

ARM 2019.x Changes

Key Features

Column Diagnostics

Column Diagnostics

- New tool for reviewing data
- Statistical tests for assumptions of AOV, run on residuals
- ARM recommends actions from results
- View diagnostic plots of data and residuals
- Find outliers

Assessment Data - Line 6

Column Number	10
Crop Type, Code	C TRZAW
Crop Name	Winter wheat
Rating Date	Aug-7-2014
Part Rated	GRAIN C
Rating Type	YIELD
Rating Unit	KG
Number of Subsamples	1
ARM Action Codes	
Number of Decimals	2

	Sub	Rep	Blk	Col	Plot	Trt	10
1	1	1	2	102	1		8.25
1	2	2	5	205	1		7.55
1	3	3	3	303	1		7.30
1	4	4	1	401	1		7.10
1	1	1	4	104	2		8.95
1	2	2	1	201	2		8.15
1	3	3	2	302	2		7.95
1	4	4	3	403	2		7.75
1	1	1	1	101	3		8.70
1	2	2	2	202	3		8.10
1	3	3	1	301	3		8.10
1	4	4	2	402	3		7.75
1	1	1	3	103	4		4.10
1	2	2	4	204	4		8.40
1	3	3	5	305	4		8.20

Column 10 Diagnostics

Diagnostics

Show Graphs (Raw)...

Statistics (P)	Raw <input checked="" type="checkbox"/>	IID <input type="checkbox"/>	AL <input type="checkbox"/>	AS <input type="checkbox"/>	AA <input type="checkbox"/>	AR <input type="checkbox"/>
N	19	19	19	19	19	19
Unique	17	19	19	19	19	18
Missing	1	1	1	1	1	1
MinRep	3	3	3	3	3	3
MaxRep	4	4	4	4	4	4
Treatments	5	5	5	5	5	5
Levene's	0.343	0.0	0.0	0.0	0.0	.
ShapiroWilks	0.929	1.0	0.999	0.998	0.999	.
Skewness	0.614	0.958	0.9	0.932	0.933	.
Kurtosis	0.661	0.847	0.901	0.878	0.877	.

Recommendations

Basis: Assessment Values

Show Graphs (AR)...

	Code	Test Statistic	Value	Comment
1	AR	Levene's	12.135	Homogeneity of variances not stabilized by available tr
2	IID	ShapiroWilks	0.992	Does not fail general test of normality of residuals
3	IID	Skewness	0.054	Does not fail test of skewness of residuals
4	IID	Kurtosis	-0.196	Does not fail test of excess kurtosis of residuals

Save to RStudio

Previous Next

Column Diagnostics

Diagnostics						
Show Graphs (Raw)...						
Statistics (P)	Raw <input checked="" type="checkbox"/>	IID <input type="checkbox"/>	AL <input type="checkbox"/>	AS <input type="checkbox"/>	AA <input type="checkbox"/>	AR <input type="checkbox"/>
N	19	19	19	19	19	19
Unique	17	19	19	19	19	18
Missing	1	1	1	1	1	1
Treatments	5	5	5	5	5	5
Levene's	0.343	0.0	0.0	0.0	0.0	.
Shapiro-Wilks	0.929	1.0	0.999	0.998	0.999	.
Skewness	0.614	0.958	0.9	0.932	0.933	.
Kurtosis	0.661	0.847	0.901	0.878	0.877	.

Statistical tests for assumptions of AOV analysis

- Levene's: homogeneity of variance
- Shapiro-Wilk's: general test for normality
- Skewness/Kurtosis: tests for normality

Tests performed on **residuals**, not raw data

Significant P value -> test fails, so assumption is not met

Column Diagnostics

Recommends actions for failed tests of AOV assumptions

- Transformations
- Non-parametric analysis

Recommendations

Basis

Show Graphs (AS)...

	Code	Test Statistic	Value	Comment
1	AS	Levene's	3.026	Transform to stabilize variance
2	AR	ShapiroWilks	0.873	Available transformations do not improve normality
3	IID	Skewness	0.143	Does not fail test of skewness of residuals
4	AR	Kurtosis	7.126	Available transformations do not correct kurtosis of residuals

Suggestions based on assumed distribution of data

- Determined from: Rating Type, Rating Unit, range of data values

Basis

Assessment Values
No 'ARM Action Codes' specified
Rating Type : STAOBJ
Rating Unit : PLANT

Column Diagnostics

Diagnostics

Show Graphs (Raw)...

Statistics (P)	Raw <input checked="" type="checkbox"/>	IID <input type="checkbox"/>
N	19	19
Unique	17	19
Missing	1	1
Treatments	5	5
Levene's	0.343	0.0
Shapiro-Wilks	0.929	1.0
Skewness	0.614	0.958
Kurtosis	0.661	0.847

IID - new ARM Action Code

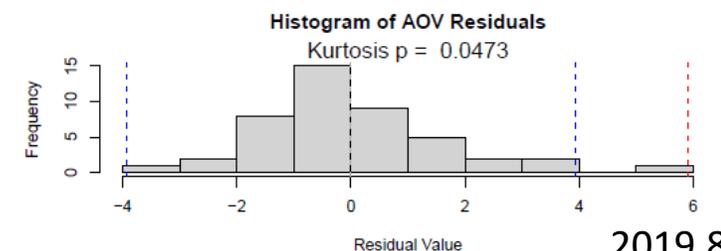
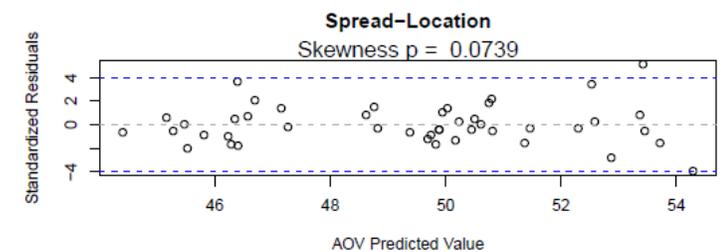
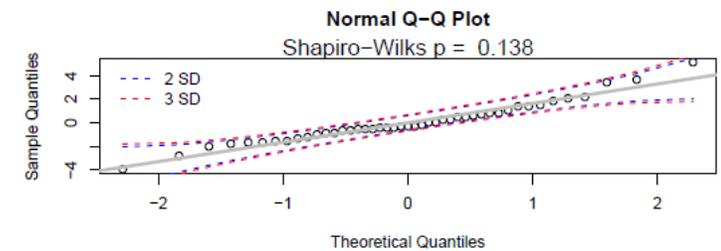
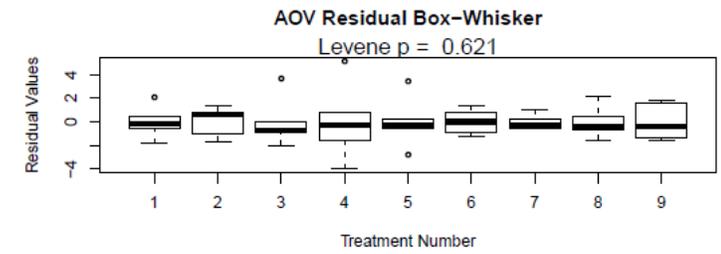
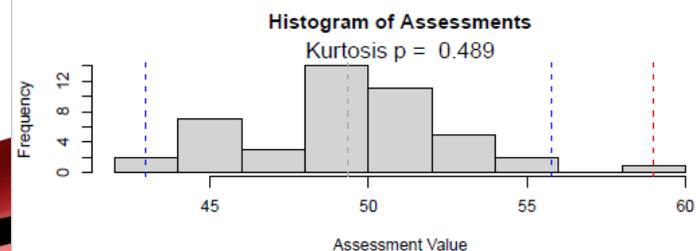
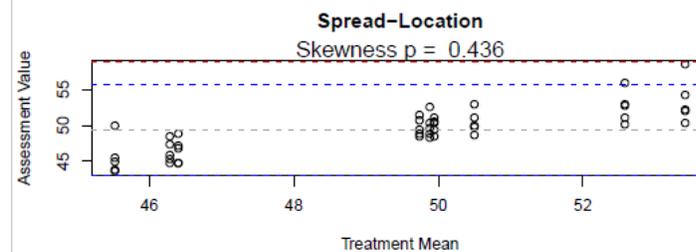
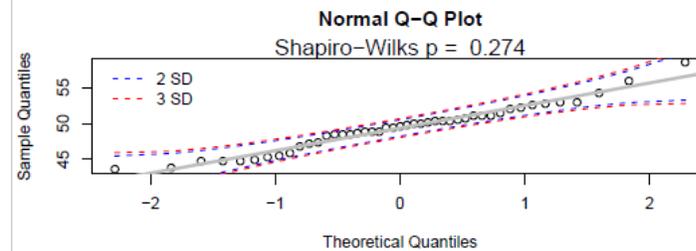
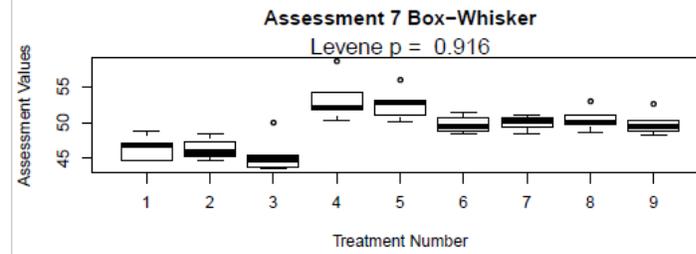
- *Identically and Independently Distributed*
- Signifies that column meets all assumptions of AOV

