

INVIVOSTAT

Getting Started

Tipsheet

Contents

1	Introduction	3
2	Importing data into InVivoStat: Data formats	3
2.1	Single measures format	3
2.2	Repeated measures format.....	4
2.3	Other formats	5
2.4	Importing a dataset into InVivoStat – Excel import.....	6
3	Data management	7
4	Output management	8
5	Running an analysis	9
6	Error and warning messages	13
7	Log file.....	13
8	Exporting results	14
9	Re-running analyses.....	14
10	User output options.....	15
11	Appendix: InVivoStat colour chart.....	24

1 Introduction

This document describes how to start using InVivoStat, including data importing, data manipulation, generating results and exporting results to other software.

Once installed InVivoStat can be accessed from the Windows Start Menu:

Start → All programs → IVS → InVivoStat

2 Importing data into InVivoStat: Data formats

Data is imported into InVivoStat from Excel (using .xls or .xlsx file formats) or from a text editor using .csv (comma delimited) format. Although some basic data editing can be done in InVivoStat, it is recommended that the user first create the final dataset in Excel, including all data manipulations, before importing into InVivoStat.

Warning – datasets cannot contain commas in either the variable names or the data itself. Variable names cannot also contain the symbols ~ (tilde), + (plus) or * (asterix) as these characters are used internally by InVivoStat. Users will not be able to load files that have such characters present.

There are two common ways to organise your raw data, depending on the experimental design, before importing into InVivoStat. As a general rule:

- The results of each parameter measured in the experiment should be placed in a single column of the dataset.
- Variable names should be placed in the first row of the dataset.
- Missing data should be left as empty cells in Excel.
- No text should be placed in numerical response columns (other than the variable name).

2.1 Single measures format

In this dataset type each animal is assessed once and once only for each parameter measured. Many different parameters can be measured but each one is ‘different’ and will be analysed separately. Each row of the dataset corresponds to the results generated from an animal. The results from each parameter are placed in a column of the dataset. Other columns to be included are the so-called ‘Indicator columns’ defining, for example, the animal ID, the treatment factor(s), gender and also any blocking factors.

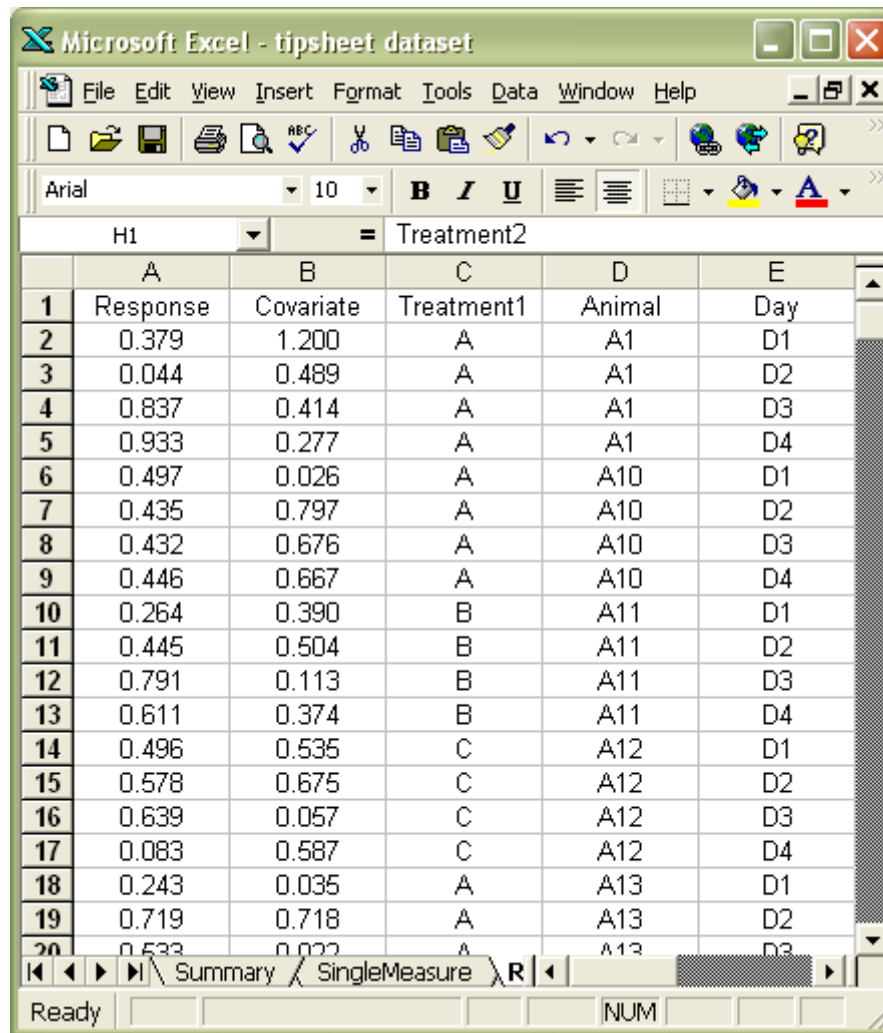
Consider a study assessing three treatments that involves transgenic and wildtype animals of both sexes. In the experiment the measurements recorded include bodyweight, locomotor activity, latency and a covariate. The dataset contains a separate variable for each of these parameters, along with indicator variables for Animal, Sex, Strain and Treatment (along with two nuisance blocking variables Block1 and Block2).

	A	B	C	D	E	F	G	H	I	J
	Animal	Activity	Latency	Bodyweight	Covariate	Treatment	Sex	Strain	Block1	Block2
1	1	1.170	0.690	0.925	0.251	D0	F	TG	Bk1	Bk3
2	1	1.302	0.206	0.962	0.410	D0	F	TG	Bk1	Bk1
3	2	1.717	0.352	0.131	0.679	D0	F	TG	Bk2	Bk1
4	3	1.170	0.741	0.302	0.396	D0	F	TG	Bk2	Bk2
5	4	1.386	0.992	0.695	0.605	D0	F	WT	Bk1	Bk2
6	5	1.441	0.089	0.004	0.992	D0	F	WT	Bk1	Bk3
7	6	1.601	0.121	0.229	0.685	D0	F	WT	Bk2	Bk3
8	7	1.571	0.802	0.331	0.082	D0	F	WT	Bk2	Bk1
9	8	1.333	0.097	0.206	0.414	D0	M	TG	Bk1	Bk1
10	9	1.570	0.367	0.729	0.068	D0	M	TG	Bk1	Bk2
11	10	1.657	0.043	0.477	0.422	D0	M	TG	Bk1	Bk3
12	11	1.474	0.517	0.096	0.290	D0	M	TG	Bk2	Bk2
13	12	1.717	0.292	0.508	0.515	D0	M	TG	Bk2	Bk3
14	13	1.170	0.416	0.983	0.854	D0	M	TG	Bk2	Bk1
15	14	1.064	0.313	0.511	0.914	D0	M	WT	Bk1	Bk1
16	15	1.244	0.841	0.965	0.770	D0	M	WT	Bk1	Bk2
17	16	1.601	0.291	0.207	0.642	D0	M	WT	Bk2	Bk2
18	17	0.987	0.018	0.107	0.310	D0	M	WT	Bk2	Bk3
19	18	1.370	0.409	0.657	0.591	D1	F	TG	Bk1	Bk1
20	19	1.502	0.112	0.824	0.023	D1	F	TG	Bk1	Bk2
21	20	1.586	0.190	0.243	0.229	D1	F	TG	Bk1	Bk3
22	21	1.370	0.796	0.075	0.834	D1	F	TG	Bk2	Bk2
23	22	1.502	0.195	0.939	0.717	D1	F	TG	Bk2	Bk3
24	23	1.370	0.580	0.644	0.080	D1	F	TG	Bk2	Bk1
25	24	1.641	0.529	0.118	0.776	D1	F	WT	Bk1	Bk1
26	25	1.533	0.433	0.453	0.831	D1	F	WT	Bk1	Bk2
27	26	1.502	0.992	0.105	0.071	D1	F	WT	Bk2	Bk2
28	27	1.586	0.562	0.696	0.097	D1	F	WT	Bk2	Bk3
29	28	1.770	0.222	0.222	0.218	D1	F	TG	Bk1	Bk2
30	29	1.770	0.222	0.222	0.218	D1	F	TG	Bk1	Bk2

2.2 Repeated measures format

If a parameter is measured repeatedly on each animal, for example over time, then the dataset must be formatted in a slightly different way to that described above. In this case the responses recorded for each parameter are still placed in a single column of the dataset, but in this case each animal is present in multiple rows of the dataset. An extra column is included in the dataset to identify the levels of the repeated factor. Indicator variables can be added to the dataset as before and covariates can also be included as extra columns of the dataset. The dataset can be described as ‘long and thin’.

