometrid moth *Psodos quadrifaria* ssp. *Sudetica* is a local endemic species, which means that it lives nowhere else, but you should be able to recognize it from this description. In the identification key they write that: "*length of front wing 11–13 mm. Dark brown wings with a strong orange marking. The male reproductive organ has a pair of clasping organs to hold the spematophore and insert it into the female*". See how the "willy" is important for geometrid moths. Copulation does not take place in the air, but after landing when the male and female turn their abdomens towards each other and they join. They can manage this in a vertical position, like on the stem of a plant, or in a horizontal position on a flower or leaf.

The female lays tiny white eggs, from which unattractive black-brown caterpillars with an arrow shape on their backs and a whitish stripe along their sides hatch out. This sun-loving (heliophilous) butterfly, and its caterpillar, which fights its way out of the egg, has a relatively wide spectrum of food plants, so they will not go hungry, even in the conditions on the Krkonoše tundra.

Another example could be the marbled white butterfly (*Melanargia galathea*), which unlike the geometrid moth *Psodos quadrifaria ssp. Sudetica,* is a widespread butterfly. It flies over meadows of

different degrees of cultivation, but can also be seen around railway embankments. When laying eggs she has relatively specific behaviour – when the word "lay" is not the correct description. She does not actually lay eggs but bombards the ground with them.

The fertilised female sits on a high place on vegetation, bends her ovipositor and at the moment when an egg is about to be emitted from it, she takes off quickly and the egg falls on the ground, where the overwintering caterpillar eventually hatches from it. You do not have to catch the female in the act of "egg bombing" to know that it is her. The butterflies have a distinct sexual dimorphism, where the underside of the males' wings are white with grey to black markings, while females have yellow wings with brown patches. Both males and females have small spots on the underside of their wings and the upper side of the wings are black with white patches. Adults fly in one generation in June and July, but you may meet older examples in early August. The caterpillar hatches from the eggs laid freely in the undergrowth in about 3 weeks. They are not too colourful, being yellow-green in colour, densely covered in hairs and decorated with a pair of protrusions on the last segment. The first part to peel off is what remains of the egg case. They enter hibernation without further feeding, hidden deep in the grass. When they awaken from their winter sleep, they feed in the daytime, but later, due to the risk of being eaten by predators, they prefer to feed at night. The larvae have two colour variants – either light green or light brown. In this year they can only expect to feed on soft grasses, such as timothy grass, and to hibernate. Certain butterfly experts claim that they need to feed on fescues, heath false-brome or upright brome, which are sources of flavonoid colours. Before pupation the caterpillars move to the underside of the stem.

Whereas the caterpillar, governed by its appetite and survival instinct, is voracious, the pupation phase is peaceful. The pupa does not travel anywhere, does not eat at all, but under its surface unbelievable things are happening. We are only exaggerating a little when we say that the body of the animal breaks down and rebuilds itself into a completely different, winged form. It is a little like the sexist joke, in which a massively overweight, middle-aged lady is looking at her folds of flab and dreams of falling asleep as a chubby caterpillar and waking up as a beautiful butterfly. In the case of the marbled white this complete transformation takes around three weeks.

Nature has many miracles, but the transformation of a caterpillar into a beautiful butterfly, and not just a tropical beauty, is undoubtedly one of the most amazing.

Marbled White butterfly

Krkonoše Door Snail

Krkonoše Door Snail – Marathon of Lovemaking

What could be interesting about gastropod breeding? You would be surprised! We will only have a look at one species, the Krkonoše door snail (Cochlodina dubiosa corcontica) from the Clausiliidae family. It is an animal which every creature in our highest mountain range may envy for the duration of its lovemaking. From its name we can tell that it is a unique member of the Krkonoše fauna, an endemic species. This means that if you do not visit Krkonoše or its foothills, the chances of observing their (not only sexual) lives are reduced to zero.

It is generally true that the species diversity of gastropods increases with the presence of an alkaline/calcareous element in the ecosystem. Logic tells us that on granite bedrock the snails have nothing to build their shells from. Calcareous elements can be found in Krkonoše; profitable quarries were opened and operated in the vicinity of Lánov in the past and you can visit today's already restored lime kiln in Albeřice. If you are going to look for our door snail, wait for damp weather and head for mixed forests where limestone is present (e.g. Rýchory – Vodovodní údolí, or Bártův les near Mladé Buky). You will have the greatest chance of finding them in decomposing fallen trees, where door snails can often be found under their bark. If we exclude the winter season (which lasts for a bloody long time in some parts of Krkonoše), their breeding season lasts for the rest of the year. This means that, unlike certain other gastropod species, the door snails do not wait to make love in a specific breeding season, dependant on the photoperiod or specific temperatures. Pavel Tachač, who has been

monitoring these creatures for several years as part of his thesis work, observed the earliest breeding on 10th April, while the last copulation was witnessed on 28th October. If there is something which influences the door snails desire to breed, it is not the season of the year or the photoperiod (part of the 24-hour cycle, when it is light, which is especially important for green plants, due to their ability to photosynthesize), but the specific microclimatic conditions, such as the humidity and temperature of the habitat, which creates a number of "reproductive peaks" – or periods of increased sexual activity during the year. This reflects the warmer days after periods of higher rainfall. Door snails, just as our other snails commonly do, survive the winter season by hibernating (winter sleep). As soon as they wake up, they are immediately "hungry for love".

But the most interesting events are still to come. The great majority of people think of all creatures with shells as "snails", and the general belief is that they are hermaphrodites. But, with a few rare exceptions, this certainly does not mean that they are able to fertilise themselves. In order for copulation to take place, two hermaphroditic individuals have to meet, go on a "date", and "admit" each other to their bodies. This must be at a really intimate distance, because door snails breed "face-to-face", which is the only way possible, without their shells getting in the way. The courtship looks almost human, with both partners cuddling up together, so that they can pass their spermatophore, which is nothing more than a "package" full of sperm, into each others' spermatheca. At this moment both individuals "act" like males, who just have – in human terminology – a rather strange way of ejaculating.

The vast majority of people consider "human" actions to be normal and what goes beyond normal as "strange". In an anthropocentric exaggeration it is written that: if the world perceived the door snail in a similar way, human sex games would be "abnormally" short in duration. When a suitable combination of factors occurs (temperature, humidity, presence of the second individual), and the door snail starts to make love, it does not cease for at least half a day, when the penis actually penetrates the other individual's body. This is not the case with some species of exotic amphibians when the male puts his spermatheca on the ground, and the female crawls along behind him and "sucks" it into her body for fertilization. For humans the very location of the door snail's penis is bizarre – not on the middle or lower part of the body, because this is hidden in the shell, but right behind the head. Therefore, this "face-to-face" position is an unconditional necessity for the successful exchange of genetic information. The period of sexual coupling is at least 12 hours, but it is no exception that they work actively on their future offspring for an entire 24-hour cycle. This species almost certainly belongs to the iteoparic door snails, which means that, unlike the semi-parsian species, the snails pass through more than one breeding season in their lives. Adults, or door snails capable of copulation, live for several years, so it would be a shame to have sex only once in a lifetime.

But then the eggs must be fertilized in the body, which is a task for females. However, changing roles and changing gender are not problems for the hermaphrodites. "*If we stay in Bohemia's woods and fields, our gastropods are born from eggs. The adult gastropod usually lays its eggs into a hole*

in the ground, which it can excavate itself, or perhaps in wet leaf litter or under the bark of a tree, etc. It is of great importance to put the eggs where it is going to be damp, and where they can develop", is how Lucie Juřičková from the Department of Zoology of the Faculty of Science of the Charles University in Prague described the secret of the birth of small gastropods, when speaking on Czech Radio. The individually laid eggs are finely translucent, milky-white and just over 1 mm in size. As far as the time of egg laying is concerned, this species takes its time. If they find a suitable damp shelter, they can lay eggs one week, or more than two weeks, after fertilization. How long does it take for a young door snail to enter the world on its own foot? Incubation lasts for an average of 18 days, but the actual time varies in accordance with the specific microclimatic conditions.

