

Canadian Agronomist



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Up to 32% higher yield with uniform canola stand establishment

CATEGORY [agronomy](#) | September 5, 2018

Spatially uniform plant stands increased canola yield by up to 32 per cent at low-yielding sites and by up to 21 per cent at high yielding sites compared to non-uniform plant stands.

Research by Agriculture and Agri-Food Canada research scientist Yantai Gan shows the importance of establishing optimum plant stands for high yield. Additionally, when the plant population falls below the Canola Council of Canada's recommended 70 plants per square metre (7 plants per square foot), having spatially uniform spacing of canola plants becomes even more important.

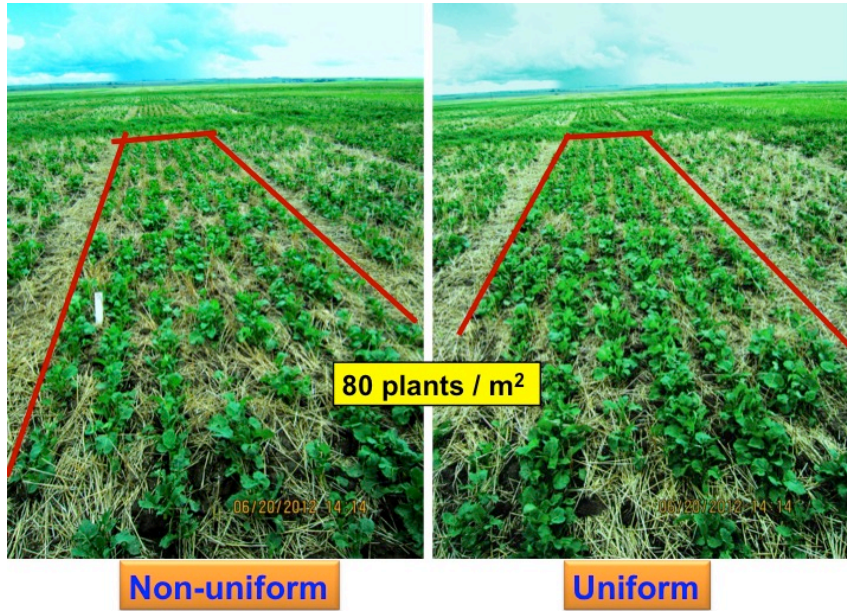
The research was conducted at Carman, Lacombe, Melfort and Swift Current in 2010, 2011, and 2012, at Brandon in 2010, Indian Head in 2011, and Morden in 2011 and 2012 for a total of 16 site-years across the Prairies.

The Liberty Link variety InVigor 5440 was seeded with a plot drill in the first to third week of May at 20-, 40-, 60-, 80-, and 100 plants per square metre to create uniform plant stands. Row spacing ranged from six inches at Carman to 12 inches at Lacombe.

Non-uniform plant stands were created by seeding at 100 plants per square metre and hand thinning at the three-leaf stage. For the non-uniform 80 plants per square metre treatment a 20 cm strip of plants were removed in each 1-metre row. Similarly, for the non-uniform density treatments of 60, 40 or 20 plants per square metre, a 40, 60 and 80 cm interval of the plant row was removed from each metre row. The non-uniform treatments were to represent poor stand establishment that can be caused by a variety of agronomic factors such as uneven planting depth, frost damage, uneven germination and early season insect damage.

Herbicides, fungicides and insecticides were applied as required.

Three weeks after emergence, plant density and emergence rate was calculated. Pod formation, seed set and canola yield were measured at maturity. Data analysis grouped Lacombe 2010, Lacombe 2011, Lacombe 2012, Melfort 2010, and Melfort 2011 as high-yielding sites with an average yield of about 65 bushels per acre (3690 kg/ha). The other low-yielding 11 site-years were grouped with an average yield of about 31 bushels per acre (1780 kg/ha.)

