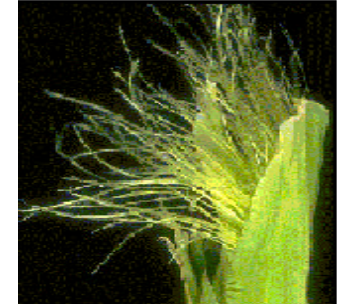


Plant Population and Planting Date Influence on High Oil TopCross Blend¹ Corn



® Pioneer Hi-Bred International, Inc. 



Objectives

- Within the optimum plant population range (18,000 to 36,000 plants/a), is the plant population yield response of High Oil TopCross Blends¹ (HOTC Blend) similar to that for conventional hybrids?
- Does plant population influence grain traits (oil, starch, protein)?
- What are yield expectations and risks with extreme planting dates (early and late) for HOTC Blends?
- Does planting date influence pollen shed and silk synchrony (nick)?
- What effect does planting date have on grain traits?

1998 and 1999 High Oil TC Blend® Agronomy Research Locations

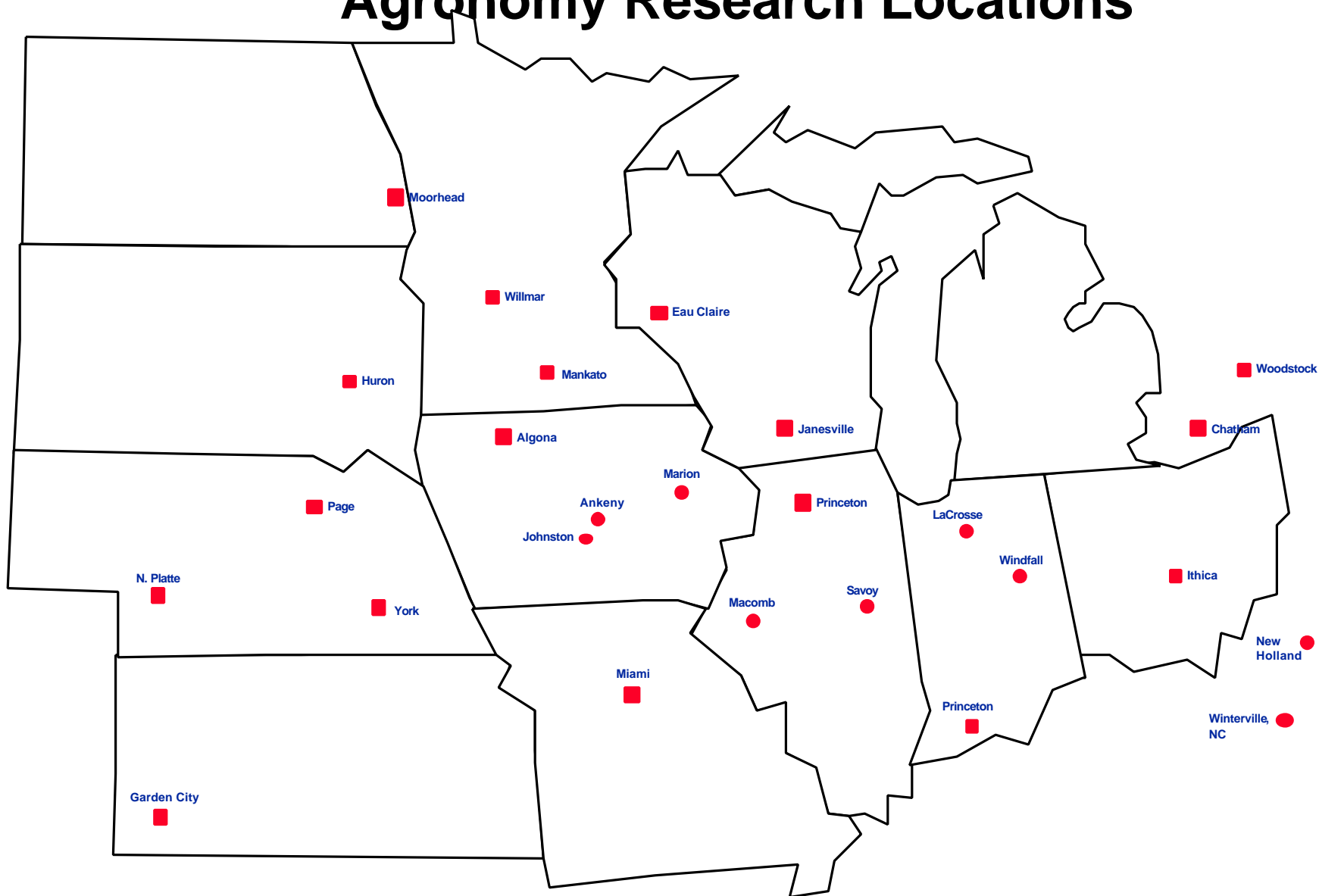


Figure 3. The Effect of Plant Population on Grain Yield of 110 CRM HOTC Blend and Conventional Hybrid, 1998

