



Assessing sunflower seeding and N rate

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An optimum seeding rate between 30,000 and 35,000 seeds/ac for hybrid 63A21 sunflower, and between 40,000 and 45,000 seeds/ac for open-pollinated AC Sierra was determined under no-till cropping systems in Saskatchewan. At N fertilizer prices of around \$0.50/lbs., the recommended N fertilizer rate based on this study was 80 lbs. N/ac for 63A21.

Seeding sunflowers on narrow rows in no-till systems has become common on the Prairies. Two studies were conducted in Saskatchewan to determine the optimum seeding and nitrogen (N) rates for short-season sunflowers in a no-till cropping system.

Optimum seeding rate differed between open pollinated and hybrid

The seeding rate study compared 7 seeding rates of 15,000, 19,800, 24,700, 30,000, 34,800, 39,700, 45,000 seeds/ac (37,000, 49,000, 61,000, 74,000, 86,000, 98,000, and 111,000 seeds/ha) with two cultivars, AC Sierra (open pollinated) and 63A21 (hybrid). This test was seeded at Indian Head, Melfort, Swift Current, Redvers, and Tribune, Saskatchewan, in 2013 and 2014, and at Indian Head in 2015. All locations used an air drill on 12 inch spacing with the exception of Tribune, which used a 71 flex planter with a cone and trash remover for no-till seeding. Fertilizer N was sidebanded at 80 lbs. N/ac (90 kg/ha).

Kernel weight decreased for both AC Sierra and 63A21 as the seeding rate increased. The hybrid 63A21 decreased by 10.7 g/1000 kernels from approximately 52 g to 41 g/1000 kernels when the

seeding rate was increased from 15,000 to 45,000 seeds/ac. The decrease in kernel weight as the seeding rate and plant density increase has been observed in almost all studies that measure the effect of seeding rate on kernel weight. However, these kernel weights were still acceptable.

The hybrid 63A21 saw an increase in yield of 25 bu/ac when seeding rate was increased from 15,000 seeds/ac with a yield of 95 bu/ac to a yield of approximately 120 bu/ac when planted at 30,000 seeds/ac. Above this rate, there was a small, numerical decrease in yields.

AC Sierra had a yield increase of 29 bu/ac when moving from a seeding rate of 15,000 seeds/ac with a yield of 51 bu/ac to 80 bu/ac at 39,700 seeds/ac, with little change above this rate.

The results indicate an optimum seeding rate between 30,000 and 35,000 seeds/ac for 63A21 and between 40,000 and 45,000 seeds/ac for AC Sierra under no-till cropping systems. The optimum target plant density for both cultivars was around 28,300 to 30,400 plants/ac. This is approximately 40% greater than the 20,000 to 22,000 plants/ac currently recommended in Manitoba for oil-type sunflowers.

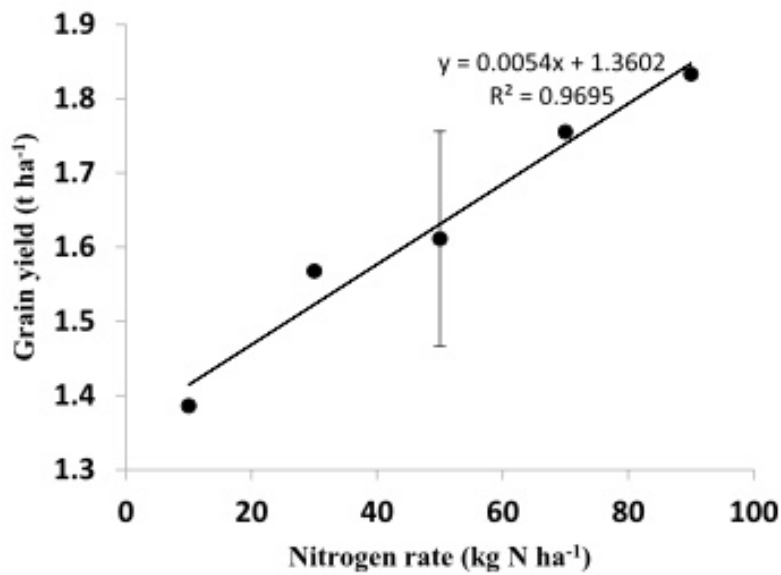
Sunflowers were responsive to high N rates

The N rate study compared 5 N rates of 9, 27, 45, 62, and 80 lbs. N/ac (10, 30, 50, 70, and 90 kg N/ha). The sunflower hybrid 63A21 was seeded at Indian Head, Outlook, Swift Current, and Tribune in 2010, Indian Head and Swift Current in 2011, and Indian Head, Swift Current, and Tribune in 2012. With the exception of Tribune, where a 71 flex planter with a cone was used, 63A21 was seeded at 45,000 seeds/ac (111 000 plants/ha) using an air seeder on 12 inch row spacing at all locations.

At all sites except Outlook and Tribune, residual N ranged from approximately 12 to 31 lbs. N/ac (13–35 kg/ha) in the top 60 cm of soil. At Outlook, residual levels of N were very high, at over 287 lbs. N/ac (323 kg/ha), and 67 lbs. N/ac at Tribune

In the study, there was a linear increase in grain yield as N fertilizer application rate was increased up to the highest rate. Yield rose from 102 bu/ac with 9 lbs. N/ac up to approximately 135 bu/ac at the 80 lbs. N/ac rate.

Relationship of nitrogen rate and average grain yield at several locations across Saskatchewan for sunflowers from 2010 to 2012



Source: May et al. 2018

At N fertilizer prices of around \$0.50/lbs., the recommended N fertilizer rate based on this study was 80 lbs. N/ac in Saskatchewan under a no-till cropping system. Further information on no-till sunflower production is now available at <https://sksunflowers.com/>

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May, WE, Dawson, MP, Lyons, CL. 2018. Response of sunflowers (*Helianthus annuus* L.) to varying seeding rates and nitrogen fertilizer rates in a no-till cropping system in Saskatchewan. *Can. J. Plant Sci.* 98:1331-1341, <https://doi.org/10.1139/cjps-2017-0313>