

Top 10 ARM Contractor Trial Resources

Use ARM to save protocols and trials from an email message

- Double click on the study in your email message.
- Follow ARM messages to save study in the permanent study folder.
 - a) Press Open to open file
 - b) Log into ARM
 - c) Click Yes to move study so do not store in temporary system directory.
 - d) Select destination folder to move file.

Automatic Backups of study changes

ARM stores backup of previous version you can easily obtain by defining a backup device for ARM to use. **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.

- Choose backup interval time (Tools, Options, File Tab, Backup: ARMbackup)
- Use Study List to review backup files
 - Right Mouse Click for Previous Version features
 - View or Restore previous file versions.

Current computer maintenance resolves many issues. Keep up to date.

Many issues are resolved by keeping your computer up to date using the most recent program versions. Examples of items that should be kept up to date are:

- Windows Updates
- Virus Checker
- Adobe
- ARM
- Sponsor Customizations
- Rebooting your computer frequently

Use file sharing instead of many trial copies in different folders ("I lost data")

How to set up ARM to use file sharing?

- Recommend laptop computer using Windows Explorer "make available offline" feature for files and folders.
- Studies stored on network
- If copy studies to/from CD, flash drive, local and network drives to work from different computers, then how do you know which device has the most recent version, and that no changes occurred since file was copied?

Study Rules

Study rules are an ARM-assisted method for sponsor to identify important information in a contracted trial.

- When rules are defined for a study, the Study Rules panel displays automatically.
- To display the Study Rules panel in a new protocol or when rules are not defined, select "Study Rules" from the Tools menu. Use the study rules panel to define new study rules. (The Study Rules menu command is disabled for any ARM licensed user who does not own the current study.)

Industry standard references

Helps ensure trial portability across company and country boundaries. Most global sponsors use industry standard references, so reduces sponsor time and "risk" from needing to modify original contractor information in order to use trials.

- BBCH Growth Stage (PDF) (Help on Toolbar, then BBCH Growth Stage (PDF))
- The EPPO Plant Protection Thesaurus website is <http://eppt.eppo.org/search.php> to search for codes.

EPPO Plant Protection Thesaurus

EPPT

Search EPPT

Enter the Name or the EPPO Code Search

Search by: **Both**

Search language: **All available**

Results per page: **50**

Whole word
 Starting with...
 Containing the word
 Use soundex algorithm
 Find children

Plant
 Animal
 Microorganism
 Group classifier

- SART (Standard Agricultural Research Terminology)
ARM lists the 6 character codes along with the comments for each code


Part Rated	Comment
ADUDEA	adult - dead
ADUFEM	adult - female

Validate Trial

Validation is essentially basic information cross-checking: that values have units, and minimum trial information requirements were met.

- Advantage: minimizes time on discussion/clarifications of the same data with each recipient.
- Helps ensure completeness and that trial follows sponsor-defined study rules.
- Helps so those who use your study in future will know from the study what actions occurred. If a contracted study fails validation for the sponsor, the sponsor is less likely to trust study results, and loses assurance that basic information was collected.



- Use  on tool bar, or Tools - Validate Protocol/Trial.

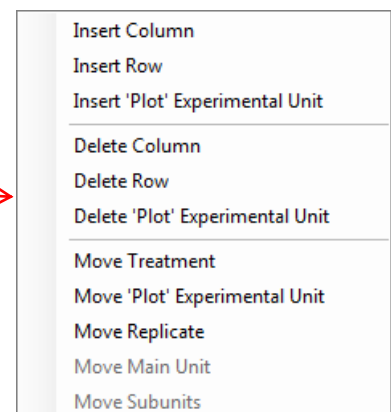
Match Trial Map with actual trial layout

Many assessment review tools, transformations, and statistical analyses are based on positions of 'plot' experimental units:

- Assessment map
- Check-weighted and check-corrected means transformations
- Analysis of incomplete block (lattice), split-plot, strip-block, and augmented experimental designs uses position information.

