Custom ANOVA

This add-in enables you to quickly launch an analysis of variance and get a complete, intuitive and interactive report.

A complete report: you have access to a large panel of graphs and tables which allow you to extract a lot of information from your data set and help you to interpret the results of the ANOVA (descriptive statistics, statistics of the model, validation graphs, adjusted values, field maps, multiple comparisons…).

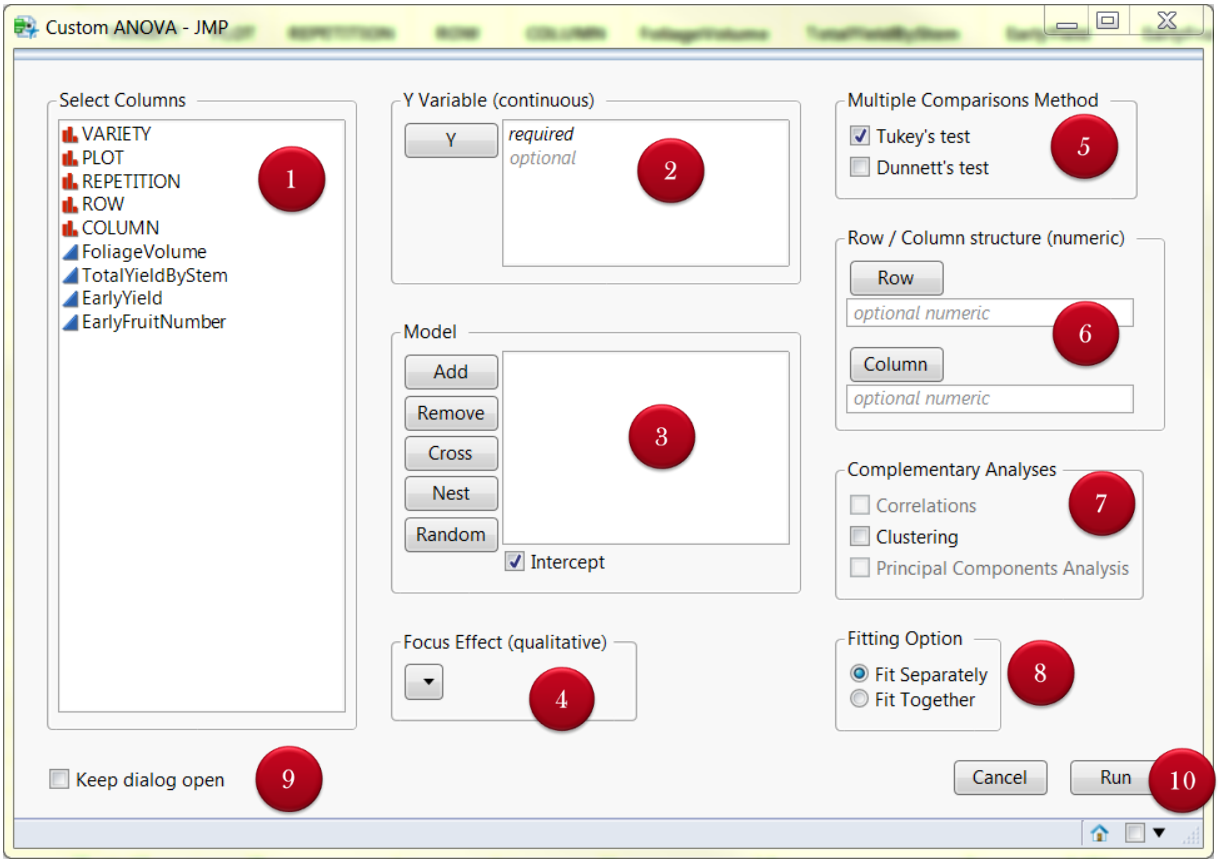
An intuitive report: the report is organized in tabs so that you can easily navigate across the different sections to find what you are interested in.

An interactive report: the majority of the graphs are connected together thus you can exploit the interactivity of JMP in the report. For example, you can select some abnormal points on the validation graphs and see their location on the field maps. The corresponding rows will also be selected in your data table.

Note that this module is reserved to the analysis of **quantitative** variables (or treated as such).

1. Interface

Here is the interface window of the module:



1) *Select Columns:* the list of the columns of your data table. Select one or several of these variables to complete the other boxes.

