IRRIGATION AND PLANTING DATE EFFECTS ON COTTONSEED COMPOSITION

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Abstract

As bans on the use of trans-fats in restaurant cooking proliferate across the US, the restaurant industry is increasingly turning to cottonseed oil because of its desirable cooking qualities. Cottonseed meal is also increasingly being utilized as a feed supplement for dairy cattle. Therefore it's important to understand how the environment can impact cottonseed composition due to its increased importance in both the restaurant and dairy industries. This study investigated how both planting date and irrigation impacted the composition of the cottonseed produced. Six cotton varieties of varying maturities and from different breeding programs were planted during two distinct planting windows in 2006 and 2007, either the first week of April (early planted) or the first week of May (late planted). Half the plots were either irrigated or were grown dryland. The experimental design was a randomized complete block with a modified split-plot treatment arrangement. Irrigation levels were the main plots, planting dates sub-plots, and varieties were sub-sub-plots. The composition of seed collected from 50 boll samples harvested from each plot was analyzed for gossypol, protein, lipids, and carbohydrates. Averaged across both years, irrigation increased the percent oil concentration of the seed by 6%, while early planting increased the oil concentration by 2%. In contrast, irrigation decreased the seed protein concentration by 8%, but planting date did not produce a significant effect on protein. In 2006 but not 2007, total seed soluble carbohydrate concentrations were increased 3% by irrigation, but planting date had no effect on these carbohydrates either year. Irrigation also increased total seed gossypol concentration by 19%. Early planting caused a 5% greater total seed gossypol concentration in 2007, but planting date had no effect in 2006. The data from this study demonstrate how certain environmental components, particularly moisture availability, can impact the composition of cottonseed.