

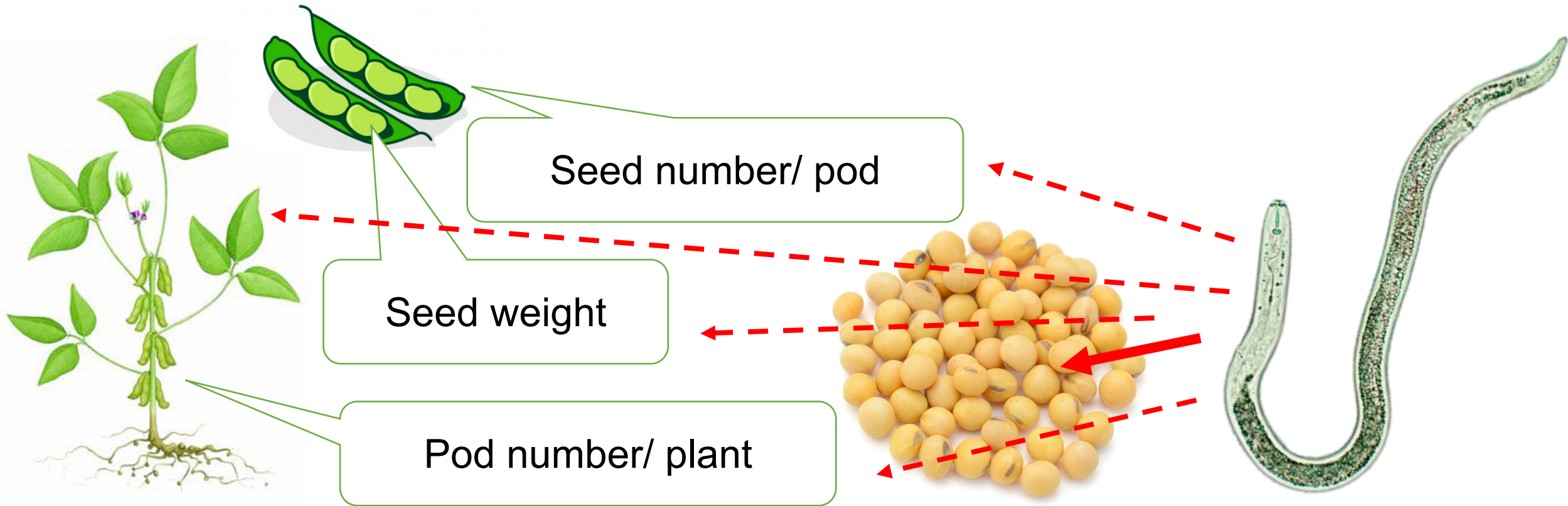
# Damage potential of *Pratylenchus penetrans* on soybean

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# Introduction



Our objective was to describe  
**the effect of *P. penetrans* on plant growth and soybean yield**  
under field and green house conditions.

# Field study - Materials and Methods

Conducted at Hancock Agricultural Research Station in 2017 & 2018 (n=201).  
Irrigated Plainfield loamy sand, sized 4.2 acres in 2017 and 2.8 acres in 2018

## Emergence stage

- Two-meter plots were established.
- Soil samples (Pi)



## Second Trifoliate Stage (V2)

- 2 plant samples  
Root weight  
Shoot weight  
Shoot : root



## Final maturity

- Harvest plots  
Yield  
Pod number/ plant  
Seed number/ pod  
100-seed weight



# Field study - Modeling

**Linear Mixed Model** by the MIXED procedure in SAS

## V2 stage

Y: Shoot weight  
Root weight  
Shoot : Root

X: Number of *P. penetrans*  
/100 cm<sup>3</sup> soil at VE (Pi)