A way to mark column as reviewed, but without any corrections required
AOV analysis is then run on the **residuals** (previously were run on raw data)

Column Diagnostics

View diagnostic plots:

- Data vs. residuals
- AOV residuals vs. transformed residuals



Column Diagnostics

Search for outliers

- Search for outliers based on residuals
- Calculates a studentized residual (accounts for number of observations)
- *(coming soon)* Exclude all calculated outliers in the column

Recommendations						
	ActionCode	Criteria	Value	Comment		
1	EX	Outliers	NA	Exclude outliers to reduce skewness		

Outliers						
	plot	treatment	replicate	column	assessment31	StdRes
1	102	9	1	2	1	-4.5

Non-Parametric Statistics

Non-parametric statistics

- Relies on ranks to analyze data, instead of means and st. dev.
- New ARM Action Code: **AR**
(*automatic rank transformation*)
 - Rank the data points
(Kruskal-Wallis or Friedman's test)
 - Perform mean comparison test on rank means (LSD)
- Analysis included with other AOV columns

Pest Type		W Weed	W Weed
Pest Name		Oxeye	Oxeye
Rating Date		Sep-4-2016	Sep-4-2016
Rating Type		STAOBJ	STAOBJ
Rating Unit		PLANT	PLANT
Number of Subsamples		1	1
ARM Action Codes			AR
Trt No.	Treatment Name	Appl Code	
			34
			35
	1 Bum	A	0.0 c
	2 Bum	A	0.1 c
	3 Bum	A	0.0 c
	4 Mow	A	0.0 c
	5 Mow	A	0.0 c
	6 Mow	A	0.0 c
	7 Spray	A	0.0 c
	8 Spray	A	1.7 a
	9 Spray	A	0.8 b
LSD P= .05		1.66	1.13
Levene's F		2.794	2.40
Levene's Prob(F)		0.016*	0.035*
Friedman's X2		.	34.526
P(Friedman's X2)		.	0.00
Ske wness		2.1418*	0.4492
Kurtosis		3.6057*	4.7736

Reported values for columns 35 are rank means and not assessment means

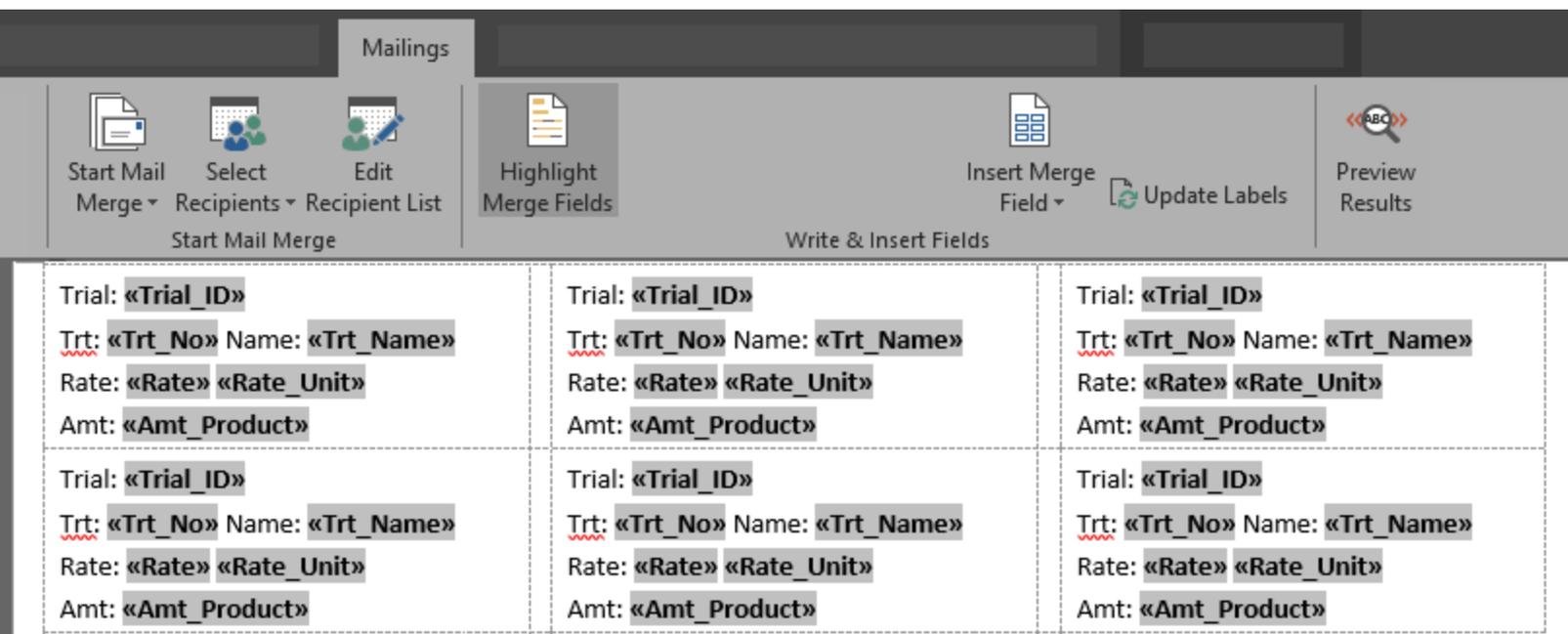
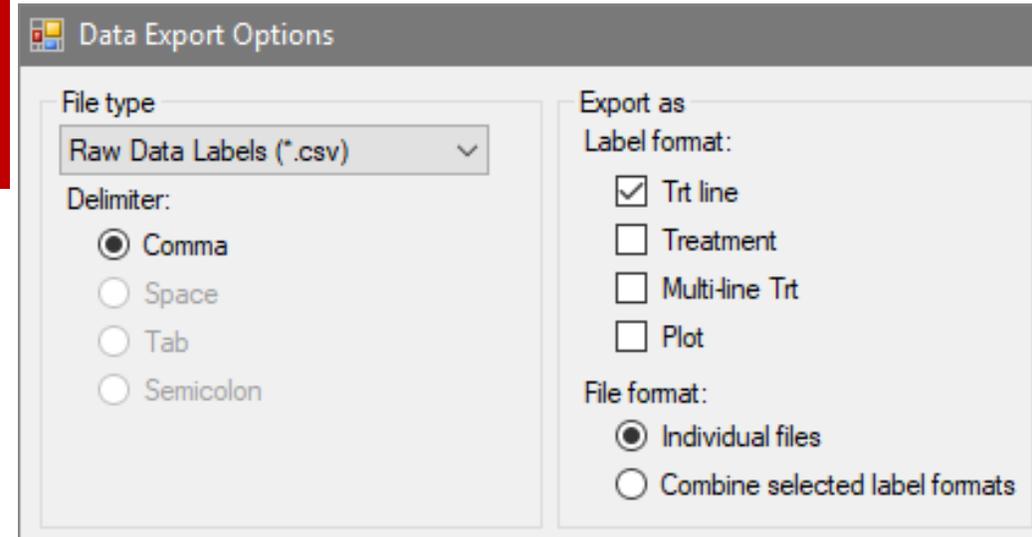
Why non-parametric???

- ANOVA has assumptions that must be met
 - Otherwise results may not be valid
- Non-parametric analysis does not have these restrictions
- Use non-parametric when:
 - Data cannot be corrected to fit assumptions of AOV
 - Data is not real-valued, like counts or index scales

Custom Labels

Custom Labels

- Create custom labels by exporting treatment/plot information to .csv



- Use Mail Merge in a word processor to create your own labels

[View Tutorial Video](#)

Import Weather Data

Import weather data

- Import weather data from **any** weather source CSV file

Weather Import

Connection: MyLocalStation-Daily

Import all weather data from file
 Import weather data to blank weather fields
 Import daily weather data for specified date range

From: May-1-2018
To: Nov-30-2018

Options

Import daily weather data prior to starting date 14 days
 Import daily weather data after ending date 1 days

Type: Daily Weather

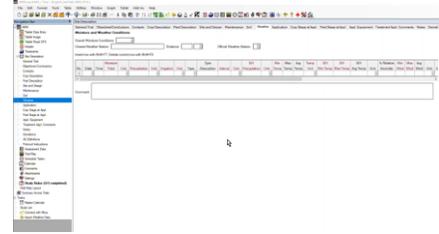
Connection Column Name	ARM Field Name
Date	Date
TempHigh	Max Temp
Time@TempHigh	
TempLow	Min Temp
Time@TempLow	
TempAvg	Avg Temp
RHHigh	
RHLow	
RHAvg	% Relative Humidity
Rainfall	Precipitation
CumulativeRainfall	

Settings... OK Cancel Help

- Define connection between CSV and ARM fields
- Specify what dates to import data from file

Import weather data

Feature in Action:



1. Define connection type and read column headings from CSV

2. Map CSV headings to ARM weather fields
Hourly = Application; Daily = Weather table

Weather Import Settings

Connection: Custom Connection...
 Connection Name: MyLocalStation-Daily
 Type: Daily Weather
 Read headers from CSV...
 Connection Data Headers:
 Date
 TempHigh
 Time@TempHigh
 TempLow
 Time@TempLow
 TempAvg
 RHHigh
 RHLow
 RHAvg
 Rainfall
 CumulativeRainfall

Type: Application Weather

Connection Column Name	ARM Field Name
Date	Application Date
Temp	Air Temperature at Appl. Start Time
RH	Application Date
DewPoint	Appl. Start Time
WindSpeed	Appl. Stop Time
WindGust	Application Method

