

# How Does Seed Quality from Farmer Saved Seed Impact Final Organic Crop Performance?

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## BARLEY, OATS AND WHEAT

Increased seed size → early vigour and early season biomass - essential to gain a competitive advantage on weeds.

### Benefit of saving seed on farm:

- Savings from seed cost
- Provides guaranteed access
- Cultivar mildly adapted to the land

### Downsides of saving seed on farm:

- Non-uniform seed size
- Seed-borne diseases difficult to control after few years

If farmers used saved seed, what proportion of that saved seed would be larger sized seed?

Crop	Small Sieve Size (5-6 64th x ¾)	Medium Sieve Size (5-6 64th x ¾)	Large Sieve Size (6-7 64th x ¾)
Proportion of Seed Lots (%)			
<b>Oat</b>	31-40%	33-34%	12-28%
<b>Barley</b>	31%	25-37%	24-54%

Seed sizes won't add up to 100 due to cracked or damaged seed

## WHAT IS THE EFFECT OF SEED SIZE AND SEEDING DEPTH ON CROP AND WEED BIOMASS, YIELD, AND DOCKAGE?

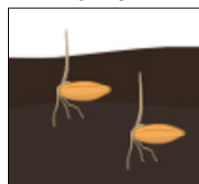
Data are from an experiment conducted at the Carman Research Station at the University of Manitoba in 2015 and 2016. The purpose of the experiment was to examine the effect of increased seed size and seeding depth on organic crop performance.

Seeding depths: 1", 2.5"

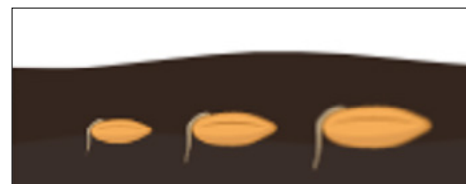
Seed sizes: small, medium and large

Seed lots: 3-5 farm-saved seed lots

### Seeding Depth



### Seed Size



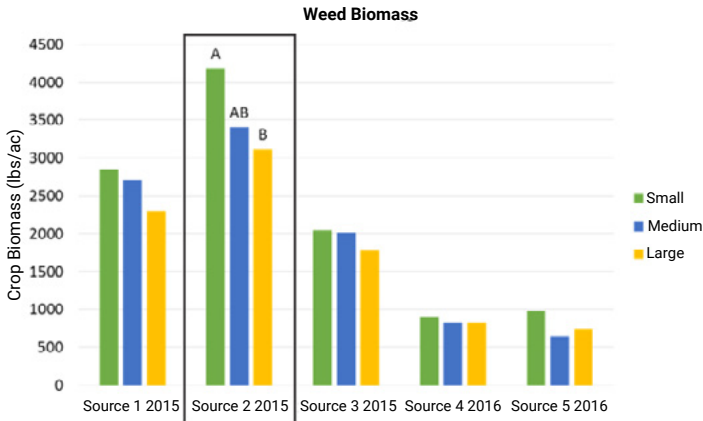
**Seasonal characteristics:** There was heavier early season weed biomass in 2015 than 2016 due to dry spring conditions in 2016

## RESULTS:

There was no benefit or downside to combining a certain seed size with a certain seed depth. The effects of seed size and seed depth were consistent across the treatments in all three crops.

