ARM Quick Reference

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Summary Results
Limiting Number of Decimals for Data Reports
Printing Excel Report Link Workbook
Graphing Data

Introduction

This document describes various tricks and shortcuts for improving efficiency when using ARM.

Terminology

Study is used for information that applies to both a protocol and a trial.

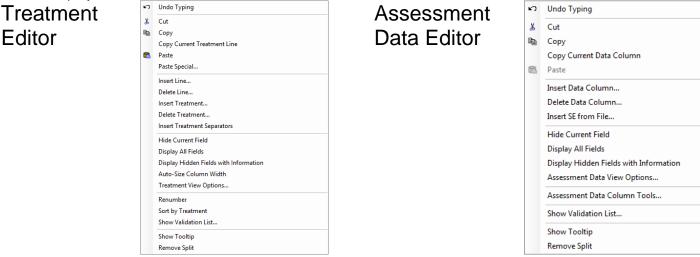
Protocol is a plan for a trial. It does not contain a randomization or space for assessment data. Protocols are stored with a file extension that begins with ".prt", such as .prt9.

Trial is the realization of a protocol. It has a treatment randomization, trial map, and space to enter assessments and location details. Trials are stored with a file extension that begins with ".dat".

Study definition is an ARM "template" that defines structure of protocols and trials. For example, G-All7 is a typical template used for most protocols and trials. However, some large corporate manufacturers who began using ARM before the year 2000 have customized study definitions that have a different name.

Right Click Menu

The quickest way to find what choices are available is to use the right mouse button. Right click on an editor or field to display the list of available choices. Each editor will have the choices available for their screen.



ARM Required File Extensions

.dat9	ARM 9 Trial	
.dat8	ARM 8 Trial	
.dat	ARM 7 Trial	
.pdv	Plot Data View	
.set	Report Set	
.dcf	Data Collector File	

.prt9	ARM 9 Protocol
.prt8	ARM 8 Protocol
.prt	ARM 7 Protocol
.ede	NACA Electronic Data Exchange
.fld	Field Description
.se	Standard Evaluation (customized .def)

'GDM Recommends' Symbol



This symbol is included in ARM documentation on options and procedures that GDM highly recommends. There are cases where GDM feels strongly about using a particular option over a different option, depending on the circumstances. The documentation will provide a detailed description of why the option or procedure is preferred, while still providing information about all available options.

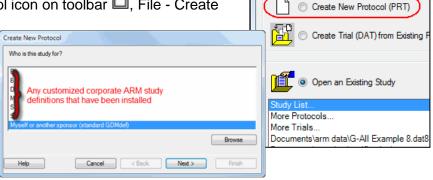
Getting Started

G	eneral Overview of ARM Menu Choices	Help	Contents	
1.	Help:		Search for Help On	•
	a. F1, any Help button, or 😰 displays help on current ARM screen.	*	Topic Study Definition	F1 F5
	 b. F5 or to a study editor displays help about current data entry field. c. ARM Quick Reference card is very useful; print it as a convenient reference! 	2	Quick Reference Card (p How To Topics Tutorial Media	idf) +
	 Use Tutorial for an introduction and overview of ARM, and How To Topics for information on typical ARM tasks. 	2	BBCH Growth Stages (pr Check for Updates	df)
2.	File: most File commands are available on the toolbar, which is faster to		Detect and Repair	
	use:		Rollback to Previous AR	M Version
3.	Edit: Undo and block commands are available on toolbar:	nanc	ds.	ARM (GDMdef) Header Treatments Gif Site Description General Trial Objectives/Conclusions
4.	Format and Table are for editing "rich text" in Trial Comments and Site or P Description.	roto	ocol	Personnel Crop Description Pest Description Site and Design Maintenance
5.	Tools : several Tools commands are on toolbar:	1		Soil Moisture Application Crop Stage at Appl. Pest Stage at Appl. Appl. Equipment
6.	Utilities : Install License, <u>Rebuild Study List</u> , and Conversion Calculator are commands.	the	most used	Treatment Appl. Comments Notes Deviations Assessment Data Trial Map
7.	Window: Split command. Study editors are on toolbar:	0	🗿 🛈 🖄 👔	O Schedule Tasks Schedule Tasks Other Schedule Tasks Comments O Attachments O Settings

Creating and Using Protocols

- 1. Create protocol by selecting New Protocol icon on toolbar D, File Create Protocol, or from "Startup Wizard."
 - a. Define who study is for:

Any customized corporate ARM study definitions installed on your PC are listed on the upper portion of dialog. Note that the ARM install does not include customized study definitions. These are provided with a special installation program at request of a research sponsor.



ARM

Create a New Study

- b. "Who is the study for?" selection determines which study definition(s) are listed on the next dialog:
 - a=Definition: Listed are choices for "Myself or another i. sponsor (standard GDMdef)" company. The recommended study definition is highlighted by default, such as "G-All7" in the example above.
 - b=Language: If the default study definition language is not ii. appropriate, then select a different definition language by clicking the down arrow on the language drop-down.

.....

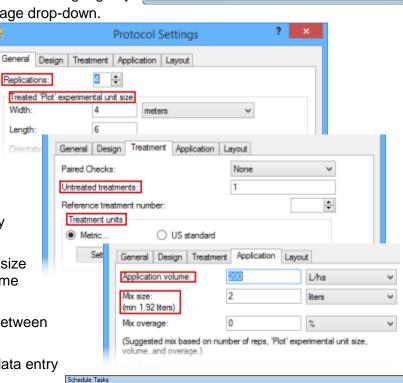
Width:

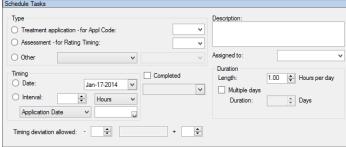
- c. After selecting "Finish" button, then define appropriate Protocol Settings on the New Protocol dialog.
- 2. Review of Settings dialog tabs.
 - a. General: Replications, Plot size (used for product calculations and some rate conversions)
 - b. Design: Best to select proper design for study before creating trial.
 - c. Treatment: Untreated treatments, specify treatment units.
 - d. Application: Application volume and mix size are used for product calculations and some rate conversions.
- 3. Entering header, overview of how to move between various data entry fields
- 4. Entering treatments, description of various data entry fields, copy/paste, keyboard shortcuts
- 5. Entering tasks:
 - a. Type each task "from scratch"
 - b. Copy/paste existing tasks from another study
 - c. Tools Merge from ARM Study to merge tasks from another protocol

Creating a Trial from a Protocol

- Begin by selecting the Create Trial wizard from toolbar ⁶, File Create Trial, or from "Startup Wizard". 1.
- Modify a proposed randomization on Trial Map. 2.
 - a. Select Settings button to change:
 - General: number of replications, plot size. i.
 - Layout: change numbering and position of plots, ii. buffer between plots. Tips: Set "Block size" smaller than number of treatments to split replicates into smaller blocks.

Set "Block size" larger then number of treatments with "Fill blocks" to get more than one replicate into the same block giving "side by side" replicates.





1	Protocol Settings		?	>
General Design Tr	eatment Application Layout			
'Plot' numbering:	Standard by block (101,102,	etc.) v	,	
Begin at:	Bottom left			
Sementine nur				
Serpentine nur	ibering	1		
Serpentine nur	Not' experimental unit numbers:	1		
Serpentine nur	Not' experimental unit numbers:			



Design: change experiment design, which may influence number of treatments or how treatment iii. information must be entered!

🚽 Trial Map

402

302

202

401

301

20

10

9

75.00

60.00

70.00

0.00

65.00

70.00

70.00 0.00

55.00

65.00

60.00

0.00

Site description

G-AII7.fm8

Change FRM..

🔍 🔍 🍓 🕨 😑 100% - 🕞

403

- b. Use Auto-Select option to drag and drop treatments, plots, and replicates.
- c. "Color by" options control how trial map is colored: by Replicate, Treatment, or Factor (for multi-factor experiment designs).
- d. Right click to insert multiple columns or rows in a trial map to define a blank space to move multi-plot units (replicate or factor).
- 3. Name and save the new trial

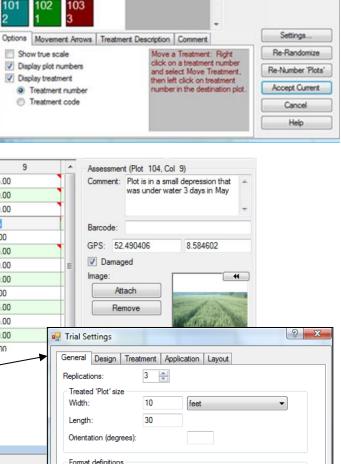
Editing Trials

- 1. Printing trial establishment reports
 - a. Trial map
 - Spray/seeding plan report and options b.
 - c. Data collection and verification reports
- 2. Entering assessment data
 - a. Copy/paste shortcuts
 - b. Copying data from spreadsheet
 - c. Special plot data tools
- Entering site description information 3.
 - a. Copy/paste shortcuts

Schedule Tasks

- b. Tools Merge from ARM Study
- 4. Changing settings that influence the trial -
- Use attachments to manage linked trial information 5.
- Use tasks to manage work calendars 6.

	Type		Description:				
	ning uc navu	n alomou. (*) (*) (*) (*)					
	Completed	Туре	Description	Timing	-	Planned	Γ
1	-	Treatment application - for A	Apply Early Post Treatment	Mar-10-2013	5	Mar-10-2013	Γ
2	-	Treatment application - for B	Apply 3-LF Treatments	5 Days After A		Apr-3-2013	Γ
3		Assessment - for A1	Assess 7 Days After EAPOCR	7 Days After A		Apr-5-2013	Γ
4		Assessment - for A3	Assess 7 Days After 3-LF	7 Days After B		Apr-17-2013	Γ
5		Assessment - for A2	Assess 14 Day After EAPOCR	14 Days After A		Apr-12-2013	T
6		Assessment - for A4	Assess 14 Days After 3-LF	14 Days After B		Apr-24-2013	ſ
7		Assessment - for A5	Assess 28 Day After EAPOCR	28 Days After A		Apr-26-2013	ſ
8		Assessment - for A6	Assess 28 Days After 3-LF	28 Days After B		May-8-2013	t
9		Other - Maintenance Treatment Date	Side Dress N Fertilizer	Jul-15-2013		Jul-15-2013	Г
10		Assessment - for A7	Pre-Harvest Assessment	Oct-1-2013		Oct-1-2013	Γ
11		Other - Harvest Date	Harvest	Oct-10-2013		Oct-10-2013	ſ
•							t



Study

G-AI7.def8

Change DEF..

ąχ

Properties

Color by

Replicate

Treatment

Auto-Select

 Treatment Plot' Experimental Unit

Replicate

ARM Help

Select Help on the toolbar then choose the following.

- Contents Display all topics in the ARM help system.
- Search for Help On Enter text to search all Help topics for.
 For example, type "Excel" to find all topics mentioning Excel spreadsheets.
- **Topic** Display help for the current topic (F1).
- **Study Definition** Display any study definition help for the current study editor (F5).
- Quick Reference Card (pdf) Display the ARM Quick Reference Card in pdf form.
- **How To Topics** Descriptions of how to perform many tasks within ARM.
- **Tutorial** PowerPoint overview of general features in ARM.
- **BBCH Growth Stages** (pdf) Display a description of BBCH growth stages for various crops, as appropriate for the current ARM program language.