2) *Y Variable:* the list of **quantitative** variables you want to study.

3) *Model:* the list of the effects in your model.
   - Select a column in the columns list and click on "Add" to add the corresponding effect.
   - Select an effect in the model box and click on "Remove" to delete it.
   - Select two, three or four columns in the columns list and click on "Cross" to add an interaction term.
   - Select an effect A in the model box and an effect B in the columns list. Click on "Nest" to add the effect A nested within B.
   - Select an effect in the model box and click on "Random" to turn it into a random effect.

4) *Focus Effect:* the list of effects that you can choose as main effect. The list is automatically generated when you build the model. It can be either a simple effect or an interaction. The summary statistics, the adjusted values and the multiple comparisons will only be calculated for this specific effect. Usually the column "Variety" or "Genotype" is chosen as Focus Effect.

5) *Multiple Comparisons Method:* choose the Tukey's test, if you want to compare pairwise the levels of the Focus Effect variable. Choose the Dunnett's test, if you want to compare the levels with a specific control. You can select one or both tests.

6) *Row & Column (optional):* if you have a Row / Column structure in your data set, select the corresponding columns to generate field maps in the report. Be careful: these columns need to be **numeric**.

7) *Complementary Analyses (optional):* check the corresponding boxes to perform a correlations study on raw data, a clustering and a principal components analyses on adjusted values (based on the focus effect).

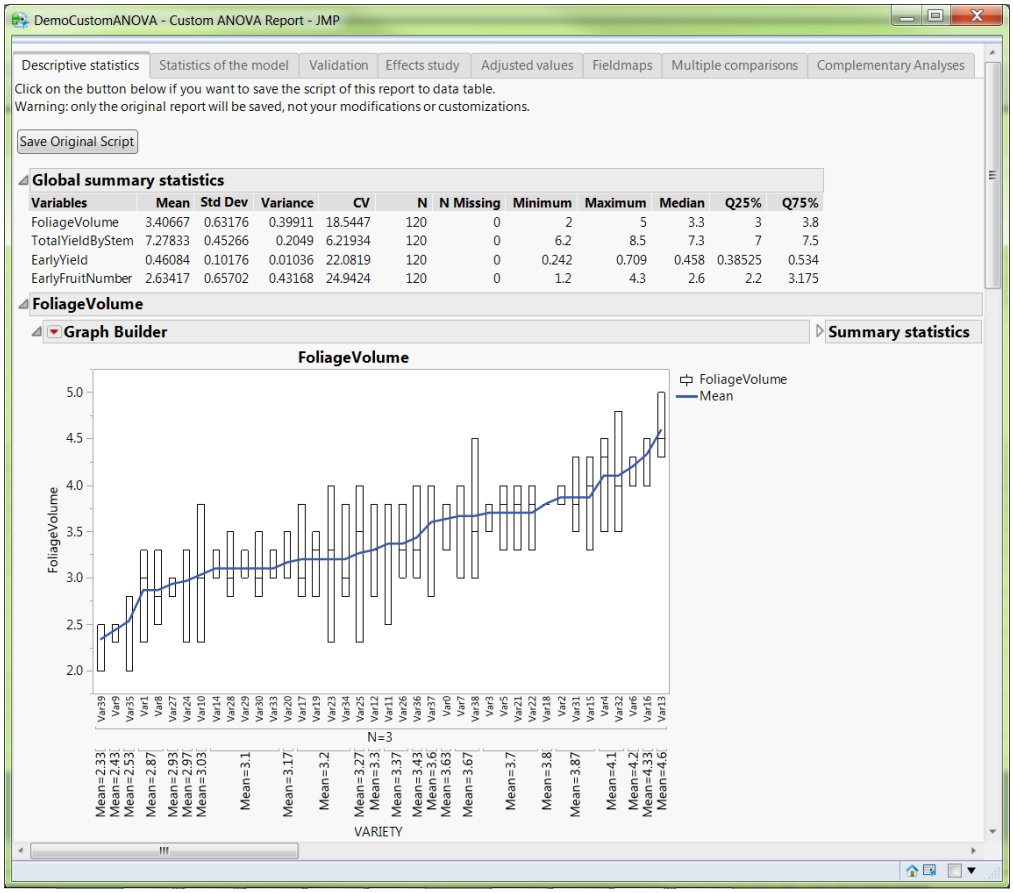
8) *Fitting option:* Fit Separately fits each Y using all rows that are nonmissing for that particular Y. Fit Together fits each Y uses only those rows that are nonmissing for all of the Y variables.