And as a bonus at the end of this chapter, here is one unusual feature of the door snails. While the overwhelming majority of gastropods (with extremely rare exceptions caused by mutations, which are particularly sought after by shell collectors) are right-turning, the door snails have left-turning shells. Please regard this as a tip to help you distinguish door snails from other snails. As much as it may seem that the Krkonoše door snail is a separate species, experts are still wondering whether this is true or whether it is only a subspecies of the door snail *Cochlodina dubiosa*.

In any case, they agree that it is a neoendemic species, which travelled here from the Eastern Alps in the Holocene (evidence of shells found in calcareous Holocene sediments in Krkonoše).

The Krkonoše Door Snail lives in old, near-natural deciduous or mixed forests

In the spring the newts head for the water to breed

Alpine Newt – Ichthyosaurus Lives on ... and Breeds

Before you start writing to the KRNAP Administration about how can they afford such a gross mistake in a popular educational brochure – hold on for a moment! Yes – the ichthyosaurs, the fish-lizards, were actually an extinct group of highly adapted water reptiles, who lived under the water surface for most of the Mesozoic (about 245 to 90 million years ago). But Ichthyosaura alpestris is neither reptile nor extinct. Some time ago, scientists in the Latin professional nomenclature for their "ichthyosaurus" also renamed the Alpine newt living in Krkonoše. The original name we probably remember from the school – Triturus alpestris – was no longer valid.

A common rule of nature is that a male is larger than a female, but with this species this does not apply. Females reach up to 12 cm in length, with the males 3–4 cm shorter. Alpine newts live on dry land as adults, and only mate in water. As soon as the water in the pool warms up a little, the newts begin to move slowly along the bottom and then begin to swim with their limbs pressed against their body.

The mating takes place in April–June (when you consider that April in the Krkonoše Mountains is often still relatively cold), and the mating season lasts for such a long time, among other reasons, because different age categories mate at different times. The intensity of mating is related to the water temperature. These cold-blooded amphibians are simply stimulated into mating by the warmer water. What is strange is that, at too high a temperature, the males interrupt their mating, as if they have lost their appetite, which is indicated by the loss of their glossy colours. One of the male's mating behaviours is blocking the paths of the females – he simply stands in her path – which means that she must stop or at least slow down and change direction, but in any case she must notice him. Given that in the same period the males are beautifully coloured, they really cannot be overlooked. Their backs are adorned with a beautiful trimmed fringe that is easily recognizable to the layman's eye, and a blue stripe stretches across the hips to the tail. In short, the males try to be as prominent and as attractive as possible for the relatively inconspicuously coloured females. Is this just an enlarged male ego endowed on him by Mother Nature? The female is also courted with the help of attractants that the males discharge into the water. "*The female responds as if she were under the influence of drug*s", said lead researcher Franky Bossuyt, a biologist at Vrije Universiteit Brussel in Belgium. "*We were convinced that if we put a plastic toy that would move at the right speed, she would follow it*." His belief was based on an experiment which involved putting male hormones into the water and then putting two females into the aquarium to find out how they responded to "male chemistry" in the water.

If he actually succeeds in stopping the female, he does not hesitate and starts copulating, giving a relatively energetic performance. He bends his tail at an angle of 180 degrees and begins to shake it sharply. If he considers that the female is receptive to mating, he releases his spermatophore that the female then sucks into her cloaca.

Incidentally, not only colouring or DNA, but also sexual behaviour is one of the factors that differentiates the Alpine newt from other closely related species, such as smooth newt (*Lissotriton vulgaris)*, Carpathian newt (*Lissotriton montandoni)* or great crested newt (*Triturus cristatus)*. After fertilization, the female will lay 100–190 eggs in the pool, which she most often sticks to the leaves of aquatic plants, but if there is a lack of plants, she has no choice but to lay them on the bottom. It only takes a few warm days. Experts say that with water temperatures of 20–22 °C it takes 8 to 9 days for the 6–8 mm long larvae, capable of independent movement, to hatch out. The larvae are brown to black in colour with bright spots and as soon as they reach 14 mm in length, the first finger appears on the forelimb.

Mating newts

The salamander's body is decorated with yellow spots or stripes

Fire Salamander – Unmistakably Yellow and Black

Unlike the newts, the fire salamander (Salamandra salamandra) does not lay eggs, but the female releases the live larvae, which have developed in her body from autumn to spring, directly into mountain stream. When it comes to mating, it is completely different for male salamanders, than for our frogs. In contrast, he is the one who crawls under the female, carrying her on his back, whereas in the opposite case, it is the male frog that travels into lovemaking as a passenger on her back.

He uses this opportunity to restrain (block) the front legs of the female and keep her in that position for a while. At the same time, by rubbing against her cloacal area, he shows the female shows that he is ready to drop the spermatophore on the ground. This, as expected, is a conical, gelatinous shape and between 5–8 mm in size.

The female then picks up the spermatophore into her innards, so the male, certain that he has completed his mission, releases the female and leaves. The larvae develop within the female, and cases have been reported when a female that was only fertilized once has released larvae in two consecutive years. Shortly before being born,

the offspring hatch out of their egg cases. However, the ambient climate plays a major role in the development of larvae. As part of an experiment, a “pregnant” female was transferred to an aquarium with controlled conditions. The transfer took place in November, and viable larvae were deposited within a few days.

The females can even delay her “delivery”, in the case that there is no water source where she could release her offspring, which was once again tested in experiments. The larvae release was delayed by six months. Salamanders usually give birth at night, so there are only a few naturalists who have seen this in the wild with their own eyes. In addition, the female is able to “measure” it so that she does not release all the larvae at once, but may return to the water source even during several days. How many offspring can one female have? Literary data vary, but the most common “range” is between 20 and 70 young. The youngest female capable of reproduction, with sperm in her cloaca, was two years old, but more commonly the “new mothers” are three years old. When her “maternal moment” arrives, the female walks into the water

Fire Salamanders are especially active at dusk and at night, while hiding in the daytime

stream, so that her front half rests on the shore and the larvae are released into the water. Being born as a salamander larva means fighting for your life from the first moment. We cannot write from the first breath, because the larvae breathe through their feathery gills. Nevertheless, they are predatory creatures that will even eat their own siblings if necessary. How big is such a newborn salamander? Its length varies between 23–36 mm. This was confirmed as the result of measuring 98 larvae that hatched in the Olomouc region. The stage as a free-swimming larva lasts about 3 months, so in August the young salamander is around 6 cm long when it sets out on its terrestrial journey for the first time.

If you would like to see the fire salamanders with your own eyes, it does not make much sense to set out on a day with azure blue skies, because these amphibians prefer the damp. So, if it is after the rain and you go to places with clean water (creeks, streams) and ideally with deciduous or mixed forest, so you have a good chance of seeing them. But the most abundant salamander populations live in the Beskydy Mountains and on the Czech-Slovak border. It is considered to be a severely endangered species, although locally it can be relatively abundant. However, the words of Col. D. W. Bright in Čapek's "War with the Newts" (Salamanders) are certainly not valid: "*Only male newts should be sold or rented out so that they would not be able to reproduce outside the farms and incubators belonging to the company.*" So if newts or salamanders are part of our nature in their own way, they may also be seen as the property of society. That is why they fall under the protection of the law.