For example, consider an experiment where the response of the animals was measured pre-treatment (the covariate) and on Days 1, 2, 3 and 4. Treatments are labelled A, B and C. The dataset should be set up as follows:



Microsoft Excel - tipsheet dataset

File Edit View Insert Format Tools Data Window Help

Arial 10 B I U

H1 = Treatment2

	A	B	C	D	E
1	Response	Covariate	Treatment1	Animal	Day
2	0.379	1.200	A	A1	D1
3	0.044	0.489	A	A1	D2
4	0.837	0.414	A	A1	D3
5	0.933	0.277	A	A1	D4
6	0.497	0.026	A	A10	D1
7	0.435	0.797	A	A10	D2
8	0.432	0.676	A	A10	D3
9	0.446	0.667	A	A10	D4
10	0.264	0.390	B	A11	D1
11	0.445	0.504	B	A11	D2
12	0.791	0.113	B	A11	D3
13	0.611	0.374	B	A11	D4
14	0.496	0.535	C	A12	D1
15	0.578	0.675	C	A12	D2
16	0.639	0.057	C	A12	D3
17	0.083	0.587	C	A12	D4
18	0.243	0.035	A	A13	D1
19	0.719	0.718	A	A13	D2
20	0.533	0.022	A	A13	D3

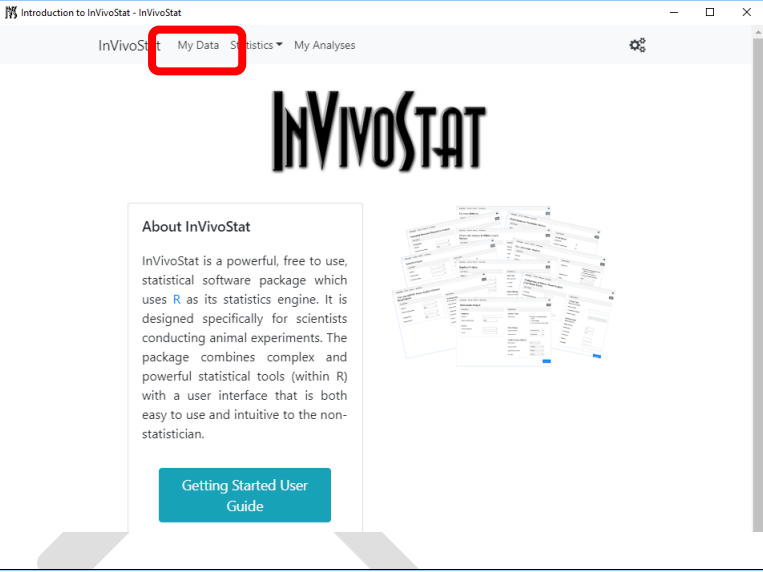
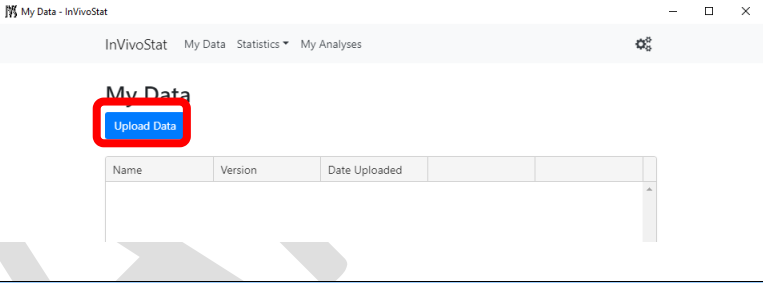
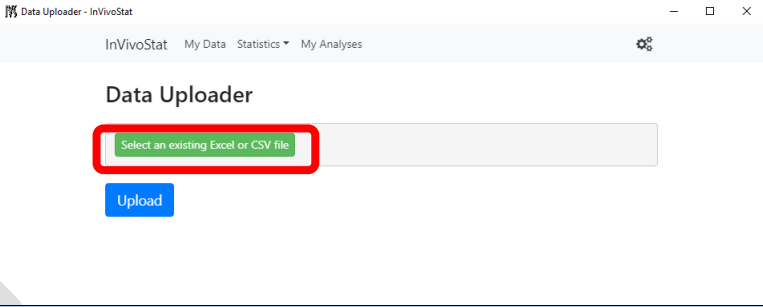
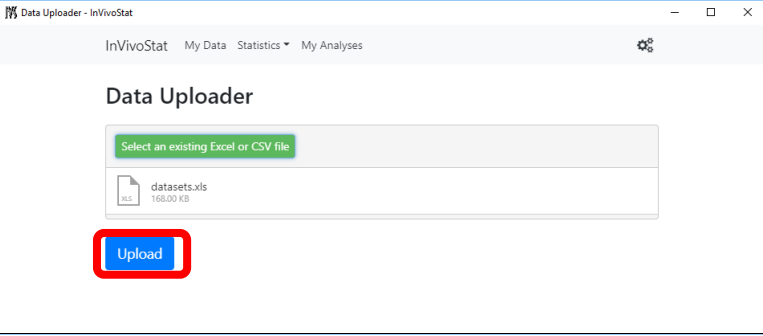
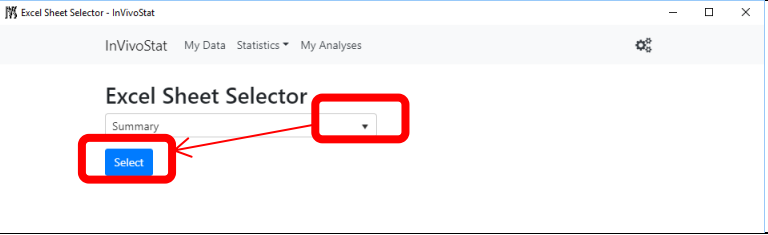
Summary SingleMeasure R

Ready NUM

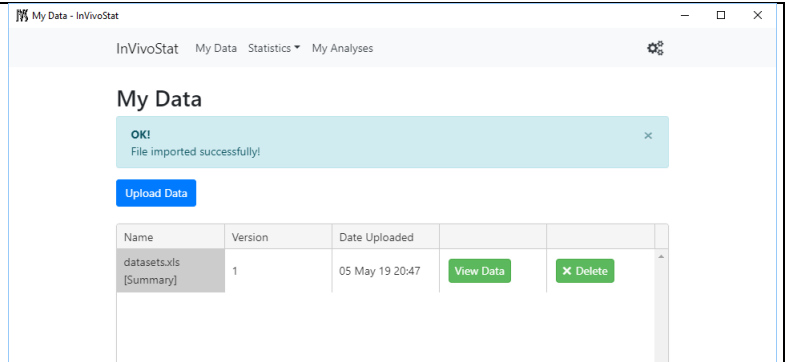
2.3 Other formats

Some of the other modules (for example, Chi-Squared and Fisher's Exact test, Nested Design Analysis and Survival Analysis) require different formats. These are described in the relevant tipsheets.

2.4 Importing a dataset into InVivoStat – Excel import

<p>Open InVivoStat from the start menu.</p> <p>Click on 'My Data'</p>	
<p>Click on 'Upload Data'</p>	
<p>Click on 'Select an existing Excel or CSV file'</p> <p>Go to the file that you want to open in InVivoStat.</p>	
<p>Click on 'Upload'</p>	
<p>If importing from Excel, select the worksheet within the workbook that you want to open.</p> <p>Click on 'Select'</p>	

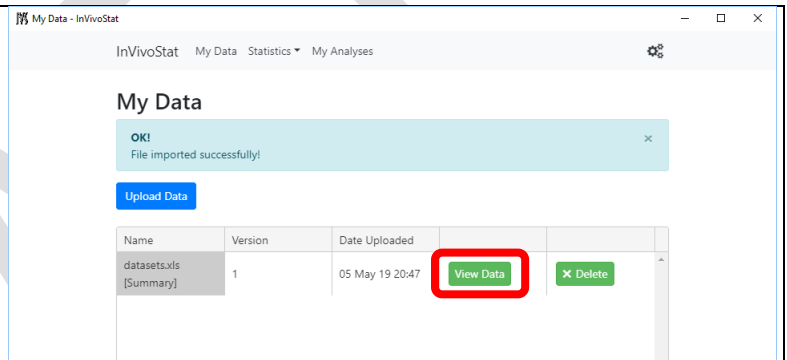
The data is now imported.



3 Data management

While it is recommended that most of the data manipulation should be made in Excel prior to importing into InVivoStat, there are a few operations that can be carried out within InVivoStat itself.