Hel	p		
	Contents		•
	Search for Help On		•
?	Topic	F1	
+	Study Definition	F5	
2	Quick Reference Card (pdf)		۲
	How To Topics		•
	Tutorial		•
	Media		
1	BBCH Growth Stages (pdf)		

Utilities

ARM includes resources helpful for your project. Select Utilities on the toolbar then choose the following.

GPS Helper



Conversion Calculator

😄 Convert – 🗆 🗙
File Options Help Cutom Density Distance Energy Pressure Speed Temperature Time Acceleration Ant. of Substance Angle Acceleration Ant. of Substance Angle Continueter Conduct Concentration Input Output Continueter Continueter Input Input Inclusion Input Input Input Input
Input: 1 heclare Output: 2471044 acre

GPS Assist is a tool to help find approximate Latitude and Longitude locations.

Note: Any changes made in this dialog are not returned to ARM.

Convert is a tool to assist with unit conversion calculations.

Select an input unit and magnitude, then select desired output unit.

Note: Any changes made in this dialog are not returned to ARM.

ARM Support Viewer

A licensed, customized version of the TeamViewer "Quick Support" program allows GDM support staff to connect to and troubleshoot a user's computer. Using the ARM Support viewer:

- Does not install any new software on your computer.
- Temporarily hides the Windows desktop background so only current programs are visible.
- Shares the entire computer desktop. Please close email or confidential material before connecting.

Connecting to GDM

Hel	p		ARM		In A
	Contents	•	ARM		"Sta
	Search for Help On	•	RM Help		Vie
?	Торіс	F1	ARM How To Topics		10
٠	Study Definition	F5	Check For Updates		Or
7	Quick Reference Card (pdf)	+	Detect and Repair		01
	How To Topics	•	Install License		In V
	Tutorial	•	Start ARM Support Viewer		
	Media		Uninstall ARM	-	All
7	BBCH Growth Stages (pdf)				AR
	Check for Updates		Back		
	Detect and Repair				
	Rollback to Previous ARM Version (911	a)	Start Search	P	
ъř	Start ARM Support Viewer		🧖 🕛 🗖 🖉 »		
	About ARM				

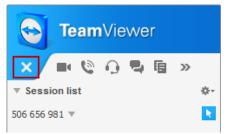
In ARM, select Help – "Start ARM Support Viewer..."

In Windows, select Start – All Programs – ARM – "Start ARM Support Viewer"

😋 🛛 ARM Support 🚽 🗖	×
R	
Allow Remote Control	\$
TeamViewer QuickSupport Program Please tell your ARM support person the ID and Password below to connect with your desktop:	
Your ID 815 225 864	
Password 8cs82v 9	
Ready to connect (secure connection)	
www.teamviewer.com Canc	el

Support Viewer shares the entire computer desktop to allow for diagnosing issues that occur from other programs that are running.

- 1. Start ARM Support Viewer (see above).
- 2. Read the disclaimer and click the **Accept** button on **Disclaimer** screen to agree.
- 3. Read the **ID** and **Password** to the GDM support person.
- 4. The password is different every time Support Viewer starts, so it is impossible for GDM to see the screen until the password is read.
- 5. The session can be ended **at any time** by clicking the X in the TeamViewer screen.



Backing up Studies

ARM can store automatic backups and histories of studies whenever they are changed.

ļ	-	ARM Options	? ×				
ļ	General Study List	File Display Editor Toolbar Send To Data Collector Special Configuration					
	Study data:	C:\Users\Matt\Documents\ARM Data\	✓ Browse				
		✓ Set as default					
Backup: E:\ARMbackup\ Browse							
		60 🚖 Backup interval (minutes)					

Select Tools – Options – File tab.

Define the path and interval that backups will occur.

Selecting a backup location



All drives eventually fail, even solid state drives such as flash drives, so always store backups on a completely separate device. A different partition of a hard drive is not a separate device; if the hard drive fails then all partitions are lost.

- If your studies are stored on a local hard drive, then use a different device, such as a flash drive or SD card as a backup device.
- If your studies are saved on a shared network drive, then either the C drive of your PC or another separate network drive can be used as a backup device.

Remember that just storing studies on a network drive does not provide the previous versions you can easily obtain by defining a backup device for ARM to use.

Restoring Previous Versions

Use the **Previous Versions** dialog to view a prior version of a file and restore or copy an archived study.

	Name	Time
1	G-All Example 8.dat8	12/20/2007 3:43:16 PM
2	G-All Example 8.dat8	12/20/2007 5:03:04 PM
3	G-All Example 8.dat8	12/20/2007 5:26:30 PM
4	G-All Example 8.dat8	12/28/2007 4:09:22 PM
5	G-All Example 8.dat8	12/31/2007 9:19:46 AM
6	G-All Example 8.dat8	1/18/2008 11:09:48 AM
7	G-All Example 8.dat8	1/21/2008 1:24:48 PM
8	G-All Example 8.dat8	1/21/2008 1:30:22 PM
9	G-All Example 8.dat8	2/27/2008 9:36:04 AM
10	G-All Example 8.dat8	2/27/2008 9:37:06 AM
11	G-All Example 8.dat8	2/28/2008 4:11:04 PM
12	G-All Example 8.dat8	3/9/2008 10:44:30 PM

From the study list, right-click on a file and select **Previous Versions**.

Lists all previous versions of a study currently stored in the ARM backup folder.

View

Open the selected archived study in separate ARM window as read-only.

Сору

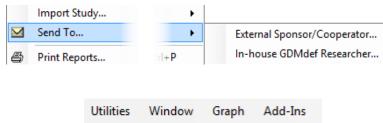
Copy the selected archived study to a different folder.

Restore

Overwrite the current version of the selected ARM study with the selected archived study file.

Emailing a Study Using "Send To"

The Send To command creates an email message containing the current study and related files.





Customizing and Sending the Message

Sending a trial Files to attach:		
 Attachments 	Original Protocol	
EDE	Attachments	
✓ Reports as PI	DF 🗸 🗌 EDP	
Report set:		
%DefRootPath%\G	DMdef\Trial Summary.set	٦
Mail subject:	Browse	
ARM Trial Results		٦
Save folder	information	7
Save folder	information	
Save folder Encrypt and pass Password: Verify Password: Destination	information	
Encrypt and pass Password: Verify Password: Destination MAPI Mail	information word protect files	
Save folder Encrypt and pass Password: Verify Password: Destination	information word protect files	
Save folder i Encrypt and pass Password: Verify Password: Destination MAPI Mail	Information Word protect files Fran O. Gylling	
Save folder Encrypt and pass Password: Verify Password: Destination MAPI Mail Login name:	information word protect files	

Select File - Send To, or select the envelope button on the toolbar. Then choose what type of person will receive the study:

- External Cooperator is someone who may be using different study definitions with their ARM program, or not using the latest ARM version.
- In-House Researcher is someone who is in the same company, or who is using the same ARM study definitions
- 1. Recommended options:
 - a. Include Attachments, EDE, and Reports as PDF using a summary report set such as "Trial Summary.set"



- b. When sending multiple attachments, like pictures, use the **Zip attachments** option.
- If your email program is not running, then enter any login information needed to start Outlook, or select Web-based Mail to utilize email in a browser.
- 3. Click **OK**.
- 4. ARM validates the trial.
- 5. ARM exports the .ede in GDM30*.tbe format and prints any reports.
- The ARM Message viewer displays any messages from actions that occur when creating the email (validation, exporting .ede, printing reports). Click OK to close the message dialog.
- 7. A new message containing the study will be created in the destination program/location.
- 8. Send the email after filling in the **To...** field, and any message contents.

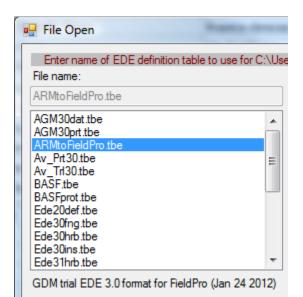
Which .tbe to Choose when Creating .ede file?

When sending an .ede to someone using ARM, use the **GDM30AII** format to ensure that all trial information is included in the .ede. (Use File - Export - EDE to begin exporting to .ede.)

• Use ARMtoFieldPro.tbe when sending trials to FieldPro software.

When sending an .ede to a non-ARM user, use the **Ede30*** or **Ede31*** format for transfers.

Enter name of EDE definition tab File name:	le to use for C:\Us
GDM30All.tbe	
Ede30fng.tbe Ede30hrb.tbe Ede30hrb.tbe Ede31hrb.tbe FieldP30.tbe FieldP40.tbe GDM30All.tbe GDM30prt.tbe MonTrial.tbe PIAF2.0.tbe PIAF3.0.tbe PIAF3.1.tbe	



ARM Study Definitions

ARM includes updated study definition (templates) features and new data entry fields that are requested by our clients. All standard GDM study definitions used since 1990 are included with ARM, so ARM can open ARM and PRM protocols and trials.

GDM Recommends/Supports G-All7, G-Gen7, and G-Seed7 Definitions

GDM	Description
Recommended ARM 8+	Select a Study Definition to use
G-All7	GDM ARM 9 Multiple Discipline Study Definition
G-Gen7	GDM ARM 9 General (non-chemical) study defn
G-Seed7	GDM ARM 9 Seed/Variety study definition, rev.
Old	

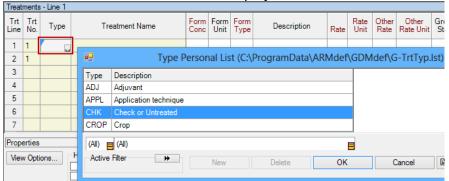
 The G-All7.def definition is a multi-discipline study definition. It uses full EPPO Bayer pest code lists, crop specific BBCH growth stage code lists, new data entry fields, and word processor formatting in many comment fields.



- EPPO/Bayer species codes and BBCH growth stage codes are in master database tables. The pest codes are separated by discipline to reduce validation list size.
- For many data entry fields there is a tool tip describing the information field. Click into a field and hold the mouse cursor over the field to show any tool tip.

Treatment Editor—Treatment Type Field (G-All7)

In the Treatment Editor, the **Treatment Type** field defines the discipline, or category of product, that determines which validation list to display for Treatment Name. Free-form entries are not allowed.



Prot	ocol Settings	?	k la
General Design Treatment Ap	oplication Layout		
Randomized Complete Block (RC	B)	· · · · · · · · · · · · · · · · · · ·	•
Factors: 1	Treatments	Merge Factor fields to	
A:	2 🗘	Do not merge 🗸 🗸	
B:	🖳 P	ersonal List ((C:\ProgramData\ARMdef\GDMdef\FACTDESC.
C:		Description 1	Description 2
The Treatment editor Type colur			Treatment Type defaults are below for GDM validation lists **
the factor description entered ab default entry.	Adjuvant	ADJ	
deradit eritiy.	Application Technique	APPL	
	Check/Untreated	СНК	
	Сгор	CROP	
	Cultural Practice	CULT	
	Fertilizer	FERT	
	Fumigant	FUMI	
	Fungicide	FUNG	
	(All)	(All)	(All)
	Active Filter		
Save as Default		пор	

To select a treatment type in the Treatments editor:

- 1. Place the cursor in the **Type** column.
- 2. Press F9 or the drop-down arrow and choose from the list.
- 3. Press OK to continue.

