

PUBLISHER

Tetraktis d.o.o.
Ulica grada Vukovara 52c, Zagreb
phone: +385 (0)1 6176 620; fax: + 385
(0)1 6178 161
e-mail: tetraktis@zg.t-com.hr
www.croatiadivina.com

croatiadivina

EDITOR-IN-CHIEF

Miljenko Majnarić

EDITORIAL BOARD

Vido Bagur, Nikola Bašić, Ive Šimat Banov,
prof. dr. Joško Božanić, dr. sc. Srećko
Božičević, prof. dr. Vladimir Jelaska, Nikša
Petrić, prof. dr. Vlado Skračić, Stipe Surać

CONSULTANT FOR PLITVICE LAKES

Ante Bionda

TRANSLATION

Tatjana Dunatov, Sandra Kalogjera, Vanda
Podgorssek, Maja Šipušić, Janet Tuškan

GRAPHIC DESIGN

Ivana Miličić

MARKETING

Đorđe Pantović

tel. 051 621 805, mob. 098 258 327
e-mail: dorde.pantovic@inet.hr

COVER PHOTO

Stipe Surać

PRINT

Kratis L.t.d., Zagreb

We wish to thank

*The National Park Plitvička jezera
The Tourism Office Korenica
The Touris Office Rakovica*

CIP - Katalogizacija u publikaciji
Nacionalna i sveučilišna knjižnica - Zagreb

UDK 502.4(497.5)(285.2 Plitvička jezera)
908(497.5)(285.2 Plitvička jezera)

PLITVICE Lakeš / <editor-in-chief
Miljenko Majnarić; translated by. -
Zagreb : Tetraktis, 2005. - (Croatia
Divina : publication for natural and
cultural landmarks)

Izv. stv. nasl.: Plitvička jezera.

ISBN 953-95048-4-8

I. Plitvička jezera – Monografija

450718086

Copyright © 2005. Tetraktis d.o.o.
All rights reserved.



Contents

10 | A PANORAMIC VIEW

Sixteen Beauties

30 | THE PHENOMENA OF PLITVICE

When Plants Design Waterfalls

36 | THE WORLD OF PLANTS

Multifaceted Flora

48 | THE INHABITANTS OF THE LAKES

The Trout's Increasingly Narrow Home

56 | INHABITANTS OF FORESTS

Life Story of a Bear from Lika

66 | GENEALOGY

With the Warm Winds of
the Last Thawing

74 | PRIMEVAL FOREST

Pan's Virgin Corner



Life Story of a Bear from Lika

IF YOU DON'T WANT TO EXPERIENCE A CLOSE ENCOUNTER WITH A BEAR WHILE YOU ARE WALKING THROUGH THE NATIONAL PARK, WHERE IT IS A PROTECTED SPECIES, BE SURE TO SPEAK LOUD SO THAT IT CAN HEAR YOU FROM AFAR; HOWEVER, IF YOU DO COME ACROSS IT, YOU SHOULD BY NO MEANS TRY TO RUN AWAY BUT SLOWLY WALK IN THE OPPOSITE DIRECTION

Written by Đuro Huber
Photos Đuro Huber, Janez Papež

The life of a bear starts in the dark of the den. In the first two weeks of January, when the weather is most unfavourable, the mother bear gives birth to up to four cubs, mostly two or three. The newborn is blind, almost hairless and weighs about 300 grammes. Although the den is well sheltered the cub would soon freeze were it not for the mother's warm body; he lies snuggled up to it and enveloped in her thick hair. The first thing he has to do is find one of six teats of her lactic glands and suck one of the best quality milks the nature has ever provided. This milk contains 24% fat and 12% protein, a veritable energy booster and sustenance source



INHABITANTS OF FORESTS URSUS ARCTOS

for fast growth. And indeed the cub grows fast; every ten days his weight doubles. The mother licks the baby bear to keep it clean and at the same time gives it a gentle massage with her tongue. The eyes open but first views are blurred, especially as the den is dark. The hair gets longer, softer and thicker so the cub does not exclusively depend on his mother's warmth. It tries to move around the confined space of the den but staggers and falls. He climbs the mother's body with the help of sharp claws and shoves with his brothers looking for the teat that is most abundant with milk. It first makes soft sounds and gradually makes all kinds of whining sounds that turn into mumbling. While nursing it produces a distinctive humming sound in time with the fast sucking tempo.

While winter passes, the cub grows and starting April he has four kilograms and looks like a dark brown furry ball. It is not shaky on its feet any more and continually explores and pushes the limits of its abilities. This is most evident in the rivalry with other babies where the goal is to knock down the opponent and be on top of him.

A CHILDHOOD WITH MOTHER

An entire new world opens the day the mother takes her cubs out of the den. There is an abundance of unfa-

miliar sights, objects, smells, sounds and tastes. It all has to be explored immediately and without delay.

