Yuma Fall 2025 Romaine Trial

TerraAgTechnologies – TerraVie 4 & 5 Evaluation

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Cooperative Extension
Yuma County

Trial Summary

- Overall yield (plant biomass and head weights) and size (head circumference and length) did not show significant differences among treatments evaluated.
- However, there were more harvestable heads in treated plots than the untreated control (average increase of 5.0% and 7.5%)
- Note: Temperatures were significantly hotter than normal, advancing harvest date a week ahead of initial forecast
- Note: Aphids encountered on plants but spray was applied multiple times to control them with very minimal damage.

Trial Details

- Product comparison trial
  - UTC
  - Terravie 4
  - Terravie 5
- Three treatment, six replication trial
- Four in-season applications
- Planting Date: 11 Nov 2025
- Harvest Date: 21 Feb 2026 (102 DAP)

Product Applications (4 Gal/AC)

- App A: 11/25/25 (14 DAP)
- App B: 12/22/25 (41 DAP)
- App C: 1/7/26 (57 DAP)
- App C: 1/13/26 (63 DAP)

Fertilization Plan

- Total # N/AC: 151

- 200# 11-52-0 MAP at preplant
- 12 GPA UAN 32 (43# N per application)
  - 12/8 (27 DAP)
  - 1/13 (63 DAP)
  - 2/2 (83 DAP)

Field Map

Feb-27-2026 (T-5 Terra Ag Romaine 2025)

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Terra Ag product comparrison

Trial ID: T-5 Terra Ag Romaine 2025
Protocol ID: T-5 Terra Ag Romaine 2025 Location: Yuma Arizona Trial Year: 2025
Project ID: T-5 Terra Ag Romaine 2025
Study Director: Robert Masson Sponsor Contact:
Investigator:

Trial Map Treatment Description

Trt	Code	Description
1	CHK	UTC
2		[Terravie 4] 4 GAL/A
3		[Terravie 5] 4 GAL/A

Pesticide

Date	Pesticide	Rate	Type	Method
11/13	Prefar	6.0 Q/A	Pre-emerge Herbicide	Sprinkler
1/15	Orondis Ultra	8.0 Oz/A	Fungicide	Spray
1/15	Quadris	12.0 Oz/A	Fungicide	Spray
1/15	Nu-Film	4.0 Oz/A	Adjuvant	Spray
1/25	Sequoia	4.0 Oz/A	Insecticide	Spray
2/4	Verimark	10.0 Oz/A	Insecticide	Spray
2/5	Verimark	10.0	Insecticide	Drip

Irrigation

Sprinkler rate: 0.1 IN/HR
Drip rate: 0.186 Acre IN/HR

Total Water Applied 14.87 Acre IN

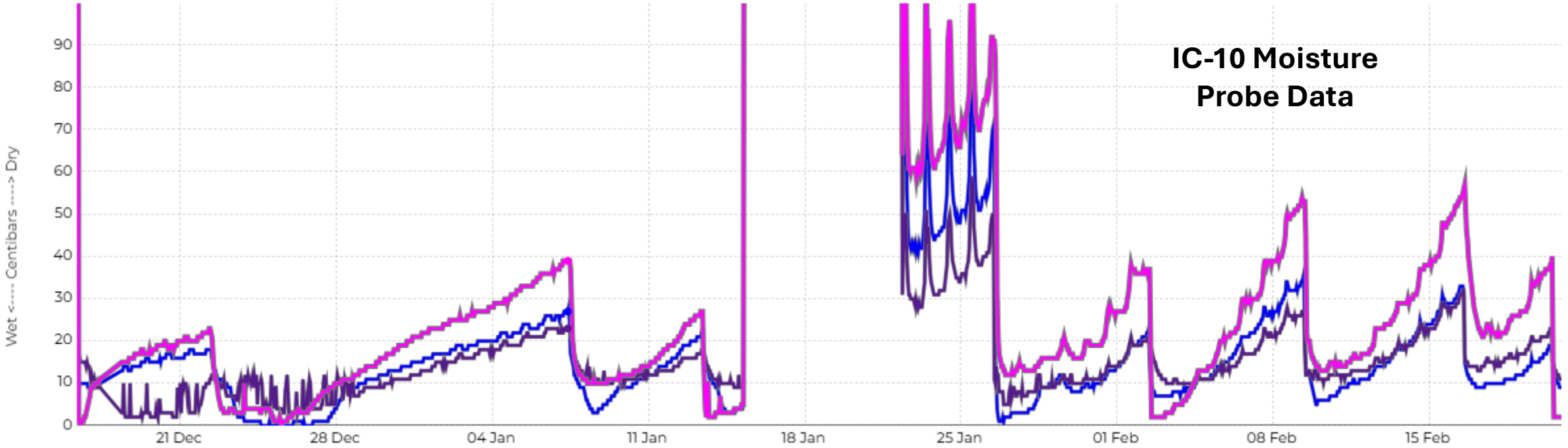
Irrigation Date	Type	Full Irr Treatment Irrigation Hours	Full Irr Water Used (AC IN)
11/10	Drip	4	0.744
11/11	Sprinkler	10	1.000
11/12	Sprinkler	10	1.000
11/13	Sprinkler	8	0.800
11/14	Sprinkler	8	0.800
11/19	Sprinkler	8	0.800
11/20	Sprinkler	8	0.800
11/25	Drip	4	0.744
12/8	Drip	6	1.116
12/9	Drip	3	0.558
12/22	Drip	4	0.744
1/7	Drip	4	0.744
1/13	Drip	5	0.930
1/29	Drip	2	0.372

Irrigation

Sprinkler rate: 0.1 IN/HR
Drip rate: 0.186 Acre IN/HR

Total Water Applied 14.87 Acre IN

Irrigation Date	Type	Irrigation Hours	Water Used (AC IN)
2/2	Drip	5	0.930
2/5	Drip	2	0.372
2/9	Drip	5	0.930
2/16	Drip	4	0.744
2/21	Drip	4	0.744



In Season Measurements (Dr. Bhupinder Singh)

- Net photosynthesis
- Gas exchange traits
  - Transpiration rate
  - Stomatal conductance
  - Vapor pressure deficit
- Light uptake traits
  - Maximum quantum yield
  - FY/FM
  - Electron transport rate
  - Chlorophyll content
- Meteorological traits
  - Canopy temperature
  - Surface temperature

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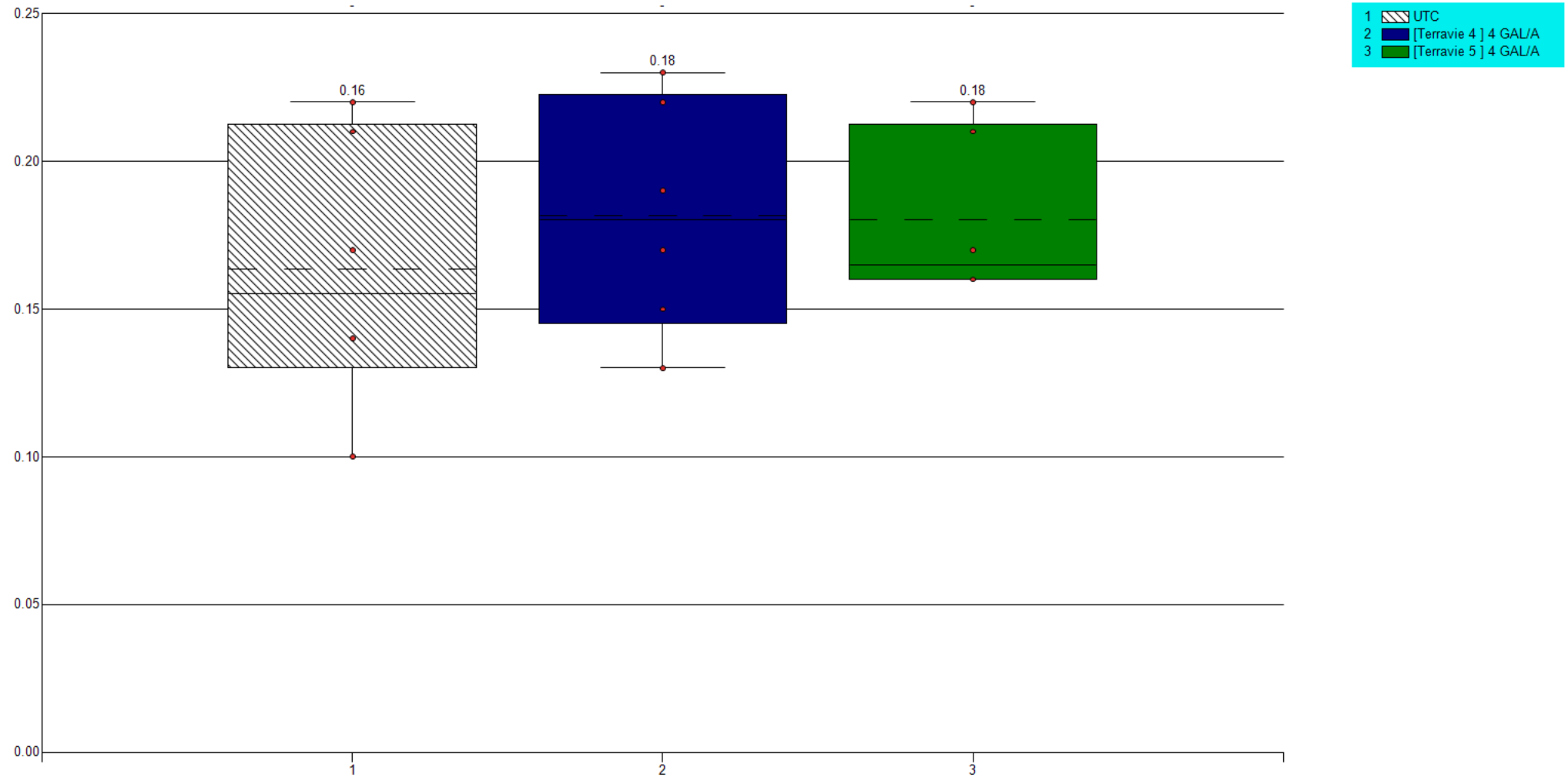
mol m-2 Stomtal conductance



