

ARM 2023 Changes

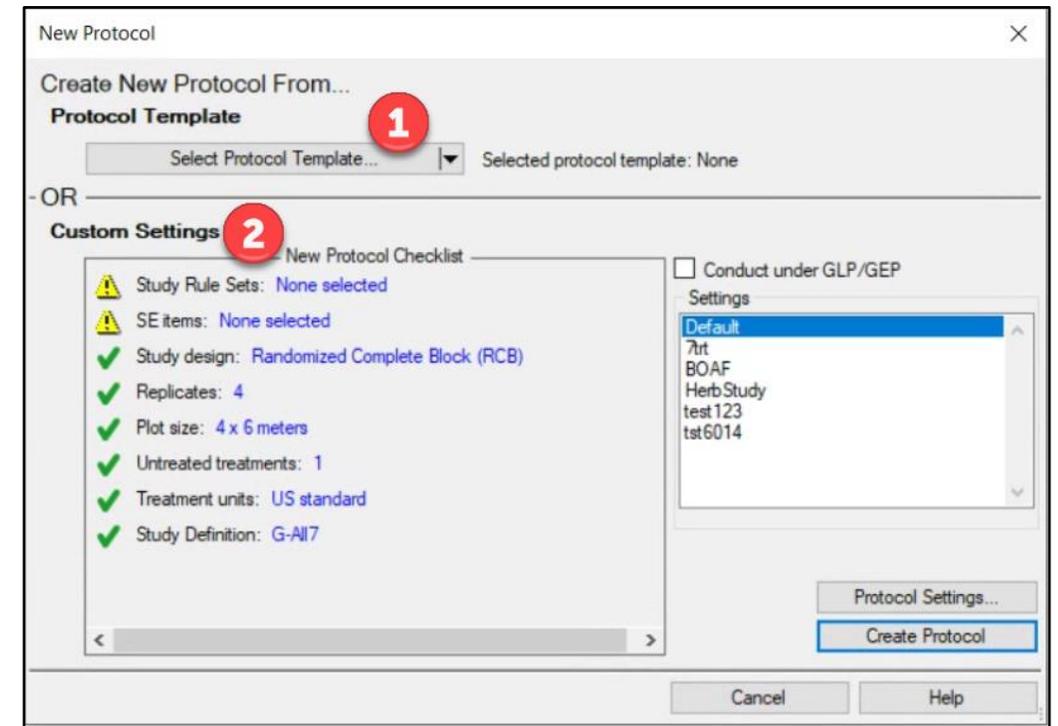
New Protocol wizard

Protocol Creation

Streamlined process for creating a new Protocol

Choose from two options:

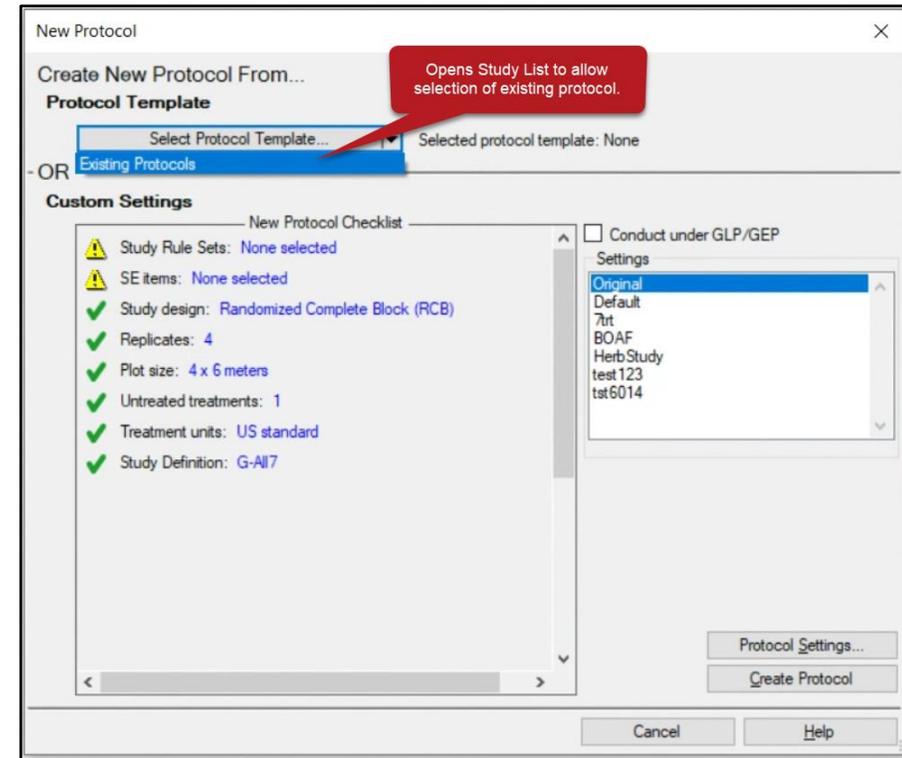
1. Protocol Templates
2. Custom Settings/Protocol Checklist
(build from scratch)



Protocol Creation

1. Protocol Templates

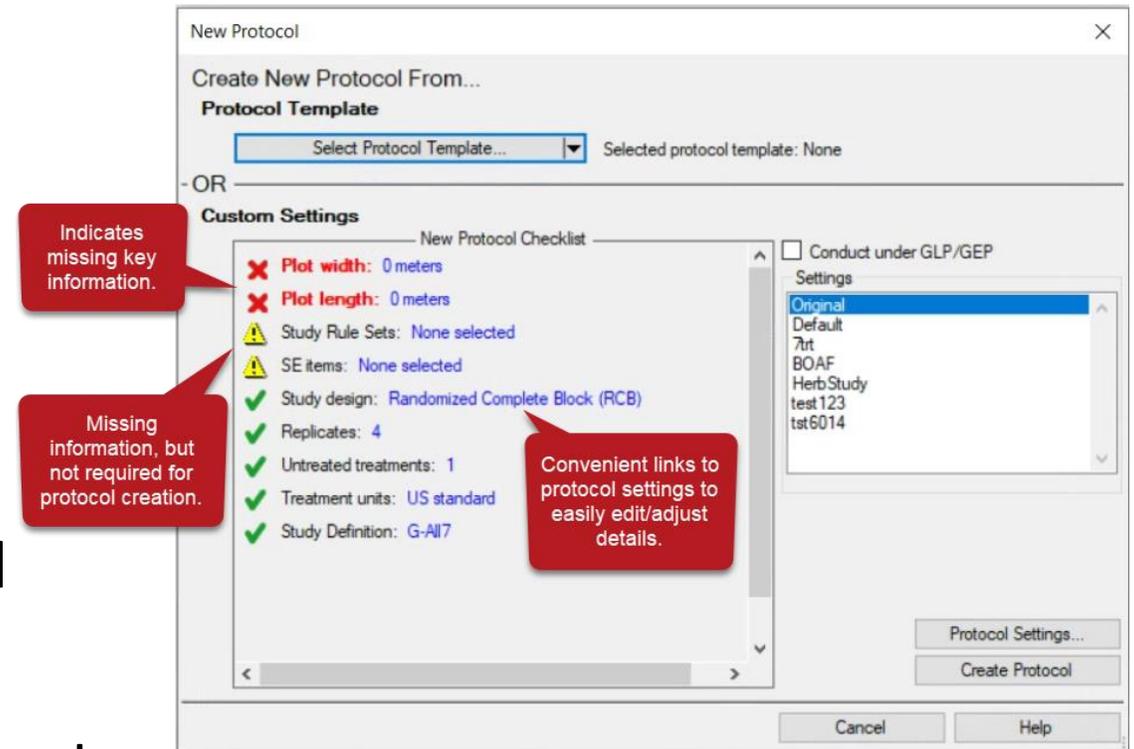
- Copy selected sections from an existing protocol
- Best way to create protocols similar to previous studies (replaces 'Save As' function)
- Pick and choose which information to copy, eliminating need to review and update all fields in protocol



