

Introduction

In 2013, over 647 thousand hectares of soybeans (*Glycine max*) were planted in Kentucky with a state wide average of 3335 kg ha⁻¹ (A new state record) (NASS, 2013). A dramatic increase in commodity prices since 2008, and the promotion of “stress relieving” products has lead many producers to ask how stress management can influence soybean yield and seed quality.

Objectives

The study was designed to determine how early and late season stresses affect soybean yield and soybean seed quality.

Methods

Field sites were established at three sites in Kentucky during 2013 and 2014. Two different relative maturity varieties were planted at each site (2.8 RM & 4.5 RM). Treatments are listed in Table 1. Insect and disease pressure was documented both prior to and post application of respected treatment. Seed yields were mechanically harvested and adjusted to 130g kg⁻¹ moisture. Seed samples were collected from the harvested plot and analyzed using near infrared (NIR) spectrometry.



Figure 1. Effect of early season application of lactofen herbicide on soybeans.

Table 1. Treatments and timing of treatment used in 2013

Treatment	Timing
UTC	
Endigo (Lambda-cyhalothrin, 30.81 g a.i. ha ⁻¹ + Thiamethoxam, 41.31 g a.i. ha ⁻¹)	R3
Quilt (Azoxystrobin, 111.25 g a.i. ha ⁻¹ + Propiconazole, 186.62 g a.i. ha ⁻¹)	R3
Quilt + Endigo	R3
BioForge (N,N'-diformyl urea , 1.2 L ha ⁻¹)	R3
BioForge + Endigo	R3
BioForge + Quilt	R3
BioForge + Quilt + Endigo	R3
Cobra (lactofen , 210 g a.i. ha ⁻¹)	V2
Cobra + BioForge	V2 + R3
Cobra + BioForge + BioForge	V2 + V4 + R3
BioForge	V2
BioForge + BioForge	V2 + R3
BioForge + BioForge + BioForge	V2 + V4 + R3

