

riojaPlot Version 1.0

Steve Juggins Oct 2020

Introduction

riojaPlot is a web app for plotting stratigraphic data found in micropalaeontological or palaeoecological studies. It can plot multiple biological and non-biological proxies against depth or age and allows trends to be visualized using a range of plot types.

Input data

Data should be in an Excel spreadsheet, with a single row of column names. These names will be used to label the x-variables so choose them carefully. Any variables charting with the words “Depth” or “Age” will be used as y-variables. For example, “Depth_in_m” or “AgeBP” are fine, “Years BP” or “core depth” are not. This allows one to plot the data using different age models by labelling the columns “Age01”, “Age02” etc. If you do not include a Depth or Age variable samples data be plotted against sample number. All other columns are used as x-variables. Data are plotted ‘as is’ and in the order they appear in the file. That is, if you want to plot a diagram of microfossil counts expressed as relative abundances you should supply percentage data with columns in correct the order. An example spreadsheet containing pollen stratigraphic data from Birks & Mathews (1978) can be downloaded from the Help tab. A screenshot of the data is listed at the end of this help file.

Getting started

Upload a Excel file and select the worksheet to use, or check the box **Use example dataset**. If your data look like biostratigraphic data with row sums in the range 50-150 riojaPlot will assume they are percentages and scale each curve appropriately, and de-select any variables with a maximum value less than 2. If not, each curve will have equal width and be scaled from min-max data values (option **Scale for %** under the **Settings tab**), and all variables will be plotted.

Options

Variables

Select a variable for the **Y axis** (if you have included more than one Depth or Age variable). **Select X variables**: If the data look like biological counts transformed to percentages then variables with a maximum value of less than 2.0 will be de-selected to avoid over-crowding. Use this option to remove or add variables to the diagram.

Settings

- **Style**: Choose to plot each variable with lines, symbols or silhouettes (filled curves). Some combinations do not make sense or look ugly so choose wisely.
- **Show bar**: Show horizontal bars, either alone or superimposed on a line, symbol or silhouette plot. **Curve** extends the bar to the data value, **Full** extends the bar the full width of the plotting area. Try it with silhouettes, and **Bars on top** unchecked.
- **Bars on top**: plot bars on top of silhouette or below.
- **Settings**: **Show 5x exag**: adds a light grey curve with 5 x exaggeration to the plot, to highlight variation in low-value parts of the curve. **Scale for %** scales each curve from zero to maximum value and adjusts width to keep scaling constant between curves. **Show min/max**: with **Scale for %** unchecked, shows either min / max or multiple values on x-axes (to prevent label crowding). **Auto sort vars**: sorts variables to highlight sequence from those with high values at base on left, to those with high values at top on right (can be useful to visualize trends in biostratigraphic data).

Colours

Select colour for lines, bars, silhouettes, symbols and zones.

Sizes

Adjust axis and label font size and label rotation.

Zonation

Add a zonation (constrained clustering) to the diagram using CONISS (Grimm 1987). Optional show zones on the diagram with the number of zones determined automatically using a broken-stick model (Bennett 1996) or chosen manually.

Groups

Assign each variable to a group and plot silhouettes in a different colour for each group.

Save the plot

Save the plot as a pdf, png or svg file. Scalable vector graphics (svg) format is good for importing into Powerpoint or Word.

Details

riojaPlot is powered by the function `strat.plot` in the R package `rioja`. The web interface is built using shiny and shinydashboard.

Example dataset

Pollen stratigraphic data from the Abernethy Forest, Scotland, spanning approximately 5500 - 12100 BP (from Birks & Mathews 1978).

Contact

Bug reports and suggestions for improvement to Steve Juggins: Stephen.Juggins@ncl.ac.uk.

References

- Bennett, K (1996) Determination of the number of zones in a biostratigraphic sequence. *New Phytologist*, **132**, 155-170.
- Birks, HH & Mathews, RW (1978) Studies in the vegetational history of Scotland V. Late Devensian and early Flandrian macrofossil stratigraphy at Abernethy Forest, Invernessshire. *New Phytologist*, **80**, 455-84.
- Grimm, EC (1987) CONISS: A FORTRAN 77 program for stratigraphically constrained cluster analysis by the method of incremental sum of squares. *Computers & Geosciences*, **13**, 13-35.

