

What are the effects of orphanage on the behaviour of young brown bears?

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Introduction

Brown bears are the largest carnivores and have an impressive size and strength. Especially with their habitats shrinking and being divided by human invasion there are more human-bear encounters. Though brown bears are shy by nature and will in general avoid potentially dangerous contact, a female bear with cubs can react defensive and appear aggressive. Because of this, occasionally female bears are killed, leaving their cubs orphaned.

This essay focuses on the effects of orphanage on the young brown bears left behind. Even though killings of mother bears should be avoided at all cost, if orphanage occurs there are several options for dealing with the cubs. This essay also discusses these solutions and their possible effects on behaviour.

The interest in this subject comes from the year I spent in 2004/2005 in Croatia in a shelter for unwanted and orphaned bears.



Articles discussed

For this essay several articles were studied, of which six in more detail, discussing behavioural studies and experiments and different aspects of orphanage and possible solutions. The selection largely has a specific focus on brown bears.

In chronological order, Jonkel et al. (1980) discuss the options for the reintroduction of grizzly bears, a sub-species of brown bears, and describe a case of the semi-successful release of a grizzly bear cub in Montana, USA during denning season using an artificial den.

Rogers (1985) compares a range of experiments with both black and brown bears in Idaho and Michigan and also discusses the different options for dealing with orphaned bears.

Palomero (1997) follows a group of 3 orphaned brown bear cubs in the wild in the Somiedo Natural Park in Spain, comparing their behaviour with non-orphaned cubs, for a period of 1,5 to two years.

Dijk, van (2005) discusses the process, successes and failures of rehabilitation and reintroductions of bears into the wild from a broad perspective, also including abandoned and captive-born bears. In this essay only results and conclusions relating to orphaned cubs are used.

Pazhetnov et al. (2005) describes the process of captive rearing of orphaned cubs in the Central Forest Reserve in Russia. They also provide an overview of behaviour development and give guidelines how to raise them.

Lastly, Huber (2005) presents a case from his knowledge of studying brown bear behaviour on why not to reintroduce captivated bear cubs back into the wild.

Besides these main articles, several supporting articles and publications are used to provide a more complete picture. A full list of articles and publications used is included at the end of this essay.

Brown bears

General, relevant behaviour

It goes too far to provide a complete overview of brown bear behaviour. Therefore, only behavioural aspects that are relevant for this essay are mentioned here.

A brown bear, though classified a carnivore, is effectively omnivorous, needing a lot of vegetation for its survival and therefore a large habitat and much resourcefulness. Depending on habitat quality an individual bear roams a habitat of 100 to 100.000 km² (Huber, 2005), spending most time foraging. They are individualistic and shy by nature, and will avoid potentially dangerous contact with other creatures, like humans, and other same sex bears.

Another main characteristic of a brown bear is also its opportunism. They will always look for the easiest solution in foraging and survival techniques. For this reason, a brown bear that finds human food resources will remember the source and often return for more, becoming a nuisance bear (Huber, 2005). When this nuisance behaviour leads to a situation where the bear feels threatened it may become aggressive. The bear then becomes, in return, an implied threat to humans (a problem bear), often resulting in the killing of the bear.

In winter, bears build a den, where they hibernate. For survival, a safe and secure den is essential to remain undiscovered. For this a vast knowledge of the habitat is essential (Huber, 2005), however den making behaviour is proven to be instinctive (Rogers, 1985) and will also be done by cubs who have not been shown this behaviour previously.

Mother/Cub relationships

A litter is usually born in winter, during hibernation, where the average litter holds two to four cubs. The age of a cub is therefore easily estimated by the time of year. The relationship between a female bear and her cubs is one of the few social bonds between brown bears.

A brown bear cub stays with its mother for two to four year, depending on area and sub species, which is considerably longer than for other bear species. In comparison, for a black bear this mother-cub bond ends after approximately 1,5 years (Swensen et al., 1998). In this time they are provided nursing, warmth and protection. They also get to know their habitat, recognize scents and are taught foraging and survival techniques through imitation of their mother. The share of learned behaviour in a brown bear in comparison to inherited behaviour is much larger than for most other species (Huber, 2005). It is unknown why the cub stays with the mother for longer than necessary for self-sufficiency, therewith delaying the reproduction cycle (Swensen et al., 1998).

Orphanage

Causes

A mother is, in general, very protective of her cubs and can act aggressively when she senses a threat for herself or her cubs. Especially considering the size and strength of a brown bear in specific, this aggressive behaviour has led to several cases where the female bear was killed, leaving her cubs as orphans.

Other causes for orphanage are increased interactions between humans and bears. Humans invade the natural habitat of a bear looking for natural resources, construction and recreation. A division of a natural habitat through infrastructure has also led to an increase in traffic accidents.