Protocol Creation

2. Protocol Checklist (build from scratch)

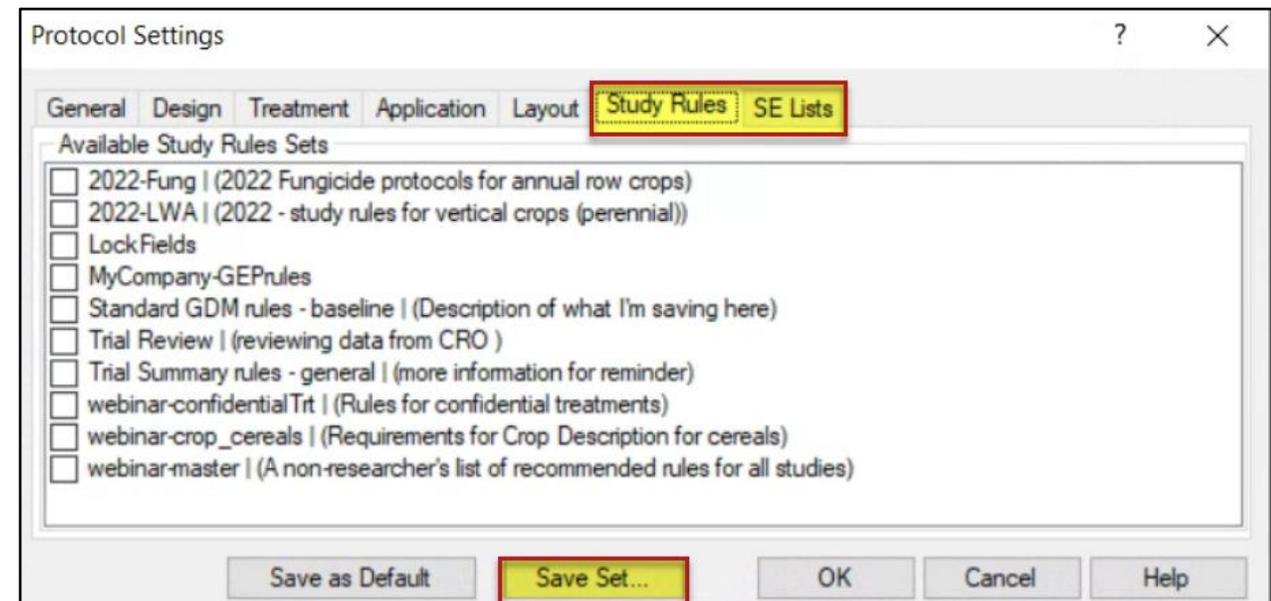
- Interactive overview of study settings prior to protocol creation
- Missing required information designated by **X**
-  designates missing recommended information
- Easily edit/adjust details with convenient links to protocol settings dialog



Protocol Setup

‘Study Rules’ and ‘SE Lists’ tabs on New Protocol Settings dialog

- Load SE files and Study Rule sets during initial protocol setup
- Select multiple SE files and Study Rule sets at a time
- Use ‘Save Set’ to save configured Settings options to use in the future
 - Now includes SEs and Study Rules!



Assessment Editor

Improved assessment view

Header fields re-organized into logical groups

Added ability to collapse and expand groups

- Can still hide and view individual rows in view

Column Number	1
Rating Date	10-Jun-21
[-] Standard Evaluation (SE)	
[-] SE Description	Count rating for Colby Interaction
[-] Part Rated	PLANT P
[-] Rating Type	COUNT
[-] Rating Unit/Min/Max	NUMBER
[-] Sample Size	1 PLOT
[-] Number of Subsamples	1
[+] Crop	TRZAS
[+] Pest	1KCHG
[-] Timing	
[-] Days After First/Last Applic.	9 9
[-] Trt-Eval Interval	9 DA-A
[-] Plant-Eval Interval	
[+] Miscellaneous	



Column Number	1
Rating Date	10-Jun-21
[-] Standard Evaluation (SE)	
[-] SE Description	Count rating for Colby Interaction
[-] Part Rated	PLANT P
[-] Rating Type	COUNT
[-] Rating Unit/Min/Max	NUMBER
[-] Sample Size	1 PLOT
[-] Number of Subsamples	1
[-] Crop	
[-] Crop Type, Code	C TRZAS
[-] BBCH Scale	BCER
[-] Crop Scientific Name	Triticum aestivum
[-] Crop Name	Spring wheat
[-] Crop Variety	
[-] Crop Stage Scale	
[-] Crop Stage Majority/Min/Max	
[-] Pest	
[-] Pest Type	W Weed
[-] Pest Code	1KCHG
[-] Pest Scientific Name	Kochia
[-] Pest Name	Kochia
[-] Pest Density	
[-] Pest Density Min/Max	
[-] Timing	
[-] Days After First/Last Applic.	9 9
[-] Trt-Eval Interval	9 DA-A
[-] Plant-Eval Interval	
[-] Miscellaneous	
[-] Description	
[-] ARM Action Codes	
[-] Number of Decimals	

Improved assessment view

When collapsed, primary information still shown

Assessment Data - Line 4	
⊖ Pest	
- Pest Type	W Weed
- Pest Code	AMAPA
- Pest Scientific Name	Amaranthus palmeri
- Pest Name	Palmer amaranth
- Pest Stage Majority/Min/Max	



Assessment Data - Line 5	
⊕ Pest	AMAPA
⊕ Timing	A1

Buttons to expand/collapse all groups:

Assessment Data - Line 1	
+	Column Number
-	Row Date
☑	Standard Evaluation (SE)
-	SE Description
-	Part Rated

View files now include expanded/collapsed state

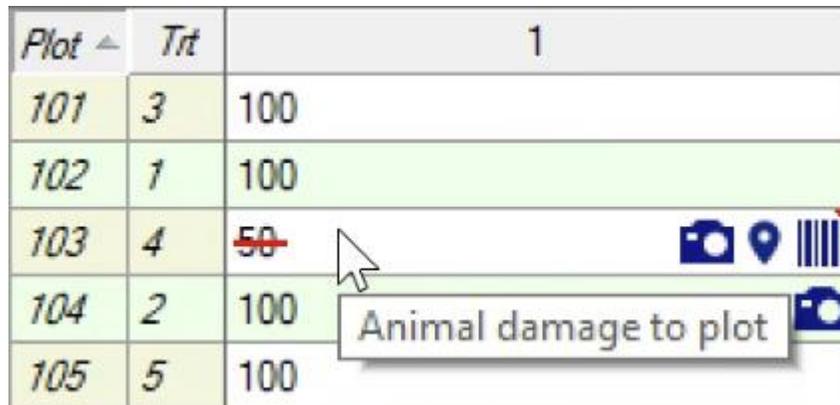
- Re-save your previous views to include this functionality

Assessment Icons

Visualize additional assessment information on data editor

- Icons for: GPS, Images, Barcode
- Comments display as tooltips
- Exclude (formerly 'Damaged') as strike-through

Plot	Tit	1
101	3	100
102	1	100
103	4	50
104	2	100
105	5	100



Assessment (Plot 103, Col 1)

Comment: Animal damage to plot

Barcode: 123456789

GPS: 44.3078 -96.7971

Exclude

Image: 

Display by treatment

Buttons: Attach, Remove, Rename

Exclude Data Points

Renamed 'Damaged' checkbox to 'Exclude'

- Removes the selected data point (plot/subsample) from analysis
- *More reasons to remove data than just a damaged plot!*

Properties

Assessment View Hidden Fields

View Options Assessed By

Assessment (Plot 103, Col 10)