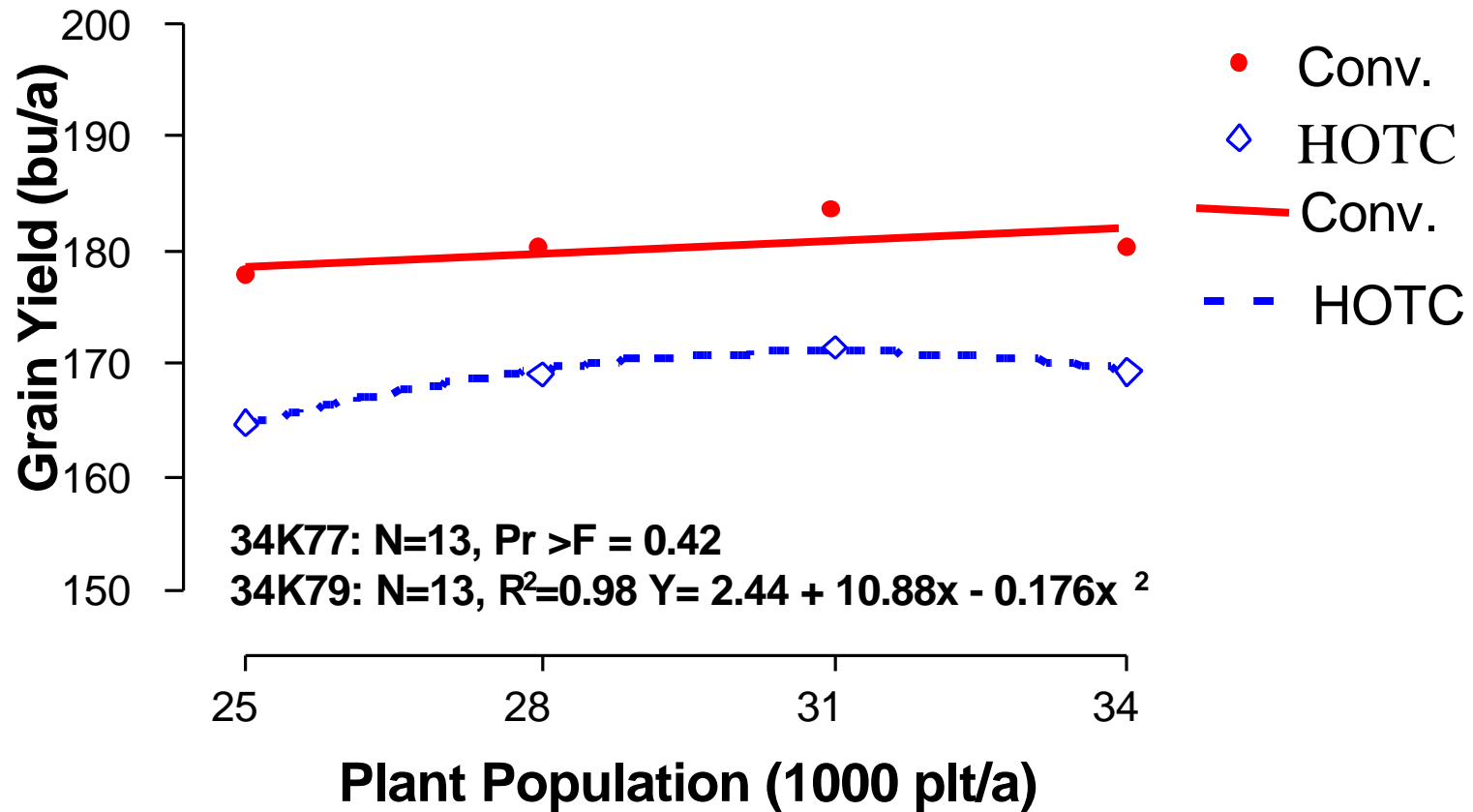