How did Karel Čapek really perceive the reproduction of the salamander in his popular novel? "*At the time of spawning the male approached only one female and pursued her quite brutally; when she escaped from him he beat her with heavy blows of his tail. He disapproved when she tried to take food and drove her away from it; it was clear he wanted to have her just for himself and simply terrorised her. Once he had discharged his milt he threw himself on another female and tried to eat her, so that he had to be taken from the tank and placed somewhere else. This second female nonetheless produced fertile eggs, numbering sixty-three in total. Miss Kistemaeckers noticed that the cloaca of all three animals was very sore, and she writes that fertilisation of the ova of Andrias Scheuchzeri seems to take place not by copulation, nor even spawning, but by what she called the sexual milieu. If we had a hundred newt couples together in a tank it would be tempting to think that a hundred individual acts of mating would take place; but in fact there will be just the one, a collective a sexualisation of the given environment or, to put it more precisely, the acidification of the water to which the mature eggs of the species will respond by developing into tadpoles. If this unknown acidification agent can be created artificially there will be no more need of males.*"

Our salamanders cannot do without the males, but the fact remains that Čapek's somewhat bizarre idea of such a kind of procreation is not unknown in nature. There are species known that reproduce parthenogenetically (i.e. without the fusion of male and female cells). This concerns some amphibians, as well as some reptiles which favour this method.

Bullhead – Fish without a Swim Bladder

The swim bladder, which in freshwater fish forms 7–11 % of the volume of the fish's body, is missing in the bullhead (Cottus gobio). It is a small fish of the trout zone growing to 12 cm, which spend most of its life under rocks. This has its ecological justification, because by changing the volume of the swim bladder the fish adjusts the specific weight of its body and adapts to the different pressures when passing through different depths, which the bullhead does not require in its way of life.

The Bullhead is a little fish of the trout zone in European rivers

They spend most of their lives under the rocks

In the Czech Republic, the bullhead is classified as vulnerable on the Red List. In general, it is an indicator of quality, i.e. water purity, so its presence in the Krkonoše Mountains is definitely a good sign. This means that we do not find bullheads in still or slow-flowing or poorly oxygenated waters, simply because they would suffocate. While it may seem that sexual life and its reproduction associated with the birth of new life is a boring affair with fish, the opposite is true. In the case of bullheads, it's not only the rather complicated attraction of a partner to the mating site, but the preparation of a nest and even the parental care for their offspring, which is not so common amongst the fish species. But let's watch the loving tenderness of the bullheads step-by-step. Bullheads live for about 10 years, but they can become sexually mature in their first year of life.

Spawning takes place in the spring months (March – May depending on the locality) and means that the female lays 100–700 eggs of about 2.5 mm in diameter. This bullhead caviar is yellow in colour and is sticky, which helps to attach the eggs to stones in places where the water flows. But no stone is like another stone – the females are choosy and the males know it, and so they try to lure the females into suitable nests. Even in the case of bullheads, it turns out that the size of the body has an effect on mating success;

large females are not satisfied with small males. In addition, the bullhead boy has to actively catch the “mother of his future children”, which means nothing less than minor violence, including ritual bites to the head. If he succeeds, the female swims into the nest he has chosen, where after the ritual dances that are part of the “engagement” ceremony, she lays her eggs. The male, or father, must guard the eggs throughout incubation, meaning until the fry hatch out. This involves not only their physical protection, including the intimidation of potential visitors, but also the aeration of the water by waving his fins. If a father is experienced, he builds a nest at a location where the stream flows through, providing fresh oxygenated water, but at the same time, there is not enough flow to rip the glued eggs off of the rocks and carry them away. At that time he voluntarily goes on hunger strike and does not receive food for the whole time. Perhaps, with the occasional exception of eating an elusive egg, so it actually becomes an occasional cannibal. As strange as it may sound, evidence of this cannibalism was provided by analysis of the stomach contents of bullheads that were captured and killed for scientific research.

Females spawn under rocks on the bottom, which means that scientists describe the bullhead as a lithophile (lithos – rock, philia – love). The male milt is similar in its internal structure to sperm intended for internal fertilization; however, the fertilization is external. The movement of the bullhead appears rather funny due to the absence of a swim bladder – it looks as if it is jumping along the bottom, using its own tail it as a “springboard”.

The Bullhead is a bioindicator of water purity

Storks' nest with young with white downy feathers

Black Storks are not Immigrants

In contemporary Czech society the word "black" has become marginalized. Part of the majority "white" population look at their "black" fellow citizens, either long-term residents or newcomers, down their noses. Luckily, storks do not think in this way. White storks (Ciconia ciconia) do not care about the black ones, even though their relatives are quite rare.

Whereas white storks have got used to cohabitating with humans and a large stork nest is often the pride of the village, the black stork (*Ciconia nigra*) loves peace and quiet and certainly does not seek out human company. They are more suited to forest complexes, which in the case of Krkonoše can be positively documented by their breeding, for example, in the Rýchory area. As extensive monitoring of migratory routes has shown, our black storks fly to warm up in Africa for the winter, and they mostly arrive back in pairs at the nesting site. The birds are big enough for them to show off at the

display grounds. They are polite and well-behaved, so that upon arrival at the nest the birds greet each other by nodding heads, both from side to side and up and down. In the case of courtship these greeting rituals gain in strength.

At the same time, they obviously enjoy circling over the nest, as if they were checking that everything is well at home. On the nest, which, just like their white cousins, the black storks repair each year (and thus it grows upwards), the pair stand up and parade around each other with their white lower tail feathers erect. The mating itself takes place at home, that is, on the nest, and they do not like having neighbours. The nesting of two pairs on one tree was proven very rarely, while the stork's white cousin actively seeks out neighbourly relations and does not mind if the neighbours can see into their bedroom. Most often the nest is placed on a tree, but it has also been found on rocks, on the ground and even on a triangulation tower.

The female most often lays 2–4 white or finely yellow-grey eggs with dimensions of about 60 x 53 mm, which is slightly larger than the "classic" hen's egg. The weight of the laid egg ranges from 83–86 g, or less than the "ten decagrammes of salad" that many of us have for breakfast. Black storks are definitely not vegetarians. Stomach analyses reveal that they love fish, but they do not turn their noses up at frogs, snakes or lizards either. The parents take turns on the nest, which

The Black Stork is a black bird with a bronze sheen and a long, red bill

Black Storks build their nests on tall trees

in practice means about five weeks of warming eggs and another two months of worry with feeding the hatchlings. The youngsters are capable of flying when aged 55–60 days, but they usually leave their nests even later; ornithologists state the time they spend in the nest as 70–73 days. And it takes three more years before they mature sexually and can try to continue their species and family.

While adults have beautifully red beaks, this is not so for newly-hatched youngsters. The development of the beak colouring was described by Pavel Čech and Václav Vilimovský as follows. "*About five-day-old chicks have yellow bills, with the root being orange. At the age of 30 days, 2/3 of the beak from the tip was yellowish-grey, in 12 days (age 43 days) the original yellow colour only covered 1/4 of its length. At the age of 60 days the chicks' beak gained a greyish (olive) colour throughout. At 45 days of age, the young storks stood for long periods on the nest, practicing comfort behaviour, trying without launching with their feet, to fly over the nest by passing the air under their extended wings. Such older chicks grow stronger and often vocalize while pulling at the nest materials and walking around clapping their bills. The youngsters react to the arrival of a parent with loud chattering and flapping their wings. The parent that remained with them on the nest regurgitates smaller food items at the edge of the nest, most often fish of around about 10 cm (gudgeon, roach, chub etc.). The larger food items are eaten again by the parent, which then regurgitates them again an hour later. When they are 10 days old the chicks are able to swallow larger food items, around 20 cm and longer than their necks."*

If you believe that the stork chicks beg for food from any shadow flying past, you are mistaken. For example, they did not respond to a passing heron. Some elements of the behaviour of the parents towards the chicks are touching, for example, the parents shade their chicks in bright sunshine, or heat them if it is too cold. But if it turns out that there are too many young, the parents will start terrorizing the weakest youngster. The youngster finds itself at the edge of the nest, stops receiving food and eventually dies and is thrown out of the nest. The chicks in the nest are fed about once per hour, which puts relatively high demands on the parents.