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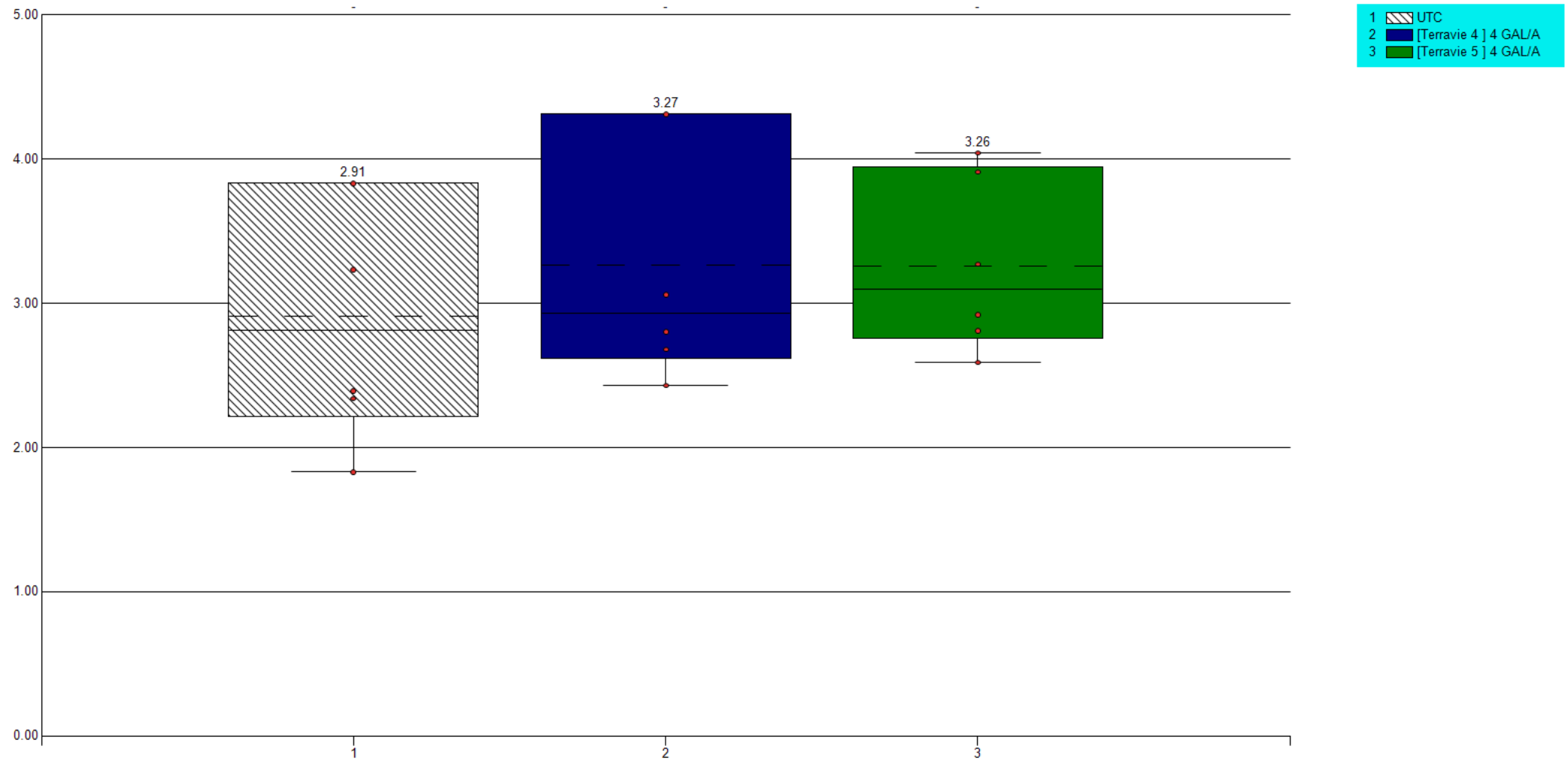
mmol m-2 Transpiration



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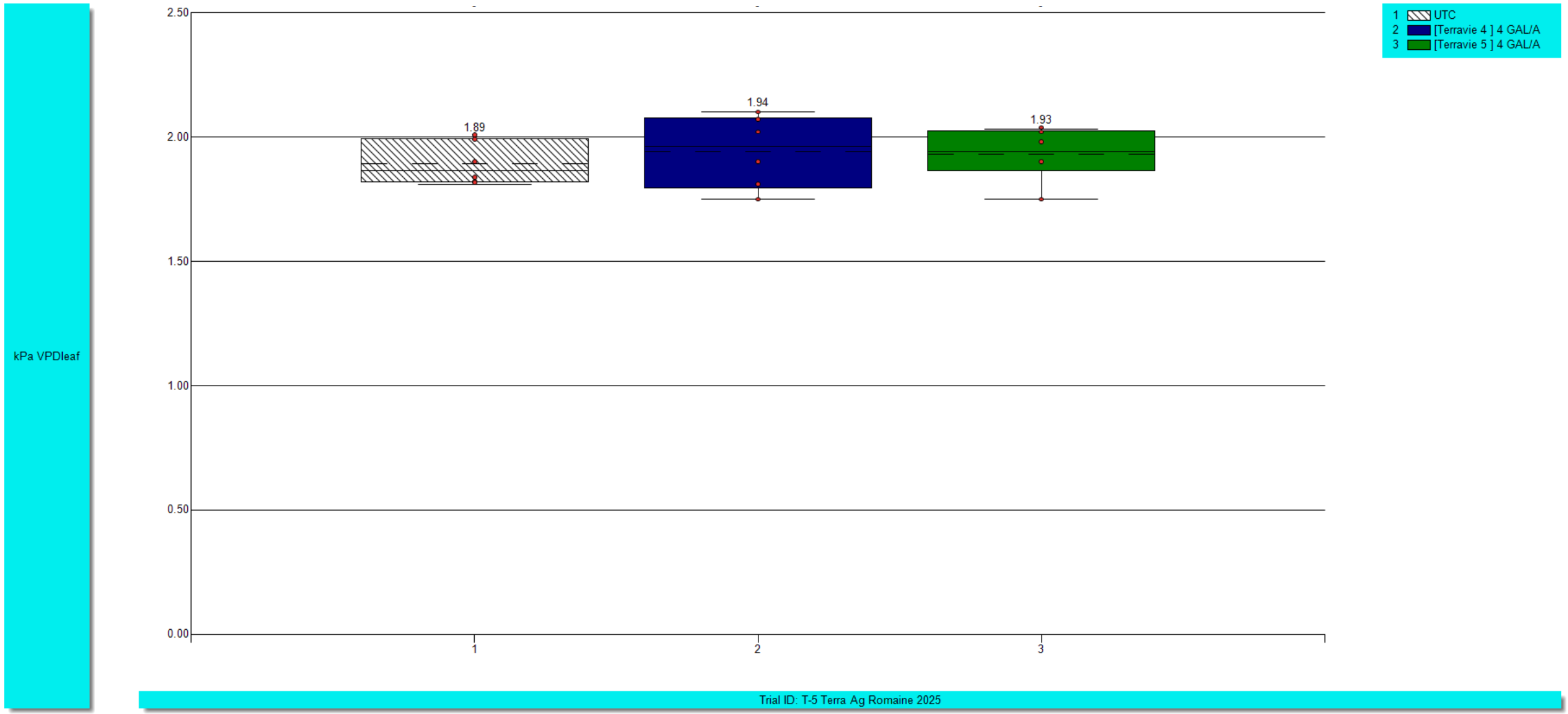