Type: Daily Weather

Connection Column Name	ARM Field Name
Date	Date
TempHigh	Max Temp
Time@TempHigh	
TempLow	
Time@TempLow	Date
TempAvg	Time
Rainfall	Moisture Total
CumulativeRainfall	Unit
	30Y Precipitation
	Min Temp
	Max Temp

SE Definitions

SE Definitions

Plan and define standard evaluations (SEs) and tasks to use in the study

- Simpler than importing SEs from file into assessment data editor

Use Tools > 'Build Headers' and 'Build Tasks' to create the SEs and tasks defined in this tab

Multiple rating timings create columns and tasks for each timing code

- Two-column SE F097_C2 times 3 rating timings A1-A3 = 6 total data columns

SE Definitions

Insert SE Definition with Shift+F7, Delete current SE Definition with Shift+F8

	1.	2.
Rating Timing	A1-A3	H1
SE Name	F097_C2	Y085
SE Description	% of infected leaves (N leaves). TIO[x]* (note: *x = column nb of infected leaves in F097A)	Fresh yield grain in kg / ... m2
Part Rated	LEAF	GRAIN
Rating Type	PESINC	WEIFRE
Rating Unit	%	KG
Sample Size	LEAF	M2
Collection Basis	SHOOT	1 PLOT
Reporting Basis	LEAF	M2
Number of Subsamples		
ARM Action Codes	TIO[1]	
Pest Type, Code		
Crop Code		

SE Definitions

1. Display SE Name list
2. Select an SE, can search/filter descriptions
3. Preview assessment columns defined in SE

Can also define tasks on this tab to add to Schedule editor

Site Description

SE Definitions

Insert SE Definition with Shift+F7, Delete current SE Definition with Shift+F8

Rating Timing: [Dropdown]

SE Name: [Search Field] **1**

SE Name Master List (SE_TABLE)

SE Name	SE Description
F088	% Disease on surface of leaf 1
F089	% Disease on surface of leaf 2
F090	% Disease on surface of leaf 3
F091	% Disease on surface of leaf 4
F092	% Disease on surface of leaf 5
F093_C2	% of infected stems (N stems). (x/N)*100 (note: 'x = column
F094_C3	% of infected pods (n plants) (F094B / F094A)*100
F095_C2	% of infected leaves (N leaves). (x/N)*100 (note: 'x = colum
F096_C2	% of infected leaves (N leaves). (x/N)*100 (note: 'x = colum
F097_C2	% of infected leaves (N leaves). TIO[x]* (note: 'x = column r
F098_C5	% of infected fruits - Disease index: (((F098A)+2*[F098B]+3*[
F099_C5	% of fruits with Russeting - Disease index: (((F099A)+2*[F099
F100_C2	% of infected leaves (N leaves). TIO[x]* (note: 'x = column r
F101_C2	% of infected bunches (N bunches): (x/N)*100 (note: 'x = c
F102_C2	% of infected bunches (N bunches). TIO[x]* (note: 'x = colu
F103	Count of spots per plant

Preview

Column Number	1	2
SE Name	F097A	F097_C2
Part Rated	LEAF	LEAF
Rating Type	PESSEV	PESINC
Rating Unit	%AREA 3	
Sample Size, Unit	LEAF	LEAF
Collection Basis, Unit	SHOOT	SHOOT
Reporting Basis, Unit	LEAF	LEAF
ARM Action Codes	TIO[1]	

(All) [Filter Icon] (All)

Active Filter: [Filter] [Remove Filter] [Display Personal] [Add to Personal] [OK] [Cancel]

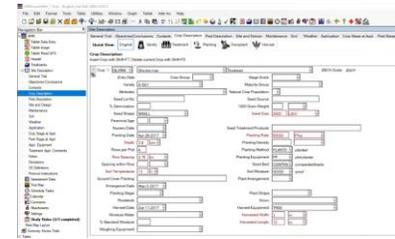
ARM 2019.x Changes

Additional enhancements

Site Description

Quick View toolbar

Feature in Action:



- Automatically filter visible Crop Description fields by task
- Simplifies interface to view/enter only pertinent information

Site Description

Quick View: Original Variety Treatment Planting **Transplant** Harvest

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

Crop 1: BRSNW Brassica napus Winter rape BBCH Scale: BRAP

Entry Date: Crop Group: Stage Scale:

Planting Stage: Plant Shape:

Rootstock: Scion:

Harvest Date: Harvest Equipment:

Moisture Meter: Harvested Width:

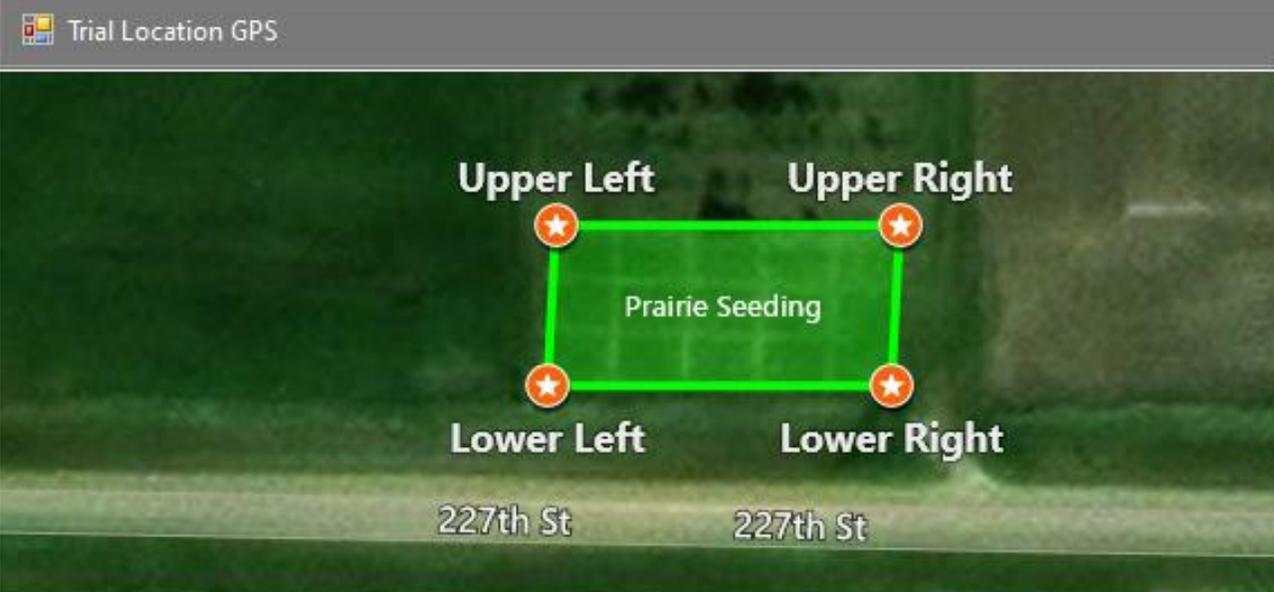
% Standard Moisture: Harvested Length:

Weighing Equipment:

- Multi-select to view fields from >1 task at a time

Trial Location GPS

- Visually verify accuracy of trial GPS coordinates
- Auto-fills Time Zone and Angle y-axis to North (Orientation) based on GPS coordinates



Trial Location GPS

Upper Left Upper Right
Prairie Seeding
Lower Left Lower Right
227th St 227th St

Trial Location

City: Country: *United States*

State/Prov.:

Upper Left: Upper Right:

Latitude of LL Corner °:

Longitude of LL Corner °:

GPS Accuracy of LL Corner:

Altitude of LL Corner:

Angle y-axis to North °:

Time Zone:

Trial Location GPS

General Trial Objectives/Conclusions Contacts Crop

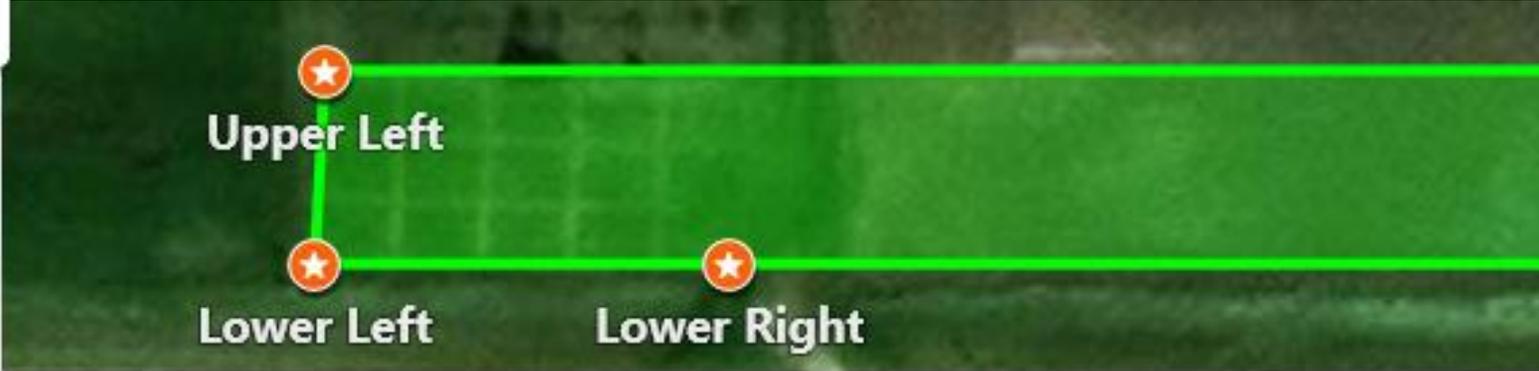
General Trial Information

Trial Location

Latitude of LL Corner °: 44.095785 N

Longitude of LL Corner °: 97.617598 W

- Open from Tool icon in GPS field, or Trial Location button
- Useful to catch errors in GPS coordinates entered!