Black Grouse – Resident of our Border Mountain Ranges

With this species let's start from a conservation point of view with some rather politically incorrect information. This is a very tasty creature. According to catch statistics, the grouse was most successful around 1910. Later in the 20th century, radiotelemetric observations showed that the home territory of the cocks ranged around 144 hectares. If we want to apply human or Christian values to this bird it completely ignores the fourth and tenth commandments (Thou shalt not commit adultery and Thou shalt not covet thy neighbour's wife).

The Black Grouse has a striking red comb above its eye and a lyre-shaped tail

And let's admit that this strategy fits the black grouse (*Tetrao tetrix*) like a glove. It is a socially-living, polygamous bird. If we look in the encyclopaedia, we will find that the "polygamy" is explained as multiple marriage (from the Greek gamos = marriage).

If we want to regard the courtship as the beginning of a proper relationship, in the case of the black grouse, we have to go to the lekking grounds, the place where the males display themselves, both in ritual and real duels. If one of the lekking grounds has proven successful, it may be used for decades – even for over half a century. Ornithologists and hunters know that it is usually located on the edges of fields, forest clearings and glades, at a place which is visible from afar. Displaying in dense forest could mean that all the effort would go to waste.

Males gather at the lekking grounds early in the morning, sometimes even before dawn. The actual "showing off" expends a lot of energy, but on the other hand, this is about preserving the species, so the males must not show any fatigue. Just remember what many human teenagers are willing to do to win the girl of his heart – if we stay with the zoological terminology – persuade her to agree to copulation. "*The lek takes place on the ground, only exceptionally on the trees. After landing the male cries out his mating call in a sharp, hissing voice (with the first syllable stressed), opens his wings, erects and spreads his tail, ruffles his feathers and pumps up his neck. His beak is open and by shaking his wings, he jumps around or flies up high. This is followed by the second phase, the so-called bubbling; the tail is tilted even further back towards the spine, the neck stretches back along the spine, and he makes a throaty sound similar to guttural vocal bubbling. At the same time, the males walk, run, jump and fly up. Both phases can take turns, or one of them may predominate. Males may take up central or fringe positions on the lekking ground. The central male on the lekking ground then takes care of 85–98 % of the copulation",* wrote the authors of "Fauna of the Czech Republic" in the section dedicated to this species. This year's young male grouse "virgins", also take part in the party, but their party is more about practice than a real effort to get a girlfriend.

We already know what the males will do for love, but what happens next? After all, it is necessary to include the lady grouse in this game. She has to choose the location of her future nest, which is an extremely responsible task. Being "only" a grass or a feather-lined bowl, it must be perfectly hidden from predators. Its diameter usually does not exceed 22 cm. Development of eggs in the female is quite rapid, so she lays her eggs about 10 days after successful fertilisation, mostly during May, exceptionally at the end of April. They are light yellow-brown, ochre to reddish with dense dots. Only the females sit on the nest, the males seem to feel that they have done their work on the lekking grounds and their duty has therefore ended.

The same applies to the care for the young, so it is possible with some ornithological exaggeration to say that the grouse are fairly "raven-like" (absent) fathers, regardless of the fact that ravens live long-term in stable pairs, whereas immediately after mating on the lekking grounds the cock grouse looks around for his next female

Hen and cock

conquest. Incubation of the eggs takes 23–25 days, which coincides with the time of the greatest supply of caterpillars. It was just evolution that arranged it as best as it could.

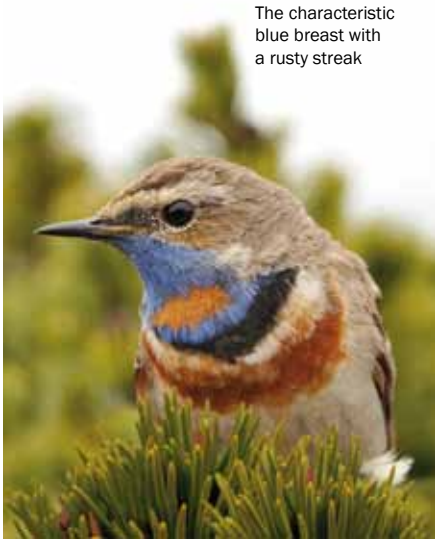
The youngsters are active and curious, and are already training their flying skills at the age of one week. They are not very successful, but they keep trying. In the vast majority of cases, these are not spoilt only children; exceptionally there can be up to 10 siblings crammed into the nest. Young grouse reach sexual maturity in the first year of life, but as already mentioned; the first year for males at the lek is more about training, than about actual reproduction. It is interesting that while the hens are willing to move up to 20 km away from their birth place, the cocks are either extremely lazy or extremely dependent on their place of birth; scientific observation has shown that they remain at their home locality. According to some theories, females do not hesitate to look for the ideal father of their children far from their birthplace, while future fathers know where they have been living successfully for years, and their sons and daughters will therefore be lucky to grow up in a beneficial and food-rich ecosystem. Given the promiscuity of the fathers, the hen cannot expect any help from the cock with raising their chicks. They just have to hope they have chosen the guy with the best possible genes. So the hens even stand in line to wait for their turn with the “best guy”. According to some ornithologists, young hens are inspired by the choices of their more experienced, older colleagues. This, of course, is only valid until the area is “overgroused” (there are too many males). Black grouse have also entered into human folklore, such as in the Alps, where the lovers of traditional Tyrolean dances dress and dance in the style of the displaying cock grouse.

The Krkonoše peatbogs with pine scrub and dwarf spruce are their second home

Bluethroat – The Most Beautiful Czech Singer

Nightingales have been well respected in the Czech lands throughout modern history. Songs about them were praised during the First Republic, the communist era and last but not, from the indisputable phenomenon of the 41-times winner of the Golden Nightingale award Karel Gott, who has remained in the centre of attention through two regimes. Even one of the two Czech Nobel Prize winners Jaroslav Seifert wrote unfavourably of them in his poem 'The Nightingale Sings Badly'. Maybe some of the lovers embracing at the side of a field also heard the nightingale singing. Nevertheless, naturalists know that the most fantastic and most elegant of the nightingales are not the English Nightingales, but the bluethroat (Luscinia svecica svecica) from Krkonoše.

Its blue breast with a rusty red star makes it a jewel, not only for its vocal expression, but also for its elegance. In our republic it lives only in Krkonoše. An interesting year in the history of the bluethroat in Krkonoše was 1977, when the tundra subspecies was first observed on the peatbog on the Pančavská louka meadow, and a year later during intensive research the ornithologists found 3 nests. It seems so "few", but for bird lovers in Krkonoše this was a wonderful piece of news, and evidence that we have another "classical" inhabitant of the arctic tundra. If you see a bluethroat, you should cherish the moment. It really is not a routine matter. In 2016 the Krkonoše population consisted of only 10 females and males.



The characteristic blue breast with a rusty streak

If we look at their intimate life and nesting habits, we will find that the older, most experienced males arrive at the nesting sites first during May. However, the timing also depends on the state of the snow cover, if it is a cold year and spring starts later, it means the later arrival of the bluethroats. The females arrive about four days later, by which time the males are singing intensely. The reasons are obvious: to announce his arrival, aurally "mark out" his territory and to catch the attention of females. Due to the low number of bluethroats in the Krkonoše Mountains, it is good to let everybody know about you as loudly as possible. Even here the proverb "first come, first served" is valid in that "he who comes first, sings first, and takes the best territory". And he takes a little risk that the weather is still too cold or winter could return. But such is the tax to pay for the male that wants to have the best territory and the best female. After arriving the females seek a hidden place for their future nest, which they start to build. In the vast majority of cases, it is placed under or between the low-growing branches of the dwarf pine scrub and is practically impossible for the lay person to find. The statistics above show that there are more males than females, which is also reflected at the nesting sites, where the ratio of males to females is 3:2. In the nesting season, the female is extremely cautious, so it is much "easier" to catch her in ornithological nets than to see her in the wild.

