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## **Expert report on the suitability of Geo Rack I systems (manufacturer: Lanzo Herp Cages) for species-appropriate husbandry and rearing of the ball python (*Python regius*)**

### Objective of this report

In the following I will investigate if enclosures of the Geo Rack I system type made by Lanzo Herp Cages are suitable for husbandry and rearing of young ball pythons (*Python regius*) and meet the specific requirements of this species.

This expert report is necessary because the dimensions of the Geo Rack I enclosures, in particular the height, don't meet the recommended minimum sizes provided in the German expert report on minimum requirements ("Mindestanforderungen an die Haltung von Reptilien") issued 10. October 1997.

First of all I will discuss general requirements concerning animal enclosures and special requirements of the ball python. The requirements concerning the species-appropriate husbandry of the ball python will be deduced from his natural way of life. Eventually I will examine the suitability of the Geo Rack I enclosures regarding these requirements and discuss limits.

### General

One decisive factor of every animal husbandry and every guideline for keeping animals are the dimensions of the enclosure for the animal. The enclosure must provide dimensions that suit the animals' natural needs. The enclosure must be escape-proof, easy and hygienic to clean, and appropriately air-conditioned and ventilated.

To estimate the relevant "natural requirements" of a species is always a major difficulty. Often and unfortunately mistakenly the term "species-appropriate" is equated and applied with "being modelled on nature" in this context. Therefore only such enclosures are accepted as species-appropriate that aim to copy a biotope excerpt. But if we don't exactly know the lifestyle habits of a species no biotope excerpt can be as detailed enough to meet the essential requirements of the species. Inversely this means: If we know the lifestyle habits of a species we can distinguish essential from irrelevant conditions. As an example: The ball python inhabits abandoned termite and rodent dens. To live in such narrow caves gives this species a feeling of safety and protection. If we take these factors into account we must admit that it makes no difference if the den was constructed by termites or rodents. Therefore the species-appropriate qualities of such a cave can also be achieved by an upside down flower pot.

### *Python regius* in nature and captivity

*Python regius* lives in the dry savannas and forests of north-west Africa and shows a natural behaviour which is well-adapted to the natural environment. To protect themselves from dehydration and overheating these animals have developed a habitat which is unique for them: They spend most of their life underground in little caves or in hollow tree roots. Primarily these caves originate from other animals (rodents or termites). The snakes hunt, eat and mate in these underground caves and even incubate their eggs there. These caves have a balancing effect on variations of temperature, they are dark and provide a constant high level of humidity. Ball pythons stay in these caves permanently and leave it only seasonally to hunt or meet mating partners. Ball pythons are very poor climbers due to their anatomy and will be found basking in the sun on little shrub only very occasionally.

*Python regius* is the boid which is kept most frequently world-wide and probably in Germany, too. Although the species can reach an age of about 25 to 30 years most of the animals in captive care die much earlier. The commonest causes of death like food refusal or infections are just secondary signs and effects of a husbandry which is fundamentally wrong. Both matters are usually based on stress evoked by wrong cage dimensions and husbandry conditions. It is crucial to meet the natural lifestyle habits as detailed above.

Ball pythons are so-called sit-and-wait predators that spend most of their life motionless and secretly. At the same time these poikilotherm animals need a temperature gradient enabling them to thermoregulate. These two conditions must be met for species-appropriate husbandry. Eventually the structure of the equipment is crucial for the species-appropriate husbandry – much more than the absolute exterior dimensions of the cage. The structure of the cage and its setup is crucial to convey the delicate boids a feeling of safety. Many diseases like pneumonia, stomatitis and mycosis are a result of a debilitated immune system due to permanent stress resulting from lack of feeling of safety.

One of the most common mistakes concerning this matter is an excessive cage height. A substantial disadvantage of very high cages is the fact that it is virtually impossible to realize a species-appropriate temperature gradient even with excessive technical effort. Since warm air ascends heating devices must be set to levels that are dangerous for the animals to reach appropriate temperatures in the lower regions of the cage. At the same time the top regions of the cage reach dangerously high temperatures. It is much easier to realize a temperature gradient that the animals can use in a flatter, longer enclosure. Plus the gradient will be used intensely because the animals can stay “protected” by the low cage cover all the time. A horizontal temperature gradient is much more important than a vertical one. In a poorly structured cage animals can make use of a vertical temperature gradient only if they give up their feeling of safety in return.

Being a cave dweller and very sensible *Python regius* has an even higher requirement for a feeling of safety as explained before. And since the natural habitat of these animals is a cave this should be transformed into captive care conditions. In other words: *Python regius* should be kept in a “cave”, not in an ordinary cage of common understanding. It's not only sufficient but absolutely species-appropriate to keep this species in a box as flat as possible (15 to 30 cm height depending on size). Such boxes shouldn't provide insight from all sides to give the animals the feeling of safety they need. The ground area should be adapted to the animal's size, too, but even more important is a small box or solid cave where the animal can hide in close body contact.

In other countries like for example the United States or England where this way of keeping *Python regius* as detailed above has prevailed and is recommended. Therefore it isn't astonishing that breeders in those countries have overcome the known and man-made problems we're facing when keeping *Python regius* like food refusal or increased diseases.