Trial Location

Upper Left:	<input type="text" value="44.095924"/>	<input type="text" value="-97.617588"/>	Upper Right:	<input type="text" value="44.095924"/>	<input type="text" value="97.617175"/>
Latitude of LL Corner °:	<input type="text" value="44.095785"/>	<input type="text" value="N"/>	Lower Right:	<input type="text" value="44.095785"/>	<input type="text" value="-97.617185"/>

Track Trial Progress

Why document trial progress?

- Requested by sponsors.
- Provides visibility and credibility to timely data entry.
- Added new fields to track status and progress throughout the season.

General Trial Information

Discipline: *herbicide*
Trial Status: *established*
Trial Usage/Type: *Screening/Exploratory*
Initiation Date:

Data Location:
Trial Reliability:
ARM Trial Created On: Sep-19-2018
Planned Completion Date:

Pest Description

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

Pest 1 Type: Code:
 Entry Date: Jul-20-2018
Attributes:

Track Trial Progress

Additional new fields to track status and progress throughout the season.

- Application tab > **Appl. Entry Date**
- Assessment Header > **Data Entry Date**

Assessment Data - Line 4	
Column Number	1
Part Rated	LEAF <input type="checkbox"/> C <input type="checkbox"/>
Rating Type	PHYGEN
Rating Unit	%
Number of Subsamples	1
Data Entry Date	Sep-19-2018
Trt-Eval Interval	7 DA-C

Application Description

	D	
Application Date:	Sep-19-2018	
Appl. Start Time:	11:15 AM	
Application Method:	SPRAY	
Application Timing:	POSPOS	
Application Placement:	BROFOL	
Applied By:		
Appl. Entry Date:	Sep-19-2018	
Air Temperature Start, Stop:	19.5	C

Trial Origin

Why track the trial origin?

- Helps answer budget questions.
- Valuable to the R&D division.
- ID's in-house, contracted or by a public institution trials.

Header

Title:

Study Rules

Trial ID: Location:

Protocol ID: Investigator: *Matthew Elsinger*

Study Director:

Sponsor Contact:

Conducted Under GEP:

Trial Origin: *contracted trial*

Trial Location

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

Trial ID	Responsible	Site	Trial Origin	Number of Trials	Site Requirements
123 a 1-5	R.E. Cearch		C	5	
123 a 6-7	Debra Dooley's Data		I	2	
123 a 8-10	Fred's Quality Data		C	3	

Header editor > Trial Origin or,
Trial Establishment Guidelines > Trial location Table

Application tab

New fields to document additional weather details at time of application:

- 'at stop time' variants of:
 - Air Temperature
 - % Relative Humidity
 - Wind Velocity + Direction
- Soil Surface Condition
- Moisture 6 Hours after Appl
- Comment

Application Description

	A	B
Application Date:	15-Apr-2018	3-Jun-2018
Appl. Start Time:	2:30 PM	10:00 AM

Applied by:		
Appl. Entry Date:		
Air Temperature Start, Stop:	17 [] C	17 [] C
% Relative Humidity Start, Stop:	[]	[]
Wind Velocity+Dir., Start:		
Wind Velocity+Dir., Stop:		
Wind Velocity+Dir., Max:		
Wet Leaves (Y/N):		
Soil Temperature, Unit:	10 C	13 C
Soil Moisture:	MOIST	DRY
Soil Surface Condition:		
% Cloud Cover:	50	20
Next Moisture Occurred On:		
Time to Next Moisture, Unit:		
Moisture 6 Hours after Appl.:		
Moisture 1 Week after Appl.:		
Weather Source:		

Comment: []

Objects as crops

- Added non-taxonomic objects under study (entered as crops)
- New Crop Type field splits crops into EPPO and non-taxonomic objects

Crop Description

Crop 1: [] [] []

Crop 1 Personal List

Crop 1	Description
C	EPPO species (Bayer) codes
N	Non-Taxonomic codes

Crop Description

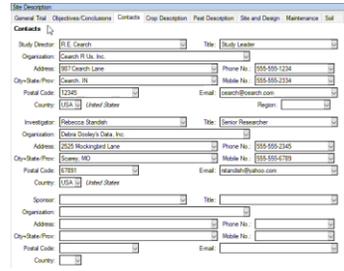
Crop 1: [N] [] []

Crop 1 Master List (Crops)

Crop 1	BBCH Scale
CBT	Closed buildings (treatment of)
CDB	Cardboard
CLN	Crop location
CPD	Crop destination
CPL	Cement plaque
CPT	Composite
CRK	Crack and crevice
CRT	Concrete
DWI	Dwellings : Indoor
DWL	Drywall
DWO	Dwelling : Outdoor
EQT	Equipment (treatment of)

Hidden Fields

Feature in Action:



- Completely remove from view all user-hidden fields

Site Description

Contacts

Study Director: Title:

Organization:

Address: 987 Cearch Lane Phone No.: 555-555-1234

City+State/Prov: Cearch, IN Mobile No.: 555-555-2334

Postal Code: 12345 E-mail:

Country: United States



Site Description

Contacts

Study Director: Title:

Organization:

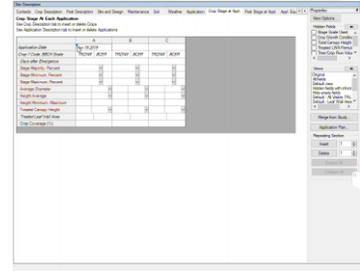
E-mail:

Country: United States

- Previously fields would simply be greyed out on-screen when hidden
- New option: Tools > Options > Editor > Completely hide user-hidden fields

Crop Stage Scale

Feature in Action:



- Scale for Crop Stage must be entered before Stage Majority/Minimum/Maximum are filled in.
- ARM now automatically opens Stage Scale list before entering the Stage

Site Description

Crop Stage At Each Application

	A		B		
<i>Crop 1 Code, BBCH Scale</i>	TRZAW	BCER	TRZAW	BCER	
<i>Days after Emergence</i>					
Stage Scale Used	▼		▼		▼
Stage Majority, Percent				▼	

ARM

 The Crop Stage Scale Used (at application) must be entered before the validation list for Stage Majority can be displayed, so please select Crop Stage Scale Used (at application) first.

OK

Previous Crops

Site and Design > Previous Crops table

Additional new fields to document previous conditions at the trial site.

- Previous Pest
- Month (that crop/pest was present)
- Comment

General Trial | Objectives/Conclusions | Contacts | Crop Description | Pest Description | Site and Design | Maintenance

Site and Design
Some information is copied from General and Design tab of Settings - make changes there

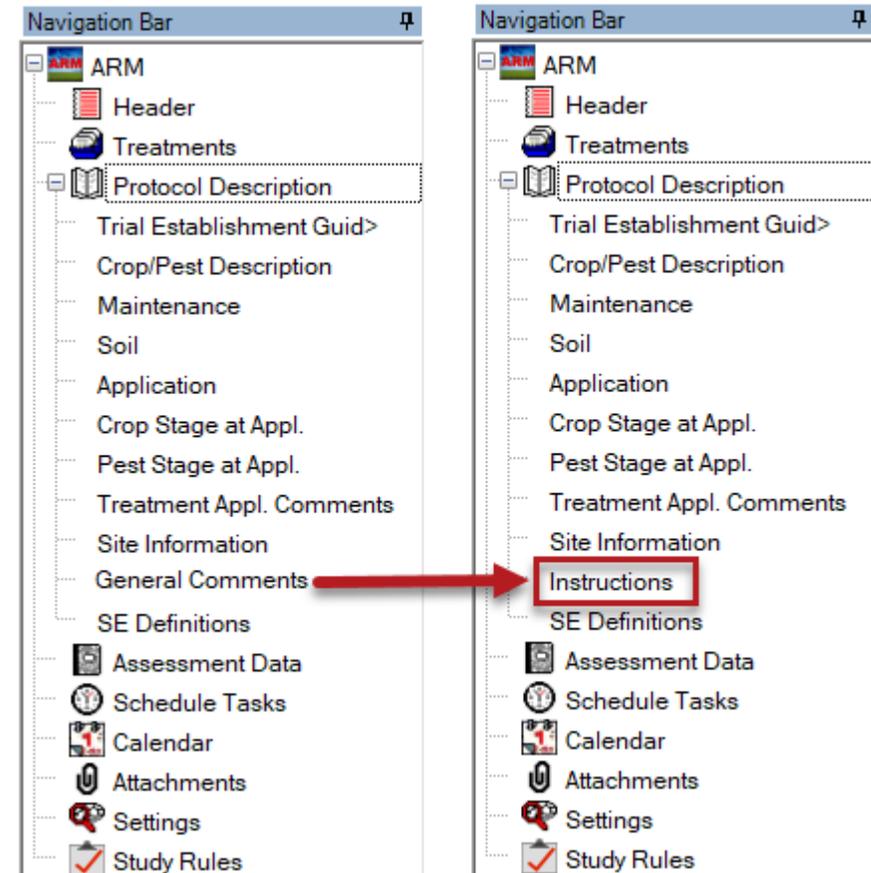
Insert row with Shift+F7, Delete current row with Shift+F8

No.	Previous Crop	Previous Pest Type	Previous Pest	Previous Pesticides	Year	Month	Comment
1.	ZEAMD	D	ERYSGT		2018		

Protocol Comments

Protocol Comments tab renamed to Instructions

- Protocol Description:
from General Comments to Instructions
- Site Description:
from Protocol Comments to Protocol Instructions



Treatments

New Treatment Type

- Added treatment type 'DEFO'
- **Defoliant** – herbicidal chemical sprayed or dusted, causing leaves to fall off



Treatments - Line 2							
Trt Line	Trt No.	Type	Treatment Name	Form Conc	Form Unit	Form Type	
1	1	CHK	Untreated Check				
2	2						

Type Personal List (C:\ProgramData\ARMdef\GDMdef\G-TrtTyp.lst)

Type	Description
CULT	Cultural practice
DEFO	Defoliant: herbicidal chemical sprayed or dusted causing leaves to fall off
FERT	Fertilizer

Trial Map

Orientation

- Display orientation from North on Trial Map
- Orientation entered in General Settings
 - *Number of degrees from North for the left edge of the trial*

The screenshot displays the 'Trial Map' interface. The top toolbar includes navigation icons, a zoom level of 100%, and a north arrow icon labeled 'N' which is highlighted with a red box. Below the toolbar, a grid of plots is shown, with the left edge of the trial highlighted by a red arrow. The 'Trial Settings' panel is open, showing the 'General' tab. The 'Orientation (degrees)' field is highlighted with a red box and contains the value '60'.