Comment: Equipment error

Barcode:

GPS:

Exclude

Plot	Trt	10	11	12 (Calculated)
101	3	8.70	13.0	8.99
102	1	8.25	12.1	8.62
103	4	4.10	11.7	4.30
104	2	8.95	Equipment error	9.44

Data Reliability

New shortcut buttons to quickly set Data Reliability

- Communicate what data to use in summaries
 -  Exclude = conclusions should **not** be made from this assessment column
 -  Good = conclusions can be made from this assessment column
 -  Best = conclusions can be made, prioritized over related assessments

Number of Subsamples		1	1				
⊕ Crop	CIDSI	CIDSI					
⊕ Pest		AONDAU					
⊖ Miscellaneous							
Data Reliability							
ARM Action Codes							
Number of Decimals		1	1				
<i>Sub</i>	<i>Rep</i>	<i>Blk</i>	<i>Col</i>	<i>Plot</i>	<i>Tit</i>	1	2
1	1	1	1	101	2	0	108.0
1	1	1	2	102	1	0.0	165.0
1	1	1	3	103	3	0.0	70.0
1	1	1	4	104	4	0.0	55.0
1	1	1	5	105	5	0.0	12.0

Assessment Header

Double-click grid separator to auto-size header grid area

Useful when collapsing sections to view more plot data

Assessment Data - Line 2

Column Number	1	2
Rating Date	15 Jul 2014	15 Jul 2014
Standard Evaluation (SE)		
Part Rated	LEAF C	PLANT C
Rating Type	PHYGEN	VIGOR
Rating Unit/Min/Max	% 0 100	% 0 100
Sample Size		
Number of Subsamples	1	1
Crop		
Crop Type, Code	C TRZAW	C TRZAW
BBCH Scale	BCER	BCER
Crop Scientific Name	Triticum aestivum (winter)	Triticum aestivum (winter)
Crop Name	Winter wheat	Winter wheat
Crop Stage Scale		
Crop Stage Majority/Min/Max		
Pest		
Pest Type		

Sub	Rep	Blk	Col	Plot	Trit	1	2
1	1	1	1	101	3	0	100
1	1	1	2	102	1	0	100
1	1	1	3	103	4	0	50
1	1	1	4	104	2	0	100
1	1	1	5	105	5	0	100

Assessment Header

Added **Pest Stage Scale** field

Stage Majority/Min/Max lists
are now based on Scale choice

*Defaults to scale chosen on
Pest Stage at Appl tab*

Pest					
Pest ID Code	1	W	Weed		
Pest Code	AMAPA				
Pest Scientific Name	Amaranthus palmeri				
Pest Name	Palmer amaranth				
Pest Stage Scale	DESC				
Pest Stage Majority/Min/Max					

Pest Stage Majority/Min/Max List

Display All ★ Favorites

Pest Stage Majority/Min/Max	Description	Scale
★ **** Cereal ****		DESC
C01	Cereal stage 1, one shoot	DESC
C02	Cereal stage 2, beginning of tillering	DESC
C03	Cereal stage 3, tillers formed	DESC
C04	Cereal stage 4, begin pseudo-stem sheaths lengthen	DESC
C05	Cereal stage 5, pseudo-stem erected	DESC

Disease Severity calculation

Added Townsend-Heuberger severity calculations from subsamples, for all scales 0-2 through 0-10

(previously had just 0-4 and 0-10)

ARM Action Codes List	
ARM Action Codes	Description
@TH02[n]	Townsend-Heuberger 0-2 disease scale from ratings summarized at plot level in separate
@TH02S[n]	Townsend-Heuberger 0-2 disease scale from subsamples (n=column, 0=no attack)
@TH03[n]	Townsend-Heuberger 0-3 disease scale from ratings summarized at plot level in separate
@TH03S[n]	Townsend-Heuberger 0-3 disease scale from subsamples (n=column, 0=no attack)
@TH04[n]	Townsend-Heuberger 0-4 disease scale from ratings summarized at plot level in separate
@TH04S[n]	Townsend-Heuberger 0-4 disease scale from subsamples (n=column, 0=no attack)
@TH05[n]	Townsend-Heuberger 0-5 disease scale from ratings summarized at plot level in separate
@TH05S[n]	Townsend-Heuberger 0-5 disease scale from subsamples (n=column, 0=no attack)
@TH06[n]	Townsend-Heuberger 0-6 disease scale from ratings summarized at plot level in separate
@TH06S[n]	Townsend-Heuberger 0-6 disease scale from subsamples (n=column, 0=no attack)
@TH07[n]	Townsend-Heuberger 0-7 disease scale from ratings summarized at plot level in separate
@TH07S[n]	Townsend-Heuberger 0-7 disease scale from subsamples (n=column, 0=no attack)
@TH08[n]	Townsend-Heuberger 0-8 disease scale from ratings summarized at plot level in separate
@TH08S[n]	Townsend-Heuberger 0-8 disease scale from subsamples (n=column, 0=no attack)
@TH09[n]	Townsend-Heuberger 0-9 disease scale from ratings summarized at plot level in separate
@TH09S[n]	Townsend-Heuberger 0-9 disease scale from subsamples (n=column, 0=no attack)
@TH10[n]	Townsend-Heuberger 0-10 disease scale from ratings summarized at plot level in separate
@TH10S[n]	Townsend-Heuberger 0-10 disease scale from subsamples (n=column, 0=no attack)

Planned Comparisons (Contrasts)

Contrasts

Define comparisons of specific treatments for a custom analysis

Analysis uses *contrasts* - statistical tests on linear combinations of values derived from data

Common uses:

- Compare a trt to >1 checks or standard products
- Avoid excluding data
- Multi-factor designs (e.g. compare trt 1-3 vs. trt 4-6 vs. trt 7-9)

Define Comparisons

Trial Settings

General Design Treatment Layout **Statistics** 1

Planned Comparisons

	Comparison	Description
1	3 == 30	3 == 30 (Constant)
2	4 = 5	Ho: M4 - M5
3	1 = 2,3,4	Ho: M1 - M2 + M3 + M4_mn

Treatment Comparison 3

Select a treatment comparison type, then define the hypothesis test:

Constant Ho: Trt: [] = Const: [] +

Paired Ho: Trt: [] = Trt: [] +

Averaged Ho: Trt: 1 = Trt: 2,3,4 +

Pairwise Ho: Trt: [] +

Averaged - compare multiple trt e.g. Trt 1 = Trt 2,3,4

OK Cancel Help

Settings > **Statistics** tab > Planned Comparisons table

Pencil icon opens Wizard

Select type of comparison, then define components to compare

Available in Protocol and Trial

Output

‘Include planned comparisons’ option

For each planned comparison:

- Contrast value and test statistic
- P-value of comparison hypothesis

If significant (< 0.05), reject H_0 and conclude there is a difference between compared treatments

AOV Means Table Report Options

Report Options | Descriptive Statistics | General Summary | Report Preview

Mean comparison test

Test: Student-Newman-Keuls

Beside mean
 Under mean

Treatment comparisons

Include planned comparisons

Exclude untreated treatment(s) from analysis

Character	Rated	Cadence	Speed	Stride Leng
Rating Type			SPEED	LENGTH
Rating Unit/Min/Max			m/s, -, -	m, -, -
Number of Subsamples		14	14	
Trt No.	Treatment Name	*	*	*
1	Fast 2	89.55 -	3.36 -	2.25 -
6	Zoom Elite	90.03 -	3.36 -	2.23 -
Planned Comparisons				
Traditional vs Fulcrum				
Estimate		-0.151	0.032	0.026
t Value		-0.578	1.072	1.632
Pr > t		0.569	0.297	0.118
Traditional vs Newton				
Estimate		0.136	0.005	0.000
t Value		0.424	0.148	-0.003
Pr > t		0.676	0.884	0.998
Excluding Zoom Elite				
Mean square		0.698	0.004	0.002
F value		1.706	0.735	1.372
Pr > F		0.175	0.575	0.267

