



ANIMALS AND MONEY

This part of BioSReports unravels interesting relations between animals and the economy.

The Economic Importance of Sawu The Elephant for Dresden Zoo

Jana Skrobanek

In Germany, zoos are incredibly popular, providing fun and education for people of all ages. While guests are expected to pay entrance fees, there are still many expenses and labor involved in caring for the animals. So the question arises: Is it actually profitable to maintain a zoo? To investigate this question, I will assess the economic importance of Sawu, the matriarch of the elephant herd at Dresden Zoo. She was born in the wild and has lived in Dresden since 1999, directly contributing to the earnings of this Zoo. To determine her individual value we have to look at the earnings and expenses of the Zoo. In 2019, Dresden Zoo had 884,270 visitors. Their entrance fees summed up to 3,534,606 €. The elephant enclosure is 4837 m² and I added an estimated 1500 m² provided by the site plan² to include the space for the zookeepers and visitor space such as walkways and safety zones. The resulting space sums up to 6337 m², or 4.87 % of the total zoo area¹. As three other elephants besides Sawu lived in that same area, Sawu's share was about 1.22 % of the total zoo space. If I assume that Sawu contributes an income that is proportional to the space she occupies, Sawu's contribution to the earnings were 45,066 € in 2019.

But what are the costs of housing Sawu? The elephant house was built in 1999 and renovated from 2015 to 2018 for 8.62 million €. In 2021, the outdoor enclosure was expanded for 750,000 €^{2,4}. With an estimated duration of 25 years this equals 374,800 € per year for housing, or 93,700 € per year just for Sawu. She is fed mostly hay, 150 kg per day² amounting to 54.75 tons per year. With a price of 130 € per ton⁴, 7,117.5 € per year are spent on Sawu's food. Dresden Zoo employs five elephant keepers², 1.25 per elephant. They are employed at payment level TV-L 6, an estimated 2843.94 € per month (Level 3) in 2019⁵. Social insurance contributions increase this amount to 3445 €, or 52,274.1 € annually. All these expenses sum up to 153,091.6 € per year to take care of Sawu. In comparison to her earnings of 45,066 € this shows that the Zoo loses 100,000 €

per year just for Sawu. It is quite clear that there is no financial gain for keeping her, and the economics are likely similar for other animals. Because of this, the Zoo in general cannot finance itself and relies on subsidies from the city council, which amounted to 2,295,000 € in 2019¹. While the Dresden Zoo may not be profitable, it still contributes to the economy, providing over 100 jobs² and additional ones due to construction projects.

It is important to know that beyond any economic considerations, Sawu contributes to Dresden Zoo as a place for education and species conservation. In terms of conservation, she is especially valuable. As she was caught from the wild her genes are not widespread within the population of zoo elephants. With the entrance fee, visitors can voluntarily pay the "Conservation-Euro" which contributes to a fund that supports several different conservation projects. One project, for example, is the Big Life Foundation for wildlife conservation in east Africa and benefits wild elephants¹. Sawu is also valuable for research. Due to her excellent training, it is possible to take biological samples, such as saliva, that would be otherwise extremely difficult to collect in the wild⁴. Zoos in general offer opportunities for research that would not be possible otherwise.

In the end, it seems there is no economical reason for keeping Sawu at the Dresden Zoo or even keeping the zoo open itself. So why keep it open? Many believe keeping animals in zoos is immoral and unnecessary. Some say zoos in general offer opportunities for research that would not be possible otherwise. It could be argued that their contribution to research, conservation and education goes beyond financial value.

1 – Zoo Dresden, Jahresbericht 2019. 2020.

2 – T. Brockmann, "Der Umbau des Afrikahauses im Zoo Dresden – Zusammenfassung und Erfahrungen innerhalb einer 3-Jahres-Retrospektive," Zool. Garten, no. 89, pp. 67-92, 2021. [Online version not available](#)

3 – personal correspondence

EXCURSIONS AND OTHER NEWS

Small insights in student's or professor's points of view, field trips, and other stuff we do.

First Graduate of Biology in Society

Nele Kheim, Sabine Klaußner

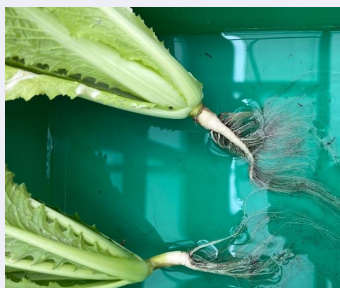
After handing in her Master's thesis "Clubroot susceptibility of brassicas after treatment with plant strengtheners", Sabine has become the first student to receive the Master's Degree of Biology in Society. She started the course in October 2021 and, after two years of hard work, she handed in and defended her master's thesis in September 2023. For her master's project, Sabine worked with the Chair of Plant Physiology, Prof. Ludwig-Müller, and investigated how brassica plants can be strengthened against a serious plant disease. Clubroot disease causes devastating damage to all brassica species around the world such as rape and Chinese cabbage, leading to massive yield losses. The fungus *Acremonium alternatum* was proven to delay clubroot infection and could be a promising option to protect brassica plants.

As part of a companies' project, Sabine tested if covering radish seeds with the fungus helps to improve plant growth by alleviating the symptoms of infected plants. Coated seeds resulted in plants that were less affected by clubroot disease, however this could not be proven statistically. For another companies' project, Sabine worked with chinese cabbage and researched if treating the plants with the plant strengthener BlackHum, combined with the fungus, lowers the plants susceptibility to the disease. Here too, the treatment did not improve health of the plants statistically.

Her results indicated a positive effect of the fungus on sick plants and helped to plan and improve future experiments in the field. Now that she has finished her Master's, Sabine plans to get some work experience outside of academia, in the big and exciting world of industry. Congratulations!



Clubroot infected chinese cabbage with typical root galls.



Chinese cabbage with healthy roots.

EXCURSIONS AND OTHER NEWS

Terrapins in South Africa - Lab Rotation

Charlotte Kricke

Species and nature conservation are socially relevant, important issues. Commonly, they might be associated with planting trees and animal shelters. What could come as a surprise, however, is that a lot of work towards species conservation also happens in the lab.

To get a small insight into this broad and exciting field, I decided to do my lab rotation at the Senckenberg Natural History Collections Dresden in the section Phylogeography with Dr. Melita Vamberger. Phylogeography, what does that even mean? Phylogeography is a field of research in which the distribution of genetic lineages of plant and animal species is studied and linked to geological events and geography. Dr. Vamberger's research focuses specifically on chelonians, with one of the current projects on eco-genetics of *Pelomedusa* terrapins in southern Africa. I had the great opportunity to participate in this project. I analysed blood and tissue samples of two *Pelomedusa* species from different sampling sites in South Africa. I analysed their DNA to determine the distribution of the two species in the region, because morphologically *Pelomedusa* species are hard to tell apart.



Pelomedusa subrufa



Pelomedusa galeata

One aim was to close sampling gaps and draw conclusions about the presence of the species. In addition, there is the exciting fact that one of the two species has strongly divergent mitochondrial lineages, with one clade subdivided into three more mitochondrial subclades. With the genetic information at hand the study could also address the question whether gene flow is present between the clades/subclades or even between the two species. Through such fundamental research and the collection of these data, reasons for the displacement of such animals can be identified in the future and measures for their protection can be implemented. Further, this helps to establish comprehensive accurate systematics of species. I am very grateful for the experience and that I could be part of this project. It was a pleasure to also get to know great people.