AAFC Field Pea Breeding and Progress in 2011

Annual report to Manitoba Pulse Growers Association as part of the Science Cluster Project: Development of genetically improved yellow and green field pea varieties and germplasm lines for Canadian pea growers

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The year of 2011was noted as another year with excessive moisture and severe disease pressure for the field pea breeding in a number of test locations. It was a very challenging year for the program because Al Sloan retired in the summer after some 30 years services and work on pulse breeding. However, it was also a very productive year in term of variety development. The main components and progress in 2011 are summarized as follows.

The program ran in full capacity. 1) In February 2011, two candidate varieties, MP1880 and MP1882, were supported for registration by Prairie Recommending Committee Pulse and Special Crops (PRCPSC). MP1880 was the highest yielding green pea in 2009-2010 pea co-op tests, while the MP1882 was a 'variety' with orange cotyledons. 2) We had seven breeding lines tested in the 2nd year pea co-op test. Six of the seven lines have been selected as the candidate varieties for registration and commercialization (see new candidate varieties below for more information). Twenty one lines were evaluated in the 1st year co-op test, and eight of them have been selected as the 2nd year co-op entries in the 2012 pea co-op test. 3) Twenty eight lines were grown in pre-coop trials in Lacombe and Morden, from which we have selected 19 lines for 2012 co-op test. 4) Approx. 130 breeding lines were grown at eight test locations across the prairie to evaluate their geo-ecological adaptations. The tests in Morden were severely affected by excessive moisture, and tests in Barrhead, AB had hail damage before harvest. We have selected 21 lines from the other six locations for 2012 Pre-coop. 5) Approx. 600 breeding lines were evaluated in replicated preliminary yield trials (PYT). Unfortunately, the trials in Brandon and Indian Head suffered from excessive moisture, resulting in unreliable data for making selections. We selected 77 lines in total from tests in other locations for 2012 multi-location tests, including 59 yellow and green pea, 14 marrowfat pea, four maple pea and one forage pea. 6) A total of 3315 lines were grown in the micro-plot (1 m^{-2}) selection (MPS) blocks in Lacombe, AB, and we have selected 780 lines from them for 2012 PYT. 7) Fifty two F6 or F7 generation progenies were grown in Lacombe in the single plant advance (SPA) blocks, and approx. 100-200 plants from each population have been selected for 2012 MPS. 8) Forty eight F5 populations were grown in Lacombe, AB, and 100-200 single plants were selected from each population for 2012 SPA. 9) Thirty nine F4 populations were grown at two sites in Lacombe, AB, and 100-200 single plants have been selected for 2012 F5. 10) The 39 F3 generation populations were grown in the winter nursery in Brawley, CA, as well as in the greenhouse at AAFC Lacombe Research Centre during the winter of 2010/2011. Approx. 100-2000 single plants were harvested from each population and planted in the 2011 F4 nursery in Lacombe. 11) Thirty five F2 populations were grown in the field in Lacombe, and 100-200 single plants have been harvested from each population. The harvested plants have been advanced to F3 generation in

the greenhouse of AAFC Lacombe Research Centre using single seed descent. They will be harvested and grown in 2012 F4 nursery. 12) Forty two new crosses were made in 2011 and the F1s were grown in the field in Lacombe, AB and Morden, MB. Each population was harvested in bulk, and will be planted in the 2012 F2 nursery in the field in Lacombe. 13) In addition to these components and progress of main breeding stream, we also conducted researches on disease resistance breeding on powdery mildew, mycosphaerella blight, and downy mildew, and conducted the trials to collect plant breeders rights. These studies will be reported elsewhere due to the page restrictions for this report.

New candidate varieties

Six breeding lines in the 2nd year pea co-op tests were selected as the candidate varieties, which will be available for growers in 2012. These are all yellow pea lines and resistant to powdery mildew. They had higher yield and better lodging resistance than the check varieties. The main four characteristics, i.e. yield, day to maturity, thousand seed weight (TSW) and pre-harvest lodging (PHL) score (1-9, where 1 = no lodging, 9 = completely fall down on the ground) were presented graphically in Fig. 1 and Fig. 2 in comparison with the check varieties. Growers interested in any of these lines should contact the Office of Intellectual Property of AAFC or the authors of the report.

Acknowledgement

This Science Cluster Project on the field pea breeding is jointly funded by AAFC, Alberta Pulse Growers Commission and Manitoba Pulse Growers Association (MPGA). MPGA also provided additional assistance in the financial management for the program.