"The displaying males often fly up and down, or walk across the ground to the female with extended wings and tail feathers, or perch on the top of the dwarf pine scrub or spruce trees. Another behaviour which is also characteristic, is when the males bend their back so that their beak and erect tail point to the sky, and by stretching their throat they show off their breast with a star – their bent position resembles a cradle" – Bohumír Chutný and

The Bluethroat is a little smaller than a sparrow

Václav Havel describe the behaviour of males with the task of "reaching out to females". It is not uncommon for one female to be courted and then inseminated by several males.

Due to the "fast-changing" Krkonoše weather, the female does not hang about and on average lays her eggs 6 days after arriving at the nesting site. She clearly does not worry about which of them is the real father. Even if the male tries to guard his loved one, it is fairly common for her to leave him and go to her neighbour with love in her eyes and intentions. But in order not to be unjust and not to throw all the "unfaithful" females into a single basket full of human condemnation, let's admit that even the males do not try too hard to be faithful either.

However it may appear that promiscuity must be reflected in the number of young born, this is not the case. In a nest carefully lined with leaves, the female most frequently lays 5–7 eggs with an average weight of less than 2 grammes, which some females defend with a specific song if they are disturbed. It is a coarse, street woman's song, you could say that she threatens and scolds. Nevertheless, it is an attempt to defend the nest and the offspring incubating in her eggs.

The males are not such "rogues", as the otter or lynx (see the chapters on these species). If there is truly an emergency, the male will get off his behind and help to feed his female. More often, however, he sits in an elevated position, from where he has an overview of the situation and of any imminent danger. If this occurs, he heroically tries to draw attention to himself and lure the predator or intruder away from the nest. The eggs hatch after two weeks and the featherless nestlings need to be heated intensively. Especially in the unstable Krkonoše weather (on the arctic tundra the weather is colder, but without rapid swings), severe temperature drops often lead to the death of the fledglings. In normal conditions it takes another two weeks before the chicks leave the nest. However, if the temperature falls sharply for a longer time, the female stops incubating, which has fatal consequences for the unborn chicks. But even exceptionally sunny weather bears its risks. Nowadays, the topic of discussion is often global warming, which in practice means that unusually warm summers bring the infestation of the fledglings by the parasitic *Trypocalliphora braueri* fly larvae, which, together with other infections, reduce the well-being and hope of the young for survival.

Black Woodpecker – Bird of the Year 2017 and an Exemplary Father

This easily recognisable and handsome black bird with a red cap became the Bird of the Year in 2017. In his "Obecná ornitologie" (General Ornithology) Zdeněk Veselovský wrote that the black woodpecker's territory covers 100–400 ha, which is a large area. If you want to distinguish males from females, we offer an excellent identification mark.

Whereas in the male black woodpecker (*Dryocopus martius*) the top of the head is red down to the root of the bill, the females wear their red cap tilted back towards their neck. That is why the males are significantly more attractive to photographers. Mating starts relatively early, often in the middle of February. Both males and females have separate bedrooms, but often in cavities near each other. They make perfect use of their head, or bill, to drum out messages stating their position. The communication takes place by one of the pair calling and the other drumming in the nest. The female often drums on a resonant branch, which enhances the effect of her message. Mating often takes place near the nesting cavity. The couple chooses a comfortable horizontal branch (they will not balance on an inclined plane); the future mother of the

The Black Woodpecker is the largest of the European woodpeckers

family presses herself down, and shows that she is free and willing to mate by shaking her head horizontally from side to side. In most cases the male carves out the nesting hole.

Sometimes the birds are happy with the cavity and return to it every year, but sometimes choose to make a laborious move, which involves hollowing out another cavity, occasionally even in the immediate vicinity of the original hole. Most are high enough that they are almost invisible from the ground, but are also difficult for many predators to reach. Sometimes the black woodpecker begins to hollow out several cavities, which, on the one hand, damages the tree and wastes energy, but also tests the quality of the wood. Sometimes he saves energy by extending another bird's cavity. This is not an energy-efficient event as carving a new apartment takes up to 28 days and pecks out around 10,000 chips. What is strange, is that couples returning to previously used cavities do not nest earlier than those who are building a "flat" again. One would think that the time saved should be devoted to sexual pleasures. However, the brood is obviously timed in such a way that the chicks hatch at the time of the greatest food abundance, so in this case hurrying would be somewhat counterproductive.

The female often lays 3–4 white or white to finely yellowish eggs with dimensions of about 30 mm in length and 50 mm in width, and weighing 10–15 g. The female cannot cope with laying more eggs at one time, but takes her time and lays one egg per day. While many woodpeckers choose trees infested with fungi, because it is easier to hammer and carve in damaged wood, the black woodpecker does not display such a clear preference. Since the black woodpecker transmits the spores of wood-destroying fungi on its beak, it can be assumed that by hollowing out the test cavities it ensures that the tree will be attacked, which will make his later work easier. This is rather contradictory to the saying that the black woodpecker is the "doctor of the forest". On the contrary, it is a carrier, just like your colleague in work, who is under pressure from the boss to complete a task or meet a deadline, so he comes to work when ill, coughs and sneezes and passes his infection to everybody else.

The parents faithfully take turns in sitting on the eggs, which gives them the chance to get away and not suffer from hunger. One to three hours before end of their duty – they can endure it. The exception is the night when only the female sits on the eggs, but it has its logic. She sleeps in the nest with the eggs, unlike her husband. The bare and blind chicks sometimes hatch at one time; sometimes it takes up to three days, which corresponds to the fact that the female laid the eggs over a period of several days. Without feathers, the chicks are in danger of hypothermia, but in this case both parents are healthily responsible and take turns in warming the chicks for about a week. Droppings (a house-proud mother and housewife comes to mind) are usually removed from the nest by the female. After ten days the young peek out of the nest and after 26–28 days they are ready to fly, that is to leave the family home and parental care. However, the parents still accompany their young through the forest for one or two months, before driving them away, thus sending them into the world to seek their own life and their own partner.

It is unmistakable, all black, with whitish eyes and bill. The male has a red crown on his head

Endangered Falcons

Although there has been talk of falcons nesting in our country since the Middle Ages, specific data are available only since the 19th century. Only 5–7 pairs of the critically endangered bird of prey the peregrine falcon (Falco peregrinus) nest on the Czech side of the Krkonoše Mountains. When rock climbers in the eastern part of Krkonoše prevented the successful breeding of one of these pairs in the spring of 20017, it was a relatively large loss. In essence, they did nothing other than to clean the wall and its surroundings from opportunist woody plants on the rocks where the pair were nesting, riveted the rock and repeatedly climbed it. At that time the nesting falcons did not tolerate this rough disturbance and abandoned the nest. The rock, on which they were about to raise the next generation, was not a permitted climbing locality, so climbing was illegal.

The Peregrine Falcon has a typical dark "beard" on its white face

A ban on entering places where falcons nest is a common conservation measure. In 2015, the Bohemian Switzerland National Park forbade entrance to 23 localities, protecting not only peregrine falcons, but also black storks and eagle owls. The peregrine falcon is one of the species that has clearly demonstrated that nature conservation makes sense. In the past, it disappeared from our nature, but with the help of man it has succeeded in returning to it, and adapting to the new circumstances. This originally rock and forest species can now nest in the cities.