Even though hunting for female bears with litters is prohibited in most countries, yearly several accounts of illegal killings are reported (Jonkel et al. 1980)

Effects

A general effect of orphanage, combined with the low reproductive potential for brown bears, especially grizzly bears, is a decrease in the number of bears in areas that are relatively close to humans (Jonkel et al, 1980).

The survival of orphaned cubs depends heavily on the time they got to spend with their mother and the survival techniques they have learned from her. An orphan of less than 3 months will have low survival chances in the wild (Huber, 2005).

Orphaned bears also have a higher risk of becoming habituated. They have not learned properly to shy away from humans and, in return, humans have a tendency of feeding small cubs, unknowingly triggering an effect of habituation. Through its opportunistic character the cub will likely return and turn into a nuisance bear and a potential threat when reaching an adult age and size (Rogers, 1985 and Huber, 2005).

However, for young bears that get orphaned after they already formed a connection with their mother the chance of forming a so-called following response towards humans is smaller. The risk of habituation among these bears is not significantly higher than with adult bears (Pazhetnov, 2005).

Basic survival behaviour for a bear cub like foraging, handling of food (even food never eaten before) and den construction behaviour is instinctive and not significantly affected by orphanage. Observations of 6 months old wild, orphaned bear cubs in these behavioural areas showed no difference from wild, non-orphaned bears of the same age (Palermo et al, 1997).

Options

Adoption

Until the 80s it was generally assumed that cubs could not survive alone in the wild (Rogers, 1985 and Jonkel et al, 1980) and that destruction or captivity were the only viable options. Rogers, also offers alternative solutions for abandoned or orphaned cubs, such as adoption.

Especially before emergence from the den, a foster mother with cubs of her own is likely to adopt a strange cub that is gently tossed in or near her den. This acceptance is more difficult after the foster mother has left the den as the mother then starts to differentiate the smells of her own cubs and strange ones. In these instances a phased introduction or drugging the foster mother are methods used to increase the chance of acceptance, both by mother to cub as cub to mother (Rogers, 1985).

In the 70s drugging the foster mother was a common used technique to allow a cub to nurse. This however proved no assurance of acceptance once the foster mother awoke. Other techniques used were group confinement and placement of food to stimulate the 'family' to

stay in the same environment, allowing them to get used to each other (Jonkel et al, 1980)

Self-sufficiency

After 5 to 7 months (depending on regional area) brown bear cubs reach an age of self-sufficiency and are, though not ideal, capable of surviving without a mother, especially when there are more surviving cubs in one litter and if there is enough food available (Rogers, 1985).

As mentioned, basic and instinctive survival techniques, like foraging, den making, but also lethargy and scratching up movements leading towards hibernation show no difference for orphaned or non-orphaned cubs (Palermo et al, 1997). After six months the fear response behaviour (shyness) develops in a similar fashion as well.

However, an observed difference between orphaned and non-orphaned wild cubs is that for the first year, the cubs in a litter depend heavily on each other, but go separate ways after hibernation. One of the reasons for this is that they stay close to their original den and habitat for the first year, leading to a quicker depletion of food in the area (Palermo et al, 1997). During this first year cubs even panic when separated (Jonkel et al, 1980).

Also, in the time together they spent most time foraging and less time playing than non-orphaned cubs. As there is no additional protection or mother to help provide food, they are more self-reliant, but also more stressed. This shows a disturbance in social development and a potential source of social intolerance at later age (Palermo et al, 1997).

Captivity and release

Raising an orphaned cub in captivity is another solution. There is however much discussion on whether or not captive-reared cubs can be reintroduced into the wild. Also, many release strategies are not well documented through lack of scientific involvement, not program related releases, illegal releases of habituated animals and non-documented unsuccessful attempts (Dijk, J.J. van, 2005). This makes it difficult to determine if the successful releases are representative for the overall success.

According to Huber (Huber, 2005) raising a cub in captivity, increases the individual bear's chances for survival, but will hamper their natural skill development. It will also increase dependency on man and habituation. For this reason, he strongly opposes a reintroduction of captive-reared cubs into the wild. Instead, he proposes investing in efforts to avoid orphanage, where possible. Captive-reared (orphaned) cubs should, according to him, remain captive and be used as ambassadors to increase human awareness.

The natural opportunistic behaviour of a brown bear makes him adapt easily to a captive environment, where food is provided to him. This association is not lost after release and even in a release in a habitat with plenty of food, the bear will look for easier ways to get food, and might resort to human resources (Dijk, J.J. van, 2005).

Rogers (Rogers, 1985) describes cases where it is shown that short-period raising of orphaned cubs in captivity, younger than three months has no direct effect on habituation. Longer term raising however increases the chance of habituation, making rehabilitation more difficult. She states that when human-bear contact is kept to an absolute minimum there are good chances of successful releases in the wild.

