HELENA PRODUCTS GROUP™

From Data to Decisions: How Industry Sponsors Can Utilize CRO Data

NAICC- Efficacy Research Training

Nick Hurdle

January 26th, 2026

DRIVEN by Tradition | **COMMITTED** to Execution | **FOCUSED** on Trust | **POWERED** by Information

EVOLVE | HELENA

Technical Development Manager

Nick Hurdle, PhD

B.S. – Crop and Soil Sciences, UT-Martin

M.S. – Weed Science- University of Georgia

Ph.D. – Weed Science- University of Georgia

Helena – Technical Development Manager

Technical Development Manager

Nick Hurdle, PhD

B.S. – Crop and Soil Sciences, UT-Martin

M.S. – Weed Science- University of Georgia

Ph.D. – Weed Science- University of Georgia

Helena – Technical Development Manager

- Develop/contract research protocols for 3rd party researchers
- Assist in product development (Concept to Launch)
- Assist field personnel with technical product questions
- In-house R&D work (storage stability, tank-mixes, Field of Innovation)
- Members of numerous Industry Societies (SWSS, ASTM, APS, ASA, ESA, etc…)

Aaron Hert
R&D Manager, Seed treatments

Nick Hurdle
Technical Development Manager

- Adjuvants
- Soybean herbicides
- Small grain herbicides

Bradley Greer
Technical Development Manager

- Fungicides
- Corn herbicides
- R&P herbicides
- Specialty

Zachary Ellenburg
R&D Data Analyst

- Database development
- Data analysis
- Statistics consultation

Clay Perkins
Technical Development Manager

- Insecticides
- Cotton PGR's
- Coron & Nutritionals

Derek Hilfiker
Technical Development Manager

- Bioscience
- HPG starter fertilizers

Experiment Data Management

1. Data collection methods/remedies
2. Data entry
3. How HPG handles data
4. What do you all need from us?

Data Collection

Common Data Collection Methods

1. Visual ratings

Data Collection

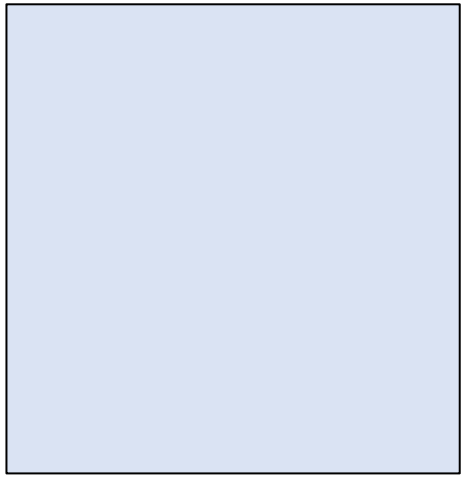
Common Data Collection Methods

1. Visual ratings
    - Subjective in nature

Data Collection

Common Data Collection Methods

1. Visual ratings
   - Subjective in nature



Light Blue?
Grey?
White?

Data Collection

Common Data Collection Methods

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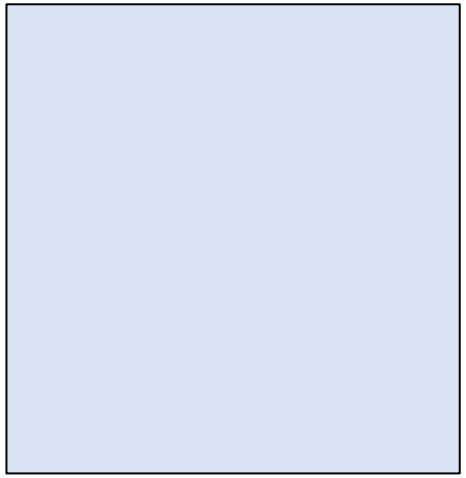

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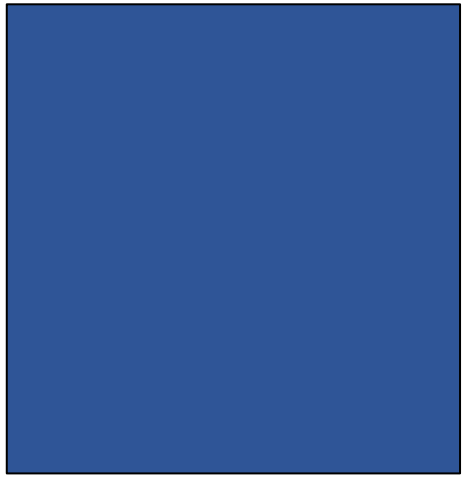

Blue

Data Collection

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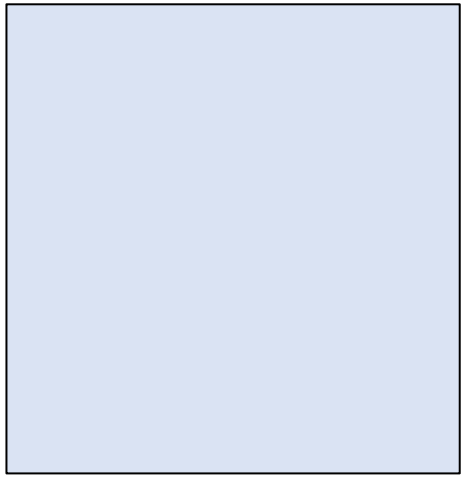

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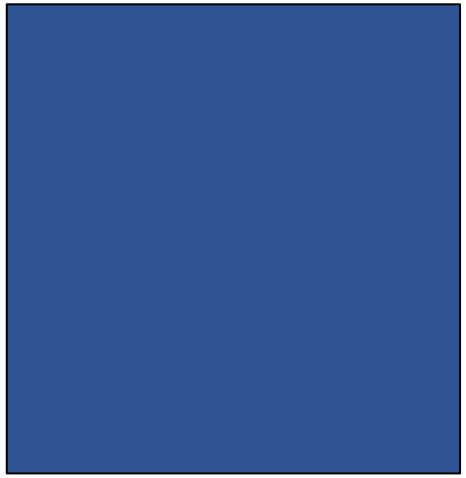
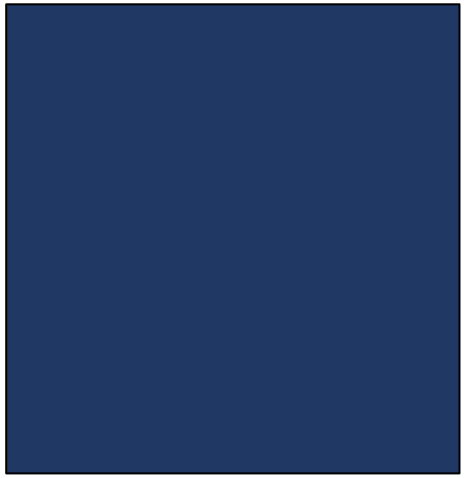