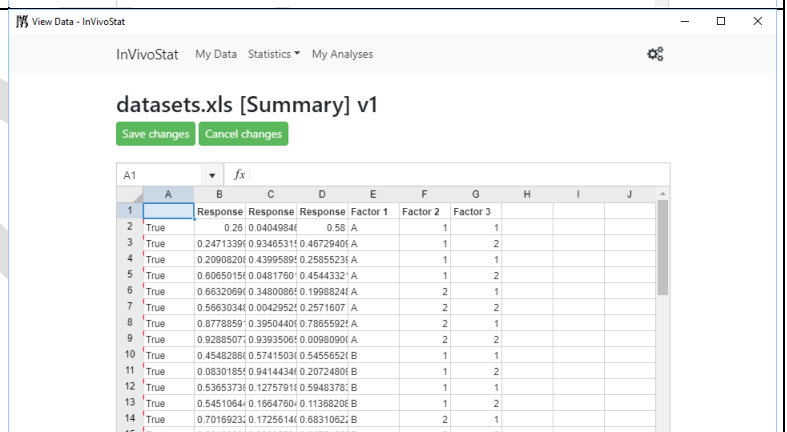
To edit the data, click on 'View Data'



Data edits that can be performed:

- Variable names
- Data values
- Note individual data entries can be deleted

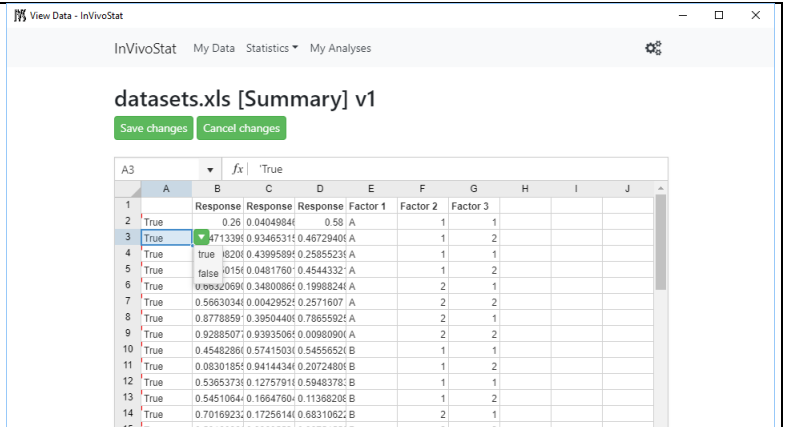
Remember to 'Save changes' before exiting.



Individual rows of the data can be excluded from the analysis.

In column A, using the drop-down menu change 'True' to 'False' to remove the observation from the dataset.

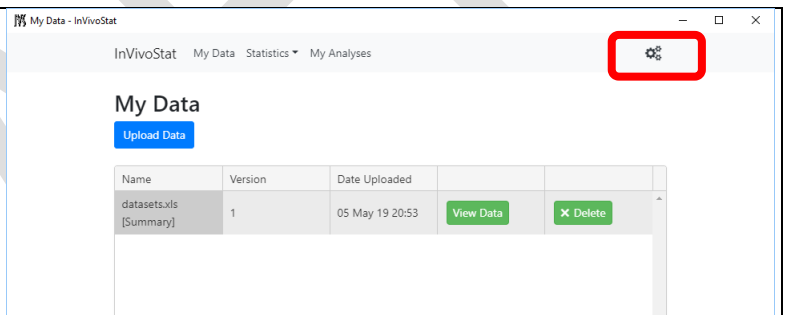
Remember to 'Save changes' before exiting.



4 Output management

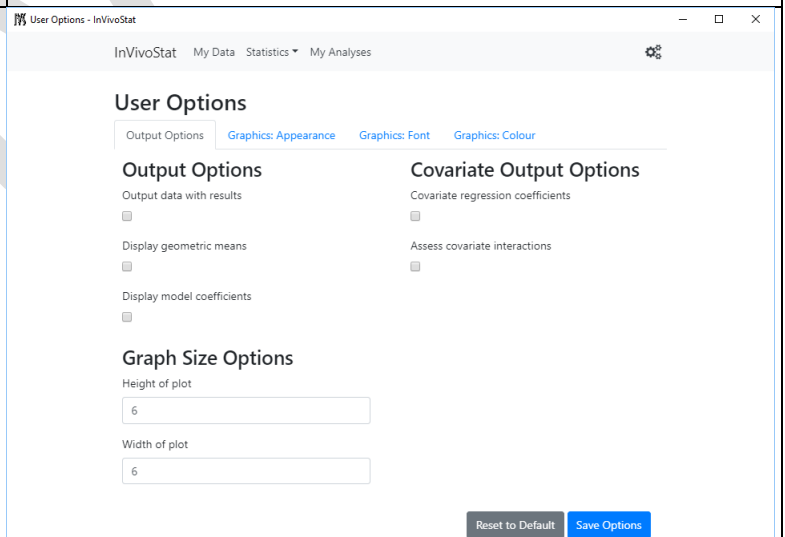
The user has the ability to change many features of the graphical output of InVivoStat and also change some of the results given in the output window.

Go to the output management interface to make changes to the output.



Using this window, the user can select additional analysis results, manipulate the InVivoStat Output, and also change the plotting parameters.

A full description of the options available in the Output Options window can be found in the Section 10 of this tipsheet.



5 Running an analysis

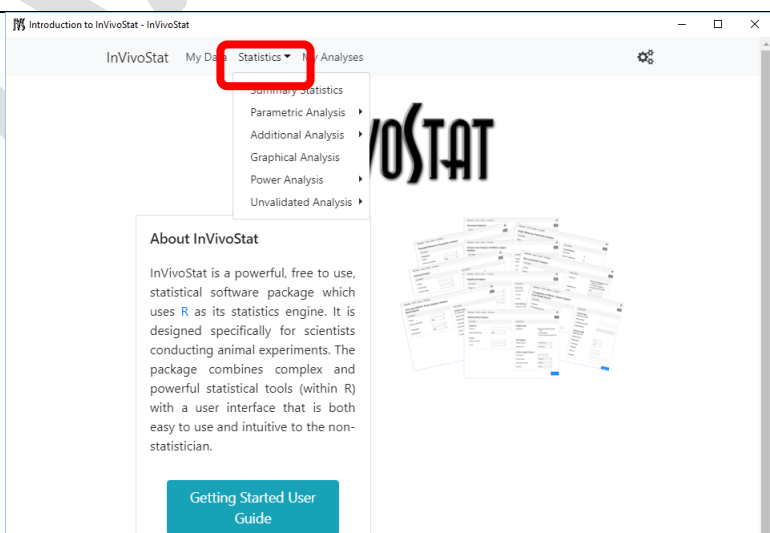
Once the dataset has been loaded into InVivoStat the user is in a position to run the analysis of their choice. The analysis modules available include:

- *Summary Statistics*
- *Parametric Analysis*
 - *Single Measure Parametric Analysis* (including t-test, ANOVA and ANCOVA)
 - *Repeated Measures Parametric Analysis*
 - *P-value Adjustment* (adjustments for multiple comparisons)
 - *Paired t-test & Within-Subject Analysis*
 - *Unpaired t-test Analysis* (including Welch's t-test)
 - *Correlation Analysis*
 - *Linear Regression Analysis*
 - *Dose-Response and Non-Linear Regression Analysis*
 - *One-Sample t-test Analysis*
- *Additional Analysis*
 - *Non-Parametric Analysis* (Kruskal-Wallis and Mann-Whitney tests)
 - *Chi-squared and Fisher's Exact Test*
 - *Survival Analysis*
 - *Multivariate Analysis*
- *Graphical Analysis*
- *Power Analysis*
 - *Comparison of Means*
 - *One-way ANOVA*
- *Unvalidated Analysis*
 - *Nested Design Analysis*
 - *Incomplete Factorial Parametric Analysis*

A full description of the specific analysis options is given in the individual tipsheets.

To begin, click on the Statistics drop-down list and select the module to use.

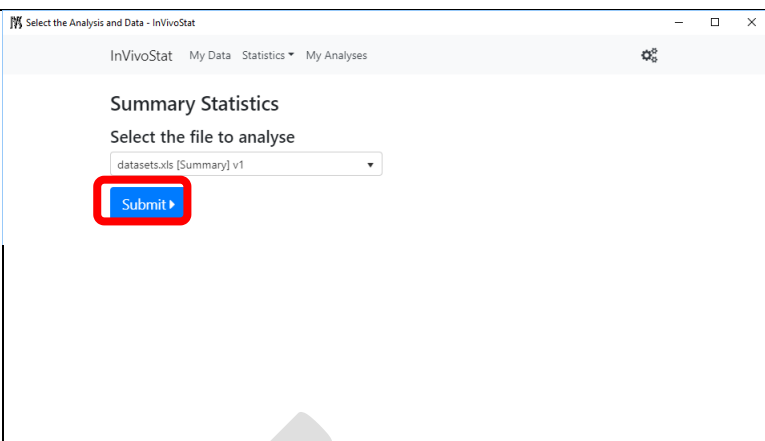
In this tipsheet, the Summary Statistics module will be employed.



Once the module is selected, the user should now choose the dataset to analyse.

Where the data is imported from within an Excel file, the data identifier will include the Excel filename and worksheet name (in square brackets).

Click on 'Submit' when the dataset has been selected.