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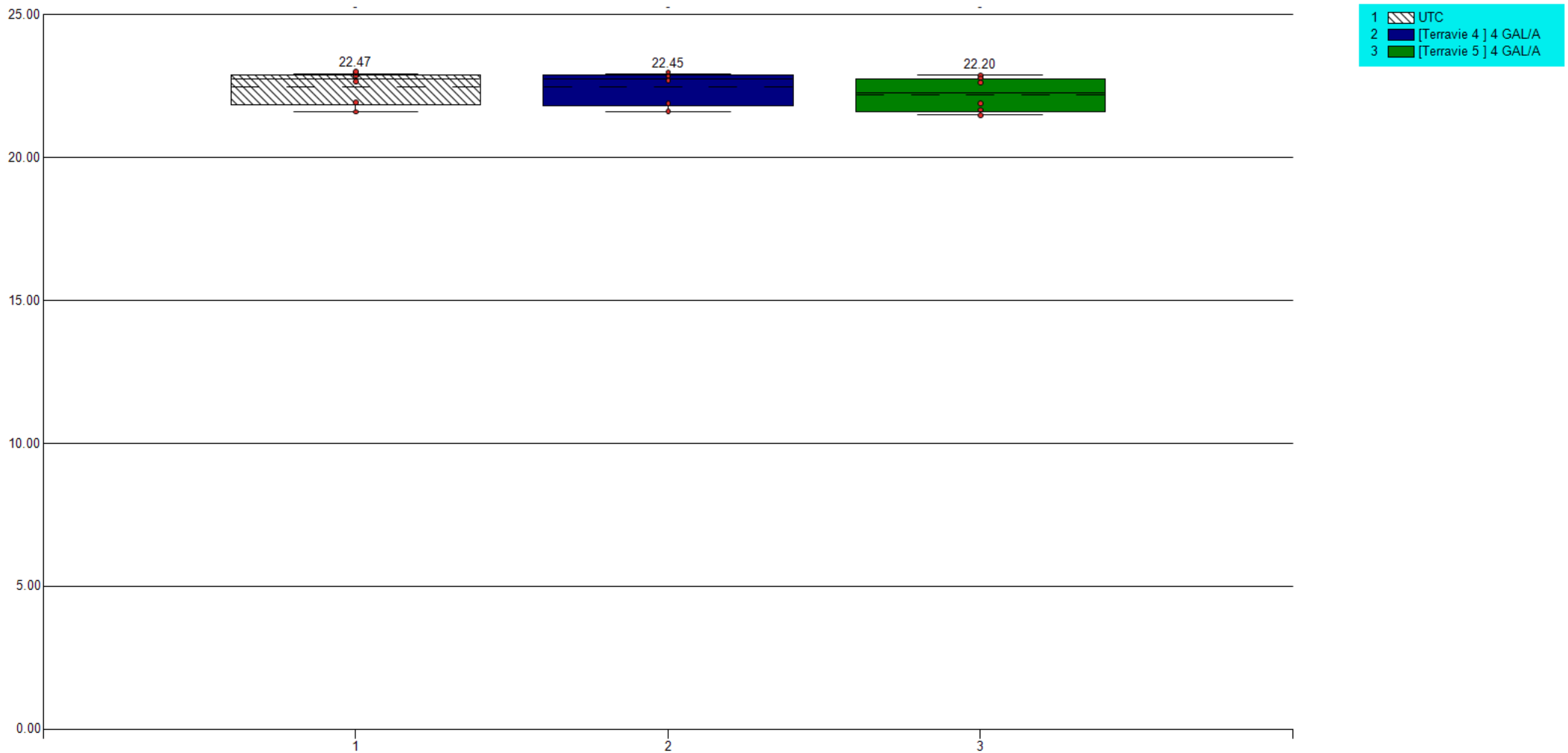
°C air temperature



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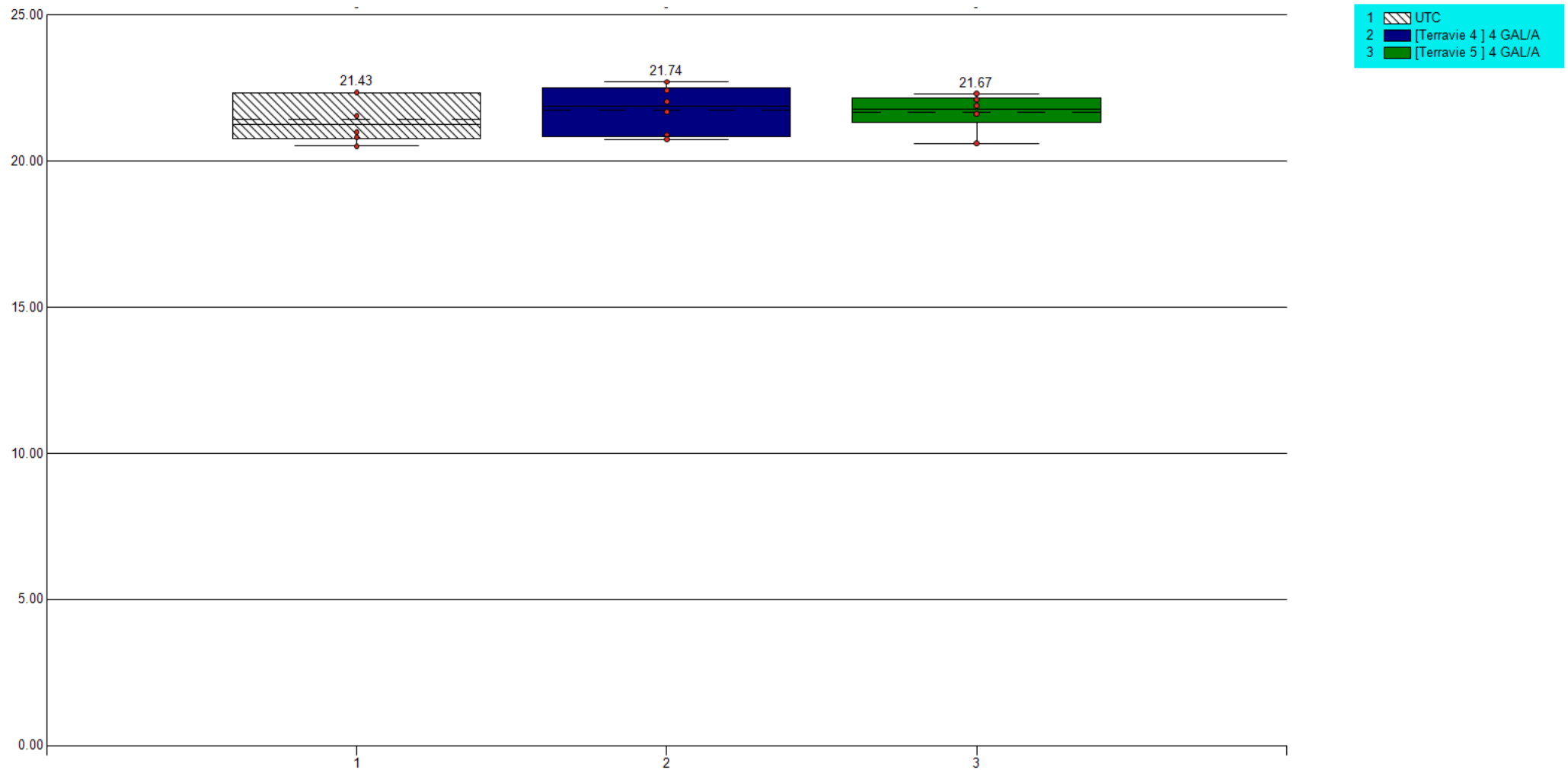
°C Canopy Temperature



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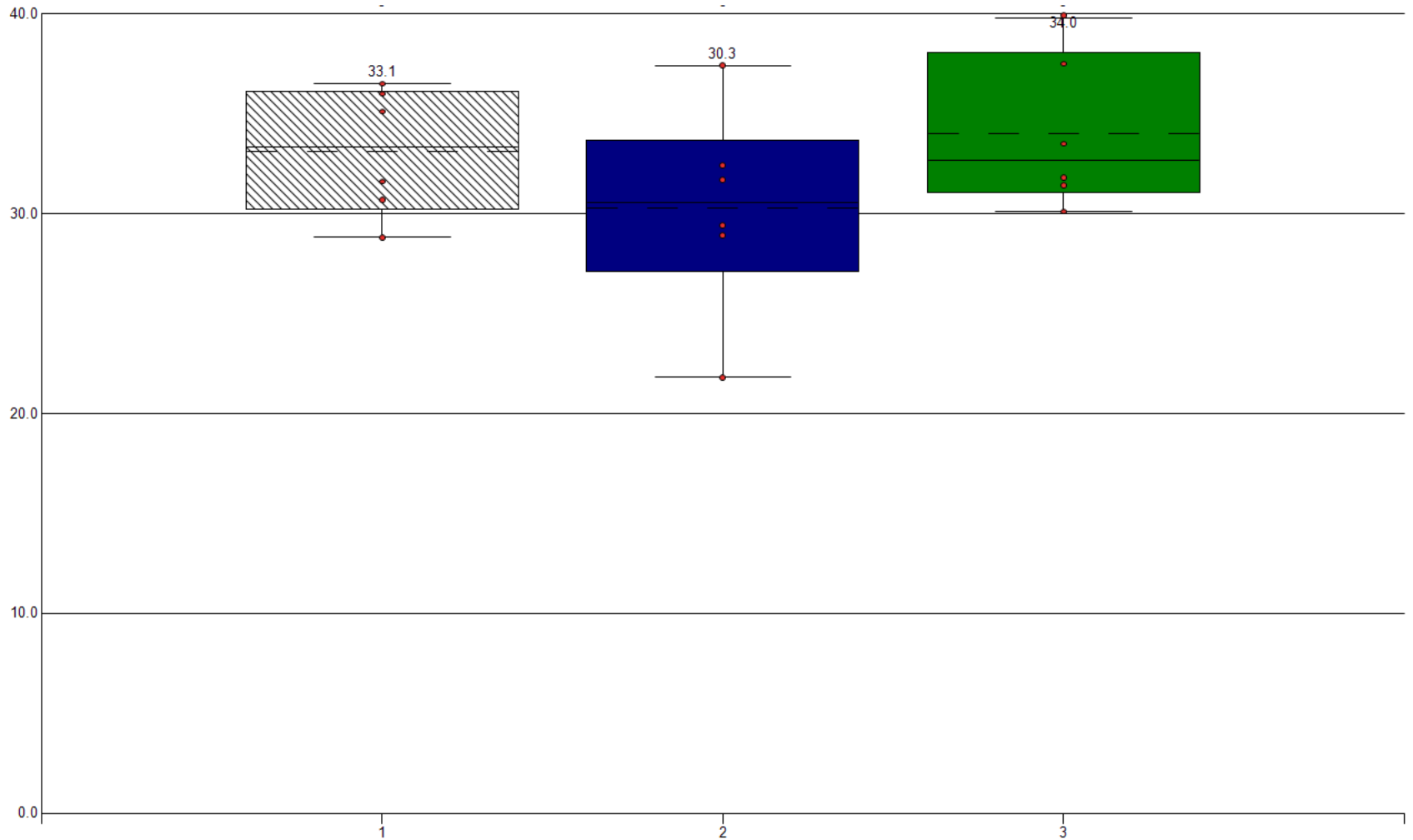
µg m-2 Chlorophyll content