Random: Year

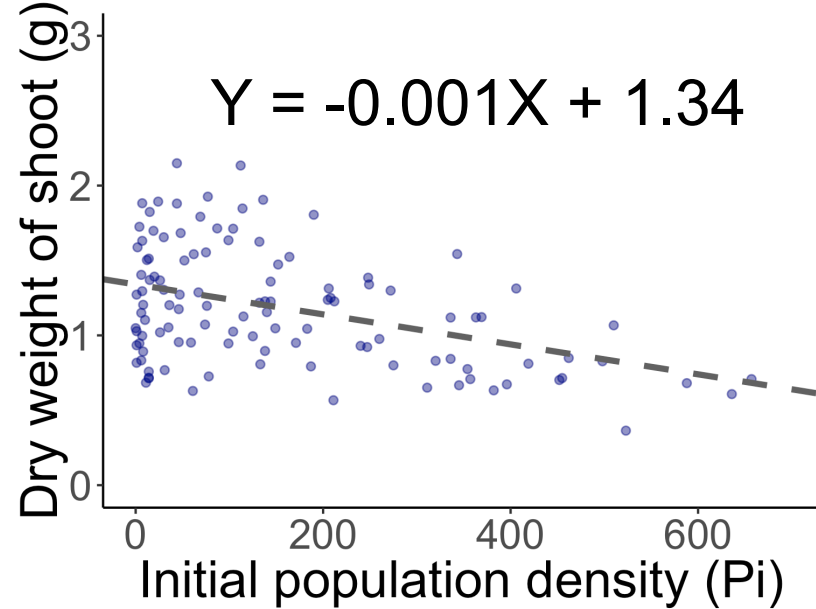
## Final maturity

Y: Yield (bu/A)  
Pod number/ plant  
Seed number/ pod  
100-seed weight

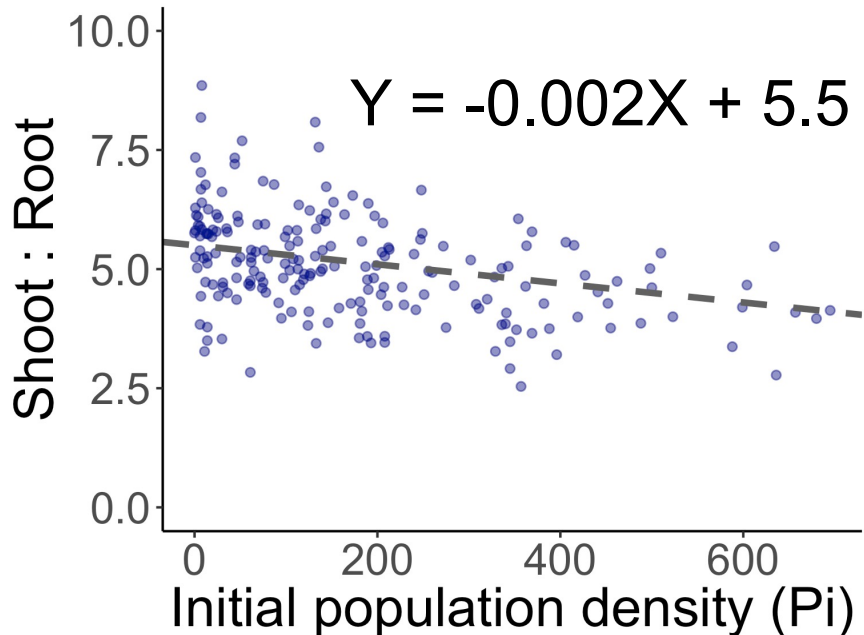
X: Number of *P. penetrans*  
/100 cm<sup>3</sup> soil at VE (Pi)

