



3 years of Comparative  
Analysis between  
Laboratory and Field  
Performance  
Outcomes on Sweet  
Corn

- Marija Topic, RST  
Crookham Company  
Calwell, Idaho

# Objective of the study

- Undertake a comparative study between in-field performance and laboratory testing to identify the seed lot's performance and uniformity under adverse planting conditions and storage potential.

# Design

- The Breeder's department planted seed on the field in early April.
- Laboratory analysts evaluated field and laboratory testing.
- Various seed lots based on their distinct qualities were chosen.
- 200 seeds were planted for each lot.
- 2021 – 12 lots were planted
- 2022 – 10 lots were planted
- 2023 - 11 lots were planted

# Field Testing

- The field was evaluated by laboratory analysts when plants were at the 5-6 leaves stage. Stands were expressed as the number of plants that emerged.
- Vigor ratings - a scale of 1-5 (1=extremely weak, 2=weak, 3=fair, 4=vigorous, 5=very vigorous).
- Slows were expressed as the # of plants that have 2+ leaves fewer than average.

# Laboratory Testing

Laboratory testing methods: warm test, cold test, and vigor index rating test.

- The focus was on the Vigor Index Rating test.
- Seed was tested under stressful conditions, 5C 1/D, 10-20C 21/D.
- Each testing method was evaluated according to AOSA Rules.
- Vigor Index Rating results expressed as the number of normal plants.