# BARLEY

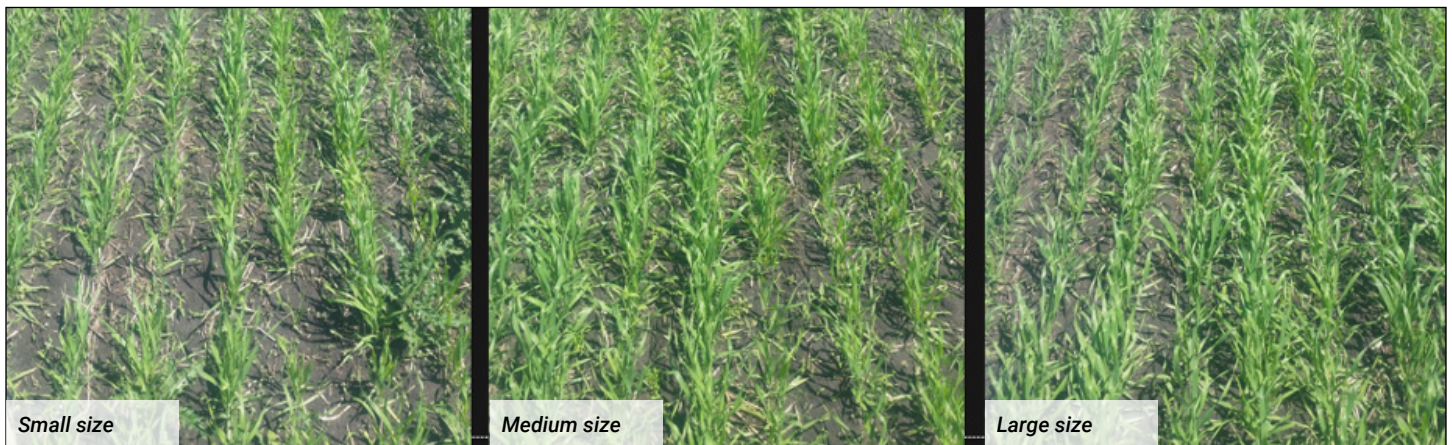
## Seed Size Impacts



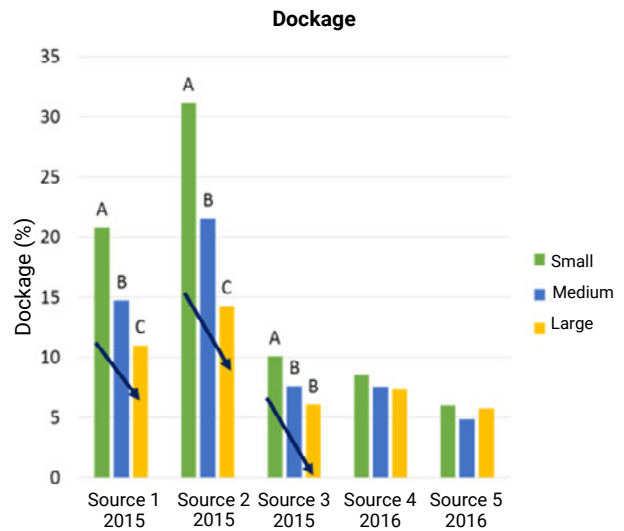
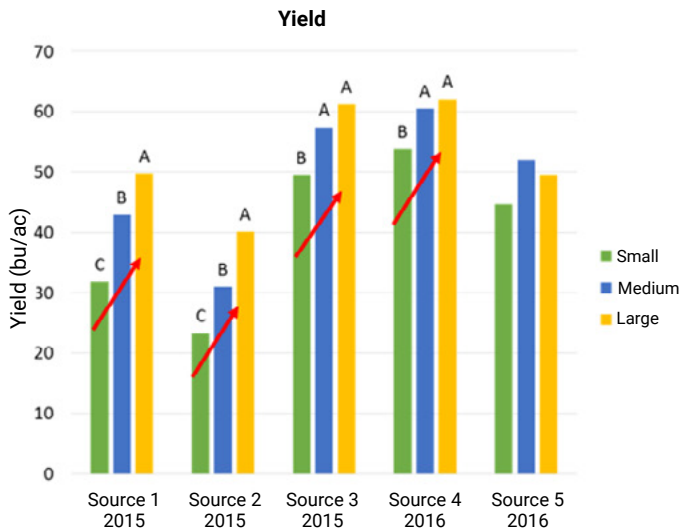
Seed size had the largest impact when the crop was competing with heavy weed pressure (2015)

2016 had lower weed biomass, reducing the effect seed size had on weed populations.

←

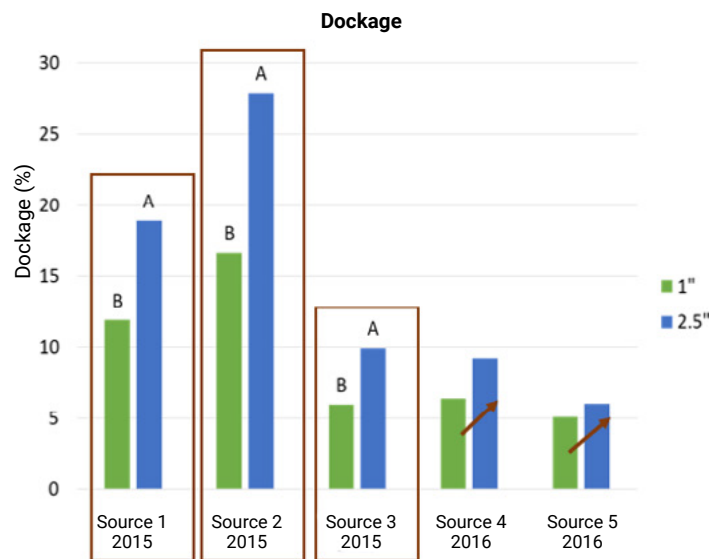
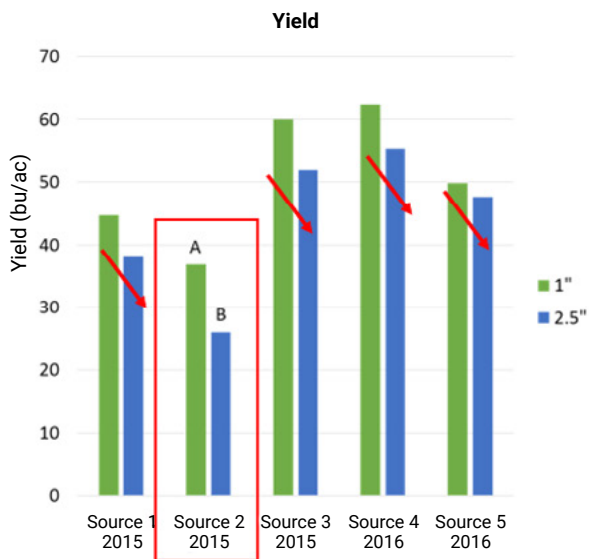