Select the Analysis and Data - InVivoStat

InVivoStat My Data Statistics My Analyses

Summary Statistics

Select the file to analyse

datasets.xls [Summary] v1

Submit

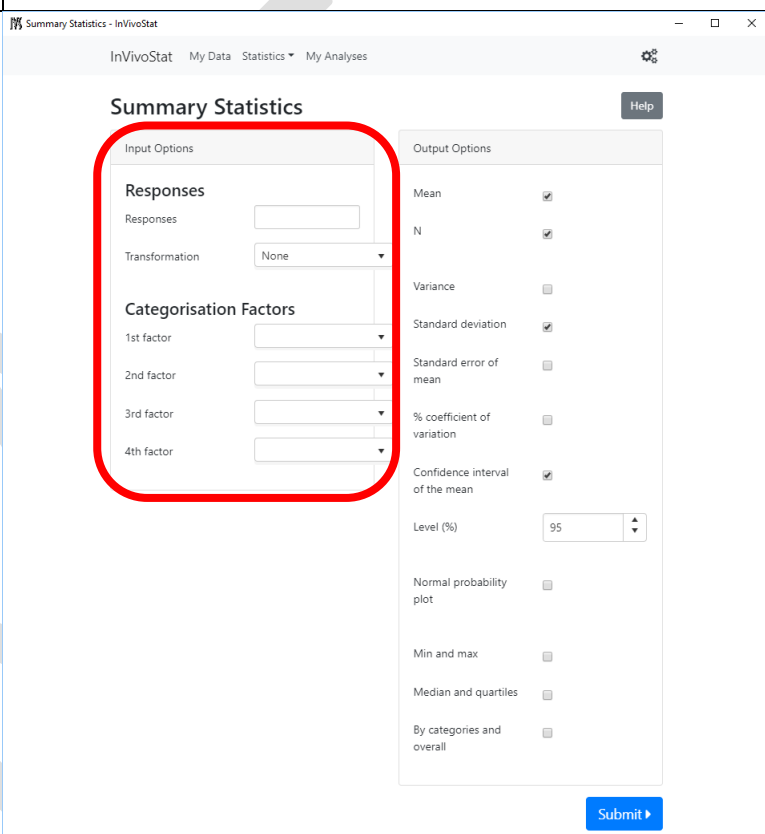
Input Options

Input options are on the LHS of the interface.

The user can now select:

- Input variables*, by clicking on the box and selecting from the drop-down list of variable.
- Analysis options*, usually from a drop-down list.

Note for certain input variables only a single variable can be selected, whereas in other cases multiple variables can be selected.



Summary Statistics - InVivoStat

InVivoStat My Data Statistics My Analyses

Summary Statistics

Help

Input Options

Responses

Responses

Transformation

None

Categorisation Factors

1st factor

2nd factor

3rd factor

4th factor

Output Options

Mean ☒

N ☒

Variance ☐

Standard deviation ☒

Standard error of mean ☐

% coefficient of variation ☐

Confidence interval of the mean ☒

Level (%) 95

Normal probability plot ☐

Min and max ☐

Median and quartiles ☐

By categories and overall ☐

Submit

Output Options

Output options are on the RHS of the interface.

The user can select:

- Output options*, to include in the statistical output.
- Parameters for the analysis* (for example, significance level)

Summary Statistics - InVivoStat

InVivoStat My Data Statistics My Analyses

Summary Statistics

Input Options

Responses

Responses

Transformation

None

Categorisation Factors

1st factor

2nd factor

3rd factor

4th factor

Output Options

Mean ☒

N ☒

Variance ☐

Standard deviation ☒

Standard error of mean ☐

% coefficient of variation ☐

Confidence interval of the mean ☒

Level (%) 95

Normal probability plot ☐

Min and max ☐

Median and quartiles ☐

By categories and overall ☐

Submit

Finally, the user should click on 'Submit' to run the statistical analysis.

Summary Statistics - InVivoStat

InVivoStat My Data Statistics My Analyses

Summary Statistics

Input Options

Responses

Responses

Response 1 X

Response 2 X

Response 3 X

Transformation

None

Categorisation Factors

1st factor

2nd factor

3rd factor

4th factor

Output Options

Mean ☒

N ☒

Variance ☐

Standard deviation ☒

Standard error of mean ☐

% coefficient of variation ☐

Confidence interval of the mean ☒

Level (%) 95

Normal probability plot ☐

Min and max ☐

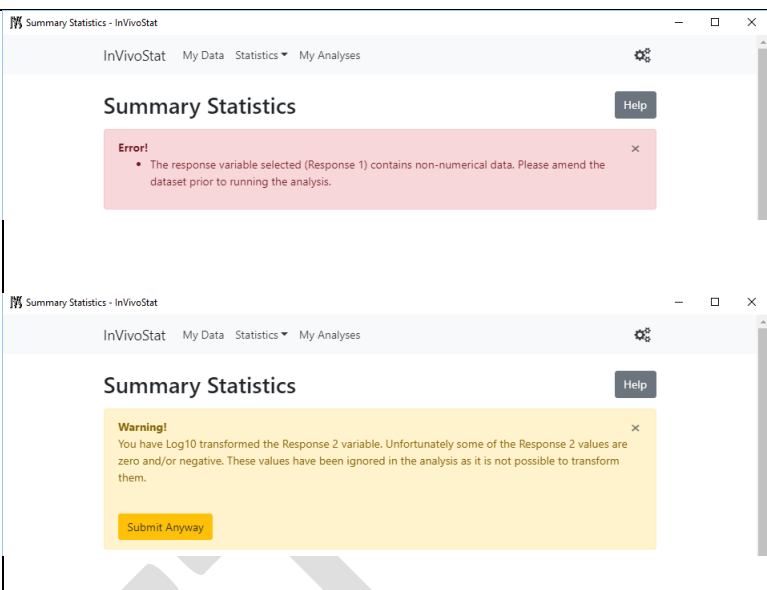
Median and quartiles ☐

By categories and overall ☐

Submit

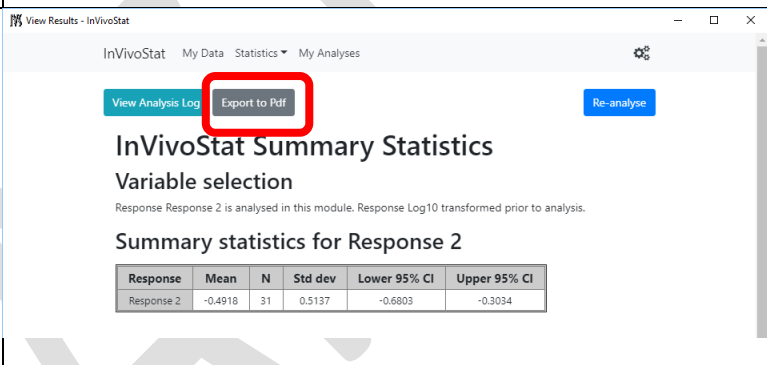
InVivoStat now runs various checks on the dataset and variables selected (analysis module dependent).

Messages are given at the top of the input window (see Section 6 for more details).



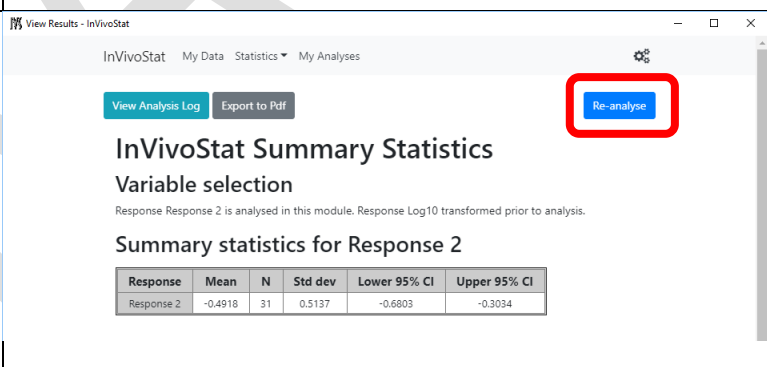
Once the analysis has been generated, the user can:

- 1) Save all the output in a pdf file



Once the analysis has been generated, the user can:

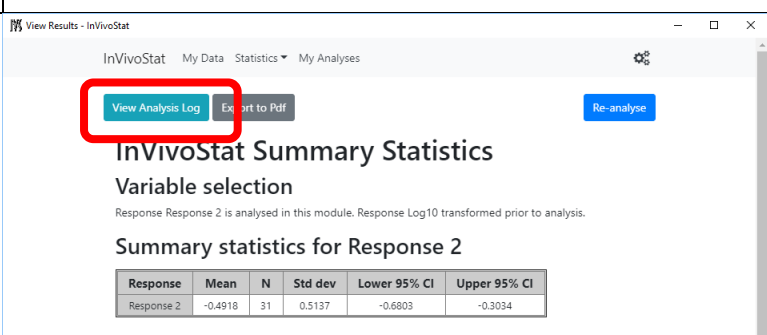
- 2) Return to the analysis dialogue box



Once the analysis has been generated, the user can:

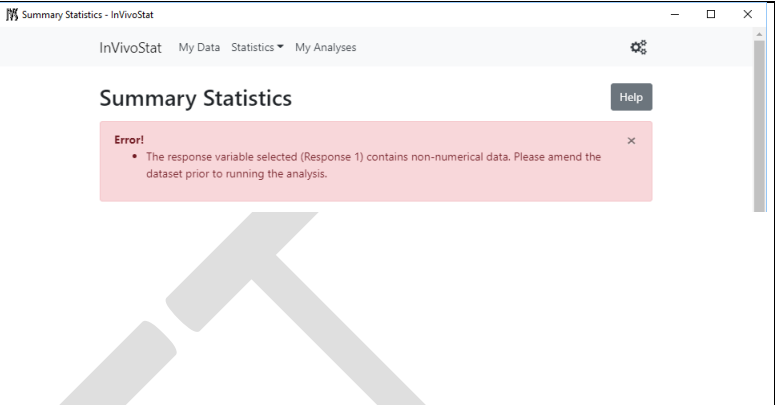
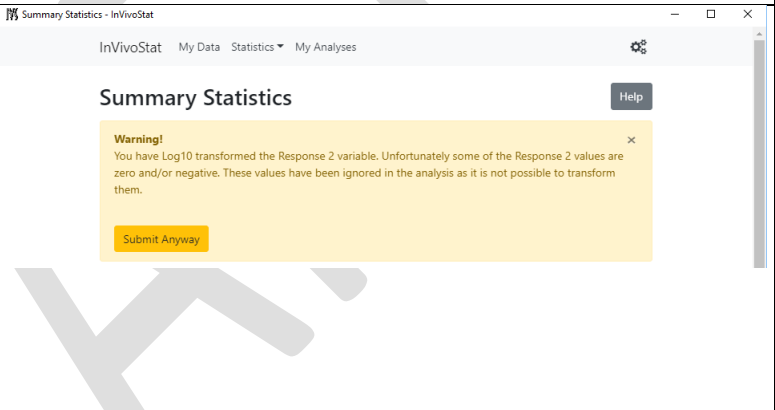
- 3) View the log file

See Section 7 for more details.



