

SUMMARY OF Ph.D. THESIS

Behavioural isolation includes all differences in courtship behaviour that allow the recognition and successful mating only within members of the same species and therewith reduce the probability of maladaptive hybridization. It can be an efficient barrier to gene flow between closely related taxa and contribute to or potentially complete their speciation. An ideal opportunity to study the role of behavioural isolation during the speciation process represent closely related or recently diverging taxa, where the exchange of genes still occurs and the process of speciation was not achieved. The house mouse can be seen as a unique model to address speciation genetic questions. This species is a great laboratory animal with described genome sequence in one side and with the natural hybrid zones between different mouse subspecies on the other hand. In my thesis I studied the role of assortative mating leading to behavioural isolation between two subspecies of the house mouse *Mus musculus musculus* and *M. m. domesticus* in both natural populations from the Czech-Bavarian transect across their hybrid zone as well as in the laboratory, using wild-derived inbred strains representing both subspecies.

I found that there is a strong divergence in both the signal and preference parts of the subspecies-specific recognition system between the two subspecies. I analysed the role of salivary Androgen binding proteins (ABP) that have been proposed to act as a signal leading to assortative mating between both subspecies. However, our results of both behavioural and genetic studies did not fully confirm this hypothesis, indicating that ABP are not in itself an efficient barrier to gene flow between both subspecies. ABP may participate on a complex system of subspecies-specific recognition, probably in transmitting the information between interacting animals in close contact. Contrary, long lasting signals such as urine and faeces seems to be more important subspecies-specific indicators and especially the former are proposed to be hot candidates for speciation traits for future studies.

Based on our results we conclude that behavioural isolation in the house mouse hybrid zone may play an important role as a barrier to gene flow and that this barrier is asymmetric between both subspecies, involves both males and females and should be seen as a complex of at least two different strategies: the assortative mating in one side and male aggressiveness in the other. The extent to which both strategies participate on the mouse speciation remains uncertain and needs further analyses mainly of the epigenetic and genetic architecture of involved behavioural phenotypes. For that purpose we prepared new wild-derived inbred strains representing genome of both subspecies with sufficient genetic variability and differences in studied behavioural traits. These strains represent a unique tool for speciation genetic studies and in combination with possibility to test candidate speciation genes in natural conditions they offer an excellent opportunity to get insights into genetic architecture of a complex behaviour and its role in speciation.

Bímová, B. House mouse as a model for genetic and evolutionary studies. *Folia Mendeliana, Scientiae Naturales*, supplementum ad *Acta Musei Moraviae*, in press.

A part of my thesis, concerning the house mouse as model for genetic and evolutionary studies, summarising the results presented in this thesis as above will be published as a review article in a supplementary issue of *Acta Musei Moraviae*