

# ARM 2021.x Changes

## Key Features

# ARM Academy

<https://gdm.talentlms.com>

- Online platform for learning ARM
- NEW course/certification: Staying Current with ARM
- Keep up with latest changes in ARM over the last year

Home / **Course catalog**



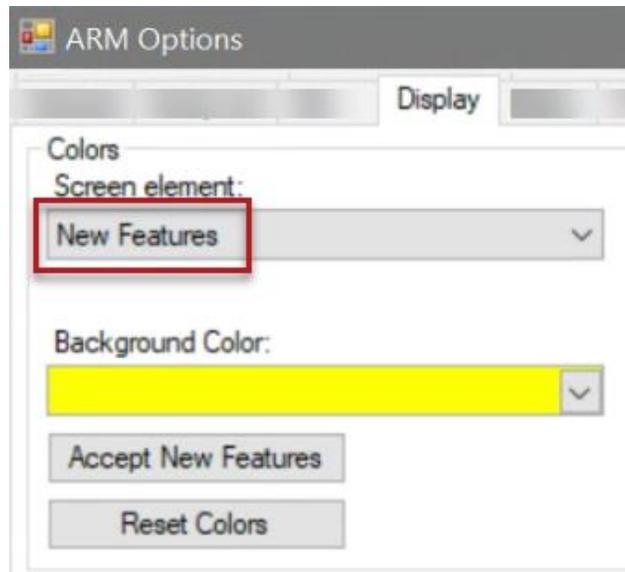
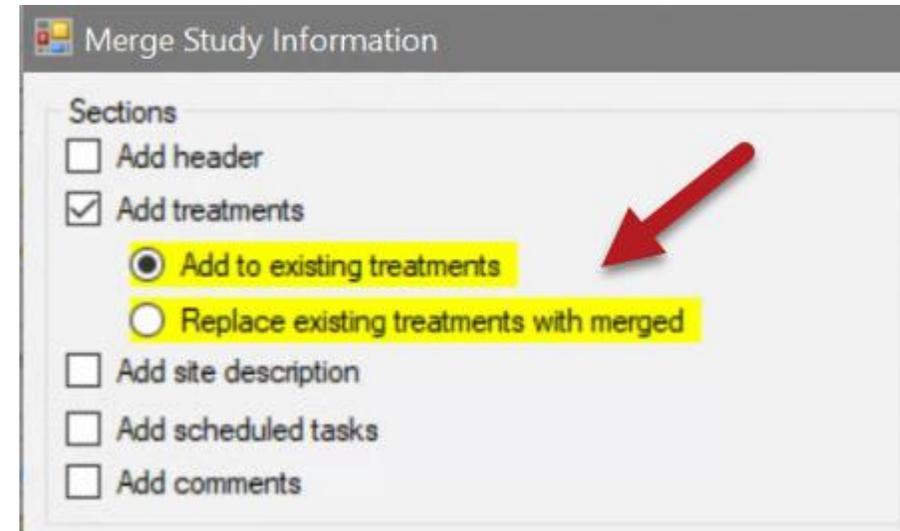
Staying Current

**Staying Current: ARM 2021**

Upon completing this course, you will be aware of the significant enhancements made to ARM since the beginning of last season. You will have a chance to practice the features most relevant to your ARM usage.

# New Feature Highlights

- New features/fields are now highlighted for limited time after release
  - New entry fields: 30 days
  - New features: first 10 times displayed on-screen



- Adjust color in Display Options
- Accept New Features to turn off highlight for all current new features/fields

# Review Protocol Entries

# Review Protocol Entries

Review trial for info that was entered in the protocol and has not been changed by the trialist

Review Protocol Entries - Site Description - Pest Description

The highlighted values are unchanged from the protocol. Please confirm or change the highlighted values.

**Pest Description**

Pest 1 Type:  Code:   Entry Date:   
 Common Name:  Stage Scale:   
 Establishment Date:  Artificial Population:   
 Establishment Rate:   Stage at Establishment:   
 Concentration:

Pest 2 Type:  Code:   Entry Date:   
 Common Name:  Stage Scale:   
 Establishment Date:   
 Establishment Rate:    
 Concentration:

I have confirmed highlighted fields in the following sections:  
 Pest 1  Pest 2

Confirm Skip Cancel

Highlighted:  
information that was  
entered in the  
protocol

Not highlighted:  
information trialist has  
entered or changed

Trialist confirms each  
section for  
completeness

# Review Protocol Entries

Performed during trial validation:

- When **rating date** entered, review assessment header fields
- When **application date** entered, review application-related fields
- When Trial Status = final, review all other trial fields

Protocol Entry Review - Assessment Data Headers

The highlighted values are unchanged from the protocol. Please confirm or change the highlighted values.

Column Number	1 (Calculated)	2	3
Rating Date	Dec-2-2021	Dec-2-2021	
Rating Time			
SE Name	F057_C4	F057A	F057B
SE Description	Rhizoctonia severity index {(1	Rhizoctonia severity index {(1	Rhizoctonia severi
Part Rated	TUBER C	PLPAC1	PLPAC2
Rating Type	COUDIS	COUDIS	COUDIS
Rating Unit/Min/Max	NUMBER	NUMBER	NUMBER
Calculation	NC	NC	NC
Sample Size	100 TUBER	100 TUBER	100 T
Collection Basis	1 PLOT		
Reporting Basis	1 PLOT		
Number of Subsamples	1		
Crop Stage Scale			
Crop Stage Majority/Min/Max			

Review Protocol Entries - Site Description - Crop Stage at Appl.

The highlighted values are unchanged from the protocol. Please confirm or change the h

**Crop Stage At Each Application**

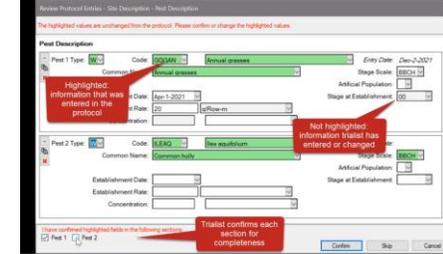
	A	B
Application Date	Dec-2-2021	
Crop 1 Code, BBCH Scale	BRSNW BRAP	BRSNW BRAP
Days after Emergence		
Stage Scale Used	BBCH	BBCH
Stage Majority, Percent	14	50
Stage Minimum, Percent	10	25
Stage Maximum, Percent	19	25
Diameter Average	5	cm
Diameter Minimum, Maximum		
Height Average		
Height Minimum, Maximum		
Density Average		
Density Minimum, Maximum		
Total Canopy Height	8	m
Treated Canopy Height	6	m
Treated Leaf Wall Area	40000	m <sup>2</sup> /ha
Treated LWA Formula	2*6*10000/3	
Treated LWA per Plot	100	m <sup>2</sup> /plot
Total Leaf Wall Area	53333	m <sup>2</sup> /ha
Total LWA Formula	2*8*10000/3	
Coverage		

I have confirmed highlighted fields in the following sections:  
 Column 1  Column 2

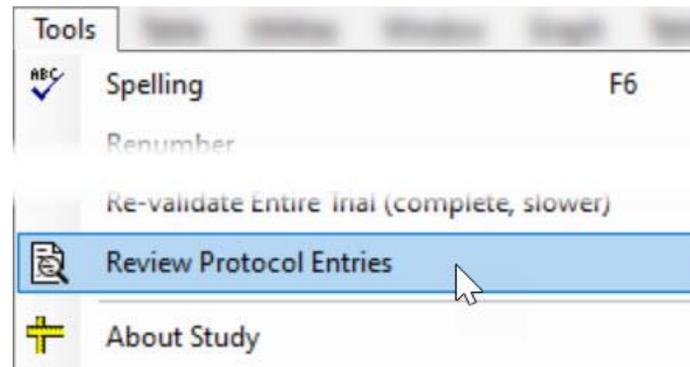
I have confirmed highlighted fields in the following sections:  
 Application A

# Review Protocol Entries

Feature in Action:



Can also perform the review anytime from Tools menu:



Benefits:

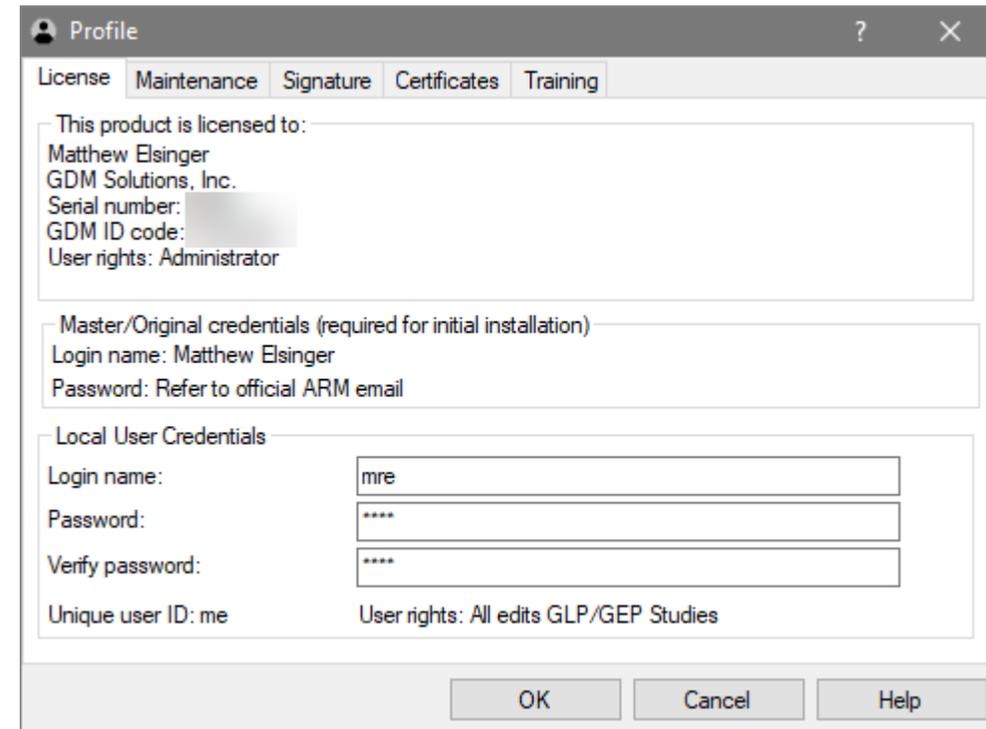
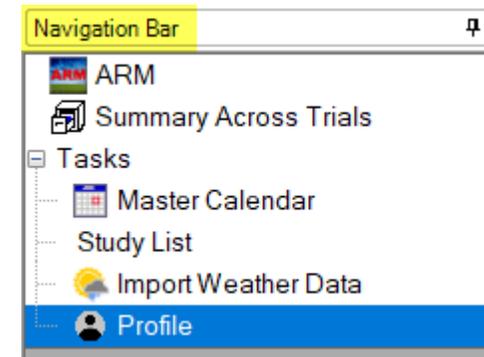
- + **Protocol Writers:** inform & instruct, with confidence in trial accuracy
- + **Trialists:** Save time with wizard, instead of manual review of all screens

# User Profile

# User Profile

A list of settings specific to the ARM licensee.

- **License**
  - Details about the ARM license
  - Add a local user or custom password
- **Maintenance**
  - License maintenance expiration date, renewal invoice
- **Signature, Certificates** - new features in ARM
- **Training** – information for ARM Academy

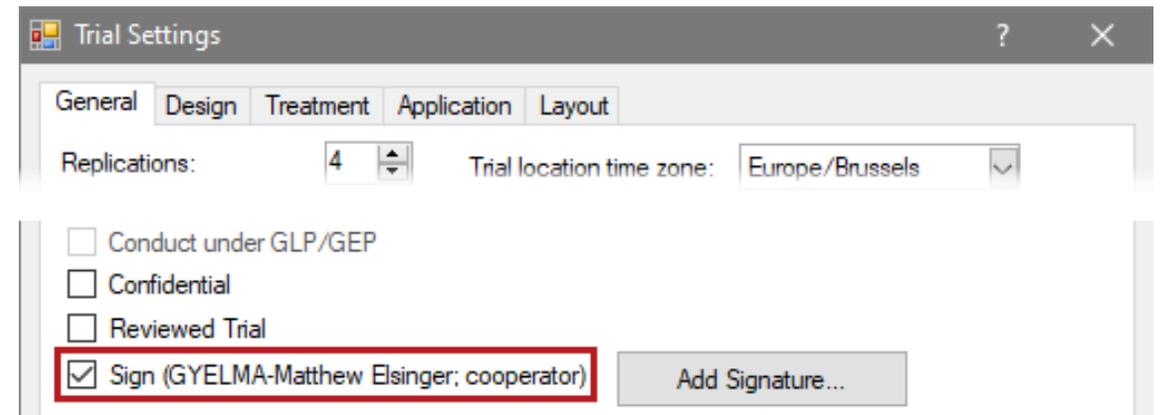
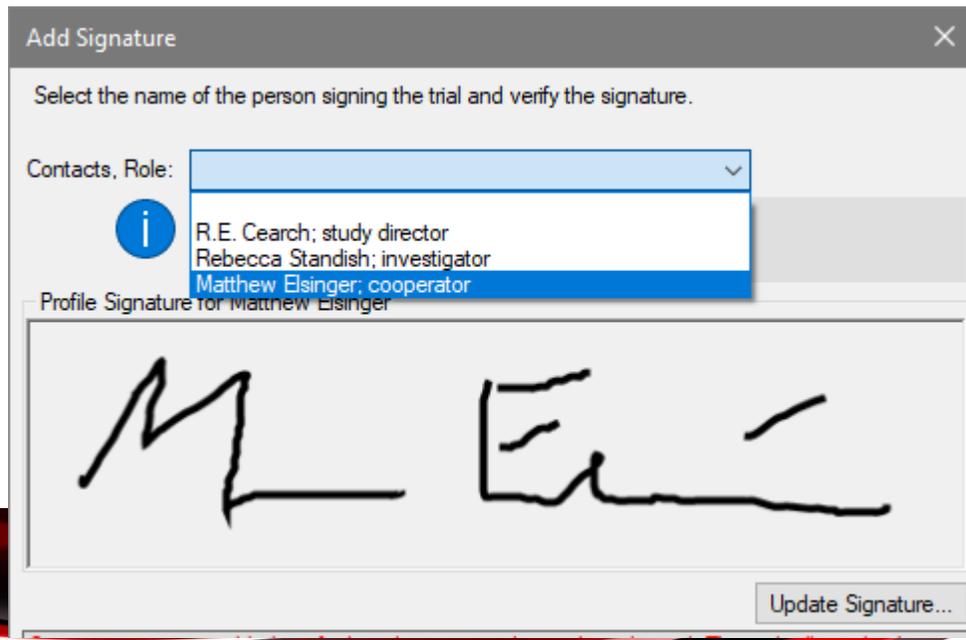


# Signature

# Trial Signature

Add your signature to a trial

1. Trial Settings > **Sign** checkbox
2. Create your signature in user profile
3. Confirm your role in the trial (fills from Contacts)



# Signature

## Add a signature to a trial

- Include signatures on reports (Global Report options)
- Add a study rule to require a signature

Sep-14-2021 (G-AI17\_Fung) Signature Page 3 of 3

**GDM Solutions, Inc.**

Trial ID: G-AI17_Fung	Location: Gembloux	Trial Year: 2014
Protocol ID: G-AI17_Fung	Investigator (Creator): Your Name	
Project ID:	Study Director: R.E. Cearch	

Sep-14-2021, GYELMA-MatthewElsinger; cooperator

Study Rules - Rule 1 of 1				
Rule	Rule ID	Editor	Field	Condition
1	Sign	Trial	Trial	Everyone in my company

# Certificates

# GEP Certificate

Save GEP accreditation / test facility details to user profile

- Easy to populate and update each trial
- Downloads certificate PDF and attaches to trial
- Track your certificate expiration (not saved in trials)

Site Description

General Trial

**General Trial Information**

Test Facility:

GEP Accreditation Number:

GEP Accreditation Link:

Profile

License Maintenance Signature Certificates Training

Test Facility:  
GDM Solutions 321 Elm St.

GEP Accreditation Number: 123456

GEP Accreditation Link:  
[http://gepcertibase.eu/documents/1997\\_\(19\)\\_01SL\\_20\\_01\\_2017\\_20\\_01\\_2022\\_...](http://gepcertibase.eu/documents/1997_(19)_01SL_20_01_2017_20_01_2022_...)

Certificate Expiration: Oct-1-2022

Certibase...

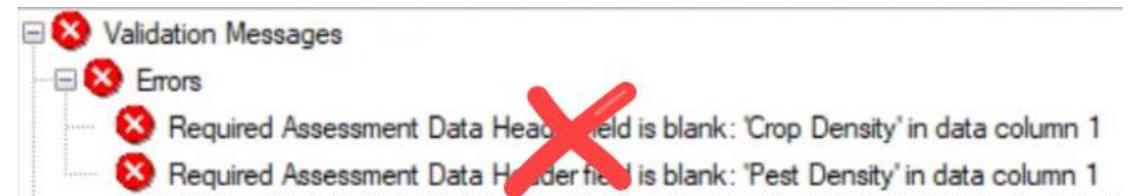
# Protocol Writers

# Validation updates

**Value** fields are not required when **unit** field contains an entry

- Now enter units to *instruct* the trialist, without throwing errors

Assessment Data	
Column Number	1
Crop Density	m2
Pest Density	%



- Tip: Add a study rule to require the value for the trialist

Rule ID	Editor	Field	Condition	Columns
Required	Assessment Data	Pest Density	With assessment data	1
Required	Assessment Data	Crop Density	With assessment data	1

# AOV Means Table report

# Descriptive Statistics

Moved options group  
to its own section/tab

Same options, new location!

