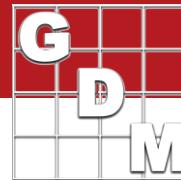


ARM Summary Across Trials (ST)



The ARM ST (Summary Across Trials) add-in summarizes ARM trials across locations and years.

Researchers, product managers and information technology groups use it to produce summaries of research trials. The resulting information can improve planning of future trials, and can help quantify the consistency of research results.

- This valuable tool combines and averages similar assessments in ARM trials across locations and years.
- ARM ST helps researchers average and report similar trials conducted at several locations, or multiyear trials.
- Because ARM ST uses the ARM interface, an experienced ARM user can readily learn to use ARM ST.
- Product managers can use ARM ST to average results for a trial series based on a common protocol.
- ARM ST aids in planning research by identifying existing trials with a specific treatment or group of treatments, and then listing all assessments for those treatments.

Will the ARM ST program save me time?

Yes. ARM ST is fast! It is designed to read and summarize trials very quickly! ARM ST can *save many hours of time* for each series of trials that you summarize. Trial search criteria can be specified for:

- Treatments
- General Study Header
- Assessment Data Columns
- Site Description

Search criteria can include wildcards. Reports are produced in a format that is very useful for data presentations and year-end summaries of results.

Once ST is installed into your existing ARM program, you can switch between ARM and AR ST with a single button click. ST features the same on-line help system as ARM and includes quick reference card.

General Features

Before ST can search and summarize trials, it needs to know the information for which to search. This query is called "criteria" in ST.

Example ST Criteria:

- Not all header lines are shown. Match and Combine wildcard * for Rating Date as do not need it separated into discrete columns for each different rating date however want this field shown.
- The following data header criteria could yield a summary listing the four indicated data columns.

Note that all four summarized columns differ in at least one of the header lines marked with @. If the ARM Data Type entry was replaced with * and then summarized again, the first two columns would be combined.

Data Header Criteria		Data Included in Summary			
Weed/crop code	SET@	SETVI	SETVI	SETLU	SETLU
Rating data type	@	Control	Control	Count	Control
Rating unit	@	Percent	Percent	# / m ²	Percent
Rating date	*				
Trt-Eval Interval	14-28 DAT	14 DAT	28 DAT	28 DAT	28 DAT
ARM Action Code	@	P			P
Decimals Accuracy	1				

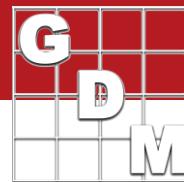
When defining **data header match criteria**, a match property of Every, Last, Max, or Min can also be defined.

"Every" includes all trial assessment data columns that match the criteria.

"Last" includes only the last data column per trial that matches criteria based on rating date.

"Max" or "Min" includes the highest or lowest value per treatment from one or more data columns that match criteria. The "Max" property is especially useful to find the greatest phytotoxicity per treatment across several rating dates in a trial.

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- When entering **search criteria**, ARM ST can scan a series of trials and list the different entries present in the current entry field. Use this feature to quickly discover which treatment names, pests, and crop species are present in the trials. You can even select items from this list to use as search criteria.



Column Number	1	2
Part Rated	-	-
Rating Date	-	
Rating Type	@	

Column Number	1	2	3
Part Rated	-	-	
Rating Date	-		
Rating Type	@		VIGOR

- Use the **Build Treatments** dialog to select trials from which ARM ST should extract treatment information.

As ARM ST reads each treatment from a trial, it compares treatment match fields (set in Summary Options Dialog) to determine if each trial treatment matches a treatment already defined in the criteria.

If not, ARM ST adds the new treatment to the criteria.

No action occurs if ARM ST determines that the trial treatment matches a treatment that is already in the treatment criteria. The process of building treatments also utilizes any criteria match wildcards that are specified in any existing treatment criteria. Only information in the treatment match fields is added to the treatment editor.

- ARM ST matches treatments across different rate units, even across AI-based and product-based rate (dosage) units.

(Note: Formulation type and concentration must be entered in treatment criteria to match across AI-based and product-based rate units.)

The screenshot shows the 'Begin Summary' dialog box. It has a title bar with 'Begin Summary' and standard window controls. The main area contains two sections: 'Current search criteria' and 'Trials to search'. The 'Current search criteria' section includes checkboxes for 'Header', 'Treatments (4)', 'Site Description', 'Assessment Data (2)', and 'Excluded trial columns'. The 'Trials to search' section shows '(6)' and two radio button options: one selected (radio button highlighted) and another labeled 'Select Trials to Search... (6)'. At the bottom, there's an 'After summary:' dropdown set to 'Auto-display ST Summary Report' and a row of buttons: 'OK' (highlighted), 'Cancel', 'Summary Options...', and 'Help'.