# Vigor Index Rating test

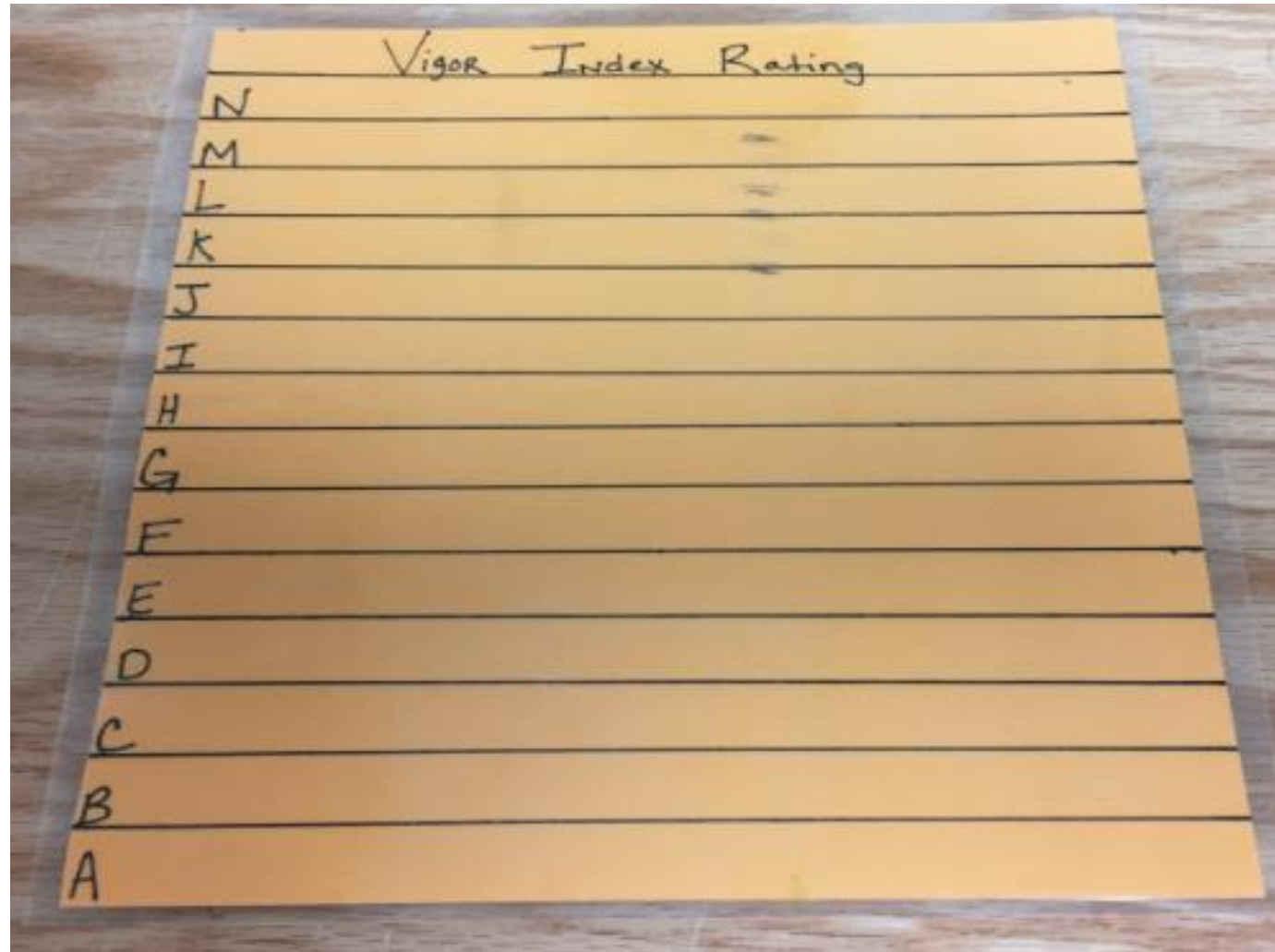
## **Pros:**

- More precise vigor information for ranking various seed lots based on their distinct qualities.
- Superior Inventory Management - Useful to help the production department and the sales department in making decisions.

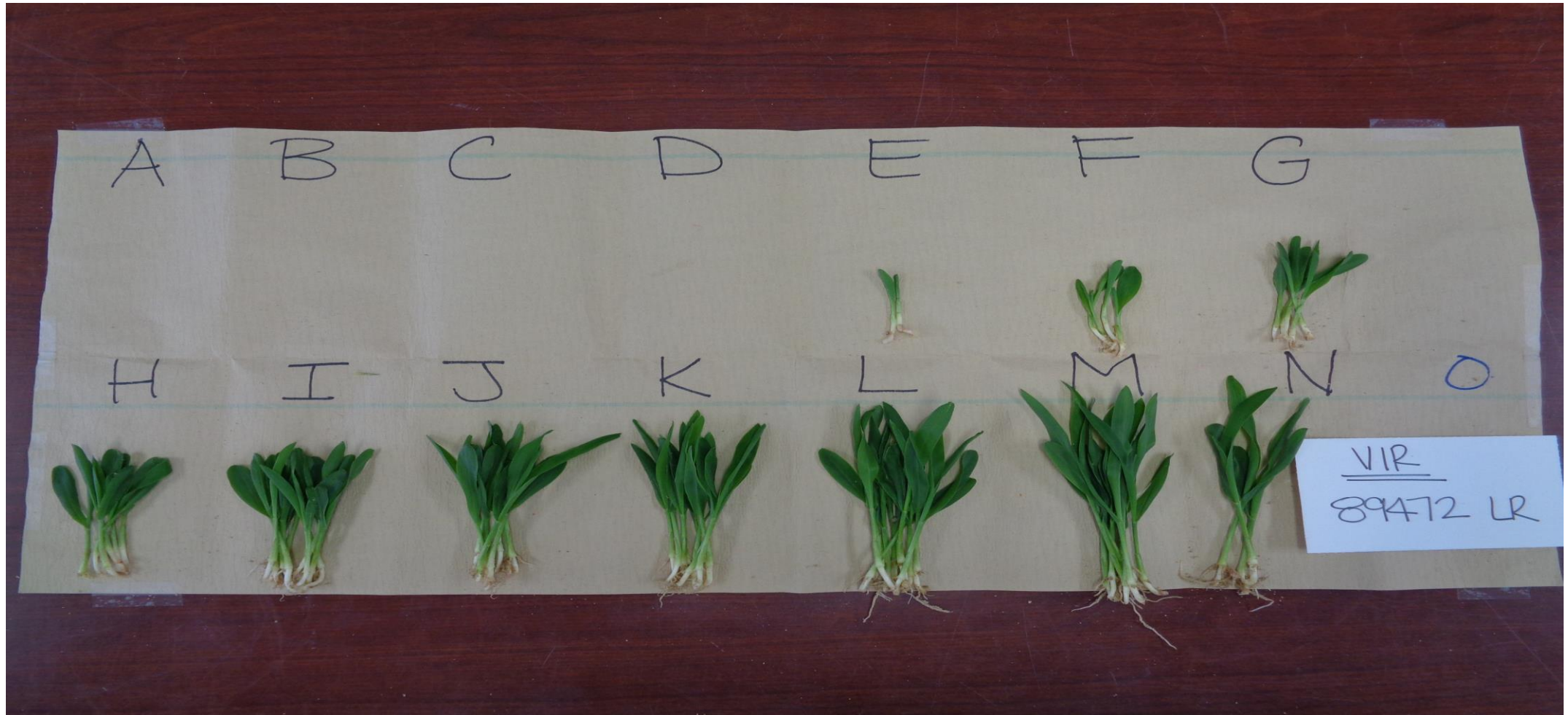
## **Cons:**

- The time required to perform the test.
- More space in the growing chamber.