Observations between 1970 and 1990 and tests, conducted from 1990 to 2000 in Russia, show that captive reared cubs can be successfully reintroduced when human-bear contact is minimized (Pazhetnov et al, 2005). By raising the bears in a dark environment avoiding all visual and audible contact with the cubs and by making sure the unavoidable contact is only with one human person (therewith maintaining a fear response for human species in general) they are able to provide thermal and nutritional care. After three months the cubs, still with no or minimized human-bear interaction, are slowly introduced to a natural environment (a forest pen) and additional feeding is reduced to encourage foraging.

These tests show that the risk of imprinting on humans is highest between two and five

months. After three months cubs develop a short primary fear response to new stimuli, though curiosity still leads to quick adaptations and loss of fear. After five months basic foraging behaviour and basic fear responses are present and within 6 to 12 weeks this fear / shyness is fully developed (provided habituation in this period is avoided). This fear response is a prerequisite for a cub to survive in the wild and a trigger for instinctive den constructing behaviour. Based on the results of each individual bear cub the development of this behaviour determines if and how the bear cub will differ from a wild bear cub and whether or not a reintroduction in the wild can be successful.

From observations made in Spain (Palermo et al. 1997) the distinction is also made how old a cub is when orphaned. For cubs older than 5 to 7 months it is recommended to keep them in the wild as they have developed enough self-sufficiency to be able to survive and to develop in a similar manner as non-orphaned cubs. For younger cubs, captive-rearing until self-sufficiency is recommended. They recommend feeding to a maximum weight and releasing them in an area with food abundance, preferably in an area close to their original den (Palermo et al. 1997 and Jonkel et al. 1980).

A case described by Jonkel (Jonkel et al, 1980) of this method underlines this effect. In this attempt the cub was released in an artificially constructed den. Even though the cub escaped from the den to find her own den, the cub survived beyond yearling age.

A different problem with releasing captive-reared bears is a release in an area where bears are already present. Social intolerance is expected when the population increases substantially or when food supplies are limited. This forces reintroduced bears to the outer skirts of the habitat, bringing them again closer to humans. The nuisance behaviour of the released bears reflects poorly on the entire population, as humans don't discriminate between a wild and a released bear. A reintroduction in a low bear-populated area is therefore recommended (Dijk, J.J. van, 2005).

A release of orphaned cubs raised in captivity is therefore only considered successful if:

- The young bear avoids human contact and nuisance (leading to problematic) behaviour
- There is no negative effect on the local bear population (social intolerance and reduction in food)
- The released bear manages to survive for a longer period of time
- The released bear is able to reproduce successfully

It is generally recommended that guidelines for reintroduction, as set out by the IUCN, are followed carefully.

Conclusion

There is a clear effect of orphanage on brown bear cubs. The impact however depends largely on the age where orphanage occurs. When orphaned within the first two months of their lives, the method of adoption proves the most successful for a bear to ensure a natural development into the wild through a foster mother.

After the age of self-sufficiency a brown bear should at all times be left in its natural habitat. The risk of habituation and altered-behaviour through captivity is too high and will not only influence the bear itself, but also other bears it comes into contact with (social intolerance) in the area where he is released.

Though self-sufficient, the orphaned cubs will display altered behaviour. They will be more reliant on other cubs from the same litter, but will nevertheless not fully develop their social skills. Also their foraging and food handling skills, though instinctive, will not be fully developed and more difficult for them. This makes them an easier prey for habituation and finding human food resources, also because their fear responses are not yet fully developed until after 10 months and because humans have a tendency to feed small bears.

Studies have however shown that the risk of habituation in these bears is higher when reared in captivity than when left in the wild. In individual cases exceptions may occur, for example

when a habitat is close to human resources. In these cases a translocation can also be considered.

Orphanage after emergence of the bears from their dens, but before the age of self-sufficiency (\pm between 2 and 5 months) proves the most fatal. The cubs cannot yet survive and find food on their own and captive-rearing appears to be the best or even only option for survival.

Depending on the development of their behaviour in captivity the decision should be made whether or not they are candidates for releasing into the wild. It is not possible to give a general advice that applies to all bears as the success of release depends on the individual bear, the level of exposure to humans and the area (food availability, bear population, etc.) where a possible release is planned.

However, I strongly feel the focus should always be to raise the cub as if it is to be released back into the wild and their behaviour should be monitored. In this period contact with humans should be kept to an absolute minimum and limited to one person. If at the age where a release is possible they show no significantly altered behaviour compared to a wild bear they should be released in an area where bear population is relatively low and food availability high (possibly by adding additional food), preferably near their original habitat.

If release is considered too risky for the bear itself or other wild bears, for example through behavioural discrepancies or habituation, they should remain captive until at least after the first hibernation. If there is no behavioural improvement visible, the bear should remain captive and, as suggested by Huber, used as an ambassador.

Besides these individual methods of taking care of orphaned bears, efforts should be made to avoid orphanage and to create awareness amongst humans on brown bears, their behaviour and how habituation can be avoided.

Sources

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