



P.O. Box 1760, Carman, MB  
 Canada R0G 0J0  
 T 204.745.6488  
 F 204.745.6213  
 @MbPulseGrowers  
 www.manitobapulse.ca

## MPSG ANNUAL EXTENSION REPORT

**PROJECT TITLE:** Mitigating soybean harvest losses through enhancing podding height

**PROJECT START DATE:** 2 April 2018

**PROJECT END DATE:** 31 March 2021

**DATE SUBMITTED:** 15 February 2019

### PART 1: PRINCIPAL RESEARCHER

#### PRINCIPAL

<b>NAME:</b>	Belay Ayele	<b>NAME:</b>	
<b>POSITION:</b>	Associate Professor	<b>POSITION:</b>	
<b>INSTITUTION:</b>	University of Manitoba	<b>INSTITUTION:</b>	
<b>EMAIL:</b>	belay.ayele@umanitoba.ca	<b>EMAIL:</b>	
<b>PHONE:</b>	204-474-8227	<b>PHONE:</b>	

### PART 2: EXECUTIVE SUMMARY

*Outline the project objectives, their relevancy to pulse and soybean farmers, and a summary of the project to date, including methods and preliminary results.*

Soybean has become the third largest field crop of Manitoba in terms of farm cash receipts. However, its production is constrained by a number of factors that causes yield reduction including harvest losses. The majority of harvest losses occur at the header due to, for example, low pod height, which is referred to as stubble loss - a problem known to be more prevalent in short season varieties. Owing to Manitoba's short growing season, soybean producers are restricted to grow short season varieties that are characterized by low podding height of the lowest pods, and this makes stubble loss a recurrent problem for Manitoban soybean producers. Therefore, developing strategies that reduce stubble losses will have a significant impact in maximizing soybean yield. Plant growth is controlled by plant produced compounds often referred to as plant hormones, and some of these compounds are implicated in enhancing plant height or stem lengthening. Thus, increasing pod height and thereby decreasing stubble losses may be achieved by altering the status of these hormones in soybean plants through application of their naturally occurring or synthetic forms, also known as plant growth regulators (PGRs). Using experiments that involved soybean cultivars with varying pod heights and controlled growth conditions, this study is aimed at developing a PGR-based strategy for increasing height of lowest pods in soybean and thereby decreasing the associated harvest losses. The findings of this project will therefore have the potential to mitigate the problem and deliver significant savings to Manitoban soybean producers.

### **PART 3: PROJECT ACTIVITIES AND PRELIMINARY RESULTS**

---

*Outline project activities, preliminary results, any deviations from the original project and communication activities. You may include graphs/tables/pictures in the Appendix.*

#### Project Activities

The project involves the training of an M.Sc. student. Accordingly, a new M.Sc student has been recruited in September 2018 and student's project is progressing well. Some of the project activities accomplished to date are listed below.

1) Selection of experimental plant materials/soybean varieties

Three soybean cultivars with different pod heights have been selected for use as experimental plant materials for the project. This selection was made in consultation with Ms. Kristen MacMillan, a Research Agronomist in the Department of Plant Science, University of Manitoba. Seeds of the three cultivars have been secured and experiments with these varieties is in progress.

2) Selection of appropriate plant growth regulators (PGRs) with the potential effects of increasing pod height

To date, three different kinds of plant growth regulators with potential effects on pod height have been secured (designated as PGR#1, PGR#2 and PGR#3). The availability of more PGRs with potential effects on altering pod height are being explored. These PGRs will be tested either alone or in combination for their effect on pod height.

3) Examining the effect of seed treatment with one of the PGRs (PGR#1) on internode elongation.

Tests have been performed to test the effect of one of the PGRs secured (PGR#1). To this end different concentrations of the PGR were prepared. The different concentrations of the PGR (100, 50 and 10 micro molar) were used to treat the seeds of one of the soybean cultivars, namely, TH37004, chosen. Treated seeds with emerging radicle were planted into pots under controlled environmental condition. Different morphological parameters were recorded throughout the growth cycle, and this included length of the first internode, and lengths of the subsequent internodes, and total plant height. Our preliminary results showed that seed treatment with the specific PGR increases the height of the cotyledonary nodes and the first nodes without affecting the lengths of the subsequent nodes.