# Vigor Index Rating chart (half inch between letters)

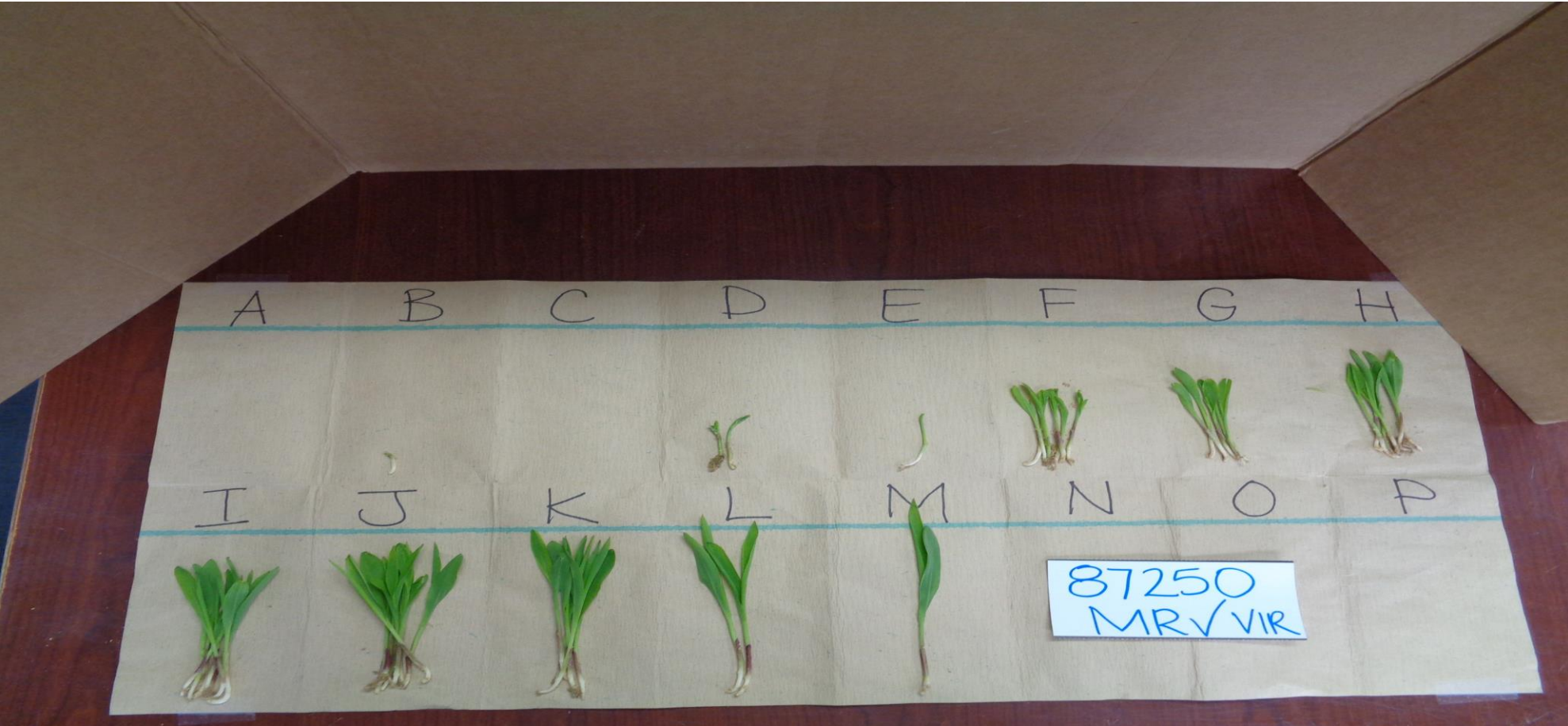


# Vigor Index Rating Test





# Vigor Index Rating Test



# Visual inspection before planting



# Importance of visual inspection of the seed before planting

## Example

### Difference between sh2i and sh2 seed

- In the level of activity and performance of the seed during germination.
- Improved flowability and plant ability for the grower, fewer skips and doubles.