Types of Comparisons

For more examples and statistical details, see:
gdmdata.com/media/documents/UserContrasts.pdf

- **Constant** – compare one trt to a specified value/constant
 - e.g. Treatment 3 average = value of 100
- **Paired** – a 1:1 comparison of one treatment to another
 - e.g. Treatment 4 = Treatment 5
- **Averaged** – compare a trt against the average of >1 other trt
 - e.g. compare a product to multiple checks
 - Note: only need to list the treatments in ARM, not the full equation

Types of Comparisons

For more examples and statistical details, see:
gdmdata.com/media/documents/UserContrasts.pdf

- **Pairwise** – compare all treatments to each other
 - Equivalent to AOV, so get same result as Treatment P(F)
 - *Tip:* Great way to exclude UTC without throwing out the data!
- **Multiple comparisons** – logical AND to combine 2+ comparisons into a single test
 - e.g. Light (Trt 1,2) vs. Medium (Trt 3,4) vs. Heavy (Trt 5,6)

The screenshot shows a software interface for defining comparisons. At the top, a table titled "Planned Comparisons" lists two entries:

	Comparison	Description
1	1,4,6 = 2,3,5	Nike vs Brooks
2	1,2 = 3,6; 1,2 = 4,5	Light vs Medium vs Heavy

Below this is a "Treatment Comparison" dialog box. It has three radio buttons: "Paired", "Averaged" (which is selected), and "Pairwise". Under "Averaged", there are two rows of comparison definitions:

- Row 1: Ho: Trt: [1,2] = Trt: [3,6]
- Row 2: Ho: Trt: [1,2] = Trt: [4,5]

The "+" button for the second row is highlighted with a red box. There is also a red "X" button to the right of the second row.

Protocol Planning

Trial Location table

Limit who can view individual rows on Trial Location table with these new fields:

- Company ID
- GDM ID
- Company Name

Trial Location
Insert row with Shift+F7, Delete current row with Shift+F8

Protocol Author

Country	State	Region	Trial Year	Trial ID	Responsible	GDM ID	Company ID	Company Name	Investigator	Number of Trials
	▼	▼		Create Trial	Name ▼		12	Comp1 ▼	▼	1
	▼	▼		Edit TrialMap	Trialist2 ▼		345	2Cmpy ▼	▼	2
	▼	▼		MakeAnApplication	Trialist3 ▼		32	C3 ▼	▼	1
	▼	▼		RecordSiteInfo	Trialist4 ▼		1357	Fourth ▼	▼	1
	▼	▼		EnterData	Trialist5 ▼		12	Comp1 ▼	▼	1

Trialists only see rows from their own company (via GDM ID or Company ID)

Trial Location
Insert row with Shift+F7, Delete current row with Shift+F8

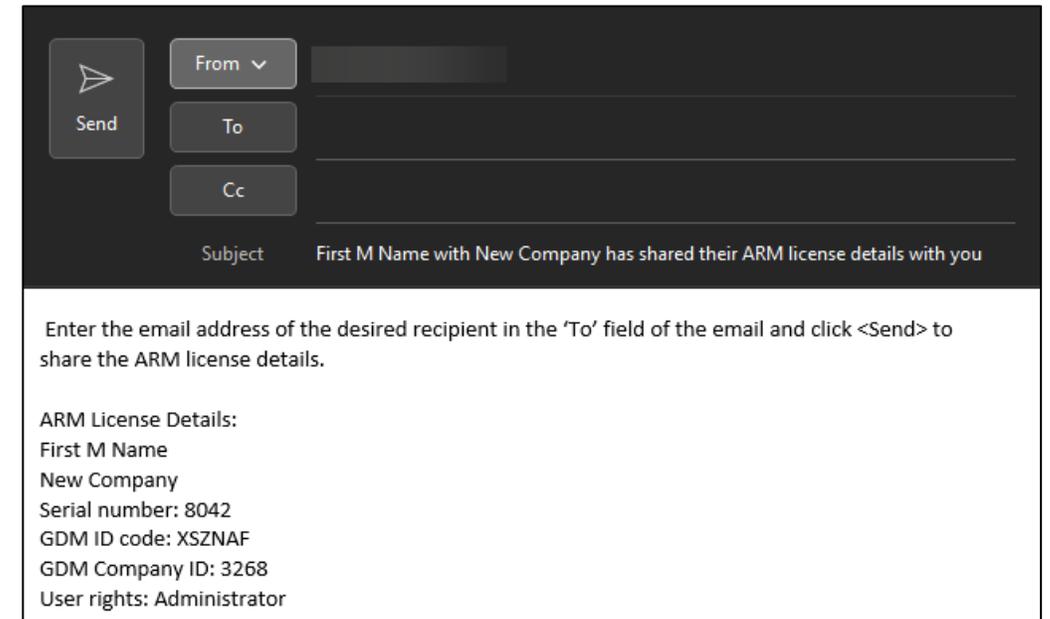
Trialist @ Comp1

Country	State	Region	Trial Year	Trial ID	Responsible	GDM ID	Company ID	Company Name	Investigator	Number of Trials
	▼	▼		Create Trial	Name ▼		12	Comp1 ▼	▼	1
	▼	▼		EnterData	Trialist5 ▼		12	Comp1 ▼	▼	1

Trial Location table

How to obtain GDM ID/Company ID from contractors?

Help > Profile > “Send License Details” button



Schedule Tasks

Connect to Outlook

Send ARM tasks to any calendar linked in Outlook

Properties

Total hours: 16

Outlook

Profile name:

Password:

Calendar Profile name:

Link to Outlook Calendar:

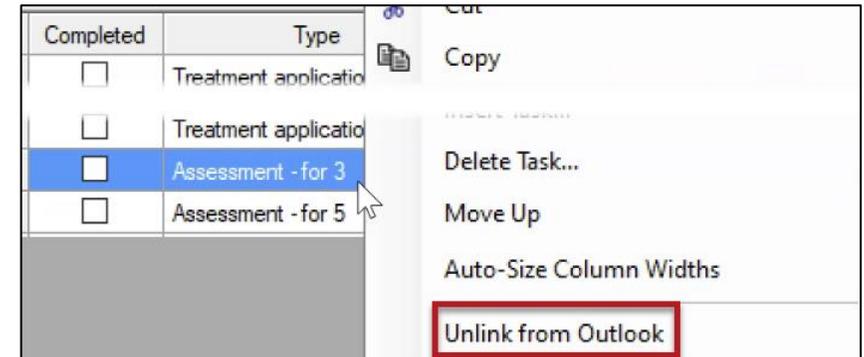
- Calendar
- Calendar
- Shared for Technicians
- Another Calendar
- Priorities

	Completed	Type		Assigned to	Outlook Profile	Link to Outlook Calendar
1	<input type="checkbox"/>	Treatment application - for A	Ap		matt@gdmdata	Calendar
2	<input type="checkbox"/>	Assessment - for 1	As	Study leader	matt@gdmdata	Calendar
3	<input type="checkbox"/>	Treatment application - for B	Ap	Technician 1	matt@gdmdata	Shared for Technicians
4	<input type="checkbox"/>	Assessment - for 2	As	Technician 1	matt@gdmdata	Shared for Technicians
5	<input type="checkbox"/>	Treatment application - for C	Ap	Technician 1	matt@gdmdata	Shared for Technicians
6	<input type="checkbox"/>	Assessment - for 3	As	Technician 1	matt@gdmdata	Shared for Technicians
7	<input type="checkbox"/>	Assessment - for 5	Ha	Harvest responsible	matt@gdmdata	Shared for Technicians
8	<input type="checkbox"/>	Other - Reporting	Dr	Data Manager	matt@gdmdata	Calendar