AOV Means Table Report Options

Report Options | **Descriptive Statistics** | General Summary | Report Preview

- LSD (or HSD if Tukey's)
- Standard deviation
- Coefficient of variation (CV)
- Grand mean
- Friedman's method for randomized blocks
- Post-hoc power analysis

Normality tests

Calculate normality tests from:  Residuals  Assessments

- Skewness
- Kurtosis
- Homogeneity of variance test Levene's

Diagnostic report

- Graph Layout: 4 X 2

# Descriptive Statistics

Specify how normality tests are calculated/reported

- \*Residuals: *contemporary* approach; matches **Column Diagnostics**
- Assessments: the *historical* approach; not recommended

AOV Means Table Report Options

Report Options | **Descriptive Statistics** | General Summary | Report Preview

Normality tests

Calculate normality tests from:  Residuals  Assessments

Skewness

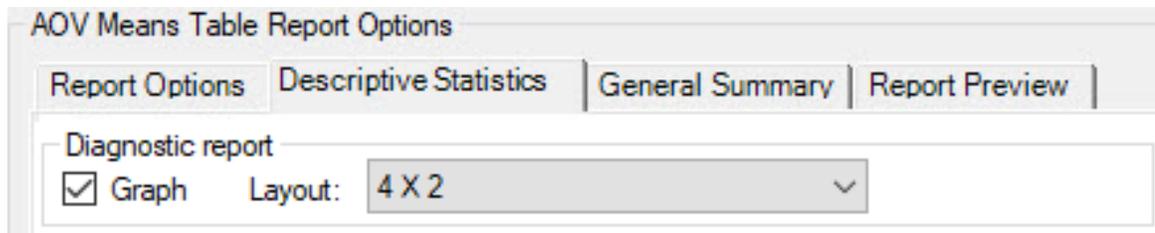
Kurtosis

Homogeneity of variance test Levene's

\*Default

# Descriptive Statistics

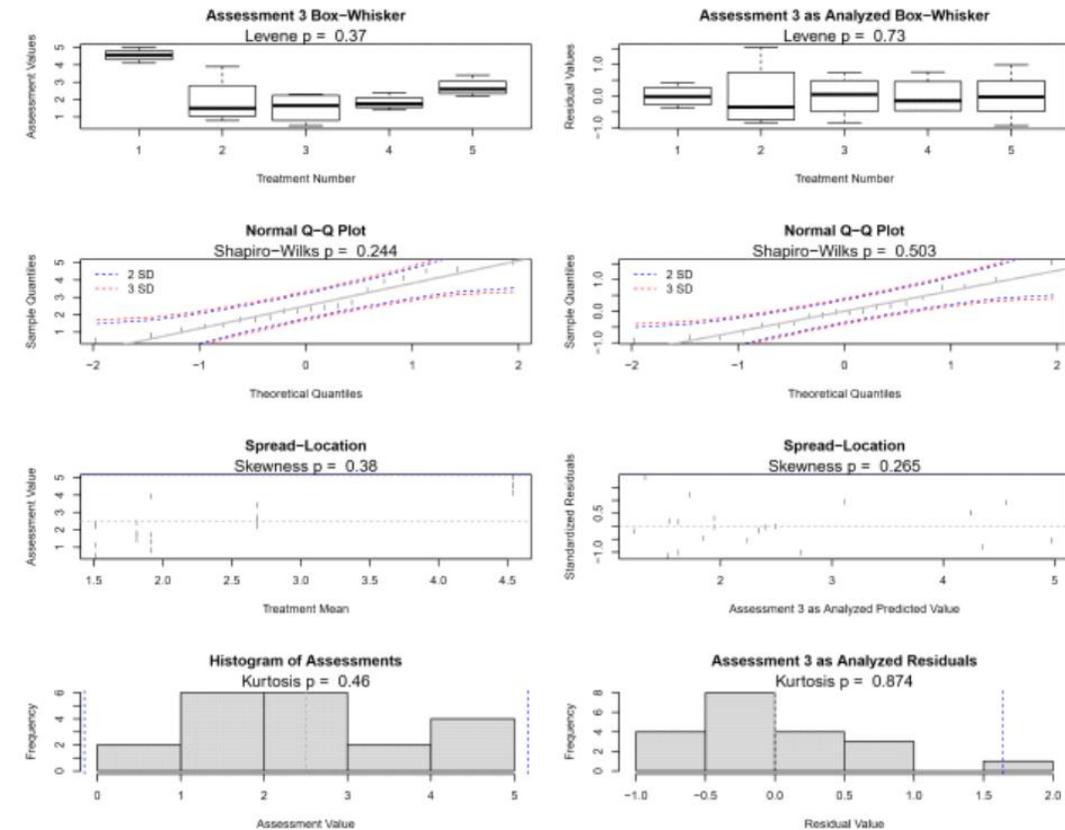
## Include Diagnostic Graphs with AOV report



- Same graphs from Column Diagnostics panel

### New Company

An assessment of the efficacy of TUB and other fungicides for the control of Septoria Diseases  
Trial ID: G-All7\_Fung Location: Gembloux Trial Year: 2014  
Protocol ID: G-All7\_Fung Investigator (Creator): Your Name



# Arithmetic mean

New option to include arithmetic mean on report

**Why?** Analyzed means are not always arithmetic:

- Data correction transformations
- Missing data adjustments

Part Rated				LEAF3 P
Rating Type				PESSEV
Rating Unit				%
ARM Action Codes				AS
Number of Decimals				2
Trt No.	Treatment Name	Rate	Appl Unit Code	3* dAS
1	Untreated Check		ABC	2.62 - 3.33 A.Mean
2	Tub	0.5 l/ha	ABC	1.11 - 1.67 A.Mean
3	Tub	1 l/ha	ABC	1.70 - 2.00 A.Mean
4	Tilt 250	0.5 l/ha	ABC	1.28 - 1.58 A.Mean
5	Mico 60 Fungol	1.5 l/ha 1.25 l/ha	AB C	3.34 - 4.08 A.Mean
LSD P=.05				1.884 - 1.991
Standard Deviation				0.389t
CV				24.92t
Replicate F				0.023
Replicate Prob(F)				0.9951
Treatment F				2.257
Treatment Prob(F)				0.1235

#### ARM Action Codes

AS = Automatic square root transformation of X+0.5

Means followed by same letter or symbol do not significantly differ (P=.05, Student-Newman-Keuls test). Mean descriptions are reported in transformed data units, and are not de-transformed. Mean comparisons performed only when AOV Treatment P(F) is significant at mean comparison level. d=Means are reported in de-transformed data units

AOV Means Table Report Options

Report Options

Mean comparison test

Test: Student

Mean descriptions

Primary mean

Arithmetic mean

Minimum and maximum

Standard deviation

Arranged

Beside mean  Under mean

# Arithmetic mean

## What should I choose?

For non-statistical audience:

- Include arithmetic mean, no de-transform needed

For statistical audience:

- De-transform means, no arithmetic mean needed

Part Rated	LEAF3 P
Rating Type	PESSEV
Rating Unit	%
ARM Action Codes	AS
Number of Decimals	2
Trt Treatment	3
No. Name	AS A.Mean
1 Untreated Check	1.77 ab 3.33
2 Tub	1.27 b 1.67
3 Tub	1.48 ab 2.00
4 Tilt 250	1.33 b 1.58
5 Mico 60 Fungol	1.96 a 4.08
LSD P=.05	0.600
Standard Deviation	0.389
CV	24.92
Levene's F^	0.848
Levene's Prob(F)	0.516
Skewness^	-0.0753
Kurtosis^	-0.9277

Transformed means, used in analysis

Arithmetic means from "raw data"

Part Rated	LEAF3 P
Rating Type	PESSEV
Rating Unit	%
ARM Action Codes	AS
Number of Decimals	2
Trt Treatment	3
No. Name	dAS
1 Untreated Check	2.62 ab
2 Tub	1.11 b
3 Tub	1.70 ab
4 Tilt 250	1.28 b
5 Mico 60 Fungol	3.34 a
LSD P=.05	1.884 - 1.991
Standard Deviation	0.389t
CV	24.92t
Levene's F^	0.848
Levene's Prob(F)	0.516
Skewness^	-0.0753
Kurtosis^	-0.9277

Means used in analysis have been de-transformed to original units

t=Mean descriptions are reported in transformed data units, and are not de-transformed.  
d=Means are reported in de-transformed data units

# Subsample Data

Automatic transformations (AS, AA, AL)  
now applied to plot mean

Previously: applied to individual  
subsample values, then averaged

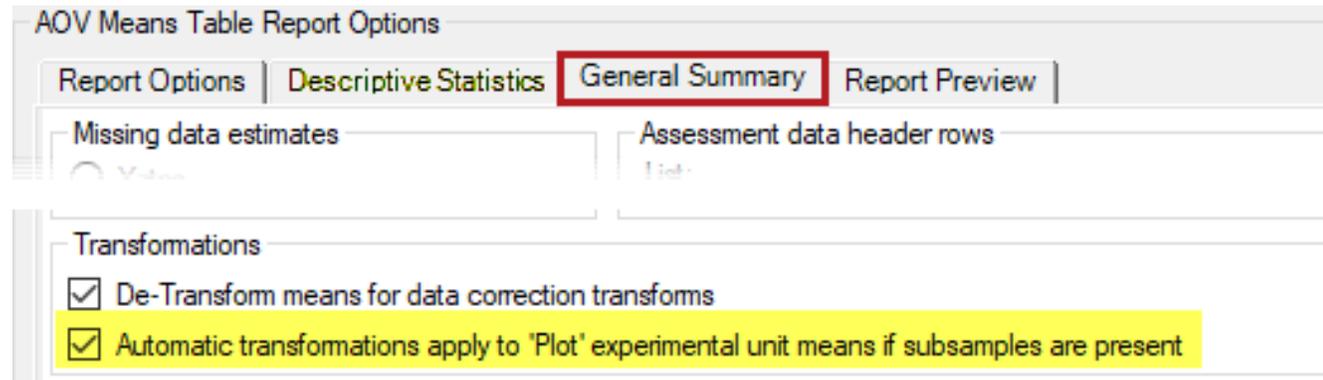
**Why?** AOV analyzes plot means, not subsample values; so  
transforms should apply to plot means too

