DESCRIPTION FOR THE GENERAL PUBLIC

In the world of science the role of animal personality was unappreciated for many years and was treated only as a curiosity. However, numerous empirical studies have demonstrated that personality types (also known as "behavioral syndromes") are widely distributed across animal kingdom and can be observed not only in birds and mammals, but also in fishes, mollusks or insects. Could such a widespread phenomenon be irrelevant for ecological and evolutionary processes? So far, researchers showed that more aggressive and exploratory individuals have higher probability of finding more food resources, which can positively affect their fitness and number of offspring. However, such individuals can also be more vulnerable to predation and harbor more parasites. Certain personality type can be more or less advantageous depending on circumstances and can be favored or discriminated by natural selection in variable environment. **Nevertheless, we still lack empirical studies that could help us understand the significance of animal personalities for ecosystems' functioning.**

During the last decade scientists investigated animal personalities in context of intraspecific competition, food resources or predation pressure, but still little is known about the role of their role for host-parasite interactions. However, we know that parasites can affect significantly their host's behavior. They make animals abandoning their burrows full of fleas or force them to search for different foraging areas to avoid bites of flies or mosquitoes. Parasites provoke an inflammatory condition that results in so-called sickness behavior: hosts reduce their exploratory activities and search of food and tend to be less aggressive towards their conspecifics. Such behavioral alteration helps them fighting infection and reduces the risk of acquiring new parasites. On the other hand, personality type can determine how many parasites animal carries. Individuals that explore their environment more intensively, they risk more encounters with parasites than their less active conspecifics. **The challenge is to distinguish if parasites affect host's behavior or the opposite: personality of the host determines its parasite burdens. Our project will help to solve this puzzle.**

We will investigate the relationship between personality and behavior in yellow-necked mice. These animals are excellent study species: they are very common and widely distributed in the majority of European forests and they serve as an important reservoir for many diseases. Thanks to the research conducted by other members of our lab, we already have extensive knowledge about the behavior and ecology of yellow-necked mice. We hypothesize that more active animals are more often infected by parasites and harbor higher parasite loads in comparison with less mobile individuals. Parasites cause change in behavior of such hosts – they cause sickness behavior that results in decreased parasite loads and, as a consequence brings back the behavior back to normal. This kind of mechanism is described as a negative feedback loop. **Negative feedback loops are a widely known mechanism that regulates numerous physiological, ecological and evolutionary processes, but it has never been studied in the context of personality types and parasitism.** To investigate this relationship, we will conduct regular live-trapping of yellow-necked mice to collect endoparasites (eggs and oocysts from fecal samples) and ectoparasites (fleas, lice, beetles and ticks collected from the fur). Moreover, we will carry multiple behavioral tests to monitor aggressiveness and exploration in mice in relation to their parasite loads. We will also perform antiparasitic treatments to observe functioning of the negative feedback loop between parasites and host's behavior. We predict that after the treatment mice (especially individuals that had more parasites) will adjust their behavior towards higher exploration and aggression. In addition, bolder, more exploratory animals will get back to pre-treatment parasite levels faster than shy mice.

Bolder mice might transmit parasites and pathogens (e.g. Lyme disease) more effectively than shy ones. Individuals that are responsible for most transmission events (known in epidemiology as 'superspreaders') can create disease hot spots and accelerate acquiring of pathogens in a population. **Therefore, personality types can play an important role for transmission dynamics.**

Our project will give new insights into ecological significance of personality types and mechanisms of their maintainance in animal populations. Personalities, by definition are the sets of traits that are stable throughout animal's life and across variable environmental conditions. Therefore, the changes in animal personality traits caused by parasites are particularly intriguing. **Our project will address the issue of flexibility versus consistency of animal personalities.**