BioS Reports

Glimpse into the activities of the
Master's course "Biology in Society"

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EXCURSIONS AND OTHER NEWS

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

Erasmus Semester at BioS - Interview with Merilyn

Simon Schäfer

BioS welcomed its first Erasmus student this winter semester. Merilyn joined us from the University of Tartu in Estonia. How did she experience studying at the TU and living in Dresden? We asked Merilyn in an interview:

Which program do you usually study in Tartu?

My degree is called „Biology and Eco Innovation". I'm in the Chair of Teriology, where we conduct complex research on mammals and the zoonotic parasites they transmit.

Why did you choose BioS at the TU Dresden?

I have always been interested in studying in Germany and I had previously visited Dresden and really liked the city. So when I saw that the TU Dresden and its degree programmes were one of the Erasmus options in Germany, it immediately caught my attention. BioS stood out to me because it offers a similar but also different perspective compared to what is available in my home university.

Of all the things you've learned here, what will live rent-free in your head?

Definitely the Science Communication course, especially the part about creating a podcast. I found it really interesting because it's such a creative way to share scientific knowledge and I've never done anything like it before. It made me come out of my comfort zone since I'm quite shy and English isn't my main language. Learning how to effectively communicate science to different audiences is something every biology student will need.

Did you face any challenges during your Erasmus semester and how did you overcome them?

One of the challenges I faced during my Erasmus semester was talking a lot and taking oral exams in English. I am quite shy and laconic, so I was worried about losing my train of thought under pressure. But the atmosphere in the classes and exams were nice so I managed it (smiling).

If Erasmus students had a survival guide for Dresden, what would be your must-know tip?

My top tip would be to take advantage of the Deutschlandticket that comes with the semester ticket. It's a great way to explore nearby cities without extra cost, making weekend trips super easy. Plus, you can use it for your daily commute to uni, which saves both time and money.

Have you picked up any German habits that your Estonian friends would find strange?

One German habit I picked up is treating Sundays as a true rest day. In Germany, almost everything is closed on Sundays – shops, supermarkets, and people actually take the day to relax. At first, it felt strange, but I got used to the slower pace and now really appreciate having a 'pause' day. Back in Estonia, where businesses are open as usual, I don't even think about going to the shops these days.

Thank you for your time, Merilyn!

ANIMALS AND MONEY

This part of BioS Reports unravels relationships between animals and the economy.

Leaving Large Footprints: A Look into the Economic Impact of Thailand's Elephant Tourism

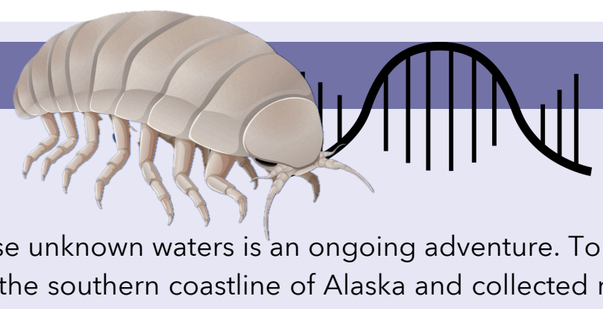
Tim Leitert

Our desire for holidays generates income and employment for millions of people worldwide. However, not only humans find jobs in this industry. All around the world some animals are used to give people an unforgettable holiday experience. One of those animals is the Asian elephant (*Elephas maximus*). Towering at heights of up to 3.4 meters and weighing between 2.7 and 5 tons [1], these animals are surely giants among tamed creatures. For thousands of years they were seen only as a source for food. However, their value and strength was later recognized, and so they began working in the tourism industry and raking in millions.