Part Rated				LEAF3 P
Rating Type				PESSEV
Rating Unit				%
Sample Size			10	LEAF
Number of Subsamples				10
ARM Action Codes				&AS
Trt No.	Treatment Name	Rate	Appl Unit Code	3 &AS
1	Untreated Check		ABC	2.25 a
2	Tub	0.5 L/ha	ABC	1.52 b
3	Tub	1 L/ha	ABC	1.40 b
4	Tilt 250	0.5 L/ha	ABC	1.52 b
5	Mico 60 Fungol	1.5 L/ha 1.25 L/ha	AB C	1.78 b
LSD	P=.05			0.398
Standard Deviation				0.258
CV				15.25

&=Transformation applied to 'Plot' experimental unit means of subsamples

# Subsample Data

Control this behavior with new General Summary option:



The screenshot shows the 'AOV Means Table Report Options' dialog box with the 'General Summary' tab selected. The 'Transformations' section contains two checked options: 'De-Transform means for data correction transforms' and 'Automatic transformations apply to 'Plot' experimental unit means if subsamples are present'. The latter option is highlighted in yellow.

AOV Means Table Report Options

Report Options | Descriptive Statistics | **General Summary** | Report Preview

Missing data estimates:  Yes  No

Assessment data header rows: List

Transformations

- De-Transform means for data correction transforms
- Automatic transformations apply to 'Plot' experimental unit means if subsamples are present

When selected, adds **&** symbol to the transform Action Code  
*(for report only, entered data is not changed)*

# Report Compression

Improved spacing to reduce unnecessary space on Protocol/Site Description, Summary reports

ARM 2021.1 AOV Means Table Page 1 of 4

**GDM Solutions, Inc.**

An assessment of the efficacy of TUB and other fungicides for the control of Septoria Diseases in Soybeans

Title No. 2: Trial ID: G-A17\_Fung Location: Gembloux Trial Year: 2014  
Protocol ID: G-A17\_Fung Investigator (Creator): Your Name

Pest Type	C TRZAW	C TRZAW	D Disease SEPTTR	D Disease SEPTTR	D Disease SEPTTR
Pest Code	C TRZAW	C TRZAW	C TRZAW	C TRZAW	C TRZAW
Crop Type, Code	Jul-15-2014	Jul-15-2014	May-13-2014	May-13-2014	Jun-18-2014
Rating Date	LEAF C	PLANT C	LEAF3 P	LEAF3 P	LEAF3 P
Part Rated	PHYGEN	VIGOR	PESSEV	PESSEV	PESSEV
Rating Type	% 0 100	% 0 100	% 0 100	%UNCK - -	% 0 100
Rating Unit/Min/Max	0 100	0 100	10 LEAF	10 LEAF	10 LEAF
Sample Size					
Reporting Basis					
Number of Subsamples	1	1	10	1	10
Crop Stage Scale			BBCH	BBCH	BBCH
Crop Stage Majority/Min/Max			32 - -	32 - -	59 - -
Pest Density			4.42 PERCENT	4.42 PERCENT	8.25 PERCENT
Rating Timing			1	1	2
Days After First/Last Applic.	91 7	91 7	28 28	28 28	64 15
Trt-Eval Interval	7 DA-C	7 DA-C	28 DA-A	28 DA-A	15 DA-B
Plant-Eval Interval	273 DP-1	273 DP-1	210 DP-1	210 DP-1	246 DP-1
ARM Action Codes			TAB[3]	TAB[3]	TAB[3]
Number of Decimals			2	2	2
Trt Treatment					
No. Name	1*	2*	3*	4*	5*
Rate Unit Code					
1 Untreated Check	ABC			0.00 b	8.25 a
2 Tub	0.5 l/ha ABC			57.98 a	1.83 b
3 Tub	1 l/ha ABC			67.06 a	1.46 b
4 Tilt 250	0.5 l/ha ABC			59.52 a	2.30 b
5 Mico 60 Fungol	1.5 l/ha AB 1.25 l/ha C			39.92 a	1.67 b
LSD P=.05			1.264	28.202	2.598
Standard Deviation	0.00	0.00	0.821	18.305	1.686
CV	0.0	0.0	32.76	40.77	54.39

**BEFORE**

ARM 2021.2 AOV Means Table Page 1 of 3

**GDM Solutions, Inc.**

An assessment of the efficacy of TUB and other fungicides for the control of Septoria Diseases in Soybeans

Trial ID: G-A17\_Fung Location: Gembloux Trial Year: 2014  
Protocol ID: G-A17\_Fung Investigator (Creator): Your Name

Pest Type	C TRZAW	C TRZAW	D Disease SEPTTR					
Pest Code	C TRZAW	C TRZAW	C TRZAW	C TRZAW	C TRZAW	C TRZAW	C TRZAW	C TRZAW
Crop Type, Code	Jul-15-2014	Jul-15-2014	May-13-2014	May-13-2014	Jun-18-2014	Jun-18-2014	Jul-2-2014	Jul-2-2014
Rating Date	SE Group No.	SE Group No.	SE Group No.	SE Group No.	SE Group No.	SE Group No.	SE Group No.	SE Group No.
Part Rated	LEAF, C	PLANT, C	LEAF3, P	LEAF3, P	LEAF3, P	LEAF3, P	LEAF2, P	LEAF2, P
Rating Type	PHYGEN	VIGOR	PESSEV	PESSEV	PESSEV	PESSEV	PESSEV	PESSEV
Rating Unit/Min/Max	% 0, 100	% 0, 100	% 0, 100	%UNCK, - -	% 0, 100	%UNCK, - -	% 0, 100	%UNCK, - -
Sample Size								
Reporting Basis								
Number of Subsamples		1	1	10	1	10	1	10
Crop Stage Scale				BBCH	BBCH	BBCH	BBCH	BBCH
Crop Stage Majority/Min/Max				32, - -	32, - -	59, - -	59, - -	70, - -
Pest Density				4.42 %	4.42 %	8.25 %	8.25 %	15.5 %
Rating Timing				1	1	2	2	3
Days After First/Last Applic.	91, 7	91, 7	28, 28	28, 28	64, 15	64, 15	78, 29	78, 29
Trt-Eval Interval	7 DA-C	7 DA-C	28 DA-A	28 DA-A	15 DA-B	15 DA-B	29 DA-B	29 DA-B
Plant-Eval Interval	273 DP-1	273 DP-1	210 DP-1	210 DP-1	246 DP-1	246 DP-1	260 DP-1	260 DP-1
ARM Action Codes			TAB[3]	TAB[3]	TAB[3]	TAB[5]	TAB[7]	TAB[7]
Number of Decimals			2	2	2	2	2	2
Trt Treatment								
No. Name	1*	2*	3*	4*	5*	6*	7*	8*
Rate Unit Code								
1 Untreated Check	ABC			0.00 a	8.25 a	0.00 b	15.51 a	0.00 c
2 Tub	0.5 l/ha ABC			0.00 a	1.83 b	71.65 a	1.74 b	88.74 ab
3 Tub	1 l/ha ABC			0.00 a	1.46 b	80.07 a	0.83 b	95.62 a
4 Tilt 250	0.5 l/ha ABC			0.00 a	2.30 b	70.60 a	2.35 b	85.11 ab
5 Mico 60 Fungol	1.5 l/ha AB 1.25 l/ha C			0.00 a	1.67 b	71.49 a	3.88 b	74.09 b
LSD P=.05				1.264	28.202	2.598	22.408	3.146
Standard Deviation	0.00	0.00	0.821	18.305	1.686	14.544	2.042	8.275
CV	0.0	0.0	32.76	40.77	54.39	24.75	42.01	12.04

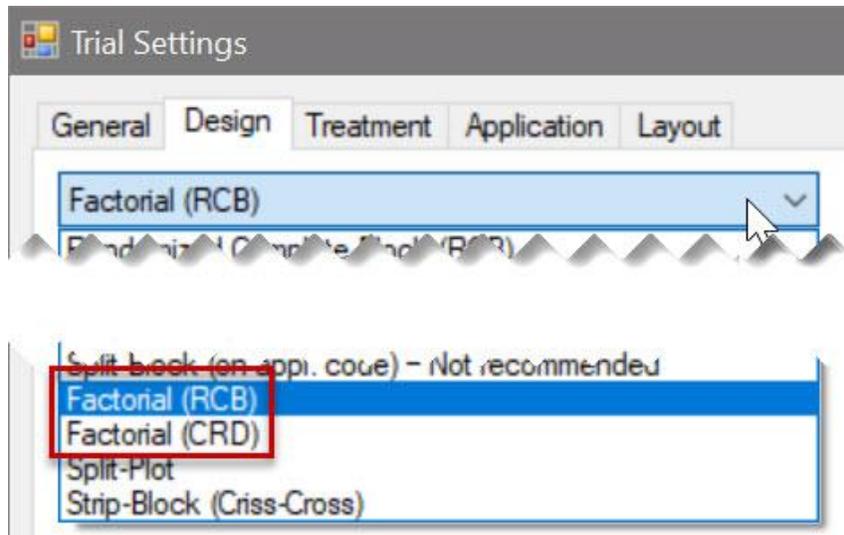
**AFTER**

# Multi-factor Designs

# Factorial CRD

## Completely Random Design w/factorial treatment arrangement

- Useful where blocking is not needed (e.g. greenhouse/lab trials)