Peregrine falcons are among the species, like storks, which are faithful to their nesting site for many years. Unlike the storks, their nest is rather inconspicuous. Most often it is on a rock ledge, but it is also placed under an overhang and if there is a suitable opportunity, they do not hesitate to reuse the abandoned nests of other birds, such as crows. As if it was beneath them to build their own nest. In Germany they did not hesitate to nest on a massive surface mining excavator. Where there is no suitable nesting site, the female lays her eggs directly on the bare ground. But in the ruins of old castles, of which there are plenty in our country, there are always some suitable corners. As great fliers the peregrines do not rely on shaking and ruffling their feathers, but on impressive and elegant acrobatic flight.

During the courtship ritual the pair flies aerial pirouettes and shouts to the world that they are preparing to conceive a new generation. At this time, their calls are most easily identifiable from afar. Even though they show marital fidelity to each other, if they lose their partner they will behave as the evolution of the reproductive instinct has taught them – they will find a replacement. The peregrine chicks are never only children. At the turn of April females most often lay 3–4 eggs at two-day intervals. They are densely reddish-brown to rusty marbled in colour. Even in the matter of incubation (warming the eggs) the parents alternate, even though the females take a larger share. Scientific literature indicates that females sit

During a dive it can reach a speed of 300 km/h

In the wild they most often nest on rocky cliffs

on eggs for about 75 % of the time. The eggs hatch after 28–32 days. At this time, the father plays an important role as a hunter by bringing prey to the nest, where the mother tears it up and feeds the young. Ideal family teamwork. The fledgling falcons grow quite rapidly and after 32–45 days leave the nest, but still live nearby for some time, because they still receive supplemental feeding. The young peregrines reach sexual maturity at 1–2 years of age, and since falcons are a migratory to wandering species, with wintering grounds in western Europe (for our breeding individuals), they return to their nesting sites in during February.

As in the older history, and unfortunately in the more contemporary, cases of raiding nests to steal eggs or young are known; most likely to rear birds for falconry or commercial use. The use of DDT had an even greater impact on the falcons' breeding, which caused their temporary extinction in the Czech Republic.

Thanks to the use of this organophosphate, the eggs had a thinner shell that cracked when the birds sat on the nest. And last but not least, the highly poisonous insecticide Carbofuran, which has been banned for decades in Europe, is still being used to illegally poison and kill birds of prey.

Red Deer Rut

The sound of red deer stags roaring could even scare the inexperienced or timid visitor. However, before this happens the stags will start to use their antlers to fight each other in ritual duels of strength, which in extreme cases may be fatal. This happens, although very rarely, when two stags fight each other, their antlers engage such that they become locked together and cannot separate. With their heads together and antlers connected, first they fall from exhaustion and then die of starvation.

It is the antlers, with which each stag demonstrates his masculinity. This "organ" could have been the reason why the Irish giant deer *Megaloceros hibernicus* became extinct. Only exaggerating a little, the palaeontologist Tom Haydn says, "*If I stretched my arms out, I could fit into this length twice*." The three-and-a-half-metre-long antlers weighed about 40 kilogrammes. Irish giant deer became extinct, but luckily the red deer has survived.

In our latitudes stags begin to grow their antlers during the spring. At first they are covered with a thin layer of skin with short, fine hair resembling velvet to the touch. The blood flowing through the

Red Deer stags are characterised by their loud bellowing in the rutting season

The most typical feature of the stags is their antlers

velvet carries nourishment to the antlers, until the autumn when the blood supply is cut off, the antlers harden and the velvet dries out. The stag will then rub his antlers against trees or any surfaces to rub off the dry velvet and reveal his new, fresh and beautiful antlers, not only to the hinds (females), but also to his sexual competitors.

The location of the arena, actually called a rutting ground, is determined by the females, which are looking after fawns. It has its own logic. She knows best which places have nutritious food supplies, so that she can devote herself more effectively to her maternal duties. The rutting also takes place there. Additionally, the imitation of female sounds is a method of getting the stag into range which is used by both hunters and photographers. The deer hunting season runs from 1st August to 15th January, which is the time when the stags' antlers are most developed. I will leave it up to each reader to decide how fair this attraction method is, but the fact remains that imitating the female calls to attract males is not only found in hunting manuals, but also in myths. Let us recall the mythical Sirens, who used their calls to lure sailors into treacherous waters.

The typical bugling of an excited red deer stag has several meanings. On the one hand, it is a clear invitation to the hinds, carrying for hundreds of metres, but at the same time it is a warning to his other competitors in love. And last but not least, it can be interpreted as a macho challenge, "Who will fight me for my harem?", while only the stags who are at least partly equal to his strength will stand up to him. The young males, aware of their disadvantage, do not usually enter into battles with obviously older and stronger rivals. They know that their time of glory and having great antlers is still before them. Perhaps this is the origin of the Czech idiom to describe the infidelity of the lover "putting antlers on the husband's head" ("cornuto" in Italian) when his wife cheats on him with her lover. The stag, in fact, divides his harem into the hinds he has already had his way with and those he has not mated with yet – hinds which still have to "wait for their antlers" (somewhat in contradiction with how infidelity is perceived in the human world). It should be added that the stags have several scent glands around their body, during rutting they also use glands in the snout and the tail; at the same time the hinds produce secretions from glands around their genitals.

Scientific observation of the sperm of stags which were shot showed that the sperm from individuals with the most powerful antlers had the greatest success in fertilising the hinds. Not in the sense that they are strong enough to "manage" their herd, but simply that when used in artificial insemination, these sperm were... more successful. But it has yet another unexpected effect. Three-quarters of the offspring of the most prolific stags were sons. How can a father have the ability to change the gender ratio of his future offspring? Basically he cannot – it is the mother – the hind who decides. "*The least fertile stags father three-quarters of daughters. However, the gender ratio of all fawns born was balanced. Together the deer reproduced the same number of sons and daughters. In deer and other large mammals it is known that the sex of the offspring is strongly affected by the capability of its mother. Strong hinds give birth to more sons, because they can handle the demands of foetal growth, and they can breastfeed their son intensively. From their son grows a stag, which can easily overcome his rivals at the rut, dominate his harem of hinds and father a large number of offspring with them. The sons of weak hinds are born with a disadvantage, which in the struggle for dominance over the herd, means that they were "born to lose". A hind could not expect to see a grandson from her weak and sickly son. That is why the weaker hinds give birth to more daughters, who will certainly bring children into the world,"* explained Jaroslav Petr on the server Osel.cz.

The annual shedding of antlers looks like a great waste of energy, because every year the stag sheds something that he will need to grow again the next year. But the quality of this male decoration shows the females who to choose as their child's father. Simply put – females like the characteristics that indicate the quality of the males and those that cannot be falsified. High-quality antlers show not only fitness or health, but also their ability to succeed in life. The stag must invest a huge amount of minerals, whether calcium or phosphorus, into growing his new antlers, whatever else may happen. So the variously deformed or underdeveloped antlers "tell tales" on their wearer that something was lacking during their growth. On the other hand, healthy and heavy decorations, acquired at great physical expense, show that the stag is able to pass on quality genetic material to his offspring. In essence, the male says to his hinds: "*Do you want to have sons just as macho as me? So in that case you must have them with me!*" It is without discussion that having the largest antlers is a clear advantage in the red deer world. And if a "discussion", or fight, does occasionally take place on the rutting ground, then occasionally the size (of antlers) matters.

While there is a widespread view that the "victorious" stag manages his herd, this old "truth" is contradicted by the findings of researchers from three universities: University of London, UWE Hartpury and University College Dublin. During a long-term observation and evaluation it was found that about 12 % of the hinds practiced polyandry, meaning they are unfaithful to the stag, or "put antlers on their master's head". Hinds give birth to fawns after 231–238 days of gestation, almost always to single offspring, which suckle their mother's milk for 4 months. Twins are a rare exception. Females are sexually mature from the second year of life.