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Harvest

- 21 Feb 2026
- Harvest a 10 foot section of each plot
- Each plant weighed for total above ground biomass
- Hearts were trimmed from the biomass and weighed individually
- Walkby percentage was calculated by counting the plants that did not make a marketable heart (lower values = more harvestable plants per plot)
- Heart circumference and length was recorded for each trimmed head
- Note: Rep 1 dropped from analysis to increase homogeneity


RAPTOR
Walt Disney

LIFETIME

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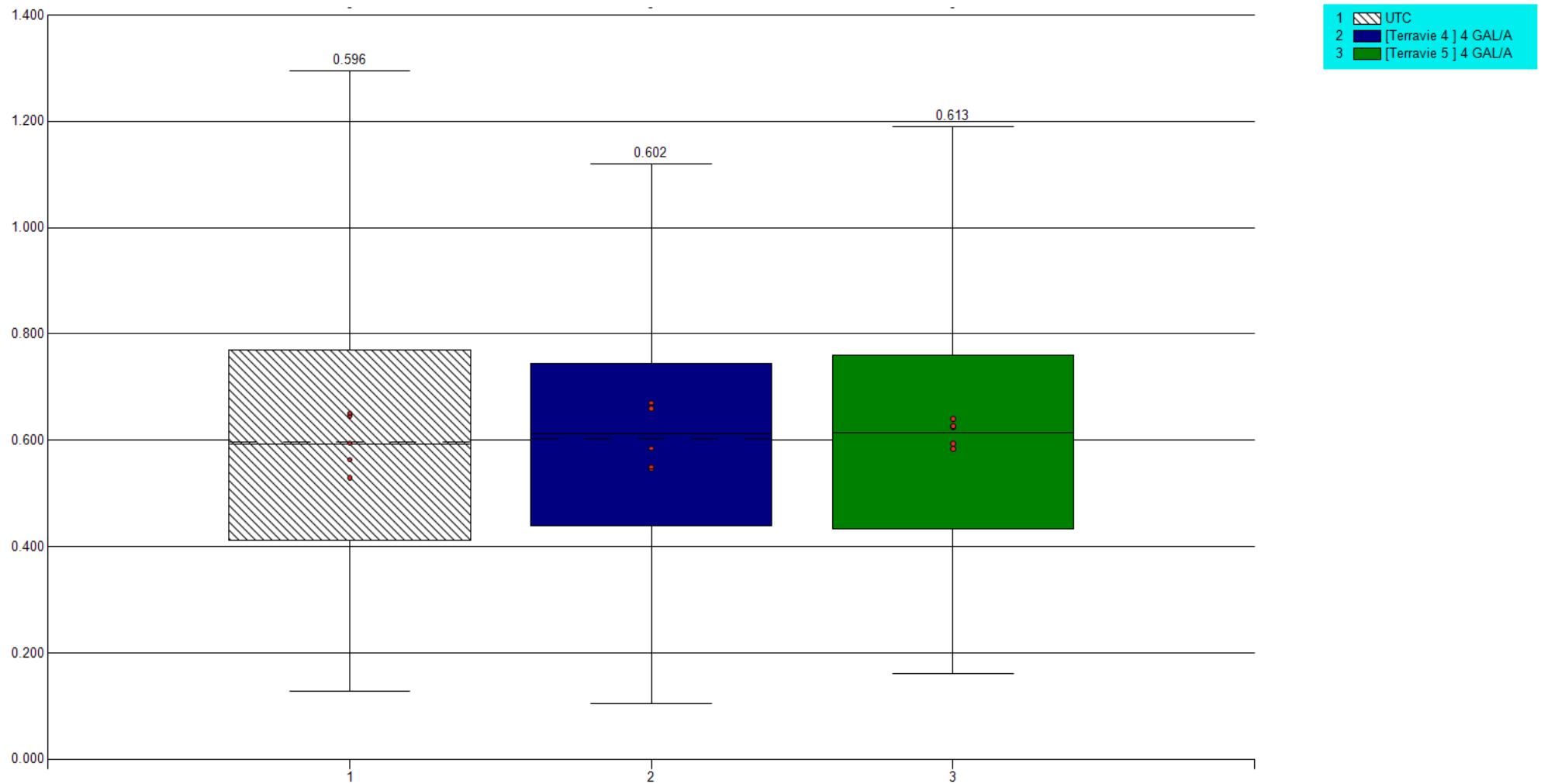
KG/Plant Above Ground Biomass



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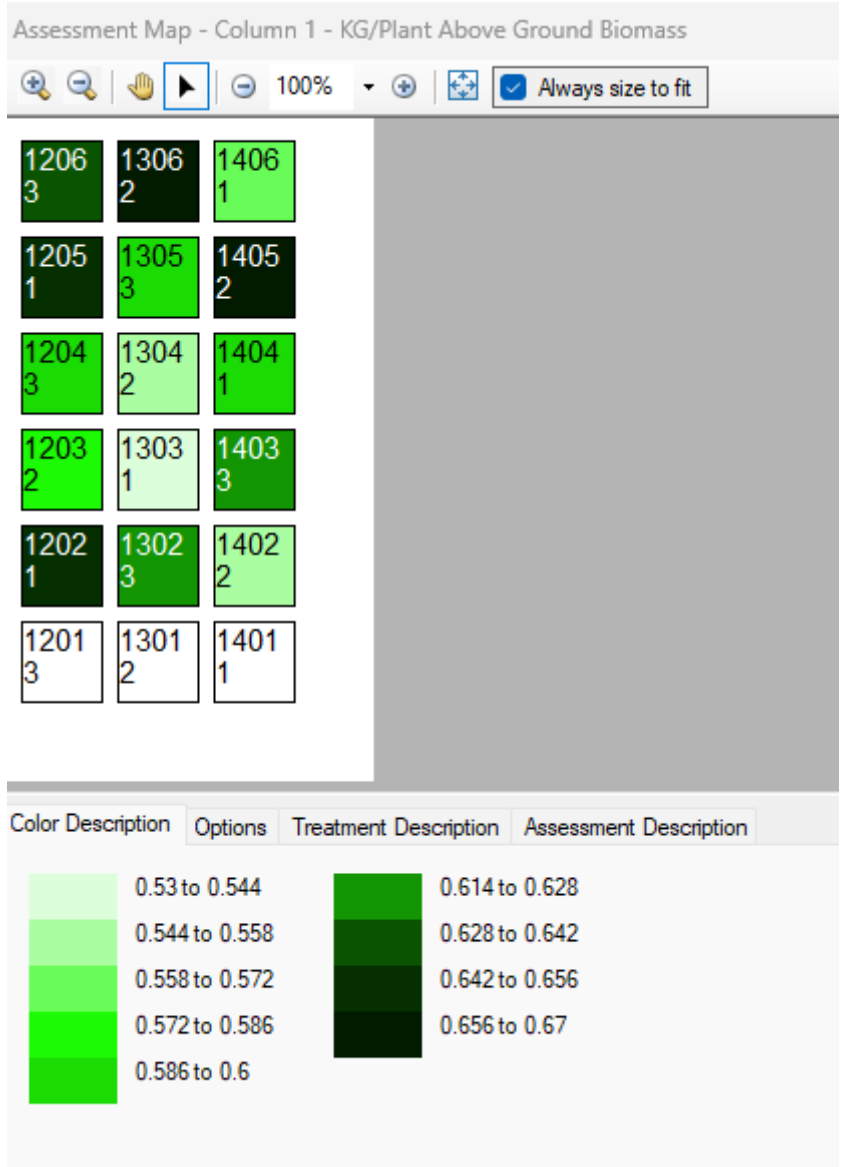
Assessment Map - Column 1 - KG/Plant Above Ground Biomass
100%
Always size to fit
1206 3
1306 2
1406 1
1205 1
1305 3
1405 2
1204 3
1304 2
1404 1
1203 2
1303 1
1403 3
1202 1
1302 3
1402 2
1201 3
1301 2
1401 1
Color Description
Options
Treatment Description
Assessment Description
0.53 to 0.544
0.544 to 0.558
0.558 to 0.572
0.572 to 0.586
0.586 to 0.6
0.614 to 0.628
0.628 to 0.642
0.642 to 0.656
0.656 to 0.67