Seed size impacts on early vigour in barley.



Yield was lowest and dockage was highest for *Source 2 2015* because that treatment had the highest weed biomass. Larger seed size resulted in higher yields, and when weed competition was high, lower dockage.

## Seed Depth Impacts



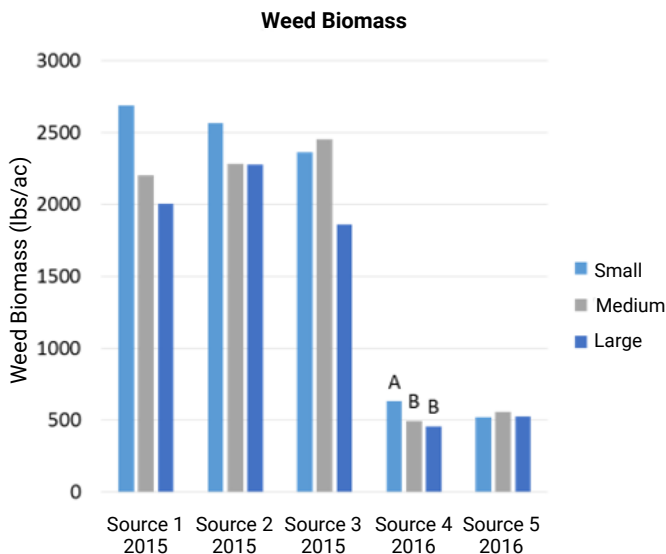
There were no significant differences between seeding depth for yield except when weed competition was high (Source 2, 2015). Shallow seeding depth (1") increased yield, and decreased dockage losses.



Seed depth impacts on early vigour in barley.

## OATS

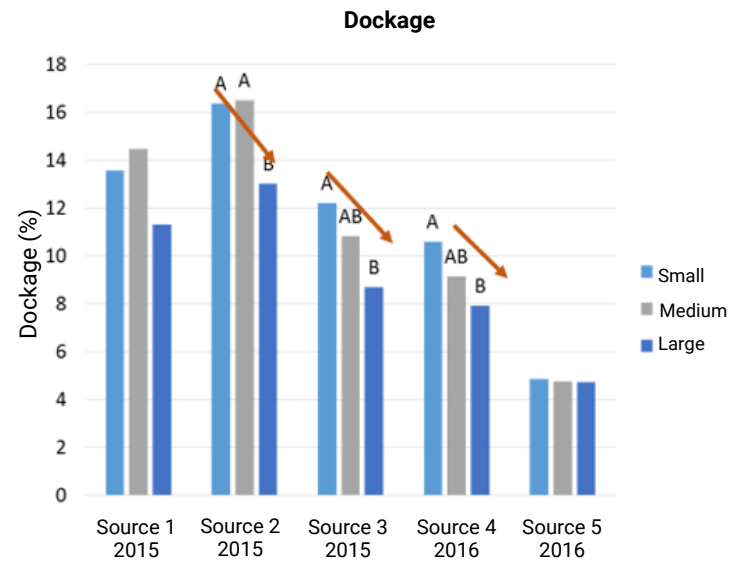
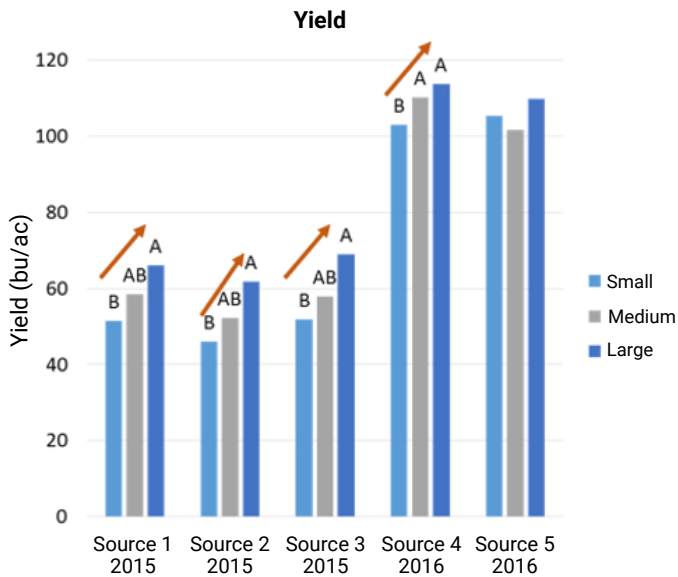
### Seed Size Impacts



