

Participatory Plant Breeding

August 2016 Newsletter



A few pictures of our farmer-breeders in July
Oat participant in Ontario (above); potato participant with Duane Falk in southern Ontario (right above); and wheat participant in Quebec

Greetings! We hope this newsletter finds you well. It has been a wild growing season for Canadian farmers – as some areas are getting too much rain, and others are dancing for it. These weather shifts really bring home how important it is for selecting varieties that fit local and fluctuating conditions as we move forward.

We wanted to thank all the participants who were able to plant their populations this year. We have been able to visit some this summer, there's amazing and innovative work being done by organic farmers across Canada! There are currently 73 farmers breeding their own varieties of wheat, oat, and potato.

Included in this newsletter you will find an update on the 2016 PPB activities, information and tips about making selections, and a brief update on some seed quality work started by the Natural Systems Agriculture team at the University of Manitoba.

Tips for making selections in wheat, oat, and potato populations

The goal of making good selections on your farm is to retain the plants that have desirable traits and removing plants that are not serving your farm. The seed that you save from these selections will be the population that you will select from for next year.

There are two types of selection: positive and negative.

Positive selection: The best plants for a particular trait are selected and marked for harvest and saved.

Negative selection: The undesired plants are removed and only the remaining plants are harvested.

While negative selection is of course an option, specifically choosing heads or potatoes is the best way you end up with a uniform population that works best on your farm.

It is possible to practice a combination for both; as you may have a potato plant with a virus and decide to remove it early in the season, and still tag some plants that have exhibited early season vigour. In potatoes, desirable traits may not 'uncover' themselves until harvest, and positive selection will take place then.

Anne previously made a wonderful selection guide and tips for selecting certain characteristics for wheat and oat, if you do not have this document, please e-mail me (Michelle) for a copy.

Common potato garden experiments

Six farmers involved in the first round of the participatory potato breeding program submitted 1-6 potato clones they selected on their farm across Canada. This year, clones are being evaluated in University of Manitoba Organic Research Farm in Carman, an organic farm in Arundel, QC and AAFC Potato Research Centre in Fredericton, NB with industry standard potato varieties (checks). The clones are being evaluated for early season vigour, resistance to leaf blight, Colorado potato beetle, scab, viruses, maturity, tuber size, eye depth, and appearance. Data will be compiled together from the locations and the information will help farmers decide which clones to focus on in the future.



Common garden experiment in at the Organic Research Farm in Carman, Manitoba.
Picture was taken on July 5.

Research update – Organic seed quality

Katherine Stanley, M. Sc.

You may remember from June 2015's newsletter the Natural System Agriculture's work on organic seed quality; specifically looking at seed size. In winter 2014/2015, seed lots were collected from organic farmers across the prairies and sieved to determine seed size. Approximately 54-65% of the wheat seed collected was larger than the 2.58 mm slotted screen (sieve size 6.5/64"). Oat and barley showed more variability than wheat. In the summer of 2015, the effect of seed size and seeding depth on the agronomic performance of wheat, oat, and barley were examined.

Seeding rates are typically higher in organic production to increase competition with weeds. Although this is a desired agronomic practice, there is concern over how this may in turn effect the quality of the seed, potentially reducing the average seed size. Wheat, oat and barley were sown at target plant populations of 150 m², 250 m² and 350 m². The harvested yield was sieved into varying size classes and seed size distribution was examined.

In all crop types, regardless of variety, seeding rate did not affect the distribution of seed size (Figure 1). This is important as it can further support that the agronomic practice of increasing seed rate will not result in a greater amount of small seeds in turn will not reduce the quality of seed.

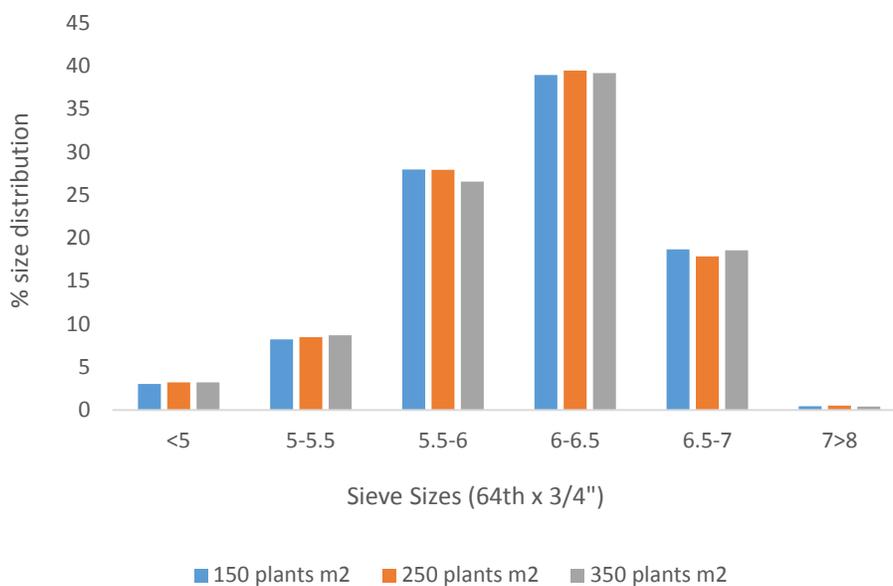


Figure 1: The effect of seeding rate on seed size distribution in oat

The second study in the seed quality trials looked at the effects of seed size and seeding depth on agronomic performance. Seed from different seed lots were sieved into size classes of small medium and large seed. Plots were sown at 1" and 2.5".