Blue



Dark Blue

Data Collection

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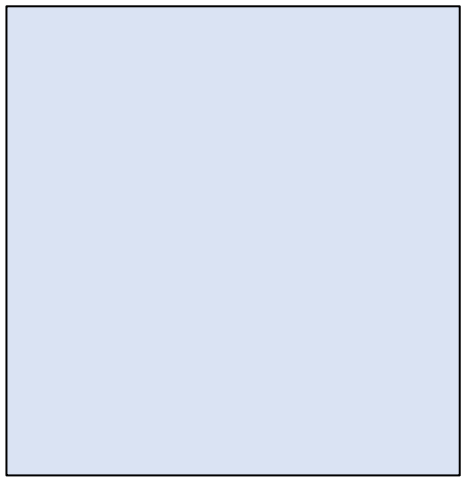
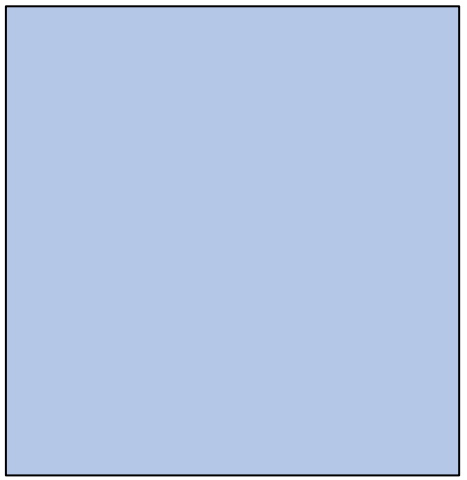
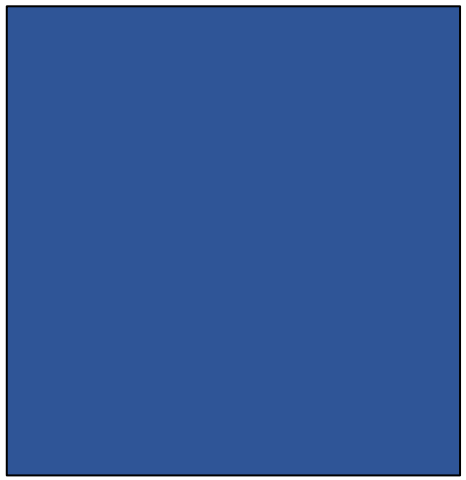
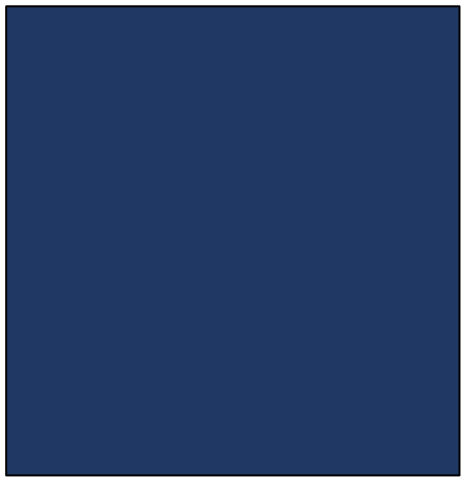

Grey


Light Blue


Blue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Data Collection

Common Data Collection Methods

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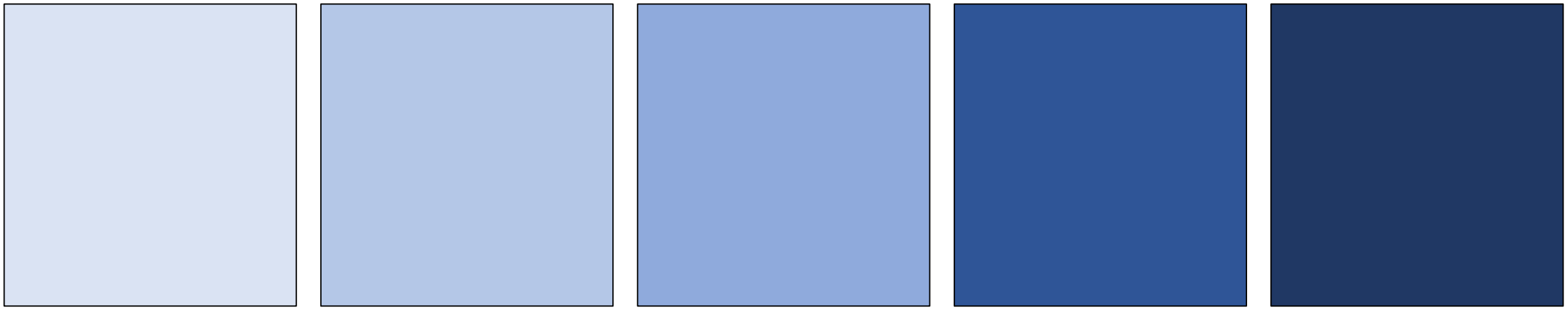

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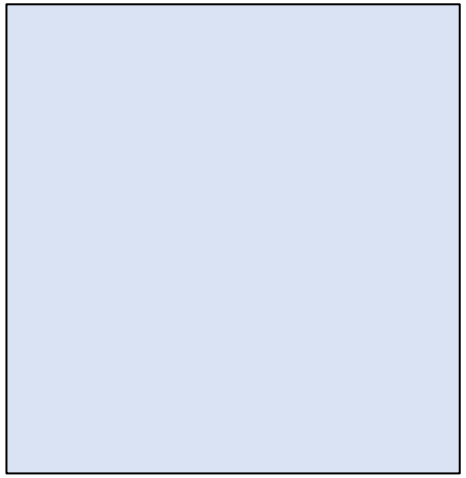
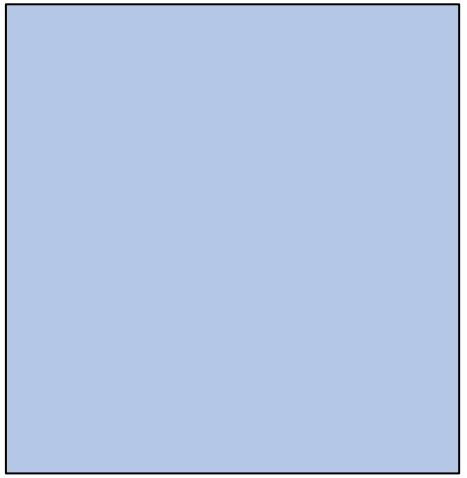


1. Light blue/Grey/White
2. Light Blue
3. Grey



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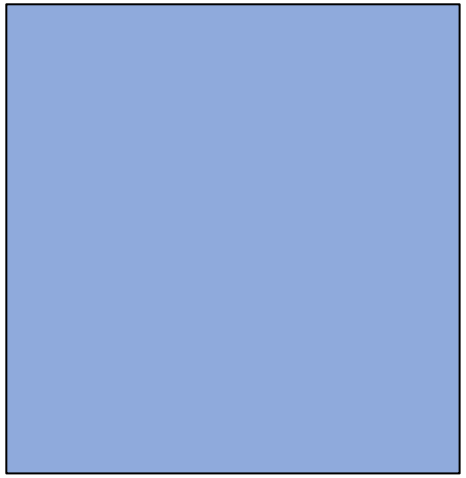
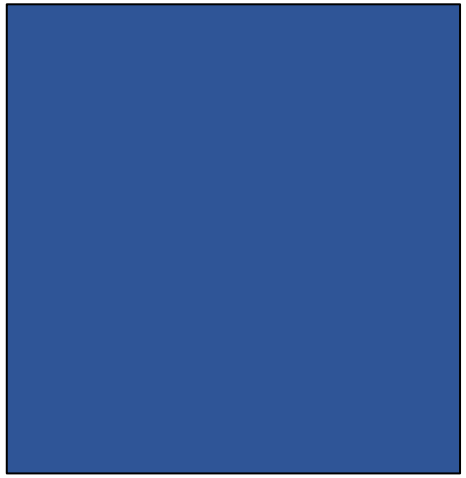
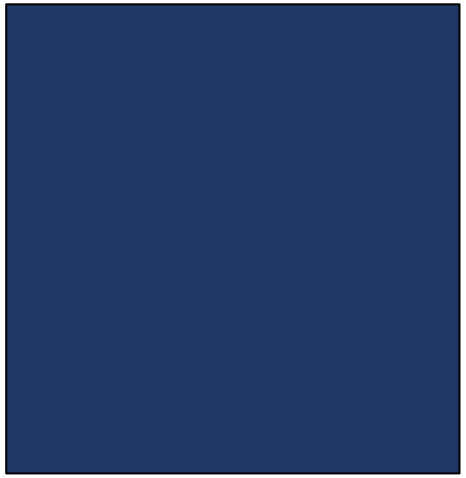