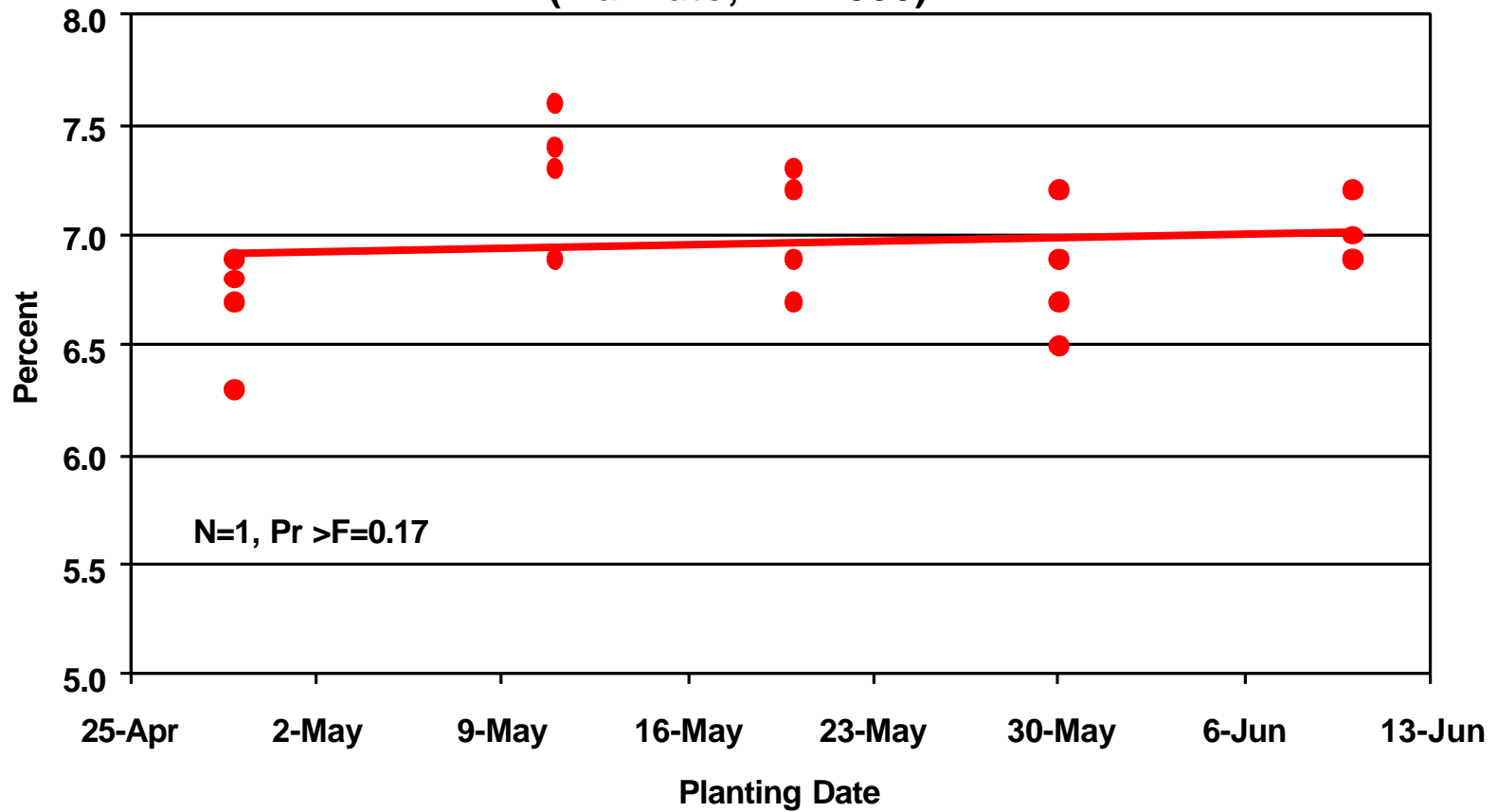