Plot ID	Replications	Color
401	1	White with diagonal lines
402	3	Teal
403	2	Green
404	4	Red
405	5	Purple
301	3	Teal
302	2	Green
201	2	Green
202	3	Teal
101	3	Teal
102	1	White with diagonal lines

Trial Settings

General | Design | Treatment | Layout

Replications: 4

Trial location time zone: []

Treated 'Plot' experimental unit size

Width: 2.5 meters

Length: 10

Orientation (degrees): 60

Study Rules

Consistent entries across Rating Timing

- New study rule
- Auto-fills and maintains same entry in chosen field, across the same Rating Timing value

Assessment Data - Line 101															
Column Number	9		10		11		12 (Calculated)		13 (Calculated)						
Crop Code	TRZAW		TRZAW		TRZAW		TRZAW		TRZAW						
Crop Name	Winter wheat		Winter wheat		Winter wheat		Winter wheat		Winter wheat						
Rating Date															
Part Rated	LEAGRE P		GRAIN C		GRAIN C		GRAIN C		GRAIN C						
Rating Type	AREA		YIELD		MOICON		YIELD		YIELD						
Rating Unit	%AREA		KG		%		T-MET		%UNCK						
Sample Size	5 LEAF						1 HA								
Reporting Basis			1 PLOT												
Rating Timing	A4		H1		H1		H1		H1						
Trt-Eval Interval	11 DA-C		30 DA-C		30 DA-C		30 DA-C		30 DA-C						
ARM Action Codes							TY1		ET5 @UPOCR						
+ Sub	Rep	Blk	Col	Plot	Trt	9		10		11		12 (Calculated)		13 (Calculated)	
1	1	1	2	102	1	10.00		8.25		12.1		8.62		100.00	
1	2	2	5	205	1	0.00		7.55		11.7		7.92		100.00	
1	3	3	3	303	1	0.00		7.30		11.3		7.69		100.00	
Study Rules - Rule 4 of 4															
Rule	Rule ID	Editor	Field	Condition	Columns/Trt Lines	Permissions									
4	Required	Assessment Data	Rating Date	Consistent entries across Rating Timing	All	All protocol owners									

Consistent entries across Rating Timing

Feature in Action:

- Useful for fields that cannot differ at a single Rating Timing
- E.g. Rating Date, Crop information

ARM - SPECIAL CONFIRMATION

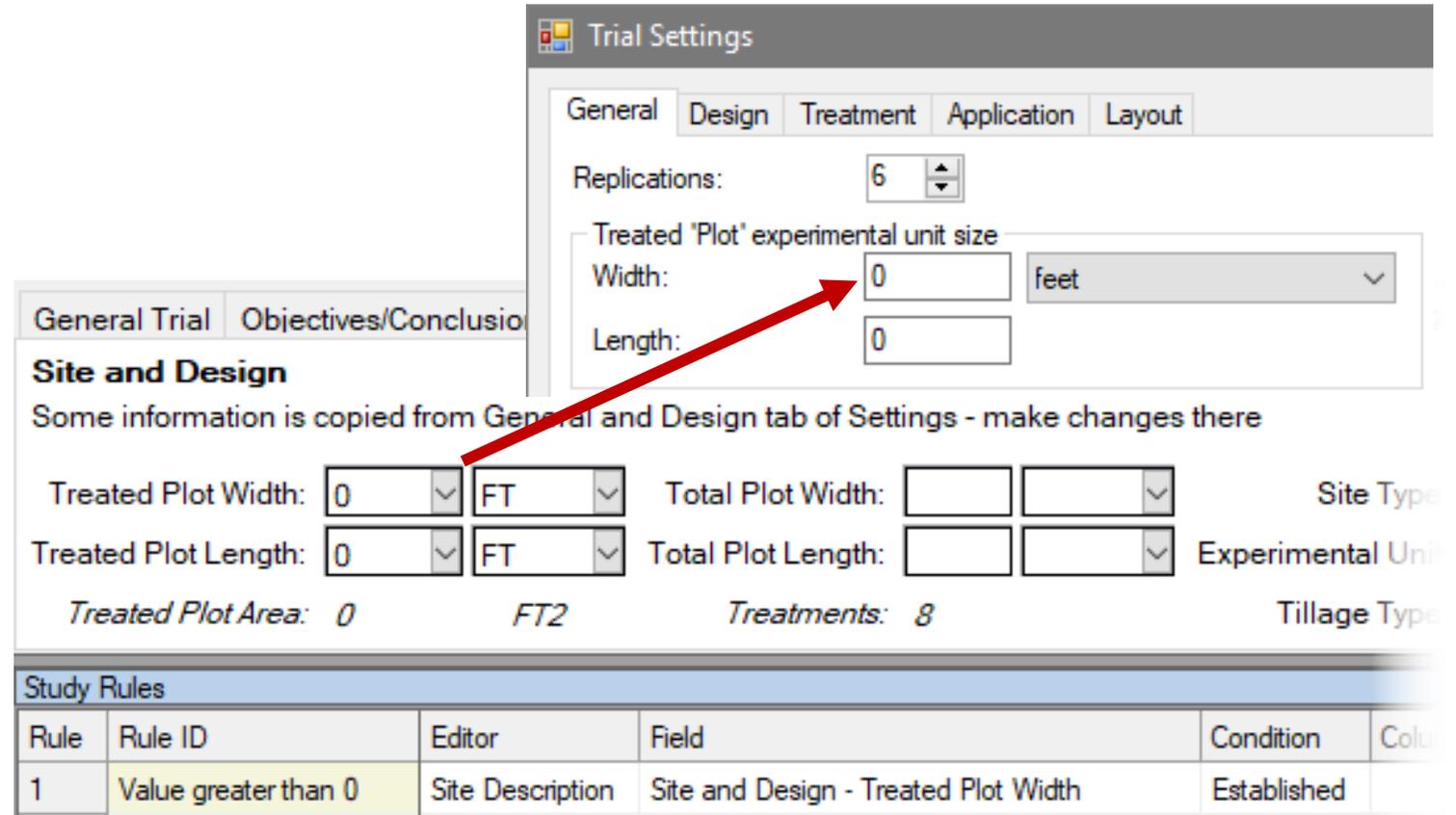
Required study rule 'Consistent entries across Rating Timing' is defined for the field 'Rating Date'. After making this change, the revised data entry will be copied to all data columns within this Rating Timing.

Select 'OK' to continue with change and copy new data entry to all remaining columns in Rating Timing. Select 'Cancel' to stop data entry change.

Rating Date		Jul-3-2019	Jul-3-2019	Jul-3-2019	Jul-3-2019
Part Rated	LEAGRE P	GRAIN C	GRAIN C	GRAIN C	GRAIN C
Rating Type	AREA	YIELD	MOICON	YIELD	YIELD
Rating Unit	%AREA	KG	%	T-MET	%UNCK
Sample Size	5 LEAF			1 HA	
Reporting Basis		1 PLOT			
Rating Timing	A4	H1	H1	H1	H1
Trt-Eval Interval	11 DA-C	30 DA-C	30 DA-C	30 DA-C	30 DA-C

Value greater than 0

- New study rule
- Require that a 'real' entry is entered when available
- Useful for fields that are auto-filled from Settings, so cannot leave blank



The screenshot shows the 'Trial Settings' dialog box with the 'Design' tab selected. The 'Replications' field is set to 6. The 'Treated Plot' experimental unit size section has 'Width' and 'Length' fields both set to 0, with a unit dropdown set to 'feet'. A red arrow points from the 'Width' field in this section to the 'Treated Plot Width' field in the 'Site and Design' section below. The 'Site and Design' section shows 'Treated Plot Width' as 0 FT, 'Total Plot Width' as empty, 'Treated Plot Length' as 0 FT, 'Total Plot Length' as empty, 'Treated Plot Area' as 0 FT2, and 'Treatments' as 8. Below this is a 'Study Rules' table.