1. Blue



1. Blue
2. Dark Blue



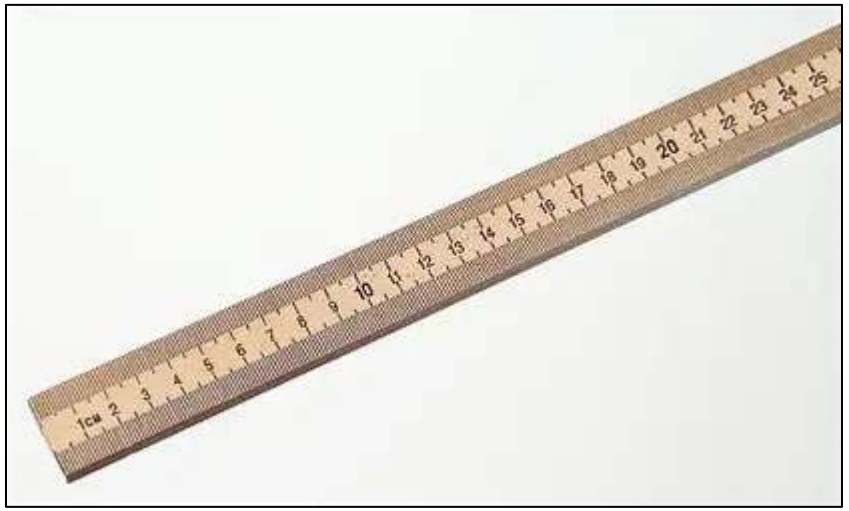
1. Dark Blue
2. Navy Blue

Data Collection

Common Data Collection Methods

2. Hard numbers/physical count

Credit: Xanthe Walker, Univ. of Sask.

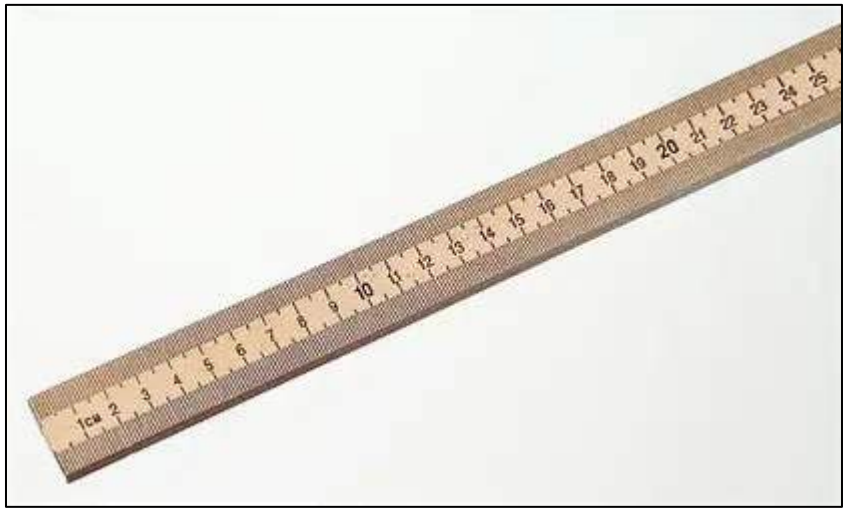


Data Collection

Common Data Collection Methods

2. Hard numbers/physical count
    - Go too fast, guestimate over time, hot/cold spots in plot

Credit: Xanthe Walker, Univ. of Sask.



Data Collection

Common Data Collection Methods

3. Additional recording tools
- Drone, SPAD meter, porometer/fluorometer, light bar, photosynthesis meters, etc…

Data Collection

Common Data Collection Methods

3. Additional recording tools

- Drone, SPAD meter, porometer/fluorometer, light bar, photosynthesis meters, etc…
  - Calibration, flight path, time of day, leaf selection, clean sensors/internal components, seals

Data Collection

Common Data Collection Methods

4. Remedies to ensure accurate data collection
    a) Ensure same person rates the same trials
    b) SLOW DOWN when counting
    c) Ensure rated spot is representative of ENTIRE plot
    d) Calibrate/clean equipment regularly, software updates

Data Collection

Common Data Collection Methods

4. Remedies to ensure accurate data collection
   a) Ensure same person rates the same trials
   b) SLOW DOWN when counting
   c) Ensure rated spot is representative of ENTIRE plot
   d) Calibrate/clean equipment regularly, software updates
   e) Rainy days or slow time, review with crew the rating procedures
   f) Have a second person verify what you rated
   g) Don’t use treatment list when rating, but verify Non-Treated Check’s if no running checks
   h) Pick areas with consistent pressure, deficiencies, etc…

Experiment Data Management

1. Data collection methods/remedies
2. Data entry

Data Entry

Data Entry Accuracy

1. Correct trial information

Assessment Data

- Assessed By
- Rating Date
- Standard Evaluation (SE)
  - SE Name
  - SE Description
  - Part Rated
  - Rating Type
  - Rating Unit
  - Rating Min/Max/Interval
  - Sample Size
  - Collection Basis
  - Reporting Basis
  - Number of Subsamples
- Crop
  - Crop Type, Code
  - *BBCH Scale*
  - Crop Scientific Name
  - Crop Name
  - Crop Variety
- Pest
  - Pest Type
  - Pest Code
  - Pest Scientific Name
  - Pest Name
  - Pest Stage Scale
- Timing
  - *Days After First/Last Appl.*
  - Treatment Appl. Interval
  - Planting Interval
  - *Days After Emergence*
  - Pest Establishment Interval
- Miscellaneous
  - ARM Action Codes
  - Number of Decimals
  - *Data Entry Date*

Application/App. Equipment

	A
Date	Jul-30-2025
Start Time	10:05 AM
Stop Time	10:40 AM
Standard	
Method	SPRAY
Timing	ACCRST
Placement	BROFOL
Mixed/Prepared By	
Applied By	
Entry Date	*Nov-5-2025*
Air Temperature Start, Stop	84 F
% Relative Humidity Start, Stop	78
Wind Velocity+Dir. Start	0 MPH
Wind Velocity+Dir. Stop	
Wind Velocity+Dir. Max	
Wet Leaves (Y/N)	
Soil Temperature	79 F
Soil Temperature Depth	
Soil Moisture	
Soil Surface Condition	

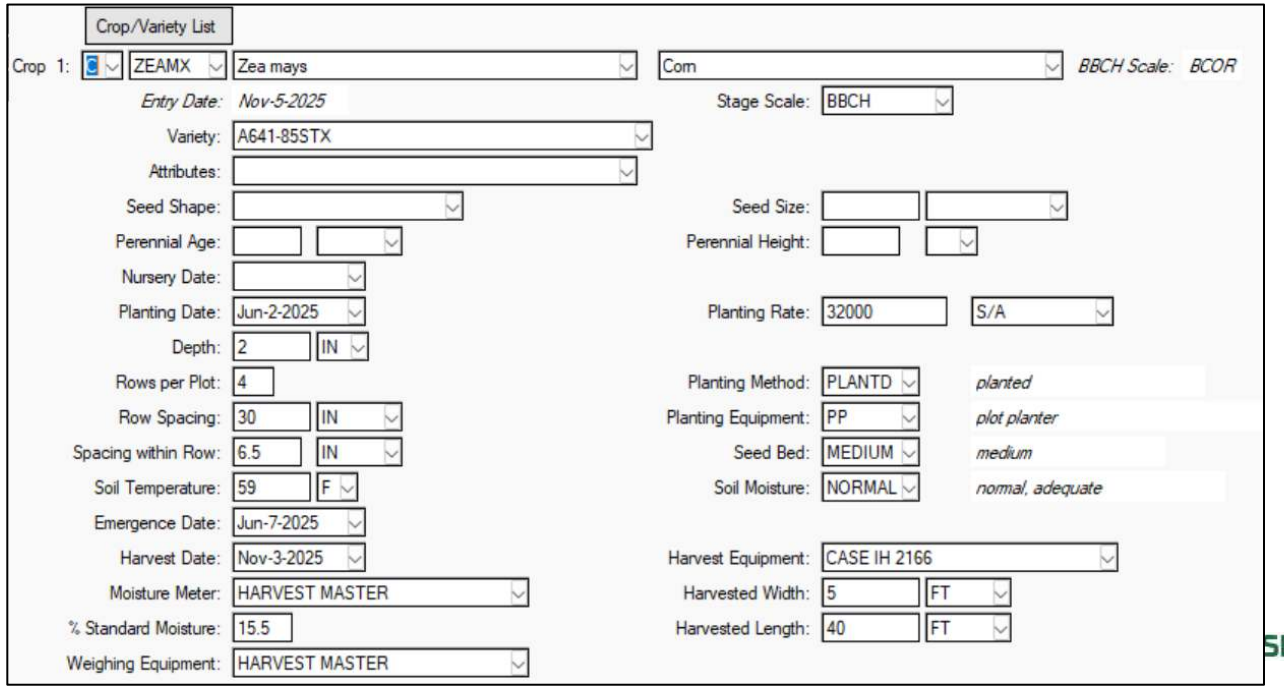
Equipment Name	SPRAYER
Equipment Type	SPRBAC
Operation Pressure	33 PSI
Nozzle Model	TT11002
Nozzle Type	TEEJTU
Nozzle TradeName	TEEJET
Nozzle Tip Size, Color	11002 YELLOW
Nozzle Spacing	20 IN
Nozzles/Row	
Nozzle Count	
Band Width	
Spray Swath	
% Coverage	
Boom ID	
Boom Length	6.7 FT
Boom Height	20 IN
Ground Speed	3 MPH
Carrier	WATER
Water Hardness (ppm CaCO3)	
Application Amount	15 GAL/AC