Random: Year

# Field study – Results at Vegetative stage

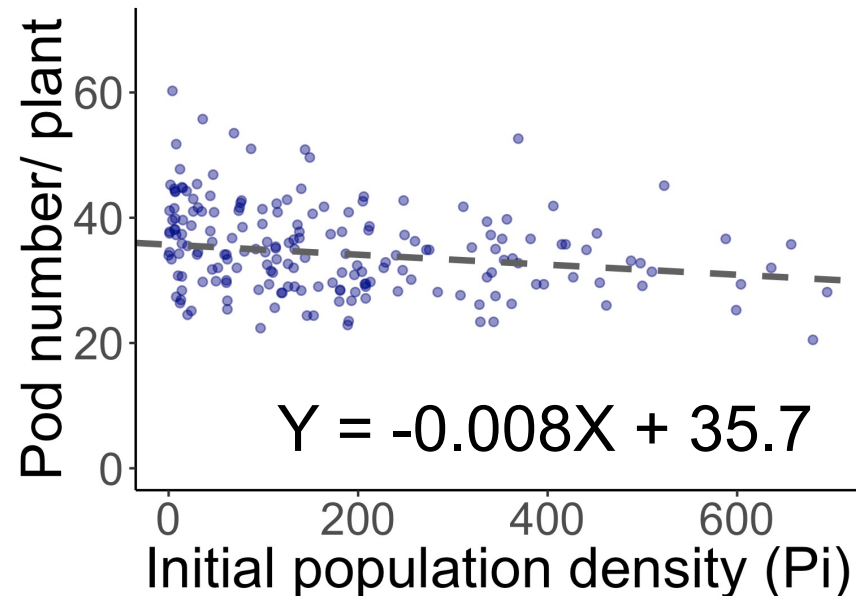
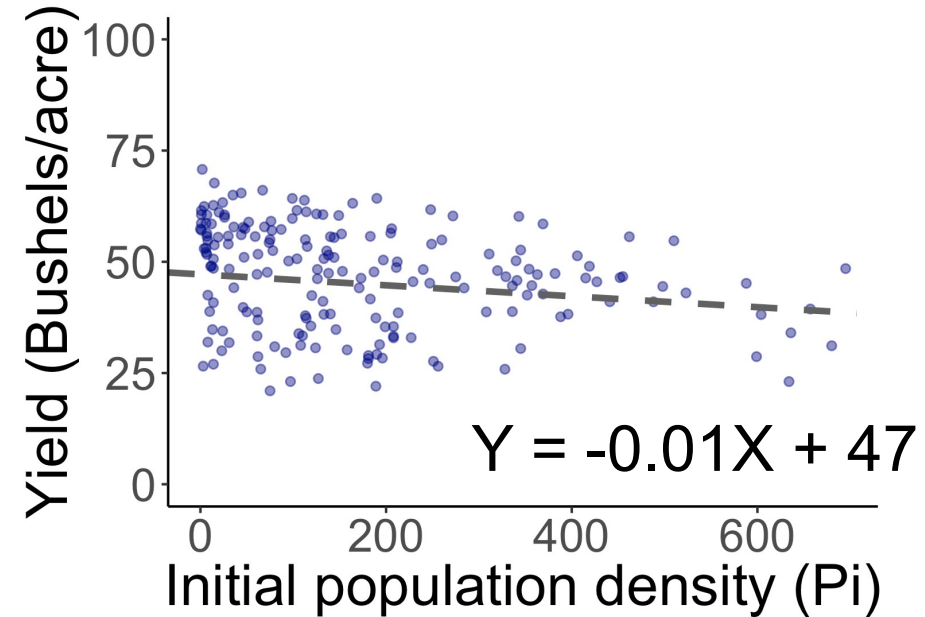
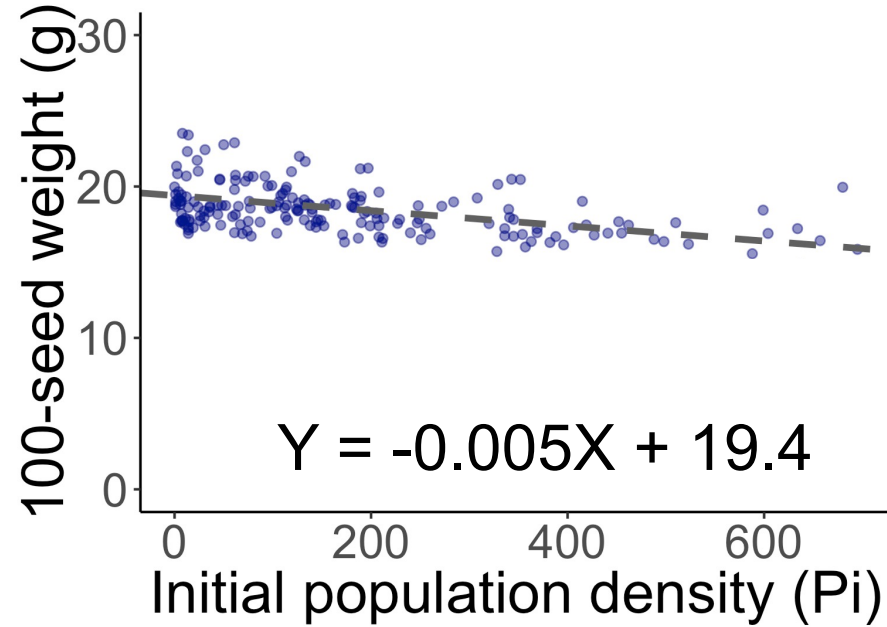