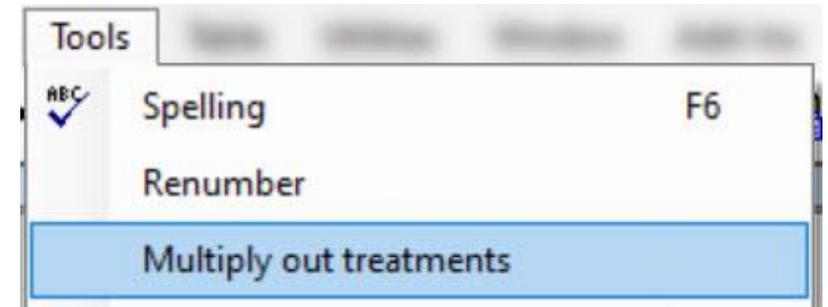


401 1 A1 B1	402 6 A3 B2	403 8 A4 B2	404 4 A2 B2	405 3 A2 B1	406 2 A1 B2	407 7 A4 B1	408 6 A3 B2
301 7 A4 B1	302 8 A4 B2	303 2 A1 B2	304 7 A4 B1	305 4 A2 B2	306 6 A3 B2	307 3 A2 B1	308 1 A1 B1
201 3 A2 B1	202 5 A3 B1	203 4 A1 B2	204 9 A4 B1	205 2 A2 B2	206 5 A3 B2	207 1 A1 B1	208 8 A4 B2
101 6 A3 B2	102 2 A1 B2	103 5 A1 B1	104 8 A1 B2	105 3 A3 B1	106 4 A4 B1	107 1 A2 B2	108 5 A3 B1

**Factorial CRD**  
No blocking;  
treatments are  
completely random

Previous "Factorial" design renamed to "Factorial RCB" to clarify

# Multiply out treatments



Convert protocol factor levels to the full "multiplied out" list

The diagram illustrates the conversion of protocol factor levels to a full multiplied out list. It shows two tables side-by-side. The left table, 'Treatments - Line 13', lists treatments with factor levels. The right table, 'Treatments - Line 26', lists the resulting multiplied out treatments. Arrows indicate the mapping from the left table to the right table.

Treatments - Line 13				
Trt Line	Trt No.	Type	Treatment Name	Factor
1			Start of Factor A (Cultural Practice)	
2	1	CULT	Tillage Method 1	
3	2	CULT	Tillage Method 2	
4	3	CULT	Tillage Method 3	
5				
6			Start of Factor B (Herbicide)	
7	1	HERB	Accord	3
8	2	HERB	Brominal PLUS	3
9	3	HERB	Cannon	3
10	4	HERB	Defol 6	6
11				
12			Start of Comparison Treatments	
13	1	CHK	Untreated Check	
14				

Treatments - Line 26						
Trt Line	Trt No.	Type	Treatment Name	Factor ID	Level No.	
1	1	CULT	Tillage Method 1	A	1	
2	1	HERB	Accord	B	1	
3	2	CULT	Tillage Method 1	A	1	
4	2	HERB	Brominal PLUS	B	2	
5	3	CULT	Tillage Method 1	A	1	
6	3	HERB	Cannon	B	3	
7	4	CULT	Tillage Method 1	A	1	
8	4	HERB	Defol 6	B	4	
9	5	CULT	Tillage Method 2	A	2	
10	5	HERB	Accord	B	1	
11	6	CULT	Tillage Method 2	A	2	
12	6	HERB	Brominal PLUS	B	2	
13	7	CULT	Tillage Method 2	A	2	
14	7	HERB	Cannon	B	3	
15	8	CULT	Tillage Method 2	A	2	
16	8	HERB	Defol 6	B	4	
17	9	CULT	Tillage Method 3	A	3	
18	9	HERB	Accord	B	1	

Useful to edit "full" treatment list while still in the protocol

# Multiply out treatments

Feature in Action:

Trt Line	Trt No.	Type	Treatment Name	Form Type	Description	Rate	Rate Unit	Appl Code
1			Start of Factor A (Herbicide)					
2	1	HERB	Accord	SC	base rate=2	2	LB AI/A	A
3	2	HERB	Brominal PL	EC	base rate=3	3	LB AI/A	A
4	3	HERB	Cannon	EC	base rate=1.5	1.5	LB AI/A	A
5			Start of Factor B (Rate)					
6	1		Rate - Low		1x	1	LB AI/A	
7	2		Rate - Medium		1.5x	1.5	LB AI/A	
8	3		Rate - High		2x	2	LB AI/A	
9			Start of Comparison Treatments					
10	1	CHK	Untreated Check		not treated			

Three products,  
with different  
base rates

Factor B is rate  
multiplier

*Note: once protocol treatments are converted, they cannot be reverted back to the original factor level view. Only Edit > Undo can reverse this action.*

# Reporting

New option to print Level Descriptions instead of treatment info

Affects: FAOV Table, Treatments reports for multi-factor studies

Factorial AOV Table Report Options

Report Options | General Summary | Report Preview

Mean comparison test

Test: LSD

Multi-factor View - Factors and levels

From Level Description Edit Level Descriptions...

From entered fields in the original protocol

From first occurrence of each factor and level in trial

Trial Map

Options	Movement Arrows	Treatment Description	Level Description	Co
A	1	Acc	Accord	
A	2	Bro	Brominal PLUS	
A	3	Can	Cannon	
B	1	Low	Rate - Low	
B	2	Med	Rate - Medium	
B	3	High	Rate - High	

Use Reset button on Trial Map to re-select fields to include in Description

# Assessment Data

# Data Limits

Part Rated	PLANT	▼	C	▼		
Rating Type	VIGOR					
Rating Unit/Min/Max	%	▼	0	▼	100	▼

- New fields: Rating Unit **Minimum** and **Maximum**
- Define the smallest and largest value that is valid for the assessment
- Auto-filled for units that already have data limits pre-defined

Rating Unit/Min/Max	Rating Minimum	Rating Maximum	Description
A0-90	0	90	angle 0-90°
percent	0	100	percent
PH	0	14	ph
PROP	0	1	proportion (0-1)
RATIO	0	1	ratio
STVSCALE	0	6	Stover scale (0-6)

# Data Limits

- Removed ARM Action Codes that define data limits
- Use new Min/Max fields instead
  - Set Minimum=0 to replace "+"
  - Set Min=0,Max=1 to replace "Y"
- **Why?** Data limits are now explicit and are set in only one place  
(previously: Action Code, Rating Type, and/or Unit)

P	Rating scale of 0 to 100 (e.g. % control or injury)
H	Rating scale of 0 to 12
C	Rating scale of 0 to 10
D	Rating scale of 1 to 10
M	Rating scale of 0 to 9 (e.g. mole crickets)
B	Rating scale of 1 to 9 (e.g. turf, sheath blight)
K	Rating scale of 1 to 7
L	Rating scale of 0 to 6
I	Rating scale of 1 to 6 (e.g. Iowa Corn Rootworm)
S	Rating scale of 0 to 5 (e.g. Idaho SB Root Maggot)
R	Rating scale of 1 to 5
X	Rating scale of 0 to 3 (e.g. Nodal Corn Rootworm; sugarcane aphid: 0=0, 1=1-100, 2=101-300,3=>300 on f
+	Only positive values (0 to 3.402823E38)
Y	Yes/No rating scale of 1 or 0, where 1=Yes and 0=No (e

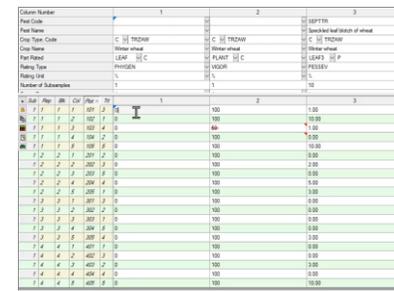
# New Fields

- Added fields for documenting:
  - Diameter
  - Height
  - Density
- For both Crop and Pest
- Include Average across trial, smallest (Min) and largest (Max)

Assessment Data		
Column Number	1	
Crop Stage Majority/Min/Max		
Crop Diameter Average	1.5	IN
Crop Diameter Min/Max	1.25	2
Crop Height Average	3.5	FT
Crop Height Min/Max	3	3.75
Crop Density	10	m
Crop Density Min/Max	10	10
Pest Stage Majority/Min/Max		
Pest Diameter Average	3	cm
Pest Diameter Min/Max	2.5	3.5
Pest Height Average	15	cm
Pest Height Min/Max	12	22
Pest Density	15	m
Pest Density Min/Max	5	30

# Assessment Data

Feature in Action:



Plot Code	Plot Name	Plot Type
101	101	101
102	102	102
103	103	103
104	104	104
201	201	201
202	202	202