During summarizing, ARM ST prints messages listing the reason why any excluded trials did not meet the current selection criteria. This helps to identify where differences occur within a group of trials.

The screenshot shows a Windows-style window titled "Summary Messages". The main content area displays four lines of text, each representing a file comparison result:

- Documents\ARM Data\Tutorial\St-Exam3.dat0 matches
- Documents\ARM Data\Tutorial\St-Exam4.dat0 matches
- Documents\ARM Data\Tutorial\St-Exam5.dat0 matches
- Documents\ARM Data\Tutorial\St-Exam6.dat0 matches

Below this, there are three summary statistics:

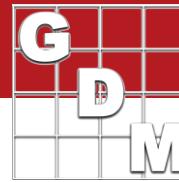
- 6 Trials Tested
- 6 Trials Matched
- 15 Match Columns

In the bottom right corner of the window is a blue "Close" button.

- Once a series of trials is summarized, you can:

- Preview results on screen in a convenient grid format. You can easily collapse and expand detail columns on this grid, such as individual trial means. Re-arrange columns within groups by simply dragging the column with the mouse.
 - Selectively remove from summary individual trial columns that were matched but for some reason are not appropriate to include. For example, you may remove a trial rating where pest pressure was very low and ratings were thus inconsistent.
 - Use the Options dialog to change the header

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- Enter a title for the report, and write a discussion for the summarized trial information while viewing the summary report.
- Print the current summary view on paper.
- Print AOV table for grand means columns.
- Save summarized information in rich text format that can easily be edited using a word processor.
- Export summarized results to a spreadsheet file that can be opened in a program such as Excel.
- Graph summary grand means with the graph tool.
- Print ARM reports for individual trials in the summary.

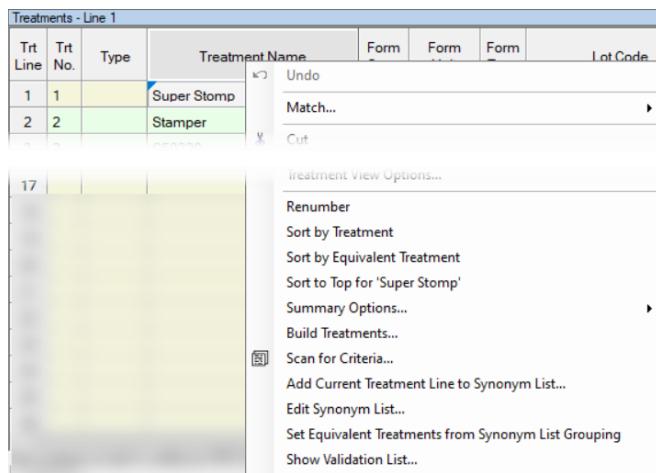
Your Company Name														
			5 ST-EXAM1		ST-EXAM2		ST-EXAM3		ST-EXAM5		ST-EXAM6		6 ST-EXAM1 ST-	
Summary Properties			Last										Last	
Weed Code			*	GRAIN	C	GRAIN	C	GRAIN	C	GRAIN	C	*	GRAIN	C
Par Rated			*	YIELD	YIELD	YIELD	YIELD	YIELD	YIELD	YIELD	YIELD	*	YIELD	YIELD
Rating Data Type			YIELD									Mean	Count	
Trt Treatment	Form	Fm	Rate	Mean	Count									
No. Name	Amt	Ds	Rate Unit											
1 Super Stomp	4 EC	1.5	LB AA	460	(5)	460 a	461 a	460 c	458 c	462 a	120	(5)	120 a	
2 Stamper	6.7 EC	4.0	LB AA	475	(4)	476 a	481 a	476 b	465 b		124	(4)	125 a	
	4 F	0.5	LB AA											
	90 DF	1.5	LB AA											
3 Sure Kill	4 EC	2.0	LB AA	465	(4)	453 a	454 a	480 a	473 a		122	(4)	118 a	
	930220	90 S	1.0 LB AA											
4 Untreated				386	(5)	410 b	415 a	366 d	364 d	376 b	101	(5)	107 b	

AOV For ST-EXAM1 GRAIN C												
SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F Prob(F)								
Total	15	15423.437500			618.229167	1.395	0.3084					
Replicate	3	1854.887500										
Treatment	3	9579.687500	3193.229167	7.204	0.0081							
Error	9	3898.062500	443.229167									

AOV For ST-EXAM2 GRAIN C												
SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F Prob(F)								
Total	15	15423.437500			618.229167	1.395	0.3084					
Replicate	3	1854.887500										
Treatment	3	9579.687500	3193.229167	7.204	0.0081							
Error	9	3898.062500	443.229167									

Editor Features

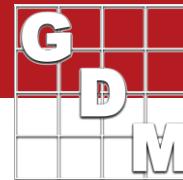
Each study criteria editor has a new right-click menu item. These menu choices provide an easy interface to set various summary options and matching wildcards. Below is the right-click menu for the treatment criteria editor.