Results

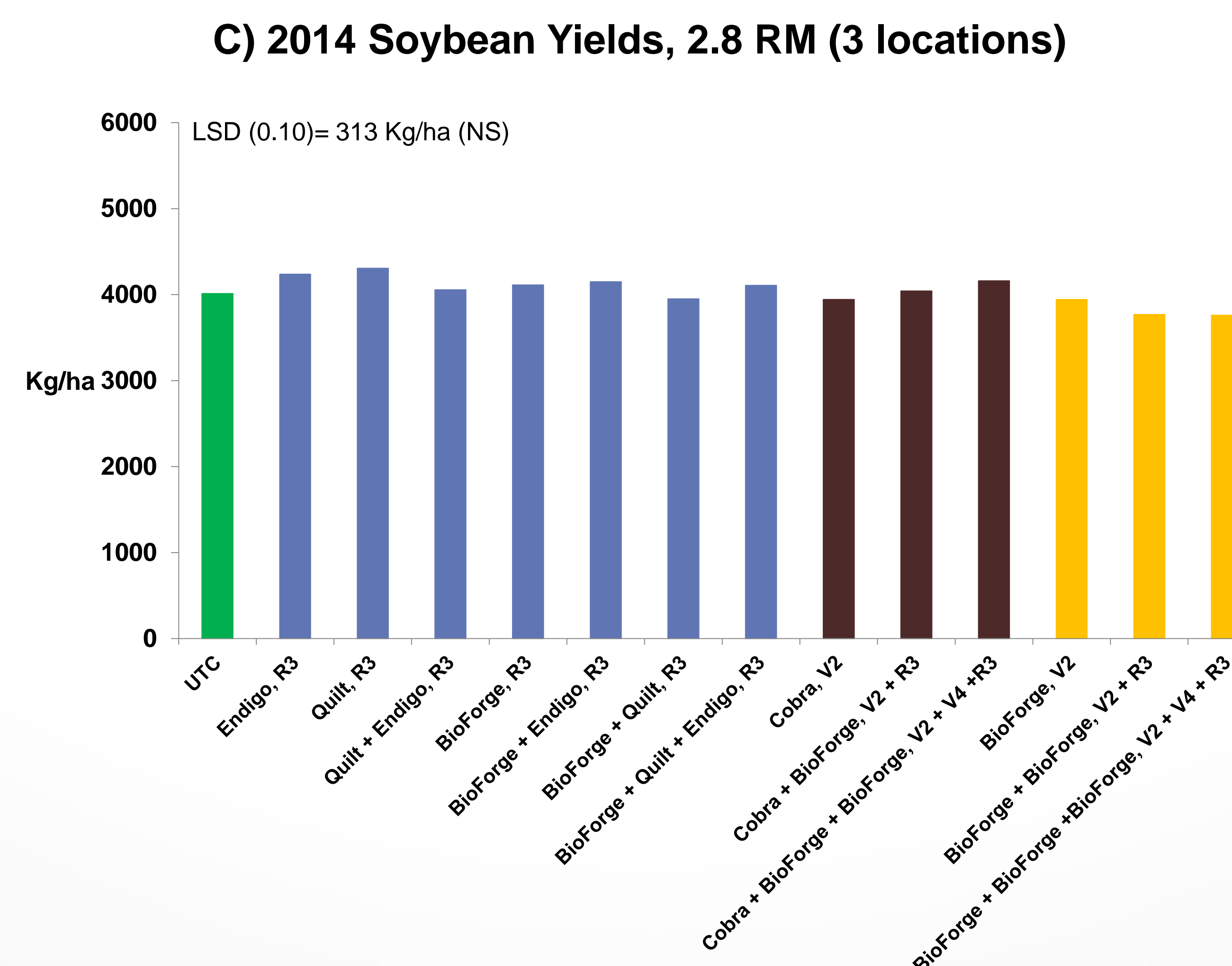
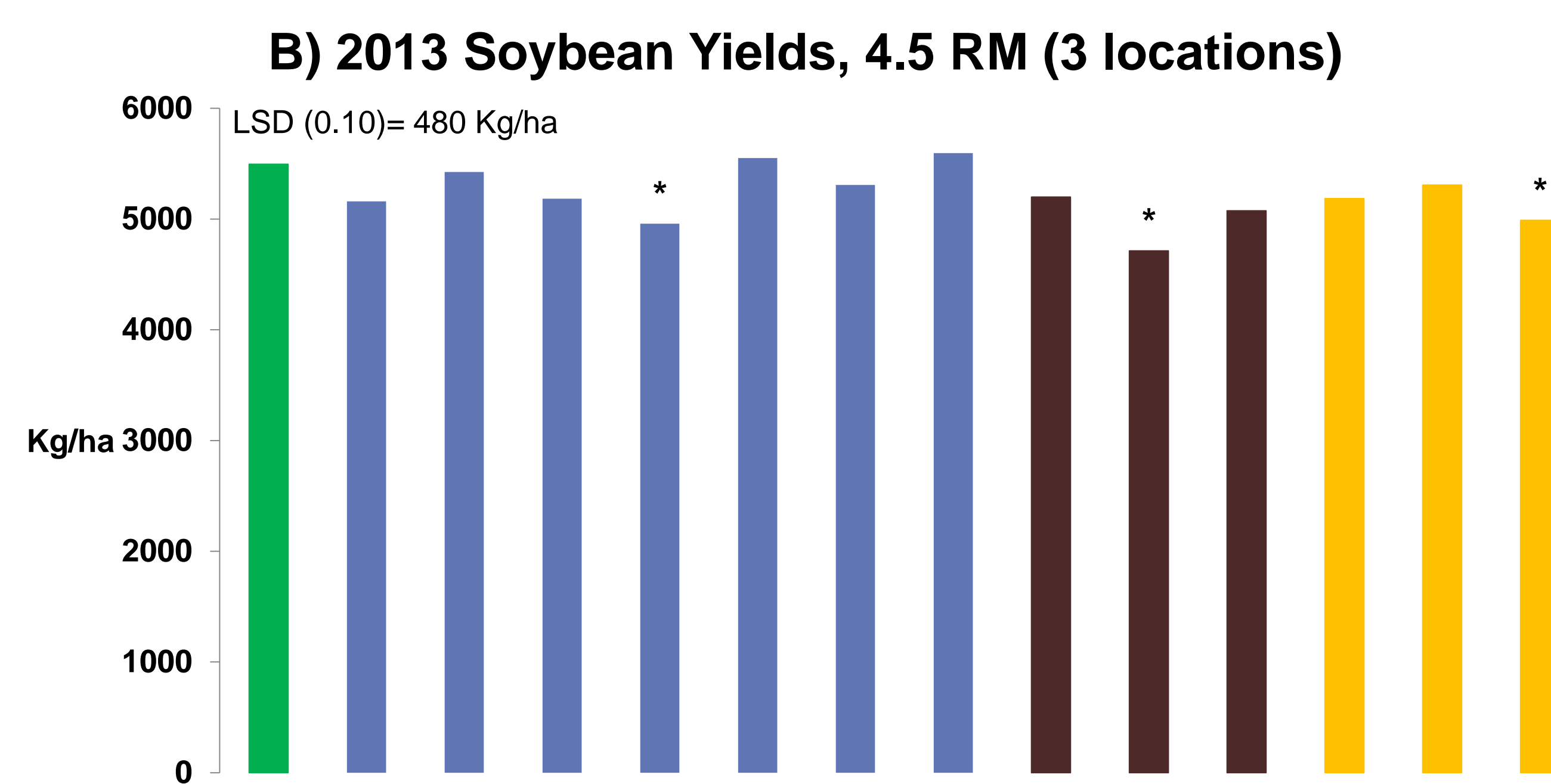
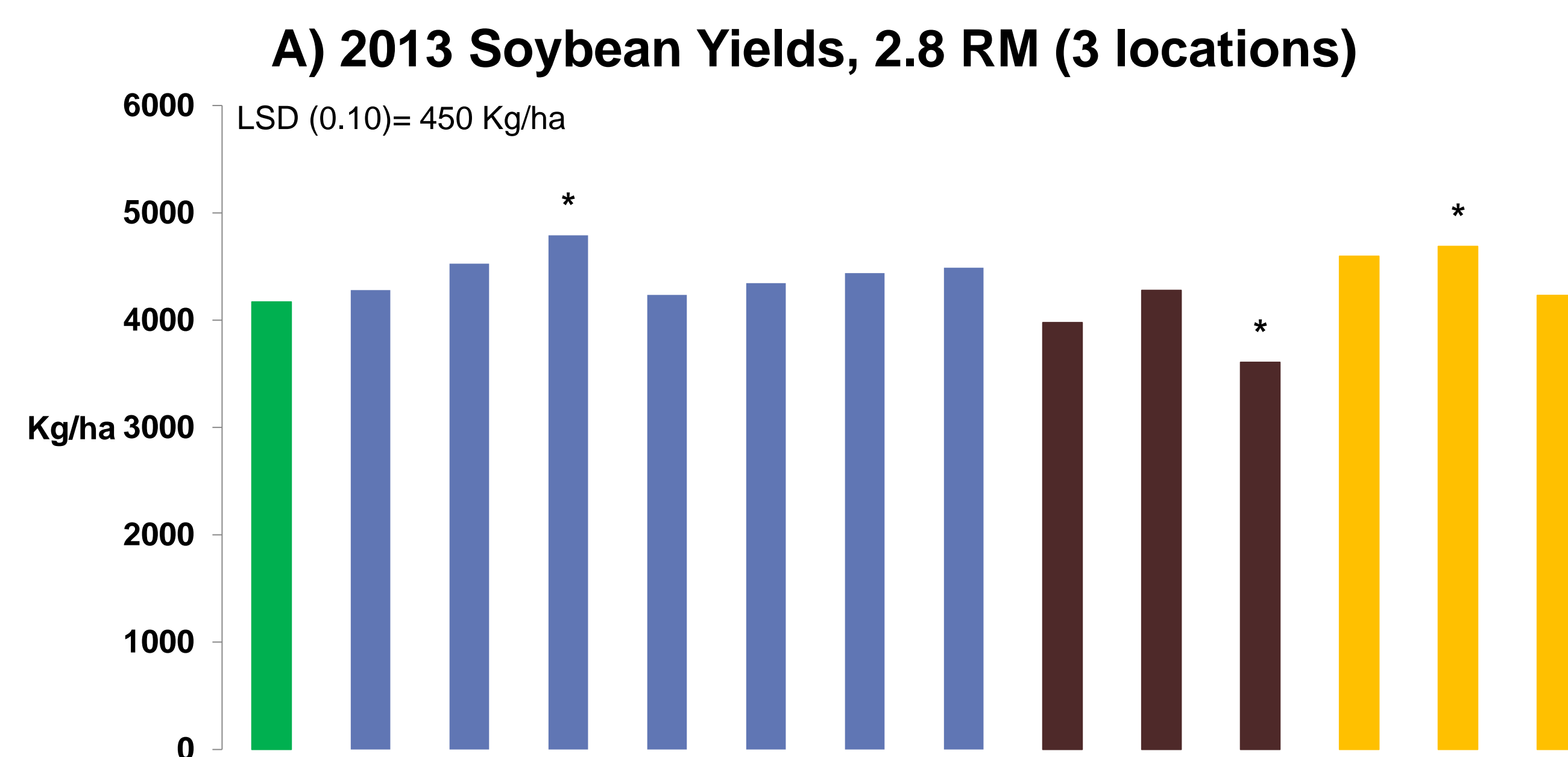