New shortcut buttons added to plot description

- Trial Map
- Sort by – Assessment Order
- Sort by – Harvest Order

	Sub	Rep	Blk	Col	Plot	Trt	1
	1	1	1	1	101	3	0
	1	1	1	2	102	1	0
	1	1	1	3	103	2	0
	1	1	1	4	104	4	0
	1	2	2	1	201	4	0
	1	2	2	2	202	2	0

Options Movement Arrows Treatment Description Comment Quality

No arrows

Assessment order

Serpentine within blocks

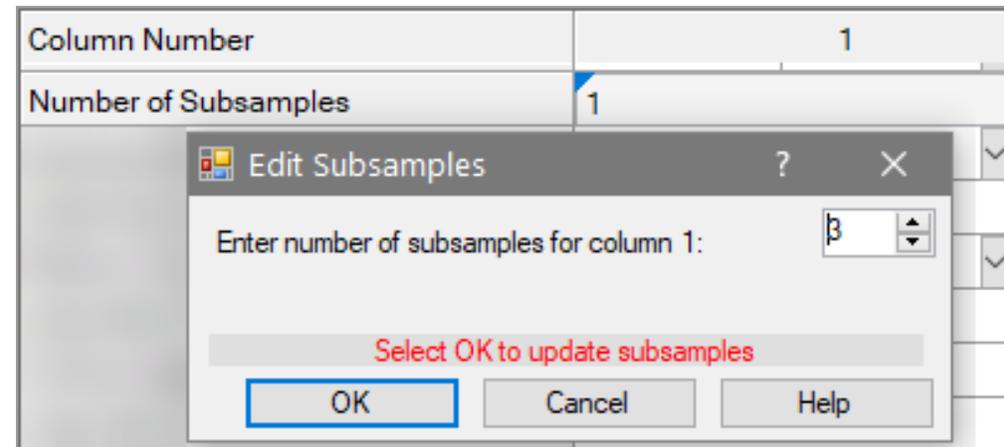
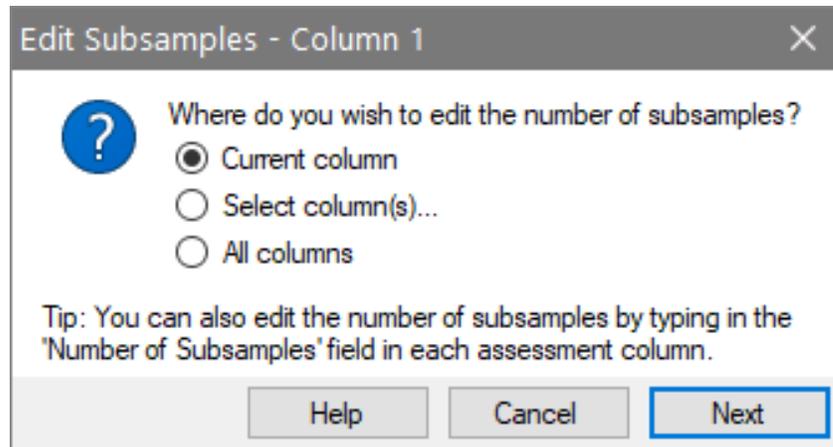
Harvest order

Serpentine across blocks

Tip: Set the Assessment & Harvest orders on the Trial Map > Movement Arrows

# Subsamples

- New wizard replaces Tools > Add/Delete Subsamples commands



- Change subsamples across whole trial, or specific column(s)

# Subsamples

*Maximum subsamples* property of a trial now automatically updates when appropriate

## Previously

Add a column of 10 subsamples, then change all columns to 1:

Trial *Max subsamples* = 10 still

## Feature in Action:

The screenshot shows the 'Assessment Data - Line 1' window with the following properties:

Column Number	1	2
Pest Type	W Weed	W
Pest Name	Palmer amaranth	Paln
Crop Type, Code	C GLXMA	
Crop Name	Soybean	
Description	Pest Stand Count	Crop Phygen - 1 Day
Part Rated	PLANT P	PLANT C
Rating Type	COUPLA	
Rating Unit	PLANT	
Sample Size	1	
Number of Subsamples	10	

The 'About Study' dialog box displays the following information:

Trial file	2020-Tutorial.dat0
Owner ID	GYELMA (XSZNAF)
File version	2015+
Format definitions .def	G-All7.def (36) 210126
Format definitions .frm	G-All7.frm (34)
From Protocol	Practice Protocol.prt
Under GLP/GEP	No
Treatments	4
Treatment line ID	1 of 6
Replicates	5
Assessment data lines	200
Data columns	4
Column ID	1 of 4
Column flags	Original, Changed
Subsamples	10
Footnotes	0
Header+Site Description	1391
Is changed	Yes

# Assessment Images

- Can now remove linked images when image file cannot be found

The screenshot displays a software interface with three main components:

- Trial Validation Messages:** A window showing a list of warnings. The first warning states: "Linked attachment(s) cannot be found and will not display: Assessment Plot 101: E:\Matt\Pictures\Camera Roll\WIN\_20201022\_19\_52\_55\_Pro.jpg". A red arrow points from this warning to the corresponding row in the table below.
- Data Table:** A table with columns labeled "Plot", "Trt", and "1". The rows are numbered 101 through 303, with alternating yellow and green background colors. A red arrow points from the warning in the messages window to the row for Plot 101.
- Assessment (Plot 101, Col 1) Panel:** A panel on the right side of the interface. It contains a "Comment:" field, a "Barcode:" field, a "Set GPS" button, a "Damaged" checkbox, an "Image:" field, and three buttons: "Attach", "Remove", and "Rename". The "Remove" button is highlighted with a red box.

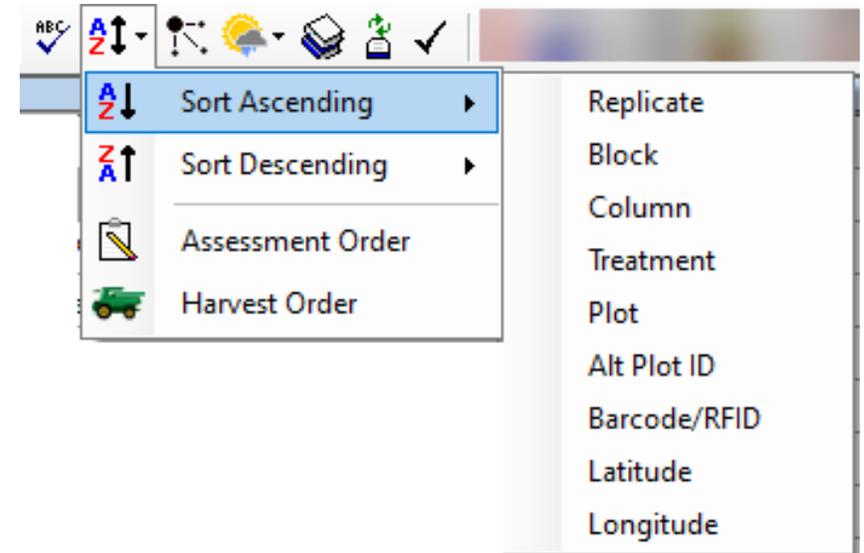
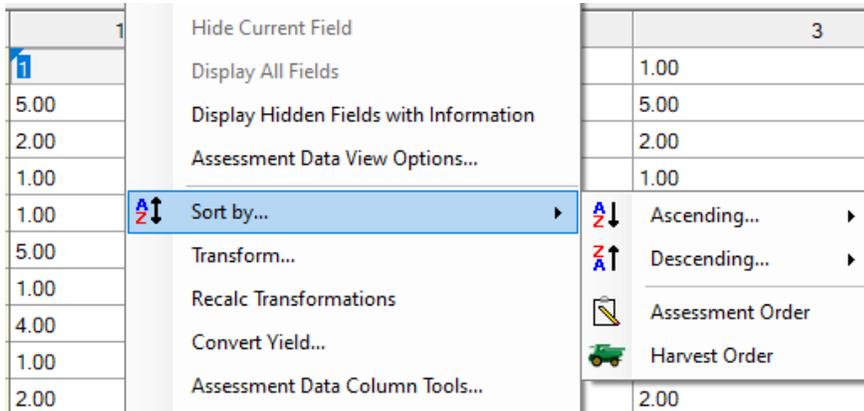
- Previously "Remove" button disabled if linked image not available

# Sort

Toolbar: Sort commands combined into one button

Sub-options depend on current editor

- Same impact on right-click menu:



# Site Description

# Unit Lists

- Drop-down list instead of Validation List dialog
- Added for fields with short, limited lists
- Faster data entry! Old vs. New:

	A	
<i>Application Date</i>	Apr-15-2021	
<i>Crop 1 Code, BBCH Scale</i>	TRZAW	BCER
Stage Scale Used	BBCH	▼
Stage Majority, Percent	32	▼ 100
Diameter Average		▼
Diameter Minimum, Maximum		▼
Height Average		▼
Height Minimum, Maximum		▼

cm  
 FT  
 IN  
 m  
 Edit...