In all crop types, seeding at 1" and larger seed sizes increased yield. In oat, seeding all sizes at 1" and seeding large oats resulted in 18% less weed biomass than small oats or all oats sizes sown at 2.5" (Figure 2).

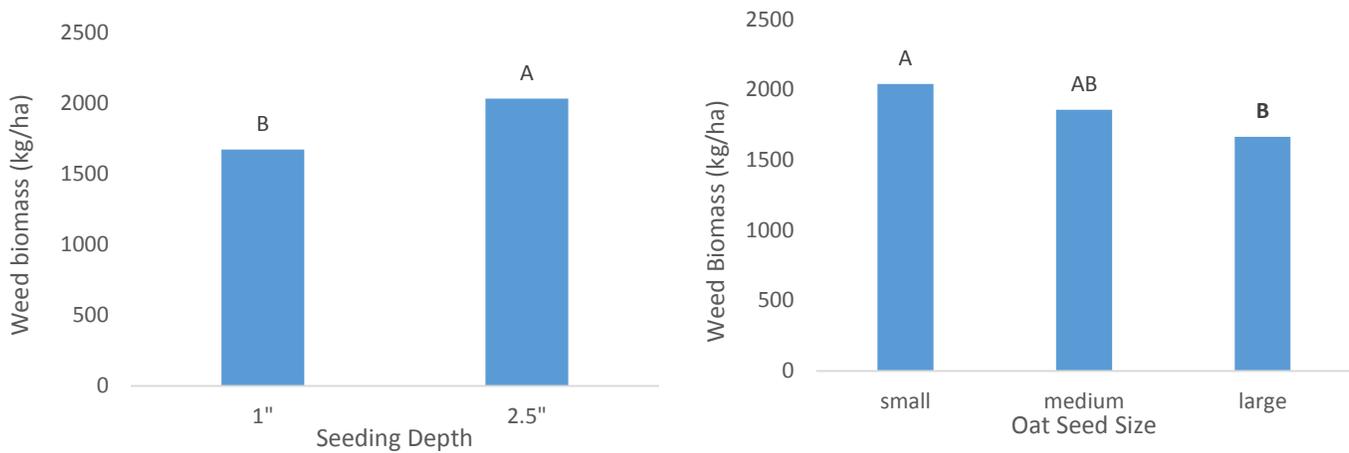


Figure 2: The effect of sown oat seed depth (left) and seed size (right) on weed biomass production. Different letters indicate significant difference between treatment means.

These same trends corresponded to final oat yield. Sowing oats at 1" increased yield approximately 11.5% while sowing large oat seeds increased yield 14% and 27% in comparison to medium and small seeds respectively (Figure 3)

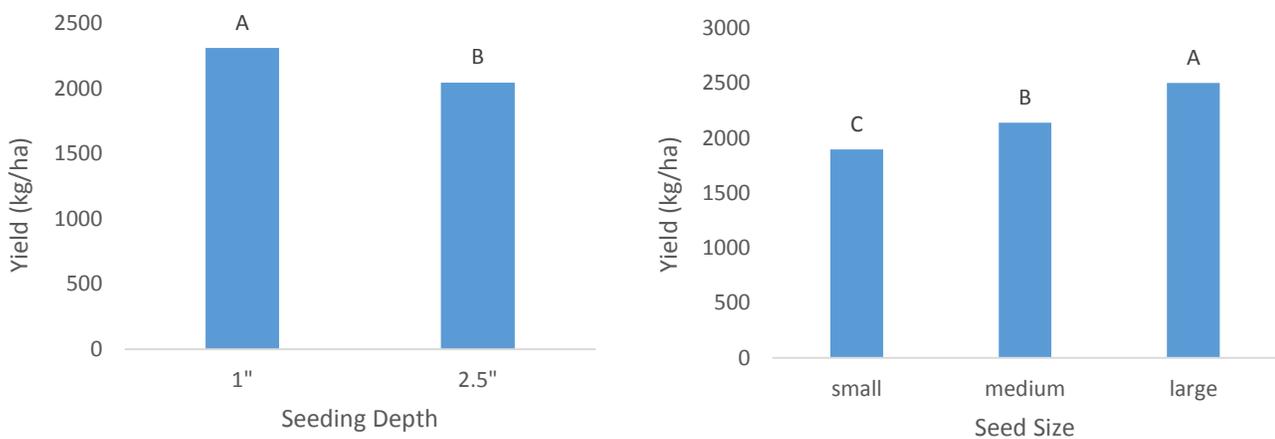


Figure 3: The effect of oat seeding depth (left) and seed size (right) on final oat yield. Different letters indicate significant differences between treatments.

Thank you for your participation in the on-farm breeding program!

If you have any questions about this program or would like to become involved please let us know.

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