

Assessment of Spring Canola (*Brassica napus* L.) and Yellow Mustard (*Sinapis alba* L.) and Intergeneric Hybrids Between *B. napus* and *S. alba* for Resistance to Insect

Pests.

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Abstract

In recent years, canola (*Brassica napus* L.), an important oilseed crop grown throughout the world, has increased in acreage in the Pacific Northwest (PNW). Insect infestation is the most limiting factor in canola production. Insect pests of canola include; diamondback moth (*Plutella xylostella* L.), flea beetle (*Phyllotreta cruciferae* L. (Goeze)), cabbage seedpod weevil (*Ceutorhynchus assimilis* L.=CSPW) and aphids (primarily cabbage aphids, *Brevicoryne brassicae* L.). Canola has been screened for insect resistance for over 50 years and little natural resistance has been found. Yellow mustard (*Sinapis alba* L.), a relative of canola, is immune or highly tolerant to all PNW insect pests. Many believe that this resistance is a result of the breakdown toxins from the high quantity of glucosinolates that yellow mustard produces. Researchers at the University of Idaho have developed *in vitro* methods of hybridizing yellow mustard and canola to develop new plant species. Yellow mustard traits have been readily transferred to canola through intergeneric crosses. Research has shown that incorporation of nitrogen and sulfur into soils planted with canola and mustard can have a direct affect on the glucosinolates in these crops. Most PNW soil has excess sulfur making it difficult to carry out this type of research, so there has been a limited amount of study in this growing region. Results from the field have also conclusively shown that there are maximum amounts of nitrogen and sulfur fertilizer that can be added to the soil where no further glucosinolate concentration will be gained and some soils are so rich in sulfur that application of sulfur will have no affect. One major goal of this project has been to screen for new insect resistant canola hybrids by examining lines where introgression of the resistance from yellow mustard has taken place. The first portion of this study was dedicated to screening for specific resistance to the cabbage seedpod weevil in the

greenhouse. A number of lines with enhanced tolerance to the cabbage seedpod weevil were found including; F4.CCM.3 and F4.CMM.19. The second portion of the study was carried out in the field where screening was done for resistance to flea beetles, diamond back moths, cabbage seedpod weevils and aphids. Hybrids lines including; F1.MCM.1 and F3.CMC.6 were found that yielded nearly the same with or without insecticide treatments. The third portion of this study was to see if glucosinolate concentrations could be mediated using nitrogen and sulfur fertilizer applications and we found that soils in the northwest are so high in nitrogen and sulfur that the addition of these elements has little or no effect on total glucosinolate concentration in seed meal.