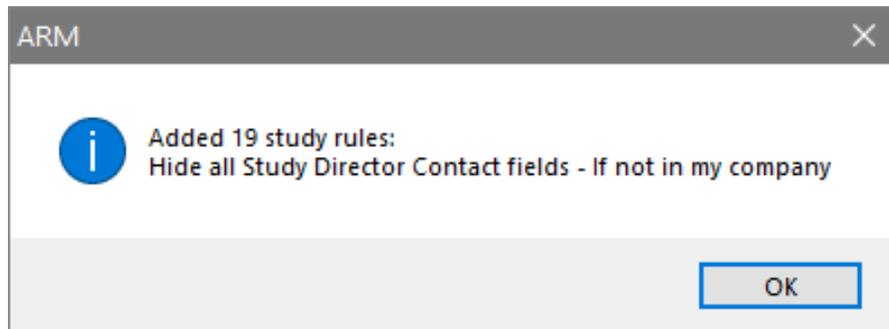


Wind Velocity+Dir. Start	I	▼	▼
Wind Velocity+Dir. Stop			▼
Wind Velocity+Dir. Max			▼
Wet Leaves (Y/N)	▼		
Soil Temperature	10	C	▼
Soil Moisture	MOIST		▼

Wind Velocity+Dir. Start	I	▼	▼
Wind Velocity+Dir. Stop			▼
Wind Velocity+Dir. Max			▼
Wet Leaves (Y/N)	▼		
Soil Temperature	10	C	▼
Soil Moisture	MOIST		▼

# Contacts

- New shortcut button
- Adds study rules to hide all details for that contact



- Note: For "other contacts" repeating section, button hides ALL "other contacts"

Role: *STYDIR* study director

Study Director: R.E. Cearch

Organization: Cearch R Us, Inc.

Hide all Study Director Contact fields - If not me

Hide all Study Director Contact fields - If not in my company

Country: USA United States

Insert Contact with Shift+F7, Delete current Contact with Shift+F8

Role: *OTHINV* other investigator

Contact Name 5: Additional Contacts repeating section

Organization:

Address 1:

# Nozzle Description

New multi-field personal list to describe application nozzles

- Nozzle Model (was 'Nozzle Size')
- Nozzle Type
- Nozzle TradeName (**new**)
- Nozzle Tip Size
- Nozzle Color (**new**)

Application Equipment

	A	B
Appl. Equipment	AZO	AZO
Operation Pressure		
Nozzle Model	APTJ-1100xVP	FL-VC
Nozzle Type	TEEJAI	DRIRED
Nozzle TradeName	TeeJet	TeeJet
Nozzle Tip Size, Color	04 Red	10 Lt. Blue

Nozzle Model Personal List (C:\Program Data\ARMdef\GDMdef\G-NozMod.lst)

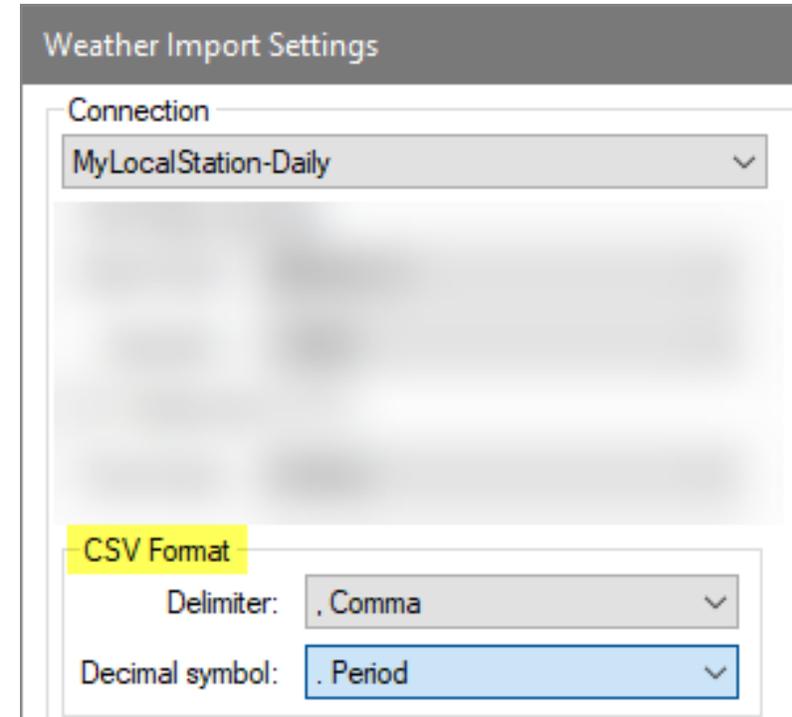
Nozzle Model	Nozzle Type	Nozzle TradeName	Nozzle Tip Size, Color	Nozzle Color	Description
APTJ-1100xVP	TEEJAI	TeeJet	04	Red	
FL-VC	DRIRED	TeeJet	10	Lt. Blue	

# Weather Import

## New options for custom weather import

- Delimiter: character used to separate columns in .csv
- Decimal symbol: used in numeric values (e.g. 14.2 or 14,2)

*Previously did not recognize delimiter=semicolon*



The screenshot shows a dialog box titled "Weather Import Settings". It features a "Connection" dropdown menu set to "MyLocalStation-Daily". Below this is a large, blurred area. At the bottom, there is a "CSV Format" section with two dropdown menus: "Delimiter" set to ". Comma" and "Decimal symbol" set to ". Period".

# Tree/Crop Row Volume

# Tree/Crop Row Volume

Now supports tree/crop row volume (TRV) calculations

**Treated TRV = Canopy Height \* Plant/Row Diameter \* 10,000 m<sup>3</sup> / Row Spacing**

Automatically calculated for applications that have all required information

**Tip:** The Application Plan displays all fields for TRV and LWA (Leaf Wall Area) in one spot

Application Plan		
Applications	A	
<b>Settings</b>		
Treated Plot Width	3.1	m
Treated Plot Length	12.5	m
Replications	4	
<b>Crop Information</b>		
Crop	1	MABSD
Row Spacing	3.10	M
Rows per Plot		
Diameter Average	2.3	m
Treated Canopy Height	2	m
Total Canopy Height		
Treated Leaf Wall Area	12903	m <sup>2</sup> /ha
Treated LWA per Plot	50	m <sup>2</sup> /plot
Treated Tree Row Volume	14839	m <sup>3</sup> /ha
Treated TRV per Plot	57.5	m <sup>3</sup> /plot

# Tree/Crop Row Volume

Adjust product calculations for TRV:

- Use new TRV treatment rate unit
- Application has calculated TRV

Rate Unit	Description
g AI/10000 m3 TRV	Grams Active Ingredient per 10000 Cubic Meters Tree/Crop Row Volume (US=same)
kg AI/10000 m3 TRV	Kilograms Active Ingredient per 10000 Cubic Meters Tree/Crop Row Volume (US=same)
kg/10000 m3 TRV	Kilograms Dry Product per 10000 Cubic Meters Tree/Crop Row Volume (US=same)
L/10000 m3 TRV	Liters Product per 10000 Cubic Meters Tree/Crop Row Volume (US=same)

Spray/Seeding Plan identifies when TRV is used in calculations

Reps: 4      Appl Code: A      Plots: 3.5 by 6 meters      Treated TRV per Plot: 31.16 m3/plot  
 Appl. Amount: 300 L/ha      Mix Size: 2.772 L/125 m3 TRV

Trt No.	Treatment Name	Form Conc	Form Type	Rate Rate Unit	Amt Product to Measure	Rep 1	Rep 2	Rep 3	Rep 4
2	Cyprodinil	750 WG		4000 kg/10000 m3 trv	1.645 g/mx	102	206	312	408
3	Cyprodinil	750 WG		6000 kg/10000 m3 trv	2.468 g/mx	101	204	308	401

# Tree/Crop Row Volume

Calculated Mix Size accounts for TRV:

New Application Amount unit for TRV

Mix Size = total mix to treat the calculated TRV of the crop (incl. overage) by treatment

Mix Size Calculator - Application A

Application amount:

Mix Size

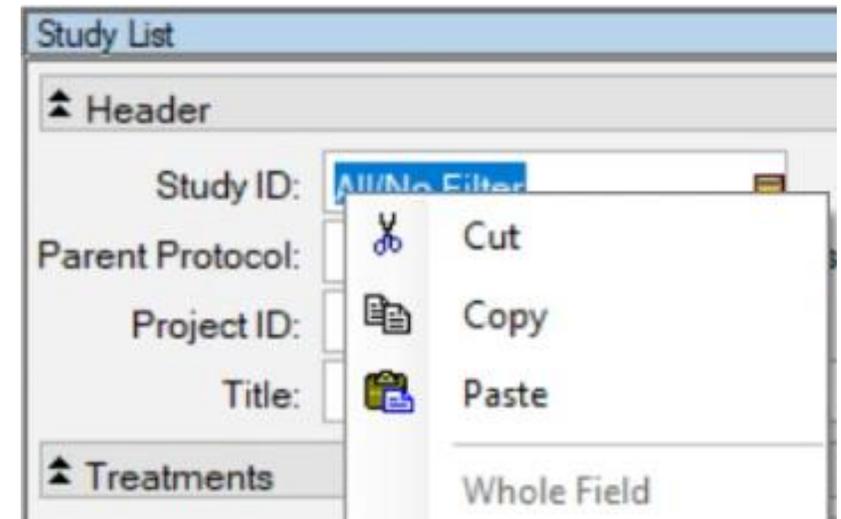
for Application	A
Treatments	1
Replicates	4
'Plot' EU size	21 m2
Application amount	1000 L/10000 m3 TRV
Mix size unit	L
Minimum	12.48 L/125 m3 TRV
Overage	<input type="text" value="10.0"/> %
<input checked="" type="radio"/> Calculated mix size:	13.73 L/125 m3 TRV
<input type="radio"/> User-defined mix size:	<input type="text" value="12.0"/> L