In summary it can be said, therefore, that the majority of python species can be kept in captivity without any problem. It is most important though to offer animals husbandry conditions what meet their natural way of life. The main factors are climatic conditions and the setup of the cage rather than the absolute size of it. It seems one cause for wrong husbandry is the tendency to anthropomorphize when judging species-appropriate husbandry conditions. For example I don't have a need to stretch out to full length at all, it is rather the opposite. Even if animals can swim it isn't species-appropriate at all to create a cage that forces animals (by size or set-up) to visit a water basin. Many species react very sensible to wrong husbandry conditions. This must not necessarily to the death of the animal, the animals can survive facing a variety of conditions. But just surviving shouldn't be considered to be a sign for species-appropriateness or well-being.

But which criteria can prove species-appropriate husbandry?

One of the most important criterion for species-appropriate husbandry of pythons is constant breeding success. Opposite to other animals pythons don't breed regularly if kept under insufficient conditions. Even though this species is kept in large numbers breeding occurs comparatively rare. Wrong conditions mean stress for the animals which leads to reduced intake of food and weakening of the animals. Malnourished and weak pythons can't reproduce because the egg cycle of the female controlled hormonally by the fat content of the blood. Pythons that are kept species-appropriate like detailed above normally don't refuse ingestion except during natural fast periods during winter. In the wild pythons are opportunistic feeders that make use of every opportunity to feed. If they refuse to feed in captive care it's manifest evidence for too much stress due to inappropriate husbandry, more than likely an enclosure too big and high in which the animals don't feel safe.

## Geo Rack I

The Geo Rack I made by LANZO Herp Cages is kind of a plastic rack system each containing eight compartments with separate boxes to accommodate animals. The exterior dimensions of these drawer-like so-called „trays“ are 35 x 23 x 14 cm (length, width, height). Vent slots are applied in the upper third of both long sides. The trays are made from clear plastic and can be mounted via guide rails so they generate a closed system hanging in the rack. At the same time the trays don't stand on the ground but hang in short distance to the ground panel. Heating the trays takes place using a heat tape which is fixed to the ground in the back third of the compartment. That way the temperature in the trays can be controlled with a thermostat. The dimensions of the trays offer sufficient ground area for young ball pythons being fed normally up to an age of four to maximal six months. Corresponding to my explanations as detailed above the height of the trays is only 14 cm and relatively slim, but therefore enables to create a cave-like feeling of safety. They are visible from only one side, and there's no particular lighting scheduled. These conditions with a diffused incidence of light offer species-appropriate conditions for a timid cave-dweller like the ball python.

Heating the trays only in the back third facilitates to set a temperature gradient which allows temperature zones with several degrees variation depending on the used substrate (the thermal features of different substrates, e.g. sand or animal litter, have a great impact on the temperature conduction in the tray). The peculiarity of strong temperature gradient is supported by the fact that plastic is a relatively bad heat conductor and the heat in the back part isn't uniformly conducted to the front of the tray. In addition the vent slots allow aggregated heat and stuffy air to leave the tray. This guarantees a temperature gradient with good ventilation at the same time.

Details that are necessary for species-appropriate husbandry like for example substrate, hiding box, drinking bowl etc. are the responsibility of the user of Geo Rack I system and shall be ignored here. It must be mentioned that a Geo Rack I can't guarantee a species-appropriate husbandry, but it provides all necessary opportunities. It can be registered that the design of enclosures in the Geo Rack I offer to meet and support all requirements I have detailed as above to rear young *Python regius*.

## Objection to the export report "Mindestanforderung an die Haltung von Reptilien"

The containers used in the Geo Rack I object the guidelines detailed in the export report on "Mindestanforderung an die Haltung von Reptilien" issued on 10. January 1997 particularly in height. The expert report demands a height of 75 per cent of the total length of the animal. A young animal of 50 cm would require a height of 38 cm according to the expert report and would need to move to a higher enclosure. Due to the very special needs of *Python regius* the regulations of the expert report are not species-appropriate in my opinion. *Python regius* is strongly terrestrial and lot arboreal as mentioned in the expert report. Of course these animals can climb on a branch, but it doesn't correspond to their natural behaviour. Taking a look at the anatomy of the species it is obvious that they are not able to move securely in the branchwood, what could lead to falls and resulting injuries. Of course this scenario isn't realistic for young animals and deduced cage heights of 40. But it proves my understanding that the expert report on minimum requirements wasn't created on facts about natural lifestyle habits of *Python regius* but on rather traditional ideas about caging in German terraria. This seems to be the cause for the decisive differences between the expert report from 1997 and my report. A large number experiences prove that ball pythons which refuse ingestion re-start feeding when moved to a drawer-like husbandry system similar to the Geo Rack I, that adult animals breed most successfully kept in such a system and show the lowest mortality rate due to diseases.

As a final note I would like to express that it is much desirable to offer animals as much room as possible with a maximum of individual alternatives. In my opinion an optimal husbandry would be to offer a drawer-like system underneath a larger cage which gives the animals the opportunity to move into "open terrain", too. But the Geo Rack I offers all minimum features to rear young *Python regius* species-appropriate and even better when equipped with the right setup. In particular because of the high controllability, easy access to the animals, and the chance to keep the trays clean and hygienic I'd like to underline from my understanding of the species' biology and my longtime experience that I can only unconditionally recommend the Geo Rack I for a healthy, species-appropriate rearing of *Python regius*.

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