Figure 7. The Effect of Planting Date on HOTC Blend (100 CRM) Oil Percent

(Mankato, MN 1998)



Materials and Methods

Plant Population Studies

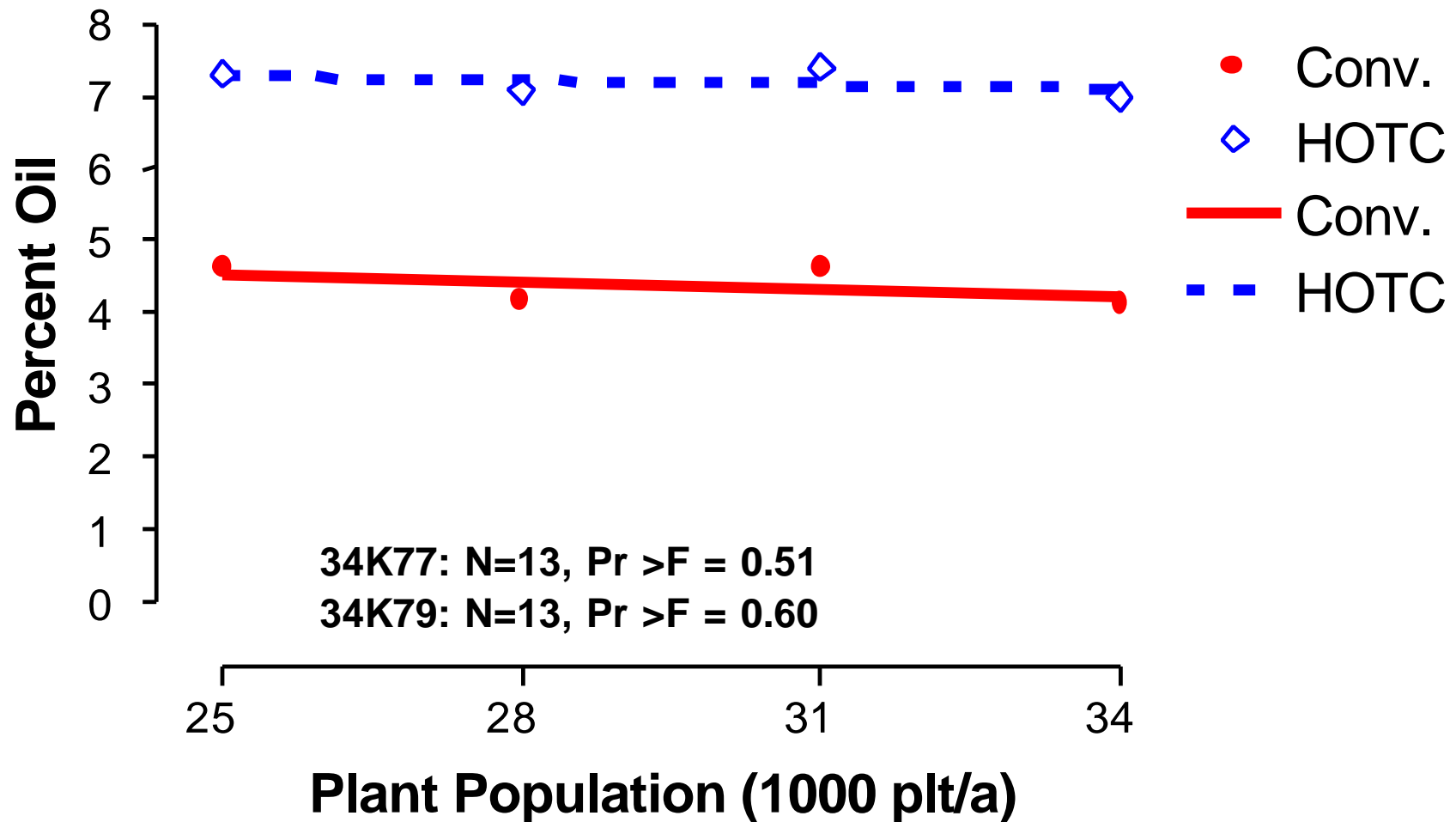
- **Trials**
 - 1998 Large Plots (1 rep)
 - HOTC Blends and Conventional hybrids= 110 CRM and 115 CRM
 - Locations = 25
 - HOTC Blends isolated from conventional hybrids
 - 1998 Small Plot (4 reps)
 - HOTC Blend = 100 CRM
 - Locations = 3
 - HOTC Blends isolated from conventional hybrids
 - 1999 Small Plot (2 reps)
 - HOTC Blend = 100 CRM & 110 CRM
 - Locations = 9 (100 CRM) & 24 (110 CRM)
- **Population Densities**
 - 1998: 25000, 28000, 31000, and 34000 plants/acre
 - 1999: 18000, 24000, 30000, and 36000 plants/acre
- **Measurements**
 - 1998: Grain yield, oil, protein, and starch
 - 1999: Grain yield