Click right mouse button on trial map to display a command menu:

- 1) Use these right-click menu commands to modify the trial map by:



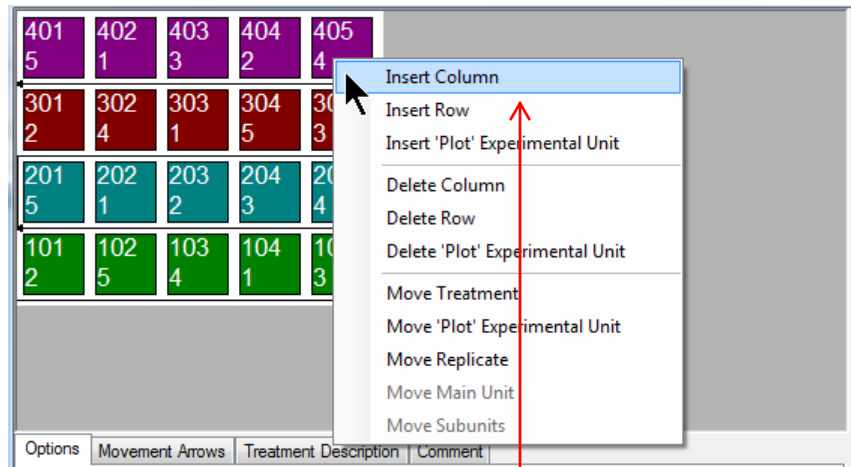
- a) Inserting or deleting 1 or more blank columns, either before the current position on the map, or at right of the trial map.
- b) Inserting or deleting 1 or more blank rows, either above the current position on the map, or at bottom of the trial map.
- c) Inserting or deleting a blank plot at the current cursor location. Existing plots to the right of the blank plot are shifted right to make room when inserting a plot, or shifted left to overlay (and thus remove) the blank plot.
- d) Moving the treatment under the cursor. Once marked, then drag the marked treatment number/code to the plot where that treatment belongs, thus swapping position of the 2 treatments. Do this to modify a randomization for an accidental application mistake, or to match the actual trial randomization.

Note that a treatment can only be moved *within the same replicate* for a randomized block design, to prevent violating the blocking rules. Use 'Move plot' described below to shift position of an entire plot, including the treatment, to any blank area or to swap position with another plot.

- e) Moving the plot under the cursor. Once marked, then drag the marked plot to the location where the plot belongs. If a plot is already at the destination, that plot exchanges position with the moved plot.
- f) Moving an entire replicate to a new position on the map, such as stacking replicates in pairs. A replicate can only be dropped onto a *blank* trial map area with enough empty rows and columns to hold the moved replicate.

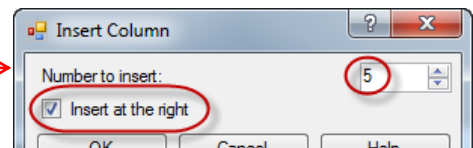
Exercise: stack rep 3 immediately above rep 1, with rep 4 above rep 2 for a 5 treatment 4 rep trial:

- i) Display the trial map.



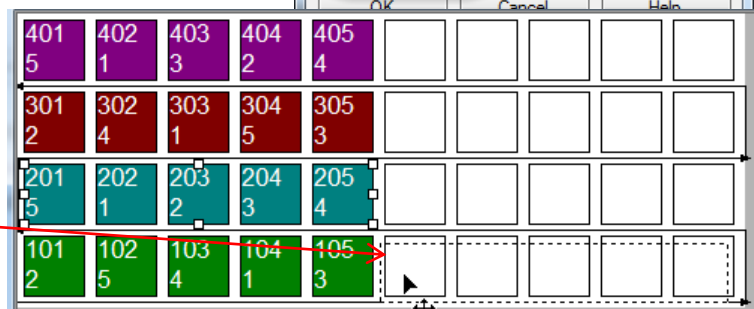
- ii) Right-click in column 5 (plots 105, 205, 305, 405), then select "Insert Column".

- iii) On the Insert Column dialog, enter "5" as number of columns to insert, and check the box to "Insert at the right".



- iv) Right-click on replicate 2, and select "Move Replicate".

- v) Grab plot 201 of the marked replicate by pressing and holding the left mouse button, and while holding the left button drag the replicate and drop it onto the blank space immediately right of plot 105:



- vi) Rep 2 is now positioned at the right of rep 1.