Figure 2. Soybean Seed Yields, * = yield differing from the UTC, p≤ 0.10.

Table 2. Temperature and precipitation during seed fill (R5-R7) for 2013 field sites.

Location	2.8 RM	4.5 RM	2.8 RM	4.5 RM
	Temperature (°C)		Precipitation (mm)	
Lexington	22.0	21.2	76.7	74.9
Hodgenville	21.9	20.9	108.0	104.6
Princeton	23.6	23.1	195.3	174.5

In 2013, treatments in the 2.8 RM that increased yield increases involved managing late season stress. Quilt + Endigo mitigates biological stresses (insects and fungi), while BioForge claims to mitigate abiotic stress (water stress). In 2014, no treatment were significantly different in the 2.8 RM.

In 2013, the 4.5 RM did not see any increase in yield. A decrease in yield was observed for three treatments that included: BioForge alone at R3, sequential applications of BioForge that included an R3 timing, and a combination of BioForge and Cobra in which the BioForge was applied at R3.. Harvest for the 2014 4.5 RM beans has not been completed yet.

Discussion

- Stress management can lead to significant increases in soybean seed yield depending on environmental conditions and is difficult to predict.
- Because of the similarities in precipitation within seed fill durations, the increase in yield from BioForge may not be related to weather.
- Applying early season stress, followed by a later application of a claimed stress reliever was not successful in increasing yields in either maturity group.

References

National Agricultural Statistics Service. 2014. Crop Production Annual Summary. United States Department of Agriculture.