To define a default **Treatment Type** entry that ARM will enter in a new treatment line when creating a new protocol:

- 1. Select Window Settings.
- 2. On the Design Tab, click in **Factor A** and press **F9** or drop-down arrow.
- 3. Select a category from the lower half of the list and press **OK**.
- 4. Press the **Save as Default** button to set the current settings as the default for new protocols.

Press OK to continue.

Assessment Data Editor – Pest Type (G-AII7)

The Pest Type field identifies which validation list for Pest Name and Pest Code is used.

Assessment D	ata - Line 1								
Column Numb	er	1		2	3	4	5	6	7
Pest Type				~	~	U	<u> </u>	U	~
Pest Code		Pest Typ	e Pers	ional List (C·\P	ProgramData\4	ARMdef\GDN	Idef\G-PestTp.I	st8) ?	×
Pest Name								,	
Crop Code	Pest Type	Pest Type	Descr	-					<u>^</u>
Crop Name	D	Disease			us, bacteria, or viru	S			
Part Rated	-	Insect	Insect						
Rating Date	0	Other		animal or nemator	le				
Rating Type	W	Weed	Weed	or volunteer crop					
Rating Unit									
Number of Su									
Assessed By									
Rating Timing									
Days After Fi	[Lun							
Trt-Eval Inter			(AI)					opy validation list	to the clipboard
Days After E	Active Filter	*		New	Delete	ОК	Cancel	🚡 🕂 🖊 🧯	2
ARM Action (
Number of De	cimals								

Press F9 or press down arrow in the Pest Type field to choose the pest discipline, such as Disease (D), Insect (I), Other animal or nematode (O), or Weed or volunteer crop (W).

The **Copy Validation List to Clipboard** button copies the entire list to the Windows clipboard.

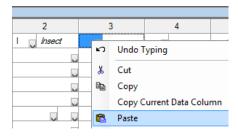
Assessment Data Editor – Copying a Single Column

									AR	M 9.1.1 (From the Assessment Data editor, type the " character in
File	Edit	Format	Tools	Table	Utilities	Winde		Graph	Add-Ins		Pest Type to copy the entire
0 🛛	ĵ 🝺	🖬 🛍 🗙	(🙇 🛛	⁰⁸ ∕ ⁰⁸	ž 🖂 - 🗐	5 🗊	S	<u>%</u> 🗈	🛍 💞	A↓ Z↑	data column heading at left (only recognized when
Navigatio			7 Ass	essment Da	ata - Line 1						entered in the first header
arı	4		Col	umn Numbe	er			1		2	field). Then press Enter.
— 📒 н	eader		Pes	t Type			1	Insect	1 🗖		

Assessment Data Editor – Copying Multiple Columns

Column Number	1	2	6	Unde Trusien
Pest Type	l 🗖 Insect	l 🗖 Insec		Undo Typing
Pest Code			*	Cut
Pest Name			B)	Сору
Crop Code				Copy Current I
Crop Name			胞	Paste

Mark a series of data columns by dragging across the **Column Number** headings. Right-click a highlighted cell, select **Copy**, and then right-click in new column and select **Paste**.



Choosing Fields in G-All7

There may be entry fields that you do not use in your research.

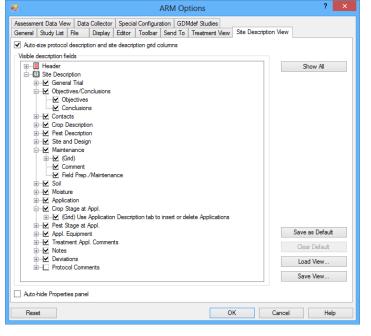
Assessment Data Editor – Assessment Data View

Assessment	t Data - Line 1									From the Assessment Data
Column Nu	mber	1	2	3	4	5	6		Properties 4	
Pest Type				ARM Options	5		?		Assessment View Hidden Fields	Editor's Properties Panel,
Pest Code						10 10 10			BBCH Scale	select View Options.
Pest Name	General Study List Assessment Data Vi			oolbar Send To Treat		of Description View			Ignore Match Crop Scientific N	select view options.
Crop Code		Data Collector	r special C	oninguration Gibinder Si	ludies				Refresh Crop Variety Description	
Crop Nam	View subsamples			Prompt	Ma	tch Sor	Visible	~	Hidden: Row < >	Calastilla varua ta ha uisihla
Part Rated	By column		~		(AII)		v		Views	Select the rows to be visible
Rating Da	Data origin			Pest Type	(AII)		v	- 1	Original	from the Visible column.
Rating Ty	Both		~	Pest Code	(AII)		v		All fields Hidden fields with information	
Rating Un	Entry status			Pest Scientific Name	(AII)				Hidden fields with information Hide empty fields	
Number of	Both		~	Pest Name	(AII)		v		Default - All visible Default - Brief fields visible	Save View will save current
Assessed	Cursor order			Crop Code	(AII)		v		Default - Fertilizer fields visible	
Rating Tin Days Afte	By column across	'Plot'	~	BBCH Scale	(AII)				Default - Non-pest fields visible Default - Tablet Data Entry	view settings in a *.pdv file
Trt-Eval In				Crop Scientific Name	(AID				longTrt	for future use. Use Load
Days Afte	Columns: 1			Crop Name	(AII)			~		
ARM Actic	Use color bands				Cle	ar Clea	r Show All			View to retrieve saved or
Number of	By 'Plot' experime	ntal unit	~	gnore match			Hide All			suggested default settings
Trainber of	Plain lines: 1	Colored lines:	0 🌲	Display sort as tabs				-		00 0
	 Display using de 	cimals accuracy								for certain disciplines.
4										
-	 Automatically res 	name images		Prompt V						Press Save As Default if
		Save as De	efault	Clear Default	Load Vie	w S	ave View			these acttings are to be used
	, 									these settings are to be used
	Reset				ОК	Cancel	Help			for all new protocols created.

Options – Protocol Description View

Assessment Data View Data Collector Special Configuration GDMdef Studies General Study List File Display Editor Toolbar Send To Treatment View Protocol Description View Image: Configuration fields Image: Configuration fields Image: Configuration fields Image: Configuration fields Image: Configuration fields Image: Configuration fields Image: Configuration fields Image: Configuration fields Image: Configuration fields Image: Configuration fields Image: Configuration fields Image: Configuration fields Image: Configuration fields Image: Configuration fields Image: Configuration fields Image: Configuration fields Image: Configuration fields Image: Configuration fields Image: Configuration fields Image: Configuration fields Image: Configuration fields Image: Configuration fields Image: Configuration fields Image: Configuration fields Image: Configuration fields Image: Configuration fields Image: Configuration fields Image: Configuration fields Image: Configuration fields Image: Configuration fields Image: Configurati	•			ARM Op	otions			?	×
	General Study List File ✓ Auto-size protocol des Visible description fields ♥	Display cription and site ription lishment Guidel Description Insert Applicatic ment Comment ation Directions e at Appl. e at Appl. ation omments	Special Configure Editor Toolbar e description grid c	ation GDI Send To columns	Idef Studies Treatment View		Sav	e as Default ear Default pad View	
					0	к	Cancel	Hel	p

Options – Site Description View



In a Protocol, select Tools – Options – Protocol Description View.

Choose items to be used. Uncheck any item to not be included.

Press **Save As Default** to keep choices for all new protocols created.

To save and use multiple formats, use the **Save View** and **Load View** buttons.

In a Trial, select Tools – Options – Site Description View.

Choose items to be used. Uncheck any item to not be included.

Press **Save As Default** to keep choices for all new protocols created.

To save and use multiple formats, use the **Save View** and **Load View** buttons.

Hiding Fields in an Editor: Mouse Right-Click

b	Undo Paste
- '	Undo Paste
. *	Cut
e.	Сору
Pr 💼	Paste
	Hide Current Field
1	Display All Fields
	Display Hidden Fields with Information
	Set As Default
	Header View Options
	Show Validation List
	Show Tooltip
	Remove Split

Right-click in a field on any editor.

Select the **Hide Current Field** option to hide the selected field from view.

Select the **Display All Fields** option to display all currently hidden fields.

Select the **Display Hidden Fields with Information** option to display all hidden fields that contain information.

ARM Options

Select Tools – Options to open the **Options** dialog.

Options – General Tab

	ent Data Viev		a Collector				GDMdef Studie			
General	Study List	File	Display	Editor	Toolbar	Send	To Treatment	View	Site Description View	
O Met	ement unit ric e treatment ur		US sta study using		v - Setting:	s.		_	uage English	*
	o-format numl t available pri		ts					Weel		~
Brie	ude study de f menus e explorer-styl				enu				nstall updates without prompting for confirmation heck for study definition updates during	
Recent	ly used file lis	t:					9 ≑	└─ sta	artup	
	o-save study	-								
Sav	re report-relat	ed setti	ngs in stud	/						
	w tooltips									
	w startup wiz o-display a lis		oming task	s at start	up					
Res	at							0	K Cancel He	0

 ARM 9.1.1 (GDMdef) - G-All7, Herb Trial

 File
 Edit
 Format
 Tools
 Table
 Utilities
 Window
 Graph
 Tablet
 Add-Ins
 Hep

 Image: Second Second

Select Tools – Options – General Tab.

Language

Set the **Language** to use for ARM menus.

Measurement unit

Set the **Measurement unit** for page setup dialogs on reports. Note: See <u>Treatment Unit</u> to set the default unit for study definitions.

Check for updates

Set the frequency that ARM checks for the availability of free updates.

Options – Display Tab

•						ARM Op	tions			?	×
Assessmen		_			_		Idef Studies				
	Study List	File	Display	Editor	Toolbar	Send To	Treatment View	Protocol Description	View		
	nat: or: t year (YYY eading zero	۰+ ۲)	hyphen		>	Default ri Microsoft Editor sc -	font: Sans Serif ch text font: Sans Serif reen fill character: ad-only field format	*			
GPS form Colors Screen e Required ForeColo	element: d fields	De	grees Deci	v	The sa	ample below act ForeColo	v is a preview of thi r o BackColor if y xample display. Sample				
Reset							0	K Cance	el	Hel	p

Select Tools - Options - Display Tab.

Date and time

Set the format of dates and times displayed on ARM editors and reports.

Why are Data Entry Fields Different Colors?

Colored fields represent fields marked as **Required** by the Study Rules.

