

## **DESCRIPTION FOR THE GENERAL PUBLIC**

From early spring to autumn, pollinating insects use rich food resources supplied by plants in the form of nectar and pollen. Nectar is the source of energy needed for all insect activity. Pollen is used as a building material from which young larvae build their bodies. Such a building material should be of proper quality. It must contain the needed amounts of every chemical element that a larvae incorporates into its body to become an adult. Even if one of the elements supplied in the pollen is deficient, larvae fed with such pollen will die or develop into an underdeveloped adult. Thus, the pollen on which bee larvae are fed must be stoichiometrically balanced (stoichiometry here refers to the ratios of various chemical elements): it must contain appropriate amounts of chemical elements. Data on various pollen chemical compositions show that the pollen of different plant species differs stoichiometrically, and if one of the elements is highly concentrated in pollen, then there is a scarcity of other elements. This may limit bees' development. Because different plant species flower from spring to autumn, the stoichiometry of available pollen should vary seasonally. Additionally, pollen stoichiometry should vary between different ecosystems (inhabited by different plants). Thus, bees should optimize the proportions of collected pollens of different species to stoichiometrically balance their larvae diet. However, this may be impossible if there is no access to appropriate plant species in a given place and at a given time.

The goal of this project is to learn about pollen-eater limitations caused by the variability of pollen stoichiometry and the impact of these limitations on pollen-eater development. Red mason bee (*Osmia bicornis*) will be used as model organisms (=example used to learn about biological processes). This species is commercially important and is widely used as crops pollinator. New data on the biology of this species may help to improve its protection, and it will shine light on the stoichiometric determinants of the life histories of other insects occupying a similar niche. A sharp decline in the number and diversity of bees is currently being observed in different countries all over the world. This decline may be connected with the decline in the diversity of bees' food plants. Learning about stoichiometric determinants of the pollen-eater strategy may help to explain this phenomenon.