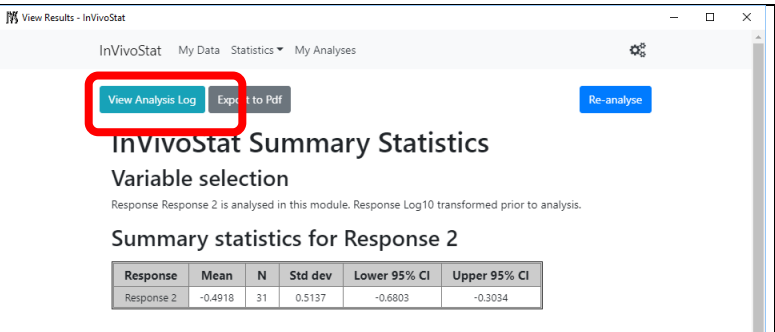
6 Error and warning messages

When running an analysis InVivoStat performs several checks of the data. These fall into two categories ‘Errors and ‘Warnings’. Messages are given at the top of the input window.

<p>Warning messages:</p> <p>Warning messages are more for information and are identified by yellow text boxes. They may highlight the need for user intervention, but in most cases they merely inform the user of a possible issue with the dataset. The analysis can proceed following a Warning message.</p>	
<p>Error messages:</p> <p>Error messages are differentiated from Warning messages by a red text box. Once an Error message has been produced the analysis will not proceed. The user must return to the dataset and make any changes necessary to address the Error message.</p>	

7 Log file

Once the analysis has been completed, the user can view a log file containing other information about the analysis. The log is available by clicking on the ‘View Analysis Log’ button at the top of the Results window. The log should also be viewed if InVivoStat produces no output. It may give the user some valuable information explaining why the analysis did not complete.

<p>The log file can be accessed for all analysis output windows.</p>	
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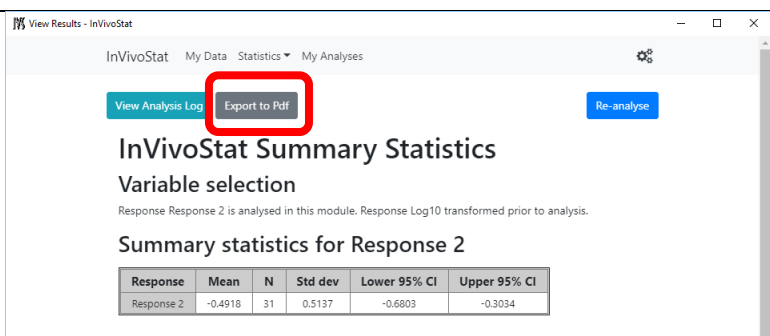
8 Exporting results

Once the results have been generated then they can be exported in a number of different formats.

All results (plots, tables and text) can be cut and pasted into other packages by right clicking on the output (then select copy). The output can also be saved as a pdf file.

The output file can also be stored as a .pdf file, including all analysis results and potentially the dataset that was used in the analysis (see Section 10).

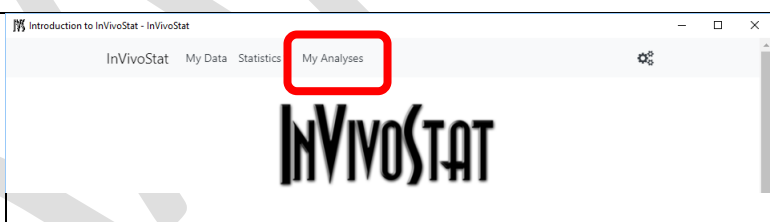
Once generated the pdf file can be saved by right clicking on generated pdf output.



9 Re-running analyses

Previous analyses can be re-ran, and results re-generated, using the 'My Analysis' window

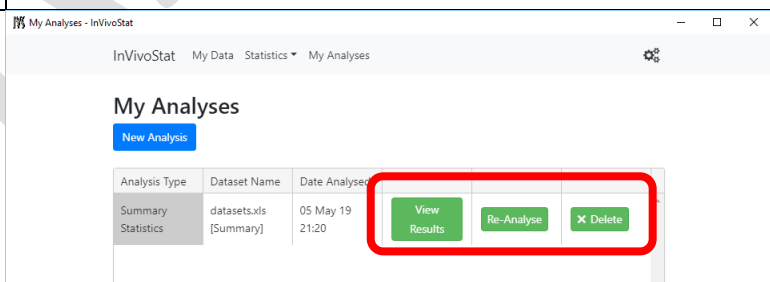
Click on the 'My Analysis' button



Previous analyses are listed in the My Analyses window.


You can:

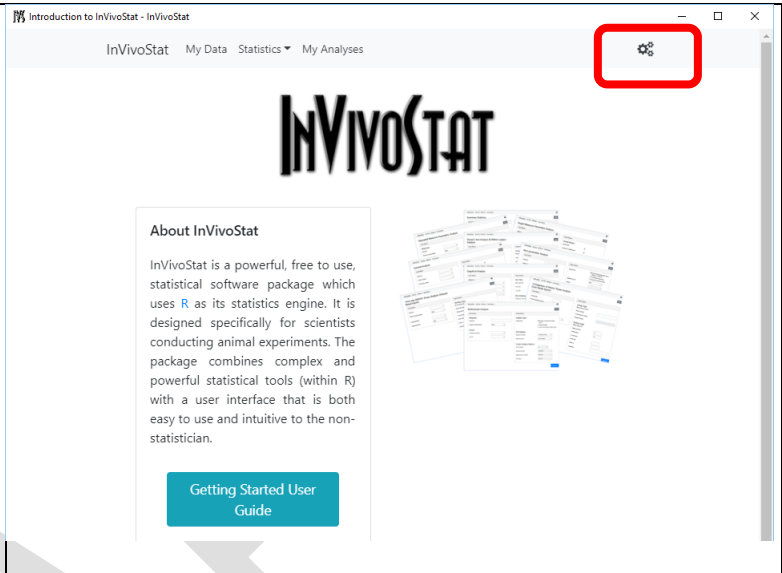
- 1) View previously generated results ('View Results')
- 2) Re-run an analysis ('Re-Analyse')
- 3) Delete an analysis from the list ('Delete') if you no longer need a record of an analysis



10 User output options

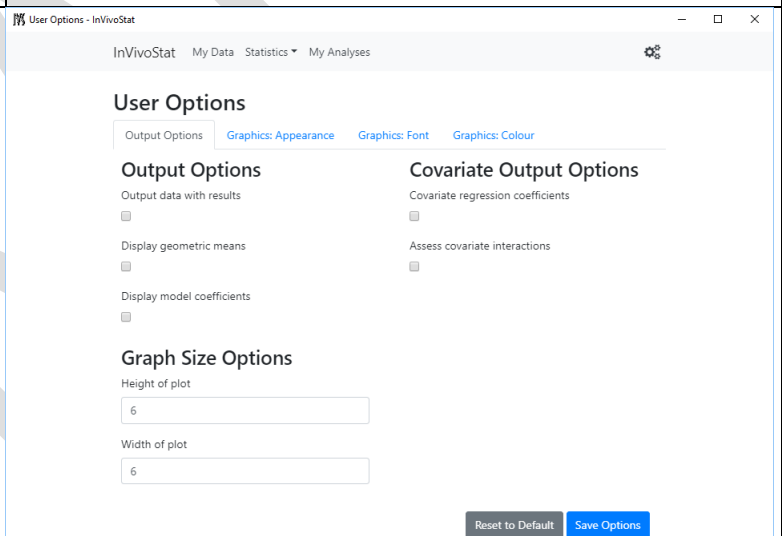
The user has the ability to control various aspects of the InVivoStat output. This includes controlling the style and output of all plots generated within InVivoStat, the choice of results generated, and whether the dataset is included in the output.

Click on the  button on the top right-hand side of the interface to open the User Output Options interface.