# Study List

# Study List

Two "quality of life" updates:

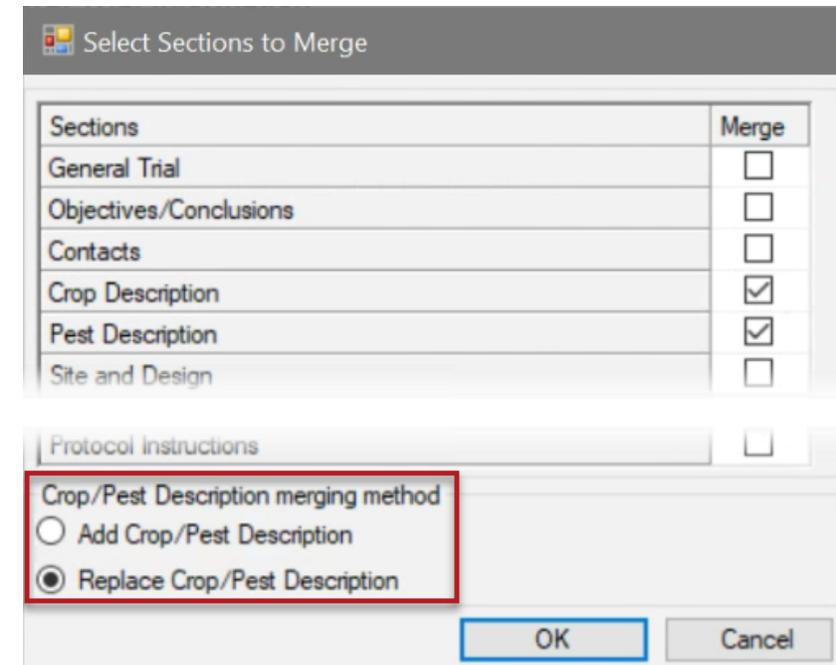
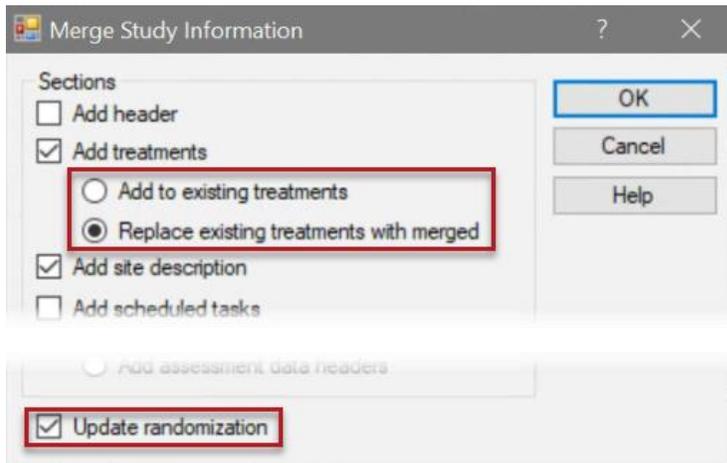
- Filter fields now support cut/copy/paste of text (Right-click or keyboard shortcuts)
- Filter is saved after opening and closing a study (within the current session)



# Merge

# Merge

- New option to **Replace** instead of *Add* to current study:
  - Treatments list
  - Crop and/or Pest information
  - Trial Map randomization

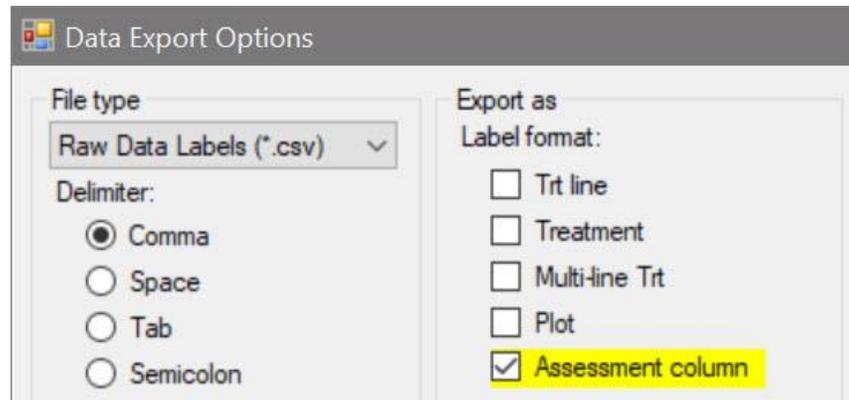


# Custom Labels

# Raw Data Labels

Export assessment column information in Raw Data Label export

- Generates 1 label per treatment, for each data column selected



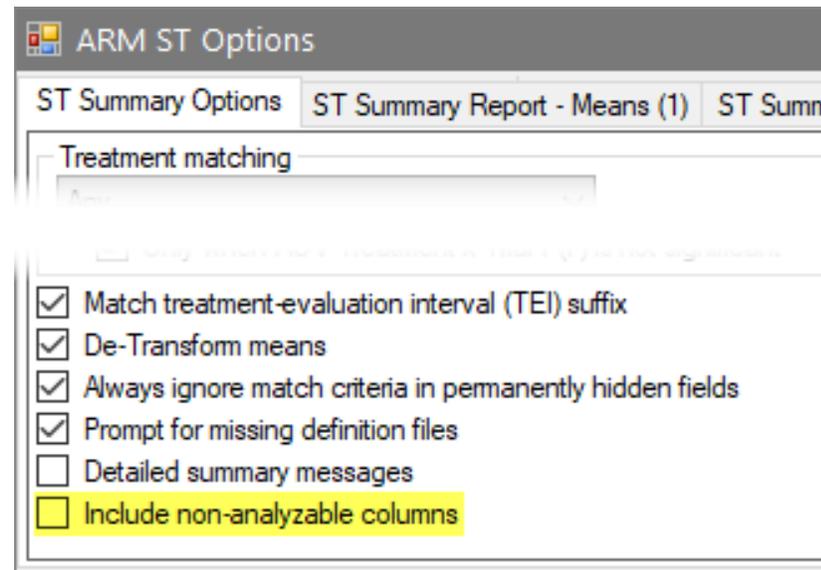
	A	B	C	D	E	F	G	H	I	J
1	Lbl Type	TRLID	TNO	EED	ECP	ERF	EDT	ERU	EBS	EBU
2	A	G-All7_Fung	1	6/1/2021	LEAF3	P	PESSEV	%	10	LEAF
3	A	G-All7_Fung	1	6/8/2021	LEAF3	P	PESSEV	%	10	LEAF
4	A	G-All7_Fung	2	6/1/2021	LEAF3	P	PESSEV	%	10	LEAF
5	A	G-All7_Fung	2	6/8/2021	LEAF3	P	PESSEV	%	10	LEAF
6	A	G-All7_Fung	3	6/1/2021	LEAF3	P	PESSEV	%	10	LEAF
7	A	G-All7_Fung	3	6/8/2021	LEAF3	P	PESSEV	%	10	LEAF
8	A	G-All7_Fung	4	6/1/2021	LEAF3	P	PESSEV	%	10	LEAF
9	A	G-All7_Fung	4	6/8/2021	LEAF3	P	PESSEV	%	10	LEAF
10	A	G-All7_Fung	5	6/1/2021	LEAF3	P	PESSEV	%	10	LEAF
11	A	G-All7_Fung	5	6/8/2021	LEAF3	P	PESSEV	%	10	LEAF

- You select the column details (header rows) to export

# Summary across Trials

# Non-analyzable columns

- New option allows *non-analyzable* data columns to be included in ST summary



Previously these columns were automatically excluded from all summaries

# Non-analyzable columns

Data column is non-analyzable when **ARM Action Code...**

- specifies that the column is non-analyzable

ARM Action Codes	Description 1
*****	*** Following Identify Non-Analyzable Data for Summary Reports ***
N	Do not analyze data (no statistics or mean comparisons), and report data from first replicate on Summary reports
NM	Do not analyze data (no statistics or mean comparisons), and report treatment means on Summary reports

- calculates the same value across replicates ("per treatment")

ARM Action Codes	Description 1
@TTAB[n]	Abbott <b>per treatments</b> calculated from treatment means (n=column)
@TTABR	Abbott <b>per treatment</b> calculated from treatment means (transforms data column immediately left of this Abbott column)
@TUPOC[n]	Percent of control <b>per treatment</b> (=APOC) relative to untreated treatment mean (untreated is 100%, change 'n' to data column)
@TUPOCR	Percent of control <b>per treatment</b> (=APOC) relative to untreated treatment mean (untreated is 100%, transforms data column)
@TTHT[n,m]	Henderson-Tilton <b>per treatment</b> (n=pre-treatment column, m=post-treatment column)
THT[n,m]	Henderson-Tilton transformation (n=pre-treatment, m=post-treatment column)
TSO[n]	Schneider-Orelli transformation (n=column)