Shank-Till Air Drill vs. Row Crop Planter in Corn

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Large shank-till air drills with seed and fertilizer hoppers that hold several hundred bushels of product have allowed producers to plant well over 40 acres/hr, placing all the seed and fertilizer in a one-pass, no-till system. Historically, these producers were also required to own a large row-crop planter to achieve proper seed singulation for corn planting. Presently, a few thousand acres of corn have been planted with air drills planting 7-inch paired rows on 30-centers with some success. It was the objective of this study to compare corn planted in 30-inch rows with a row crop planter (Monosem) to corn planted in 7-inch paired rows on 30-inch centers with a shank-till air drill (Horsch-Anderson). Both systems allow harvesting with conventional 30-inch corn heads.
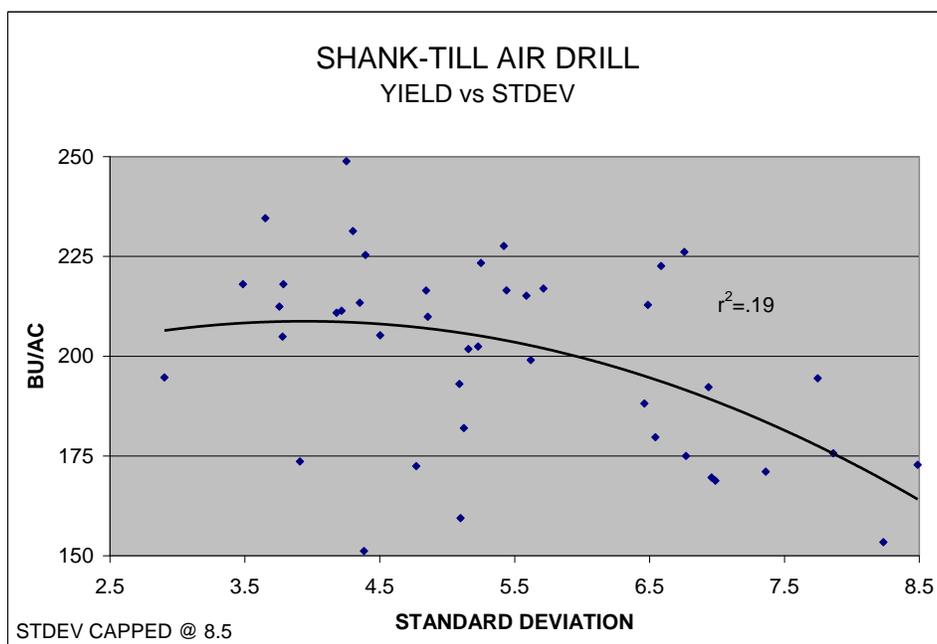
Materials and Methods

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Soil:	Maddock sandy loam; soil-N 25, soil-P and soil-K were very high, soil-S was very low.
Previous crop:	2007 – soybean; 2006 – field corn; 2005 – field pea and potato.
Seedbed Preparation:	Fall coulter chiseled. Worked with soil finisher once on May 15.
Planting:	Planted Pioneer 38H65 with a Horsch Anderson (air drill with triple shoot boots on a shank) (33,000 seeds/acre) and with a Monosem (double disk row openers) (33,000 seeds/acre) on May 16.
Plots:	Shank-till air drill plots were 17 ft. long by 7.5 ft. wide with three paired rows (7 inches between pairs) on 30-inch centers. Monosem planted plots were 17 ft. long by 10 ft. with four 30-inch rows. The plots were in pairs, with 48 replicates.
Fertilizer:	April 21, broadcast 28 lbs. N/acre, 44 lbs. P_2O_5/acre, 55 lbs. K_2O/acre and 22 lbs. S/acre as 10-16-20-8. Horsch Anderson plots also received 12 lbs. N/acre and 40 lbs. P_2O_5/acre of 10-34-0 at planting. Stream-bar 60 lbs. N/acre as 32-0-0 on May 16. Side dressed 140 lbs. N/acre as 32-0-0 on June 17.
Irrigation:	Overhead sprinkler irrigation as needed.
Pest control:	Buccaneer Plus (32 oz/acre) + NIS (0.5% v/v) + AMS (1 lb/10 gal) on June 7, Cornerstone Plus (40 oz/acre) + AMS (1 lb/10 gal) on June 27 and hand weeding for weed control.
Harvest:	Harvested on November 12 with a Hege plot combine. Harvest area one center row or center paired row 17 foot long.

