

Development of a New and Improved Soy Staging System- Year 1 Report

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Project Summary: Understanding soybean growth stages is fundamental for all aspects of soybean production. Determining the correct growth stage is essential for: 1) Appropriate and legal application of post-applied products, 2) Estimating yield potential or yield loss due to crop injury (hail), disease (SDS), or defoliation from insect feeding, 3) Proper timing and increased ROI for fungicide use (e.g. white mold application timing), 4) Estimating maturity dates under late planting, double crop or early frost situations, and 5) Irrigation scheduling and termination, and 6) Enhancing phenotyping and breeder selections based on seed fill duration or other physiological parameters. However, several soybean growth staging systems published in the last 45 years present contradicting and vague descriptions, leading to confusion among farmers and other agricultural professionals. Therefore, the objectives of this project are to: 1.) Simplify the current growth stage indicators 2.) Use the revised stages to better describe soybean seed-fill duration 3.) Revise the definition of physiological maturity and harvest maturity 4.) Develop a new way to designate maturity groups that reflects the duration of the growing season 5.) Define and assign the role of determinacy (eg determinate, indeterminate, and semi-determinate)

Preliminary (Year 1) Results: In 2017, a field trial was established at the Western Agricultural Research Station in Clark County, Ohio, to re-evaluate the soybean staging system. Eighteen soybean varieties ranging from 0.2 to 7.5 relative maturity were evaluated. Soybeans with a 5.5 relative maturity or greater did not achieve full maturity before a killing frost in mid-October. Soybeans were not harvested until November 27 to allow the frost-killed soybeans to dry-down naturally in the field. Grain yield varied considerably based on relative maturity. The earliest maturity (0.2) yielded 13-25 bu/acre while the latest maturity (7.5) yielded 32-45 bu/acre. The highest yield, 65 bu/acre was achieved with a 4.1 relative maturity.

This trial will be repeated in 2018. After completion of the second year, data will be analyzed across states to improve the current soybean staging system.