

# CULTURAL PRACTICES DOCUMENTATION FORM

## KSU-Manhattan Contest (April 21, 2012)

### Instructions:

1. Fill in your documentation information in each of the text fields. Note information required for submission is indicated with an asterisk (\*).
2. Save the completed form.
3. Send it as an e-mail attachment to [beanstalk@ksu.edu](mailto:beanstalk@ksu.edu) OR print it and FAX it to 785-532-6094 or mail it to Nathan Nelson, 2708 Throckmorton Hall, Manhattan, KS 66506.

**This form must be received by 5:00 PM on Friday, April 13<sup>th</sup>, 2012.**

### I. TEAM INFORMATION

**Team Name** (use the same name that was used when you registered)\*

Wheat State Agronomy Club

**Team Members:** (include name and e-mail)

student name*	student e-mail
Matt Everhart	
Jeffrey Albers	
Mitchell Keller	

**Organization being represented** (school, 4-H, FFA, etc):

Organization Name\* Kansas State University

**Team Adviser:** (Adviser's responsibility is to monitor adherence to rules)

Adviser Name*	Nathan Nelson
Adviser e-mail*	<a href="mailto:nonelson@ksu.edu">nonelson@ksu.edu</a>
Adviser Phone*	785-532-5115
Address1*	2708 Throckmorton Hall
Address2	
City*	Manhattan
State*	KS
Zip*	66506

**II. Planting Date\*** (not before Monday March 5, 2012): Pre-soaked beginning 3/5/2012, planted 3/7/2012

### III. Seed Documentation:

Cultivar Name*	Macon 11GGS3 RS
Seed Source (describe where was it obtained and how you choose it)*	Seed was provided by Russell Dille, with KSU soybean breeding program. Multiple cultivars were selected to represent a range of maturity groups and specific varieties with particular growth habits (i.e., taller, larger leaves). This cultivar performed the best.

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**IV. Rooting Medium\*:** describe the soil/rooting medium used to grow the plant. Including all the information available about where you obtained it, its physical and chemical composition, why you chose it, and analyses performed by testing laboratories. **How do you think your choices affected plant growth?** (1000 characters max.)

We selected pro-mix bark based rooting medium with a biofungicide obtained from Hummert international. This was selected for high infiltration rate and good drainage. This was a concern because phytophthora root rot can be a problem for soybeans grown in containerized pots. Good drainage and the biofungicide should decrease the chance for this to damage the soybeans. No chemical analysis was performed. We assumed that the medium was void of nutrients and all nutrients would have to be added. Rooting medium helped the roots grow very well. There was not any compaction. We did not have signs of over watering (due to good drainage) and we did not have any disease. However, we think the lack of nutrients in the root medium may have limited growth.

**V. Growth Amendments\*:** describe any fertilizers or other chemical used, include chemical information, application technique, application amounts, and dates of application(s). **How do you think your choices affected plant growth?** (1000 characters max.)

We supplied all nutrients with a Peters professional 20-20-20 +TE soluble fertilizer containing 20% N, 20% P<sub>2</sub>O<sub>5</sub>, 20% K<sub>2</sub>O, 0.7% MgO, 1.5% SO<sub>3</sub>, 0.02% B, 0.015% Cu (EDTA chelated), 0.12% Fe (DTPA chelated), 0.06% Mn (EDTA chelated), 0.01% Mo, 0.015% Zn (EDTA chelated). The fertilizer was added to 20 gallons of water to create a 3200 ppm N concentration. The solution was diluted 16X (to create 200 ppm N) and used to water the plants 1 time per week until V4. After V4, they were watered 3 times per week with the solution. Plants did not receive enough nutrients. They started showing deficiency symptoms at V4 growth stage, these persisted throughout the contest. The leaves were pale green with some signs of chlorosis. We expect the lack of nutrients decreased growth and plant vigor, resulting in smaller plants, smaller leaves, lighter green color, and less biomass.

**VI. Lighting and Temperature\*:** describe the lighting and temperature environment used to grow your plant. If known, include such things as light intensity, daylight duration, temperature control, etc. **How do you think your choices affected plant growth?** (1000 characters max.)

The plants were in a growth chamber for the first 5 weeks of the contest and then placed in a greenhouse for the last 2 weeks. While in the growth chamber, the lights were set at 18 h daytime and 6 h night time. Lights were ramped up at 20% light for the first 2 h of the day, 60% light for the next two hours, followed by 100% light. Light source was a combination of fluorescent and incandescent lights. Diurnal temperature cycled from 65 oF night time temp and 80 oF daytime temperature. Once placed in the greenhouse, the light was all natural and maximum and minimum temperatures were set at 75 and 65 oF respectively. We started the plants in the growth chamber because temperature control in the green house can be difficult during winter and early spring. However, we did not have enough light in the growth chamber, which caused the plants to become etiolated (thin stems, long inter-nodal distances, very tall plants). It would have been better to move them to the greenhouse earlier.

**VII. Water\*:** describe the water regime used and **how your choices affected plant growth.** (1000 characters max.)

Seeds were soaked for 48 hours (beginning on 3/5/2012, the first day of the contest) between two soaked paper towels on a greenhouse bench. They were kept moist by adding water 2 to 3 times daily. After seeds were planted (3/7/2012), they were watered once weekly until V4 growth stage, then 3 times a week after V4. Watering was sufficient so that they were never drought stressed. The watering regime maximized plant growth by providing plants with an optimal moisture environment.

**VIII. Scientific Method\*:** describe your use of the scientific method for choosing the optimal genetics, rooting medium, plant nutrition, or light, temperature, and moisture for soybean growth. **IMPORTANT** – See website for definition of scientific method and detailed guidelines for this section. (1000 characters max.)

The primary question considered was: How will plant soybean genetics influence plant growth characteristics (leaf size, color, plant height)? Russell Dille, in the KSU soybean genetics program, helped us select varieties with contrasting growth characteristics. Specific hypothesis was that varieties from higher maturity groups will produce larger plants. We grew 8 different varieties. Each variety was grown in two pots. Plants were visually inspected for differences in plant height, leaf color, and leaf size. We found that soybean varieties have different growth characteristics. Although the tallest variety did have the highest maturity group of the soybeans tested (group 5), higher maturity group did not always correlate to larger plants. Varieties tested include IA 3023 (tended to be shorter), LD00-3309, KS 4694, P9411 (greener leaves), KS 5507NRR (smaller leaves), 5601T (darker leaves, taller), Harper (dark leaves), Macon (taller). The tallest variety was selected for entry in the contest.