Sharp-sighted Lynx – The Most Beautiful Cat in the Czech Republic

Wherever a lynx appears in the Czech Republic, including the Krkonoše Mountains, it becomes a media star. After all, we do not have a lot of cats here, and its reputation as a hunter, an apex predator, raises some people's curiosity and admiration, but with others it awakens the need to test their strength, best of all with a rifle. Feline predators, with the exception of lions, are solitary animals, so if they want to meet for a mating rendezvous they must, at least temporarily, give up their hidden way of life and go in search of a partner. The mating season (when the cat is in heat), during which the lynx actively seeks love, comes in February or March, the pregnancy itself lasts for 10 weeks. It is no exception for males to fight over the mother of their future children, but they are non-lethal and bloodless fights.

A mating rendezvous...

Lynx do not have a natural enemy in nature, but despite strict protection, they are endangered by poaching

From the perspective of lynx reproduction, the scientists were extremely interested in one feature, the yellow body – a temporary gland producing internal secretions – which is found in the cortex of the ovaries. Its task is to produce hormones during the reproductive process. This is an interesting feature in the lynx, which other cats do not have. The large yellow body produces progestogens (hormones) in varying amounts for a period of at least two years, regardless of whether the female is pregnant or not. When a newly-born lynx kitten sees the light of day, it only weighs 250–360 g, but it immediately starts, on the basis of smell and touch, to react to its mother, it opens its eyes when it is 7–15 days old. Not until it is four months old will the kitten reach a weight of four kilogrammes, which human babies often weigh at birth. By this time the kitten is making short trips in the surroundings of its den. Although the mother first gives her kittens a taste of meat when they are one month old, she will continue to suckle them into their third month. If we were to compare the male lynx to somebody from the human world, it would be the father who does not pay child maintenance (alimony). He takes no part in helping the mother with bringing up the kids. The females reach sexually maturity at two years of age. The males have to wait for an extra year for lovemaking, although they do train their coupling movements earlier. Lynx remain fertile for a long time, usually until their death. The young leave their mother after around ten months, which means they are leaving as she comes into heat again. Nature arranged it well as felines often practice infanticide, when grown kittens are killed by the mother's new partner. So if the

The Lynx is mainly active at dusk

young lynx want to survive, it is a good idea to clear out of his way.

In the wild lynx can live for up to 17 years, so the females can bring quite a few new generations into the world. But this only applies to ideal cases, usually they die much younger. His greatest enemy is man, but of the humans the greatest enemy of the lynx is the hunter. This statement is not an attack on the armed component of the civilian population, but the result of a study conducted on the basis of a large anonymous poll. "*The overwhelming majority of hunters would support the legal possibility to hunt lynx. Since 2001, the number of hunters who anonymously confessed that they had killed a lynx has increased,"* wrote Lucie Kavanová in the magazine Respekt. Hunters undoubtedly see the lynx as a competitor; because on the basis of research in Šumava National Park, it was shown that the most frequent prey animals are roe deer (*Capreolus capreolus*), red deer (*Cervus elaphus*), hare (*Lepus europaeus*) and wild boar (*Sus scrofa*). If you are wondering if these are the same species that the hunters pursue during a hunt, then your thoughts are heading in the right direction. Obviously it is an old fixed attitude. As Alfréd Brehm wrote in his "Life of Animals", "*He hunts everything alive. He literally rages among the deer and chamois, attacks sheep, goats and calves, liquidates the black grouse and capercaillie, and is a real catastrophe for the hunting beat. He can tear down several pieces of prey during one night; legends are told about him."* Unfortunately, this is one of them, but although it comes from the pen of a renowned scientist of the 19th century, the bloodthirsty reputation of the lynx persists in contemporary society. Even without hunters the young lynx do not have it easy – a 50 % mortality rate means that only every second youngster lives to adulthood.

Fish are the basis of their diet

The Otter is a Loner

Writing that the otter (Lutra lutra) is a solitary animal is true, but it is a bit of a cliché. When we are talking about love, just as in the case of the lynx, you need to make yourself known. Otters mark their territory all year round, so if you find some droppings, stinking of fish, on a rock or other elevated or conspicuous place, ideally near the watercourse, you can be almost certain that an otter will be somewhere nearby. Otters are faithful to their marked locations, but the intensity is somewhat variable. In addition, they do not only leave droppings as markers, but also use anal gland secretions. In general, otters are solitary and they try to avoid mutual contact, except during the mating season. The scent markers are just like letters. They inform about gender and readiness for mating, which is quite important information, both in terms of conserving the species as a whole, as well as the mission of individual otters to pass on their genes to the next generation.

Otters are excellent swimmers and can stay underwater more than 5 minutes

The marking sites tend to be stable, but the intensity of tagging varies considerably, especially depending on the season (mostly lower in summer, higher in autumn and winter, possibly in spring), but also depending on habitat type, food availability and on specific individuals (their age, gender, social status, physiological status, etc.). The courtship season is not particularly long, so during the roughly 14 days, the animals must find each other, enchant one another and complete that pleasurable connection. Even if the males of this species behave rather like "evil stepmothers" and soon after copulation they "take to their heels" and disappear, leaving the mother to raise their offspring herself. The males are sexually mature at about eighteen months old, but they will not find a female of the same age for love, as the females take their time, maturing six months later. The fertile period, or estrus, is repeated throughout the year and lasts 30–45 days, but most of the pups are born in late spring and in the summer when the surrounding nature offers the most food, which means lower mortality of newly-born pups.

Are otters passionate? It may look like this: *"The first approach of partners often ends with aggressive attacks. Later the animals start to vigorously pursue each other on land and in water. The stormy courtship of mating otters is of enormous significance. During this courtship the two, normally solitary, animals, which otherwise do not like to have any physical contact with other otters, get used to each other. The reason for mutual touching and growing*

contact is the preparation for mating. The male holds the female's body by hugging her with his front legs and firmly biting the skin on the back of her neck. During mating lasting 20–30 minutes, semen is ejaculated into the vagina of the female. Otters are one of the species with provoked ovulation that is triggered by mating. The males usually mate with several females. Also females sometimes mate with other males," Michal Holeček reveals intimate details in his bachelor thesis on the otter's love life.

Gestation lasts from 59 to 63 days, and the females give birth to 1–3 blind pups; most often it is a single pup and a little less often she has twins. Triplets are a great exception. As the pups are born essentially hairless, the mother's presence is necessary to keep them warm. The otter is not stupid, so it does not leave its mark in the vicinity of the burrow. It is not necessary to draw attention to yourself. Although they leave their droppings to "mark out their territory", the burrow is not on the edge of the territory. And she already has pups, so why would she take any unnecessary risks with her and their lives. Today otters are among the species that we are pleased to see, but in the past there were laws ordering that they be killed, and even offering a "bounty" on their heads. The meat, like beaver meat, was sold or delivered to monasteries as Lenten food, because according to ecclesiastical "logic", the creature lives by the water, it feeds on fish... so it is not meat and like fish, we can eat it during the period of fasting.

Mating lasts 20–30 minutes

Do Bats Make Love Upside Down?

The widespread image of a bat wrapped in a cloak from its own wings is interesting and as catchy as a horror film, but factually incorrect. That pear-shaped form hanging by its claws and head down in a cave is a horseshoe bat. Although it belongs to the flying mammals, not every bat likes to hang around. Whole colonies of bats may be found huddled together on the ground or under a roof, not hanging head down, but just lying there like "ordinary" mammals.

Let's get to "the root" of this problem, and using a colony of the greater mouse-eared bat (*Myotis myotis*) as an example, we will approach the whole process of how bats arrive in this world. As soon as it warms up in the spring, the bats begin to wake from their winter sleep. Bats' time for love is at the end of summer, when this year's young are already flying and the mother is not worried about her offspring, so she can look for a new "groom". Bats have a relatively long penis, which together with the penis bone (os penis), facilitates penetration of the female. If we want to look at bats through the "eyes

Mating takes place twice a year in the autumn and winter

of morality", we can only say that bats are immoral philanderers, because both females and males mate with several partners during the summer. Elizabeth Crichton and Philip Krutzsch in their book "Reproductive Biology of Bats" explained that the females occasionally return to the same male to mate again. It seems that she has a favourite lover she likes to return to. At the same time, females are looking for suitable wintering sites, i.e. caves or underground shafts with a constant temperature of 3–13 °C.

