Sclerotinia stem rot, caused by Sclerotinia sclerotiorum, is a disease problem of canola worldwide causing serious yield losses especially under wet weather conditions. Sclerotinia resistance has been a long-time goal of canola breeders and producers. In this study, 354 Brassica napus accessions were screened for stem rot resistance, including both indoor and outdoor screening methods. Several promising lines were identified and research has been initiated to develop molecular markers linked to sclerotinia resistance, which will be a valuable tool for selection of resistant progeny in canola breeding programs.

Sclerotinia stem rot, caused by Sclerotinia sclerotiorum, is a disease problem of canola worldwide causing serious yield losses especially under wet weather conditions. While sclerotinia is still managed primarily through crop rotation and occasionally by fungicide application, there is new hope that plant genetics could offer answers. Sclerotinia resistance has been a long-time goal of canola breeders and producers. Progress in breeding for resistance to this disease has been slow mainly due to a lack of good sources of resistance, inefficient screening methods, and the fact that resistance likely relies on the combined effect of several genes.

Hundreds of canola lines from around the world have been ranked according to their resistance to sclerotinia. The ranking is based on a combination of both the length and depth of the stem lesion. In this study, a total of 354 B. napus accessions were screened for stem rot resistance most of which originate in Canada, Europe and Asia. All lines are maintained by PGRC (Plant Gene Resources of Canada) in Saskatoon.

This research project focused on development of both indoor and outdoor screening methods for a renewed effort in identifying lines with high levels of sclerotinia resistance. Plants were raised in an environment that resembles field conditions but allows inoculations of the stems to simulate the natural infection. This method guarantees...
uniform inoculation and allows measurements of different levels of resistance in germplasm, breeding lines and cultivars. The resistant lines that were selected for testing under these semi-field conditions were as resistant as in the indoor test. However, some of the very susceptible lines in the indoor test were less susceptible in the field.

In the group of resistant lines, there were both late and early flowering accessions. The early flowering lines are long awaited new sources of stem rot resistance needed for development of canola cultivars in Canada. Results show that older Canadian varieties ranked very poorly, however, in comparison, some lines from Asian sources showed high levels of resistance in both the field nursery and indoor testing.

Research has been initiated to develop molecular markers linked to sclerotinia resistance in the most promising lines, which will be a valuable tool for selection of resistant progeny in canola breeding programs. Other research is ongoing to determine whether the basis of resistance is different among lines from various origins using association mapping.
Figure 2. Several hundred *Brassica napus* lines rated for sclerotinia stem rot reaction sorted from resistant to susceptible within six geographical regions (AUDPC is the area under the disease progress curve). Lines with promising high level of stem rot resistance were identified in Pakistan, Japan and South Korea.