- A “cascading filter” option is available, so when scanning data header criteria ST can match other existing data header criteria entries during the scan. This offers a list of data header entries that are present only in trials matching existing data header criteria entries. For example, use this to obtain a list of assessment types for all assessments of a specified pest species.
- Increased maximum number of criteria treatments from 999 to 9999, to support summarizing very large trial groups containing diverse treatments. As a result, ST can summarize more than 1000 trials into one summary table.

- Match number ranges such as "6-8" or "7.2-7.7" in site descriptions, to match trials with soil pH within a define range.
- Changed so automatic matching wildcards are assigned only in the first plot data header criteria column. The wildcards are required for column 1 so a new summary will run properly when a user does not enter plot data header match information.
- Apply user-defined product synonyms to criteria treatments to automatically assign equivalent treatments. This greatly simplifies summarizing across different product names that have the same active ingredient. Simply use Tools - Build Treatments to gather the list of all unique treatments across trials to summarize, and then apply synonyms to combine like treatments.
- ST now supports the "match and separate" wildcard @ in site description information. ST creates one additional row in the assessment header for each match wildcard field in the site description, and uses entries in the additional match rows the same as "match and separate" wildcards in the assessment header. The result is separate grand mean data columns summarized for each different site description entry that occurs in the match and separate data entry fields. **Note:** If a match and separate wildcard @ is entered in a repeating section, ST matches only one instance of the repeating section per trial.

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Summary and Reporting Features

ST Summary Options

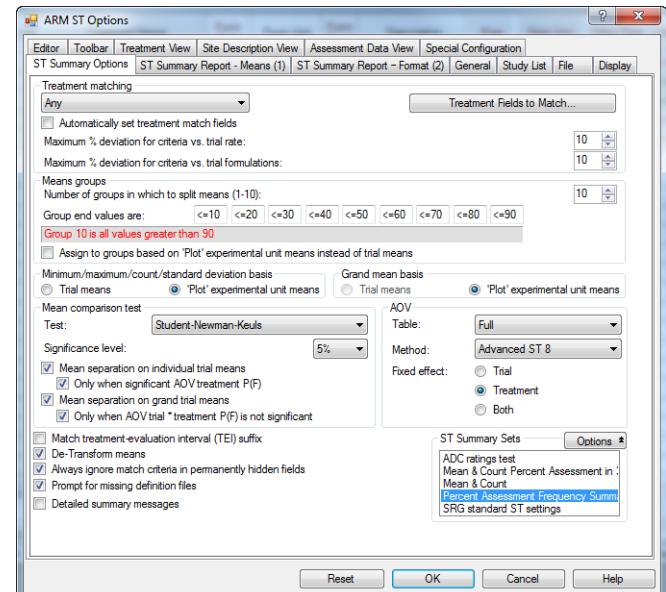
These "ST Summary" options tell ST how to summarize trials.

Whether to display percentage of total count on the ST Summary Report when groups are active. This value indicates the percent of plot means or trial means (depending on the summary option) from a summary column that are included in each group for the summary column.

Increased the maximum number of means groups from 3 to 10, to better support frequency reports.

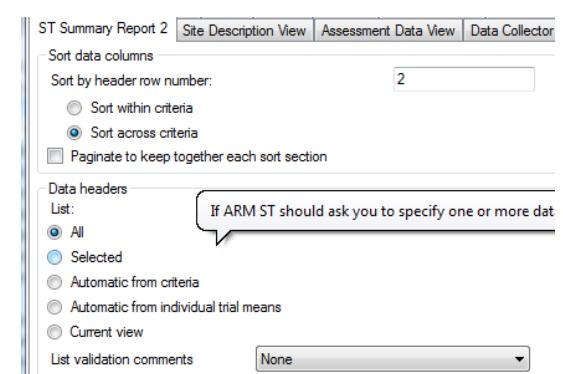
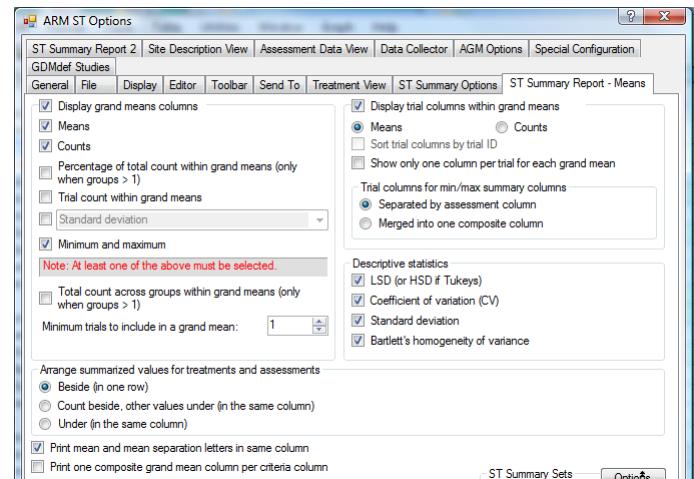
"Advanced ST 8" analysis method uses the R statistics tool to give an accurate, statistically adjusted analysis of trials with missing data or different number of replicates. Analysis method automatically adjusts according to experimental design of each summarized trial.