After copulation, the most amazing period of reproductive biology occurs, during which nothing happens. Now that "nothing" is interesting because in the vast majority of mammals, after copulation the fusion of sperm and egg occurs and new life is created. This is not so with bats. The female is able to "store" the sperm for a safer part of the year. If the embryo was fertilized and developed late in the summer, childbirth would occur at the beginning of the winter, just before the winter sleep, during which the young would die due to a lack of fatty insulation. The female "allows" the viable sperm to reach the egg only after a few months of hibernation when her heart rate drops to 1–2 beats per minute. Exceptionally, chiropterologists (bat specialists) have even observed copulation in hibernating bats, including the greater mouse-eared bat. In 1973, the Dutch scientist S. Daan published his observations on when he watched fifteen bats of the genus Myotis copulating during their hibernation. Breeding behaviour has also been witnessed in hibernating clusters of *M. myotis* during winter in Germany. After she delivers her young the female cleans the baby by licking it. The young are born blind and hairless.

Therefore, it is no surprise that in the days after delivery, except for the night flight when the females hunt to feed themselves, the offspring are hidden beneath a fold in the female's wing. The young bat "guards" its mother, holding on with its milk teeth and paws. When the mother is getting ready to leave to hunt, she pushes and chases the youngster away, behaving in what seems, at first sight, to be a "hostile" way. Interestingly, the total time spent hunting for nursing mothers is longer than for non-pregnant females, which may mean they need an increased supply of nutrients for milk production. The temperature of the youngster, left alone during the time that the female is on the wing, logically decreases. At around midnight the female returns to breastfeed her offspring, bringing the baby's temperature back to its original level. However, not all the adult females fly out to feed, and some of them always remain with the young, thereby maintaining warmth and social ties in the colony.

The females are fairly loyal to their summer shelters, which is also passed on to their offspring, so that ideally the summer colony grows in numbers. However, this loyalty also brings the risk that if the shelter is destroyed, the bats could disappear completely from the area. This is why it is necessary to establish legal protection for these localities (often large attic spaces in churches, castles and stately homes).

Male and juvenile bats live alone for most of the summer time, while females associate in large colonies of up to hundreds of individuals. The benefits of these maternal colonies are obvious: it is easier to maintain a higher temperature for the survival

of young bats where mothers gather to heat and protect their offspring. In addition, in springtime some of the females are pregnant. If the weather "goes crazy" and the temperature falls, the females can radically slow down the development of their unborn babies. The explanation is simple: as the ambient air temperature drops, the amount of flying insects is radically reduced and all of our bats are insectivorous. Being hungry at the time of advanced pregnancy is certainly not a good strategy for the survival or healthy development of the baby. It is necessary to realize that bats are mammals, and that bat mothers responsibly breastfeed their babies. Although only for a short time, after about two months the young bats can fly and hunt, but shortly after birth they are wholly reliant on maternal care.

In the vast majority of cases bat mothers give birth to a single offspring, twins are really exceptional. The reason is obvious as when they fly somewhere, the newborns attach themselves to their mother's body, and if they were two, the mother would not be able to take off. Differences in the timing of the first reproduction have been observed in the greater mouse-eared bat. In the temperate zone, most females begin to participate in breeding only from the second year of life, with the average age of females in the summer colony being 3–4 years. It is a good idea to answer the question from this chapter: Do the female bats give birth upside down? The answer is yes they do. The birth takes just a few minutes, and the newborn bat is caught by the mother in her membranous wing, from where it climbs along her chest to the nipple.

During mating the male wraps the female in his wings and bites her to keep her in place

Does the wise man multiply wisely?

However much we would like to think that we are not part of nature, that we are "something extra", in fact, as wise people (Homo sapiens) we have fooled ourselves into believing that we are more than animals, it is the most basic mechanisms, including reproduction, that always show us that we have made this anthropocentric mistake.

Nevertheless, we do what we can to be emancipated from that ancient natural cycle. In our cultural evolution we have advanced so far that artificial insemination no longer requires the physical coupling between two individuals (meaning the loss of enormous pleasure). Our species has reached a stage where, unlike animals, it can accurately plan its copulation to the nearest hour. In summer or in winter, regardless of the weather, but with regard to a particular television programme. While it may sound bizarre, in so many households you may hear the sentence: *"Not now baby, the 'Street' is about to start."* Still, we are all "ordinary" animals and respond on a subconscious basis. We no longer sniff the surroundings of the vaginal and anal openings, as dogs or lynx do for example, but according to verified experiments we respond to our partner's "pheromone scent". We still have to join the sperm with the egg, even if we were able to create clones from our nuclear cells. But even in this case, we come across the limits of natural laws. Just like clones with exactly the same DNA, our species would be threatened by any disease that, if it could destroy one, it could destroy all of us. Growers of cloned bananas or rice know all about this. Like any other terrestrial animal, we need air, water, and, if we are not asocial individuals, we need a partner too. In each of our cells we carry the message and the memory of our primate ancestors and their predecessors from the depths of the ages. And as you can see, basically we do not differ from our primate relatives in basic biology.

We have culture, laws, we build libraries and fertilization clinics, but despite all of this, our hormones "can rule our heads". Whatever we try to do, we cannot explain love, even if both countless television shows and renowned scientific workplaces try to do so. With the exception of our closest relative, the chimpanzee, we are the only species that mates without the need to produce offspring, and on the contrary, we are the only species on the planet which actively protects ourselves against conception. While in the animal kingdom the rule is that if the females have enough food and shelter, they give birth to more offspring, in the case of human females it is exactly the opposite. More educated and richer women have fewer offspring than their counterparts from poor areas, whether they are in the African Sahel or women or girls from Brazilian favelas (slums). And despite all of this... we are still primates, for whom lovemaking makes us feel good. Our males need to show off – his car, his muscular body or the state of his bank account.

Even though we would like to deny our animal instincts at times, our emotions take us on a rollercoaster, from fear up to enthusiasm. And we are still subject to evolution. Some people are immune to the Lhasa fever, others to malaria. During the evolution of modern man, the pigmentation of our skin has changed. We can see the difference between the African and the Scandinavian at first sight, and the expert can recognise the Asian by their hair follicles. Some scientists claim that rather than genetic evolution, we will increasingly be influenced by memetic (or mental) evolution. This may also affect the field of reproduction, but it would be literally unnatural to give it up altogether. In the future, there may be pressure on genetic engineering, when some of us will want to have more sporty offspring, while others will value and seek higher intellect, empathy or artistic abilities in our future kids. But before that time arrives, let us enjoy our normal life, which includes all the plethora of reproductive "demonstrative" rituals and maternal instincts. Nature, through evolution, "arranged" that fathers "like" their newly born offspring and feel the urge to protect them. And for mothers this is true on a much stronger scale. Within the animal kingdom, we care for our children for the longest period, sometimes for decades. For some human males, who are still under the loving care of their mothers at the age of thirty-five, the unflattering term "mummy's boys" has emerged.

This moral discussion on immoral topics cannot end in any other way than with the lyrics of the song from the Czechoslovak-French animated film "The Creation of the World":

Love each other and multiply,
As the world is singing,
Love each other and multiply,
It's the film's beginning.
Love each other and multiply,
So that Eden may thrive,
Love each other and multiply,
No greater aim has life.
Love each other and multiply,
That's why couples exist,
Love each other and multiply,
The most beautiful of gifts....

Even humans have their place, or places, in Krkonoše...

Making love in Krkonoše

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