Maximizing Profits of the New High Oleic Acid Peanut Varieties with the Efficient use of Fungicides and Irrigation

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There is an urgent need to develop varieties and production systems that will reduce the cost of peanut production in Oklahoma. Two of the major inputs are irrigation and fungicides. The purchase and application of fungicides can cost Oklahoma peanut producers up to $150/a. The cost of applying one acre-inch of water is variable from farm to farm. All producers agree that the cost of pumping the water is high and increasing. Also, the availability and quality of water for agriculture use is decreasing in many areas.

It is clear that irrigation and fungicide use increases peanut yields in Oklahoma. As the production environment becomes more wet (more irrigation water) and humid, the disease pressure increases and this increases the need for disease control practices such as fungicide applications. When the amount of water applied is reduced then the disease pressure and number of fungicide applications can be reduced.

Variety trials conducted during 2001 and 2002 identified some breeding lines that have high oleic acid, good yields under rain fed and/or irrigated conditions, and/or some resistance to leaf spot and Sclerotinia blight. Also, with the new irrigation system at the Caddo County Research Station, trials can be conducted to test different irrigation rates.

The objective of this trial was to develop a combination or combinations of varieties, fungicide spray schedules, and irrigation rates that would maximize the net return to Oklahoma peanut producers.

Three runner cultivars (Tamrun 96, Tamrun OL 01, and Tamrun OL 02) and three runner breeding lines (UF 00620, UF 00627, and UF 98604) were tested during 2004. Tamrun 96 was the only entry that did not have the high oleic acid trait. In a separate trial, two Spanish cultivars (Spanco and Tamspan 90) and four Spanish breeding lines with the high oleic acid trait (TX996784, TX996670, TX996612, and TX974614) were tested. OLin was not included because it had poor yields during the past three years. These varieties were tested under three different irrigation schedules – full, half, and minimum – in a field with low Sclerotinia blight pressure (Figures 1 and 2). These same varieties were tested in a field with high Sclerotinia blight pressure under three different irrigation schedules – full, three-quarter, and half (Figures 3 and 4). In the field with low Sclerotinia blight pressure each of these variety X irrigation treatment combinations (total of 36 combinations) were then evaluated.
with no fungicides or one 15 oz spray of Headline® and one 15 oz spray of Folicur® to control foliar diseases. No fungicides were applied to control soilborne diseases such as Sclerotinia blight. Each plot had three replications. In another trial with three replications about 50 yards away, these same varieties were tested with no irrigation. The total water available (rain plus irrigation) to each treatment and total irrigation applied for each month are presented in Figures 1 and 2. The full, half, minimum, and none irrigation treatments received approximately 11 in, 5.5 in, 2.6 in, and 0 in respectively, of irrigation for the entire season.

In the field with high Sclerotinia blight pressure each of the runner variety X irrigation treatment combinations were evaluated with one 7.2 oz application of Folicur®, one 1.5 pt application of Omega®, and one 15 oz application of Headline® or with one 9 oz application of Headline®, one 7.2 oz application of Folicur®, two 1.5 pts applications of Omega®, and one 15 oz application of Headline®. Each plot had three replications. In another trial with three replications about 50 yards away, (the same trial referred to in the previous paragraph) these same varieties were tested with no irrigation. The full, three-quarters, minimum, and none irrigation treatments received approximately 9.5 in, 5.5 in, 3.5 in, and 0 in respectively, of irrigation for the entire season.

In this report emphasis will be given to the varieties and irrigation treatments as further analysis is needed on the different fungicide treatments.

The yields for the runner varieties in the fields with high and low Sclerotinia blight pressures were reduced as less irrigation water was applied (Figures 5 and 6) for most varieties, but then increased when no irrigation was applied. The increase in yield when no irrigation was applied was not expected, but the main reason that this occurred was because the field where there was no irrigation was about 50 yards away from the irrigated field. There must be some soil or micro-environmental factors that caused the unexpected results.

The yields for the Spanish varieties do not show a clear trend as the amount of irrigation water applied is changed (Figures 7 and 8).

The results of the Irrigation X Fungicide X Variety Trials conducted at Ft. Cobb during 2003 and 2004 provide no clear results that can be used to make recommendations for peanut producers in Oklahoma. They need to be analyzed in more detail and used to help plan for appropriate Irrigation X Fungicide X Variety Trials to be conducted in 2005.

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**Figure 1.** Total of rain and irrigation (in) in the Irrigation X Fungicide X Variety Trials in a field with high Sclerotinia blight pressure – Caddo Research Station, 2004.
Figure 2. Total irrigation (in) in the Irrigation X Fungicide X Variety Trials in a field with high Sclerotinia blight pressure – Cado Research Station, 2004.

Figure 3. Total rain and irrigation (in) in the Irrigation X Fungicide X Variety Trials in a field with low Sclerotinia blight pressure – Caddo Research Station, 2004.
Figure 4. Total irrigation (in) in the Irrigation X Fungicide X Variety Trials in a field with low Sclerotinia blight pressure – Caddo Research Station, 2004.

Figure 5. Yield (lbs/a) in the Irrigation X Fungicide X Runner Variety Trial in a field with high Sclerotinia blight pressure – Caddo Research Station, 2004.
Figure 6. Yield (lbs/a) in the Irrigation X Fungicide X Runner Variety Trial in a field with low Sclerotinia blight pressure – Caddo Research Station, 2004.

Figure 7. Yield (lbs/a) in the Irrigation X Fungicide X Spanish Variety Trial in a field with high Sclerotinia blight pressure – Caddo Research Station, 2004.
Figure 8. Yield (lbs/a) in the Irrigation X Fungicide X Spanish Variety Trial in a field with low Sclerotinia blight pressure – Caddo Research Station, 2004.