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Getting to higher canola emergence

With consistent depth, placement into warm, moist soils, and good competition against weeds, your canola fields can turn a higher percentage of seeds into mature, high-yielding plants

By Jay Whetter



Bob Bartley checks on his canola stand establishment in early June 2019. *Photo: Supplied*

Bob and Shelley Bartley raised some eyebrows when Shelley shared photos of their seeding tool on Twitter. The farmers from Roland, Man., seed with a 35-year-old John Deere hoe box drill attached to a new John Deere cart. “I bought that John Deere 9450 hoe drill for \$17,000 way back when,” Bob Bartley says. “We worked away on this setup for 10 to 15 years to get it to where it is now.”

The drill has three ranks of openers with about 18 inches between each and seeds rows on seven-inch spacing. Bartley follows a minimum-tillage program on his sandy loam soil, usually hiring a custom applicator to deep-band fertilizer in the fall. This pass provides just enough residue management to allow for a smooth seeding operation with his drill.

Bartley doesn’t put any fertilizer down with his seed and works at a speed that allows the hoe drill to achieve fairly good stand establishment.

Bartley uses the agronomy services of Jason Voogt, owner of Field2Field Agronomy based in Carman, Man. “With Bob, we aim for seven surviving canola plants per square foot, and the seeding rate is usually around five pounds per acre,” Voogt says. “Though it’s an antique and moves a little dirt, the drill is very easy on the seed and Bob usually gets a pretty good catch.”

Voogt says that Bartley’s emergence percentage was even higher than expected in 2019 because he ended up with around nine plants per square foot. “He seeded the third week of May, so the soils were warm and emergence was fast,” Voogt says.

All in all, Bartley has taken the steps necessary to achieve the recommended canola stand of five to eight plants per square foot — emerging uniformly — with one of the older seeding tools still in use on the Prairies. Autumn Barnes, agronomy specialist with the Canola Council of Canada, says “Bob Bartley’s experience with his older drill demonstrates



Bob Bartley’s seeding unit, a 35-year-old John Deere 9450 hoe drill with a new seed tank. photo: Supplied

that the fundamentals of good stand establishment are more about the end goal and not so much about buying the newest piece of equipment.”

One factor with Bartley’s drill is narrow row spacing. This has its advantages but may not be ideal in all scenarios.

Narrow row benefits

More seed-placed fertilizer. More rows per acre mean higher seedbed utilization (SBU), which allows for higher safe rates of seed-placed fertilizer. The recommended safe rate of seed-placed fertilizer for six-inch row spacing is twice that of 12-inch spacing. With the same seed and fertilizer rates per acre, a drill with narrower rows will have less seed and fertilizer per row, which reduces proximity and improves seed safety. Interestingly, even with his narrow rows, Bartley doesn’t put any fertilizer in the seed row.

More weed competition. This hasn’t been a major issue since herbicide-tolerant canola came along. In-crop sprays effectively remove the weed competition, so the integrated weed management advantage of rapid ground cover from narrow rows hasn’t been much of a factor. But it could be. For one thing, crops slow to cover the ground will need two or more in-crop sprays to set back the weed competition. This increases costs. It also increases the likelihood of selecting for herbicide-resistant weeds, and it increases the chances of active weeds growing in the canopy and causing problems at harvest. A twist to the weed conversation is that the increased soil disturbance with narrower rows can cause more weed seeds to germinate.

Lower yield loss. The risk of yield loss is higher as row widths get very wide. Lewis Baarda is a research scientist with Farming Smarter, an applied research organization based at Lethbridge, Alta. Baarda led a recent study that compared canola in 20-inch versus 12-inch rows — both seeded with a planter.

“The 20-inch rows had a pretty heavy yield penalty across the board,” Baarda says. The plant population on wide rows just isn’t high enough to capture the yield potential of the crop. “Planters seem like a good tool, but wide rows are detrimental,” he says.