Grand mean basis option to specify whether to calculate grand mean from plot means or treatment means. Thus grand mean basis can be different than minimum/maximum/count basis for some analysis options.

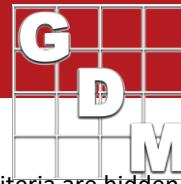


ST Summary Report Options for Means

- Option to not print grand mean on a report, to better print frequency reports listing counts within groups.
- Option to include the total count across groups within a grand mean when grand means are displayed and groups are active.
- Whether to include the total count across groups within a grand mean when grand means are displayed and groups are active.
- Whether to include trial count within grand means. When included, the trial count lists how many unique trials are included in the grand mean. Note that this count differs from the "Count" analysis column, which indicates the number of plot means or treatment means included in the grand mean.
- Arrange all count values (Count, % Total, and Trials) beside or under the grand mean.
- Include on ST Summary report the descriptive statistics of LSD, coefficient of variation, standard deviation, and Bartlett's homogeneity of variance for individual trial means columns.
- Save and load ST options sets (*.sts) from ST Summary and ST Summary Report dialogs. Option sets allow defining summary settings for special purposes, such as a frequency summary.
- Optionally print means and mean separation letters in separate columns, which is quite useful when printing reports to Excel.



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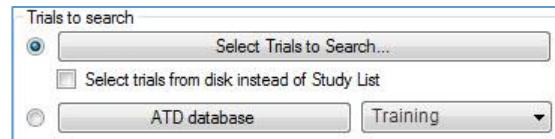


ST Summary Report Options

- Option to drop (or exclude) equivalent treatments, so equivalent treatments defined in treatment criteria are hidden on the report preview dialog and in reports. This option can greatly reduce report length when many equivalent treatments are defined, such as when combining different treatment products that all contain the same active ingredient.
- The summary message viewer now identifies when trial columns are excluded from a summary, as a reminder when a user has removed some trial data columns from the criteria.

Latest updates

- Automatic connection to study list or the optional ARM Trial Database, to quickly and easily view and select trials based on information present in the trials.



- New ST Properties panel shows the choices for matching selection information that you define for trials to include in a multi-trial summary.
- A simple Excel-like interface makes it very easy to review and choose trials from the same trial data entry fields used in ARM.
- The list of currently selected trials displays on each study editor as match information is defined.
- New "Advanced ST 8" analysis method uses the R statistics tool to give an accurate, statistically adjusted analysis of trials with missing data or different number of replicates. Analysis method automatically adjusts according to experimental design of each summarized trial.

The screenshot shows the 'ST Properties' panel on the right and the 'AOV' (Analysis of Variance) interface on the left. The 'ST Properties' panel includes a 'Match' dropdown set to 'Alpharetta GA/Anon/BAD'. The 'AOV' interface shows 'Table: Full' and 'Method: Advanced ST 8' selected. Red arrows indicate a connection between the 'Match' dropdown in the ST Properties panel and the 'Method' dropdown in the AOV interface.

Additional Features

- Whether to print ARM reports for trials matched in the last summary that was run, or for all trials searched during the last summary. After selecting File - Print reports, a "Select trials to include" dialog displays when a criteria file is open. The user may choose "Trials matched in last summary" or "Select trials to include".
- Support for special customized reports that GDM can create for special purposes. For example, a trial location or soil information report gathering selected site description information per trial into a single summary table across all trials. These customized reports are only supported when the optional GDM trial database is licensed.
- New ST raw data export, to export raw data for all summarized trials into a file that can readily be analyzed or graphed using another statistics package. Thus ST can perform the difficult task of selecting trials and gathering assessment data, with full flexibility in how the data is analyzed or presented.