Rule	Rule ID	Editor	Field	Condition	Color
1	Value greater than 0	Site Description	Site and Design - Treated Plot Width	Established	

Permissions

- The default permissions is now "Everyone in my company" for new rules
- Easier for colleagues to also edit study rules, not just the study owner

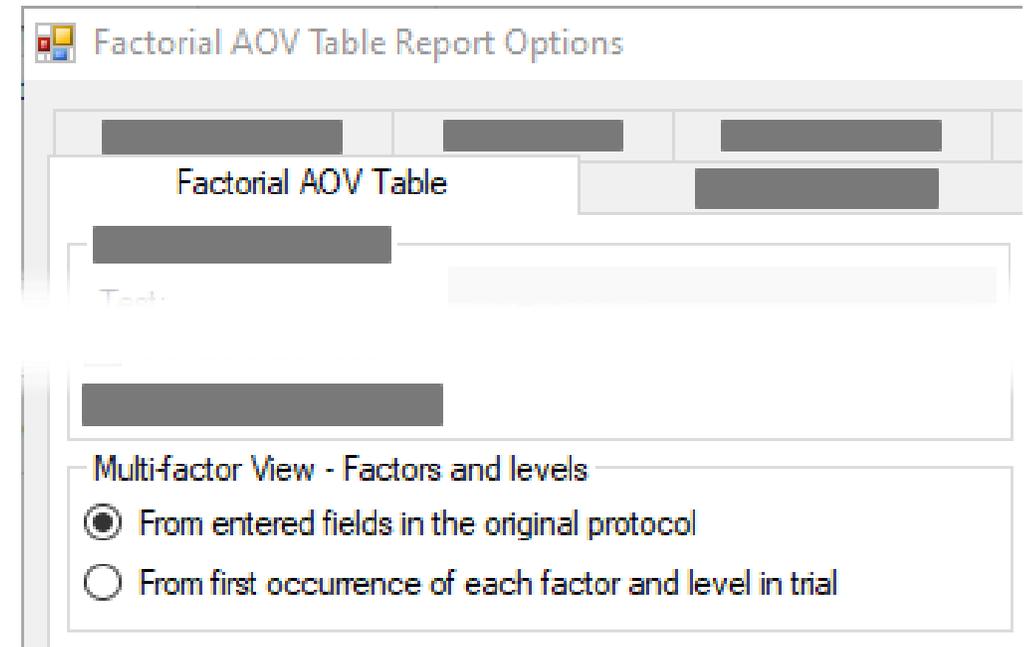
Study Rules					
Rule	Rule ID	Editor	Field	Condition	Permissions
1	Limit validation list	Assessment Data Header	Crop & Pest in Site Description	Always	Everyone in my company

- *Note: ARM remembers the last Permissions chosen when adding new rules, so this default applies mainly to new installations*

Print Reports

Factorial AOV Table

- New **Multi-factor View** option
- Factors and levels printed:
 - Only information that was entered in original protocol
 - How they are currently entered in the trial



The screenshot shows a dialog box titled "Factorial AOV Table Report Options". It contains several sections with redacted text. The main section is titled "Factorial AOV Table" and includes a "Test:" label. Below this, there is a section titled "Multi-factor View - Factors and levels" which contains two radio button options: "From entered fields in the original protocol" (which is selected) and "From first occurrence of each factor and level in trial".

Trial Fact Sheet

- New report provides a trial synopsis
- Useful for trial tours, overview

PROTOCOL ID: G-A117_Fung

AUTHOR: Your Name

TRIAL ID: G-A117_Fung

ORGANIZATION NAME: New Company

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

OBJECTIVES:

SITE INFORMATION:

Location: Gembloux

ADDRESS:

GEMBLoux, NAMUR

SOIL TEXTURE: CL

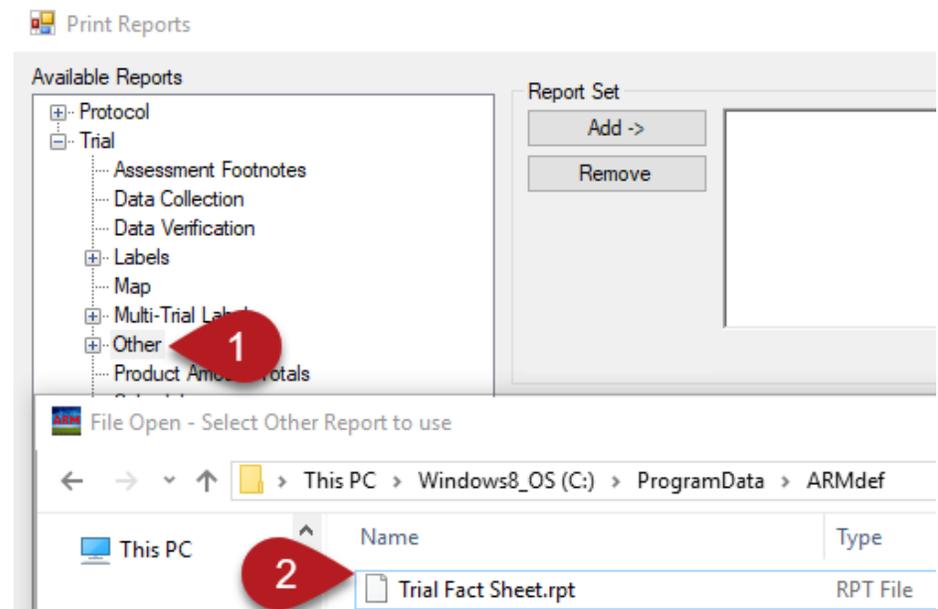
TILLAGE TYPE:

PLOT WIDTH: 2.5 m

REPS: 4

PLOT LENGTH: 10 m

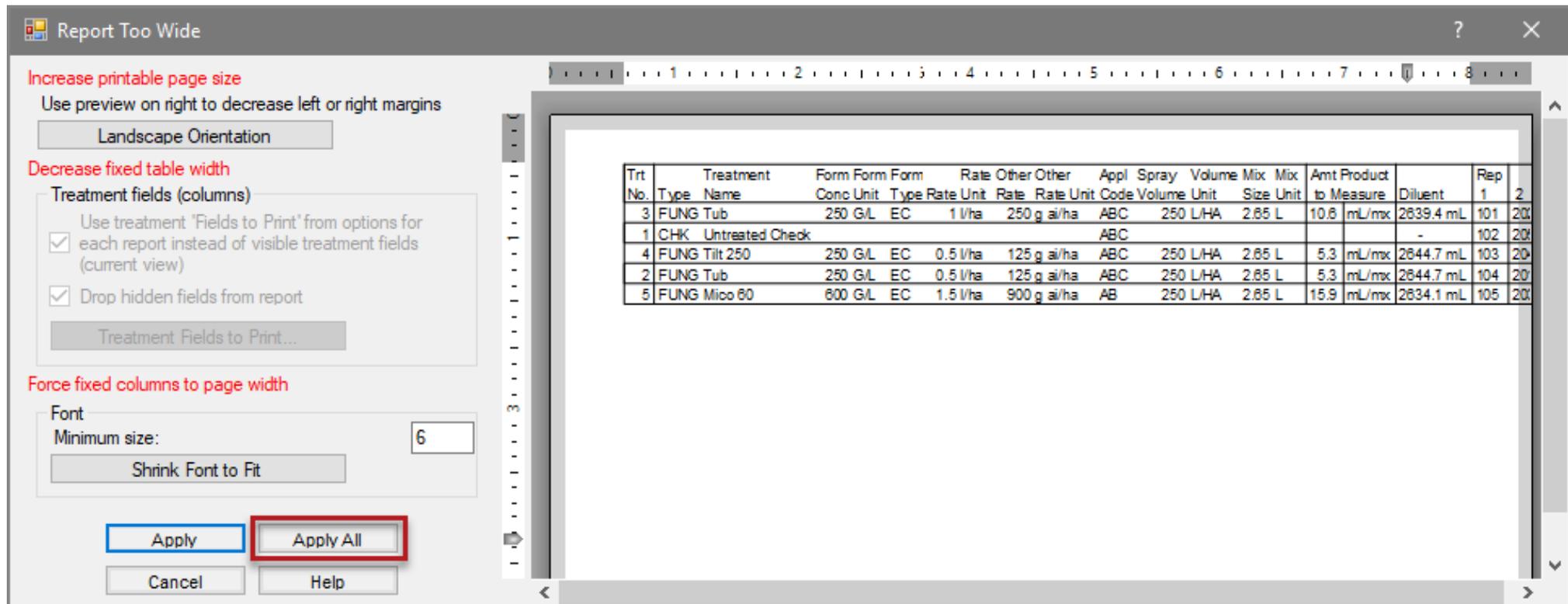
TREATMENTS: 5



1. Select 'Other' in Available Reports
2. Load *Trial Fact Sheet.rpt* from ARMdef folder

Report Too Wide

- **Apply All** button added to apply changes to all pages in report.
- Previously dialog appeared *for every* page.



Protocol Instructions

- Always include Protocol Instructions on Site Description reports
- Use 'Selected Tabs' report to hide these

(G-A117 Herb)

Site Description Page 1 of 1

Gylling Data Management, Inc.

Determination of the efficacy and lowest effective dose rate of HERB 1 against monocotyle and volunteer grass weeds in Winter Rape when applied in Spring

Trial ID: G-A117_Herb Location: GERMANY Trial Year: 2014
Project ID: Dicamba Study Director: R.E. Cearch

Geographic Area/Environmental Considerations:

Typical area for the crop. Preceding crop preferably Winter wheat

Cropping Considerations:

- Minimum tillage sites preferred
- Cultural conditions have to be uniform for all plots. The conditions in the trial should be conform and representative for the cultivation of the crop in the region.
- Report all other treatments in detail in the "crop maintenance" section of the DAT file.

Data to Collect:

Provide weather data as follows (min. requirement):
as from 1 day before application up to the final assessment average, min and max temperature and precipitation on a daily basis. => Data from the nearest weather recording station should be attached as a file in standard format (for example: Excel table, Comma-separated list, ...). Indicate the distance of the trial site to the weather station.