401 5	402 1	403 3	404 2	405 4					
301 2	302 4	303 1	304 5	305 3					
101 2	102 5	103 4	104 1	105 3	201 5	202 1	203 2	204 3	205 4

vii) Repeat this process to move rep 3 immediately above rep 1. (Right-click on plot 301, select "Move Replicate", and drag to the plot immediately above 101.)

viii) Next move rep 4 above rep 2, so the trial map has this appearance:

301 2	302 4	303 1	304 5	305 3	401 5	402 1	403 3	404 2	405 4
101 2	102 5	103 4	104 1	105 3	201 5	202 1	203 2	204 3	205 4

ix) Either select "Accept Current" to keep this change, or "Cancel" to abandon this change.

x) If using a "real trial", then close trial without saving any changes.



Use Recommended Assessment Review Methods

Recommended methods to review assessment data columns are located in the **Tools** section of the **Properties** panel of Assessment Data editor.

To display the Assessment Data editor: open a trial, and on Navigation Bar choose Assessment Data. The Properties panel should automatically open.

Note: if the Properties panel displays as a closed tab



then click once on the Properties tab to open the panel, and then click once on the auto-hide pin  to lock panel in the open  position.

Following is an overview of the assessment data review tools:

2) **AOV Means Table** displays preview of the AOV Means Table report beginning at the current data column, using current AOV Means Table Report Options settings. To change AOV Means Table report options:

- Click the Printer icon on toolbar (or click File - Print Reports) to display Print Reports dialog.
- Right-click on AOV Means Table report and select Report Options.

Sub	Rp	Bk	Col	Plot	Trt	1
1	1	1	1	101	2	22
1	1	1	2	102	5	32
1	1	1	3	103	4	15
1	1	1	4	104	1	125
1	1	1	5	105	3	18

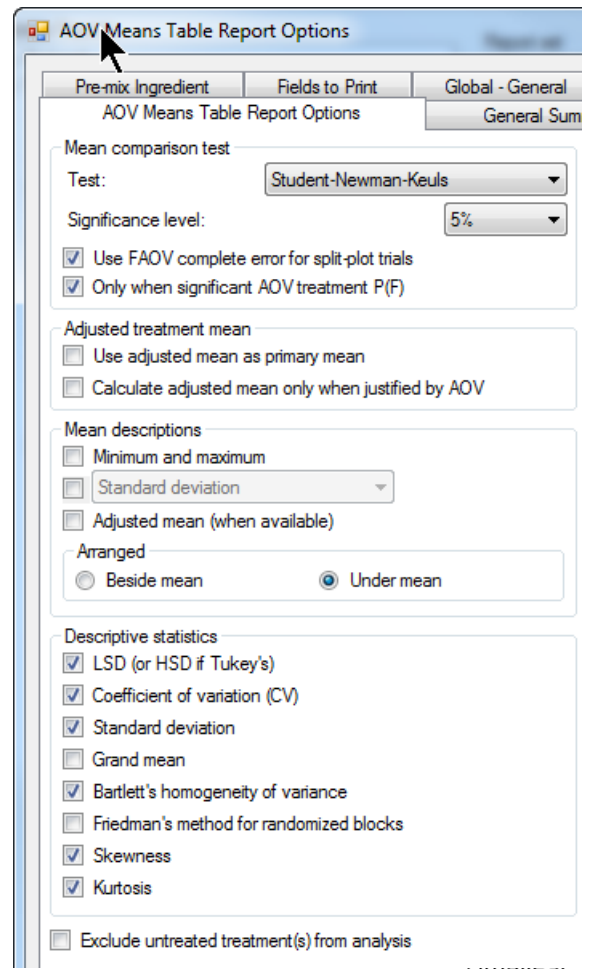
c) Change report options as desired. Here are recommended defaults to use:

These defaults will:

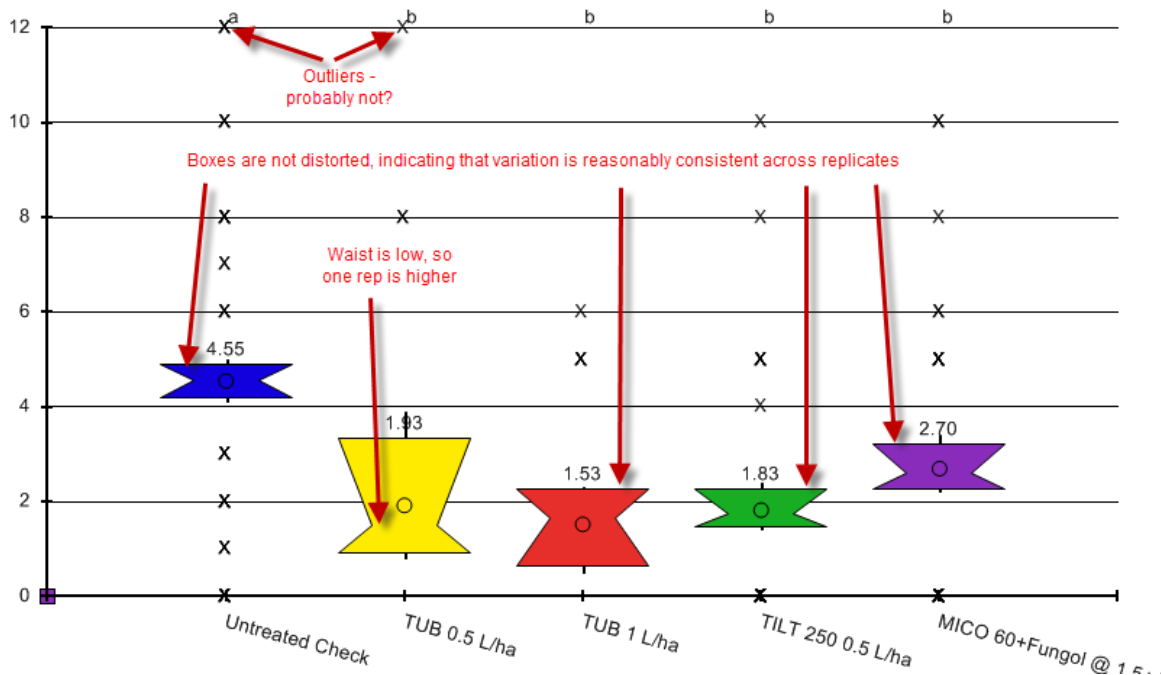
- i) Use a mean comparison method that maintains the selected significance level regardless of how many treatments are in the trial.
- ii) Performs a "protected" mean comparison test, so mean comparisons are only performed when Treatment P(F) indicates that "at least one treatment appears to be significantly different".
- iii) Tests for heterogeneity, skewness, or kurtosis. Any of these indicate that data violates assumptions for analysis of variance, and should be corrected to ensure adequate precision from the mean comparison test.

3) **Box-Whisker** displays a box-whisker graph for the current data column using current graph option settings.

This graph type shows the "spread" of treatment data around the median, 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 the largest and smallest non-outlier values. An **outlier** is a point that lies outside of the box by more than 1.5 times the height of the box, and is indicated by "x" on the graph.



The example below is from data column number 3 in example trial G-All7_Fung.dat8:

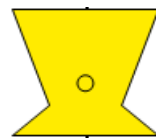


Options used to create this graph are:

- Benefits of using these option settings:
- Display subsample values that are possible "outliers", outside of box by > 1.5 times box height.
 - Display treatment mean as "O" on box.
 - Display mean values on the graph.
 - Mean comparison letters above top axis.
 - Y grid lines make it easier to read value of positions within the graph.
 - Scale graph to show all possible outliers within boundaries of the graph.

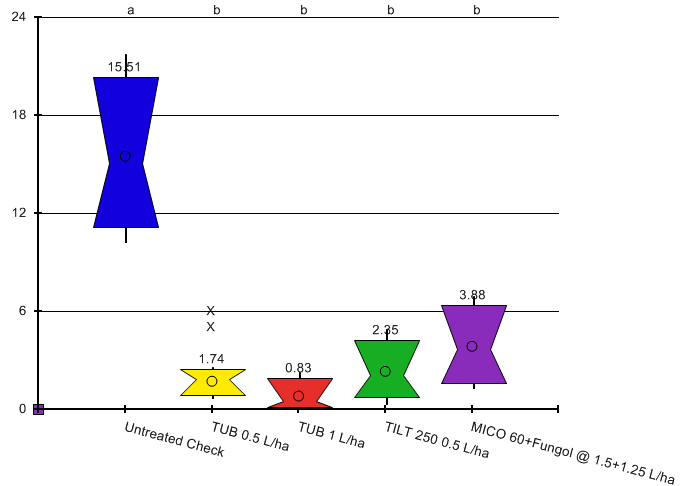
General benefits of using a box-whisker graph to review data are:

- Box height shows amount of variability within a treatment, thus is a measure of assessment consistency or "stability" of each treatment.
- Waist position indicates whether variability is skewed, when one replicate is somewhat higher or lower than others. For example, when waist is "low", then a value in one of the replicates is somewhat higher than in other replicates. The box at right is treatment 2 from data column number 3 in example trial G-All7_Fung.dat8.



