

# Genetic research to improve control of Brassica diseases

Joana G. Vicente, Vânia H. Passo, Sebastian E. Fairhead and Eric B. Holub

## General strategy

- Extensive screening of diversity collections of Brassica and relatives.
- Disease surveys, establishment and characterisation of pathogen collections.
- Identification of race-specific and potential broad-spectrum sources of resistance.

## Oomycete diseases

### White rust (*Albugo candida*)

- Resistance to different pathotypes of isolates and an example of broad spectrum resistance have been identified.
- Diagnostic markers are being developed to detect variation in *Albugo* populations.



White rust symptoms on broccoli

Symptoms on brassica floret and silique

### Downy mildew (*Hyaloperonospora brassicae*)

- Resistance to different pathotypes of isolates has been identified.
- Strong dominant resistance transferred to pre-breeding broccoli and cauliflower lines.
- Combined resistance genes have been recommended for broad spectrum downy mildew control for the UK production.



Symptoms in a UK nursery

Susceptible and resistant phenotypes

## Bacterial diseases

### Black rot of crucifers

#### (*Xanthomonas campestris* pv. *campestris*)

- Resistance to the most important races is present in the A (*B. rapa*) and B genomes (*B. nigra*), but absent in the C genome (*B. oleracea*).
- Single locus for resistance to race 4 mapped in *B. napus* and QTL for resistance to races 1 and 4 mapped in *B. rapa*.
- The pathogenic and genetic diversity of isolates from different parts of the world is being studied.



Cabbage field

Typical V-shape symptoms

Resistance in *B. napus*

### Leaf spot disease (*X. campestris* pv. *raphani*)

- Wider host range including tomato.
- Limited number of accessions screened.



Symptoms on radish

brassicas

tomato

Xcr races on brassicas

### New variants of *Xanthomonas campestris*

- Variants that cause vascular and leaf spot symptoms identified in the Mauritius and US are being characterised.



Symptoms on cabbage (Photos: Rajiv Lobin, Agricultural Extension Unit, Mauritius)

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