Options – Treatment View Tab

						AKIVI	Op	tions)
Assessment		_			-			Idef St	udies nent View						
General St			Display	Editor	olbar			neau	HELL VIEW		rotocol	Description	view		
Ingredients	for pre-mixe	es			Treatm							_			-
✓ Hide In	gredients g	id			Treatn		ield					Range	-		^
	rate unit				Trt No							(1-4)	3	•	
🔿 Use p	re-mix rate u	unit			Туре							(8-8)	8	✓	
Force	rate to Al				Treatn		lame	•				(0-75)	30	-	
					Form (Conc						(0-10)	10	<	
- Base pro	duct calcul	ations	on Other F	Rate and	Form	Unit						(0-8)	8	✓	
unit fields				ate and	Form [*]	Туре						(0-3)	3	✓	
Freeze Field					Lot Co	de						(0-20)	20	✓	
Treatment N	lame			~	Densit	y						(0-6)	6	✓	
					Regist	ration	Nur	nber				(0-20)	12		
Use color ba					Re-En	try Int	erva	1				(0-12)	12		
By treatment	t			×	Descri	iption						(0-75)	15	-	1
Auto-hide	e Properties	panel			Cost							(0-12)	12	•	
					Cost L	Init						(0-12)	12		1
					Identif	icatio	n Co	de				(0-23)	23		
					Suppli							(0-3)	2		۷
					Enter d	esired	field	length	s in the Se	ettin	g colum	ın.		Show All	
					treatme	int edi	tor.	Edit rep		s (Fi		columns) on t Reports) to		Hide All	
					Treatr	nent fi	eld n	orint opt	ons						
										from	options	s for each re	port		
Save V	iew		Load Viev	V	● Us	e visib	le tre	eatment	fields (cu	men	t view)	on all printed	l reports		
Reset										ОК		Cano		Held	

Select Tools – Options – Treatment View Tab.

Select the columns to display on the Treatments Editor using the **Visible** column of the **Treatment Fields** options.

Printing Treatment Fields

Use the **Treatment field print options** to define what treatment fields are printed.

 Note that selecting Use visible treatment fields (current view) on all printed reports will override any Fields to Print option on all reports.

Options – File Tab

•						ARM Op	otions		? ×	
Assessme	nt Data Vie	w Data	Collector	Specia	al Configura	ation GDI	Mdef Studies		_	
General	Study List	File	Display	Editor	Toolbar	Send To	Treatment View	Protocol Description View		
Study dat	a:	c:\users\	Browse							
		Set as	s default							
Backup:		F:\ARMb	Browse							
		60 🚖	Backup	interval ((minutes)					

Select Tools – Options – File Tab.

Define where to store backup data and the time interval that backups will occur.



An SD card is recommended for backup as an inexpensive and secure storage option. The Backup interval should be a minimum of every 60 minutes.

Backup data must be stored in a folder named 'ARMbackup' to clearly identify the backup folder for ARM studies. Select File – Open Study From List and right-click on the file to open and select **Previous Versions** to view the backed up versions of the study.

This feature offers the advantage of being able to go back to *any* time in the historical life of the file. Making a backup of a computer's files will only save the *last* saved copy, which may or may not be the desired version.

Settings – Treatment Unit: Metric or US Standard

The treatment unit is set by study in the Window – Settings dialog. A default unit can be set for each study definition. The treatment unit sets a default formulation concentration unit for chemical products entered as treatments. It also sets which treatment units are displayed for the primary treatment rate unit.

	Protocol Set	ttings ? ×
General Design	Treatment Application	Layout
Paired Checks:		None 🗸
Untreated treatment	s:	1
Reference treatment	t number:	-
Treatment units Metric Settings	O US standard	
Treatment Fields	w Options	
	Dry formulation unit Specify formulation u	Lation Unit Setting
	Percent	Grams Al/kg OK Cancel
Save as De	fault OK	Cancel Help

To set treatment units:

- 1. Begin a new protocol or open an existing study.
- 2. Choose Window Settings and click the Treatment tab.
- 3. Set the **Treatment units** option to **Metric** or **US standard**.
- For Metric, also define a default unit for dry chemical formulations (% or grams AI/kg) by pressing the Settings button.

For study definitions with a second rate and unit field, the treatment unit setting does not restrict which rate unit displays in the list.

Press the **Save as Default** button for all new files to use these settings.

Changing Your Login Password

	User List Information	f X
ARM Program Licensee: Gylling Data Management, Inc. Matthew ElsingerGYELMA		
Authorized user 1 of 0	Matthew Elsinger	Cancel
Login name: Login password	Matthew Eisinger	Help
Password		
Verify password:		
Unique user ID: User rights	MRE	
O Read		
O Enter data		
 All edits 	Add	
GLP/GEP Studies	Update	
Previous	Next Delete	

Select Edit – User List.

Type the desired login password into both the **Password** and **Verify password** boxes to change the password needed to log in to ARM.

Enter a unique user ID for each user to identify each edit made by this user in the GLP/GEP audit trail log.

The user's initials is the recommended ID.

Click **Update** if button is not grayed out. Otherwise click **Add**.

Study List

Use the Study List table to select one or more ARM studies to open.

Locating Studies in Study List

Select File – Open – Study from List. Use the following features to locate studies when the study list is large:

Filter

Heade	er				
Study ID		Pare	nt	Protocol 📃 Stu	dy
Title					
🛣 Site D	escription - General(1)				
	Location	F			
₽	The second secon	ige	Ì		
	Brookings, SD 57006	^	ſ		
	Gembloux		ſ		8
	GERMANY				
c 🗆	GROOTPAN		Ľ	Organization	
	Huin		E		_
	Kutsugan		Ľ		_
	Le Vezier		ŀ		
	Lopo		ľ		
-	MOISDON LA RIVIERE		ľ		
	Pinxton				>
	Sudbury				

Define one or more filters to display only studies that match the contents of the specified fields.

In the Study List editor, click on the yellow filter icon in the field to filter. Select one or more items from the filter list and select:

- **Include** will display all studies containing the selected items.
- **Exclude** will display all studies that *do not* contain the selected items.

Press **OK** to display the results.

					Display only studies that include the specified
Stu	idy ID 🔺	Title		7.	text in the current study list column.
G-	All7_Fung	Ana	Filter by Trial	d other fungicides for the control o	Enter a phrase including several words
	All7_Herb	Dete	Filter For	effective dose rate of UEPR 1 agai	(such as "on wheat") to display only studies
	All7_Herb	Dete	Remove Filter	effective dose rate of HERB1 agai	that contain the exact phrase.
G- G-	•		Filter 'Title'		$\frac{1}{2}$ To display studies with "wheat" in the title:
G-			Filter For:		
G-	1	Con			1. Right click on the Title column.
G-		Sere	Reneme File	OK Cancel	2. Select "Filter For."
St-		A			3. Type "wheat."
31	EXAMPLE 1	AL 111	Archive File	aning Number 1	
					Press Enter or select OK.

Use **Filter For** in combination with **Filter** to further reduce the number of studies displayed. To display studies that include "wheat" in the title and are in one location, use **Filter** on the **Location** field, then use **Filter For** on the **Title** column.

Sort

Apply a sort to change the order studies display in the list.

In the grid section that displays items in the list, click once on a column heading to sort the list in ascending order (from A to Z) according to information entered in the column. Click the column heading again to sort in descending order (from Z to A). The list is sorted by **Last Opened** by default.

Filter For

Find

		Find			1	? ×
Find Replace Find what: Options:	cotton Search Down					~
			More	▼ Find Next	Cano	cel
	Browse Rebuild	#	Clipboard	ОК	H	lelp

In the lower right corner of the study list, click the binoculars button to use the **Find** command. ARM will search for the first study that contains the specified item in any column of the list.

For example, using the Find dialog to search for "cotton" locates the first study with the word cotton in any of its columns.

Rebuilding the Study List

Sea	arch Location	
D	Search specified path	
	C:\Users\Matt\Documents\ARM Data\	Browse
۲	Search all known paths	
	C:\Users\Matt\Documents\ARM Data\ C:\Users\Matt\Documents\ARM Data\2013\ C:\Users\Matt\Documents\ARM Data\Tutorial\	
	Search subfolders	
_		
	puild Method	
Ret		irectory location
Ret	Duild Method Clear existing studies and rebuild entire study list Update existing study list, keeping all existing studies Remove rows for studies that are no longer stored in the d	
	Clear existing studies and rebuild entire study list Update existing study list, keeping all existing studies Remove rows for studies that are no longer stored in the d identified in the study list Update information in study list for studies that have change	ged since the

Select Utilities – Rebuilt Study List.

Search Location

Define the file path(s) ARM will search for studies.

- Search specified path will search for studies only in the listed path.
- Search all known data paths will search in a list of paths from which you have previously opened studies.

Rebuild Method

Define what to do with the list of existing studies that are currently in the study.

- Clear existing studies will start from an empty list.
- Update existing study list will add onto the current list, keeping the existing studies.

Note: This feature *does not delete* any studies, only alters what studies are in the Study List.

Validating Studies

What is Validation?

Validation is a checking process to help you avoid mistakes while editing study information. ARM contains lookup tables, called validation lists, to help enter information consistently. These lists also function as cross-checks for common mistakes.

Keyboard Commands to use with validation lists

F9	Validate current field entry against corresponding validation list
Shift F9	Display validation list for current data entry field
Ctrl F9	Add validation items to the corresponding Master List
Ctrl C	Copy validation list to clipboard (only when validation list is displayed)
Ctrl A	Validate study, and stop at first error
Ctrl E	Validate study, and list all errors in the message viewer

Master Validation Lists – EPPO Bayer and BBCH Crop Growth Stage Lists

EPPO pest Bayer code lists and BBCH crop growth stage lists are very large lists that are maintained in a database. For example, the EPPO weed (plant) list contains more than 27000 records. These lists are not editable within ARM.

Note: Validation lists in the database display as Master validation lists.

Use the EPPO Plant Protection Thesaurus to search for EPPO codes.

The website is http://eppt.eppo.org/search.php.

Select Help – BBCH Growth Stage to review the PDF documentation.

(Composition of the second sec	EPPO Plant Protection Thesaurus EPPT Search EPPT								
VE DE									
Home	Enter the Name or the EPPO Code			Search					
News/modifications	Search by : Both 🔻	Search mode	Type of entity						
Licensed user	Search _{language:} All available 🔻	 Starting with Containing the word 	AnimalMicroorganism						
	Results per page : 50 🔹	 Use soundex algorithm Find children 	Group classifier						

 Help

 Contents
 •

 Search for Help On...
 •

 Topic
 F1

 Study Definition
 F5

 Quick Reference Card (pdf)
 •

 How To Topics
 •

 Tutorial
 •

 Media
 •

Personal validation lists

GDM recommends adding frequently used items to a personal validation list so the validation lists display faster, and show items you typically select.

🖳 Pest Co	de Master List (EPPO_CODES)		? x
Pest Code	Pest Scientific Name	Pest Name	Language 🖍
1MANRG	Mandarivirus	Mandarivirus	US
ABCLM0	Apricot chlorotic leaf mottle	Chlorotic leaf mottle apricot	US
ABMMO0	Apricot Moorpark mottle agent	Moorpark mottle of apricot	US
ABMV00	Abutilon mosaic virus	Abutilon mosaic virus	US
ABPL00	Apricot pucker leaf agent	Pucker leaf of apricot	US
ARRP00	Apricot ringpox agent	Ringnov of apricot	TIS T
All/No F 👻	All/No Filter 🗸	All/No Filter 🗸	All/No F 👻
Display Pe	ersonal Add to Personal	OK Cancel	• † M 🧖

- Begin a new protocol using G-All7.def, or open an existing study.
- In the Assessment Data Editor, click into **Pest Type**, press **F9**, and select an entry.
- 3. Click into **Pest Code**, press **F9**.
- 4. If there is a **Display Master** button visible (if a personal

list is currently displayed),
then click this button.

5. Highlight a commonly used pest, and then click **Add to Personal** button.

The next time you display this pest code list, the personal list will display with the selected pest in the list.