Reduced canola-to-canola competition. This gets tossed onto the list, but researchers don’t really have a



Depending on what you want your plant stand to accomplish, the choice between narrow or wide rows is yours. photo: Supplied

good handle on how close together canola seeds and plants can be before they start to impede each other to the point that the seed doesn’t germinate or the plants die off. With eight plants per square foot on 12-inch spacing, this probably won’t be a noticeable factor, but when those eight plants are split into two rows, the seeds and plants do have more room. Is this an advantage?

Steve Shirtliffe, a professor and researcher at the University of Saskatchewan, has a new study looking into the spatial dimension of canola seeding rates. “Ideally, what we’d like to know is how much space does a canola seed need to maximize yield,” Shirtliffe says, adding that eliminating competition altogether is the wrong objective. “Competition within a stand is good,” he says. Otherwise, you have a few large plants that mature much later and yield lower.

Wide row benefits

Retain more moisture. Knives on narrow rows can still move a lot of soil. Paired-row openers are like mini cultivator shovels and can leave fields blackened, even in a no-till situation. That is why canola farmers in drier areas usually opt for narrow openers such as knives or disks on wider row spacing. “Row spacing of 10 to 12 inches is often the preferred choice in traditionally dry regions to reduce soil disturbance and retain as much topsoil moisture as possible,” Barnes says.

Reduce soil coverage over front rows. With wider rows, seed depth can be more consistent because front-row runs are less likely to be buried by soil thrown from middle and back rows. This will be a bigger problem at higher speeds, even with wider rows, Barnes says.

Residue clearance. With any row width, farmers want an opener that can penetrate residue to place seed into the soil. But in full no till, wider row spacing can improve the flow of soil surface residue through the seeding tool.

Lower machinery costs. Narrower rows mean more shanks, openers and hoses per foot of seeding tool, which can increase the cost somewhat. “Given how long drills can last and the other important agronomic factors to consider in seed row spacing, growers will decide whether the cost difference between eight, 10 or 12-inch spacing is a factor for them,” Barnes says.



Bob Bartley with his father Bruce. photo: Supplied

Possibility for mid-row banding. Wider rows make it possible to use mid-row openers for fertilizer placement, which can be an option to improve the logistics of putting down high rates of fertilizer in a one-pass system in a low disturbance scenario.

The universal goals to improve emergence

To repeat, canola performance is maximized with a stand of five to eight plants per square foot emerging evenly to produce a uniform stand. Farmers can achieve this whether their approach is based on narrow or wider rows. The following factors can make a big difference to emergence percentage and seed return on investment:

Uniform depth and seed spacing. Lewis Baarda’s recent planter study also compared the two planter treatments — canola at 20- and 12-inch row spacing — to an air drill treatment with 10-inch spacing. He says the planter showed clear advantages for consistency of seed depth and seed spacing. “These make a difference when it comes to establishment of a uniform canola stand,” Baarda says.

This consistency improves seed survival, canola stand establishment and seed return on investment, and Baarda says it also translated into higher yield in about half of their trials. Another canola study led by Chao Yang and Yantai Gan, research scientists with Agriculture and Agri-Food Canada in Swift Current, Sask., found that spatially uniform stands increased seed yield by up to 32 per cent at low-yielding sites and by up to 20 per cent at high-yielding sites. Yang and Gan found that the yield differences were largest with stands of 40 plants per square metre (or around four per square foot) or less. Barnes adds that consistent seed depth can be achieved with most seeding tools that are levelled, have good openers and are operated at a speed that allows them to work at their best (see Table 1 below).

Uniform stands yield more, especially at lower plant densities.