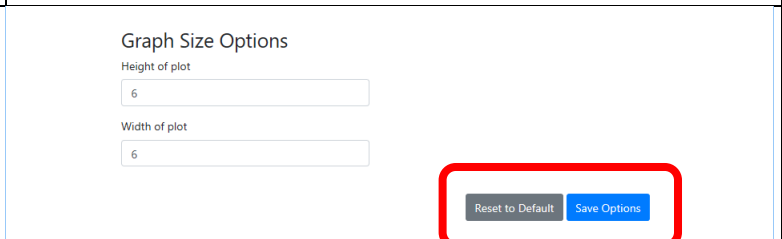
The User options window consists of four tabs:

- 1) *Output Options*
General options, including which output to display
- 2) *Graphics Appearance*
Graphical appearance options, including point symbols and line properties
- 3) *Graphics Font*
User has ability to control all text fonts appearing on plots
- 4) *Graphics Colour*
User has ability to control colour palette on plots, including ability to generate black and white colour scheme

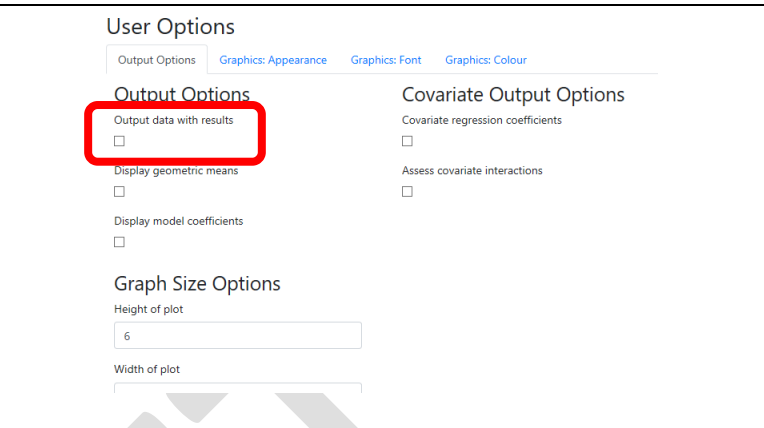
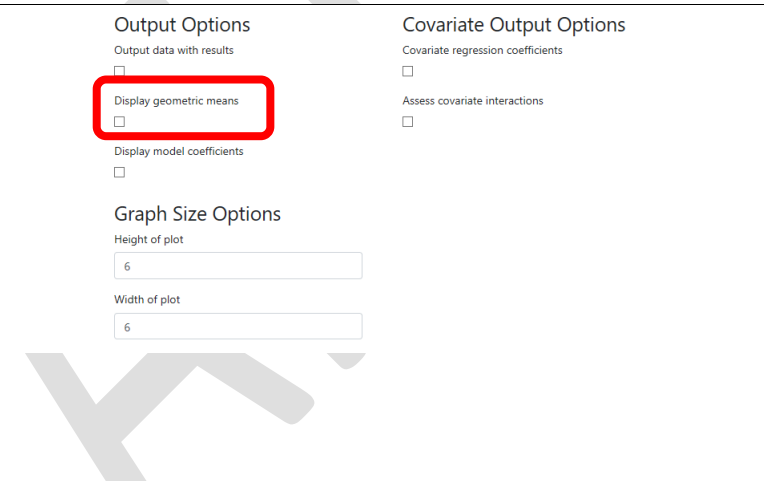
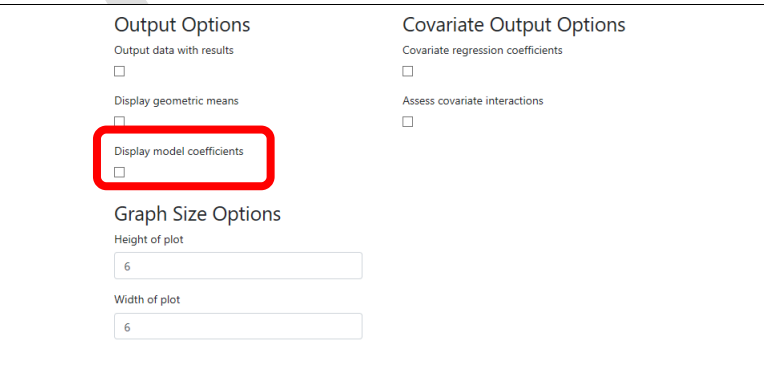
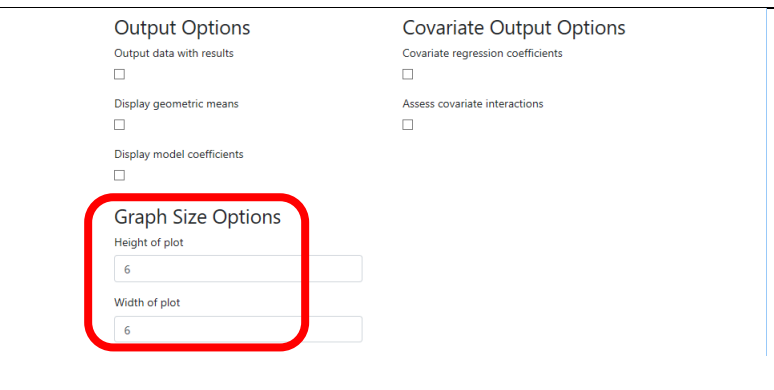


At any time, the user can restore the Output Options to the default settings.

Once the settings have been edited, they must be saved before progressing with any analysis.



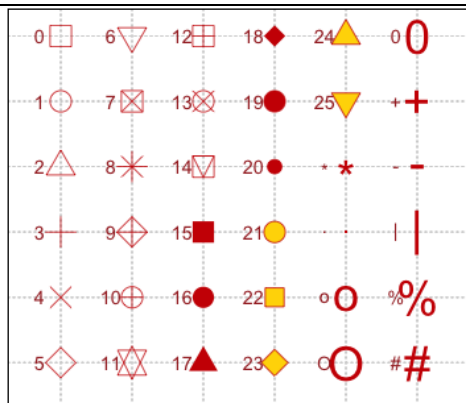
Output Options

<p>‘Output data with results’</p> <p>When selecting this option, InVivoStat will include a printout of the data being analysed at the end of the output</p>	
<p>‘Display geometric means’</p> <p>For the parametric analyses, if a log transformation is applied to the response prior to analysis, and hence the analysis is performed on the log scale, then by selecting this option implies the output will also include the back-transformed geometric means (on the original scale) alongside the Least Square (predicted) means on the log scale.</p>	
<p>‘Display model coefficients’</p> <p>For the Single Measures Parametric Analysis module, selecting this option implies that the coefficient solutions of the fixed effects will be included in the output. Note these results are automatically generated in the Linear Regression module.</p>	
<p>‘Graph Size Options’</p> <p>InVivoStat generates plots (within the HTML output) as .png files. These options control the size of the png files.</p> <p>Right clicking on the plots allows the user to extract individual png files.</p>	

<p>‘Covariate regression coefficients’</p> <p>When a covariate is included in a parametric statistical model, by selecting this option InVivoStat will include in the output the covariate regression coefficients (i.e. the slope of the overall regression line).</p>	<div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <p>Output Options</p> <p>Output data with results <input type="checkbox"/></p> <p>Display geometric means <input type="checkbox"/></p> <p>Display model coefficients <input type="checkbox"/></p> <p>Graph Size Options</p> <p>Height of plot <input style="width: 100%;" type="text" value="6"/></p> <p>Width of plot <input style="width: 100%;" type="text" value="6"/></p> </div> <div style="width: 50%;"> <p>Covariate Output Options</p> <p>Covariate regression coefficients <input checked="" type="checkbox"/></p> </div> </div>
<p>‘Assess covariate interactions’</p> <p>When a covariate is included in a parametric statistical model, InVivoStat assumes the covariate by treatment interactions are non-significant. The recommended approach to assess this assumption is to consider the categorised scatterplots (presented by default in the output).</p> <p>By selecting this option InVivoStat presents the results of the statistical model that includes these interactions, allowing the user to make a more formal assessment of the covariate interactions.</p>	<div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <p>Output Options</p> <p>Output data with results <input type="checkbox"/></p> <p>Display geometric means <input type="checkbox"/></p> <p>Display model coefficients <input type="checkbox"/></p> <p>Graph Size Options</p> <p>Height of plot <input style="width: 100%;" type="text" value="6"/></p> <p>Width of plot <input style="width: 100%;" type="text" value="6"/></p> </div> <div style="width: 50%;"> <p>Covariate Output Options</p> <p>Covariate regression coefficients <input type="checkbox"/></p> <p>Assess covariate interactions <input checked="" type="checkbox"/></p> </div> </div>

Graphics Appearance

<p>‘Points’ (size and symbol)</p> <p>The user can change the symbol and size used for points on plots.</p> <p>Plots affected include scatterplots, means with SEM plots (line plot version), case profile plots, predicted vs. residual plots, normal probability plots, box plots (outliers) and survival plots (censored observations).</p> <p>Symbols available include:</p>	<div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <p>User Options</p> <p><u>Output Options</u> Graphics: Appearance Graphics: Font Graphics: Colour</p> <p>Points</p> <p>Size <input checked="" type="text" value="4"/></p> <p>Shape <input type="text" value="21"/></p> <p>Display point labels <input type="checkbox"/></p> <p>Points Jitter Amount</p> <p>Horizontal <input style="width: 100%;" type="text" value="0.1"/></p> <p>Vertical <input style="width: 100%;" type="text" value="0.1"/></p> </div> <div style="width: 50%;"> <p>Lines</p> <p>Lines size <input style="width: 100%;" type="text" value="1"/></p> <p>Solid type <input type="text" value="Solid"/></p> <p>Dashed type <input type="text" value="Dashed"/></p> <p>Display lines on LS Means plot <input type="checkbox"/></p> <p>Display lines on Plot of Means with SEM <input type="checkbox"/></p> <p>Error Bars</p> <p>Size <input style="width: 100%;" type="text" value="4"/></p> </div> </div>
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‘Display point labels’

For scatterplots, selecting this option allows the user to include labels of the case ID number. This can be useful for identifying potential outliers or unusual responses in large datasets.