Seed size had a significant effect on seed size only in Seed Source 4. However, there is a pattern that larger seed size does reduce weed biomass in oats.

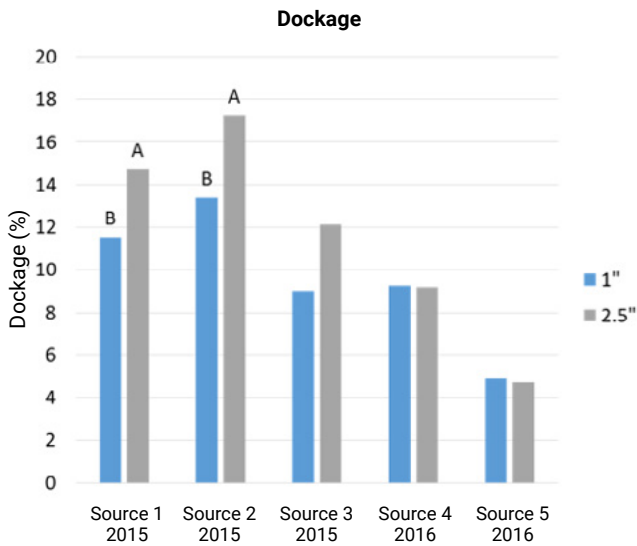
Oats are very competitive against weeds; this may be why significant differences were not observed.





Although seed size did not significantly impact weed biomass, yield increased and dockage decreased with increasing seed size.

### Seed Depth Impacts

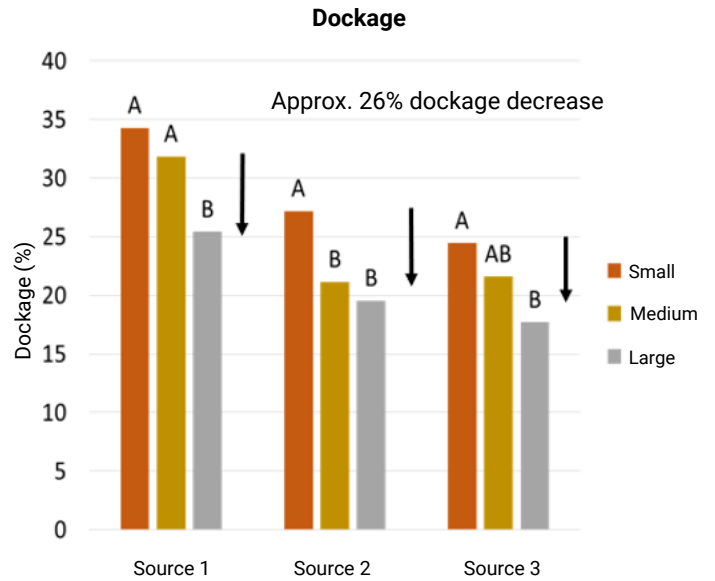
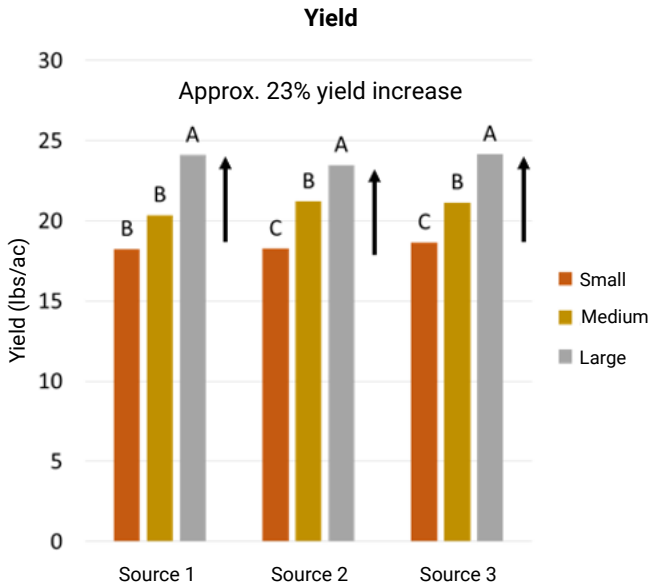