$P_i = 201$  (3-695) in 2017  
 $P_i = 165$  (0-1313) in 2018



Plant Parameter	Estimate	<i>P</i> - value
Root weight (g)	-0.00003	NS
Shoot weight (g)	-0.001	< 0.0001
Shoot : Root	-0.002	< 0.0001

# Field study – Results at Final maturity

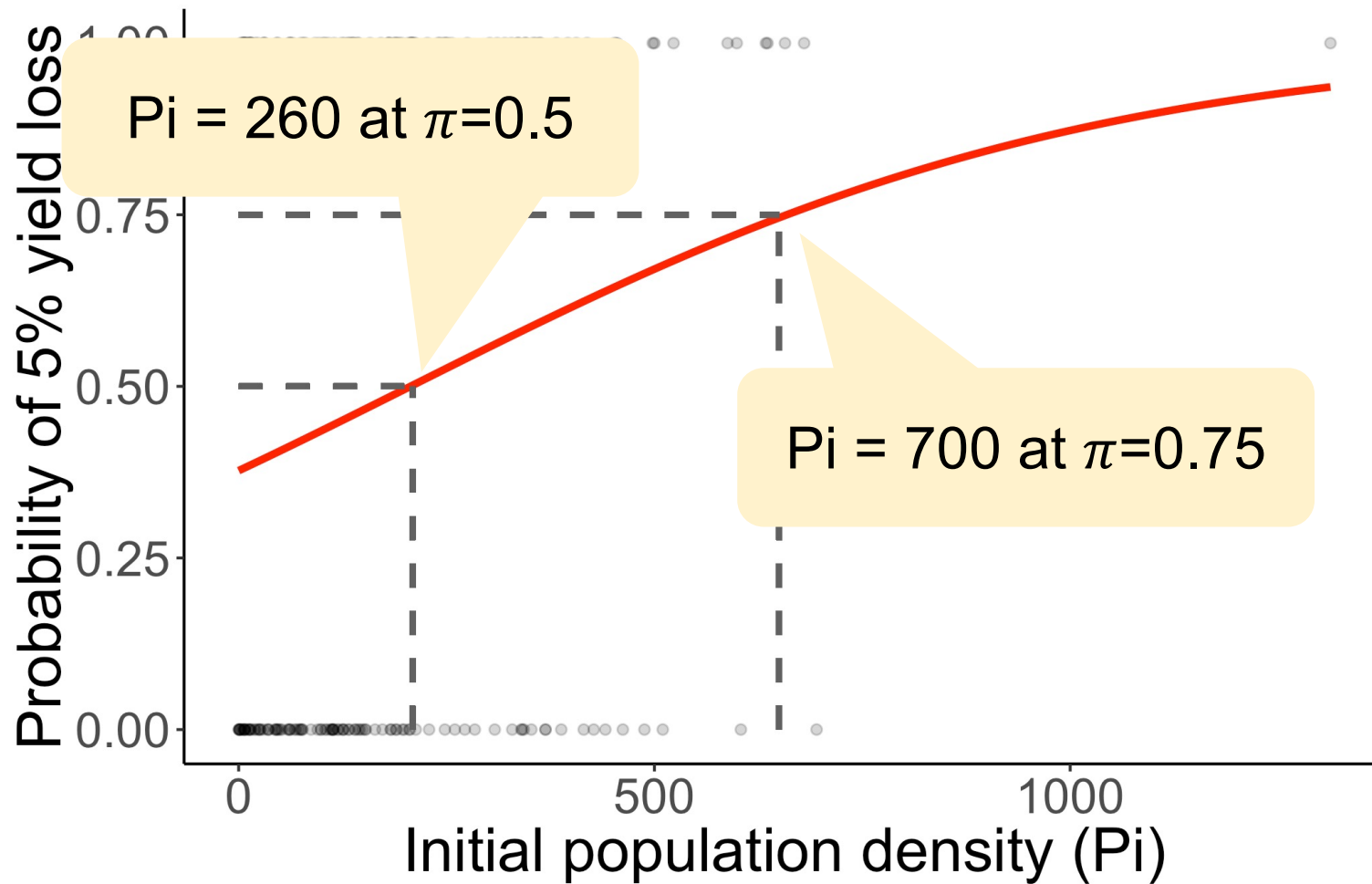


Plant Parameter	Estimate	<i>P</i> - value
Yield (bu/A)	-0.011	0.002
Pod number/ plant	-0.008	0.0008
Seed number/ pod	0.00006	0.002
100-seed weight	-0.005	< 0.0001

# Field study – Probability of 5% yield loss

**Should growers implement nematode management?**

What is the probability that the cost of the application is covered?



**Logistic regression**

Where  $Y = 1$   
when yield loss is  $\geq 5\%$ ,  
otherwise  $Y = 0$



# Green house study - Materials and Methods



## **Inoculum level:**

0 , 2000, 4000, 8000, 12000, 16000, 20000  
with 8 replications

## **Cultivar:**

Corsoy and P24T05R (Pioneer)

## **Data:**

Weights of shoots and roots at V2 (3 reps)  
Weights of shoots and roots at final maturity (5 reps)  
Yield and yield components (5 reps)

## **Data analysis:**

Generalized Linear Mixed Model (GLIMMIX procedure in SAS)

Fixed effect – Inoculum level, soybean cultivar, Inoculum level x cultivar

Random effect – Trial, Replication(Trial)

