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18/02/2011 | Author: Pia Heinemann

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Like animals in the winter switch to energy saving mode

Go in the cave - Many animals hide in the cold season. Just not all the same deep sleep: They have different strategies.

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Energy-saving animals - a life on the edge 1 of 11



The brown bear has

PHOTO:

OKAPIA

hibernation. In the warm seasons, he has diligently collected and consumed food in the winter of his supplies.

Cold are the winters in North America. Not a good time to roam around outside. American black bears undergo so back five to seven months a year in sleeping caves. Eh hardly find food now, so why the dark, inhospitable, not just spend time in deep sleep?

Bears sleep when there is too little food - as well as marmots, seven shepherds, bats and many other mammals. But really solves the winter of hibernation?

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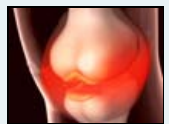
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Small hibernators, which weigh less than five kilograms - bats or rodents - to drive their body temperature in winter down considerably. You then cool for several days or even weeks almost to the temperature of the

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environment. Are they in the "torpor," a state of rigidity, they almost never respond to external disturbances. You can run away, nor defend themselves. Their breathing and their metabolism is slowed down considerably.

So they do not freeze to death, these animals are waking regularly for a few hours and take their body temperature up to the normal 35-38 degrees Celsius. These recovery times are for scientists a critical feature for true hibernation.

While reducing the cold stare time, the metabolic rates of small mammals in two to five percent of normal body function activity. "Depending on the size of the animal's metabolic rate drops more or less," now scientists write Øivind Tøien and Brian M. Barnes of the University of Alaska at Fairbanks in the journal Science. The rule is: the smaller the animal, the stronger it cool down. And the colder the animal, the more inactive, his metabolism - so the assumption of biologists. Decreases body temperature by ten degrees, slowing down the metabolism by 50 percent, write the researchers.

The tricks of the animals for winter

1 of 9



PHOTO: DPA

hedgehogs spend five months of the year in hibernation. Here, their body temperature drops to 1.5 degrees Celsius. "World Online" shows the following additional tricks how animals protect themselves against cold.

But what about the large hibernators, the bears? To find out how they weather the harshness of the winter food is scarce, the researchers in the autumn of three consecutive years, five black bears captured and the Institute of Arctic Biology at the University of Alaska transported in Fairbanks. Here they were implanted sensors that recorded their heart, muscle and breathing activity. Then the bears were in wooden boxes which were equipped with modern surveillance technology to keep her nap in the forest. With cameras and motion detectors, the animals were remotely monitored by biologists.

This monitoring gave an amazing insight: The bears slow their metabolism independently of their body and the ambient temperature. "Animals have their body temperature down 37-38 degrees Celsius during their winter sleep to an average of 33 degrees," wrote the biologist. "Less than 30.4 degrees Celsius were not measured. This can probably be explained by the fact that would take at a temperature of 30 degrees neurons serious damage. "

During their winter hibernation, the animals take neither food nor liquid, and they excrete no digestion products. "They reduce their metabolic rate to 25

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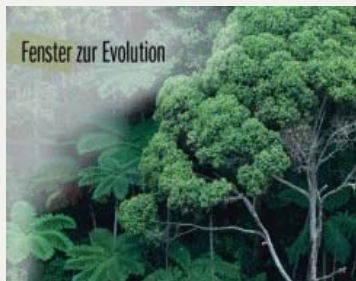
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African elephant: even the limited trade in ivory and elephant leather stored must not continue to take place. Animal rights activists have criticized the initiative of Tanzania and Zambia, because such poaching would reignited. 470,000 and 690,000 elephants live in Africa, more to the east and south.

The Bears can shut down their metabolism so almost as much as small mammals sleep, but not as durable: Between twice a day and once every two days watching the Bears on short turn around and warm their temperature to 37 degrees. Small mammals awaken more often.

The animals whose period of rest with those of most black bears are comparable, are Fettschwanzmakis. The lemurs live in Madagascar - and have to withstand any cold temperatures. From November to March (ie in the southern hemisphere autumn), they feed on reserves they store mainly in the form of fat in their tails. From April to October, they hide in tree holes and fall into the rigidity - the typical sedation in between. With them is not the decline of ambient and body temperature critical for the fall in activity. They drive their metabolism down rather active as soon as the dry season in Madagascar certain fruits that make up their main food, are no longer available.

VIDEO



How perfect is the real nature?

Also in "Science" writes the Marburg winter sleep researcher Gerhard Heldmaier ". In small mammals make active slowdown and the temperature-dependent slowing of the metabolism of each of about half of the down-regulation of the metabolism" The new study shows that the active reduction of metabolism accounts for a larger share of black bears.

"The molecular mechanisms and biochemical pathways that are affected by metabolic processes are still unclear," writes Heldmaier. General are the effects of torpor on respiratory metabolism and energy balance of the cells. In almost all families of mammals have been found hibernating - possibly maybe could be very many, if not all mammals, their metabolism and reduce long-term active.

If one could unravel the mechanisms of hibernation, this could for example be important for human victims, or for astronauts: Then, namely, one could exploit the tricks of the hibernating animals for people who must survive for a time motionless.



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