DESCRIPTION FOR THE GENERAL PUBLIC

In nature, organisms usually stay in close relations with their environment and other living organisms. Coexisting species and individuals create various types of relationships of either positive or negative character, and parasitism is a common example of such interactions. It is widely believed that parasitism is one of the main factors responsible for many evolutionary processes occurring in nature. Among the others, parasitism is regarded as one of the major costs of animal sociality, as the rate of horizontal transmission of parasites and pathogens increases with the size and density of host aggregations. On the other hand, life in a group may be favoured due to more effective defence against predators, increased foraging efficiency via social information transfer or elevated chances of finding a mate for reproduction. Therefore, living in a group is the basic form of social structure in many animal species.

Since parasites and pathogens impose a strong detrimental impact on their hosts by reducing their reproductive success and increasing their mortality rate, we should expect a positive relationship between the cost of parasitism and investment in antiparasite defence among species. At the population level, better defended host individuals are likely to suffer less from the negative effects of parasites than poorly defended hosts, which should determine their settlement decisions along the gradient of parasite pressure. It is, thus, expected that individuals with better immunocompetence should choose reproductive groups (colonies) of larger size, which provide better protection against predators and may increase chances of finding food, while individuals with lower immunocompetence should avoid them.

The main aim of this project is to determine whether individual level of immunity affects the choice of colony size in birds. For these purposes, we propose a novel experimental approach, where different-size patches of attractive nesting area (artificial floating rafts) were provided for a colonial waterbird, the common tern, at a site with limited availability of natural nesting habitat. As a result, permanent experimental colonies of different size (25-30 vs. 100-130 breeding pairs) were established, which allows us to test hypotheses related to group size choice.

In order to test whether individual immunocompetence affects settlement decisions of terns, we plan to assess different components of innate and acquired immunity of adult terns nesting in the colonies of different size. For genetic analyses we have chosen the genes of toll-like receptors (TLRs), which play a key role in the innate pathogen recognition. Also, the strength of immune response will be assessed with two immunological assays: hemolysis–hemagglutination assay (innate humoral immunity) and enzyme-linked immunosorbent assay (ELISA) for determination of antibody concentration (acquired humoral immunity).

We expect that this project will provide a novel insight into the mechanisms linking parasitism and animal sociality. In particular, the knowledge on how individual immunocompetence affect social behaviour and settlement decisions will help to better understand ecological and evolutionary consequences of avian coloniality.