Site Description Report Options

Global - General Global

Site Description

Empty fields

Print blanks

Keep with previous page

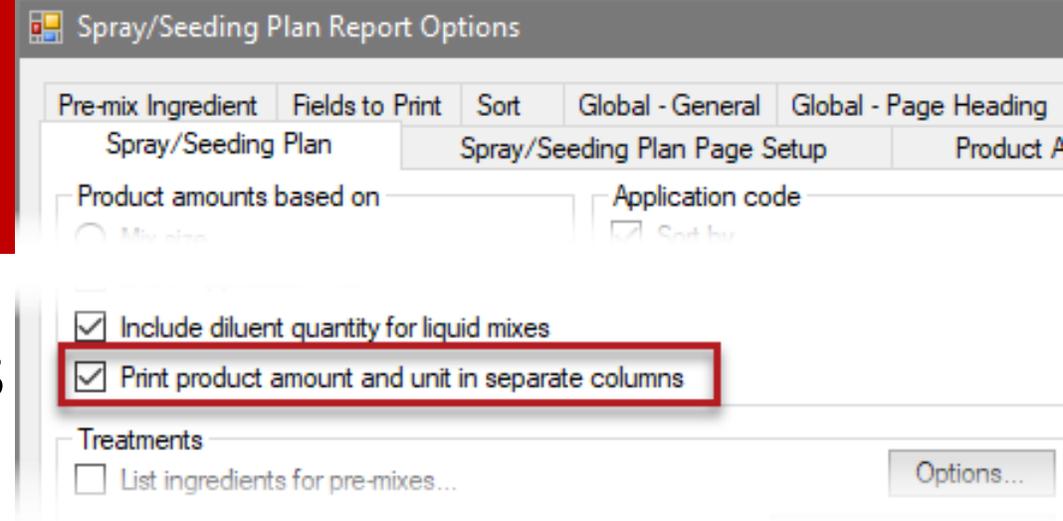
Print display only protocol instruction fields

Print study rules

Use fixed-width font

- No more need for option to include the fields

Spray/Seeding Plan



- Added option to print product amounts and units in separate columns.

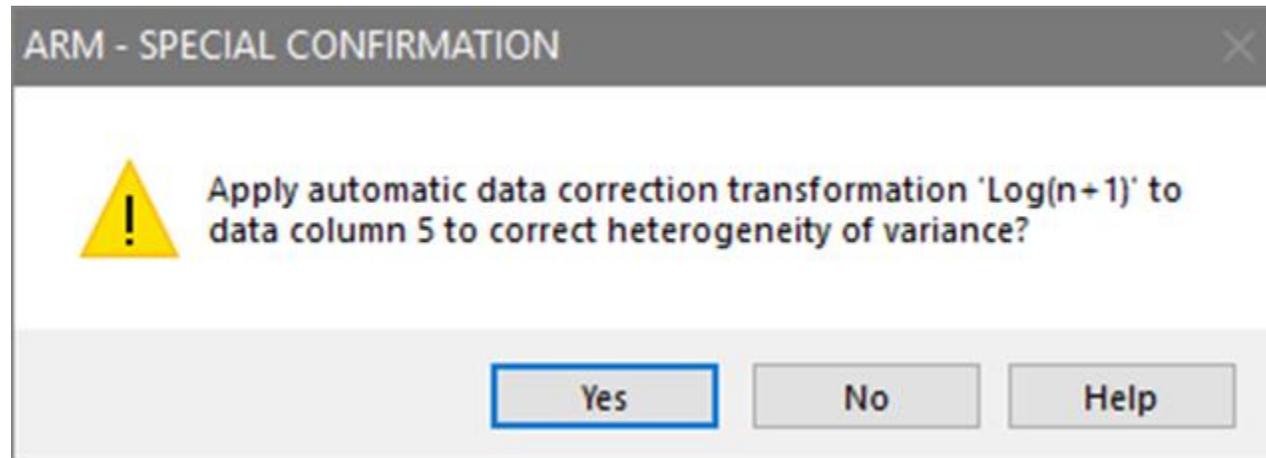
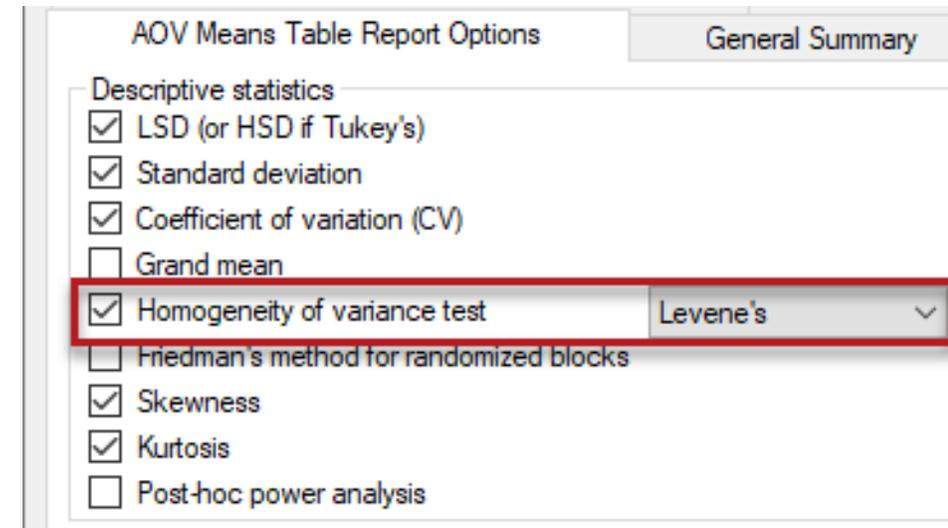
Reps: 4 Appl Code: A Plots: 2.5 by 10 meters
 Spray vol: 250 L/ha Mix Size: 2.65 L (total for 4 plots; minimum=2.5 L)

Trt No.	Treatment Name	Form Conc	Form Unit	Form Type	Rate Rate Unit	Amt Product to Measure	Rep 1	Rep 2	Rep 3	Rep 4
3	Tub	250 G/L	EC	1 l/ha	10.6 mL/mx	101	202	301	402	
4	Tilt 250	250 G/L	EC	0.5 l/ha	5.3 mL/mx	103	204	305	404	
2	Tub	250 G/L	EC	0.5 l/ha	5.3 mL/mx	104	201	302	403	
5	Mico 60	600 G/L	EC	1.5 l/ha	15.9 mL/mx	105	203	304	405	

- Useful when printing to Excel, so amounts are in a separate column.

AOV Means Table

- Levene's homogeneity of variance test is now used for verifying assumptions of AOV to suggest data corrections to apply



- Previously Bartlett's was used in check, regardless of option selection

ARM Window

Spray Volume

- Renamed to **Application Amount** to be more generic for all treatment/application types

Appl Code	<i>Appl Amount</i>	<i>Amount Unit</i>	<i>Mix Size</i>	<i>Mix Unit</i>
ABC	250	L/HA	2.65	Liters
ABC	250	L/HA	2.65	Liters

Trial Settings

General Design Treatment Application Layout

Application amount: L/ha ▼

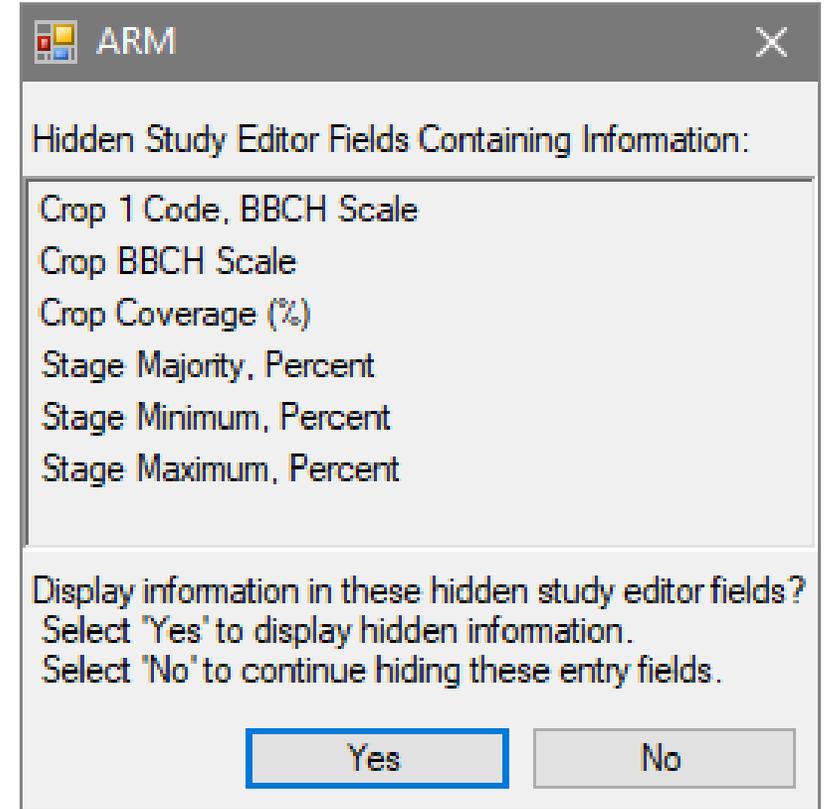
Mix size

Treatments	1
Replications	4

	A		B	
Appl. Equipment	AZO ▼		AZO ▼	
Equipment Type	▼		▼	
Water Hardness (ppm CaCO3)				
Application Amount	250	L/HA ▼	250	L/HA ▼
Mix Overage	150	mL ▼	150	mL ▼
Mix Size	2.65	▼ L ▼	2.65	▼ L ▼