9) *Keep dialog open:* check this box if you want the launch window to stay open after clicking on the "Run" button. Thus you will be able to quickly modify one or several parameters before redoing the analysis.

10) *Run:* once you have selected all the parameters click on "Run" to launch the analysis. If you have chosen the Dunnett's test, an additional window will open to make you precise the control level.

2. Report

After launching the analysis, the report window opens.

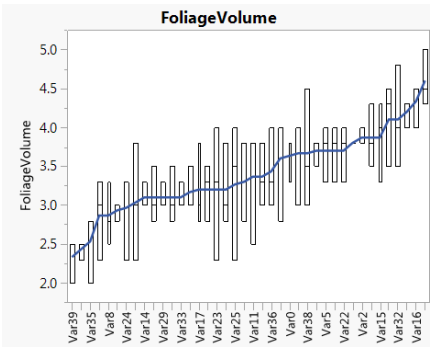


An overview of the information that you can find in the different tabs is proposed below. Screenshots of some tables and graphs are also displayed.

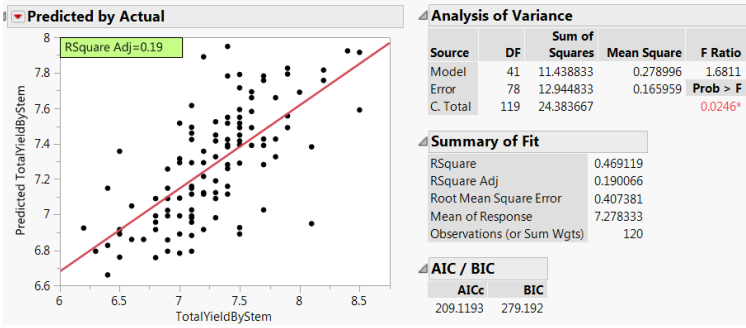
- *Descriptive statistics:*
  - Possibility to save the script of the report to the data table
  - Global summary statistics table, which contains the mean, median, standard deviation, quantiles… for each Y variable
  - For each Y variable:
    - Boxplots based on the Focus Effect variable
    - Summary statistics table based on the Focus Effect variable

Global summary statistics

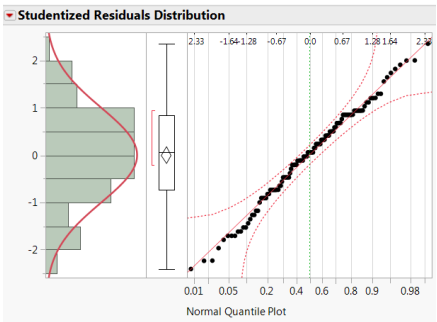
Variables	Mean	Std Dev	Variance
FoliageVolume	3.40667	0.63176	0.39911
TotalYieldByStem	7.27833	0.45266	0.2049
EarlyYield	0.46084	0.10176	0.01036
EarlyFruitNumber	2.63417	0.65702	0.43168

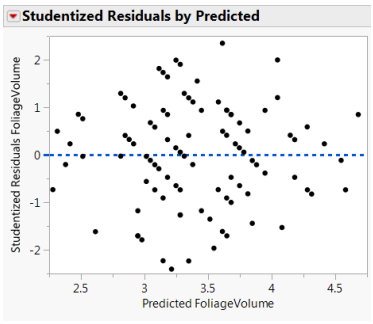


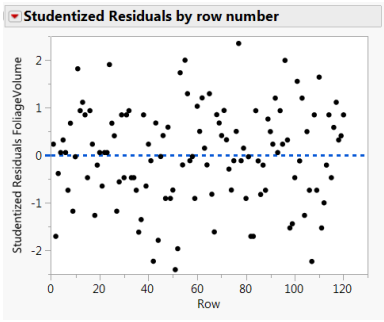
- *Statistics of the model:*
  - Possibility to display the table with predicted, adjusted, corrected values and residuals
  - Global statistics of the model table which contains the RSquare, Root Mean Square Error, AIC… associated with the model of each Y variable
  - For each Y variable:
    - Predicted by actual plot
    - Three tables with different statistics of the model
    - Lack of Fit test (if available)