Results and Discussion

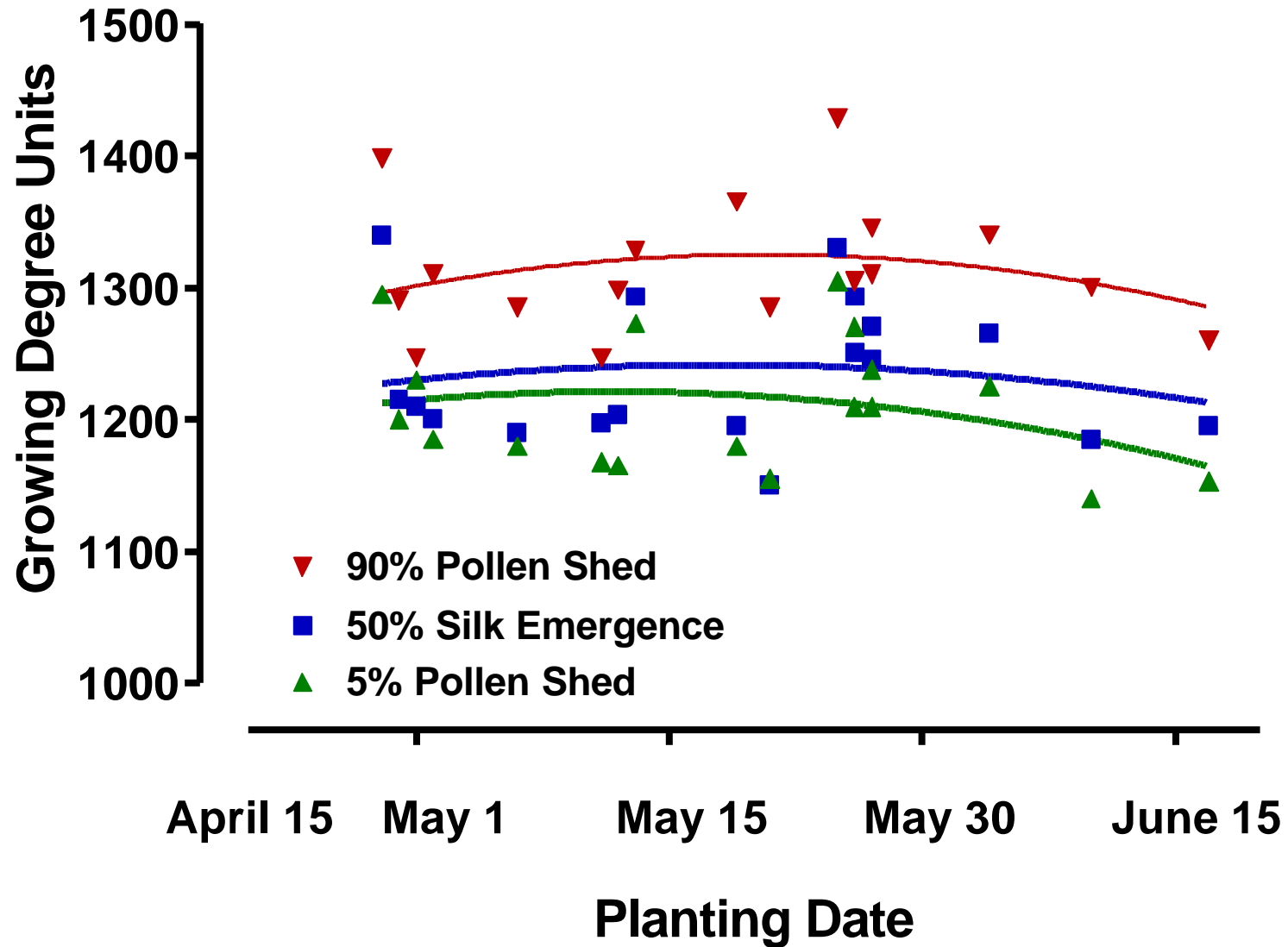
Plant Population

- Grain yield, oil percent, and Income/acre results are shown in Figures 1 to 5.
- Optimum population for the 100 CRM products was approximately 35,000 plants/acre (Figure 1).
- Optimum population for the 110 CRM products was approximately 31,000 plants/acre (Figure 3).
- TC Blend plant population response was similar to the conventional hybrid (Figures 1 and 3).
- Plant population did not influence oil percent (Figures 2 and 4). 110 CRM HOTC Blend had an \$29.00/acre advantage over the conventional hybrid (Figure 5).

Figure 4. The Effect of Plant Population on Oil Percent of 110 CRM HOTC Blend and Conventional Hybrid, 1998



**Figure 8. The Effect of Planting Date on
Pollination of 100 CRM H0TC Blend, 1998 and
1999, four locations**



Planting Date Studies

The Effect of Planting Date on HOTC Blend Grain Yield and Percent Oil

- **1998**
- **Locations**
 - Mankato, MN; York, NE; Johnston, IA and Windfall, IN
- **Replicates = 4**
- **Planting Dates = 5 (April 15 to June 15)**
- **Measurements**
 - Stalk count and ears per plant
 - Grain yield, grain moisture, test weight
 - Growing degree units to 50% silk and 50% shed
 - Oil, protein, and starch percent

Figure 1. The Effect of Plant Population on Grain Yield of 100 CRM HOTC Blend and Conventional Hybrid, 1999

