

Condiment Mustard Breeding: 2022 update

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Brown and oriental mustard (*Brassica juncea*) breeding:

Three brown mustard yield trials (21CYT01, 21CYT02 and 21CYT03) were conducted at five locations (Agriculture and Agri-Food Canada (AAFC)-Saskatoon farm, AAFC-Scott farm, AAFC-Swift Current farm, Redvers and Coaldale (Hytech)) in 2021. Ten hybrids B3782, B3877, B3885, B3963, B3964, B3965, B3966, B3967, B3968 and B3993 were selected for entering into the Mustard Adaptation Test (MAT) in 2022 based on their agronomic performance in the yield trials. B3877, B3885, B3963, B3967, B3968 and B3993 had over 20% higher yield than the check variety Centennial Brown. B3782, B3964, B3965 and B3966 had 15% higher yield than Centennial Brown. B3782 and B3966 contained similar oil and protein contents as Centennial Brown. The ten hybrids will be tested as candidate varieties in the MAT at multi-locations in western Canada this year.

Three oriental mustard yield trials (21CYT04, 21CYT05 and 21CYT06) were conducted at five locations (AAFC-Saskatoon farm, AAFC-Scott farm, AAFC-Swift Current farm, Redvers and Coaldale (Hytech)) in 2021. Six oriental mustard hybrids O3829, O3840, O3841, O3845, O3848 and O3986 were selected for entering into the MAT in 2022 based on their agronomic performance in the yield trials. O3841 and O3848 had 20% higher yield than the check variety Cutlass. O3840, O3845 and O3986 had 14% higher yield than Cutlass. O3829 had 13% higher yield than Cutlass, but had significantly lower oil and higher protein contents than Cutlass. The six hybrids will be tested as candidate varieties in the MAT at multi-locations in western Canada this year.

Yellow mustard (*Sinapis alba*) breeding:

Three yellow mustard yield trials (21CYT07, 21CYT08 and 21CYT09) were conducted at five locations (AAFC-Saskatoon farm, AAFC-Scott farm, AAFC-Swift Current farm, Redvers and Coaldale (Hytech)). Four synthetic lines Y4011, Y4012, Y4015 and Y4016 were selected for entering into the MAT in 2022 based on their agronomic performance in the yield trials. Y4015 and Y4016 had 10% higher yield than the check variety Andante. Y4011 and Y4012 had 9% higher yield than Andante. The four synthetic lines will be tested as candidate varieties in the MAT at multi-locations in western Canada in 2022.

Developing herbicide-tolerant mustard *B. juncea* and yellow mustard *S. alba*:

Non-GMO Group II (Imidazolinone (IMI)) herbicide tolerant (HT) mustard *Brassica juncea* lines have been successfully developed at AAFC-Saskatoon Research and Development Center and received approval for commercial use (Environment, Food & Feed) from CFIA and Health Canada. As indicated in Figure 1, two weeks after spraying the Group 2 herbicide Odyssey at 1x rate, all the plants of Centennial Brown died, while the plants of HT line B4017DH6 survived and exhibited normal growth. The HT trait will be transferred into the Ogura cms parental lines including male sterile line, maintainer line and restorer line to develop IMI-tolerant hybrid varieties in brown and oriental mustard. Development of IMI-tolerant yellow mustard (*S. alba*) germplasm is under way.

Figure 1. Spay Group II herbicide Odyssey at 1X rate on Centennial Brown and the herbicide tolerant line B4017DH6



The three homozygous mutant lines Y4063-1, Y4063-2 and Y4063-3 only exhibited moderate tolerance to Solo, Express and Refine SG, and are susceptible to Ally. Y4063-1, Y4063-2 and Y4063-3 as well as the wild type Y164 are all tolerant to Muster. To transfer the herbicide tolerant trait from Y4063-1 into the elite inbred lines Y67-22, Y304, Y313, Y457, Y598, Y602, Y1929 and Y1943, BC1F1 plants with the marker for the herbicide tolerant trait were backcrossed to its recurrent parents, Y304, Y602, Y457, Y596 and Y2257-9-7, respectively, and BC2F1 seeds have been harvested.