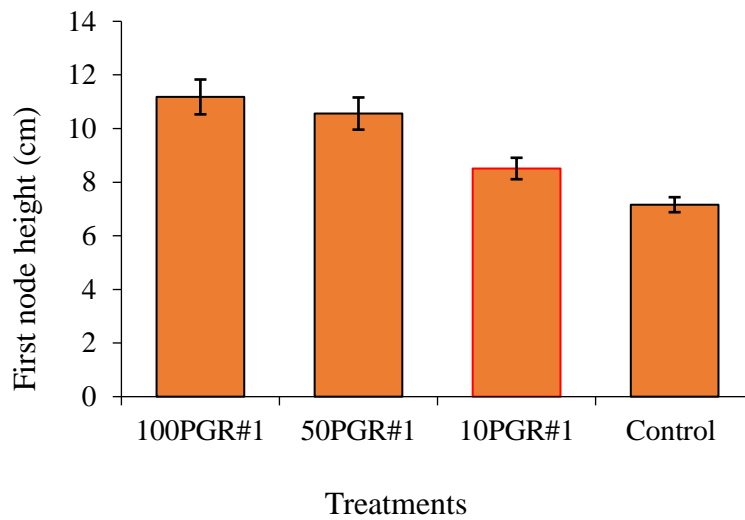
4) Investigating the effect of seed treatment with PGR#2 on internode elongation of the same cultivar.

Experiments to test the effect of PGR#2 on stem elongation is in progress. This experiment also involved treatment of the seeds of cv. TH37004 with PGR#2 at different concentrations. Following imbibition, the treated seeds have been planted under controlled environmental condition and collection of the necessary morphological data is being collected from plants derived from control (untreated) and treated seeds.

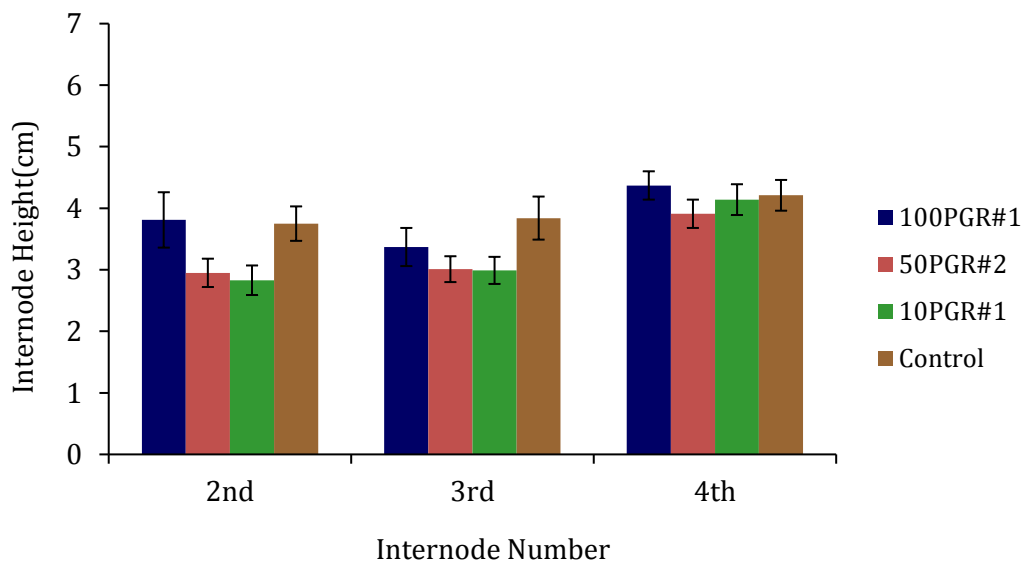
5) Preparations to test the third PGR using the same soybean cultivar is underway.

**APPENDIX**

Include up to 1 page of tables, graphs, pictures.



**Figure 1.** Effect of different concentrations of PGR#1 on the height of the first node (from the cotyledonary node).



**Figure 1.** Effect of different concentrations of PGR#1 on the lengths of internodes located above the first node.