Results

Corn grain yields were higher with the row-crop planter and standard deviations (STDEV) were lower than the shank-till drill. Figures 1 and 3 suggest that higher yields with the row-crop planter were due to its ability to provide a very low STDEV of 1.96 compared to 5.95 for the shank-till drill. As STDEVs increased the row-crop planter produced yields of about 210 bu/ac at a STDEV of about 2.5, compared to a similar yield with the shank-till air drill at a STDEV of 3.5. Standard deviations from four producers including 10 fields (40 measurements), averaged 2.3 at Oakes, North Dakota, in 2006. When the STDEV of the row-crop planter reached 2.3, corn grain yielded 214 bu/ac. The shank-till air drill yielded 208 bu/ac at a STDEV of 3.5.

Treatment Name	Grain Yield bu/ac	Grain Moisture %	STDEV	Population plants/ac
Shank-Till Air	198.5	24.6	5.95	33524
Row Crop	218.3	25.0	1.96	33631
Mean	208.4	24.8	3.95	33577
LSD 0.05	8.2	NS	0.83	NS
C.V. (%)	9.5	5.0	50.9	12.7

SHANK-TILL AIR DRILL
YIELD vs STDEV

$r^2 = .19$

BU/AC

STANDARD DEVIATION

STDEV CAPPED @ 8.5

Figure 1. The effect of STDEV on corn yield when planted with a shank-till air drill at the Oakes Irrigation Research Site in 2008.
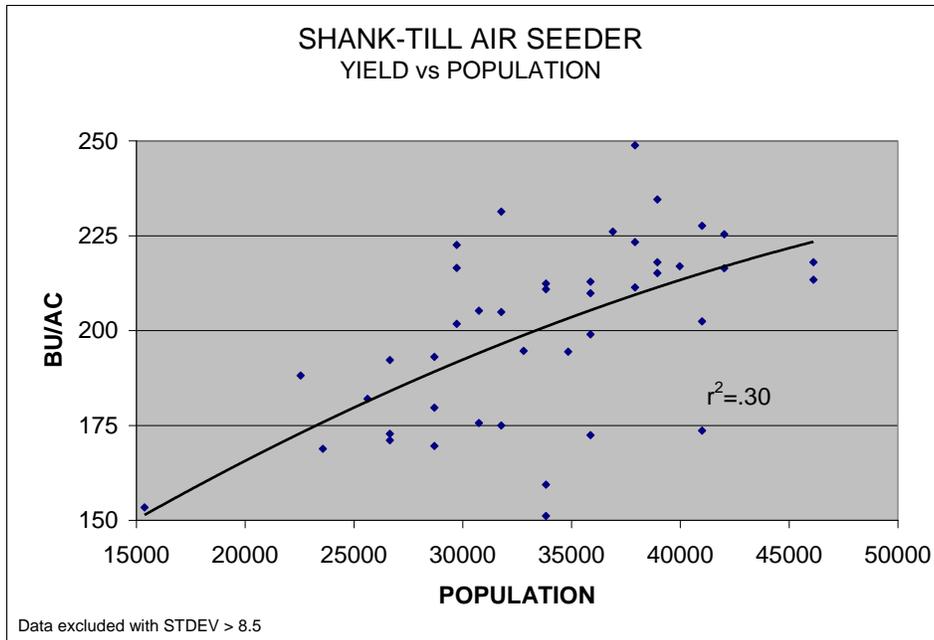
Figure 2. The effect of population on corn yield when planted with a shank-till air drill at the Oakes Irrigation Research Site in 2008.
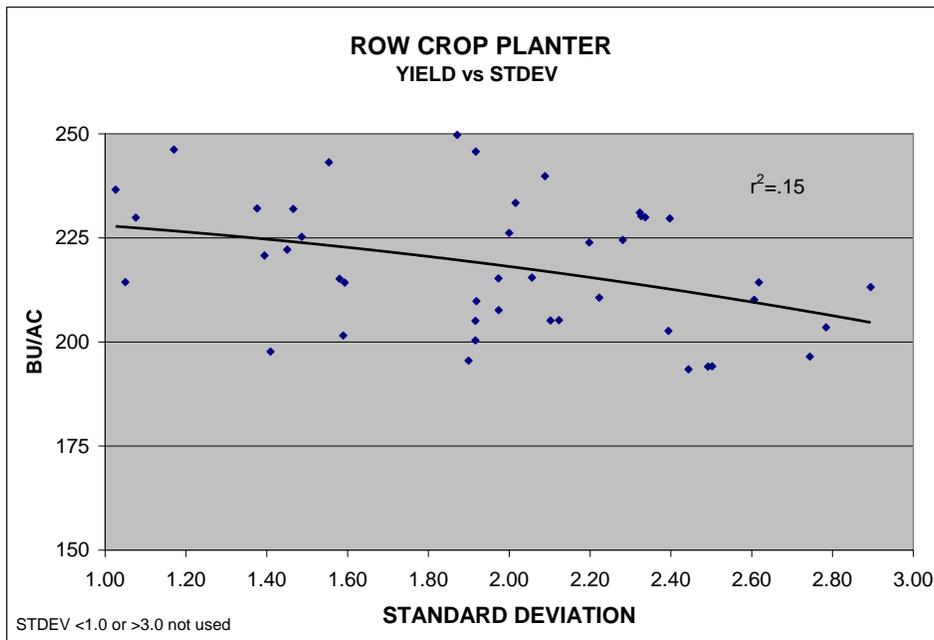
Figure 3. The effect of STDEV on corn yield when planted with a row-crop planter at the Oakes Irrigation Research Site in 2008.
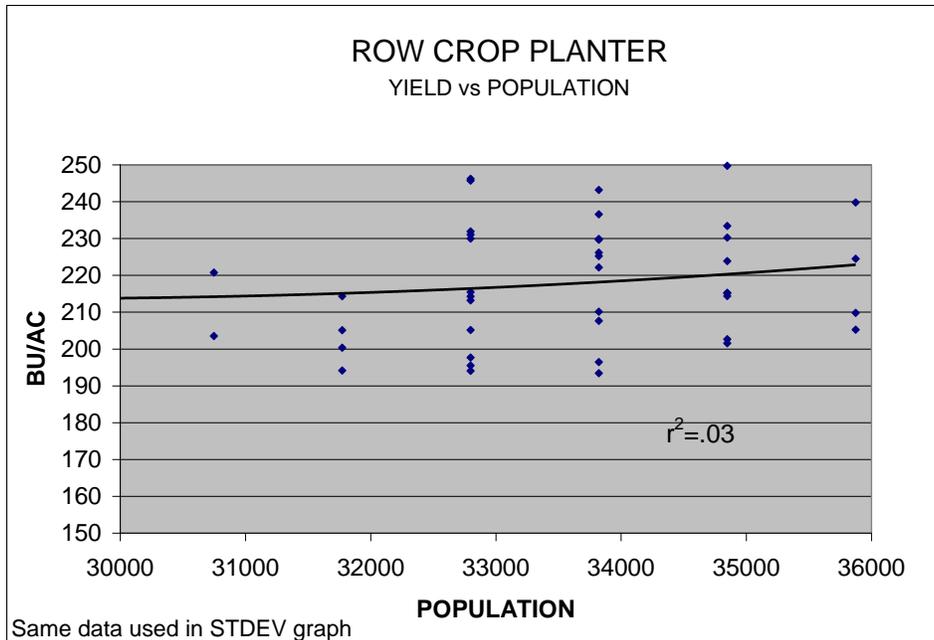
Figure 4. The effect of population on corn yield when planted with a row-crop planter at the Oakes Irrigation Research Site in 2008.