

Public Abstract

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Title:Optimization of Soybean Carbohydrate Profiles and Profit Potential Using Variable Planting Dates and Genetic Backgrounds

Information on management practices that can increase crop value can be useful for soybean producers in maximizing farm profits. Seed composition and yield have been shown to be affected by differing planting dates, which alters the environment in which a crop is grown. Providing soybean meal high in sucrose and low in the Raffinose Family of Oligosaccharides (RFOs) is desirable for improving digestibility and increased feed efficiency for livestock animals. Soybean meal with high sucrose and low RFO concentrations has the potential to increase energy, and soybean producers are able to receive a premium for feed that meets these standards. In this study, the effects of planting date on soybean seed composition and several agronomic traits were investigated using ten specialty lines with modified carbohydrate profiles due to known gene mutations, and with ten check varieties. A secondary objective was to estimate the economic impact of these specialty soybeans. The environment had a significant effect on all traits measured, except protein. Planting date had a significant effect on all agronomic traits except lodging and seed weight, and all seed composition traits measured except RFOs. RFO concentrations were shown to be more stable when compared to sucrose concentrations. Early plantings showed increased yield and oil and late plantings showed increased sucrose and higher seed quality. Higher temperatures were shown to be associated with higher oil and RFO concentrations, while cooler temperatures were associated with higher sucrose concentrations. This research shows that growing soybeans with the high sucrose/low RFO trait for specialty markets have the ability to improve profitability for soybean producers, and they will fit best in a double-cropping production system in Missouri. These results will provide useful information to soybean producers aiming to grow these types of specialty soybeans for niche markets in aims of increasing farm profits.