- c) Provides a visual mean comparison, since treatments where boxes overlap are probably not significantly different.
- d) Simplest method to identify heterogeneous treatments, since height of the treatment box is substantially larger or smaller than other treatments.

In the example at right, the box for "Untreated check" treatment 1 in data column 7 is much higher than the other 4 treatments. Bartlett's homogeneity test for data column 7 indicates 96% chance of heterogeneity, with significant skewness and kurtosis (non-normality).



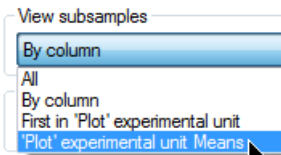
4) **Assessment Map** displays assessment data values on a trial map, to help identify whether assessment differences may be influenced by "spatial effects" that can occur from variations within the trial site.

Differences in assessment values are indicated by color intensity. Lower values display in lighter colors than higher values. Select "Color description" tab to display a color key showing range of assessment values that are represented by each color.

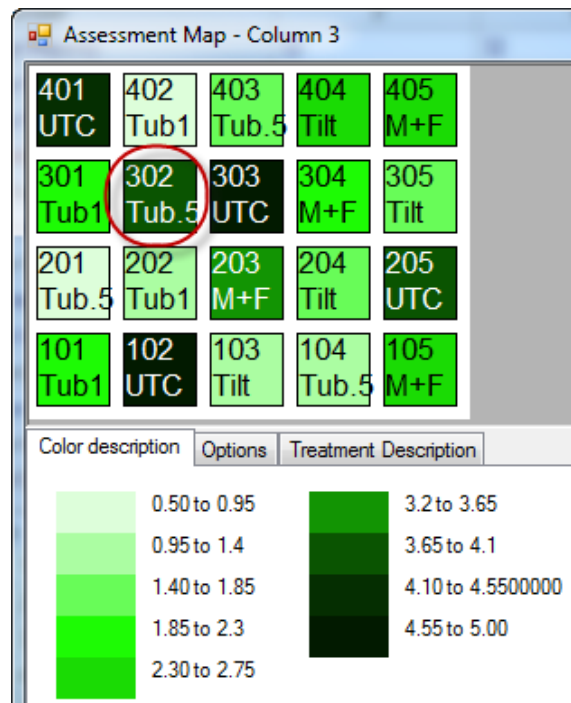
For example, if crop yields seem consistently lower in one corner of a trial, it may indicate a lower quality soil in that portion of the trial. Spatial effects can also occur from an underground drainage tile line below a portion of the trial, or a variation in pest densities across the trial.

To help identify why the box for treatment 2 in data column 3 is distorted, display the assessment map for data column 3. Notice that the value for treatment 2 "Tub.5" in replicate 3 is substantially darker than in the other replicates. It is likely that replicate 3 is causing the distorted box on this graph.

Confirm this by changing the View Options setting "View subsamples" to "Plot experimental unit Means", sorting assessment data by treatment, and then reviewing treatment 2 for data column 3:



Rp	Bk	Col	Plot	Trt	3
1	1	4	104	2	1.30
2	2	1	201	2	0.80
3	3	2	302	2	3.90
4	4	3	403	2	1.70



Notice that the value in replicate 3 is more than twice the value in other replicates. It is important to keep in mind that these values are all quite low, so even though a percent incidence difference of > 2% is **measurable**, for this situation the difference is **not meaningful**.

Use "Send To" Feature for sending Trial with attachments, EDE, dat, pdf, rtf

1) Package results using Send To:

- a) Validates trial
- b) Creates a *.ede to import into sponsor study definitions
- c) Includes the ARM trial *.dat8/*.dat so all original data is included. Customization format and company determines the study file version that ARM includes with File - Send To. Thus, you can use ARM 9 and still provide trials to sponsors who use ARM 8.
- d) Includes attachments, providing all supplemental information
- e) Includes reports printed to *.rtf for a quick overview of trial result. Create your own report sets and use this as the default report set for "Send To".