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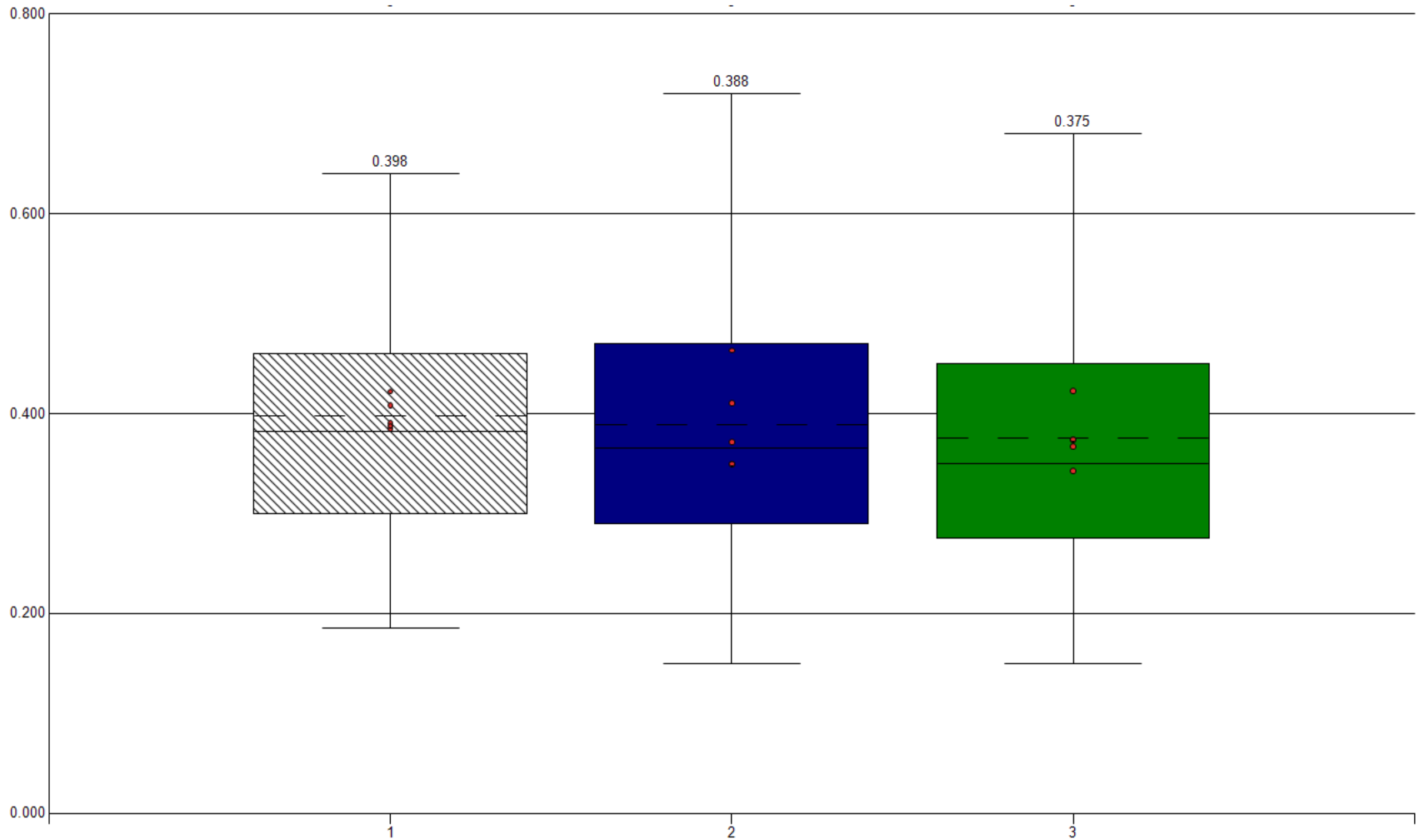
KG/Heart Heart Weight



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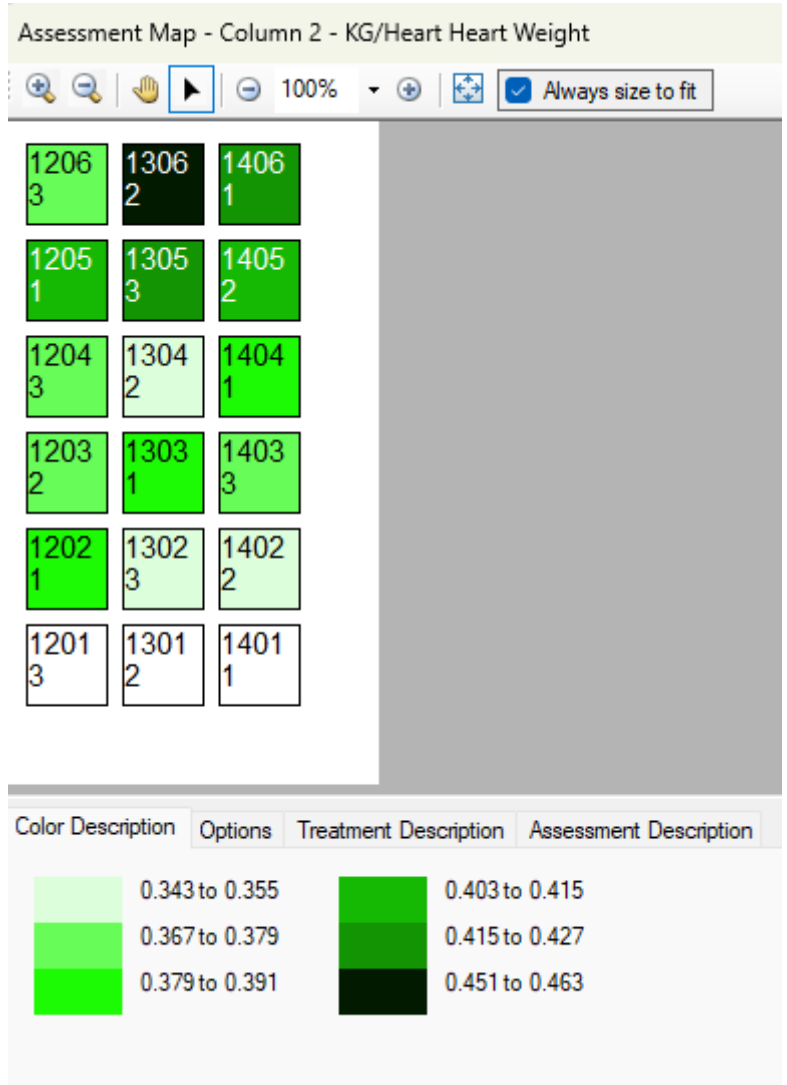
Assessment Map - Column 2 - KG/Heart Heart Weight
100%
Always size to fit
1206 3
1306 2
1406 1
1205 1
1305 3
1405 2
1204 3
1304 2
1404 1
1203 2
1303 1
1403 3
1202 1
1302 3
1402 2
1201 3
1301 2
1401 1
Color Description
Options
Treatment Description
Assessment Description
0.343 to 0.355
0.367 to 0.379
0.379 to 0.391
0.403 to 0.415
0.415 to 0.427
0.451 to 0.463