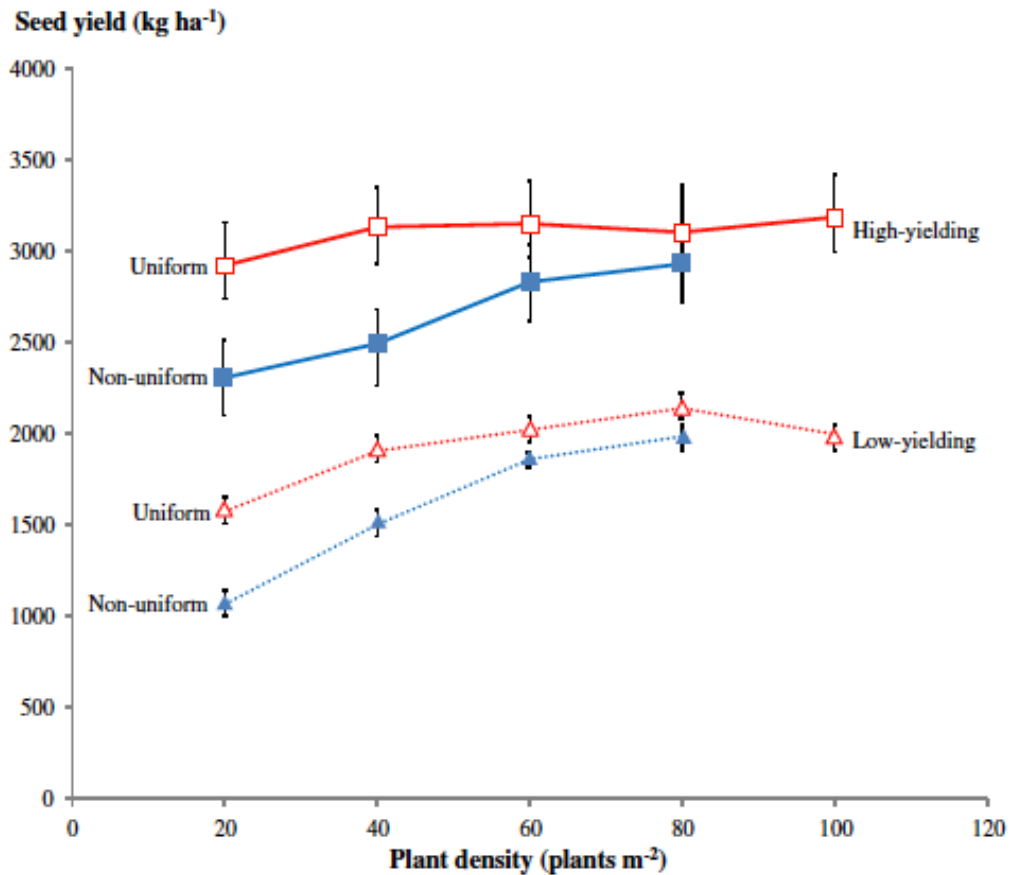


Yield influenced by plant population and uniformity

There was no difference in canola yield between a uniform and non-uniform plant stand when plant density was higher than 60 plants per square metre at high yielding sites. However, when plant density fell below 60 plants at the high yielding sites, the uniform plant stand out yielded the non-uniform stand by 21 per cent.

At low-yielding sites, yield with uniform plant stands was significantly higher at all plant populations. At the lowest plant population of 20 per square metre, uniform plant stands yielded 32 per cent higher than the non-uniform plots. For the remaining plant populations, uniform stands had higher yield by 21, eight, and seven per cent at the plant densities of 40-, 60-, and 80- plants per square metre.

Seed yield of canola grown at different densities in uniform versus non-uniform stands at low-yielding and high yielding sites in western Canada



Bars are standard error (n=9) of the mean. Significant differences were detected between uniform and non-uniform stands at both high yielding (P=0.0128) and low yielding (P<0.0001) sites when plant density is lower than 60-plants/square metre

SOURCE: Yang, C. et al (2014)

Uniform plant stands also resulted in more uniform pod set and more pods per plant, which resulted in more uniform maturity.

The researchers concluded that when overall plant density falls lower than the recommended plant population, the uniformity of plant stand becomes critical for yield because a uniform stand allows individual plants to use resources more efficiently than plants in a non-uniform stand.

Yang, C., Gan, Y., Harker, K.N. et al. *Agron. Sustain. Dev.* (2014) 34: 793.

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