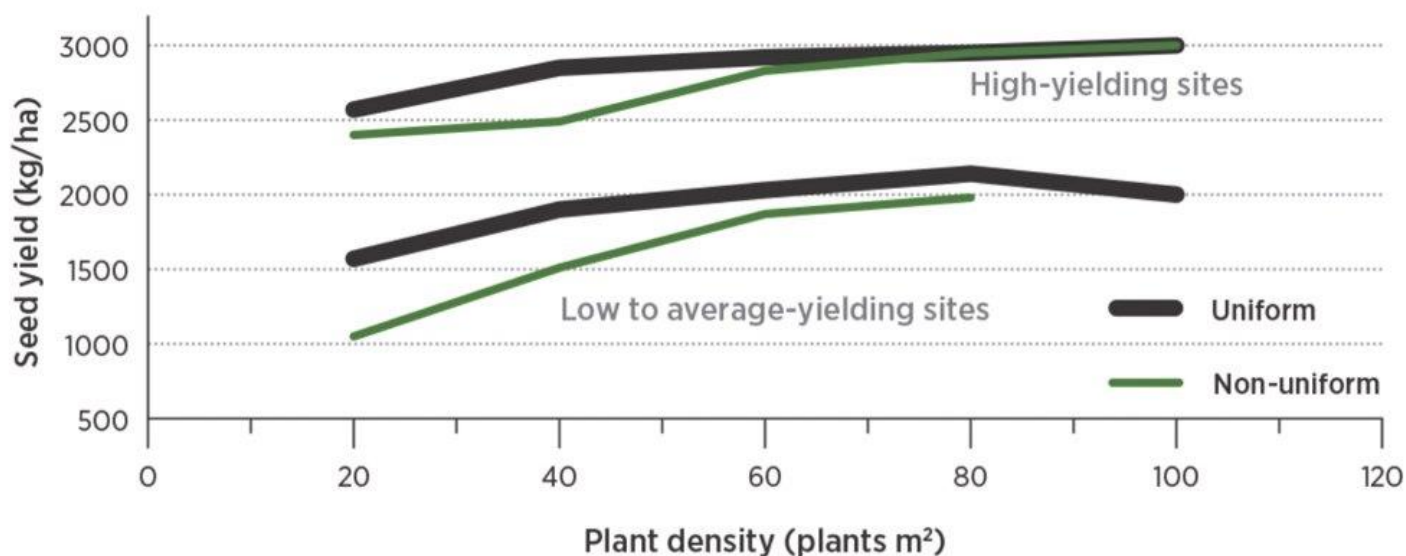


Table 1. photo: File

Seeding speed. At higher speeds, rear openers tend to throw more soil over the front rows. And at higher speeds, drills have more variability in operating depth. Bartley operates his hoe drill at 4.5 m.p.h. for canola “unless there are storm clouds on the horizon.” Barnes recommends that farmers find a speed that suits the seeding tool and the field conditions. “Set a speed that allows the tool to perform to the best of its abilities while balancing the need for a timely seeding operation,” she says.

Less flowering time, more pod filling time. Another study led by Yantai Gan showed a shorter flowering period, which is achieved with higher plant populations and uniform stand, relates to higher yields. Gan compared results for stands of 20, 40, 60, 80 and 100 canola plants per square metre (or around two, four, six, eight and 10 plants per square foot). On average, the thin stands (20 per square metre) flowered for two to three days longer compared to dense stands (80 per square metre), and plots that flowered longer had lower yields. Gan also found that the time from the end of flowering to pod maturation had a significant positive effect on canola seed yield. “The gist is that a canola crop with a shorter flowering period will have more time left over for pod fill,” Barnes says.

Upgraded equipment can improve placement, emergence and efficiency, but no matter what seeding set up a canola farmer uses, the fundamentals of canola stand establishment are those steps that allow for a uniform stand with enough plants to meet the crop’s yield potential. “If farmers are getting five to eight plants per square foot, those plants are emerging at around the same time and seed survival is moving toward 75 per cent, then the seeding system is working,” Barnes says, even if that system is built around a 35-year-old hoe drill.

Bartley says his drill isn’t perfect. “We’ve gone to narrow carbide tips to move less soil, and it’s a challenge sometimes to get every rank seeding at the same depth,” he says. “But we’ve given an old drill new life and been able to achieve our canola stand establishment goals at the same time.”