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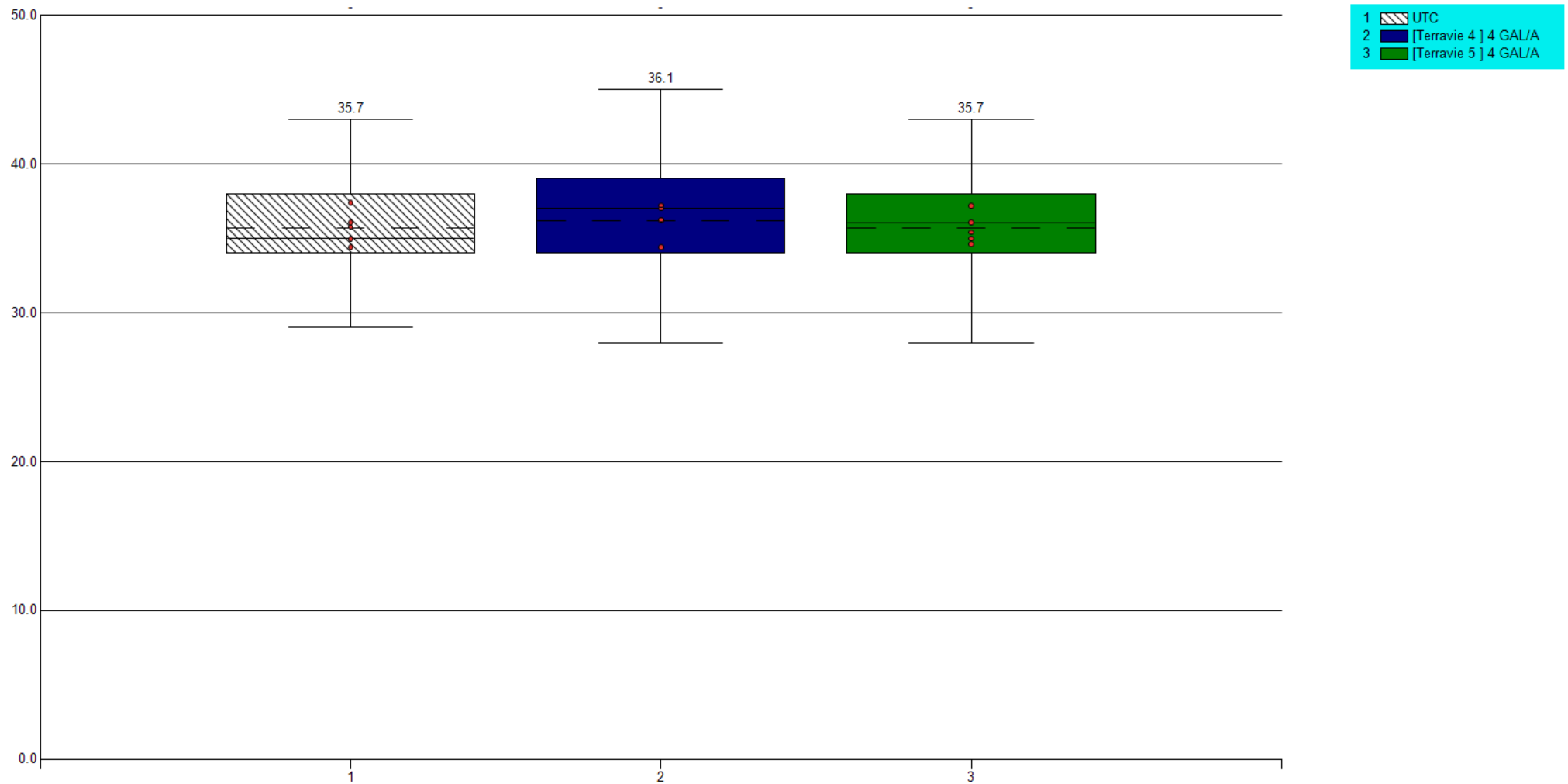
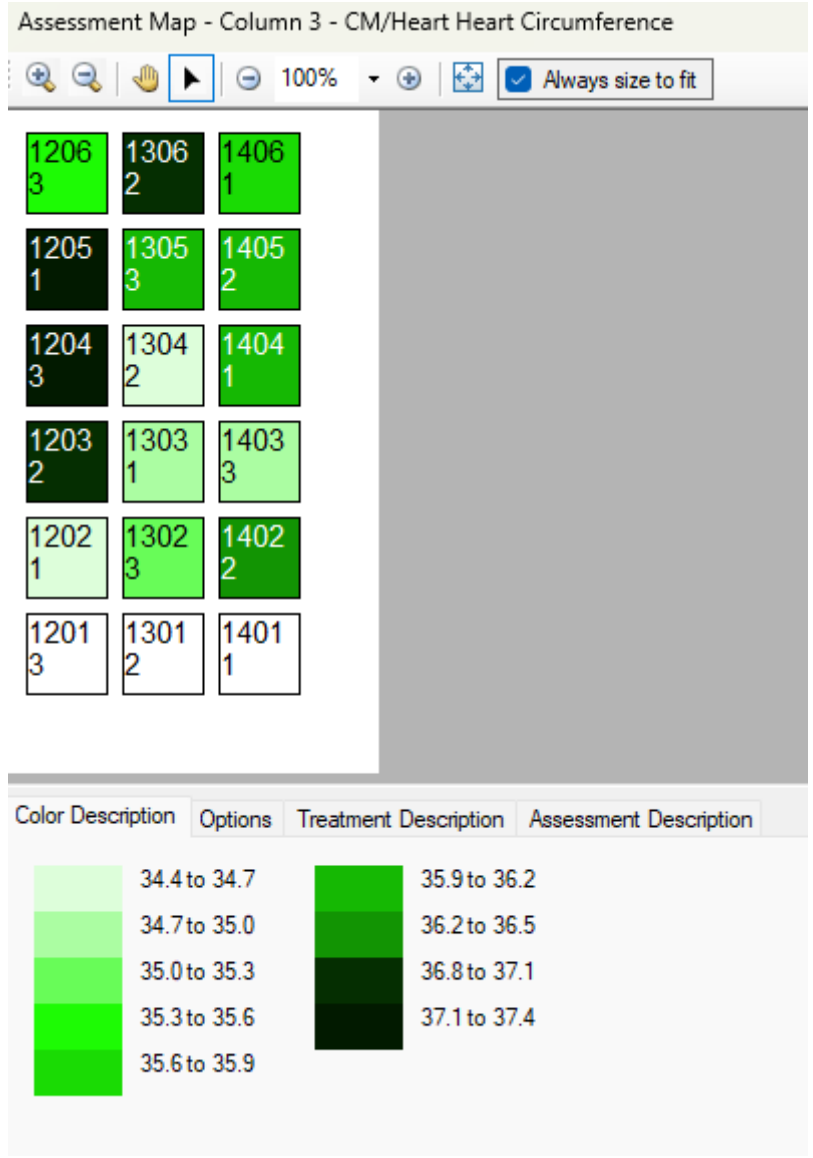
CM/Heart Heart Circumference



Trial ID: T-5 Terra Ag Romaine 2025


Assessment Map - Column 3 - CM/Heart Heart Circumference
100%
Always size to fit
1206 3
1306 2
1406 1
1205 1
1305 3
1405 2
1204 3
1304 2
1404 1
1203 2
1303 1
1403 3
1202 1
1302 3
1402 2
1201 3
1301 2
1401 1
Color Description
Options
Treatment Description
Assessment Description
34.4 to 34.7
34.7 to 35.0
35.0 to 35.3
35.3 to 35.6
35.6 to 35.9
35.9 to 36.2
36.2 to 36.5
36.8 to 37.1
37.1 to 37.4

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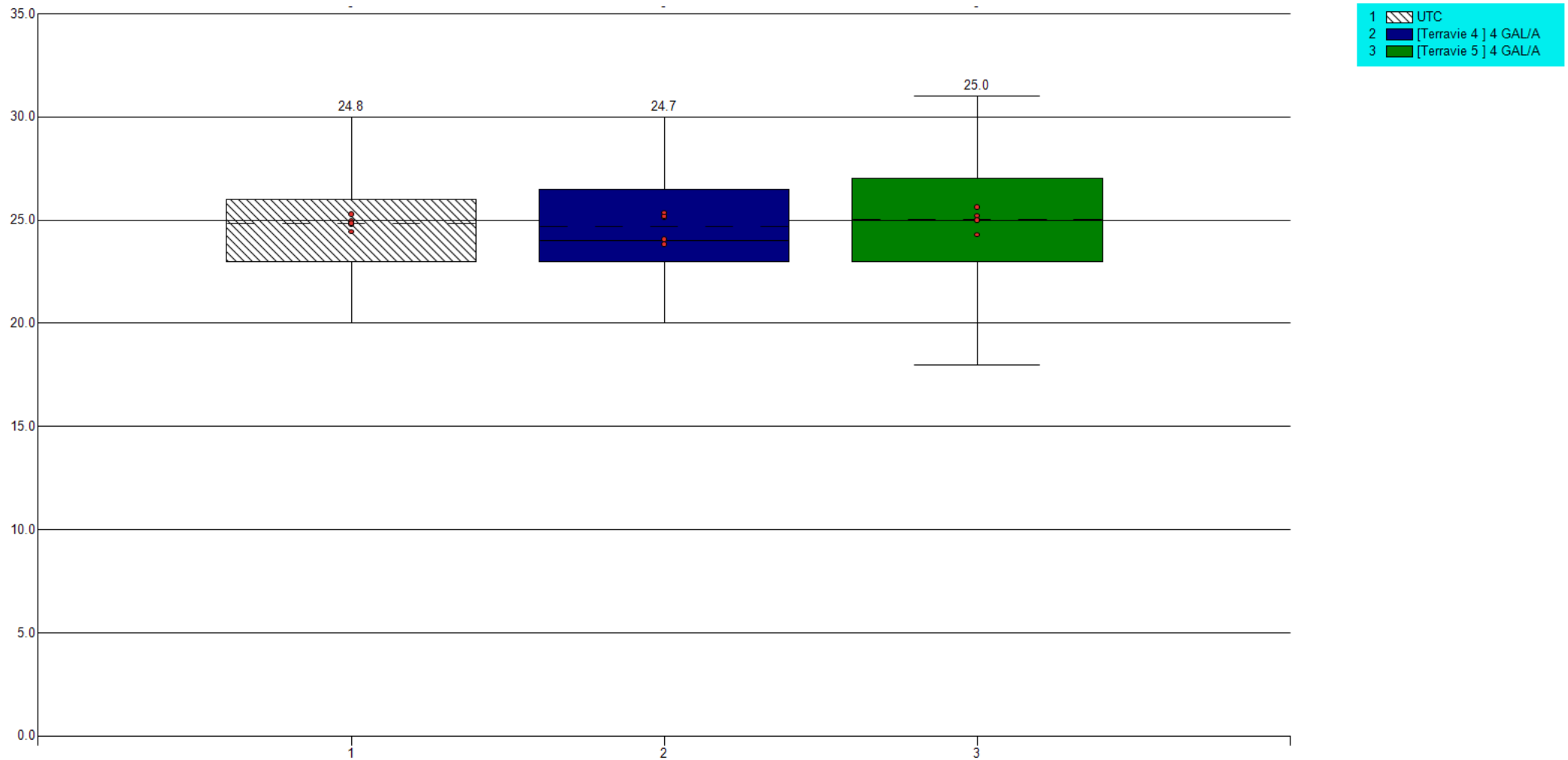
CM/Heart Heart Length