Previously could only send to the default calendar, limiting sharing options

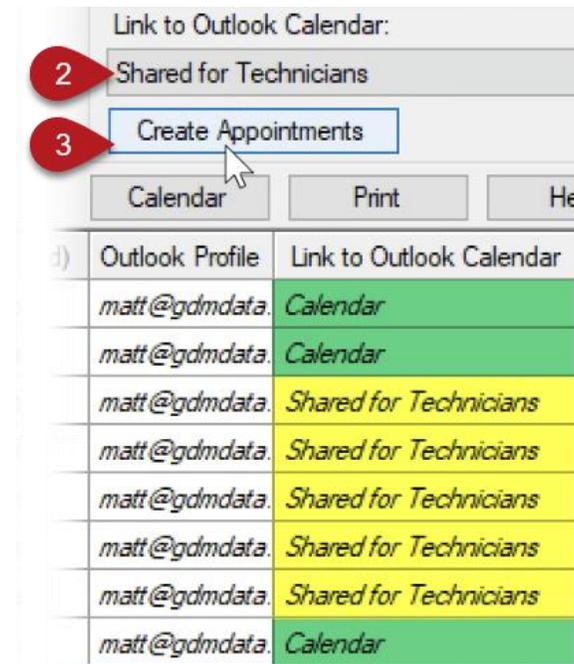
Connect to Outlook

Right-click to unlink task from Outlook



Send tasks to different calendars by unlinking then sending again

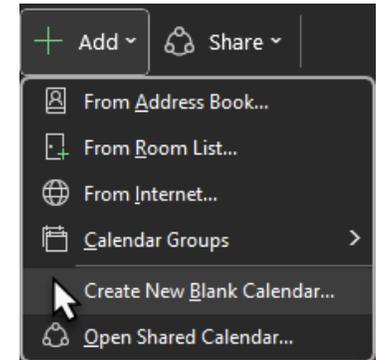
	Completed	Type		Outlook Profile	Link to Outlook Calendar
1	<input type="checkbox"/>	Treatment application -for A	Ap	<i>matt@gdmdata.</i>	<i>Calendar</i>
2	<input type="checkbox"/>	Assessment -for 1	As	<i>matt@gdmdata.</i>	<i>Calendar</i>
3	<input type="checkbox"/>	Treatment application -for B	Ap		
4	<input type="checkbox"/>	Assessment -for 2	As		
5	<input type="checkbox"/>	Treatment application -for C	Ap		
6	<input type="checkbox"/>	Assessment -for 3	As		
7	<input type="checkbox"/>	Assessment -for 5	As		
8	<input type="checkbox"/>	Other - Reporting	D	<i>matt@gdmdata.</i>	<i>Calendar</i>



Connect to Outlook

How do I create a new calendar?

- Calendar > Add > Create New Blank Calendar...



How do I share this calendar?

- Calendar Properties > Permissions > Add > [Person] + Can Edit

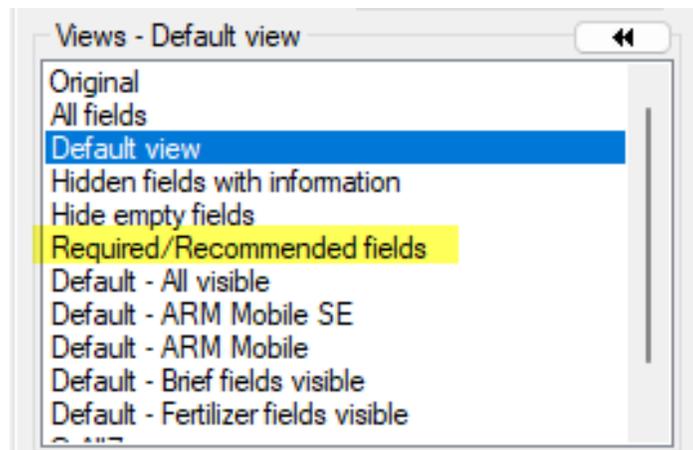


Editor View

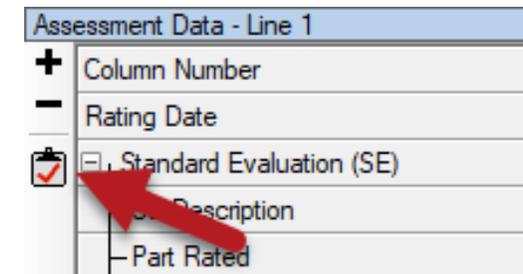
Required/Recommended Fields

New automatic view for editors: Required/Recommended Fields

- Displays only fields that have a Required or Recommended study rule
- *Includes Conditional rules, and built-in configuration rules*
- Available on Treatments, Site Description, Assessment Data editors



- Also a shortcut in assessment header:



A screenshot of a table header titled "Assessment Data - Line 1". The table has several columns: "Column Number", "Rating Date", "Standard Evaluation (SE)", "Description", and "Part Rated". The "Standard Evaluation (SE)" column has a checked checkbox, and a red arrow points to it.

Assessment Data - Line 1	
+ Column Number	
- Rating Date	
<input checked="" type="checkbox"/> Standard Evaluation (SE)	
Description	
- Part Rated	

Tip: to revert to the standard view, select “Default view” from list

Treatments

Treatment Type

New Types added:

- ADDI - Additive
- GETR - Genetic Trait
- IGR - Insect Growth Regulator
- PROT - Protectant Coating
- SAFE - Safener
- TACL - Tank Cleaner

Treatment Type is used for grouping products into separate Treatment lists

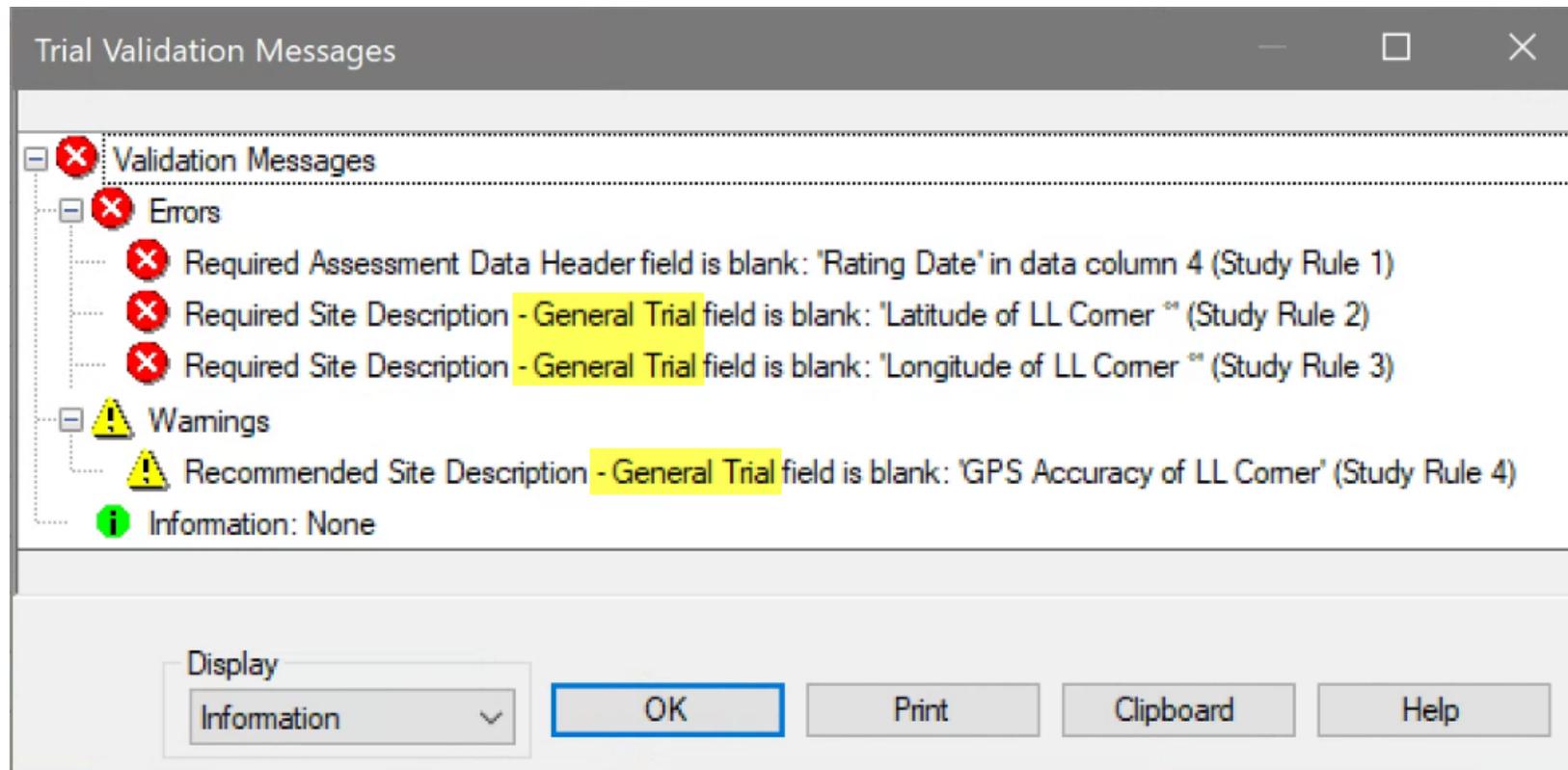
Treatments - Line 1			
Trt Line	Trt No.	Type	Treatment Name
1	1	CHK	Untreated Check

