



## Impact of seed size and seeding depth on barley and oat production

CATEGORY [agronomy](#) | March 10, 2021

Large seed and shallow seeding independently improved organic barley and oat production.

In organic production, pre-seeding tillage is an important weed management strategy, however this can cause drier seeding conditions. To compensate, greater seeding depths are often used, which may reduce crop performance.

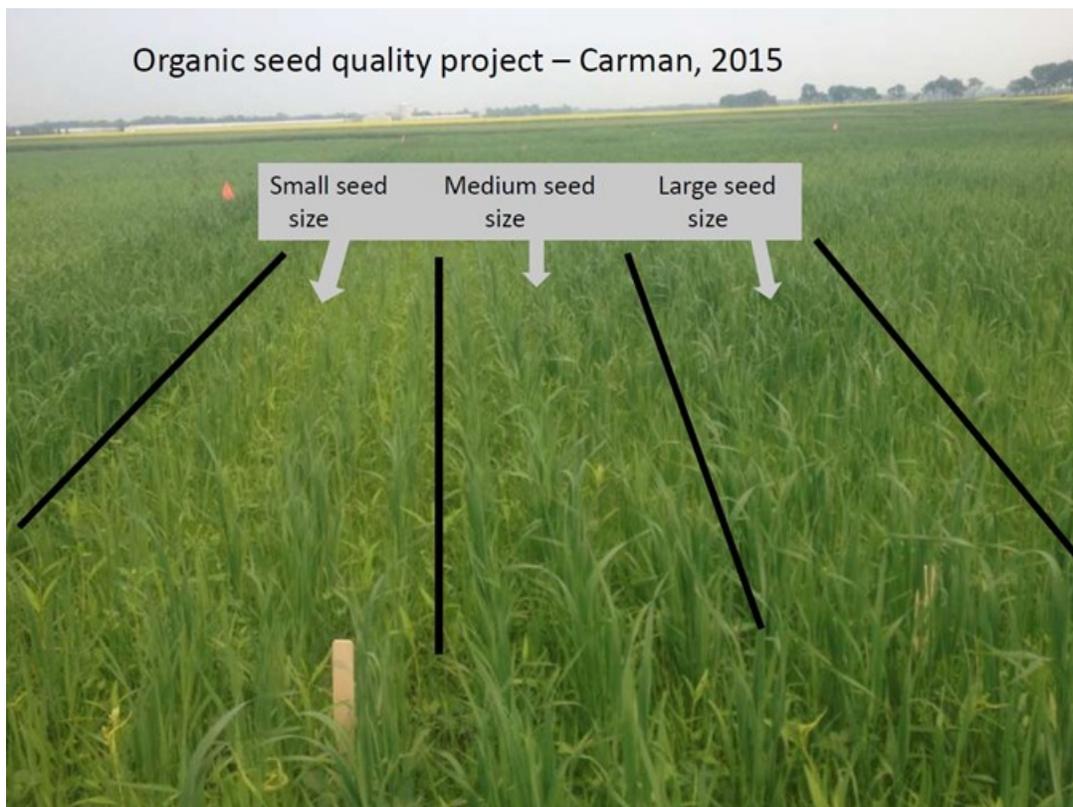
A 2-year research project was conducted on organically managed land at a University of Manitoba site near Carman, Manitoba. The objective of the study was to investigate how varying oat and barley seed sizes sown at 2 depths under organic management influence crop and weed growth and final grain yield. Farm-produced seed of different oat and barley cultivars representative of what organic farmers typically grow were evaluated in field trials.

For the experiments, the seed lots were separated and classified into small, medium and large seed sizes. Barley seed lots were selected from cultivars Newdale, Tradition and CDC Meredith, and oat seed lots from cultivars Furlong, Pinnacle, and Summit. The seed lots were sown at two depths in organic fields, shallow (2.5 cm) and deep (6.4 cm). A pea-oat green manure was grown in the year

prior to each experiment. Crop emergence, weed biomass, grain yield, and dockage were evaluated during the field experiments. Moisture conditions were good over both years of the study.

### **Positive outcomes of large seed and shallow seeding**

The research results showed that large seed and shallow seeding independently affected yield and weeds, and led to more positive outcomes. All 3 factors investigated in the project, seed lot source, seeding depth and seed size, affected yield and weed parameters. In both years, there was a trend of decreased grain yield and increased weed biomass with deeper seeding and use of small seed size, although the results were only significant in 2015.



However, the results did not show a strong interaction between seed depth and seed size. Over the 2-year study, there were no observed seed size by seeding depth interactions for any of the factors, including crop emergence, weed biomass, grain yield, or dockage for oat or barley. The research indicated that large seed size did not necessarily compensate for lower crop productivity and higher weed biomass owing to deep seeding. It is possible that under a wider range of seeding depths, including very deep seeding treatments and under more stressful soil moisture conditions, the experiments may have produced a stronger interaction between seed size and seeding depths.

The larger seed size did have a significant effect of reducing dockage in 1 of 2 years from barley, and for both years in oats. On average, the large seed decreased dockage by 30% compared to the small seed, representing a significant improvement in weed management potential with large seed. Over the two-years of the study, large oat seed resulted in an average of 18% decrease in weed biomass and a 13% increase in grain yield. Therefore, larger seed may result in increased yield potential of the current crop and decrease weed problems in future crops.

Overall, the research showed that the use of large seed and shallow seeding independently resulted in higher grain yield, less weed biomass and fewer weed seeds in the threshed grain sample. The magnitude of positive effects was similar for both independent factors. Although using larger seeds means using a larger volume of seed per hectare, the economics in this study showed that averaged across years and crops, for each 1 kg/ha invested in seed, the return was 10 kg/ha of grain; a 10 to 1 return on investment. This study shows how subtle improvement in management such as the use of large seed and shallow seeding can increase the productivity of organic oat and barley production.

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Katherine A. Stanley and Martin H. Entz (2019). Can large seed size compensate for deep seeding in organic barley (*Hordeum vulgare*) and oat (*Avena sativa*) production? An assessment of farm-saved seed. *Org. Agr.* 9:373–381. <https://doi.org/10.1007/s13165-018-0239-5>