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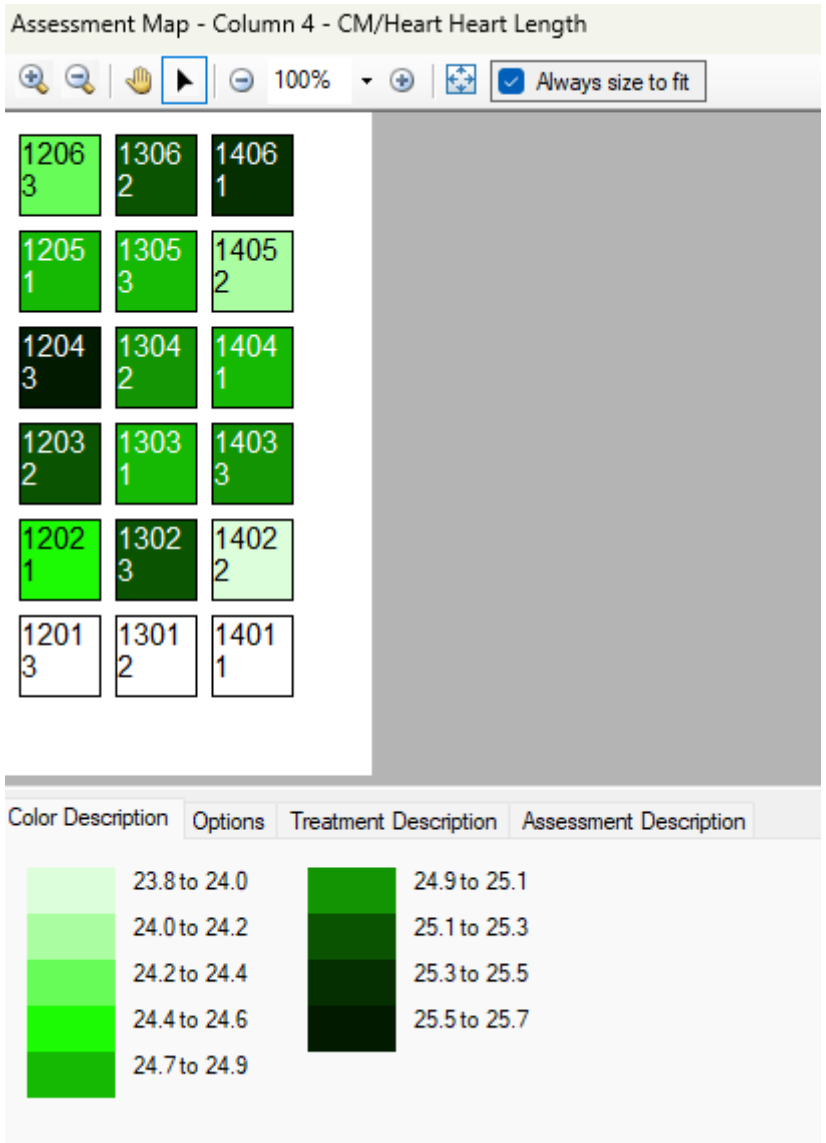
Assessment Map - Column 4 - CM/Heart Heart Length
100%
Always size to fit
1206 3
1306 2
1406 1
1205 1
1305 3
1405 2
1204 3
1304 2
1404 1
1203 2
1303 1
1403 3
1202 1
1302 3
1402 2
1201 3
1301 2
1401 1
Color Description
Options
Treatment Description
Assessment Description
23.8 to 24.0
24.0 to 24.2
24.2 to 24.4
24.4 to 24.6
24.7 to 24.9
24.9 to 25.1
25.1 to 25.3
25.3 to 25.5
25.5 to 25.7

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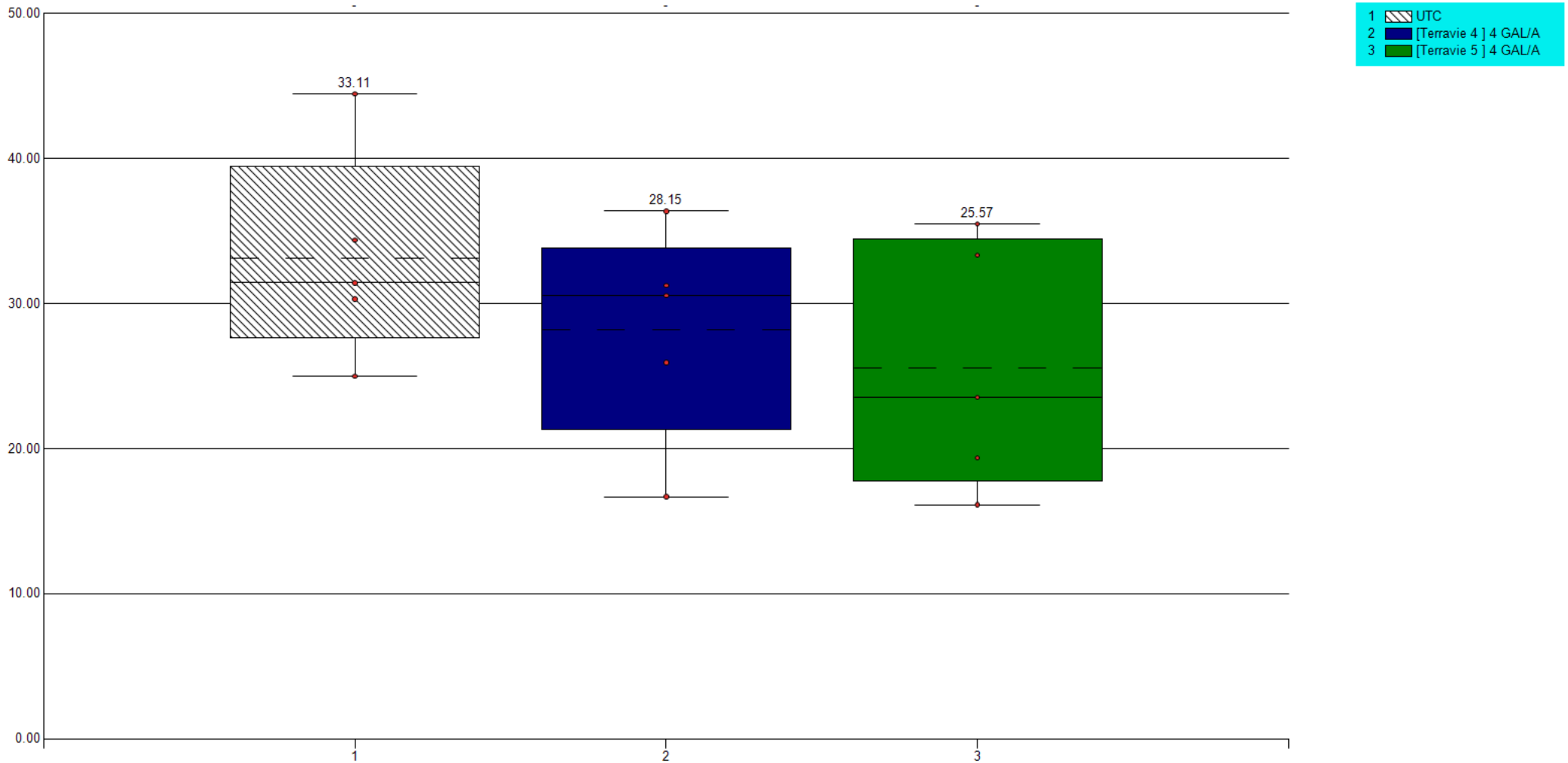
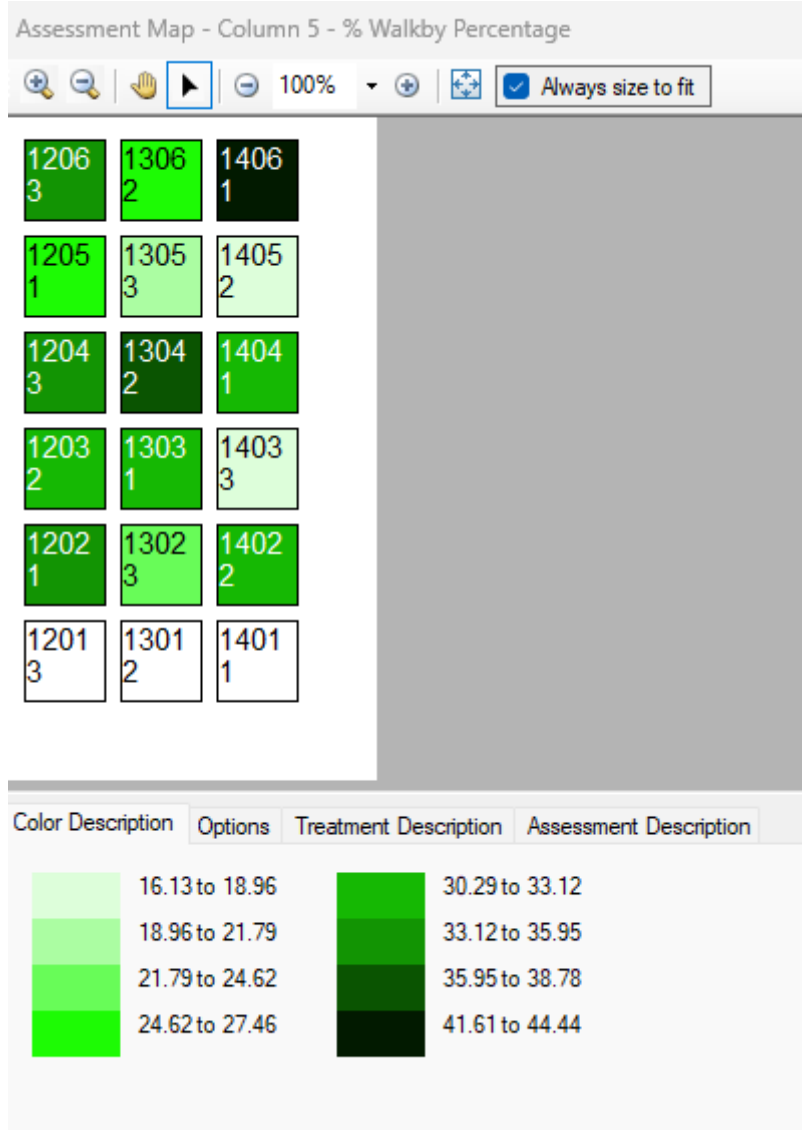