Data Entry

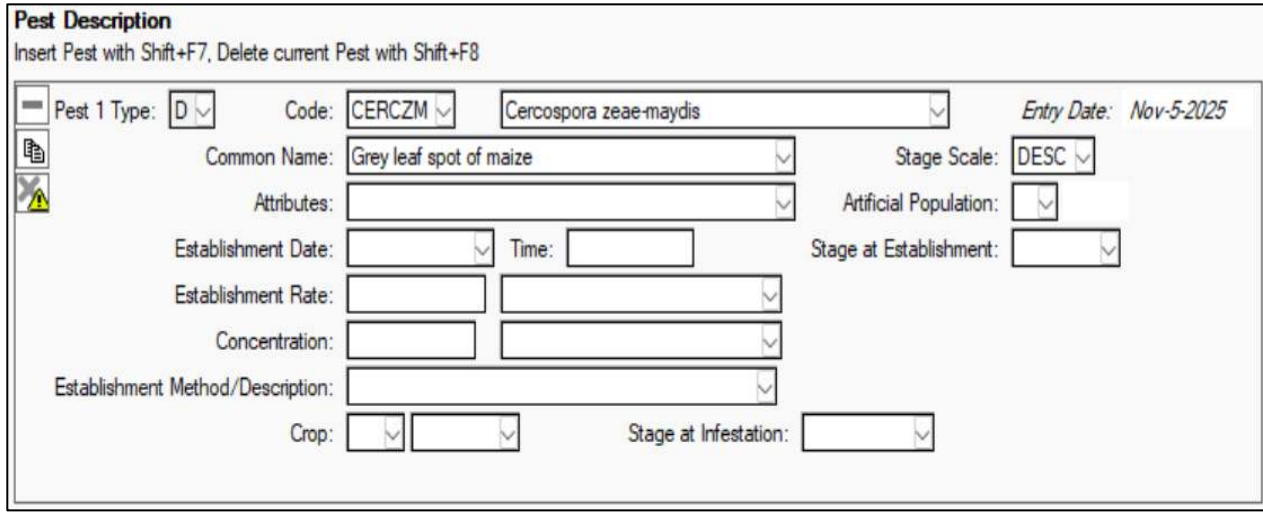
Data Entry Accuracy

1. Correct trial information

Crop Description



Pest Description



Data Entry

Data Entry Accuracy

1. Correct trial information
2. Correct data entry
   - Numbers are entered accurately
   - Treatments and reps are accurate to data recorded
   - Proper movement through field (numerical order, serpentine, reverse order, etc…)

Data Entry

Data Entry Accuracy

1. Correct trial information
2. Correct data entry
3. Ensure any copy/pasted information is correctly copied/pasted

Taking Notes

1. Take and record notes as they happen
   - Whole or half plot rated? Any heavy/light plots? 1 meter of row?
   - 0-100 scale, 0-10, 1-5, physical counts
   - Who rated and environmental conditions at rating

Taking Notes

1. Take and record notes as they happen
2. Accurate pest rated
   - Verify what you are rating
   - No overall ratings (be species specific)

Taking Notes

1. Take and record notes as they happen
2. Accurate pest rated
3. Any field specific notes
   - Previous crop and applications
   - Poor drainage, nutrient “x” deficiency, low population, rep 4 on old field road

Experiment Data Management

1. Data collection methods/remedies
2. Data entry
3. How HPG handles data

How HPG handles Data

Assessment Data Tab in ARM

1. Run initial analysis
    - Run according to trial goals

How HPG handles Data

Column 9 does not meet assumptions of AOV: data has skewness/kurtosis

Apply 'Log(n+1)' transformation to correct skewness/kurtosis.

Column 10 does not meet assumptions of AOV: Exclude treatment 11 from analysis to correct skewness/kurtosis.

Column 15 does not meet assumptions of AOV: data has skewness

Apply 'Log(n+1)' transformation to correct skewness.

Column 21 does not meet assumptions of AOV: data has skewness/kurtosis

Apply 'Log(n+1)' transformation to correct skewness/kurtosis.

Column 11 does not meet assumptions of AOV: data has heterogeneity of variance/skewness/kurtosis

Apply 'Log(n+1)' transformation to correct heterogeneity of variance.

Column 7 does not meet assumptions of AOV: data has skewness

Apply 'Arcsine square root percent' transformation to correct skewness.

Column 12 does not meet assumptions of AOV: data has heterogeneity of variance/skewness

Apply 'Arcsine square root percent' transformation to correct heterogeneity of variance/skewness.

Column 8 does not meet assumptions of AOV: data has heterogeneity of variance

Apply 'Arcsine square root percent' transformation to correct heterogeneity of variance.

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Column 24 does not meet assumptions of AOV: Exclude replicate 1 to correct skewness/kurtosis.

Column 11 does not meet assumptions of AOV: data has heterogeneity of variance/skewness/kurtosis

The assessment column failed Levene's test for homogeneity, and thus violates the AOV assumption of homogeneity of variance.

This is typically solved by either applying a data transformation or excluding from analysis the problem treatment(s).

Use Tools - Transform to apply a Log, Square Root, or Arcsine Square Root Percent transformation.

