

DESCRIPTION FOR THE GENERAL PUBLIC (IN ENGLISH)

Animals living in seasonal environment need to adjust to changes in photoperiod, ambient temperature and food availability. In response to shortening days and lowering ambient temperature, heterothermic animals use torpor, a state of regulated decrease in metabolic rate and body temperature, which brings about substantial energy savings. However, not all individuals respond to winter photoperiod in the same way. Within the population of Siberian hamster (*Phodopus sungorus*), a model species to study seasonality, we can observe whole spectrum of phenotypes within population, from hamsters which do not change their physiology and morphology, through individuals with only some traits of winter phenotype, to animals with complete suite of winter traits: white fur, low body mass, gonadal regression and daily torpor. Before winter, phenotypes differ between each other only in body mass and non-responding hamster are significantly heavier than responding ones.

We ask a question about the background of polymorphism in winter phenotype within one population. We suggest that body mass is a proximate factor for polymorphism in winter phenotype. We proposed two hypotheses. First hypothesis will verify the effect of delayed life history effects on body mass and in consequence on winter phenotype. We predict that environmental conditions under which animals were born and spent their juvenile period are responsible for the polymorphism in winter phenotype. However, differences in body mass may also result from differences in food intake. Thus, we also hypothesize that variability in winter phenotype results from interindividual differences in behavioral traits related to foraging efficiency.

We suggest that polymorphism in winter phenotype persists in one population, because both phenotypes are beneficial, depending on environmental conditions, and both ensure winter survival and successful breeding next year. This project links experimental and correlational research, which will allow us to explain the mechanism of polymorphism in winter phenotype in the population of heterothermic species.