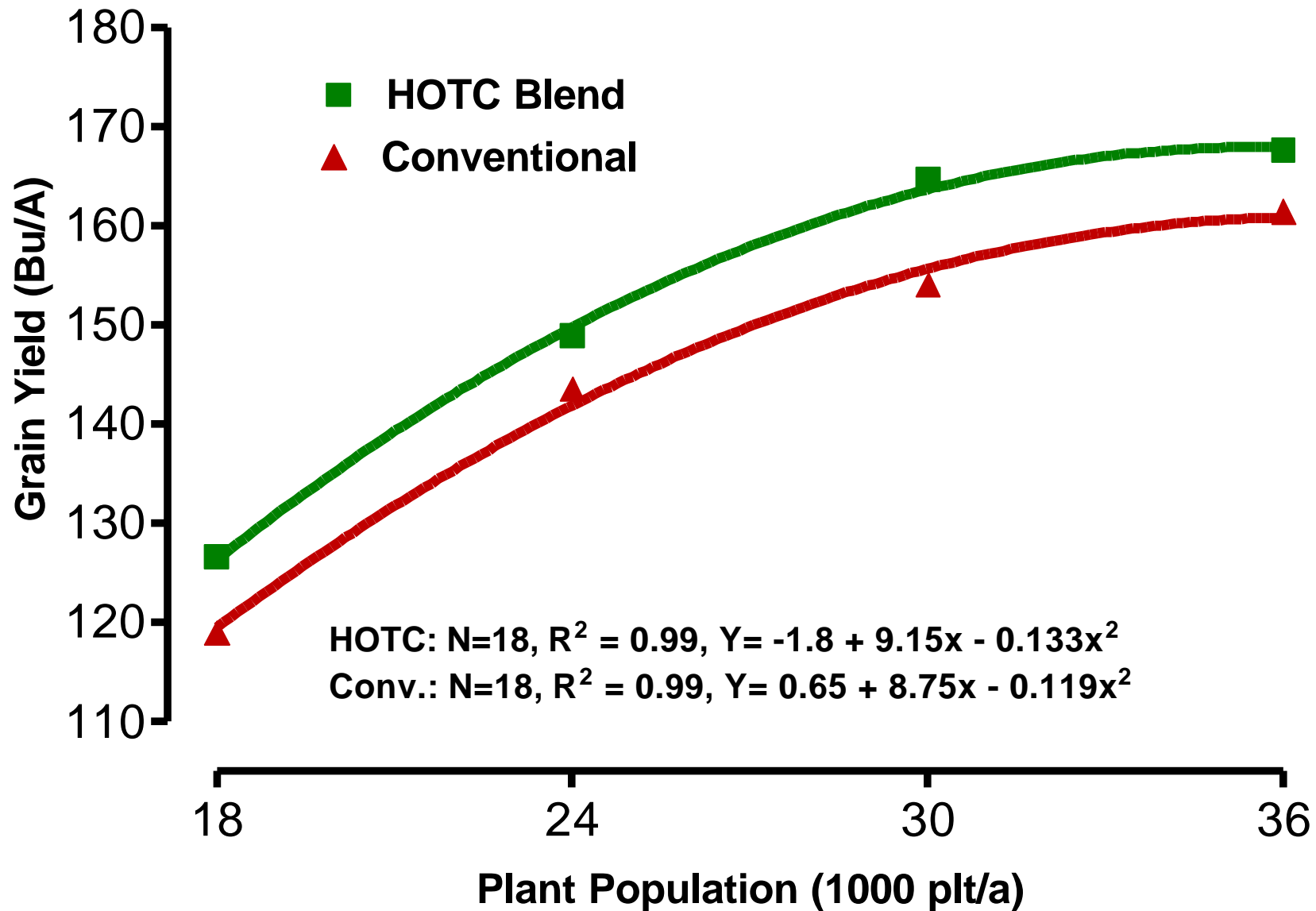
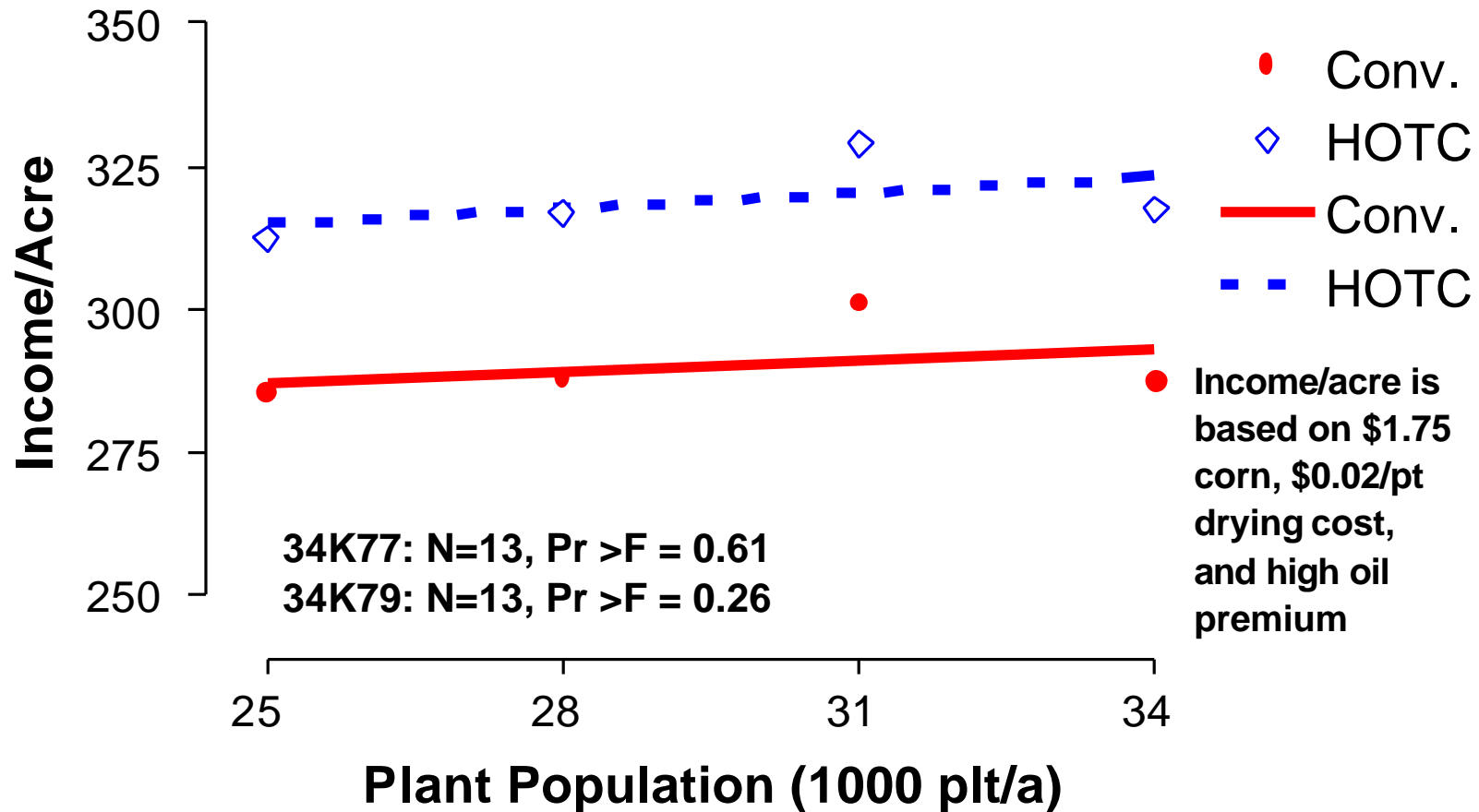