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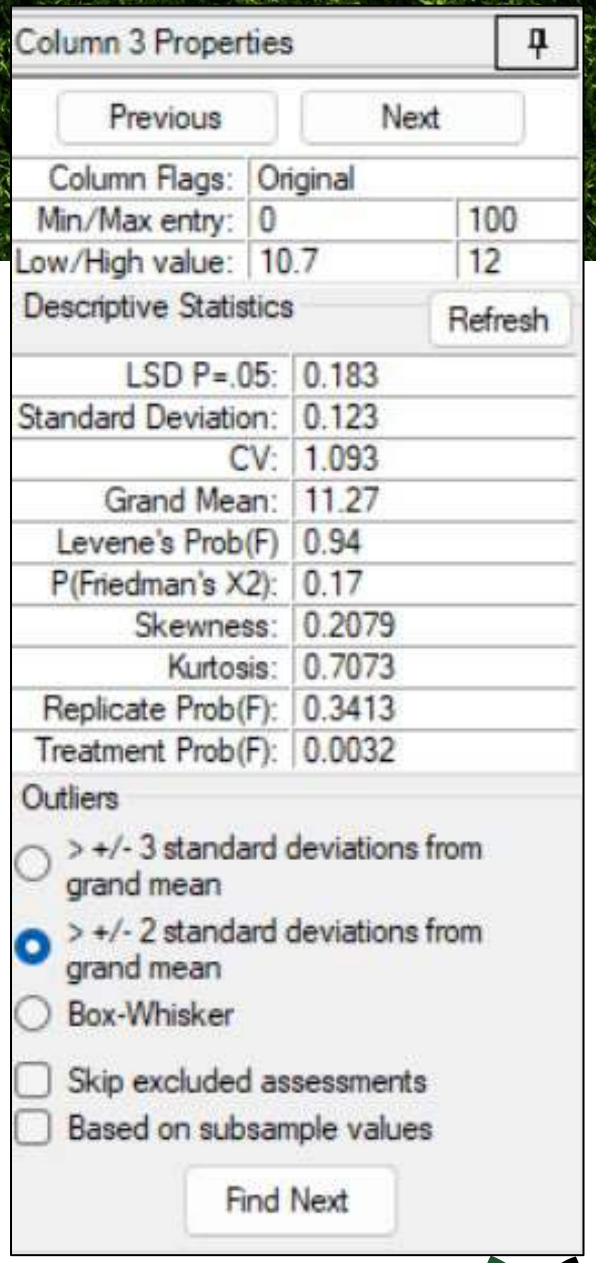
11 of 24 columns had some type of issue

How HPG handles Data

Assessment Data Tab in ARM

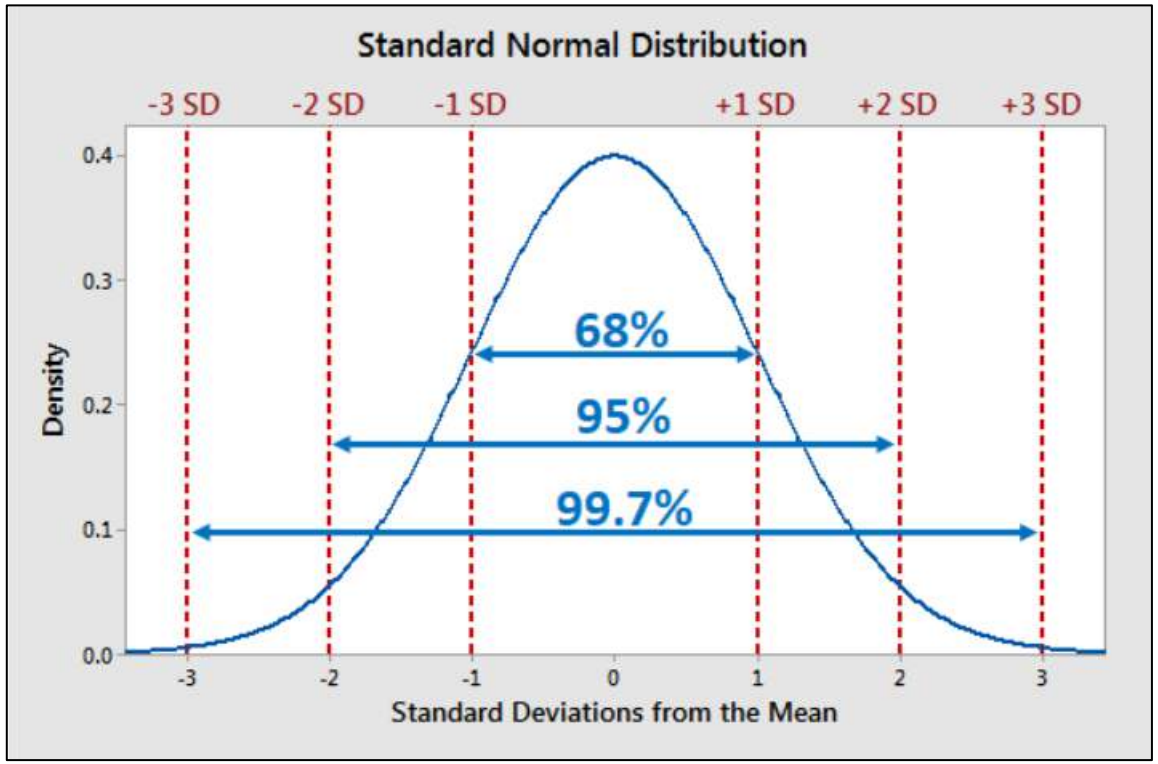
1. Identify Outliers
   - Have ARM identify outliers
     - Greater than 2 or 3 std. dev.



How HPG handles Data

Assessment Data Tab in ARM

1. Identify Outliers
    - Have ARM identify outliers
        - Greater than 2 or 3 std. dev.
            - Empirical Rule



How HPG handles Data

Assessment Data Tab in ARM

1. Identify Outliers
   - Have ARM identify outliers
   - Identify them yourself
     - Sort by treatment
     - Keep at least 3 reps per trt
       - More for biological trials

Sub	Rep	Blk	Col	Plot	Trt	7
1	4	4	4	404	3	8
1	1	1	4	104	4	2
1	2	2	11	211	4	10
1	3	3	9	309	4	8
1	4	4	1	401	4	8
1	1	1	5	105	5	2
1	2	2	10	210	5	8
1	3	3	7	307	5	5
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How HPG handles Data

Assessment Data Tab in ARM

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11 of 24 columns had some type of issue

How HPG handles Data

Assessment Data Tab in ARM

Column 7 does not meet assumptions of AOV: data has skewness

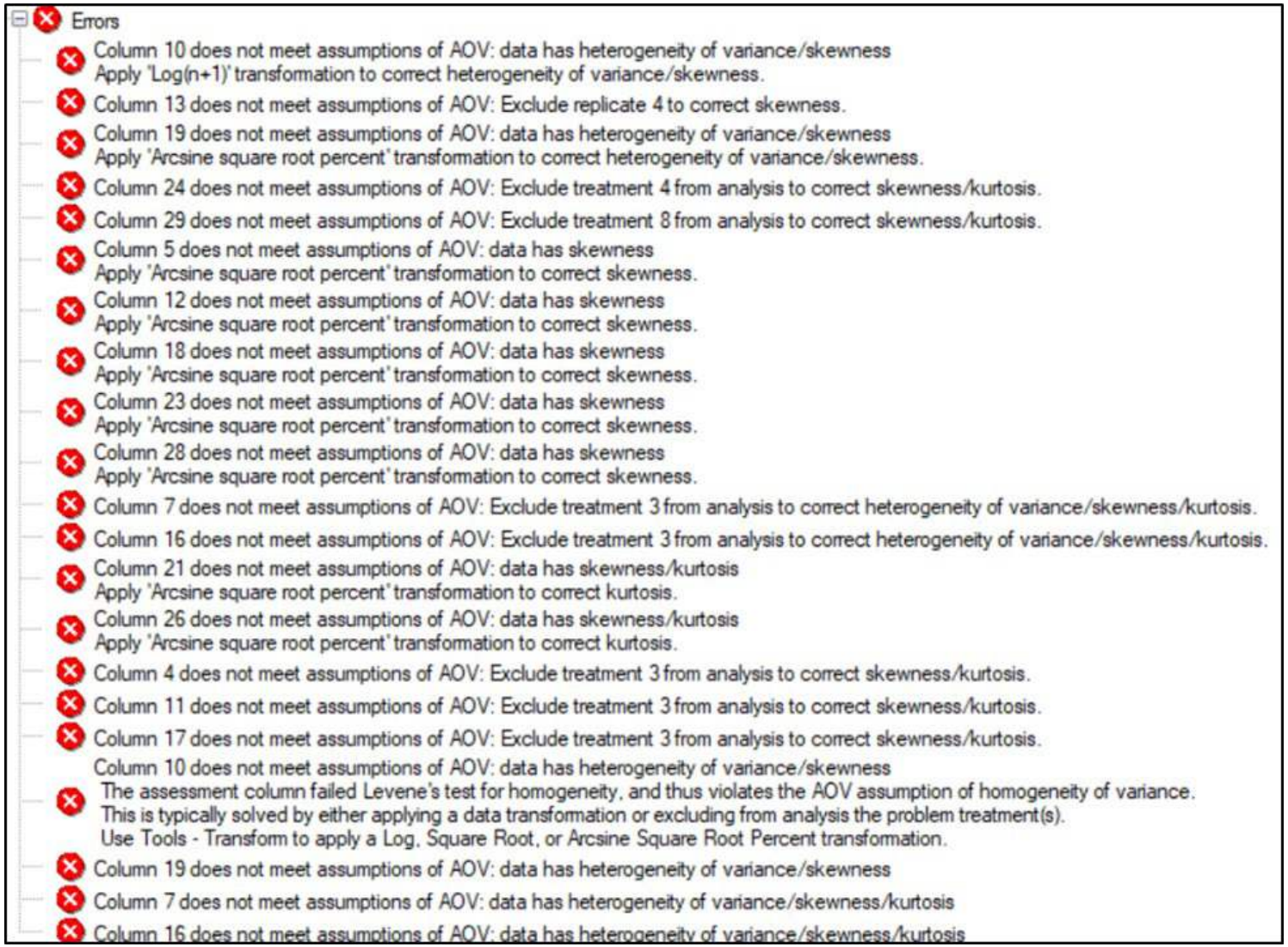
Apply 'Arcsine square root percent' transformation to correct skewness.

