

English walnut (*Juglans regia*) is a crop plant of increasing economic importance, both in Poland and in the World. It is valued for its fruit, timber and medicinal properties (plethora of phenolic compounds and anti-oxidants). The most know compound, naphthoquinone juglone, isolated from bark, leaves and fruit shells, exhibits promising anti-cancer properties.

*Aceria erinea*, eriophyoid mite belonging to the family Eriophyidae, is one of the main and most difficult to control pests of English walnut. Arachnids from this family are feeding on a wide range of crops and are responsible for serious damage to agriculture. Their feeding induces development of galls on different plant organs, contributing to the decrease of plant fitness and reducing plant ability to photosynthesis, thereby reducing yield. Moreover, eriophyoid mites are vectors of many viral diseases of plants, which further adversely affects the plant yield.

Galls are structures that facilitate feeding of mites. They are formed solely from plant tissues. So far, little is known how mites "urge" the plant to create a completely unusual structure that acts as a shelter and feeding site for the pest. *A. erinea* induces a specific type of plant gall, called erineum, which is formed by bulging the leaf blade and filling thus formed "cavity" with trichomes produced by epidermal cells. In this "cavity", the mites feed and reproduce, protected from external factors and predators.

The project is part of research conducted by botanists, molecular biologists and entomologists, which main research goal is to clarify developmental mechanisms of galls. The main aim of the current proposal is to check if and which plant sugar and amino acid transporters are active and necessary to produce nurse tissue in erineum, from which the eriophyoid mites feed. The walnut genome was sequenced in 2016, thus molecular studies on this plant can be easily carried out, and it can be used as a model plant in the study of woody plant responses to mite infestation.

The results obtained within the project, although generally relate to basic research, may help to find factors underlying the susceptibility of plants to mites attack and help to obtain plants with a reduced susceptibility to this group of pests. Their introduction will improve the fitness of crops, and the amount and quality of the yield. It will also reduce the amount of pesticides released into the environment.