Every leaf or twig will attract the cub's attention; it will strike it with the paw, sniff it and chew it. If it comes across the remains of snow, it will slide down the slope on its stomach or back, pushing snowballs with the muzzle or striking them with a paw. It will climb the trees and play with his brothers tirelessly. When he gets tired and hungry he will make the mother lie on her back, climb on top of her, suck some of that fabulous milk and then crash out. This is a happy-go-lucky time but also a time of accelerated learning. There are also some risks and efforts to make. Mother must start eating after having starved since previous autumn. She has to move on while looking for food, which is not easy and is rather slow with the cubs behind her. They are on the lookout for whatever can be used to play with, so very often they do not keep the desired direction. While walking down the slopes or crossing the brooks and rivers they may fall or drown. However, the worst danger for the cubs is the mature males. If such a male comes across a female with her young, and he did not father them, he will try to kill them. If he does, the female will mate again that same season and

EMPTY EUROPEAN HABITAT

The brown bear used to inhabit the entire Eurasia and North America. The only places in Europe where he never lived were island, and the Mediterranean islands of Sardegna, Corsica and Cyprus. Nowadays he is almost extinct in Europe, while the remaining populations are small, far apart from each other and disappearing. The largest can be found in Cantabria in Spain with two groups of 70-80 bears and in the Apennine Mountains (in and around Abruzzo National Park) in Italy with 40-50 bears. Extremely small groups of three or four still survive in the Italian Alps (Trento) and the Western Pyrenees. The last bears in the Central Pyrenees were killed during the 1980s but the species was reintroduced in 1996 and 1997 with three bears from Slovenia. A similar reintroduction was carried out in Austria where three bears from Croatia and Slovenia were added to a sole surviving bear from

1989-1993. Today there are around 25 bears in Austria. Also, from 1999-2002, 10 bears from Slovenia were reintroduced into the Trento region in Italy. There is a plan to introduce a few bears from Croatia into the Western Pyrenees in the next few years.

The only stable population in Europe, of about 1000 bears, can be found in Scandinavia. Only two major populations lived to see the end of the last century in central and East Europe (not counting Russia). It is estimated that there are 8100 bears in the Carpathian Mountains and about 2800 in the Dinaric Alps.

A part of the second largest group in Europe lives in Croatia. The bears in Croatia, together with those in Slovenia represent a genetically identical and stable population placed farthest west and thus a possible rescue for bears in Western Europe. Genetic research, comparing base pairs of the same genes between bears of different populations show, based on the numbers of different base

thus he gets an opportunity to be a father. Of course, the mother will do her best to protect her offspring. Spring brings the first fresh plant food. When the first cuckoopints (*Aurum maculatum*) and other herbaceous plants appear on sunny meadows of the hills around Plitvice, bears find and enjoy them in large quantities. They dig out the cuckoopints together with roots and only bite off the green part of other plants. First the mother does it and then the cubs as well. By the end of April they have their milk teeth, their digestive system is fully functioning so the first solid food is really welcome. Mother shows them what and how to eat and where to find the food. The games with all the objects around have taught them a lot, so that now when they turn the stone over or crush a rotting log they can find a tasty morsel rich in protein, like insect eggs or grubs or some other full-grown invertebrate. This is how a bear satisfies his need for protein although plants represent 90% of his food.

As summer approaches Plitvice abounds with various fruits; strawberries, raspberries, blueberries, cornelian cherries and wild fruit. There is loads of food all around and the cub remembers what he had eaten and where he had found it. However, he still feeds on the mother's

At the area of Plitvice, the female bears have a habitat of about 100-150 square kilometres and the male over 200 square kilometres. These territories do not belong to individuals; they share it with 5-10 other bears



pairs, a family tree of their genetic relationship. The Croatian bears (and the ones in Slovenia and Bosnia and Herzegovina) are genetically identical to those in the Alps and do not differ much from the bears in the Pyrenees. On the other hand, the Carpathian Mountains bear and the bears from Russia and North Scandinavia differ greatly and are not suitable for reintroduction into Western Europe. All of this places the brown bear on top of natural heritage list of Croatia.

In Croatia the brown bears appear on the territory of 15700 square kilometres, while they permanently reside on the area of 10000 square kilometres in the forests of the Dinaric Alps, Gorski Kotar and Lika (across Snježnik, Risnjak, Velika and Mala Kapela, Pješivica and Velebit). They are sometimes seen in Čičarija, Učka and Žumberak. It is estimated that there are about 600 animals, maybe even 1000. Immediately after World War II the numbers were significantly smaller and they gradually increased to

reach the capacity of the habitat in the late 70s. Around 1990 the number seemed to be stable around 400. The population increased by 25% from 1997-1999 and was about 500.