1 of 24 columns had an issue

Perform transformations if outliers can no longer be removed (3 data points/trt)

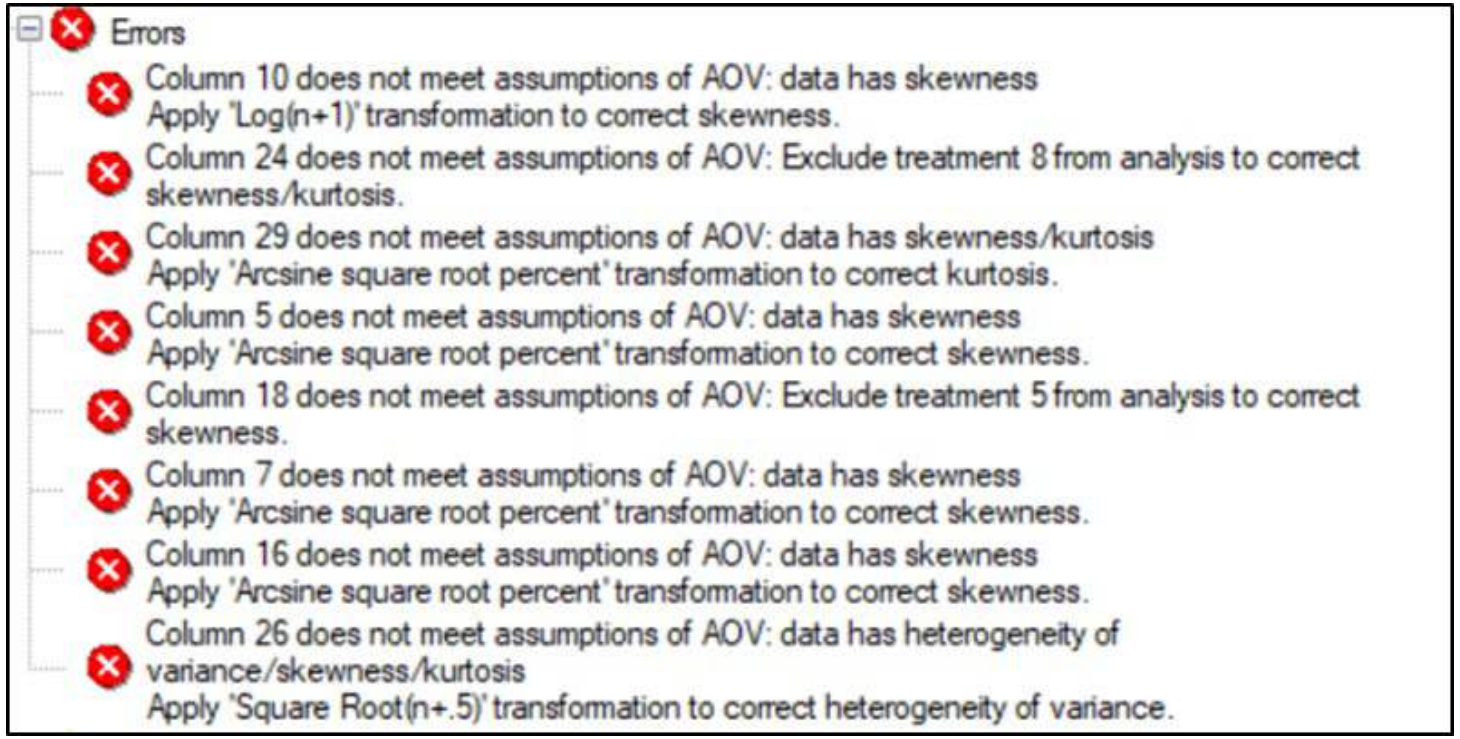
How HPG handles Data

17 Errors

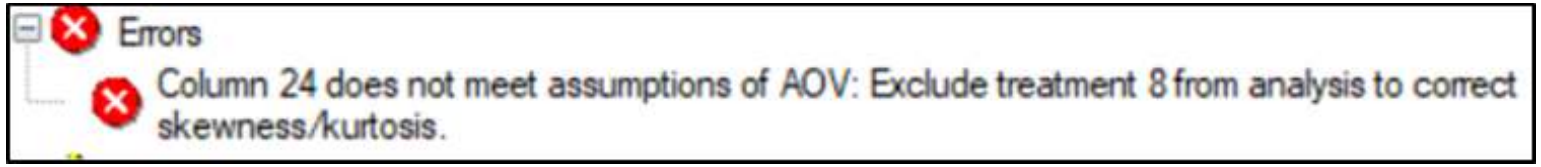


How HPG handles Data

8 Errors



How HPG handles Data

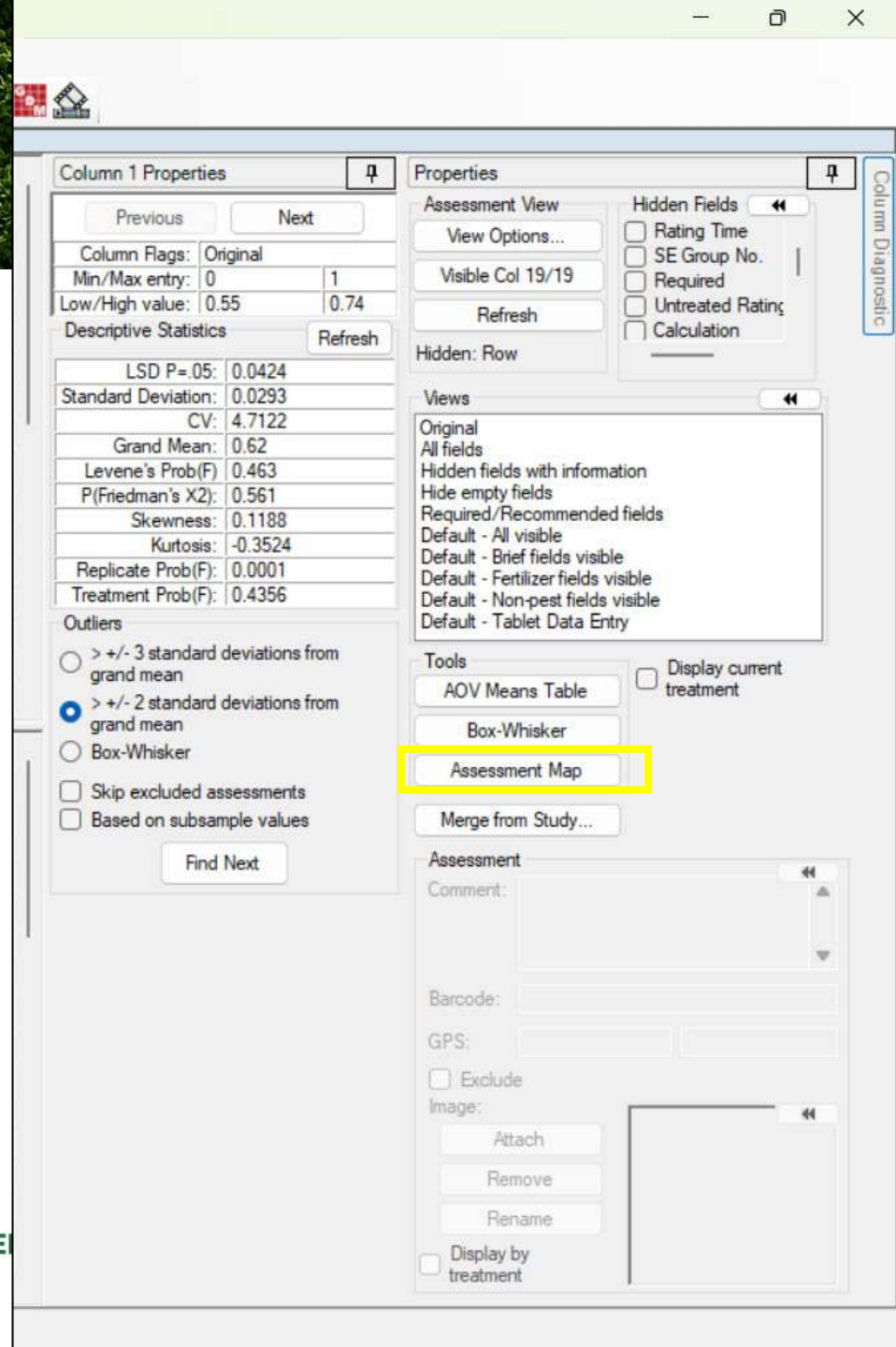


1 Error that can’t be fixed

How HPG handles Data