AutoSave

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Wrap Text

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Conditional Formatting

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	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y
1	Depth	Age	Betula	Pinus sylv	Ulmus	Quercus	Alnus glut	Corylus-M	Salix	Juniperus	Calluna v	Empetrum	Graminea	Cyperace	Solidago	Composit	Artemisia	Caryophyl	Sagina	Silene	Chenopoc	Epilobium	Papilionae	Anthyllis	A
2	300	5515	15.11	51.82	2.68	3.44	5.54	6.88	0	0	7.07	0.76	1.34	4.78	0	0	0	0	0	0	0	0	0	0	0
3	305	5632	21	59.48	0.93	1.86	0.93	7.81	0.93	0	3.35	0.74	0.56	2.04	0	0	0	0	0	0	0	0	0	0	0
4	310	5749	9.26	76.23	0.54	1.09	0.73	7.08	0	0	2.36	0.36	0.18	2.18	0	0	0	0	0	0	0	0	0	0	0
5	315	5866	20.7	74.84	0.8	0.48	0	0.96	0.16	0	0.64	0	0.32	0.64	0	0	0	0	0	0	0	0	0	0	0
6	320	5983	6.07	88.06	0.39	1.37	0.2	1.17	0.2	0	0.78	0.59	0.39	0.59	0	0	0	0	0	0	0	0	0	0	0
7	325	6100	11.32	81.57	1.15	1.34	0.19	2.3	0.58	0	0.38	0	0.38	0.58	0	0	0	0	0	0	0	0	0	0	0
8	330	6218	14.86	73.52	1.52	1.71	0.19	5.52	0.76	0.38	1.14	0	0	0.38	0	0	0	0	0	0	0	0	0	0	0
9	335	6335	13.22	73.93	0	0	0.19	9.68	0.19	0.37	0.56	0	1.12	0.56	0	0	0	0	0	0	0	0	0	0	0
10	340	6452	25.55	56.57	1.28	2.55	0.36	9.12	1.46	0.36	1.46	0	0.73	0.55	0	0	0	0	0	0	0	0	0	0	0
11	345	6569	26.93	57.99	1.8	1.8	0	6.1	1.8	0.36	0.18	0	1.97	0.36	0	0	0	0	0	0	0	0	0	0	0
12	350	6686	30.33	54.94	2.08	0.69	0	6.41	1.39	0.35	0.69	0	1.91	0.52	0	0	0	0	0	0	0	0	0	0	0
13	355	6803	30.17	57.5	1.83	1.5	0.17	4.67	1.17	0.5	0.5	0	1.17	0.5	0	0	0	0	0	0	0	0	0	0	0
14	357	6924	29.25	54.49	1.15	1.91	0	6.88	1.15	0.38	2.1	0	1.53	0.57	0	0	0	0	0	0	0	0	0	0	0
15	360	7044	33.91	49.92	1.11	0.48	0.16	8.56	1.74	0.32	0.48	0.16	2.06	0.79	0	0	0	0	0	0	0	0	0	0	0
16	363	7165	40.16	42.17	1.2	1	0.2	8.23	2.41	1.2	0.4	0	2.01	0.8	0	0	0	0	0	0	0	0	0	0	0
17	365	7286	57.69	14.58	0.48	1.12	0.32	16.83	2.56	0.8	1.12	0	3.21	1.12	0	0	0	0	0	0	0	0	0	0	0
18	367	7407	58.28	5.32	1.64	2.04	0	24.54	2.04	0.2	1.43	0.2	2.66	0.82	0.2	0	0	0	0	0	0	0	0	0	0
19	370	7527	62.96	4.41	1.41	1.23	0.18	22.93	1.76	0.18	0.88	0.53	2.12	1.06	0	0	0	0	0	0	0	0	0	0	0
20	373	7648	58.69	2.12	1.35	1.74	0	29.15	1.74	0	1.74	0.58	1.93	0.77	0	0	0	0	0	0	0	0	0	0	0
21	375	7692	61.34	1.51	1.18	0.67	0	25.21	2.35	0	2.52	0.67	3.19	0.84	0	0	0	0	0	0	0	0	0	0	0
22	405	8225	65.33	2.09	0.87	0.17	0	20.21	3.31	0.17	1.92	0.35	3.14	1.92	0	0	0	0	0	0	0	0	0	0	0
23	410	8314	62.29	1.54	0.51	0.51	0	23.55	1.88	0.85	3.41	0.34	3.24	1.02	0	0	0	0	0	0	0	0	0	0	0
24	415	8402	70.74	1.85	0.74	0.56	0	17.04	1.85	0.74	2.22	0.56	2.41	1.09	0	0	0	0	0	0	0	0	0	0	0