The bear in Croatia is a hunted animal outside preserved areas. During the hunting season the animals are attracted by baits and shot down in line with the set shooting quotas, (10% of the estimated bear population). The numbers for the 1990-1999 period record 273 killed bears (27.3% a year), which amounts to 4.4% of the estimated population. Due to unreliable facts this number might be higher in reality. 60% of the dead bears were shot (50% killed legally and 10% killed by poachers). 17% died on roads (9.5% on the railways and 7.5 on the roads). At least 37 bears (14%) were killed during the war (minefields, shelling, shootings at the front line, traffic accidents, poaching).

milk for most of his first year. He has twenty kilos in the autumn and needs to put on even more fat to prepare him for the coming winter. Following his mother, he finds spots with plenty of food, the most important of which is the fruit of the beech tree rich in fats that he transforms into a special brown tissue. Since October, while feeding intensively the bear family look for a suitable den. It is never the one they spent the previous winter in. The mother teaches her cubs what can serve the purpose of a den space; a crevice between rocks or a hollow under a vertical rock or a space among the roots of a big tree. Naturally, such a space needs further adjustment. The bears first dig a narrow tunnel which will lead into the den. Sometimes what is needed is just a little digging to make a deeper or wider hollow while sometimes several cubic metres have to be dug out. Then they have to find and bring material to make the bed. It can be leaves or dried grass but best are fir twigs. Cubs happily climb a small fir tree and break the thin branches. When the time to den in comes the cubs protest a little while. It is not easy to stop playing and having fun. However, on a certain day in November or December, depending on the amount of the first snow, the whole family settles down calmly in their den. This is the second winter that the cubs spend in the den with their mother and this is where they will be on their first

THE DENS OF PLITVICE

The bears that were tracked telemetrically in the area of Plitvice were found to lay down in their dens six times in adapted caves, once among the roots of a giant fir tree or outside under a low spruce tree. All the dens were located on steep slopes where people rarely venture, but not necessarily far from roads or houses. Three dens were at Preka Kosa, two in the Korana Canyon, one at Seliški Vrh and still another one near Rudopolje, far outside the Park. The north-west slopes of Seliški Vrh are probably farthest from people, but dens in the Korana Canyon were less than 100 metres from asphalted roads, about half kilometre from Golubnjača cave, each year on the other side. Both of these dens were used by Lili, the first year while she was still with her mother and brother and the following year alone, when she swam across the Korana and fixed her den in the canyon near the village of Rastovača.





birthday. They do not remember the first winter and the den where they were born, but this one will be an important lesson just like everything their mother had taught them in their first twelve months. The den now feels quite crammed with the growing cubs. They sleep curled on top of each other and so keep warm. The second spring finds them ready and eager for more adventure. Yet, they will still follow their mother and feed on her milk whenever she lets them. However, the milk only partly satisfies their needs as they have a huge appetite. They grow faster than last year.

In June, when they are a year and a half old, their life abruptly changes. The new mating season is here and the mother is ready to breed once more. She is looking for a mate and drives the cubs away. They are confused; on one hand they like the complete freedom and on the other they prefer the security of her presence. The mating season lasts about three weeks and the mother will mate with several males if she has an opportunity. When it is over she will not drive the cubs away although they are not so close any more. They follow their mother but at times wander off quite far from her. When again the time to den up comes they part for good. Mother goes to her den alone where she will give birth to another bear generation. The cubs make their own dens or sometimes share it for another winter.

INDEPENDENT MATURING

In his third spring the young bear has to choose and fight for his territory. If it is a female she might stay in her mother's territory or at least in a part of it. If it is a male he has to negotiate large distances looking for a space where there are no other adult bears. All large males chase him off and this can bring him to the very borders of the bears' habitat, often close to human settlements. They continue growing fast and now weigh over 50 kilos. A female bear is fully grown at the age of 4 or 5 with 100 to 120 kilos. A young male grows even faster but reaches maturity at the age of 6 or 7 and then weighs from 150 to 200 kilos.

While growing up finding food is their main concern. Now they have no mother to show them the way but

they still have a huge appetite so they eat what they can. They go where there is a lot of food at one spot. Except visiting the feeding places in the vicinity of the national Park, they sometimes find the rubbish dumps or cultivated fields with crops. This is an opportunity for a conflict with the humans. Although their mother taught them to stay away from men, at this stage of their life young bears can easily forget it and find themselves in a lot of trouble.

SEX LIFE

Depending on her weight a young female bear could mate for the first time in her third spring at the age of two and a half. Usually, however, it happens at the age three and a half and she has her first cubs when she is four. A male bear is sexually mature a year later, when he is at least three and a half but most commonly when he is four and a half. Yet he is not likely to impregnate a female as there are older and stronger males who dominate the area.