### What does this mean for the grower and producer?

- Reliability in seed availability, emergence, vigor, and ease of harvest.
- Repeatability, the same results, season to season, year to year with the added vigor of the sh2i gene.

### Germination results:

- Warm Test: sh2 = 89%    sh2i = 94%
- Cold Test: sh2 = 88%    sh2i = 94%
- Soil Test: sh2 = 86%    sh2i = 98%
- Sand Test: sh2 = 86%    sh2i = 94%

# Data

Lab VIR	Field VIR	Cold germ	Warm germ
75	82	78	96
85	92	83	99
86	83	83	95
89	90	81	97
91	91	71	98
73	80	80	95
68	86	77	99
80	89	92	97
73	88	84	96
87	76	89	99
93	87	96	98
94	93	96	95
89	90	93	97
95	95	92	94
96	96	96	96
95	90	93	94
90	88	92	92
96	93	96	93
90	94	94	98
94	98	92	98
92	87	90	96
91	89	92	91
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91	91	95	96
88	85	91	94
95	89	88	95
91	86	89	98
94	95	95	97

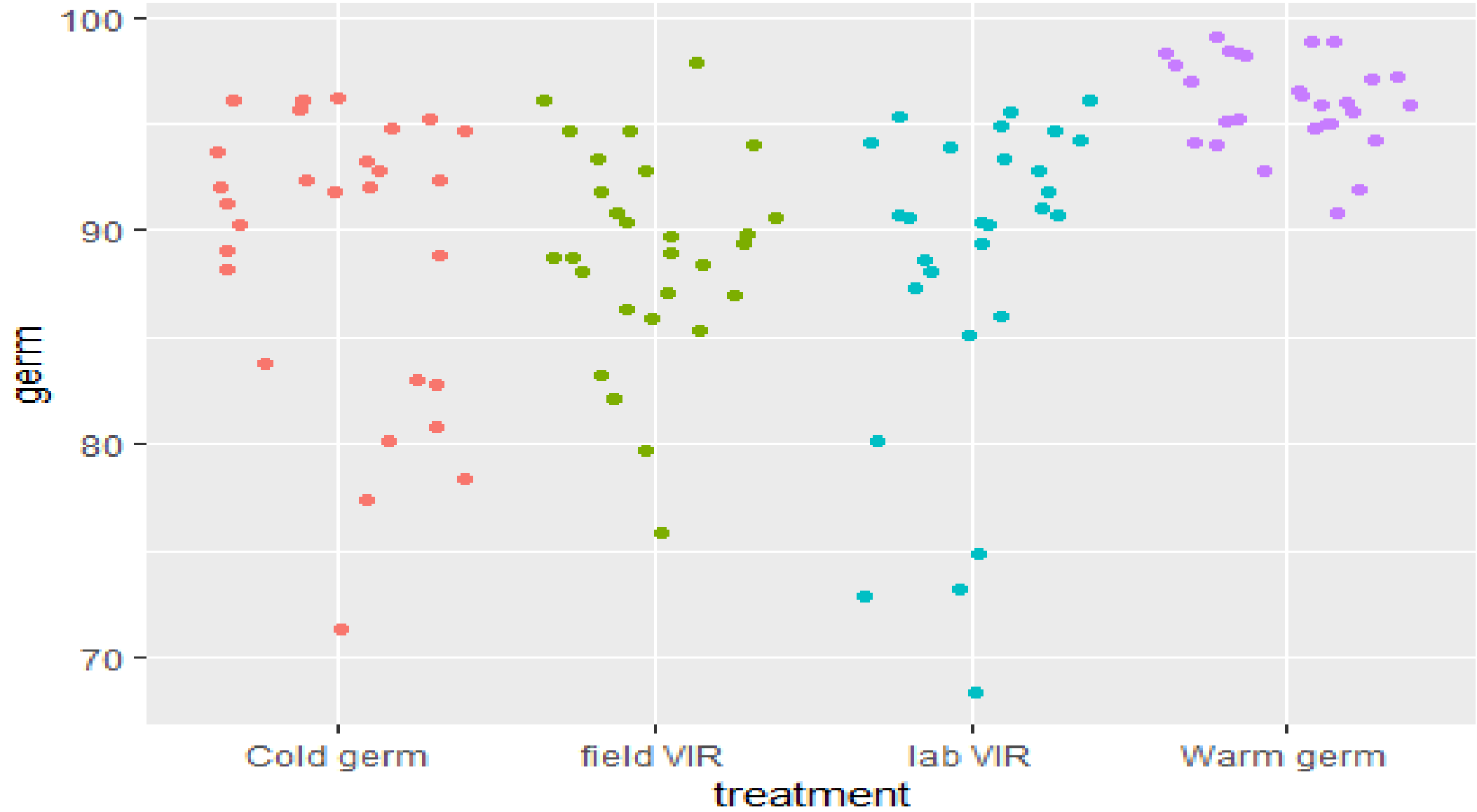
- Descriptive Statistics:

Group	Germ. Mean	Germ. SD
1 Cold germ	89.04	6.78
2 Field VIR	89.00	4.94
3 Lab VIR	88.36	7.67
4 Warm germ	96.00	2.09

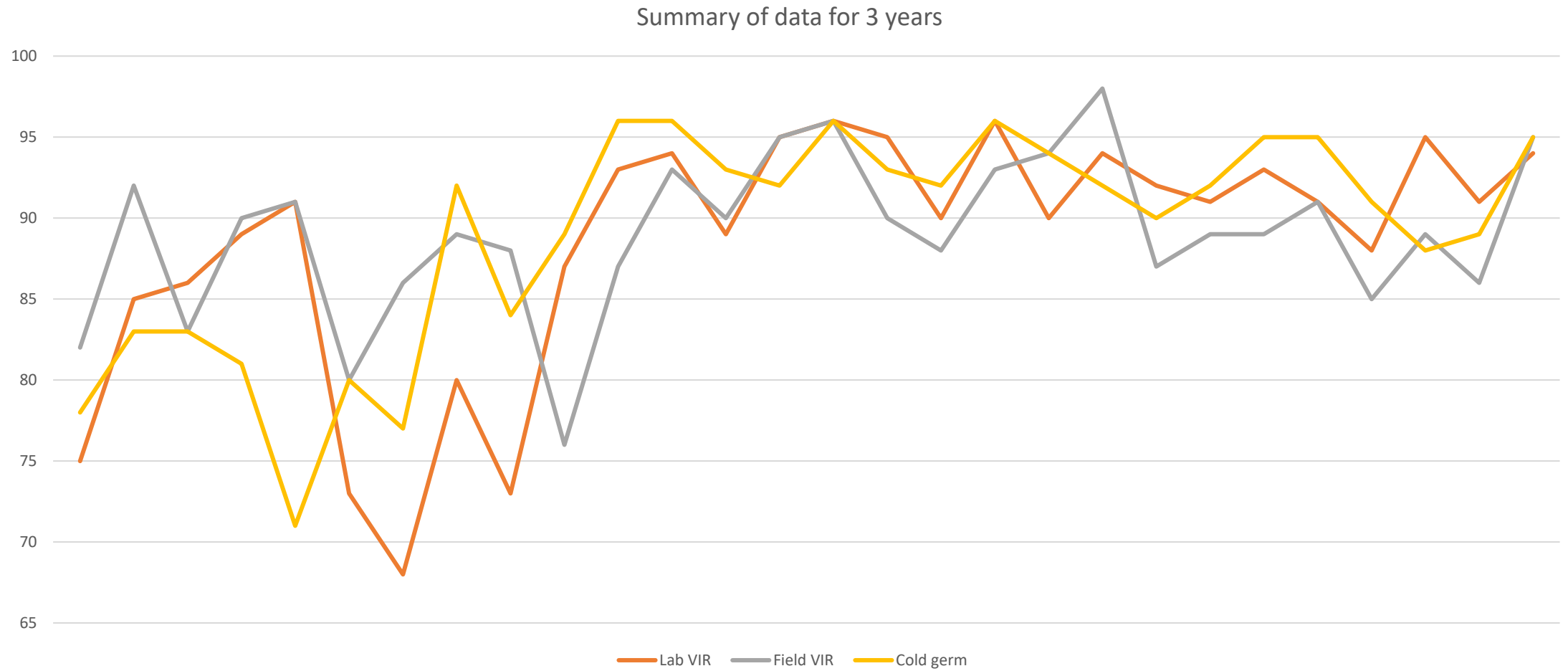
- Treatments with significant differences are highlighted in red.