- *Validation:*
  - For each Y variable:
    - Distribution of the studentized residuals and normal quantile plot (normality hypothesis)
    - Studentized residuals by predicted plot (homoscedasticity hypothesis)
    - Studentized residuals by row number plot (independence hypothesis)
    - Residuals map (if you have selected a Row and a Column columns in the interface window)
    - Residuals table

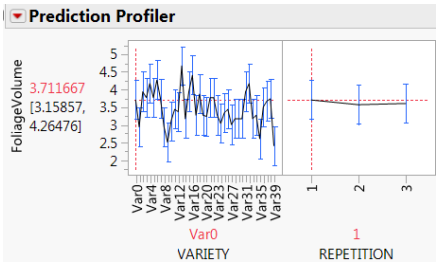






- *Effects study:*
  - Table with the pvalue associated with each effect of the different models
  - Corresponding pvalue graphs
  - Prediction Profiler
  - Screening tools: Normal plot and Pareto Plot (if available)

Effect	FoliageVolume	TotalYieldByStem	EarlyYield
VARIETY	<.0001*	0.0219*	0.0009*
REPETITION	0.4147	0.3690	0.0001*



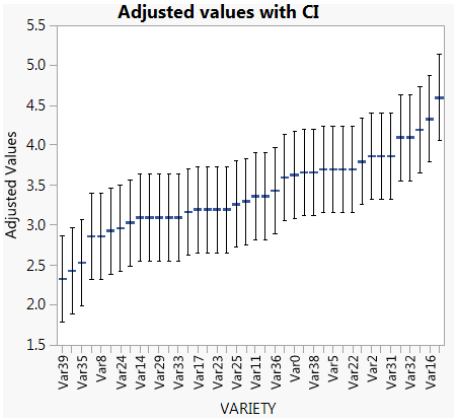
- *Adjusted values:*
  - Global Adjusted Values table for each Y variable and based on the levels of the Focus Effect variable
  - Global Corrected Values table (= Adjusted Value Focus Effect + Residuals)
  - For each Y variable:
    - Adjusted values and confidence interval graph
    - Adjusted values and confidence interval table
    - Corrected values table

Adjusted values VARIETY

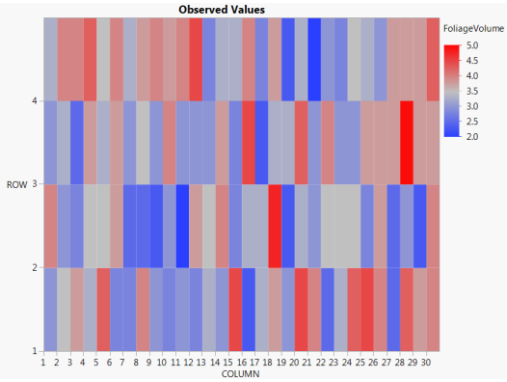
VARIETY	FoliageVolume	TotalYieldByStem	EarlyYield	EarlyFruitNumber
Var0	3.63333	6.86667	0.42367	2.43333
Var1	2.86667	6.86667	0.48533	2.76667
Var2	3.86667	7.06667	0.46767	2.73333
Var3	3.7	7.06667	0.52267	2.73333

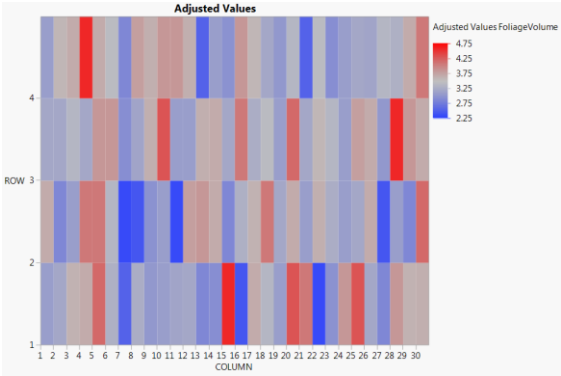
Corrected values (VARIETY)