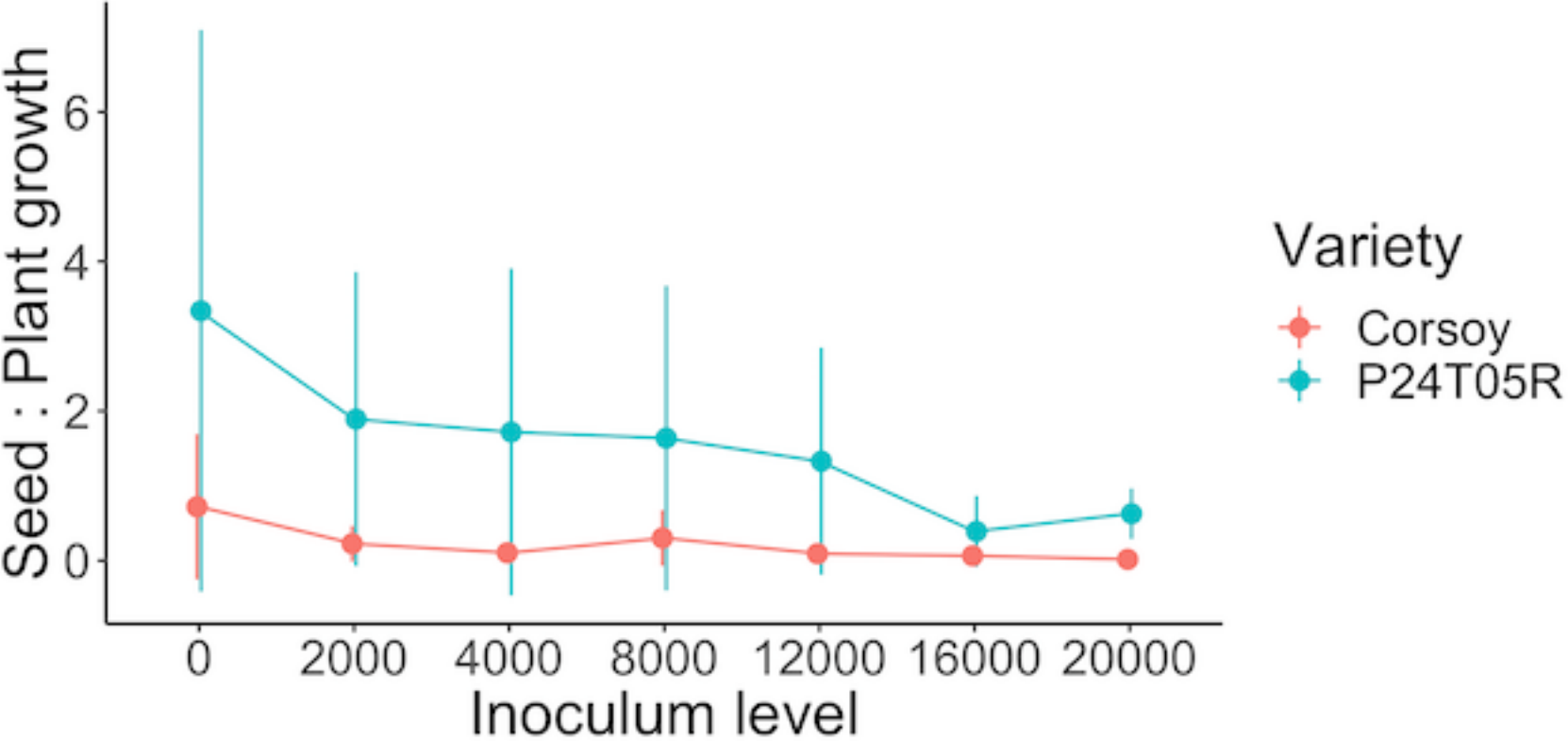


# Green house study – Results\*

Vegetative stage

Fixed effect	Root	Shoot	Shoot:
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Final



Inocu

Cultiv

Inoculum level x Cultivar

NS

NS

NS

Seed:  
Plant growth\*\*

0.03

< 0.0001

NS

\*P-value of F test statistics

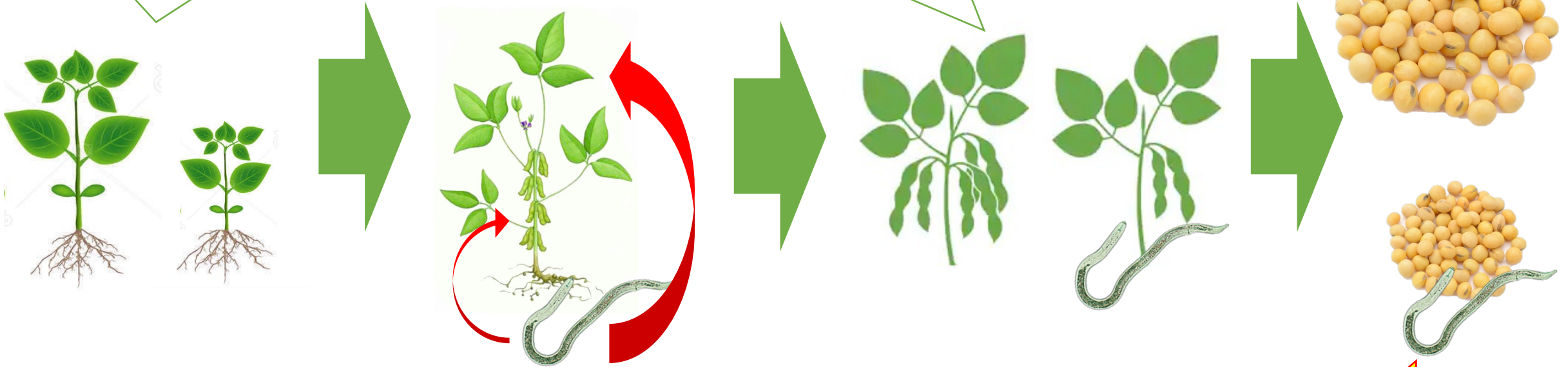
\*\*Seed = weight of seeds,

Plant growth = weights of shoots and roots at final maturity

# Conclusions

Reduced shoot weight, but  
maintained root weight.

Reduced pod number



Manipulated the energy  
partitioning of plants toward  
plant growth over reproduction

**Yield loss**

# Thank you



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