Effects of Intercropping and Tramlines on Wheat Yield

Steve Prochaska, Agriculture and Natural Resources Extension Agent

Objective

To evaluate the effects of a modified relay intercropping system and tramlines on wheat yield.

Background

Cooperator:	OSU Unger Farm	Fertilizer:	27-69-90 in fall 1997
County:	Crawford		95 lbs/A N topdressed
Tillage:	Disked (2x)	Herbicides:	2,4-D ester (1 pt/A)
Previous Crop:	Soybean	Varieties (W):	X15 and Agra 962
Drainage:	Systematic	Planting Date:	October 5, 1998
Soil Test:	pH 6.9, P 31 ppm, K 122 ppm	Planting Rate:	120 lbs/A
		Interseeding Date:	June 9, 1999

Methods

Wheat was planted in a 10-inch row spacing (with two 20-inch tram lines) with a 15-foot Great Plains drill on Oct. 5, 1998. Soybeans were planted into the 10-inch row wheat on 6/9/99 with the same drill as used to plant wheat. Wheat had completed flowering. Drill was on a three-point hitch of the tractor for planting of soybeans into wheat.

Results

Table 1. Agra 962 Wheat Yields in a MRI System by Unit Area*.

Variety	Rep 1	Rep 2	Rep 3	Rep 4	Average
Agra 962	95.9	101.8	100.6	97.5	98.9
Agra 962 with Tramline	81.4	76.6	79.6	80.7	79.6

F value: 12.62, significant; Coefficient of variation 2.73%; LSD 4.22.

*Agra 962 from six rows of wheat vs. Agra 962 with tramline four rows of wheat and 10-inch space.

Table 2. X15 Wheat Yields in a MRI System by Unit Area*.

Variety	Rep 1	Rep 2	Rep 3	Rep 4	Average
X15	90.5	95.1	88.9	72.1	86.7
X15 with Tramline	72.1	76.9	74.7	72.9	74.15

F value: 5.92, not significant; Coefficient of variation 9.04%.

*X15 from six rows of wheat vs. X15 with tramline four rows of wheat and 10- inch space.

Table 3. Agra 962 Wheat Yields in a MRI System by Drill Width*.

Variety	Rep 1	Rep 2	Rep 3	Rep 4	Average
Agra 962	95.9	101.8	100.6	97.5	98.9
Agra 962 (15')	87.8	88.7	88.9	88.1	88.2

F value: 60.7, significant; Coefficient of variation 2.1%; LSD 3.4.
*Six rows of wheat vs. 15-ft. weighted tramline wheat yield.

Table 4. X15 Wheat Yields in a MRI System by Drill Width*.

Variety	Rep 1	Rep 2	Rep 3	Rep 4	Average
X15	90.5	95.1	88.9	72.1	86.7
X15 (15')	80.2	84.7	81	72.1	79.5

F value: 1.58, not significant; Coefficient of variation 9.67%.
*Six rows of wheat vs. 15-ft. weighted tramline wheat yield.

Summary and Notes

The fall weather was very conducive to wheat growth and development. Wheat as of Dec. 10, 1998, had formed three to five tillers per plant. All wheat was heavily tillered in 1999. Interseeding of soybeans was not as damaging to wheat in 1999 as in 1998. This was due to the two red wheat varieties standing very straight in the field which facilitated interseeding of soybeans by the grain drill. The effect of interseeding soybeans into wheat in 1999 was not statistically significant as evidenced by the comparison of MRI wheat yields measured without the tramline to the same wheat varieties in the Ohio Wheat Performance Test also on the Unger Farm. Thus, the differences in wheat yield in a MRI system and a conventional production system can be attributed in 1999 to the presence of the tramline.

If wheat yield in a MRI system is divided into one area measured with the tramline and one area measured without the tramline (Tables 1 & 2), a wrong conclusion as to the effect of MRI yield might be drawn because the tramline is not equally present throughout the field. Thus, an equation was developed to represent wheat yield in a field with tramlines. Dividing the field into equal 15-foot drill widths (18 hole drill with two holes stopped to form tramline), the total area in a field with the tramline effect was calculated to be 55.5% (10 rows/18 rows). Thus, a weighted yield for tramline effect can be calculated: MRI wheat yield = (0.555 x tramline area wheat yield) + (0.445 x unaffected area wheat yield).

Weighted yields for MRI yield are compared to wheat yields unaffected by tramlines in Tables 3 and 4. The difference between Agra 962 wheat yield (no tramline) and Agra 962 wheat with a tramline is significant and the average difference is 10.7 bushels/acre. This yield difference expressed as a percent of the no tramline Agra 962 is very close to the proportion of ground area lost to the tramlines within a 15-foot drill pass (11%). There was not a significant difference in X15 wheat yields (Table 4) with a tramline and without a tramline.

For additional information, contact:
Steve Prochaska
The Ohio State University Extension
prochaska.1@osu.edu