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Geoffrey Klumpp

Iowa State University, gklumpp@iastate.edu

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Effects of a Plant Growth Regulator Product on Soybean at R2-R3

by

Geoffrey Klumpp

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in partial fulfillment of the requirements for the degree of

MASTER OF SCIENCE

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Program of Study Committee:
Andrew W. Lenssen, Major Professor
Kenneth J. Moore
Mark E. Westgate

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Abstract

The agricultural industry had a rapid increase in commodity prices from late in 2010 until the fall of 2014. With those higher prices, there was a niche market for added-value products brought to the market, many of which promised the local grower a five-bushel yield increase per acre on soybeans. I wanted to focus on a select group of these products, plant growth regulators (PGRs). I specifically worked with a commercial product that contained three phytohormones, cytokinin, a gibberellic acid, and an auxin. For this project, there were thirteen side-by-side trials for each of the following years, 2015, 2016, 2017. The treatments tested were fungicide and insecticide vs. fungicide, insecticide, and commercial phytohormone product at the R2-R3 growth stage in soybeans. There were 39 total trials across the three years, all in the Central Iowa area. The objective of this experiment was to determine if the use of the PGR containing three phytohormones in addition to both fungicide and insecticide applied foliar during the growth stages of R2-R3 would increase soybean yield compared to just a fungicide and insecticide foliar application applied at the same time.

Over three years of on-farm trials, there was a positive yield response of 5.4 bu/acre with the addition of the commercial PGR product containing three phytohormones when applied on soybean during the R2-R3 growth stages. Soybean treated with fungicide, insecticide, and commercial PGR product averaged 65.4 bu/acre while soybean just treated with fungicide and insecticide averaged 60.0 bu/acre with an LSD of 1.0 bu/acre. In 13 studies in 2017, stem diameter was increased 0.54 cm and pod number was increased by 29.9 pods per plant following an application of the PGR product compared to the control treatment. The soil parameters measured did not influence yield, but the application of the commercial PGR product did influence yield. Using the R statistical program (version 3.4.2) to analyze the data, there was a yield advantage from the commercial PGR product application. The commercial PGR product application having a 5.4 bu/acre yield advantage over just a fungicide and insecticide application. There was an advantage in additional node development with the commercial PGR product application. An application of the commercial PGR product, fungicide, and insecticide increased yield over just a fungicide and insecticide application at R2-R3 growth

stages in soybean. This yield advantage was due to soybean plants producing more nodes for development of additional pods and seed.