25	420	8490	68.78	2.12	0.35	0	0.18	17.28	3.17	1.41	1.41	0.53	2.47	0.88	0	0	0	0	0	0	0	0	0	0	0
26	425	8579	62.35	1.38	0.35	0.35	0	12.44	6.22	5.53	3.8	1.38	3.45	0.86	0	0	0	0	0	0	0	0	0	0	0
27	430	8670	73.91	2.19	0	0	0	6.75	0	5.66	3.47	1.46	4.2	0.73	0	0	0	0	0	0	0.18	0	0	0	0
28	435	8804	68.56	2.84	0	0	0	1.78	4.44	11.01	1.95	3.2	3.2	1.24	0	0	0	0	0	0	0	0	0	0	0
29	440	8938	63.82	3.26	0	0	0	1.24	4.19	8.54	3.73	1.55	8.54	2.17	0	0	0	0	0	0	0	0	0	0	0
30	445	9071	66.44	2.19	0	0	0	2.02	4.72	10.79	1.85	1.85	5.73	2.19	0	0	0	0	0	0	0	0	0	0	0
31	450	9205	54.08	3.84	0	0	0	0.96	5.12	20.48	2.72	1.44	7.2	2.56	0	0	0	0	0	0	0	0	0	0	0
32	455	9339	51.92	0.67	0	0	0	0.17	3.01	22.04	0.33	5.18	13.02	2	0.17	0.17	0.17	0	0	0	0	0	0	0	0
33	460	9473	39.8	1.52	0	0	0	0.84	4.55	34.74	2.36	3.2	7.59	2.19	0	0	0	0	0	0	0	0	0	0	0
34	465	9606	17.5	2.14	0	0	0	0.89	2.68	19.29	4.46	21.79	19.64	8.75	0	0.18	0	0	0	0	0	0	0	0	0
35	470	9740	3.79	1.42	0	0.47	0	0	2.84	0.47	0.47	1.9	35.07	20.38	0.47	0	13.27	0	0	0.47	0.47	0	0	0	0
36	475	9912	4.78	6.27	0	0	0.3	0.3	3.88	0	0.3	1.19	9.25	13.73	0.3	0	42.69	0.6	0	0	0	0	0	0.3	0
37	480	10084	7.04	4.93	0	0	0	0	4.93	0	0.35	2.82	6.69	6.34	0	0	46.48	1.41	0.35	0.35	0.35	0	1.06	0	0
38	485	10256	5.86	5.86	0	0	0	0.84	7.11	0.42	1.67	1.67	7.95	4.18	0	0	40.59	1.26	0	0.42	0	0	0	0	0
39	490	10428	5.64	2.19	0	0	0.31	0.31	4.7	0.31	0	3.13	4.08	5.64	0	0	67.08	0.63	0.31	0	0	0	0	0	0
40	500	10771	8.39	4.01	0.36	0	0.36	0.36	9.49	0	0.36	2.92	6.93	5.11	0	0.36	47.45	1.82	1.09	0	0	0	0	0	0
41	505	10943	7.21	0.6	0	0	0.6	0.3	5.71	1.2	0.9	3	6.91	6.61	0.3	0	57.96	0.9	0	0	0.3	0.3	0.3	0	0
42	510	11115	10.7	3.7	0	0	0	0.41	5.35	1.23	0	4.12	7.41	6.58	0	0	55.14	0.82	0	0	0	0	0	0	0
43	515	11244	27.33	4.26	0	0	0	1.15	1.64	11.13	0.33	19.48	16.69	10.47	0.33	0.16	0.33	0.33	0.16	0	0	0	0	0	0
44	520	11373	31.88	1.05	0	0	0	0.7	1.39	2.26	0	34.84	12.02	8.19	0.35	0	1.39	0	0	0	0	0	0	0	0
45	525	11502	20.77	0.88	0	0	0	0.53	1.41	0	0.35	35.56	20.95	12.32	0	0	1.23	0	0	0	0	0	0	0	0
46	530	11631	18.18	0.18	0	0.18	0	0.18	2.55	0	0	34.55	14.73	6.55	0.18	0.73	1.09	0	0	0	0	0	0	0	0
47	535	11760	4.4	1.89	0	1.26	0	0	33.33	1.26	0	1.89	23.9	6.29	1.26	0	1.26	0	0	0	0	0.63	0	0.63	0
48	540	11889	3	2	0	1	0	0	16	0	0	1	21	7	2	0	2	0	0	0	0	1	0	1	0
49	545	12018	7.62	8.57	0.95	0	0.95	0.95	5.71	0	0	3.81	14.29	11.43	0.95	1.9	0.95	0	0	0	0	0	0	0	0
50	550	12147	1.04	2.08	0	1.04	0	1.04	5.21	0	0	1.04	9.38	20.83	4.17	4.17	4.17	1.04	1.04	1.04	1.04	0	0	0	0
51																									

Figure 1: Abernethy Forest Stratigraphic data (from Birks & Matthews, 1978)