Type List	
Type	Description
ADDI	Additive
ADJ	Adjuvant
APPL	Application technique
FUNG	Fungicide or Bactericide
GETR	Genetic Trait
HERB	Herbicide
IGR	Insect Growth Regulator
INOC	Inoculum
PROD	Unspecified product type
PROT	Protectant Coating
SAFE	Safener
SBSTR	Substrate: surface or material (such as type of pot)
SDTR	Seed treatment
STD	Standard (temporary, must update Type to pass va
TACL	Tank Cleaner
VAR	Variety

Validation

Validation messages

Added Site Description tab/section names for Study Rules

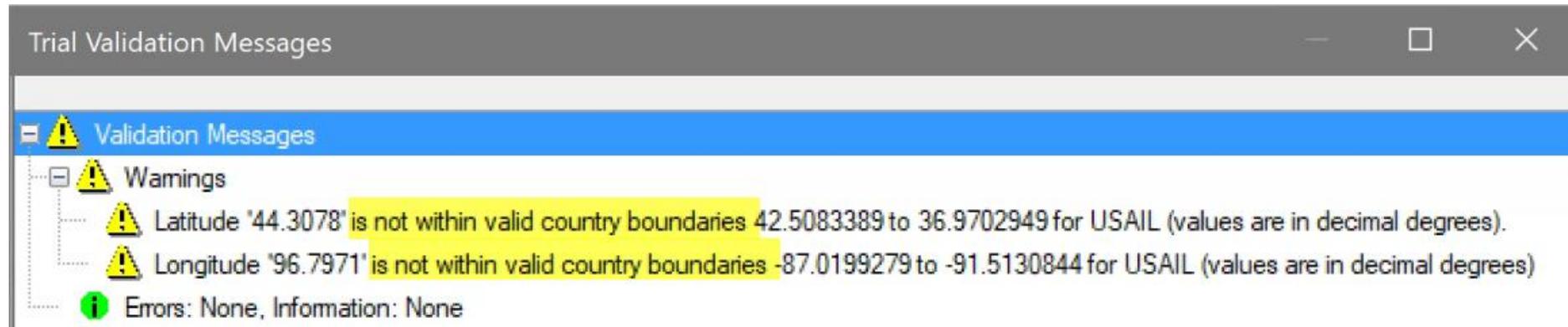


Weather Import

Weather Import

GPS Coordinates are now validated prior to importing weather

- ARM checks against define GPS boundaries for Country and State/Prov.



Weather details may be inaccurate if coordinates are not correct

AOV Means Table

Scott-Knott analysis

New mean comparison option: Scott-Knott

- Assigns treatments to a cluster, and each cluster/group is assigned a single letter
- Groups are considered different based on a likelihood ratio test computed from the between-group sums of squares.
- Used for registration purposes in Brazil

Rating Date	Jun-22-2014	Jul-5-2014	
Part Rated	PLANT, P	PLANT, P	
Rating Type	COUDIS	COUDIS	
Rating Unit/Min/Max	% , 0, 100	% , 0, 100	
Crop Type, Code	C, TRZAW	C, TRZAW	
Crop Name	Winter wheat	Winter wheat	
Pest Code	ERYSGT	ERYSGT	
Pest Name	Powdery mildew >	Powdery mildew >	
Trt No.	Treatment Name	2	3
1	Sure Kill	30.8 c	44.2 d
2	Sure Kill Super Stomp	40.8 b	61.7 b
3	Sure Kill 930401	26.7 d	42.5 d
4	Sure Kill 930401	21.7 e	24.2 e
5	Sure Kill	31.7 c	42.5 d
6	Sure Kill	41.7 b	52.5 c
7	Super Stomp	22.5 e	24.2 e
8	Untreated	70.0 a	93.2 a

AOV Means Table Report Options

Report Options | Descriptive Statistics | General Summary | Report Preview

Mean comparison test

Test: Scott-Knott

Significance or alpha level:

Adjusted treatment mean

Use adjusted mean as primary mean.

None

LSD

Duncan's New MRT

Student-Newman-Keuls

Tukey's HSD

Waller-Duncan k=100

Dunnett's vs. Control

Dunnett's vs. Reference

Scott-Knott

Entry Field Changes

Greenhouse

New Site Description tab: **Greenhouse**

Document environmental conditions daily throughout the study

Site Description

Weather Greenhouse Application

Greenhouse Information
Insert row with Shift+F7, Delete current row with Shift+F8

No.	Greenhouse ID	Date	Light Intensity	Light Intensity Unit	Hours of Light	Min Temp	Max Temp	Temp Unit	Min % Relative Humidity	Max % Relative Humidity	Irigation Type	<i>Irigation Type Description</i>	Irigation Frequency	Irigation Duration	Irigation Duration Unit
1.															

Field trials should still use Weather tab for documenting conditions

New Tab: Equipment

Site Description			
Equipment			
	1.		2.
Equipment Name	ZX5-Drone	▼	▼
Platform Type	Drone	▼	▼
Platform Trade Name	Trimble ZX5	▼	▼
Platform Model		▼	▼
Sensor Type	Camera	▼	▼
Sensor Trade Name	Olympus	▼	▼
Sensor Model		▼	▼
Resolution	16	MP	▼
Sensor Height	100	m	▼
Sensor Speed		▼	▼
Original Data Location		▼	▼
Analysis Company	Trimble	▼	▼
Analysis Method	UASMaster	▼	▼
Software Version	14.0.0	▼	▼
Scale Trade Name		▼	▼
Scale Model		▼	▼

- Document details about equipment used in the trial
- Save all details to Favorites from Equipment Name field
- *Skip rows that are not pertinent to that equipment*

New Tab: Equipment

Link assessment column to Equipment details using ID field

Column Number	14	15	16
Standard Evaluation (SE)			
SE Name	D011		
SE Description	Normalized difference vegetation inc		
Part Rated	CANOPY		
Rating Type	NDVI		
Rating Unit/Min/Max	-1-1	-1	1
Sample Size	1	READNG	
Equipment			
Equipment			