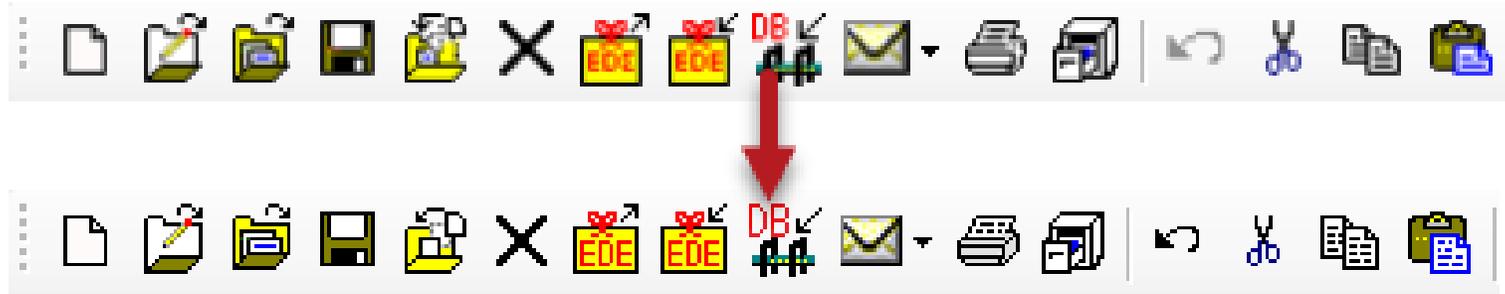
Hidden fields with info

- Automatically show fields that are hidden from view, but contain information
- Eliminates prompt when opening a study
- Ensures that all information is conveyed when opening a file for the first time



Toolbar

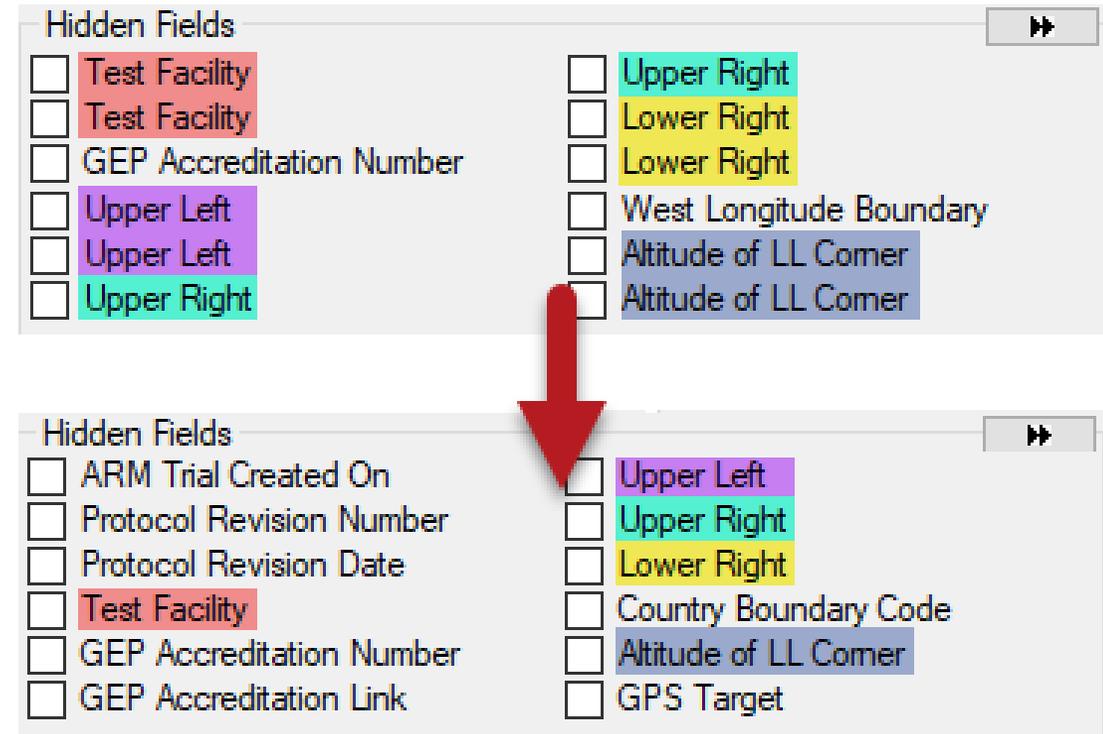
- Improved the appearance of toolbar buttons



- Cleaned up some missing pixels so we can actually tell what the image is supposed to be!

Properties Panel

- Field pairs display as single checkbox in Hidden Fields list
- Value + Unit fields
- Code + Description fields

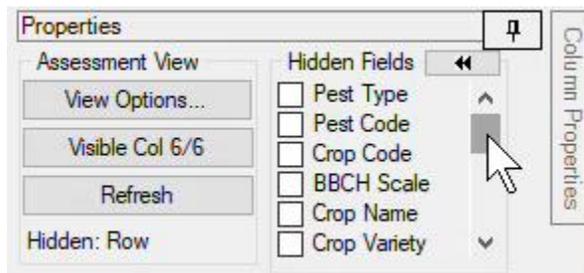


Treatments, Protocol/Site Description, Assessment Data editors

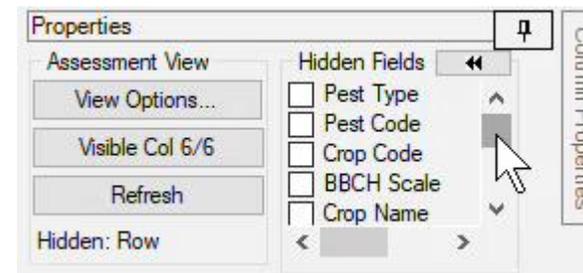
Hidden Fields

- Do not scroll back to the top of the list when selecting a field.
- Now much easier to make multiple fields visible at a time

Before:



After:



Display Options

Change rule colors

- Change the background color of required and recommend fields

Site Description

General Trial | Objectives/Conclusions | Contacts | Crop Description | Pest Description

Trial Location

City: GEMBLOUX

Latitude of LL Comer °:

Longitude of LL Comer °:

GPS Accuracy of LL Comer:

Study Rules

Rule	Rule ID	Editor	Field
1	Required	Site Description	General Trial - Latitude of LL Comer °
2	Required	Site Description	General Trial - Longitude of LL Comer °
3	Recommended	Site Description	General Trial - GPS Accuracy of LL Comer

ARM Options

Display

Colors

Screen element:
Recommended fields

Background Color: Sample

Reset Colors

- Tools > Options > Display tab > Colors

Font color fix

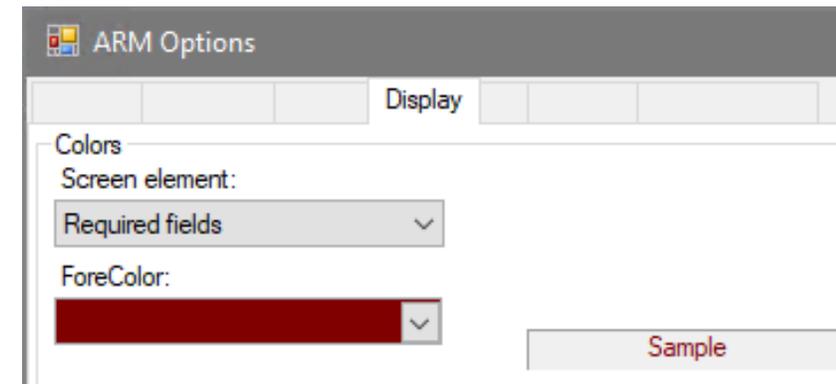
- Font Color option for Required fields now only applies to always-required fields (found in some customizations)

Treatments - Line 13

Trt Line	Trt No.	Type	Treatment Name	Form Conc	Form Unit	Form Type	Description	Rate	Rate Unit	Other Rate	Other Rate Unit	Appl Code
2	2	FUNG	Tub	250	G/L	EC		0.5	L/ha	125	g A/ha	ABC
3	3	FUNG	Tub	250	G/L	EC		1	L/ha	250	g A/ha	ABC
4	4	FUNG	Tilt 250	250	G/L	EC		0.5	L/ha	125	g A/ha	ABC
5	5	FUNG	Mico 60	600	G/L	EC		1.5	L/ha	900	g A/ha	AB
6	5	FUNG	Fungol	200	G/L	SC		1.25	L/ha	250	g A/ha	C
7												

Trt Line	Trt No.	Type	Treatment Name	Form Conc	Form Unit	Form Type	Description	Rate	Rate Unit	Other Rate	Other Rate Unit	Appl Code
2	2	FUNG	Tub	250	G/L	EC		0.5	L/ha	125	g A/ha	ABC
3	3	FUNG	Tub	250	G/L	EC		1	L/ha	250	g A/ha	ABC
4	4	FUNG	Tilt 250	250	G/L	EC		0.5	L/ha	125	g A/ha	ABC
5	5	FUNG	Mico 60	600	G/L	EC		1.5	L/ha	900	g A/ha	AB
6	5	FUNG	Fungol	200	G/L	SC		1.25	L/ha	250	g A/ha	BC

- Previously other field pairs were also colored



Migrate Settings

Migrate Settings

Copy settings when moving to a new PC

- Copy personal lists, report sets, ARM settings to new computer

What's new?

Prompt to create package *before* deactivating the old PC.