Dockage was significantly higher when the crop was seeded at 2.5" depth for source 1 and 2. Yield did not differ between seeding depths for the same sources (1 and 2). ←



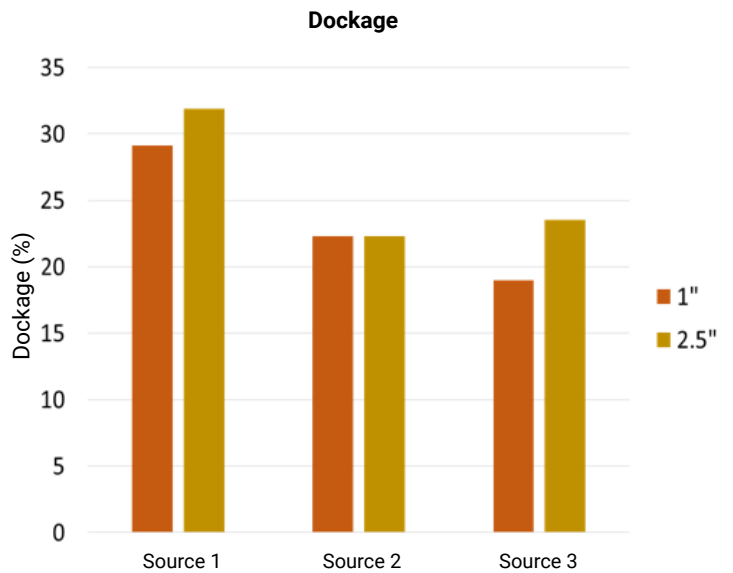
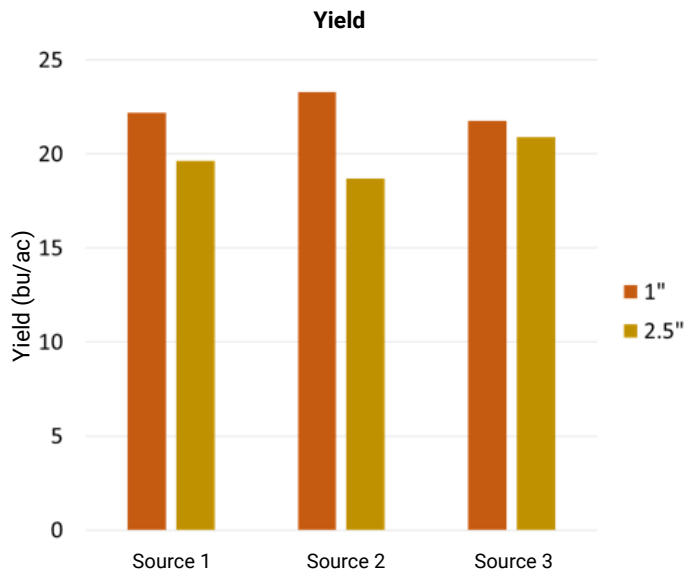
# WHEAT

## Seed Size Impacts



Seeding larger seed size resulted in an average of 23% yield increase over seeding smaller seeds, and a 26% dockage decrease.

## Seed Depth Impacts



Although visually yield was slightly higher when wheat was seeded at 1" depth versus 2.5" depth, high variability resulted in seeding depth having no significant impact on yield.

## TAKE HOME MESSAGES:

- Barley seed size reduced weed biomass when weed biomass was heavy in 2015. Oat seed size didn't impact weed biomass which may be due to oat's higher competitive ability.
- Sieving for larger seed is advantageous for organic farmers, larger seed size resulted in higher yields and lower dockage (especially in heavy weed pressure) for barley, wheat, and oats.
- Shallow seeding depth increased yield and reduced dockage in barley and oats, but did not change yield or dockage in yield due to high variability.

## Acknowledgements

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## REFERENCES

1. Stanley, K.A., Entz, M.H., 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. Agric. 9, 373–381. <https://doi.org/10.1007/s13165-018-0239-5>