Equipment	Equipment	Platform Type	Platform Trade Name	Platform Model	Sensor Type	Sensor Trade Name	Sensor Model	Resolution	Resolution Unit
1	ZX5-Drone	Drone	Trimble ZX5		Camera	Olympus		16	MP

Site Description	
Equipment	
	1.
Equipment Name	ZX5-Drone
Platform Type	Drone
Platform Trade Name	Trimble ZX5
Platform Model	
Sensor Type	Camera
Sensor Trade Name	Olympus
Sensor Model	
Resolution	16 MP
Sensor Height	100 m
Sensor Speed	
Original Data Location	
Analysis Company	Trimble
Analysis Method	UASMaster
Software Version	14.0.0
Scale Trade Name	
Scale Model	1

Regulations

Document multiple GEP Accreditation Certificates in a single trial

- New field: Certificate Expiration
- Add new certificate if current expires before finishing trial
- 'Update Trial' adds new repeating section
- Delete old certificates with simple button click

Regulations

Insert new certificate on Profile editor (shortcut=F9)

Grapevine E-L Growth Stages

Added support for E-L growth stages for viticulture

- ARM can convert between BBCH and E-L

Crop Description
Insert Crop with Shift+F7, Delete current Crop with Shift+F8

Crop 1: C VITSS Vitis sp. Grape
Entry Date: 9-Jun-23 Crop Group: Stage Scale: E-L

Stage Scale List

Stage Scale	Description
BBCH	BBCH uniform plant stages
DESC	descriptive growth stages
★ E-L	Grapevine E-L growth stages
FEEKES	Feekes cereal growth stages
NOSC	Does not have a growth stage
TURF	Turf grass growth stages
VR	Vegetative/Reproductive growth stages

Crop Stage At Each Application

Application Date	1-Jun-21
Crop 1 Code, BBCH Scale	VITSS BGRA
Days after Emergence	
Stage Scale Used	E-L
Stage Majority, Percent	

Stage Majority, Percent List

Stage Ma	Description	Scale	Online Description
★ 1	Winter bud	BGRA	https://www.awri.com.au/...with.pdf
2	Bud scales opening	BGRA	https://www.awri.com.au/...with.pdf
3	Wooly bud ± green showing	BGRA	https://www.awri.com.au/...with.pdf
4	Budburst; leaf tips visible	BGRA	https://www.awri.com.au/...with.pdf
7	2 to 3 leaves separated; shoots 2-4 cm long	BGRA	https://www.awri.com.au/...with.pdf
9	2 to 3 leaves separated; shoots 2-4 cm long	BGRA	https://www.awri.com.au/...with.pdf
11	4 leaves separated	BGRA	https://www.awri.com.au/...with.pdf
12	5 leaves separated; shoots about 10 cm long	BGRA	https://www.awri.com.au/...with.pdf
13	6 leaves separated	BGRA	https://www.awri.com.au/...with.pdf
14	7 leaves separated	BGRA	https://www.awri.com.au/...with.pdf

Active Filter: (All) (All) (All) (All)
Remove Filter Display Favorites Add to Favorites Cancel

Application Standard

Standardized application description list, a combination of:

- Method
- Timing
- Placement

Application Description

NA NA

	A	B
Date	1-Jun-21	
Standard	PREE	POST
Method	SPRAY	SPRAY
Timing	PREPRE	POSPOS
Placement	BROADC	BROADC

Standard List

Display All ★ Favorites

Standard	Method	Timing	Placement	Description
★ POST	SPRAY	POSPOS	BROADC	spray after crop and/or weed has emerged
DEPI	SPRAY	POSPOS	RDPFOL	spray at delayed pinpoint flood in rice
DRPF	SPRAY	POSPOS	RDPFOL	applied post to drained paddy
PIFL	SPRAY	POSPOS	RDPFOL	sprayed at pinpoint flood (temporary drain)
PODI	SPRAY	POSPOS	ROWUNF	spray post emerg. under crop to emerged weeds
SPOT	SPRAY	POSPOS	SPOT	spot spray weeds
PLCU	SPRAY	POSTHA	BROADC	post after last cutting of season
PTTP	SPRAY	POSTTR	BROADC	spray to crop after transplanting

Add ones that match to your Favorites List to save time and increase consistency with describing your applications

Objectives/Conclusions

Materials and Methods

- Pre-filled from Protocol Instructions
- Update for what actually occurred

Results

- A summary of the information collected in the trial
- Distinct from the Conclusions that are made from these results

The screenshot displays a software interface for trial documentation. At the top, a navigation bar includes tabs for 'General Trial', 'Regulations', 'Objectives/Conclusions', 'Contacts', 'Crop Description', 'Pest Description', and 'Site and Design'. The 'Objectives/Conclusions' tab is active. Below the navigation bar, there are four main sections, each with a text input field and a help tooltip:

- Objectives:** A text input field with a tooltip that says 'Enter objectives of the trial. (press F5 for help)'.
- Materials and Methods:** A text input field with a tooltip that says 'Instructions that were actually executed in this trial. (press F5 for help)'. Above this field, a yellow highlight is present, and a note reads: 'Materials and Methods were copied from Protocol Instructions. Edit instructions with what was actually executed.'
- Results:** A text input field with a tooltip that says 'General summary of results collected in this trial. (press F5 for help)'.
- Conclusions:** A text input field with a tooltip that says 'Summary of conclusions that were made based on reviewing trial Results. (press F5 for help)'.

Application Description

New Application fields for a trial:

- Mixed/Prepared By
- Soil Temperature Depth
- Flood-Appl Interval
- % Ground Cover
- Moisture 2 Weeks Before Appl
- Moisture 1 Week Before Appl
- Moisture 2 Weeks After Appl
- Moisture 3 Weeks After Appl
- Moisture 4 Weeks After Appl

Application Description			
	A		
Date	1-Jun-20		1-Jun
Standard			
Method	SPRAY		SPR
Timing	ATEMER		ATE
Placement	FOLIAR		FOL
Mixed/Prepared By			
Applied By			
Air Temperature (Depth, Class)	50		50
Wet Leaves (mm)	N/A		N/A
Soil Temperature			
Soil Temperature Depth			
Soil Moisture	SLIWET		SLIW
Flood-Appl Interval			
Soil Surface Condition			
% Ground Cover			
% Cloud Cover			
First Moisture Occurred On			
Time to First Moisture			
Amount of First Moisture			
Moisture 2 Weeks Before Appl.			
Moisture 1 Week Before Appl.			
Moisture 6 Hours after Appl.			
Moisture 24 Hours after Appl.			
Moisture 1 Week after Appl.			
Moisture 2 Weeks After Appl.			
Moisture 3 Weeks After Appl.			
Moisture 4 Weeks After Appl.			