The female in heat sends off scent messages that attract the males from far away. Several of them gather around a female and very often fight for a right to mate. In addition to terrifying growls, the bears strike with paws or bite the head (ears) and neck. The weaker party usually gives in on time, before serious injuries occur. The winner mates with the female several times during a few days and then leaves looking for another. This gives the weaker or some other bear a chance to mate after all. This way the cubs do not necessarily have the same father, which can be quite an advantage. On one hand nature encourages diversity as a means of selection. More importantly, the offspring of different fathers confuses potential cub killers and the danger of meeting a male who is not a father diminishes.

HABITAT

At the area of Plitvice, the female bears have a habitat of about 100-150 square kilometres and the male over 200 square kilometres. These territories do not belong to individuals; they share it with 5-10 other bears. The bears of the same sex avoid each other within their area but they never actively defend it, like for example the wolves do.



GOLDEN RULES FOR CLOSE ENCOUNTERS

The food left around attracts bears. It could be food left on purpose for the bears to find them (observation, photographing, hunting), food not properly stored, crops and domestic animals, leftover food; rubbish in bins and containers or rubbish left at legal or illegal waste dumps. At such places bears start associating the man's smell with a positive experience, which is not what they had learned in the past. So, a bear with such an experience might not run away when he sees a man. We say then that he got used to people, which does not mean that the bear is dangerous but such behaviour is certainly not desirable. A bear that doesn't run when he meets a man is potentially dan-

gerous because most people do not know what to do in these situations. Some will try to come closer to see him better or take a photograph, some will shoot and wound him and many will start believing that seeing bears so often means that there are too many of them. Some bears that are used to people will start doing damage on a regular basis while looking for food. This is when it becomes a problem because such bears do not live long. They perish in road accidents; get killed in the so-called self-defence or are deliberately killed. Remember, don't ever feed the bears or leave rubbish in the bear's habitat.

Do not Surprise a Bear

A sudden encounter with a bear can happen when you are walking in a thick forest, on a rugged terrain or when the wind is blowing towards you and there is some other noise in the environment (e.g. waterfalls). While you are walking around the bear's habitat make your presence loud enough so that the bear can hear you at least 30 metres away. If you are quiet you may find yourself within bear's "personal space". He might feel endangered and shocked by the unexpected surprise and could attack you as a means of defence. The situation is especially dangerous when the encounter involves a wounded bear or a mother bear with cubs. She could attempt to free the passage for her offspring by removing the man from her path. A strike of the bear's paw or the bite can be very dangerous. One should respect the strength and speed of a bear and be cautious at all times.

Do not approach the bear, especially a mother bear with her cubs

If you spot a bear do not approach him. Watch him from a distance, take photographs and slowly move away.

Do not run away from the bear

In case you accidentally come across a bear do not run. Try to move aside to give him some space and speak in a quiet voice to help him orientate himself. If you are in a company of people, stay together so that the bear does not feel encircled. If you try to escape abruptly or make a loud noise he might come after you. If there is no space or time to escape, lie flat with your face on the ground and pretend to be dead. This way you will not pose threat to the bear any more and he will leave. Sometimes, but very rarely, a bear can see man as his prey. In that case one should defend oneself with all possible means.



They leave their marks in different ways. They usually do it by clawing on the tree bark or by breaking the top of a smaller fir tree or a spruce. They also rub against coniferous trees and leave their hair and scent. The area that the bears use one year will partly be used another year as well, but they will enter some neighbouring areas while at the same time discarding parts of the already used territory. The habitats are usually so large and located in such a way that they reach beyond the boundaries of the National Park. This means that not a single bear is safe from hunting. Although the habitats are large when compared to the ones in Scandinavia or Canada, they are in fact exceptionally small. There, even female bears command the expanses of over 1000 square kilometres. In other words, it can be said that the habitat of the Plitvice bear is top quality as they can satisfy their needs in ten times smaller territory than for instance in Sweden.

RELATIONSHIP WITH MAN

If the mother bear was worth her salt, she had taught her offspring to avoid people at any cost. Of course, she could

not teach them where the boundaries of the Park are and so they will surely meet people, in the Park as well as outside it. An encounter with the man is always lethal for the bear. He can be run over on the road or on the railway track. He can be shot down during the hunting season. The Plitvice National Park is surrounded by hunting grounds and there are at least 7 feeding places not more than 1000 m from the borders of the park. Poachers will shoot at them for reasons known to them only. A special problem occurs if a bear forages for food in the garbage and other places connected with people. Such a bear loses his innate fear of man, which his mother transferred to him and will often be seen around, which means additional problems. He might do damage, cause panic among people when entering the rural places, or risk being killed on the road, maybe eat something harmful or get trapped in some rubbish. Anyway, a bear that starts behaving in this manner won't live long. "Rubbish is a bear killer!" is a saying that holds true everywhere in the world.