	diff	lwr	upr	p adj
## field VIR-Cold germ	-0.03571429	-4.066369	3.994940	0.9999955
## lab VIR-Cold germ	-0.67857143	-4.709226	3.352083	0.9715157
## Warm germ-Cold germ	6.96428571	2.933631	10.994940	0.0000970
## lab VIR-field VIR	-0.64285714	-4.673512	3.387797	0.9755984
## Warm germ-field VIR	7.00000000	2.969345	11.030655	0.0000886
## Warm germ-lab VIR	7.64285714	3.612203	11.673512	0.0000164

# Scatterplot of data points

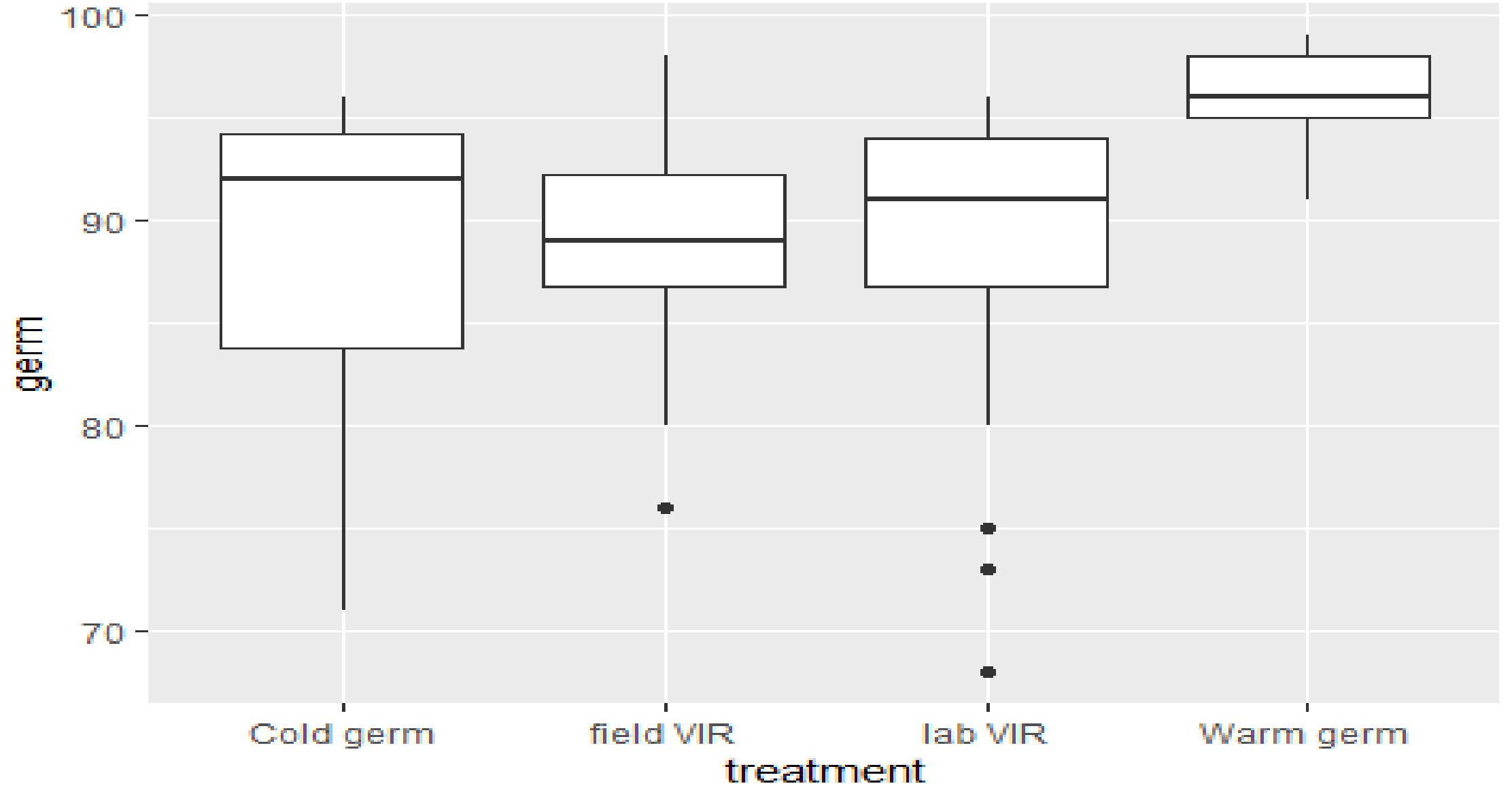