Pest Code	Pest Scientific Name	Pest Name	Language
1MANRG	Mandarivirus	Mandarivirus	US
	All/No Filter	✓ All/No Filter	▼ All/No F ▼

Finding Items in a Validation List

Press **F9** in a validated field to display a validation list, and then use one of the search commands to search through both validated items and comments:

Search by

- Type the first letter of an item to step to the item that begins with that letter.
- Type the first few letters of an item to step to the next item that matches. ARM stops searching when you pause typing letters.

Find

- Press Ctrl+F to use the Find command on the Edit Menu, or
- Click the **Find** button (binoculars button) at bottom right of validation list.

Use Down Arrow / Up Arrow or Page Down / Page Up keys to scroll through the validation list.

Changing Information in Editable Validation List

To add a new entry to a personal validation list:

- Rating Type		💀 Assessed By Personal List (C:\Pro	gramData\ARMdef\GDMdef\G-ApplBy.lst)	Enter the information to add
Rating Unit		Assessed By Comment	ARM - Information	into the validated field(s) of
Sample Size, Unit		Jenkins, B. Example entry		the study editor.
Collection Basis, Unit				
Number of Subsamples	1		No matches found. Add item to list?	1
Crop Stage Majority				Put the cursor into the
Crop Stage Scale				-primary validated field, and
Crop Density, Unit			Yes No	press F9.
Pest Stage Majority		All/No Filte - All/No Filter -		piess rg.
Pest Density, Unit		New Delete	OK Cancel 🗈 茾 🌡	
Footnote Number				If you are asked to add the
Assessed By	FranGylling			information then choose Yes.

To remove an item from an editable personal list:

🖳 Assessed	By Personal List (C:\Pro	gramData\ARMdef\GDMdef\G-ApplBy.lst)
Assessed By	Comment	<u>^</u>
FranGylling	Example Assessed By	
Jenkins, B.	Example entry	E
		-
All/No Filte 👻	All/No Filter 👻	
New	Delete	OK Cancel 🗈 茾 🏟 🦿

Press **F9** to display the validation list.

Select the desired item, and press the **Delete** button.

Select **OK** to confirm deletion.

Keyboard Commands

General Keyboard Commands

F1	Topic specific help
F5	Study definition specific help (if present)
Tab / Shift+Tab	Within help file, select the next / previous link
Esc	Leave dialog box without making modifications
Alt Down Arrow	Display list in a combo box (an edit box with down arrow at right side)
Ctrl+Z	ARM Undo feature (or Edit – Undo)

Common Study Editor Commands

The following editor commands work with all study editors:

	· · · · · · · · · · · · · · · · · · ·					
Enter	Advance to the next field					
Shift+Tab / Alt+Left Arrow	Move to previous field or column in current line					
Tab / Alt+Right Arrow	Move to next field or column within current line					
Up Arrow / Down Arrow	Next line / Previous line					
Right Arrow / Left Arrow	Left/right within current field, or previous/next field if at start/end of field					
Page Up / Page Down	Next screen / Previous screen					
Backspace	Erase character to left of the cursor					
Alt Backspace	Undo the last change made in the editor text box for the current field					
Delete	Erase character to the right of the cursor					
F6	Spell check					
F11 / F12	Move to previous / next field					
Shift+Up Arrow/Shift+Down Arrow	Begin / extend block marks in direction of arrows					

Header, Protocol and Site Description Editor Commands

Enter	Close paragraph in wrapped text block					
Shift+Enter Extend block mark						
Ctrl+Left Arrow Previous word in current text field						
Ctrl+Right Arrow Next word in current text field						
Shift+F7 Insert one instance of a repeating section (only in an elastic site description s						
Shift+F8	Delete one instance of a repeating section (only in an elastic site description					
	section)					
Shift+Esc	Exit wrapped text field and move to previous					
Esc	Exit wrapped text field or grid and move to next field					

Treatment Editor Commands

In Treatment Name field, duplicate entire treatment line above
Duplicate single corresponding field from above
Display ingredients dialog, to calculate a premix rate for current treatment line from a
desired ingredient rate
First character in current treatment field
Last character in current treatment field
Current field in first treatment line
Current field in last treatment line
First field in current treatment line (left side)
Last field in current treatment line (right side)
First field in first treatment line (upper left corner)
Last field in last treatment line (lower right corner)
Insert blank lines above current treatment line
Insert blank treatment separator lines
Delete treatment lines
Validate current treatment field entry
Display validation list for current treatment field
Add to master validation list for current treatment field
Sort into treatment order
If current field is Treatment Number, will mark entire line
If current field is Treatment Number , delete treatment line without confirmation

Assessment Data Editor Commands

The Treatment Editor commands listed above apply, as well as:

"	Duplicate entire data header at left (only when entered in first / top header field)
6	Duplicate header entry at left of data column
'or * or o	Duplicate assessment data entry from assessment data line above current line
Z or O	Enter 0 into current blank assessment data entry cell and advance to next entry cell
	("Z" for Zero, the letter O for number 0)
C or H or I	Enter 100 into current blank assessment data entry cell and advance to next entry cell
	("C" for "Centi-", "H" for "Hundred", the letter "I" looks like number 1)
Tab	Move right to the next assessment data column
Ctrl+Page Down	Move right 1 screen page
Ctrl+Page Up	Move left 1 screen page
Alt+A	Move cursor to next blank data column
# Enter	View footnote # (typed into footnote number field)
	Missing data identifier
Shift+Alt+Left /	Extend block mark to another column
Right Arrow	
F2	If in an assessment data cell, display Subsample Editor
Mouse shortcut	Click on the assessment data header prompts to scroll one column left

Right Mouse Button

The right-click menu shows context-specific actions that are available. See <u>Right Click Menu</u> for more information.

Entering Treatments

Inserting Treatments versus Treatment Lines

Each treatment line defines one component of a treatment so one treatment can consist of more than one line of treatment information.

Treatments - Line 1 Trt Trt No. Туре Treatment Name Line 1 1 NO. Undo 2 ቆ Cut 3 Bb) Copy 4 5 Copy Current Treatment Line 6 ß Paste 7 Paste Special... 8 Insert Line... 9 Delete Line... 10 Insert Treatment... 11

Open the Treatments editor, right-click in any cell and select:

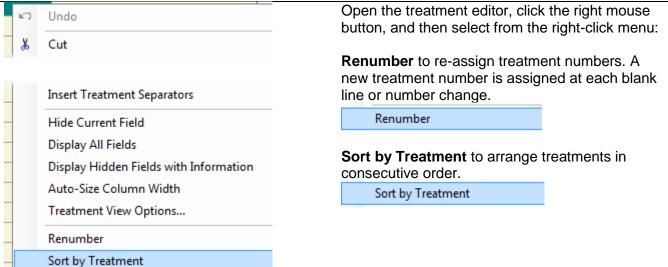
Insert Treatment to add a *new* treatment to the current study. In a trial, assessments for the new treatment are added at the end of each replicate.

Insert Treatment...

Insert Line to add more treatment lines to an *existing* treatment

Insert Line...

Arranging Treatment Information



Treatments & Plots in Split Plot or Factorial Trial

The number of treatments is calculated by multiplying the number of levels in each factor as below:

(Factor A * Factor B * Factor C) + Comparison Treatments

The number of plots in a trial is calculated by multiplying:

Number of Treatments * Number of Replications

Calculating Ingredient Rates in a Pre-mix

For treatment products that contain more than one ingredient, the rate of each ingredient can be calculated from the product rate. The products must be defined in the validation list with ingredient information entered in the correct format.

In ARM, press **F1** to display help, and then find **Validation List Item Format** in the **Index**. See the "Sure-Kill" example for the correct ingredient format.

To display the ingredient dialog when it is hidden:

- 1. Right-click mouse on treatment editor.
- 2. Select Treatment View Options.
- 3. Clear the checkbox for Hide Ingredients grid.
- 4. Open the Properties Panel and click the pin button to keep the panel in view.

Treat	ments	- Line 1								
Trt Line	Trt No.	Туре	Treatment Name	Form Conc	Form Unit	Form Type	Description	Rate	Rat Uni	î
1	1									
Prop	erties									Þ
No ii	ngred	ient inforr	nation		Vie	ew Opti	Hidden Fields Hidden Fields Lot Code Density Rejistratio Re-Entry Ir Cost Cost Cost Unit	n Numi	ber	~
< Prop	pertie	s							>	

Rate / Rate Unit and Other Rate / Other Rate Unit

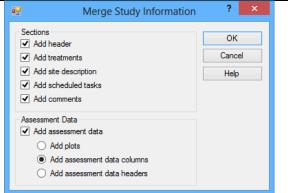
Many study definitions include two pairs of rate and unit fields.

- Two different views of the same rate for each treatment line can be helpful. Examples include: an Al-based unit (g Al/ha) and a product-based unit (L/ha), or a metric unit and a US standard unit.
- The first (left-most) rate fields are the primary rate and unit fields for product amount calculations.
- The second (right-most) rate fields are calculated from the primary rate and unit entries.
- In GDMdef study definitions the right-most unit fields are named **Other Rate**. In older study definitions they were named **Product Rate**.

New Rate Units

Contact GDM for any modifications to the list of rate units that are displayed in the treatments editor. Please do **<u>not</u>** attempt to add new rate units yourself! The rate unit definition includes values that greatly influence product amount calculations.

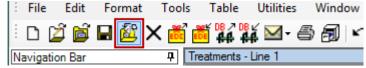
Copying Information from a Similar Study



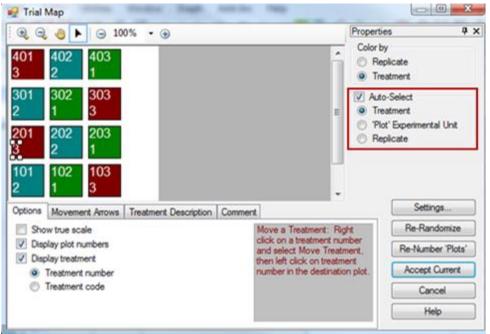
Select Tools – Merge – from ARM Study to copy information like the header, treatments, site description, tasks, comments, and assessment data with columns and data headers from an existing study.

Editing a Randomization

Before trial is established



After trial is established



Open a protocol; select File – Create Trial or choose **Create Trial** icon to assign a randomization.

Open a trial; select Window – Trial Map.

To switch the positions of two treatments:

- 1. Check the **Auto-Select** box and then choose **Treatment**.
- 2. Click on a treatment number.
- 3. Drag the treatment number to a new plot.

The cursor will display a slashed circle if the treatment cannot be moved to the current cursor location.

Experimental units and replicates can be also be moved using the **Auto-Select** option.

Entering Assessment Data

Inserting Today's Date

Rating	Date											Ļ
Rating Type										01.2		
Rating Unit									arch, 2			
Numbe	er of Su	heamn	00			Sun	Mon	Tue	Wed	Thu	Fri	Sat
NUMBE		badinp	63			26	27	28	29	1	2	3
Assess	sed By					4	5	6	7	8	9	10
SE Na	me					11	12	13	14	15	16	17
						18	19	20	21	22	23	24
Sub	Rp	Bk	Col	Plot ∆	Tr	25	26	27	28	29	30	31
1	1	1	1	101		1	2	3	4	5	6	7
1 2 2 1 201							0		Today	r: 3/1/2	012	

Press the **spacebar** in any study editor date field to insert today's date in the current date format. Rating Date

Or click the down arrow in a date field and click the **Today** button.