% Walkby Percentage

Trial ID: T-5 Terra Ag Romaine 2025


Assessment Map - Column 5 - % Walkby Percentage
100%
Always size to fit
1206 3
1306 2
1406 1
1205 1
1305 3
1405 2
1204 3
1304 2
1404 1
1203 2
1303 1
1403 3
1202 1
1302 3
1402 2
1201 3
1301 2
1401 1
Color Description
Options
Treatment Description
Assessment Description
16.13 to 18.96
18.96 to 21.79
21.79 to 24.62
24.62 to 27.46
30.29 to 33.12
33.12 to 35.95
35.95 to 38.78
41.61 to 44.44

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Terra Ag product comparison

Trial ID: T-5 Terra Ag Romaine 2025
Protocol ID: T-5 Terra Ag Romaine 2025 Location: Yuma Arizona Trial Year: 2025
Project ID: T-5 Terra Ag Romaine 2025
Study Director: Robert Masson Sponsor Contact:
Investigator:

SE Group No.			1	2	3	4	5	6
Rating Unit			KG/Plant	KG/Heart	CM/Heart	CM/Heart	%	mol m-2
Rating Min/Max/Interval			0.01, 2, -	0.01, 2, -	1, 60, -	1, 50, -	0, 100, -	
Number of Subsamples			36	27	27	27	1	1
Description			Above Ground Bi>	Heart Weight	Heart Circumfer>	Heart Length	Walkby Percenta>	Stomtal conduct>
Number of Decimals			3	3	1	1	2	2
Data Entry Date			Feb-25-2026	Feb-25-2026	Feb-25-2026	Feb-25-2026	Feb-25-2026	Mar-3-2026
Trt No.	Treatment Name	Rate Rate Unit	Appl Code	1*	2*	3*	4*	5*	6*
1	UTC			0.596 -	0.398 -	35.7 -	24.8 -	33.11 -	0.16 -
2	[Terravie 4]	4 gal/a	ABCD	0.602 -	0.388 -	36.1 -	24.7 -	28.15 -	0.18 -
3	[Terravie 5]	4 gal/a	ABCD	0.613 -	0.375 -	35.7 -	25.0 -	25.57 -	0.18 -
LSD P=.05				0.0722	0.0372	1.70	0.74	8.641	0.052
Standard Deviation				0.0495	0.0255	1.17	0.51	5.925	0.040
CV				8.2	6.58	3.25	2.06	20.47	23.02
Levene's F^				0.403	0.206	0.377	0.403	0.149	0.581
Levene's Prob(F)				0.677	0.817	0.694	0.677	0.863	0.572
Shapiro-Wilk^				0.8862	0.9792	0.962	0.9652	0.9251	0.9661
P(Shapiro-Wilk)^				0.0587	0.9634	0.7274	0.7823	0.2303	0.721
Skewness^				-0.4885	0.43	-0.088	-0.582	-0.5479	0.0635
P(Skewness)^				0.4139	0.4708	0.8816	0.3328	0.361	0.9071
Kurtosis^				-1.3018	0.7128	-0.2202	-0.1758	-0.7073	-0.5861
P(Kurtosis)^				0.2649	0.5351	0.8471	0.8776	0.5382	0.5796
Replicate F				0.778	3.411	0.555	0.990	3.104	0.713
Replicate Prob(F)				0.5697	0.0657	0.7016	0.4654	0.0809	0.6280
Treatment F				0.160	1.032	0.250	0.555	2.093	0.380
Treatment Prob(F)				0.8549	0.3993	0.7849	0.5948	0.1857	0.6934

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Terra Ag product comparrison

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Protocol ID: T-5 Terra Ag Romaine 2025 Location: Yuma Arizona Trial Year: 2025
Project ID: T-5 Terra Ag Romaine 2025
Study Director: Robert Masson Sponsor Contact:
Investigator:

SE Group No.			7	8	9	10	11
Rating Unit			mmol m-2	kPa	°C	°C	µg m-2
Rating Min/Max/Interval							
Number of Subsamples			1	1	1	1	1
Description			Transpiration	VPDleaf	air temperature	Canopy Temperat>	Chlorophyll con>
Number of Decimals			2	2	2	2	1
Data Entry Date			Mar-3-2026	Mar-3-2026	Mar-3-2026	Mar-3-2026	Mar-3-2026
Trt No.	Treatment Name	Rate Appl Rate Unit Code	7*	8*	9*	10*	11*
1	UTC		2.91 -	1.89 -	22.47 -	21.43 -	33.1 -
2	[Terravie 4]	4 gal/a ABCD	3.27 -	1.94 -	22.45 -	21.74 -	30.3 -
3	[Terravie 5]	4 gal/a ABCD	3.26 -	1.93 -	22.20 -	21.67 -	34.0 -
LSD P=.05			1.017	0.150	0.870	0.912	6.34
Standard Deviation			0.790	0.117	0.676	0.709	4.93
CV			25.14	6.07	3.02	3.28	15.17
Levene's F^			0.836	1.124	0.384	0.532	1.115
Levene's Prob(F)			0.453	0.351	0.687	0.598	0.354
Shapiro-Wilk^			0.9428	0.9778	0.891*	0.963	0.9753
P(Shapiro-Wilk)^			0.3237	0.9251	0.0401*	0.6595	0.8897
Skewness^			0.452	-0.3459	-0.4755	-0.323	-0.1957
P(Skewness)^			0.411	0.5276	0.3876	0.5549	0.7197
Kurtosis^			-0.8088	-0.4204	-1.2743	-0.549	0.2734
P(Kurtosis)^			0.4465	0.6904	0.2362	0.6036	0.7954
Replicate F			0.829	0.873	0.175	1.214	0.103
Replicate Prob(F)			0.5571	0.5319	0.9660	0.3699	0.9892
Treatment F			0.398	0.302	0.307	0.331	0.947
Treatment Prob(F)			0.6819	0.7459	0.7425	0.7256	0.4200

Plot Photos


Plot-1201
Trt-3


Plot-1301
Trt-2


Plot- 1401
Trt-1


Plot- 1202
Trt- 1


Plot- 1302
Trt-3


Plot- 1402
Trt-2


Plot-1203
Trt-2


Plot-1303
Trt-1


Plot-1403
Trt-3


Plot-1204
Trt-3


Plot-1304
Trt-2


Plot-1404
Trt-1


Plot-1205
Trt-1


Plot-1305
Trt-3


Plot-1206
Trt-3


Plot-1306
Trt-2


Plot-1406
Trt-1