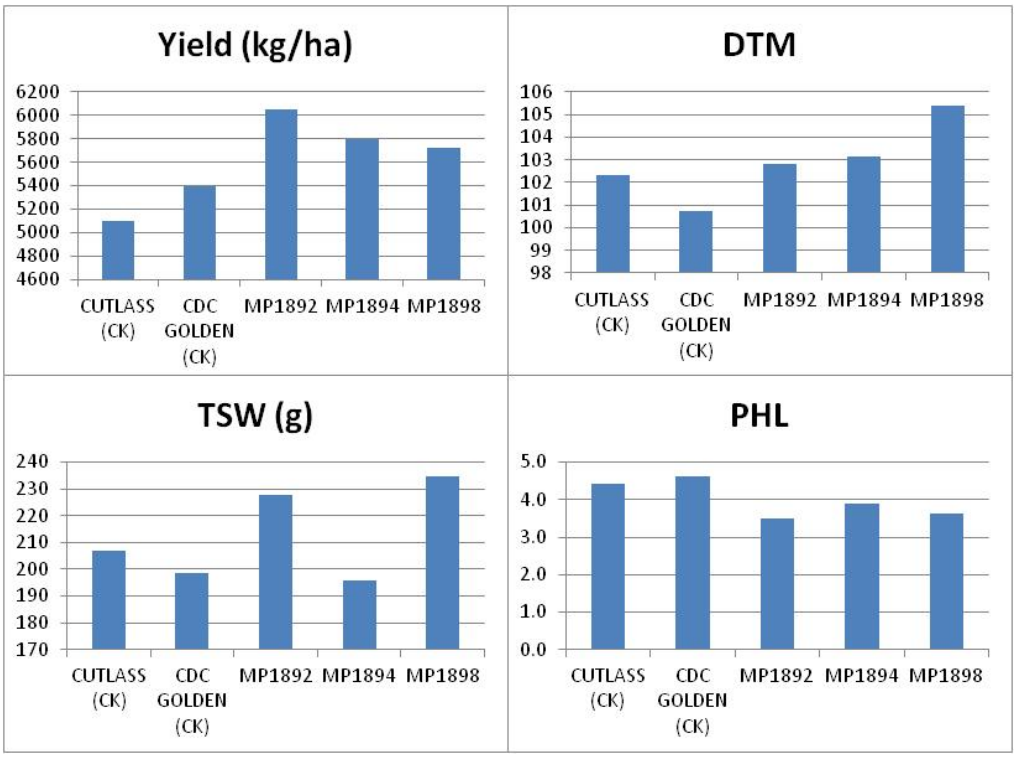

Figure 1. Four main characteristics of MP1892, MP1894, MP1998 and the check varieties Cutlass and CDC Golden in 2010-2011 Field pea co-op test-A.

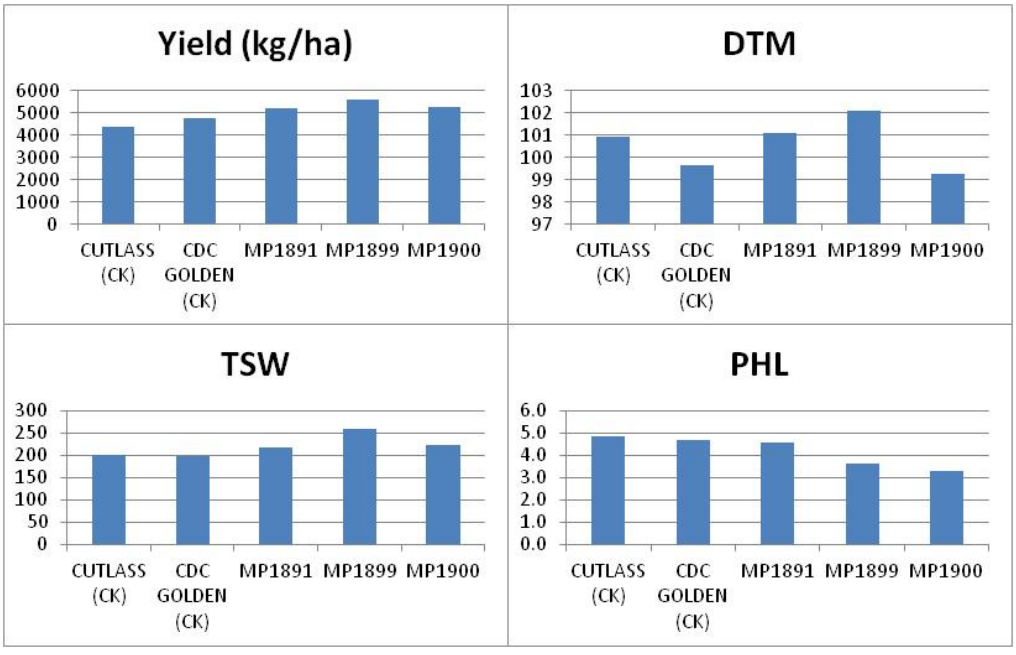

Figure 2. Four main characteristics of MP1891, MP1899, MP1900 and the check varieties Cutlass and CDC Golden in 2010-2011 Field Pea CO-OP Test-B.