

Plant metabolites as stimulants and/or inhibitors of parasitic plant seed germination

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Broomrapes (*Orobanche* and *Phelipanche* spp.), are holoparasitic weeds that severely infesting a large number of important crops and causing severe yield losses. The main obstacle for long-term management of broomrape infested fields is the durable seedbank with evolved mechanisms of host recognition upon perception of host-derived germination factors. The continuous spread of broomrapes strongly affects the farmers work as heavy infestations lead to a complete crop loss and have a great negative impact over many years. In fact, parasitic seeds can survive in soil for decades until the germination is induced by a chemical signal exuded by the root of the host plant. Current control methods relies on the use of resistant crop varieties and herbicides, albeit success has been marginal. Considering that seed germination is a key phase for parasitic plant development and infestation, a further approach proposed for the management of these weeds has been to use microbial or plant metabolites to stimulate in absence of the host (the so called “suicidal germination) and/or inhibit the broomrape seed germination. Some metabolites induced a rapid cessation of radicle growth with the promotion of a layer of papillae at the radicle tip hampering the contact of the parasite to the host. The development of herbicides based on natural metabolites from wild plant, targeting early stages on parasitic plant development, might contribute to the reduction of broomrape seed bank in soils. This research is innovative as it proposes an alternative method to the massive use of synthetic herbicides for the management of parasitic plants. Natural inspired herbicides could reduce the environmental impact and consequently the risks for humans and animal health.

This communication will illustrate the preliminary results on the isolation and chemical characterization of metabolites extracted from root of seventeen weed plants and the results of testing them on the seed germination of different broomrape species.