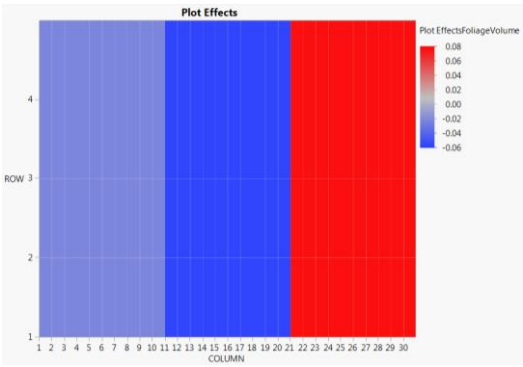
Row Number	FoliageVolume	TotalYieldByStem	EarlyYield	EarlyFruitNumber
1	3.72167	7.17333	0.46397	2.53667
2	2.22167	6.37333	0.61497	3.53667
3	3.72167	6.87333	0.51797	2.93667
4	3.72167	6.97333	0.57397	2.83667

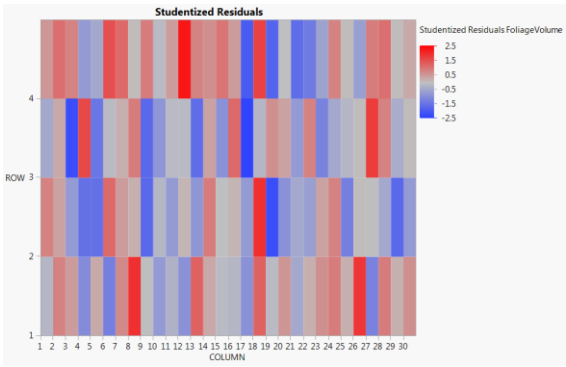


- *Fieldmaps:* (if you have selected a Row and a Column variables in the interface window)
  - For each Y variable:
    - Observed values fieldmap
    - Adjusted values fieldmap
    - Plot effect fielmap (= Observed Value – Adjusted Value Focus Effect - Residual)
    - Studentized residuals fieldmap

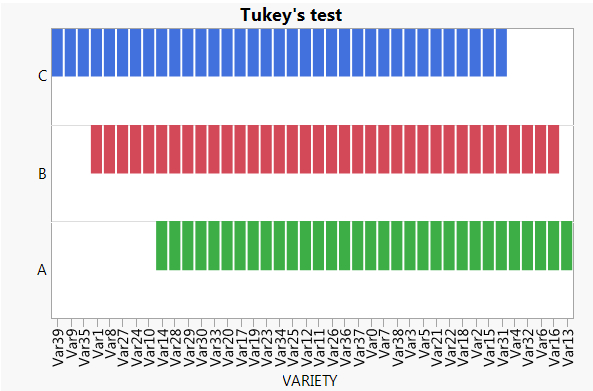






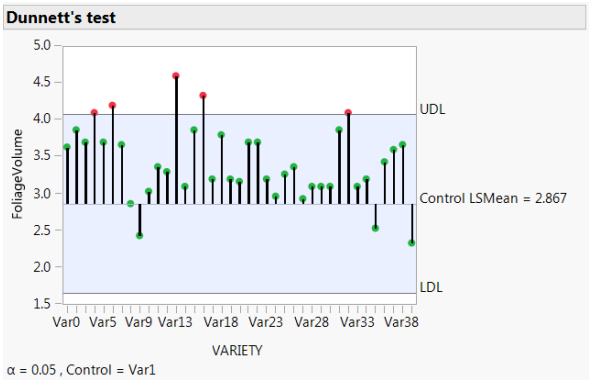


- *Multiple comparisons:*
  - For each Y variable: (if you have selected the Tukey's test)
    - Graph of the groups of the levels (of the Focus Effect variable) which are not significantly different
    - Connecting Letters Report
    - Ordered Differences Report
  - For each Y variable: (if you have selected the Dunnett's test)
    - Control Differences Graph
    - Control Differences Report