Assessment Data Tab in ARM

2. Heat Map/Assessment Map
   - Shows any field issues not recognized by sight alone
   - Can look back at field history and diagnose
   - Visual representation for treatments
   - Visual representation for ranges



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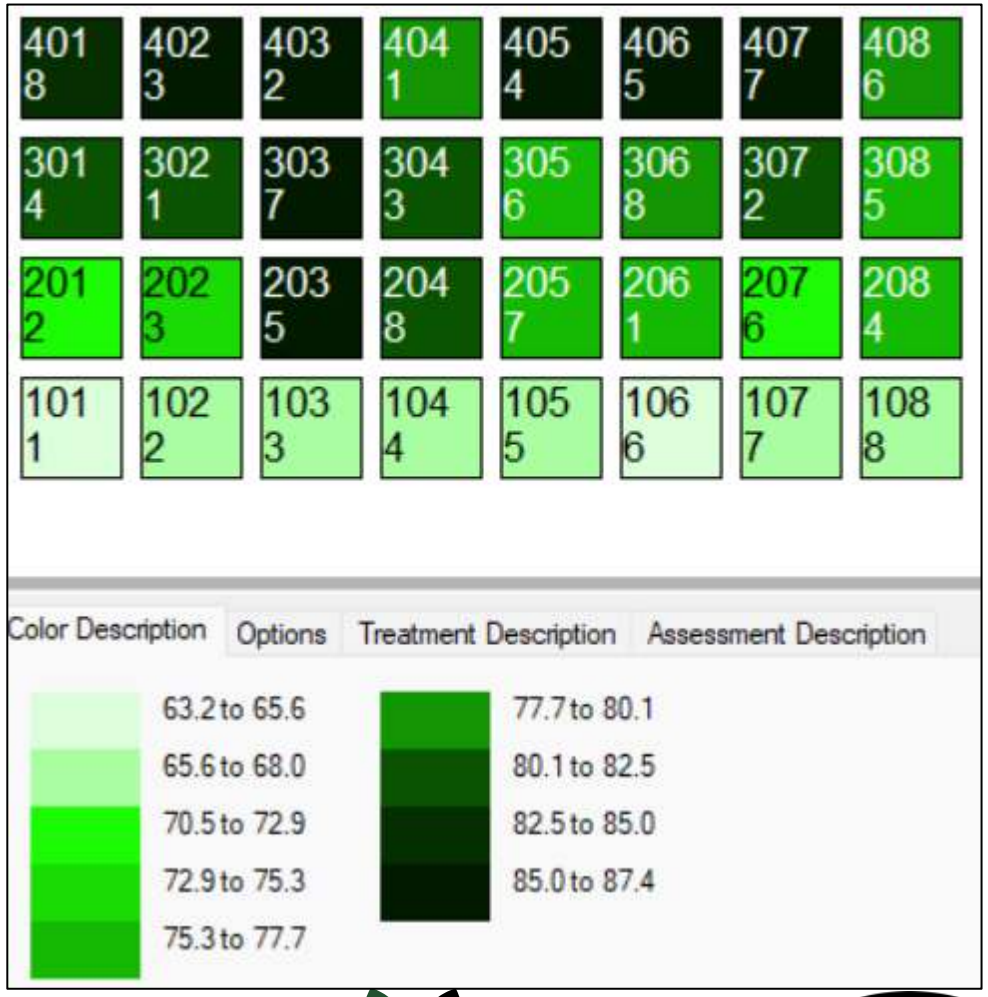
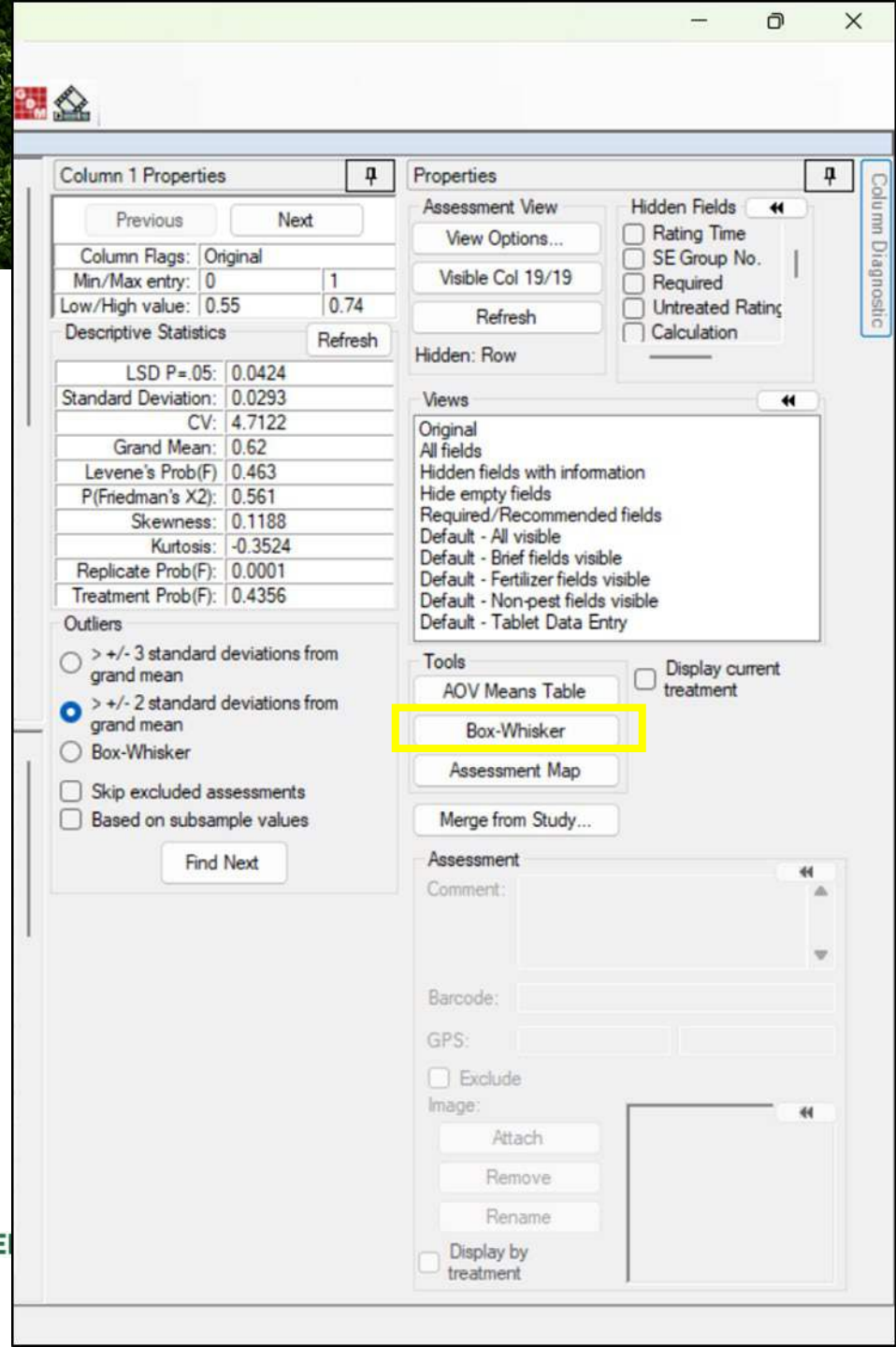