Points

Size

4

Shape

21

Display point labels

☐

Points Jitter Amount

Horizontal

0.1

Vertical

0.1

Lines

Lines size

1

Solid type

Solid

Dashed type

Dashed

Display lines on LS Means plot

☐

Display lines on Plot of Means with SEM

☐

Error Bars

Size

4

‘Points Jitter Amount’

In the Graphics Module, when the axes are categorical (i.e. non-numeric) then on scatterplots the user has the option of adding a random jitter to the points to allow the user to see all individual results.

This option allows the user to control the amount of random jitter applied to the points.

Points

Size

4

Shape

21

Display point labels

☐

Points Jitter Amount

Horizontal

0.1

Vertical

0.1

Lines

Lines size

1

Solid type

Solid

Dashed type

Dashed

Display lines on LS Means plot

☐

Display lines on Plot of Means with SEM

☐

Error Bars

Size

4

‘Lines’

The user can change the thickness and pattern of lines included on InVivoStat’s plots.

Applies to many plots, including regression lines on scatterplots, lines connecting means on LS Means plots, error bars and normal curves on histograms.

User can control the line type for the default solid lines separately from the default dashed lines.

Line types available include:

'blank'	
'solid'	<div></div>
'dashed'	<div></div>
'dotted'	<div></div>
'dotdash'	<div></div>
'longdash'	<div></div>
'twodash'	<div></div>

Points

Size

4

Shape

21

Display point labels

☐

Points Jitter Amount

Horizontal

0.1

Vertical

0.1

Lines

Lines size

1

Solid type

Solid

Dashed type

Dashed

Display lines on LS Means plot

☐

Display lines on Plot of Means with SEM

☐

Error Bars

Size

4

‘Display lines on the LS Means plot’

By default the least square means, presented on the LS Means plots in the parametric analysis modules, are not connected by a line. Selecting this option will include lines connecting the means.

Points

Size

4

Shape

21

Display point labels

☐

Points Jitter Amount

Horizontal

0.1

Vertical

0.1

Lines

Lines size

1

Solid type

Solid

Dashed type

Dashed

Display lines on LS Means plot

☐

Display lines on Plot of Means with SEM

☐

Error Bars

Size

4

‘Display lines on the Plot of Means with SEM’

By default the means presented on the Means with SEM plot in the Graphical Analysis module, are not connected by a line. Selecting this option will include lines connecting the means.

Points

Size

4

Shape

21

Display point labels

**Points Jitter Amount**

Horizontal

0.1

Vertical

0.1

Lines

Lines size

1

Solid type

Solid

Dashed type

Dashed

Display lines on LS Means plot



Display lines on Plot of Means with SEM

**Error Bars**

Size

4

‘Error Bars size’

This option allows the user to control the width of the whisker on the Means with SEM plot in the Graphics Analysis module and the confidence interval on the LS Means plot.

Points

Size

4

Shape

21

Display point labels

**Points Jitter Amount**

Horizontal

0.1

Vertical

0.1

Lines

Lines size

1

Solid type

Solid

Dashed type

Dashed

Display lines on LS Means plot



Display lines on Plot of Means with SEM

**Error Bars**

Size

4

Graphics: Font**‘Overall Parameters’**

These options allow the user to control the font type, size, colour and style on the main title and the X-axis and Y-axis titles on plots.

Font styles available include plain, italic or bold.

User Options[Output Options](#)[Graphics: Appearance](#)[Graphics: Font](#)[Graphics: Colour](#)**Overall Parameters**

Title font size

20

X-axis title font size

15

Font

Helvetica

Font style

Plain

Font colour

Black

Legend Parameters

Title text colour

White

Legend text size

15

Position

Default

X-axis Label Parameters

Labels font size

15

Legend angle

0

Horizontal adjustment

0.5

Y-axis Label Parameters

Labels font size

15

Legend angle

0

Vertical adjustment

0.5

‘X(Y)-axis Label Parameters’

These options allow the user to control the font size and orientation of the X-axis and Y-axis labels on the plots.

The default angle for the X- and Y-axis labels is horizontal.

X-axis horizontal adjustment controls the relative position of the X-axis labels in relation to the tick marks.

Y-axis vertical adjustment controls the relative position of the Y-axis labels in relation to the tick marks.

User Options

Output Options Graphics: Appearance Graphics: Font Graphics: Colour

Overall Parameters

Title font size
20

X-axis title font size
15

Font
Helvetica

Font style
Plain

Font colour
Black

Legend Parameters

Title text colour
White

Legend text size
15

Position
Default

X-axis Label Parameters

Labels font size
15

Legend angle
0

Horizontal adjustment
0.5

Y-axis Label Parameters

Labels font size
15

Legend angle
0

Vertical adjustment
0.5

‘Legend Parameters’

These options control the legend title and text colour.

This title text option defines the colour of the Legend title text, where the title corresponds to the factor whose levels are given in the legend. The default colour is white (hence legend title not shown).

The user can also select the position of the legend, over-riding the default location. Options include right, left, top or bottom.

User Options

Output Options Graphics: Appearance Graphics: Font Graphics: Colour

Overall Parameters

Title font size
20

X-axis title font size
15

Font
Helvetica

Font style
Plain

Font colour
Black

Legend Parameters

Title text colour
White

Legend text size
15

Position
Default

X-axis Label Parameters

Labels font size
15

Legend angle
0

Horizontal adjustment
0.5

Y-axis Label Parameters

Labels font size
15

Legend angle
0

Vertical adjustment
0.5

Graphics Colour

<p>‘Black & white format’</p> <p>By selecting this option, InVivoStat will produce all plots using a black and white colour scheme.</p>	<div> <div>User Options</div> <div> <div>Output Options</div> <div>Graphics: Appearance</div> <div>Graphics: Font</div> <div>Graphics: Colour</div> </div> <div> <div>Plot Output Options</div> <div>Black & white format</div> <div><input type="checkbox"/></div> </div> <div>Overall Colour Options</div> <div> <div>Fill (colour)</div> <div>RoyalBlue1</div> </div> <div> <div>Fill (black & white)</div> <div>Grey</div> </div> <div> <div>Line (colour)</div> <div>Red</div> </div> <div> <div>Line (black & white)</div> <div>Black</div> </div> </div> <div> <div>Categorised Plot Colours</div> <div> <div>Black & white palette range minimum</div> <div>0.1</div> </div> <div> <div>Black & white palette range maximum</div> <div>0.8</div> </div> <div> <div>Palette (colour)</div> <div>Set1</div> </div> <div> <div>Header bar</div> <div>Ivory2</div> </div> </div>
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<p>‘Header bar’</p> <p>This option defines the colour of the header bar in categorised plots where separate plots are produced for the levels of the categorisation factor and the factor levels are included in a header bar above the plot.</p>	<div style="border: 1px solid #ccc; padding: 10px;"> <p>Categorised Plot Colours</p> <p>Black & white palette range minimum</p> <input style="width: 100%;" type="text" value="0.1"/> <p>Black & white palette range maximum</p> <input style="width: 100%;" type="text" value="0.8"/> <p>Palette (colour)</p> <input style="width: 100%;" type="text" value="Set1"/> <p>Header bar</p> <input style="width: 100%;" type="text" value="Ivory2"/> </div>
<p>‘Fill (colour/ black & white)’</p> <p>These options control the colour of the fill areas on the plots, for example the colour of the bars on the Means with SEM plot, the symbols on the scatterplot, bars on the histogram plot and boxes on the box-plot.</p> <p>Colours available to the user are given in the Appendix.</p>	<div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <p>Plot Output Options</p> <p>Black & white format</p> <input type="checkbox"/> </div> <div style="width: 50%;"> <p>Overall Colour Options</p> <p>Fill (colour)</p> <input style="width: 100%;" type="text" value="RoyalBlue1"/> <p>Fill (black & white)</p> <input style="width: 100%;" type="text" value="Grey"/> <p>Line (colour)</p> <input style="width: 100%;" type="text" value="Red"/> <p>Line (black & white)</p> <input style="width: 100%;" type="text" value="Black"/> </div> </div>
<p>‘Line (colour/ black & white)’</p> <p>These options control the colour of the lines used on the non-categorised plots when using the colour and black and white schemes.</p> <p>Colours available to the user are given in the Appendix.</p>	<div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <p>Plot Output Options</p> <p>Black & white format</p> <input type="checkbox"/> </div> <div style="width: 50%;"> <p>Overall Colour Options</p> <p>Fill (colour)</p> <input style="width: 100%;" type="text" value="RoyalBlue1"/> <p>Fill (black & white)</p> <input style="width: 100%;" type="text" value="Grey"/> <p>Line (colour)</p> <input style="width: 100%;" type="text" value="Red"/> <p>Line (black & white)</p> <input style="width: 100%;" type="text" value="Black"/> </div> </div>