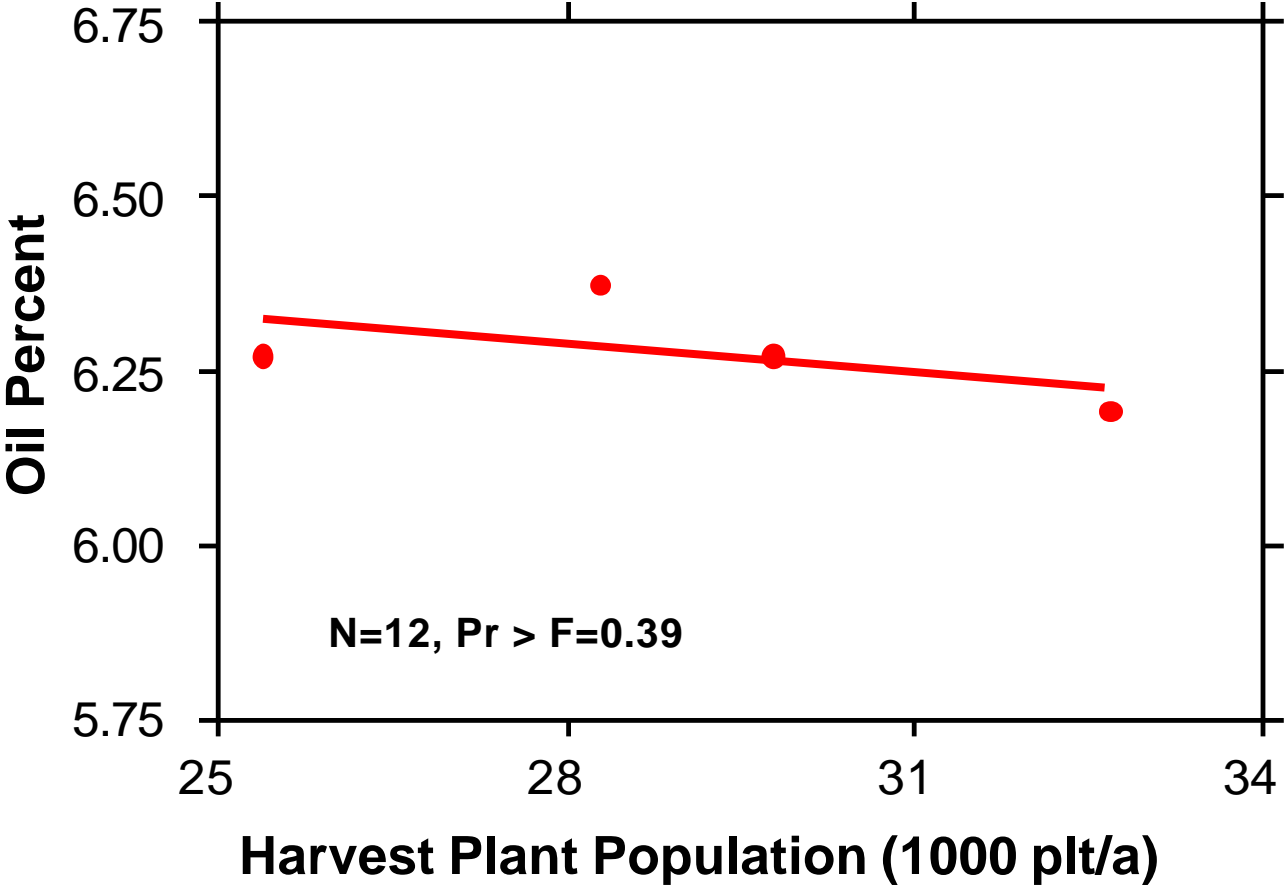
Figure 5. The Effect of Plant Population on Income/Acre of 110 CRM HOTC Blend and Conventional Hybrid, 1998



The Effect of Planting Date on HOTC Blend Pollen Shed and Silk

- **1998 and 1999**
- **Locations**
 - Mankato, MN; York, NE; Johnston, IA; and Windfall, IN
- **Replicates = 3**
- **Planting Dates**
 - April 25, May 10, and May 25
- **HOTC Blend components**
 - Five pollinators
 - Five grain parents
 - Blend components grown in separate plots
- **Measurements**
 - Pollen shed duration and GDUs to 50% silk emergence

