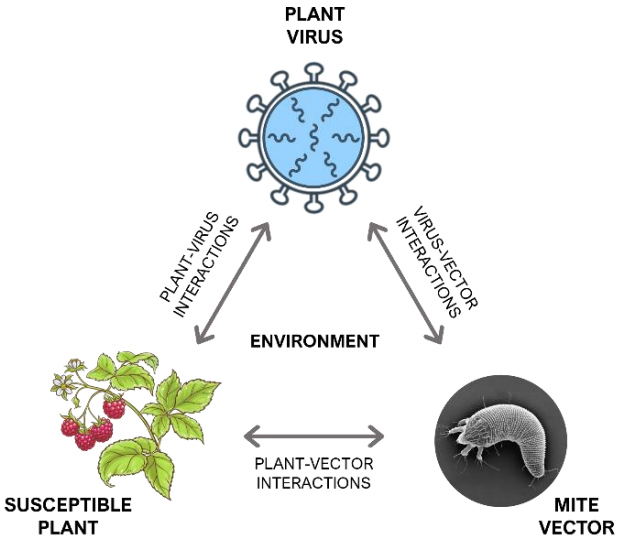
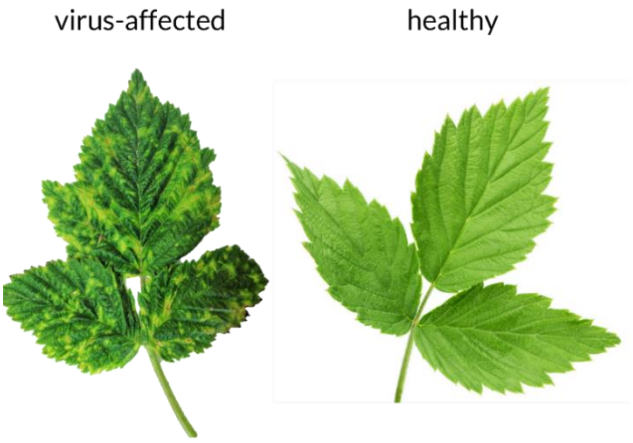
About 690 million people globally are undernourished, and by 2050, food demand will increase by 70%. Agricultural scientists need to develop better pest and disease control strategies to face this challenge. Plant viruses are responsible for considerable losses in all crops. Once in a plant, they cannot be cured, contributing to unstable food supply and high prices. Most plant viruses have strict relations with insects, nematodes, or mites that feed on plants and transmit them. This relation is usually so strong that a particular virus can be spread only by specific vector species. Identification, in-depth understanding, and vector elimination are major components of all successful control strategies.



The transmission cycle for mite-transmitted plant viruses. Each step and interaction in the transmission process represents a unique opportunity for disruption

Mites are a grossly understudied group of virus vectors primarily because of their microscopic size. This project will focus on three mite-transmitted viruses, wheat streak mosaic virus (WSMV), raspberry leaf blotch emaravirus (RLBV), and European mountain ash ringspot-associated emaravirus (EMARaV).



One of the viruses used in our study is RLBV, with leaf symptoms presented above. This mite-transmitted virus is widespread in Europe, causing substantial losses in raspberry production

This project aims to advance our understanding of virus transmission by mites and answer the fundamental question of virus replication in a mite body. Our research group will also actively seek new viruses and vectors, starting with berry crops (raspberry, blackberry, strawberry, blueberry, and chokeberry). Poland is one of the largest berry producers in the world.

Expected results include (a) identification and characterization of vectors for RLBV and EMARaV; (b) understanding of the transmission mode for RLBV, EMARaV, and WSMV; (c) knowledge on virus persistence in all life stages, including eggs laid by infected mite females; and (d) detection and discovery of new viruses and vectors in Polish berry production. Outcomes of this project will dissect the intricate molecular mechanisms of mite transmission. They will also help to improve crop biosecurity as new practices and solutions will be developed for mite-transmitted diseases.