Using ARM Action Codes in Assessment Data Headers

ARM Action Codes identifies special actions that ARM should perform. In the **ARM Action Codes** field of the assessment data header, press **F9** for the validation list. The list contains special actions for columns of data:

ARM /	Action C	Codes			
Numbe	er of De	cimals		💀 ARM Action Code	s Personal List (C:\ARMdef\GDMdef\G-DataTp.lst8)
Sub	Rp	Bk	Со	ARM Action Codes	Description
1	1	1		******	*** Following are Defined Rating Limits that ARM will Enforce ***
1	2	2		С	Rating scale of 0 to 10
1	3	3		P	Rating scale of 0 to 100 (e.g. % control or injury)
1	4	4		R	Rating scale of 1 to 5
_	-			1	Rating scale of 1 to 6 (e.g. lowa Corn Rootworm)
				S	Rating scale of 0 to 5 (e.g. Idaho SB Root Maggot)
				В	Rating scale of 1 to 9 (e.g. turf, sheath blight)
				М	Rating scale of 0 to 9 (e.g. mole crickets)
				+	Only positive values (0 to 3.402823E38)
				Y	Yes/No rating scale of 1 or 0, where 1=Yes and 0=No (e.g. EPPO taint test)
					*** Following Identify Non-Analyzable Data for Summary Reports ***
				EC	Do not analyze untreated check, and report check treatment mean on AOV Means Table
				ES	Automatically exclude (remove) this data column from all Summary reports
				сет	Automatically avaluate (remarks) this data column from all ADM ST (Summary Across Trials) summarice
•					
				All/No Filter	▼ All/No Filter
_	_	_	-		New Delete OK Cancel

- Defined rating limits, such as limiting entries to a range of 0 100.
- Special AOV Means Table calculations for percent control.
- Transformation ID codes for built-in transformations.
- Mean comparison ID codes for Standardized Summaries.
- Indexes for EPPO rating scales.
- General calculations. Identify nonanalyzable data for summary reports.

Treatment Evaluation Interval (TEI)

ſ	🖷 Trt-Eval Inter	val Personal I	List (TEL\$)
1	Trt-Eval Interval	Comment	
ĺ	21 DA-C	C 14-09-11	
1	54 DA-B	B 12-08-11	
1	72 DA-A	A 25-07-11	

TEI is the number of days after (or before) an application when the assessment was performed. ARM will automatically add the TEI or list the choices in the drop down list when there are multiple application dates in a trial.

If this dialog display, then enter an Assessment Date in the current data column so TEI can be calculated relative to date of the assessment.



Footnotes

Footnot	e Number	1		
Assesse		Footnote 1	×	
SE Nam			<u>^</u>	
Trt-Eval				
ARM A				
+ Sub				
▲ 1				
1				
1			×	

In the Assessment Header, type a footnote number in the Footnote field. Then press **Enter** to display the footnote textbox. **Note**: Several data columns can

reference the same footnote number.

Sorting Assessment Data Headers

Select Tools - Options - Assessment Data View.

.	ARM Options			?	x
General Study List File Display Editor Assessment Data View Data Collector Special	Toolbar Send To Treatme Configuration GDMdef Stud	nt View Protocol Description	n View		
View subsamples	Prompt	Match	Sort	Visible	
By column 🗸 🗸	Crop Code	(AII)	2	VISIDIE	
Data origin	BBCH Scale	(AII)			
Both 🗸	Crop Scientific Name	(AII)			
Entry status	Crop Name	(AII)		✓	
Both 🗸	Crop Variety	(AII)			1
Cursor order	Description	(AII)			
By column across 'Plot'	Part Rated	(AII)		✓	
Columns: 1		(AII)		✓	
	Rating Date	(AII)	1	✓	~
Use color bands		Clear	Clear	Show A	II
By 'Plot' experimental unit Plain lines: 1 Colored lines:	Ignore match ✓ Display sort as tabs			Hide Al	
Display using decimals accuracy					
 Automatically rename images 	Prompt V				
Save as Default	Clear Default	Load View	Sav	e View	
Reset	[OK Cano	el	Help	

Click the **Clear** button below the **Sort** column to remove any current sort.

Put cursor in the **Sort** column of the data header field you wish to sort (such as **Rating Date**).

Enter a **1** to identify this as the first sort field.

If you wish to apply a sort within rating date, then put **2** in the second sort field (**Crop Code**).

Set the **Display sort as tabs** option to create a separate editor tab for each rating date.

Select **OK** to apply the sort.

Viewing Subsamples

Select Tools – Options – Assessment Data View.

•			ARM Op	otions				?	×
	Display Editor ollector Specia		oar Send To guration GD		_	Site Description View			
View subsamples By column	¥		ompt	11-5	(AID)	Match	Sort	Visible	^
Data origin Both	¥	1 HE	eporting Basis umber of Subs		(AII) (AII)			 Image: A start of the start of	
Entry status			op Stage Majo	ority	(AII)				

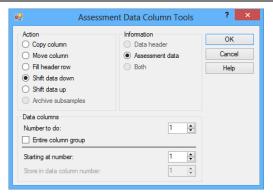
Set the View subsamples option to By column.



Check that **Number Recommends** of **Subsamples** data header row is visible (grid in upper right of dialog).

Enter the number of subsamples to view in the assessment data header of each data column.

Whoops, Missed a Plot when Entering Data



Open the Assessment Data editor and place the cursor in the missed assessment cell.

Select Tools – Assessment Data Column Tools – Shift Data Up or Shift Data Down. Indicate the data column for action and how many times the column should be shifted. Press **OK** to shift the data.

Properties Panel: Additional Assessment Information

9	*	Assessmen	it (Plot 104, C	ol 9)	
75.00		Comment:		all depression that	-
60.00			was under wa	ater 3 days in May	
70.00					Ŧ
65		Barcode:	-		
0.00		000 50	100.000	0.504000	
65.00		GPS: 52	490406	8.584602	
70.00	E	🔽 Damag	jed		
70.00		Image:			H
0.00		Att	ach		-
55.00		Ren	nove	The state	100
65.00				M. Martina	
60.00		Displa	ay current		
0.00		rootin			

Select the **Properties** button on the Assessment Data editor to display the Properties Panel.

8	^	P
D	D	be
SEPTTR	Zi	lies
Septoria tritici	Cc	Н
Speckled leaf bl	Cc	45

Enter additional information for an assessment.

- Digital photograph
- Comment
- Damaged value marker
 - o A damaged assessment is not analyzed
- GPS Coordinates
- Bar Code label ID

Attaching Images

Assessmen	t (Plot 101, Col 1)	
Comment:		< >
Barcode:		
GPS:		
Damag Image:	ed	
Atta	ach	
Ren	nove	
Ren	name	
Display b treatmen	by It	

To attach an image to an individual assessment:

- From the Assessment Data editor, click the **Attach** button on the Assessment Data Properties Panel.
- Drag and drop image file(s) onto a specific assessment data cell within the Assessment Data editor.
- Take a photo with the **Tablet Data Collector** (available only on TDC installations).

File name components

Defines the way image files are renamed when they are attached.

Copy to trial fol	lder 🗹 Rename i	image
File name compo	nents	
✓ Trial ID:	1 ≑ 🖌 Plot:	4 ≑
Trt:	2 🚔 🗌 Sub:	5 🜲
Asm. Date:	3 🜩	
Add T, P, S	(Trt, Plot, Sub) prefi	x to file name components
G-All7_Herb_T00	04_Apr-18-2008_P1	01

Rename Image

Rename the image file according to the **File name components** options. When **Copy to trial folder** is not selected, this option will keep the images in their original folder.

Copy to trial folder

Copy the image files to the folder where the currently loaded trial is located. The files are automatically renamed according to the **File name components** options.

Attaching multiple images

 Direction By column across 'Plot' experimental unit Across columns within 'Plot' experimental unit Columns: 1 - 	
Number of images per 'Plot' experimental unit within an assessment column:	1 🜲

By column across 'Plot' experimental unit

Subsequent images that are attached will default to the next line in the Assessment Data editor within the current column.

Across columns within 'Plot' experimental unit Subsequent images that are attached will default to the next column, within the current experimental unit, for the number of columns specified by the Columns option.

To attach more than one image to a single experimental unit per column, increase the **Number** of images per 'Plot' experimental unit option to the desired number of images.

Copying and Pasting from Spreadsheet



Mark a block to copy in Excel, right-click into the destination cell in the Assessment Data editor and select **Paste**. Include "Plot" as the column heading in the block copied from Excel to identify a column of plot numbers.

Press **F1** in Assessment Data Editor for hints and more information.

Transferring Information from ARM to Excel/PDA

Select the **Push** button **Select** the **Push** button on the ARM toolbar to push a trial to an Excel rating shell, PDA, or Psion Workabout Enhanced Rating Shell.

After collecting ratings, select the **Pull** button **After** to pull ratings into the original trial.

Data Quality

ARM provides several tools to review assessment data to ensure the quality of data. These tools can be accessed from the **Tools** section on the Properties Panel of the Assessment Data editor. If the panel is not opened, click on the Properties tab to open the panel.

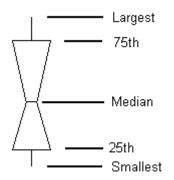
Properties	ą
Assessment View	Hidden Fields 🛛 📢
View Options	Pest Scientific N ∧ BBCH Scale
Ignore Match	Crop Scientific N
Refresh	Crop Variety Description
Hidden: Row	< >
Views	
Original All fields Hidden fields with inform Hide empty fields Default - All visible	nation
	Tools
Tablet TDC	AOV Means Table
Data 789 Entry 856	Box-Whisker
	Assessment Map

AOV Means Table

The AOV Means Table button displays a preview of the AOV Means Table report beginning at the current data column, and including all columns after the current that contain data. This report uses the current AOV Means Table Report Options settings on the Print Reports dialog.

Box-Whisker Graph

The **Box-Whisker** button displays a box-whisker graph of the current data column. A Box-Whisker graph illustrates the spread of treatment data groups around their medians, using a "box" and "whiskers" to break down each data group by percentiles. The **box** extends from 25th to the 75th percentile and is divided by the median. The **whiskers** extend from ends of the box to largest and smallest observation.



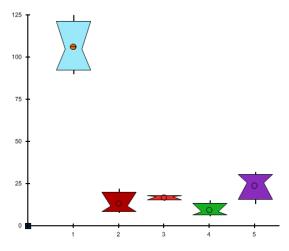
- Each box is one treatment, numbered from left to right.
- Height of box indicates amount of variability for the treatment. Any plus symbol + identifies a possible plot or subsample outlier.
- The narrow "waist" of box is the 50th percentile. A low plot data value will force waist below the midpoint of box.
- Treatment name will not display at bottom of graph if too many fields are included per treatment. Select Tools – Options – Labels Tab to edit labels.

A Box-Whisker graph:

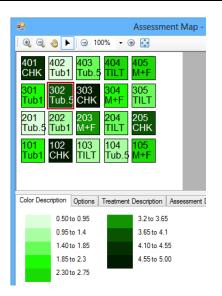
 Shows variability within a treatment, thus is a measure of assessment consistency within each treatment. Waist position is skewed when one replicate is somewhat higher or lower than others.

