

Factsheet: Incorporating tillage radish in annual crop production systems



Objective:

The objectives of this experiment would be to determine

- 1) When tillage radish should be seeded to maximize cover crop establishment and biomass accumulation
- 2) What effects tillage radish have on its companion cash crop and N nutrient dynamics and
- 3) If incorporating tillage radish in an annual cropping system will provide benefits in terms of improved seed yield and quality in the proceeding crop.

Methodology:

Field trials were conducted at Scott in the 2014 and 2015 growing seasons. A 2 x 5 factorial experiment in a randomized complete block design with four replicates was set up. The first factor was nitrogen rate (100 % and 150 % of soil test recommendation) and the second factor was tillage radish incorporation time (50 % flowering, hard dough, postharvest-drilled-in, postharvest-harrowed and check (no radish)). The tillage radish was broadcast into seeded wheat at 50% flowering and hard dough stage.

Table 1. Treatment Lists for the 2014 and 2015 growing seasons at Scott, SK.

Trt #	2014	2015
1	100% N, no tillage radish	100% N, no tillage radish
2	150% N, no tillage radish	150% N, no tillage radish
3	100% N, tillage radish broadcast at 4-5 leaf stage	100% N, tillage radish broadcast at 50% flowering
4	150% N, tillage radish broadcast at 4-5 leaf stage	150% N, tillage radish broadcast at 50% flowering
5	100% N, tillage radish broadcast at 50% flowering	100% N, tillage radish broadcast at hard dough stage
6	150% N, tillage radish broadcast at 50% flowering	150% N, tillage radish broadcast at hard dough stage
7	100% N, tillage radish broadcast at hard dough stage	100% N, tillage radish post-harvest, broadcast, harrow
8	150% N, tillage radish broadcast at hard dough stage	150% N, tillage radish post-harvest, broadcast, harrow
9	100% N, tillage radish broadcast immediately after harvest	100% N, tillage radish post-harvest, drilled-in
10	150% N, tillage radish broadcast immediately after harvest	150% N, tillage radish post-harvest, drilled-in

Key Findings:

- Tillage radish population and radish root length were both significantly affected by broadcast timing.
- Wheat yield was significantly affected by nitrogen rate but not by radish broadcast timing. This may be because in order for the tillage radish to positively influence the cash crop yield, it requires proper establishment and an extensive rooting system for nutrient cycling.
- Both in-crop broadcasts are not significantly different compared to each other, but significantly different from the postharvest broadcasts.
- The drilled-in method facilitated seed to soil contact, resulting in a higher emergence compared to the other broadcast methods.
- Both the postharvest timings did not reach the stages for root length measurements.
- From the study it can be concluded that radish timing does not interfere with the cash crop yield at least in the year of seeding, but variable N rates can effectively alter crop yields.

- However, the broadcast timing influences radish establishment and root biomass, and thus affecting its function of soil structure improvement.
- Based on the results and from other studies, farmers can incorporate radish at seeding time (by drilling) up to the hard dough stage (by broadcasting) in cereals.

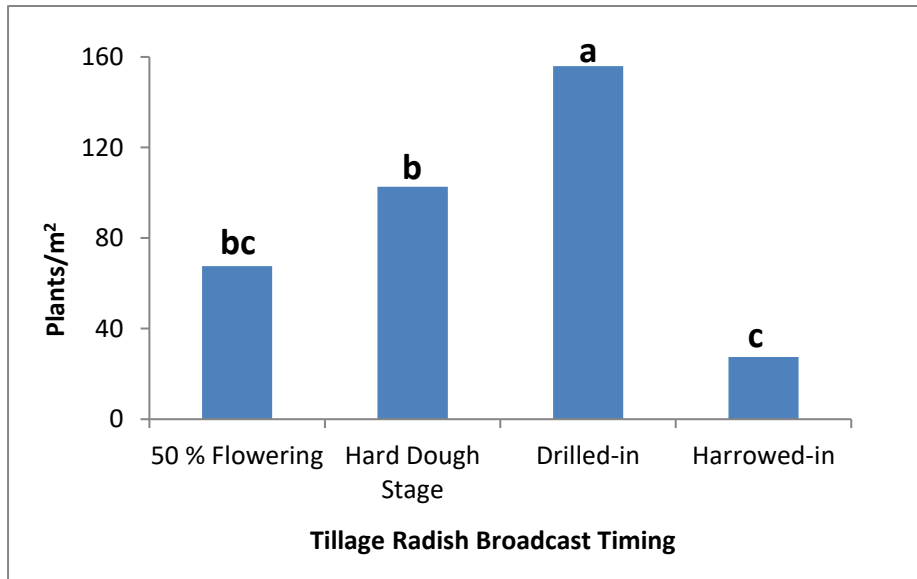


Figure 1: Effects of tillage radish broadcast timing on radish emergence for 2015 growing season at Scott; SK. Vertical bars followed by the same letters are not significantly different according to Tukey’s Honestly Significant Difference (HSD) ($P > 0.05$).

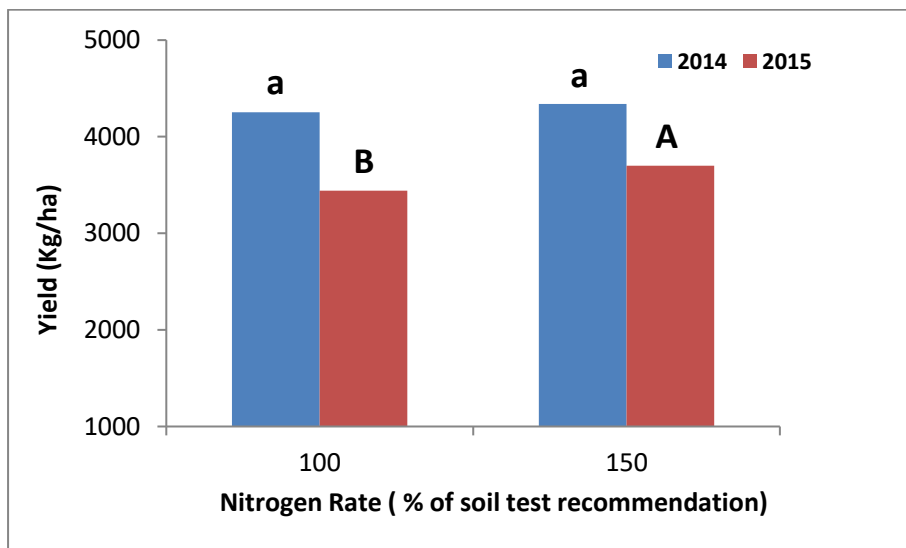


Figure 3: Effects of N rate on wheat yield for 2014 and 2015 growing season at Scott, SK. Vertical bars followed by the same letters are not significantly different according to Tukey’s Honestly Significant Difference (HSD) ($P > 0.05$).