In the early 1900s, around 100,000 elephants were working in Thailand [2]. In recent years, this number has dropped to 15,000 across Asia [3] and to 3,800 in Thailand [4]. A single elephant is worth between €25,000 to €50,000 depending on age, gender and training [5], adding up to €95-190 million for Thailand. 2,700 elephants (71%) are estimated to work in tourism [4], making them worth between €67.5-135 million. In 2019, out of the nearly 40 million tourists, 11 million people intended to ride elephants or interact with them [6]. If all 11 million tourists pay their admissions of between €14 and €128 [7], elephants contribute between €154 million and €1.41 billion via tourism. This sum is generated by 2,700 elephants, meaning each elephant contributes about €57,000 to €522,000 a year. These figures are much higher than an elephant's selling price. However, it is important to also look into the costs of keeping elephants to see how much money they are really profiting. As an example, the cost of maintaining Maesa Elephant Camp in 2021, where 73 elephants live, was about €1.66 million [7]. Assuming that this sum is spent on elephants in the form of shelter, food, staff and veterinarians, costs per elephant break down about €22,740 each year. These costs taken away from the income generated from each elephant, still results in a profit of about €34,00 to €500,000 each year.

Elephant tourism has a high potential for making money and is one of Thailand's most important tourism areas. It is difficult to accurately calculate the real amount of expenses and earnings since they are very dependent on different circumstances. However, the recent corona pandemic made a huge dent in the industry, partially leading to owners selling their animals to sanctuaries [8,9]. Additionally, there is a shift in the reputation of this sort of encounter regarding the western world. Since elephants are often captured in the wild, forced into obedience and otherwise chained up all day, many tourists decide to avoid those establishments [10]. More and more elephants move to sanctuaries where people still pay admission fees to observe them. Nevertheless, the sanctuaries are dependent on donations to care for the pachyderms [6]. The economic value of elephants is therefore going down into negative values as more elephants retire into those sanctuaries. This means that this industry that once earned the country a huge amount of money, will continue to decline in the coming years.

EXCURSIONS AND OTHER NEWS



Lab Rotation at the Senckenberg: Improving Barcoding Success

Sophie Merz

Only 10% of deep-sea wildlife is known to humankind and identifying what's in these unknown waters is an ongoing adventure. To gain a better understanding of the remaining 90%, the research vessel RV Sonne So-23 set sail to the Aleutian Trench that runs along the southern coastline of Alaska and collected material from the deep-sea waters and ground. For identifying the mostly low-quality DNA samples, the universal primers (LCO/HCO) are a helpful tool but fail to generate a PCR product in many cases. The department for population genetics at the Senckenberg Natural History Collections were responsible for getting good quality sequences, which led them to design new primers. This is where my Lab Rotation started: testing these new primers for the isopod genus of *Chelator*!

Most of my work in the lab was PCRs and running gels to test how different parameter settings change the success of getting a PCR product out of the low-quality DNA. This PCR product was then analyzed with the help of a sanger sequencer, generating a sequence that could be compared to the different *Chelator* species. After my four weeks at the Senckenberg, I was able to add a COI sequence to almost all of the unknown *Chelator* samples. In contrast to the regularly used 'Folmer' primers, the new primers worked with very high annealing temperatures (up to 62°C – Folmer failed at 52°C). These higher annealing temperatures allow for a far more specific primer binding. Another parameter tested was $MgCl_2$ concentration, but which had no effect on the specificity. All PCR products of the primer testing generated a high-quality sequence after being analyzed with Sanger sequencing, aligning with the reference data.

The newly designed primers can be a great alternative to the universal primers for identifying species of *Chelator* with two main application ideas: choosing one primer as a universal primer (PCR product for the two species even in higher temperatures) - or with a species-specific primer (judge species based on PCR success). Both ideas have different advantages, being either time- or cost-efficient. This process of designing specific primers can be applied to other species, improving the barcoding success even for low-quality samples. I am very glad to have done this Lab Rotation with Heiko Stuckas and was given the opportunity to get a lot of experience in the lab and do experiments and data analysis on my own. I learned a lot about 'field-work' applications of lab work and gained a lot of insights into the research questions of the Senckenberg society.

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