Understanding the resistance mechanisms of white mustard (*Sinapis alba*) to the pollen beetle (*Brassicogethes aeneus*)

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Scientific context

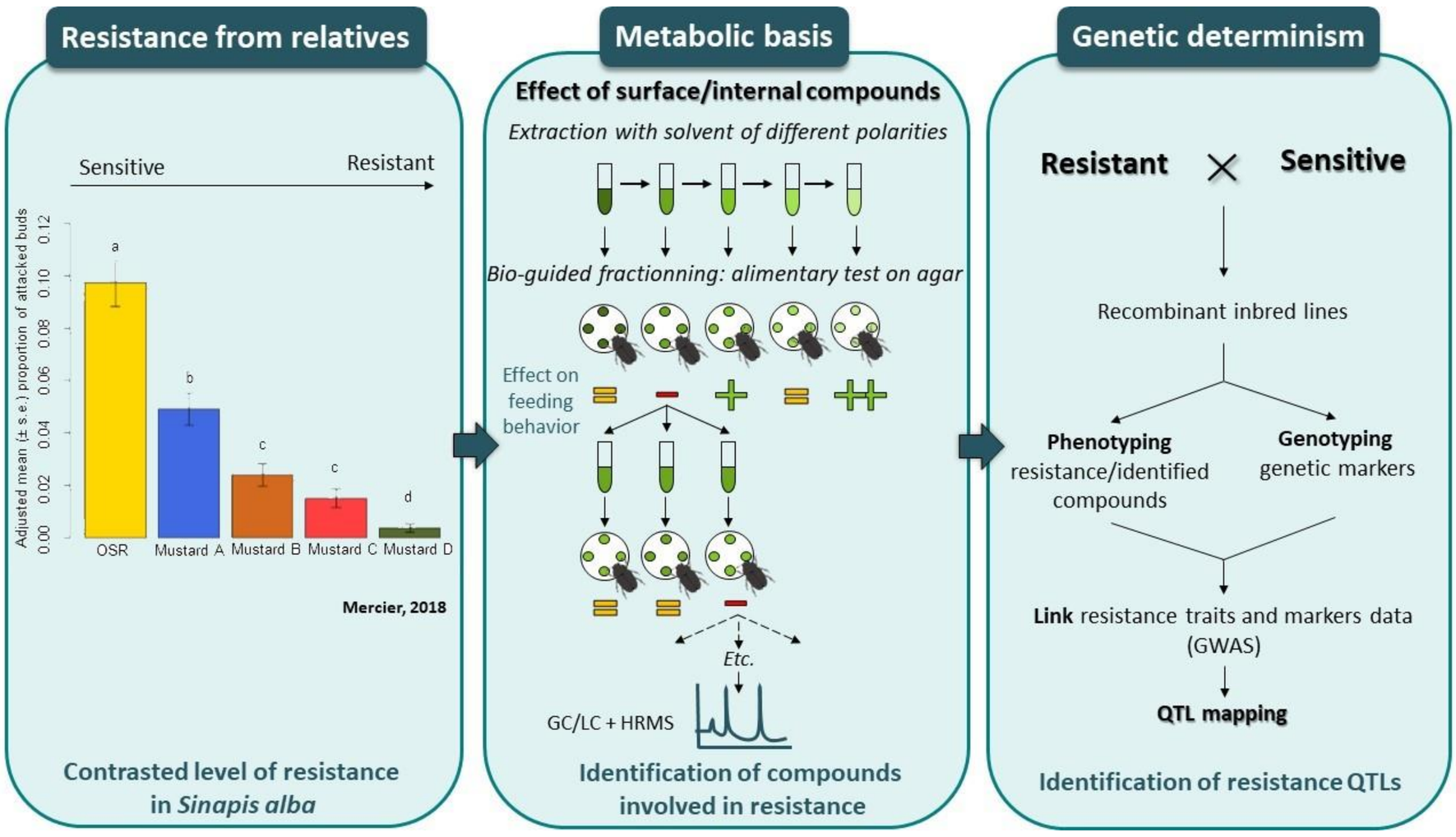
During the 400 Ma of “coevolutionary arms race”, plants have evolved diverse and complex defensive strategies to overcome damage caused by insects. The importance of specialized metabolites as a source of resistance to insect has been widely demonstrated. These defensive compounds can be favored in artificial selection to protect crops against pests.

Socio-economic context

Insects are responsible for about 13-16% of yield losses and are mainly managed through the use of synthetic insecticides. Over-use of these compounds have become recognized to negatively impact human health and biodiversity. An additional limitation, is the low durability of this strategy as numerous pest species are becoming resistant. Based on insect-plant interactions, several alternative control methods have been developed (*e.g.* biological control, « push-pull » strategy etc.). Another strategy used in integrated pest management is breeding for plant resistance to insects.

Objectives

Oilseed rape (*Brassica napus*) (OSR) is the world’s second oilseed crop. Cultivation of winter OSR is long exposing it to many biotic stresses, such as insects. A major pest of OSR is the pollen beetle (*Brassicogethes aeneus*), whose adults feed on pollen in flower buds, during a short period before flowering starts. Previous studies showed that there is no resistance in OSR. However, partial and variable resistance in a related species, the white mustard (*Sinapis alba*) has been found. The objective of this PhD is to identify the mechanisms of resistance of white mustard to pollen beetle in order to target more precisely the traits to be introgressed into OSR.



Perspectives

This PhD will allow the identification of chemical compounds and associated QTLs involved in white mustard resistance to the pollen beetle and open the way for introgression of resistance genes in OSR through positive allele pyramiding strategies.

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