How HPG handles Data

Assessment Data Tab in ARM

3. Box and Whisker Plot



How HPG handles Data

Assessment Data Tab in ARM

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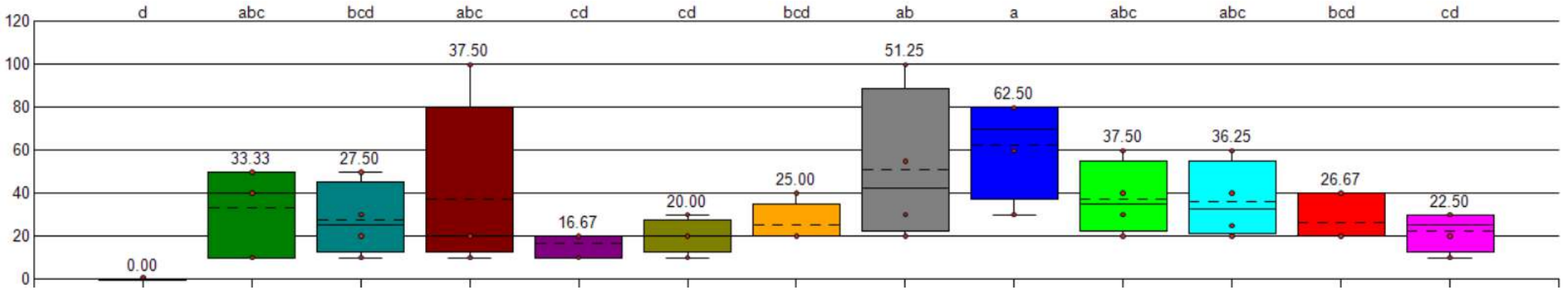

How HPG handles Data

Assessment Data Tab in ARM

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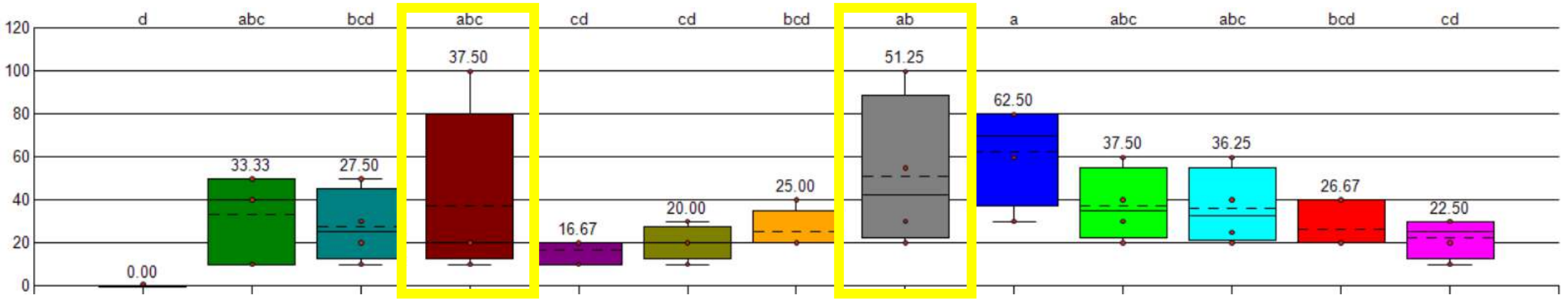
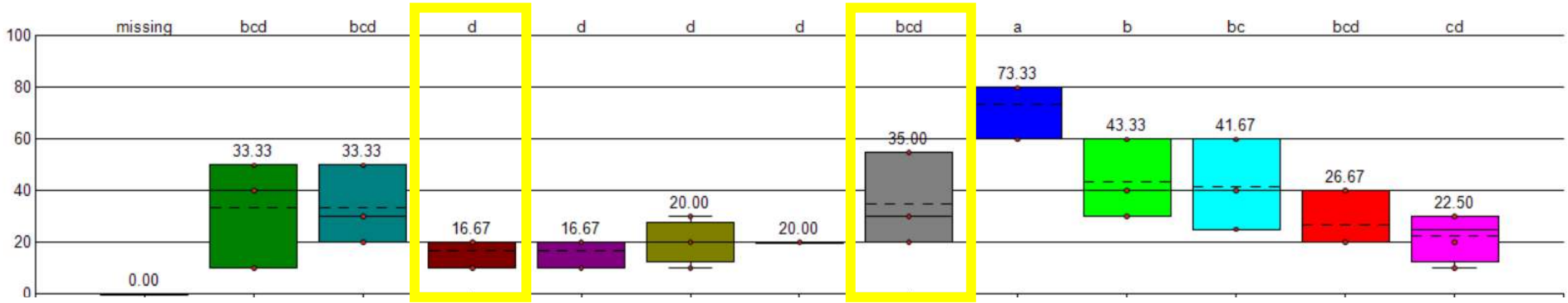


How HPG handles Data

Assessment Data Tab in ARM

3. Box and Whisker Plot
   - Outliers removed



100%, 20%, 20%, 10% control
Removed 100%

100%, 55%, 30%, 20% control
Removed 100%

How HPG handles Data

Assessment Data Tab in ARM

4. Presentation Development
    - Create presentations for review with HPG Staff
        - What to/not to pursue further testing
    - Enter data into internal database for long-term storage and viewing
    - Review data for future trial placement
    - Data review with field personnel for their thoughts/experiences

How HPG handles Data

Final thoughts

1. Ensure ratings are objective and performed by the same person
2. Ensure equipment is up to date and functioning properly
3. Calibrate yourself and crew throughout the season
4. Be specific with pest ratings and ensure adequate pest coverage
5. Review trials throughout season for errors, field conditions, etc…

How HPG handles Data

Final thoughts

1. Ensure ratings are objective and performed by the same person
2. Ensure equipment is up to date and functioning properly
3. Calibrate yourself and crew throughout the season
4. Be specific with pest ratings and ensure adequate pest coverage
5. Review trials throughout season for errors, field conditions, etc…
6. SLOW DOWN!

What can we do to help y’all?


HELENA PRODUCTS GROUP
thank you!
HELENA
EVOLVE
DRIVEN by Tradition | COMMITTED to Execution | FOCUSED on Trust | POWERED by Information