(E.g. when waist is "high", then value in one of the replicates is somewhat lower than in other replicates.)

- Provides a visual mean comparison, since treatments where boxes overlap are likely not significantly different.
- Simplest method to identify heterogeneous treatments.



Assessment Map



The **Assessment Map** button displays assessment data values on a trial map to help identify spatial effects that can occur from variations within the trial site. For example, if crop yield appears consistently lower in one corner of the trial, it may indicate a lower soil quality in that area of the trial.

- Differences in assessment values are indicated by color intensity. Lower values display in lighter colors than higher values.
- For example, note that the box for treatment 2 "Tub.5" in the third replicate (plot 302) is substantially darker than treatment 2 in the other replicates. This indicates that replicate 3 could be causing the larger data value for this plot.

Entering Site Description

Increasing and Decreasing Repeating Sections

Protocol / Site Description editors use repeating sections to add more instances of data entry rows or columns, such as applications.

- Press Shift+F7 with the cursor in a repeating section to add one section.
- Press Shift+F8 with the cursor in a repeating section to delete the current repeating section.
- Put the cursor in the Ins/Del Columns here field to increase or decrease number of columns using the **Shift+F7** or **Shift+F8** command.

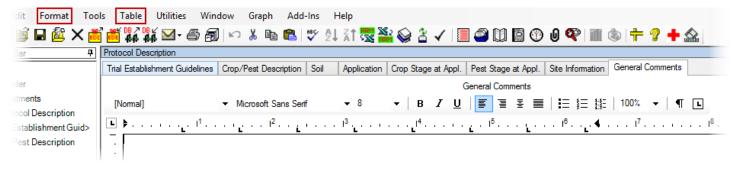
The right-click menu also has commands to "Insert Repeating Section" and "Delete Repeating Section".

Using Tables and Fonts in Rich Text Fields

The ARM GDMdef study definitions support rich text in large comment fields such as the **Comments**, **Objectives** and **Conclusions** editors.

Use the **Table** menu commands from the toolbar to add, edit, and delete tables. Use the **Format** menu to define font size, color, and other font features.

Choices on the Format and Table menu are disabled if a data entry field does not support rich text.



Field Map

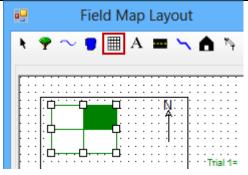
Creating a Field Map

Name: Description:			Johnny Overby Dir Test Plot for Marve		kota Wheat	
Start date:		Oct-14-2013				
End da	ate:					
Measu	urement	units:	meters	~		
Field	bounda	ary points				
Num	ber of p	oints:	4			
Coor	dinate s	system:	meters			~
Poi	nts		X (meters)		Y (meters)	
1*		0		0		
2		12.5		0		
3		12.5		40		
4		0		40		

Select File – New Field Map. Define corners of the field with point 1 (the origin) beginning at the lower left corner of the field. Enter either as X and Y coordinates or GPS coordinates.

Select **OK** to create the field map. Then name the file to save and press **OK** to continue.

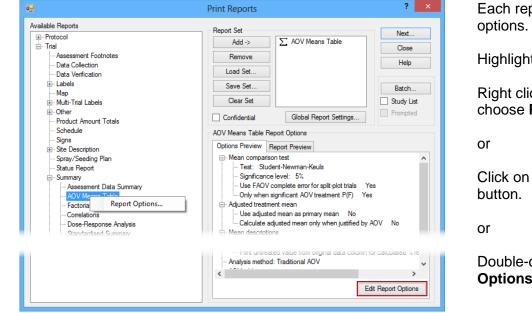
Adding a Trial to Field Map



- 1. Click the grid toolbar button to define a trial.
- 2. Click and drag the left mouse button from top left corner of the trial in the field map to the bottom right corner of the trial on the map to draw the trial on the map.
- 3. Double-click the trial grid to display a trial map.
- 4. Click the Add Study button, and select the trial to add.
- 5. Click the Accept Current button to use this trial.
- 6. Click **Save** to save the updated field map.

Printing Reports

Setting Print Options



Each report has its own set of options.

Highlight the report then either:

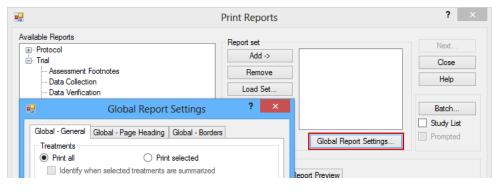
Right click the report name and choose **Report Options**.

Click on the **Edit Report Options** button.

Double-click an option on the **Options Preview** section.

Global Settings

The three Global Settings tabs control general settings that apply across all ARM reports.



Global – General

Define how treatments and assessment data headers will print.

Global – Page Heading

Define how the header information and page numbering will print.

Global – Borders

Define how the borders will print with the assessment data.

Portrait or Landscape Printing

To set the **Orientation** option for all reports:

•	Print	? ×
Current printer		Print
HP Officejet 6700 (Network)		After print:
Orientation	Print range	Close Print dialog 🗸 🗸
O Portrait O Landscape	All Pages	Preview

To set the **Orientation** option for a particular report:

🖳 Spray/S	Seeding Plan Report	t Options	? ×	
Product Amount Totals	Pre-mix Ingredient	Fields to Print	Sort	
Global - General	Global - Page Heading	Global -	Borders	
Spray/Seeding Plan	Spray/Seeding Plan Page Setup			
✓ Use report specific options]			
Orientation Portrait Landscape	-			

Changing Fonts on Reports

		Pi	rint	? ×	
	Current printer			Print	
	C Landscape	O Pages		Preview	
	Page order Down, then over		Copies: 1 🚔	Page Setup	
-		Page	Setup	?	×
	t printer ficeiet 6700 (Network)		[Labels	
Margin				Primary Font	
Left:	0.5"	Right:	.5"	Fixed-Width Font	
Top:	.5"	Bottom:	.5"	Bar Code Font	
			ОК	Cancel Help	

From the Print Reports dialog, select Next.

On the **Print** dialog, use the **Orientation** option to set the page orientation for <u>all</u> reports.

Press Edit Report Options – Page Setup tab.

Check **Use report specific options** to override the default setting for all reports, and use the **Orientation** option selected on this screen.

Select File – Page Setup.

Use **Primary Font** and **Fixed-Width Font** to define desired font and size to use on reports.

Report Sets

Print Reports	
Report set Add -> Remove	Spray/Seeding Plan Trial Map Product Amount Totals
Load Set	
Save Set	
Clear Set	
Confidential	Global Report Settings

A **Report Set** is a collection of reports that are selected to print. Click on a report in the **Available Reports** list, then click **Add** button to add the report to the end of the report set list.

Press the **Insert** key on the keyboard to add the currently selected report in the **Available Reports** section to above the cursor position in the report set.

The **Save Set** button will save the report set list with all options for the reports in the set.

Use the Load Set button to print these reports again next time.

Click **Clear Set** to clear the current selection of reports.

Printing the Site Description

There are several different forms that customize the way the site description can be printed.

Custom Form

This form uses the Site Description report options set by the user. This is the report that was called "Site Description" in previous ARM versions.

There are several common scenarios for printing the Site Description. The other available forms are pre-set configurations of the Site Description report options for these common scenarios.

Blank Form

All Site Description fields are included, and empty fields are printed with a blank following the prompt. This form is intended to be used as a fill-in form for entering information (example: % Sand _____). **Note:** The Site Description report options are not available for this report, and no changes are made to the current report options when this form is used.

Standard Form

Blank fields are compressed out of the report, leaving only those Site Description fields that contain data. This is the most concise way to display all information entered into the Site Description.

Note: The Site Description report options are not available for this report, and no changes are made to the current report options when this form is used.

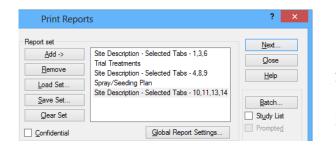
Named View

Select a Site Description view to determine the particular set of fields to print. These view files can be created and modified from the <u>Site Description View options</u> of the Options dialog. The Site Description report options are available for this report when a Named View is selected.

Note: This will not change, or use, the current view in ARM—only access a saved view *.ddv file.

Selected Tabs

Print only selected sections, or tabs, of the Site Description. This can be used to interleave the Site Description tabs throughout a report. This form uses the Site Description report options, which can be set by right-clicking the Custom Form report and selecting **Edit Report Options** before selecting tabs.



- Click the small plus sign
 ■ next to the Selected Tabs option in the Available Reports section of the Print Reports dialog to display the selection prompt.
- 2. Choose the tabs to include for the particular section, and press **OK**.
- 3. These tabs are then added in one entry on the current report set. More reports can then be added as desired.

Print Menu

The **Print** menu includes shortcut buttons for printing reports to file. Each file choice has specific options.

- a. Excel button "pushes" report directly into Excel.
- b. Word Processor button creates *.rtf file and opens the file in Word.
- c. Adobe button creates standard Adobe *.pdf file and opens the default *.pdf reader program.

📧 Excel 😿 Word Processor 🦪 Add	obe PDF 📙 File	-Print to
Format: Columns as tables Use tab separated columns when resident section borders	equired to keep	Excel
 Tab separated columns Locked objects 		Adobe
Adjust table cell left/right margin by:	-0.076cm	📙 File
Adjust table column width by:	0.102cm	
File name format		
Study ID Report Name	Date	в

Spray/Seeding Plan Report Questions

Why no product amount calculations?

- A recognized formulation type (such as EC), rate, and rate unit must be entered before ARM can calculate a product amount for formulated chemicals.
- For active ingredient rates, the formulation concentration must also be entered. Ensure the **mix size** option on the Application tab of the Settings dialog is larger than zero to obtain any mix basis rate units.
- For seed rate units (SEEDS/M2, SEEDS/HA), a rate and unit must be defined. Enter the Thousand Grain Weight (TGW) to obtain calculation of grams seed.

Why are dry product amounts 10 times too large (or small)?

- Insure that the default metric dry formulation unit is set correctly in the Settings dialog.
- Enter the actual formulation concentration unit in the treatments editor.

How do I control which treatment fields are printed?

• Use the **Treatment Fields to Print** button on report options to identify which treatment, rate, and unit fields to include on a report.

Summary Results

Always confirm your Summary Report options. What are the selected options for the Mean Comparison Test?

Standardized Summary

This report uses mean comparison test identifier codes listed in **ARM Action Codes** field in each assessment data column to determine how that column should be analyzed. The report prints in a format that is very similar to the AOV Means Table report.

Printing Both Sets of Treatment Rates and Units

Protocol Treatm	nents Report Options ? ×
Protocol Product Amount Totals	Pre-mix Ingredient Fields to Print
Treatments List ingredients for pre-mixes List validation comments	Options
	Fields To Print

ARM can support study definitions with two sets of treatment rate and unit fields. (Typically to list both active ingredient and product rates, or metric and US units.)

Use the **Treatment Fields to Print** button on report options to identify the rate and unit fields to include on a report.

AOV Means Table

Analyze all single factor designs, or 2 factor designs with significant A*B interactions, or 3 factor designs with significant A*B*C interactions. Some key options are:

• Mean comparison test

The first four mean comparison tests are listed in order of most liberal to most conservative. A liberal test is more likely to identify random differences as significant, while a conservative test is more likely to ignore actual treatment differences.