Connecting Letters Report

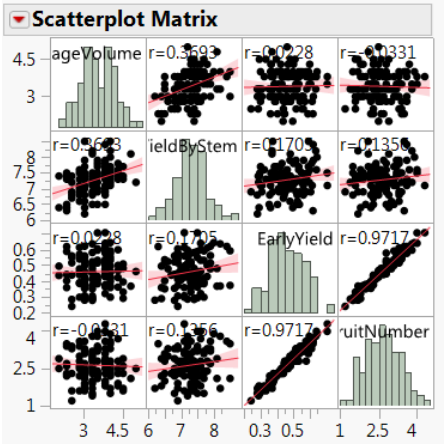
Level				Least Sq Mean
Var13	A			4.6000000
Var16	A	B		4.3333333
Var6	A	B		4.2000000
Var4	A	B		4.1000000
Var32	A	B		4.1000000
Var2	A	B	C	3.8666667
Var15	A	B	C	3.8666667
Var31	A	B	C	3.8666667
Var18	A	B	C	3.8000000
Var3	A	B	C	3.7000000

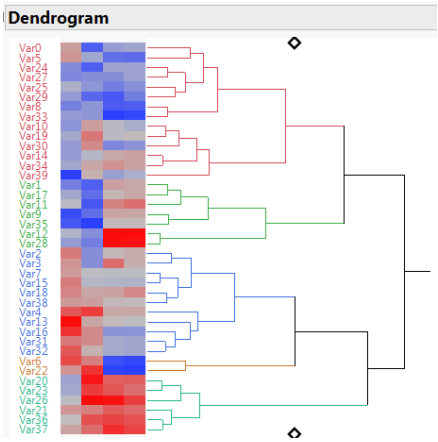


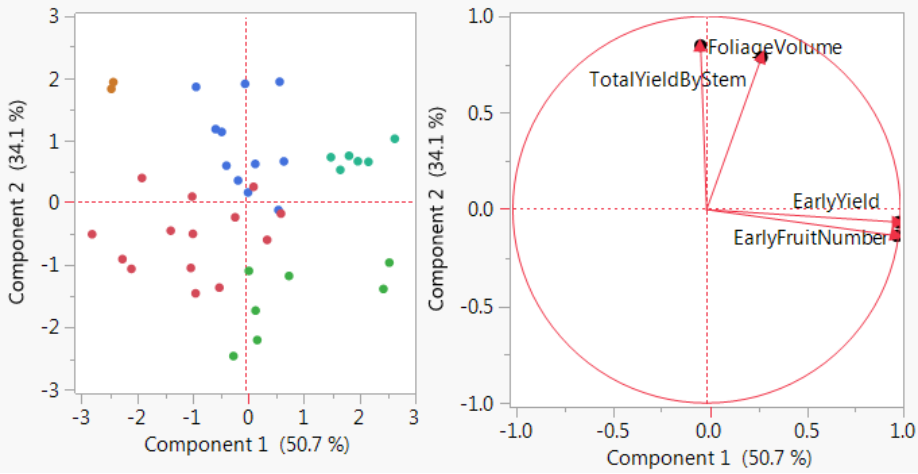
Control Differences Report

Level	- Level	Difference	Std Err Dif	Lower CL	Upper CL	p-Value
Var13	Var1	1.73333	0.3834244	0.52153	2.945132	0.0007*
Var16	Var1	1.46667	0.3834244	0.25487	2.678465	0.0073*
Var6	Var1	1.33333	0.3834244	0.12153	2.545132	0.0209*
Var4	Var1	1.23333	0.3834244	0.02153	2.445132	0.0431*
Var32	Var1	1.23333	0.3834244	0.02153	2.445132	0.0431*
Var31	Var1	1.00000	0.3834244	-0.21180	2.211799	0.1846
Var2	Var1	1.00000	0.3834244	-0.21180	2.211799	0.1846

- *Complementary Analyses:* (if you have checked boxes in the launch window)
  - Correlations
    - Correlations matrix
    - Scatterplot Matrix
    - Heatmap of correlations
  - Clustering
    - Dendrogram for levels of Focus Effect
    - Dendrogram for Y variables
    - Cluster Summary
    - Clustering History
  - Principal Components Analysis
    - Score plot (individual) and loading plot (variables) for the two first components
    - Loading Matrix
    - Squared Cosines of Variables
    - Partial Contributions of Variables







3. Update

This add-in may be updated in order to improve it or fix bugs. If you have access to the Limagrain Vegetable Seeds statistic server the update is automatic. When a new version is available, a window will open when you launch the Custom Anova and you just have to accept the installation.

Then relaunch the add-in.

If you do not have access to the server the current version of the add-in is used to run the analysis.