Application Equipment

New fields improve **drone** application documentation:

- Flying Mode
- Spray Swath

Protocol: Application tab

Trial: Application Equipment tab

Application Equipment						
	A			B		
Equipment Name	DRONE			DRONE		
Equipment Type	SPRDRO			SPRDRO		
Flying Mode	WAYPOINT]			WAYPOINT		
Operation Pressure	90	kPa		90	kPa	
Nozzle Model	ALBUZ			ALBUZ		
Nozzle Type	CONHOL			CONHOL		
Nozzle TradeName	ZATRORANGE			ZATRORANGE		
Nozzle Tip Size, Color	ATR80	ORANG		ATR80	ORANG	
Nozzle Spacing	0	IN		0.0	IN	
Nozzles/Row	1			1.0		
Nozzle Count	1			1		
Spray Swath	2.0	m		2.0	m	
Ground Speed	6	MPS		6	MPS	
Carrier	WATDEI			WATDEI		
Water Hardness (ppm CaCO3)	442			442		
Propellant	COMCO2			COMCO2		
Tank Mix (Y/N)	N	no		N	no	

Pest Establish. Intervals

Pest Stage at Appl. >
Establishment Interval

Amount of time between
pest establishment and
application date

Pest Stage At Each Application	
	A
Application Date	1-May-2023
Pest 1 Code, Type, Scale	ERYSGT D BBCH
Establishment Interval	13 DAYS

Assessment > **Pest Est.-Eval Interval**

Amount of time
between pest
establishment and
rating date

Pest Description

Pest 1 Type: D Code: PHYTIN Phytophthora infestans
 Common Name: Late blight of potato
 Attributes:
 Establishment Date: 18-Apr-23
 Establishment Rate: 3.5 g/Row-FT
 Concentration: 1000 SP/ML

Column Number	11 (Calculated)					
Rating Date	10-Jun-23					
Standard Evaluation (SE)						
Rating Type	AUDPC					
Rating Unit/Min/Max	AUDPC					
Number of Subsamples	1					
Crop	ZEAMD					
Pest	PHYTHB					
Timing						
Days After First/Last Applic.	85 85					
Trt-Eval Interval	85 DA-A					
Plant-Eval Interval	70 DP-1					
Pest Est.-Eval Interval	53 DI-1					
Miscellaneous						
Sub	Rep	Blk	Col	Plot	Trt	11 (Calculated)
1	1	1	4	104	1	2880.5
1	2	2	5	205	1	2933
1	3	3	6	306	1	3010

Linked Unit Fields

Linked related unit fields:

- Changing unit in one field automatically changes unit in linked field
- Value automatically adjusted to new unit

Which fields are linked? Fields where two separate value/unit pairs should always use the same unit, such as:

- Crop Description – Row Spacing and Spacing Within Row fields
- Total Plot Width and Total Plot Length fields
- Crop Stage at Appl – Crop Height, Total Canopy Height, and Treated Canopy Height fields

The screenshot shows a software interface for crop management. The main section is titled 'Crop Description' and contains several fields for data entry. The fields are as follows:

- Crop 1:** C (dropdown), GLXMA (dropdown), Glycine max (text)
- Entry Date:** Jan-7-2020
- Variety:** A1001 (dropdown)
- Attributes:** (dropdown)
- Seed Shape:** (dropdown)
- Perennial Age:** (dropdown)
- Nursery Date:** (dropdown)
- Planting Date:** May-1-2020 (dropdown)
- Depth:** (dropdown)
- Rows per Plot:** 4
- Row Spacing:** 30 (text), IN (dropdown)
- Spacing within Row:** 2 (text), IN (dropdown)
- Soil Temperature:** (dropdown)
- Emergence Date:** (dropdown)
- Harvest Date:** Oct-1-2020 (dropdown)
- Moisture Meter:** (dropdown)
- % Standard Moisture:** 14.0
- Weighing Equipment:** (dropdown)

Header

Role: INVEST investigator

Investigator: Matthew Elsinger

Organization: Debra Dooley's Data, Inc. Org. Type:

Address 1: 2525 Mockingbird Lane Phone No.: 555-555-23

Address 2:

Country: USA United States Fax No.:

City: Scarey, MO E-mail: matt@gdn

Other: State/Prov.:

'Investigator' field added to general study Header

- Automatically fills from Contacts
- Prints on all reports

Mar-6-2023 (2020-Tutorial)

ARM 2023.0 Site

New Company

Example protocol for training purposes.

Trial ID: 2020-Tutorial Cooperator Trial ID:

Protocol ID: 2020-Tutorial Location: Brookings, SD Trial Year: 2020

Project ID: Conducting a Trial Project ID 2: Project ID 3:

Study Director: Sponsor Contact:

Investigator: Matthew Elsinger

Header

Title:

Example protocol for training purposes.

Trial ID: 2020-Tutorial Cooperator Trial ID:

Protocol ID: 2020-Tutorial Location: Brookings, SD Trial Year: 2020

Project ID: Conducting a Trial

Study Director: Sponsor Contact:

Investigator: Matthew Elsinger

Investigator (Creator): Matthew Elsinger

New validation list items

New options related to bee research:

Formulation Type:

- SR – a solid strip of plastic (or other inert material) with active ingredient already applied.

Rate Units:

- Strips/Brood Chamber - Strips per brood chamber
- Pouches/Hive - Pouches per Hive
- mL/Hive - Milliliters Product per Hive
- g AI/Hive - Grams Active Ingredient per Hive
- ng AI/ μ L - Nanograms active ingredient per microliter mix
- ng AI/mL - Nanograms active ingredient per milliliter mix
- mg AI/mL - Milligrams active ingredient per milliliter mix



New validation list items

New options related to bee research:

Crop:

- HVE - Bee Hive (in non-taxonomic list)

Application method:

- POUCH - pouch or bag

Application timing:

- POHVSP - After Hive Split
- PONWEL - After New Queen Egg Laying
- EGH50 - eggs 50% hatched

Application Placement:

- HIVE - bee hive
- HIVET - bee hive, top
- HIVEM - bee hive, middle
- HIVEB - bee hive, bottom

Equipment Type:

- SPRBOT - spray bottle

Part Rated:

- HVBXDE | hive box – deep
- HVBXMD | hive box – medium
- FRBEDE | bee frame – deep
- FRBEMD | bee frame – medium
- FRBRDE | brood frame – deep
- FRBRMD | brood frame – medium
- BROODO | brood – open
- BROODC | brood – capped

Rating Type:

- Missing - missing or not found

Rating Unit:

- 0-30 | 0-30 index/scale | INDEX

Collection Basis Unit:

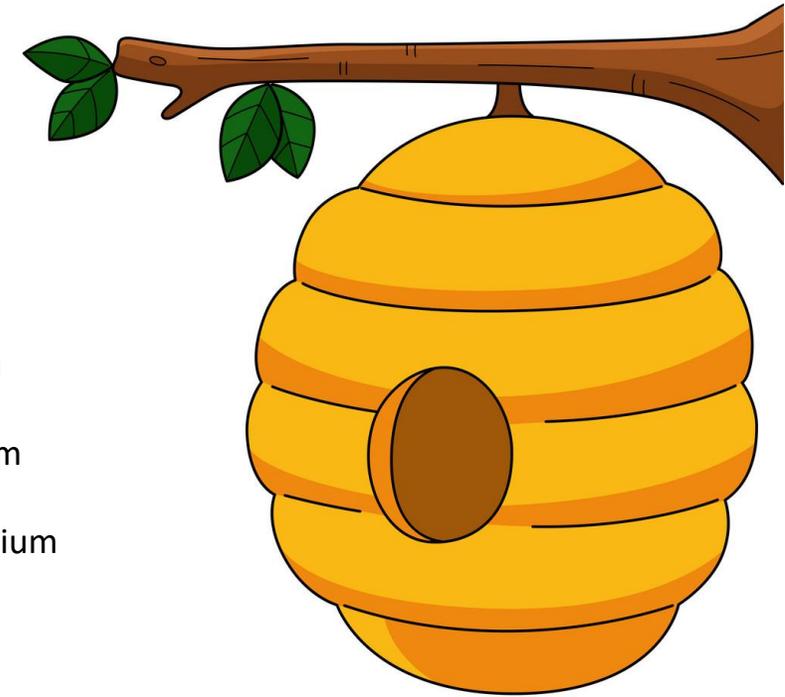
- HIVE - bee hive

Sample Size Unit:

- HIVE - bee hive

Reporting Basis Unit:

- HIVE - bee hive



Settings

Study Rules window



Updated editor option: “Display Study Rules as split window”

Now: Displays rules editor on lower half when rules are added from a different screen

Examples:

- Load an SE that contains Study Rules
- Merge from Study
- Right-click > Load Rule Set