Duncan's New MRT 🗸 🗸
None LSD
Duncan's New MRT Student-Newman-Keuls
Tukey's HSD
Waller-Duncan k=100
Dunnett's vs. Control Dunnett's vs. Reference

Notes regarding the LSD (Least Significant Difference) test:

- (1) Use with "Only when significant AOV treatment P(F)" option for Fisher's Protected LSD test.
- (2) Use when analyzing only 2 treatments (General -Global Print selected) for Paired t-Test.
- (3) When using LSD to make an unplanned comparison of the highest and lowest mean in a trial with more than two treatments, the difference between treatments can be substantial even when there is no treatment effect. Some statisticians have determined that when using 5% LSD for a trial with:
 - (a) Three treatments, the significance level is actually 13%
 - (b) Six treatments, the significance level is 40%
 - (c) Ten treatments, the significance level is 60%
 - (d) Twenty treatments the significance level is 90%.
- ii. Use FAOV complete error term for split-plot trials option automatically uses appropriate error term for AOV Means Table analysis of a split-plot or strip-block trial.
- iii. Only when significant AOV treatment P(F) option give a "protected" mean comparison test, since mean comparisons are only performed when analysis indicates there are significant differences between treatments at probability level specified for the mean comparison test.

Note: Using this option with LSD mean comparison test gives "Fisher's Protected LSD" test.

Pre-mix Ingredient	Fields to Print	Global - General	Global	- Page Heading	Global - Bor
AOV Means Table	Report Options	General Summ	ary	General Sun	mmary Page Setup
Mean comparison test -			Mean sorti	ing	
Test:	Duncan's New MR	т ∽	None		
Significance level:		5% ❤	Ascen	ding	
Use FAOV complete	a amas fas anlit niat tripla		 Desce 	nding	
			Print o	ne sorted mean colu	umn per page
 Only when significar 	nt AOV treatment P(F)				umn per page
	nt AOV treatment P(F)		Calculated		umn per page
 Only when significar 	nt AOV treatment P(F)				umn per page
Only when significar Mean symbol identifying Affinition	nt AOV treatment P(F)			1 %'s	umn per page
Only when significant Mean symbol identifying Descriptive statistics	nt AOV treatment P(F) when AOV cannot det		Calculated	1 %'s	umn per page
Only when significant Mean symbol identifying Descriptive statistics LSD (or HSD if Tuke	nt AOV treatment P(F) when AOV cannot det		Calculated	1 %'s	umn per page
Only when significar Mean symbol identifying Descriptive statistics LSD (or HSD if Tuke Coefficient of variatie	nt AOV treatment P(F) when AOV cannot det		Calculated AOV Table	1 %'s	umn per page
Only when significant Mean symbol identifying Descriptive statistics LSD (or HSD if Tuke	nt AOV treatment P(F) when AOV cannot det		Calculated AOV Table O None O Brief O Full	1 %'s	
Only when significar Mean symbol identifying Descriptive statistics LSD (or HSD if Tukk Coefficient of variati Standard deviation Grand mean	nt AOV treatment P(F) y when AOV cannot det ev(s) on (CV)		AOV Table None Brief Full Report	t both adjusted and	unadjusted terms
Only when significar Mean symbol identifying Descriptive statistics LSD (or HSD if Tukk Coefficient of variati Standard deviation Grand mean Bartlett's homogenei	nt AOV treatment P(F) y when AOV cannot det ev(s) on (CV)		AOV Table None Brief Full Report	1 % 6	unadjusted terms

- iv. **Bartlett's homogeneity of variance** option helps identify treatment heterogeneity, important because homogeneous treatment variance is an assumption for AOV.
- v. **Mean sorting** option sorts treatment means from low-to-high or high-to-low on the report.
- b. Factorial AOV to perform initial analysis of all multi-factor designs, identify if there are significant interactions between factors (A*B, A*B*C, etc.), and calculate means for each factor level averaged across remaining factors.
- c. Correlations to determine degree of association between data columns.
- d. Dose-Response Analysis to estimate the treatment rate that provides the desired response level.
- e. Standardized Summary an AOV means table report that performs only the mean comparison test identified by ARM Action Code in each data column.



Assumptions of AOV - data are random, independent, normally distributed, and have a common variance. Detect violations of AOV assumptions using:

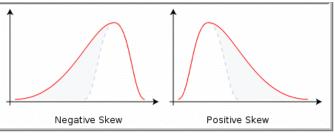
a. Bartlett's test of homogeneity of variance

Assessment data columns with probability >=95% of treatment heterogeneity or non-normal data are indicated by * in descriptive statistics section at bottom of AOV Means Table report.

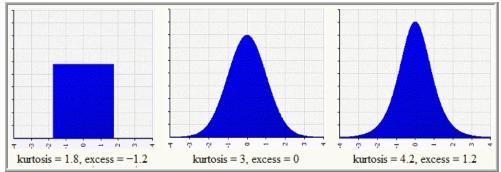
Trt No.	Treatment Name	11	12	13	14
1	1 Untreated	106.3 a	106.3	105.5 a	105.9 a
	2	13.5 bc	13.5 b	12.6 cd	13.0 cd
	3	17.0 bc	17.0 b	17.0 bc	17.0 c
1	4	9.5 c	9.5 b	9.0 d	9.2 d
-	5	24.0 b	24.0 a	22.8 b	23.4 b
	(P=.05) 8.9 ett's X2 12.24		6.15	0.14t	0.621
P (Ban Skewn Kurtos		0.016* 1.6078* 1.0506		0.103 0.8784 -0.2758	0.231 1.34* 0.399

b. Skewness and Kurtosis tests of normality

 Skewness measures asymmetry of the data distribution, meaning that the peak on a data distribution graph is shifted either right or left:



ii. Kurtosis measures "peakedness" of data distribution, meaning the peak is either flatter or sharper than a normal distribution: (ARM reports *excess kurtosis* as shown below.)



Limiting Number of Decimals for Data Reports

Assessm	ent Da	ta - Lin	e 15					
Column I	Column Number							^
Rating T	ìming					2		
Days Aft	er First	/Last /	Applic.			13	13	
Trt-Eval	Interva					13 DA-A	l l	
Plant-Ev	al Inter	val				236 DP-	1	
ARM Ac	tion Co	des				Р		
Number	of Deci	imals				2		~
+ Sub	Rp	Bk	Col	Plot ∆	Trt		9	^
₿ 1	1	1	1	101	4	75.00		
1	1	1	2	102	2	60.00		

•		AOV N	Means Table Repo	ort Optio	ons	?	×
Pre-mix Ingre AOV Mea	ans Table Report Option		Global - General General Summa		l - Page Heading General Sum	Global - Bo mary Page Setu	
Missing data e	stimates		Assessment data head List	errows			
	View		Print data heade	ers once pe	er column		
De-transform							
Treatments	f decimals accuracy to: (line between						

To limit the number of decimals of accuracy by column:



In the Assessment Data header, use the **Number of Decimals** field for each column.

By default ARM prints one more decimal of accuracy than the most precise data item.

To limit the number of decimals of accuracy <u>across all reports</u>:

Select File – Print Reports. Select a summary report, press the **Edit Report Options** button, and click on the **General Summary** tab.

Then enter the number of decimals in the **Force number of decimals accuracy to** field.

Printing Excel Report Link Workbook

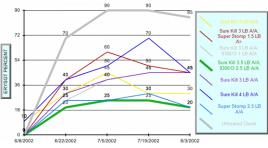
The report link workbook is a method to create customized site description reports that are printed in Microsoft Word. A template document is used to define the report format, and to link with a special Microsoft Excel report link template where ARM prints trial information.

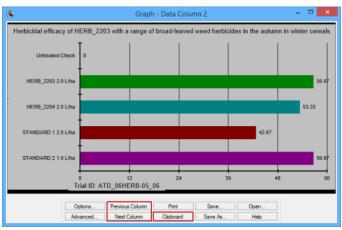
Open the ReportLink.xls and example ReportLinkTemplate.doc in the GDMdef study definition directory for an example. The ReportLink.xls includes cell comments describing how to use the workbook. Hold the mouse cursor over cells with a red mark in the upper left to view comments. The Word template document must link to cells in column D of ReportLink.xls to obtain trial site description information.

Graphing Data

- 1. Graph types and recommended uses:
 - a. Bar most suitable for discrete treatments, such as comparison of different treatment products
 - b. Line used to show trends in values over a continuous scale, like different rates of a treatment product
 - c. <u>Box-Whisker</u> A Box-Whisker graph illustrates the spread of treatment data groups around their medians, using a "box" and "whiskers" to break down each data group by percentiles. The **box** extends from 25th to the 75th percentile and is divided by the median. The **whiskers** extend from ends of the box to largest and smallest observation.
- 2. Graph tips:
 - a. Use **Horizontal** bar graph to better display long treatment names.
 - b. Use Next Data/Previous Data buttons on Graph window to display the same graph for other data columns.
 - c. The Clipboard button is the easiest way to copy graphs to another program; select Paste in destination program to include the graph.
 - d. Treatment selection order (e.g. 5 4 3 2 1) determines treatment order on a graph.
 - e. Use "Error Bar" tab on Graph Options to display standard deviation or standard error bars Note: The error bars on ARM graphs are calculated using appropriate error terms from AOV. On many graph programs (such as Excel) error bars are *only correct for Completely Random design.*
 - f. The Treatment Description on Trial Map is used for treatment labels on graph, giving a brief 1-line description of each treatment. Edit the treatment description to adjust (typically shorten) treatment labels for graphs and map reports.
 - g. Use "Show data labels" on Labels tab of Graph Options to display treatment mean values.
 - h. Use "Display AOV mean comparison letters" on Labels tab of Graph Options to display mean comparison letters from AOV. Options button displays AOV Means Table Report options, to choose a different mean comparison test or significance level.
- 3. To export graphs to other software, display the graph, then:
 - a. Press the Clipboard button to copy the graph to the clipboard, to paste into another program.
 - b. Press **Save As** button and select **File** for the **Target** option to save the graph to a file on disk.

Remember: Typically 20% of ARM features are enough to perform all needed activities. Increasing to 30% helps you perform those activities most efficiently.





					Graph	Optio	ns		-
	Ge	neral	Fonts	Labels	Legends	Titles	Axis	Colors	Error Bar
					Xa	xis label			
	5	STA	NDARD	125 g Al/	ha				
	4	HEF	RB 1 100	g Al/ha					
	3	HEF	RB 1 80 g	, Al/ha					
	2	HEF	RB 1 50 g	Al/ha					
	1	Untr	eated Cl	heck					
								_	
								R	eselect
	•	Shov	w data la	bels					
	• •	Disp	lay AOV	mean con	nparison lett	ters		O	ptions
4	7	Position AOV mean comparison labels above X axis							
		Rese	elect Dat	a	Load D	efault		Save D	efault
		0	К	Ci	ancel	App	bly Now		Help

Graph Export Options		
Image format Metafile	v	
Target Clipboard File Browse File name: C:\Users\Matt\Documents\ARM Da .wmf		
ОК	Cancel	Help
ous Column Print xt Column Clipboard	Save Save As	Open Help