11 Appendix: InVivoStat colour chart

white	chartreuse4
aliceblue	chocolate
antiquewhite	chocolate1
antiquewhite1	chocolate2
antiquewhite2	chocolate3
antiquewhite3	chocolate4
antiquewhite4	coral
aquamarine	coral1
aquamarine1	coral2
aquamarine2	coral3
aquamarine3	coral4
aquamarine4	cornflowerblue
azure	cornsilk
azure1	cornsilk1
azure2	cornsilk2
azure3	cornsilk3
azure4	cornsilk4
beige	cyan
bisque	cyan1
bisque1	cyan2
bisque2	cyan3
bisque3	cyan4
bisque4	darkblue
black	darkcyan
blanchedalmond	darkgoldenrod
blue	darkgoldenrod1
blue1	darkgoldenrod2
blue2	darkgoldenrod3
blue3	darkgoldenrod4
blue4	darkgray
blueviolet	darkgreen
brown	darkgrey
brown1	darkkhaki
brown2	darkmagenta
brown3	darkolivegreen
brown4	darkolivegreen1
burlywood	darkolivegreen2
burlywood1	darkolivegreen3
burlywood2	darkolivegreen4
burlywood3	darkorange
burlywood4	darkorange1
cadetblue	darkorange2
cadetblue1	darkorange3
cadetblue2	darkorange4
cadetblue3	darkorchid
cadetblue4	darkorchid1
chartreuse	darkorchid2
chartreuse1	darkorchid3
chartreuse2	darkorchid4
chartreuse3	darkred

darksalmon	goldenrod4
darkseagreen	gray
darkseagreen1	gray0
darkseagreen2	gray1
darkseagreen3	gray2
darkseagreen4	gray3
darkslateblue	gray4
darkslategray	gray5
darkslategray1	gray6
darkslategray2	gray7
darkslategray3	gray8
darkslategray4	gray9
darkslategrey	gray10
darkturquoise	gray11
darkviolet	gray12
deeppink	gray13
deeppink1	gray14
deeppink2	gray15
deeppink3	gray16
deeppink4	gray17
deepskyblue	gray18
deepskyblue1	gray19
deepskyblue2	gray20
deepskyblue3	gray21
deepskyblue4	gray22
dimgray	gray23
dimgrey	gray24
dodgerblue	gray25
dodgerblue1	gray26
dodgerblue2	gray27
dodgerblue3	gray28
dodgerblue4	gray29
firebrick	gray30
firebrick1	gray31
firebrick2	gray32
firebrick3	gray33
firebrick4	gray34
floralwhite	gray35
forestgreen	gray36
gainsboro	gray37
ghostwhite	gray38
gold	gray39
gold1	gray40
gold2	gray41
gold3	gray42
gold4	gray43
goldenrod	gray44
goldenrod1	gray45
goldenrod2	gray46
goldenrod3	gray47

gray48	gray98
gray49	gray99
gray50	gray100
gray51	green
gray52	green1
gray53	green2
gray54	green3
gray55	green4
gray56	greenyellow
gray57	grey
gray58	grey0
gray59	grey1
gray60	grey2
gray61	grey3
gray62	grey4
gray63	grey5
gray64	grey6
gray65	grey7
gray66	grey8
gray67	grey9
gray68	grey10
gray69	grey11
gray70	grey12
gray71	grey13
gray72	grey14
gray73	grey15
gray74	grey16
gray75	grey17
gray76	grey18
gray77	grey19
gray78	grey20
gray79	grey21
gray80	grey22
gray81	grey23
gray82	grey24
gray83	grey25
gray84	grey26
gray85	grey27
gray86	grey28
gray87	grey29
gray88	grey30
gray89	grey31
gray90	grey32
gray91	grey33
gray92	grey34
gray93	grey35
gray94	grey36
gray95	grey37
gray96	grey38
gray97	grey39

grey40	grey90
grey41	grey91
grey42	grey92
grey43	grey93
grey44	grey94
grey45	grey95
grey46	grey96
grey47	grey97
grey48	grey98
grey49	grey99
grey50	grey100
grey51	honeydew
grey52	honeydew1
grey53	honeydew2
grey54	honeydew3
grey55	honeydew4
grey56	hotpink
grey57	hotpink1
grey58	hotpink2
grey59	hotpink3
grey60	hotpink4
grey61	indianred
grey62	indianred1
grey63	indianred2
grey64	indianred3
grey65	indianred4
grey66	ivory
grey67	ivory1
grey68	ivory2
grey69	ivory3
grey70	ivory4
grey71	khaki
grey72	khaki1
grey73	khaki2
grey74	khaki3
grey75	khaki4
grey76	lavender
grey77	lavenderblush
grey78	lavenderblush1
grey79	lavenderblush2
grey80	lavenderblush3
grey81	lavenderblush4
grey82	lawngreen
grey83	lemonchiffon
grey84	lemonchiffon1
grey85	lemonchiffon2
grey86	lemonchiffon3
grey87	lemonchiffon4
grey88	lightblue
grey89	lightblue1

lightblue2	magenta1
lightblue3	magenta2
lightblue4	magenta3
lightcoral	magenta4
lightcyan	maroon
lightcyan1	maroon1
lightcyan2	maroon2
lightcyan3	maroon3
lightcyan4	maroon4
lightgoldenrod	mediumaquamarine
lightgoldenrod1	mediumblue
lightgoldenrod2	mediumorchid
lightgoldenrod3	mediumorchid1
lightgoldenrod4	mediumorchid2
lightgoldenrodyellow	mediumorchid3
lightgray	mediumorchid4
lightgreen	mediumpurple
lightgrey	mediumpurple1
lightpink	mediumpurple2
lightpink1	mediumpurple3
lightpink2	mediumpurple4
lightpink3	mediumseagreen
lightpink4	mediumslateblue
lightsalmon	mediumspringgreen
lightsalmon1	mediumturquoise
lightsalmon2	mediumvioletred
lightsalmon3	midnightblue
lightsalmon4	mintcream
lightseagreen	mistyrose
lightskyblue	mistyrose1
lightskyblue1	mistyrose2
lightskyblue2	mistyrose3
lightskyblue3	mistyrose4
lightskyblue4	moccasin
lightslateblue	navajowhite
lightslategray	navajowhite1
lightslategrey	navajowhite2
lightsteelblue	navajowhite3
lightsteelblue1	navajowhite4
lightsteelblue2	navy
lightsteelblue3	navyblue
lightsteelblue4	oldlace
lightyellow	olivedrab
lightyellow1	olivedrab1
lightyellow2	olivedrab2
lightyellow3	olivedrab3
lightyellow4	olivedrab4
limegreen	orange
linen	orange1
magenta	orange2

orange3	purple4
orange4	red
orangered	red1
orangered1	red2
orangered2	red3
orangered3	red4
orangered4	rosybrown
orchid	rosybrown1
orchid1	rosybrown2
orchid2	rosybrown3
orchid3	rosybrown4
orchid4	royalblue
palegoldenrod	royalblue1
palegreen	royalblue2
palegreen1	royalblue3
palegreen2	royalblue4
palegreen3	saddlebrown
palegreen4	salmon
paleturquoise	salmon1
paleturquoise1	salmon2
paleturquoise2	salmon3
paleturquoise3	salmon4
paleturquoise4	sandybrown
palevioletred	seagreen
palevioletred1	seagreen1
palevioletred2	seagreen2
palevioletred3	seagreen3
palevioletred4	seagreen4
papayawhip	seashell
peachpuff	seashell1
peachpuff1	seashell2
peachpuff2	seashell3
peachpuff3	seashell4
peachpuff4	sienna
peru	sienna1
pink	sienna2
pink1	sienna3
pink2	sienna4
pink3	skyblue
pink4	skyblue1
plum	skyblue2
plum1	skyblue3
plum2	skyblue4
plum3	slateblue
plum4	slateblue1
powderblue	slateblue2
purple	slateblue3
purple1	slateblue4
purple2	slategray
purple3	slategray1

slategray2
slategray3
slategray4
slategrey
snow
snow1
snow2
snow3
snow4
springgreen
springgreen1
springgreen2
springgreen3
springgreen4
steelblue
steelblue1
steelblue2
steelblue3
steelblue4
tan
tan1
tan2
tan3
tan4
thistle
thistle1
thistle2
thistle3
thistle4
tomato
tomato1
tomato2
tomato3
tomato4
turquoise
turquoise1
turquoise2
turquoise3
turquoise4
violet
violetred
violetred1
violetred2
violetred3
violetred4
wheat
wheat1
wheat2
wheat3
wheat4

whitesmoke
yellow
yellow1
yellow2
yellow3
yellow4
yellowgreen