# Statistical analysis of data for 3 years

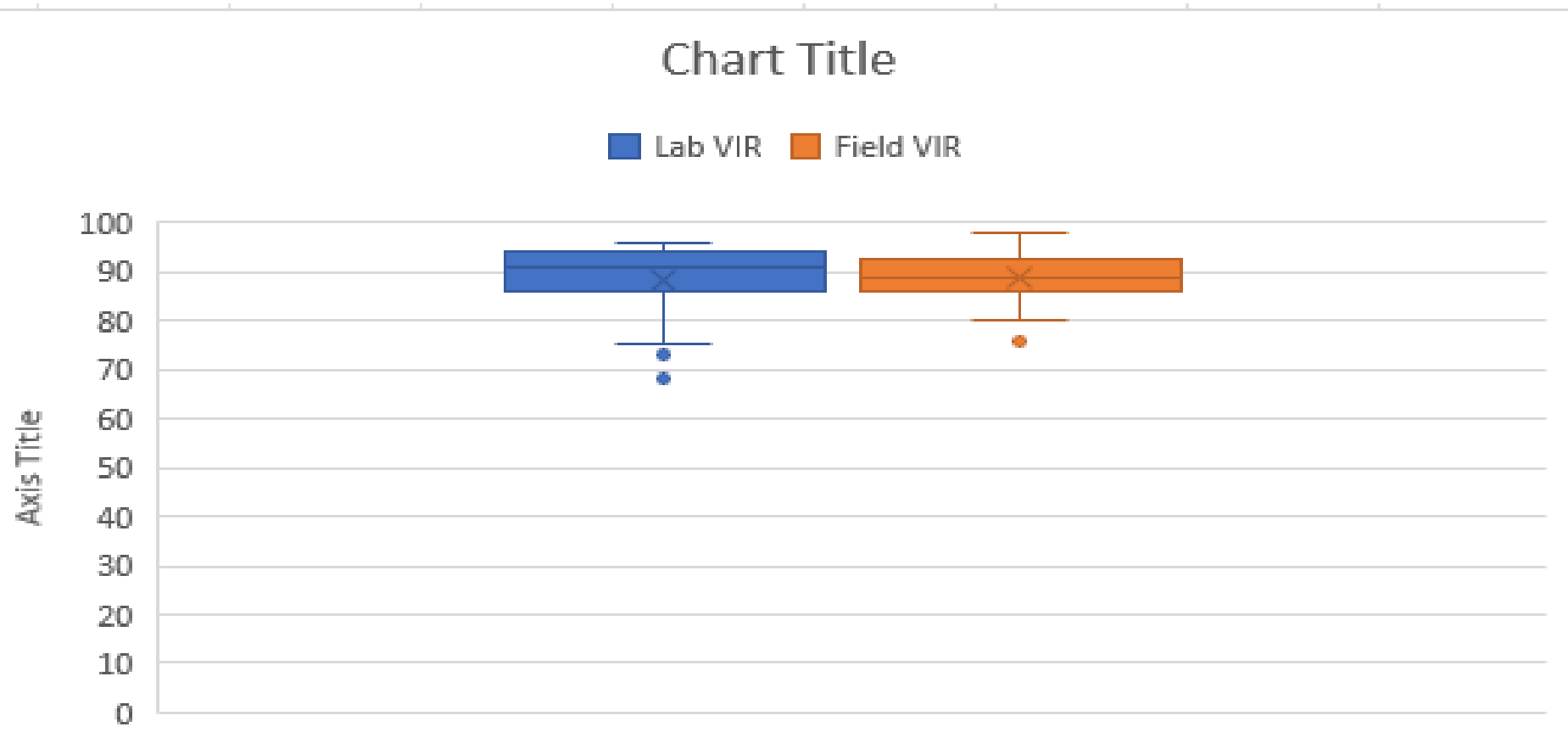




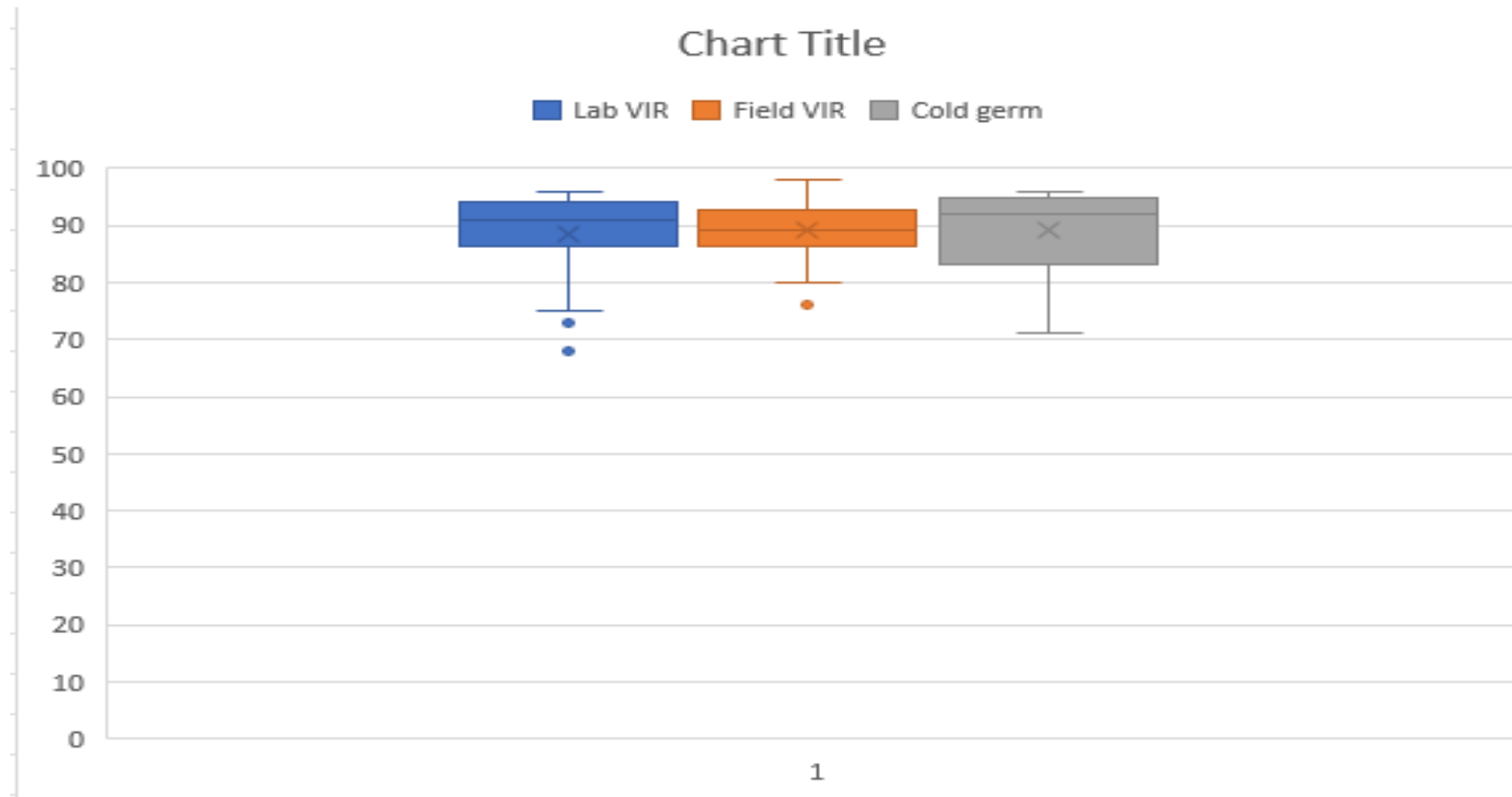
boxplot of datapoints



# Comparison between Lab VIR and Field VIR results



# Comparison between Lab VIR, Field VIR, and cold test results



# Conclusion

- There are no significant differences between the means of each treatment.
- Vigor Index Rating is a reliable test to identify the seed lot's performance and uniformity under adverse planting conditions and storage potential.
- An internal procedure for the cold vigor index is created and used to rate seed lots for sweet corn.
- There appear to be some larger differences within varieties, especially in the first year of data.

# Acknowledgements

- Thanks to the Breeder department, Dustin Batt and Jennifer Ireland.
- Laboratory analysts.
- Statistical analysis was performed by Damien Courtier, Snowy River.



# QUESTIONS

Marija Topic Crookham Company

[marijat@crookham.com](mailto:marijat@crookham.com)

THANK YOU!