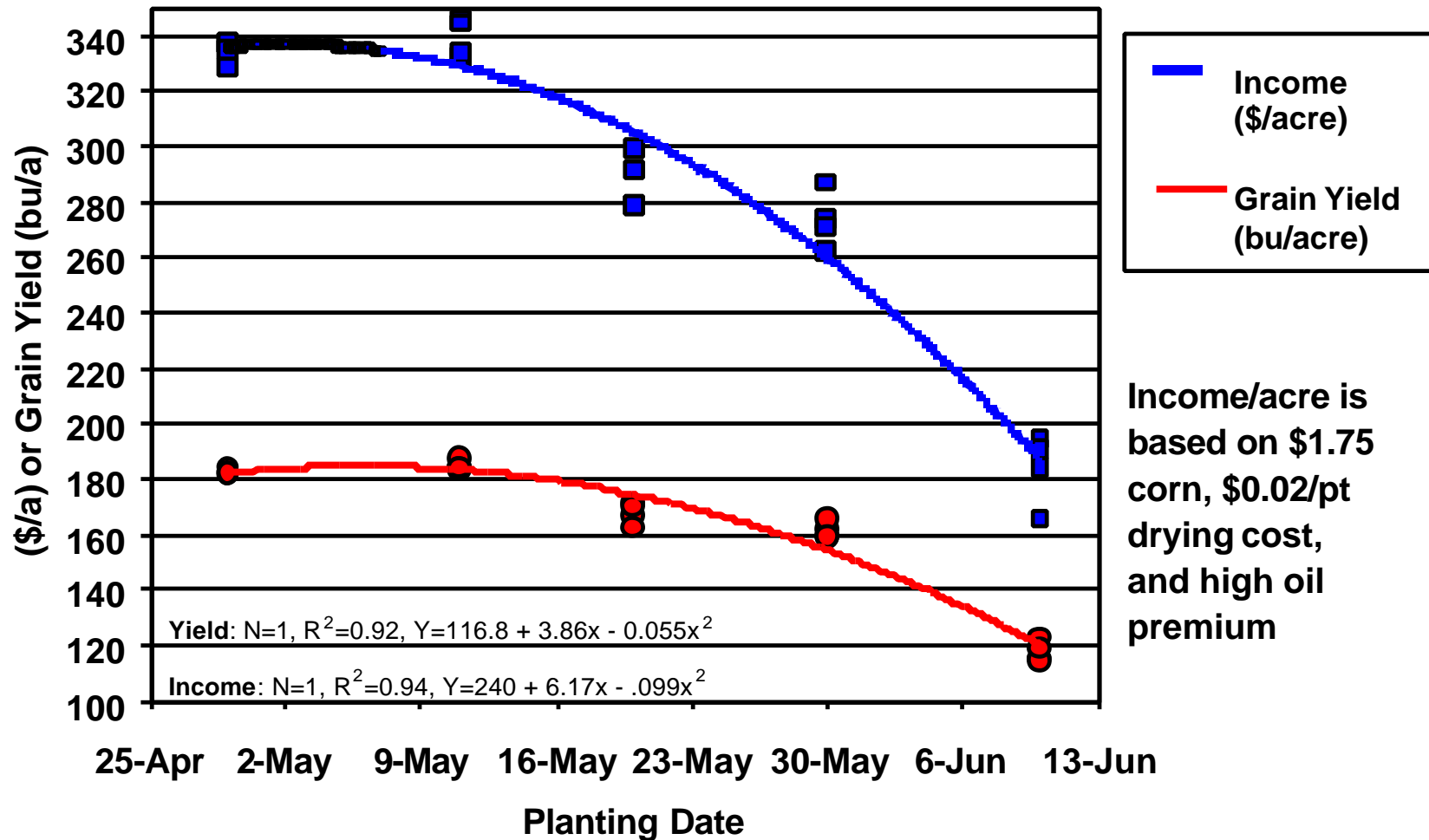
Figure 2. Effect of Plant Population on Oil Percent of 100 CRM HOTC Blend, 1998



Planting Date

- Grain yield and Income/acre were significantly reduced with delayed planting (Figure 6).
- Grain yield generally declined after May 15 at 3 of the 4 sites (data not shown).
- Effect of planting date on oil percent was mixed.
- Oil percent at Mankato (Figure 7) and Johnston (data not shown) was not influenced by planting date.
- Oil percent increased as planting date was delayed at York and Windfall (data not shown).
- Kernel size was smaller with delayed planting at the responsive sites (data not shown).
- Synchrony of pollen shed and 50% silk (nick) was not influenced by planting date (Figures 8 and 9).

Figure 6. The Effect of Planting Date on HOTC Blend (100 CRM) Grain Yield and Income/Acre (Mankato, MN 1998)



SUMMARY

Plant Population

- Within this plant population range, the optimum plant populations for yield and income/acre (including oil premiums) were generally similar for TC Blends and their normal non-sterile conventional hybrids.
- Within the optimum range evaluated, plant population did not significantly influence oil, starch, or protein content of TC Blends.

Planting Date

- Grain yield and income/acre for TC Blends were reduced when planting was delayed. Results confirmed that planting should occur before May 15 for optimum yield and income/acre.
- Oil content either increased or did not change with planting dates later than mid-May, compared to optimum dates. Increased oil contents did not overcome losses in income/acre due to reduced yield with late planting
- Even though the pollination results suggest nick was acceptable, delaying planting puts additional stresses (heat, drought, or insect pressure) on the crop that may increase a growers risk.