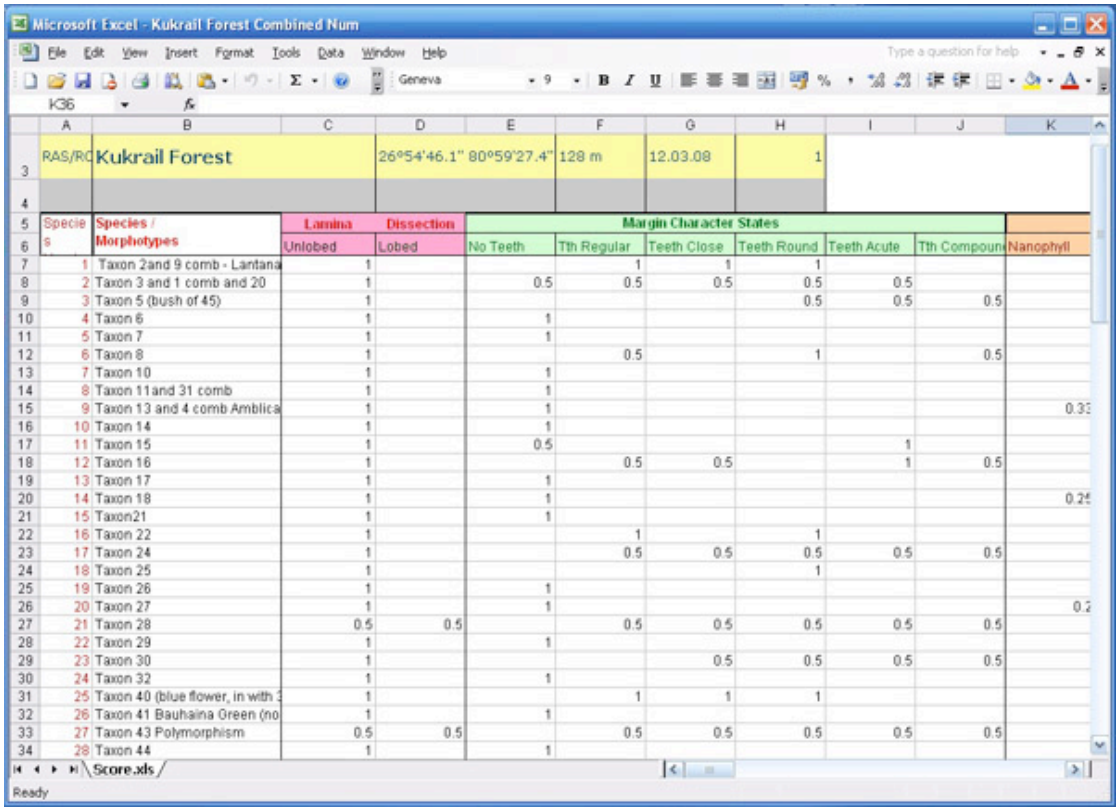
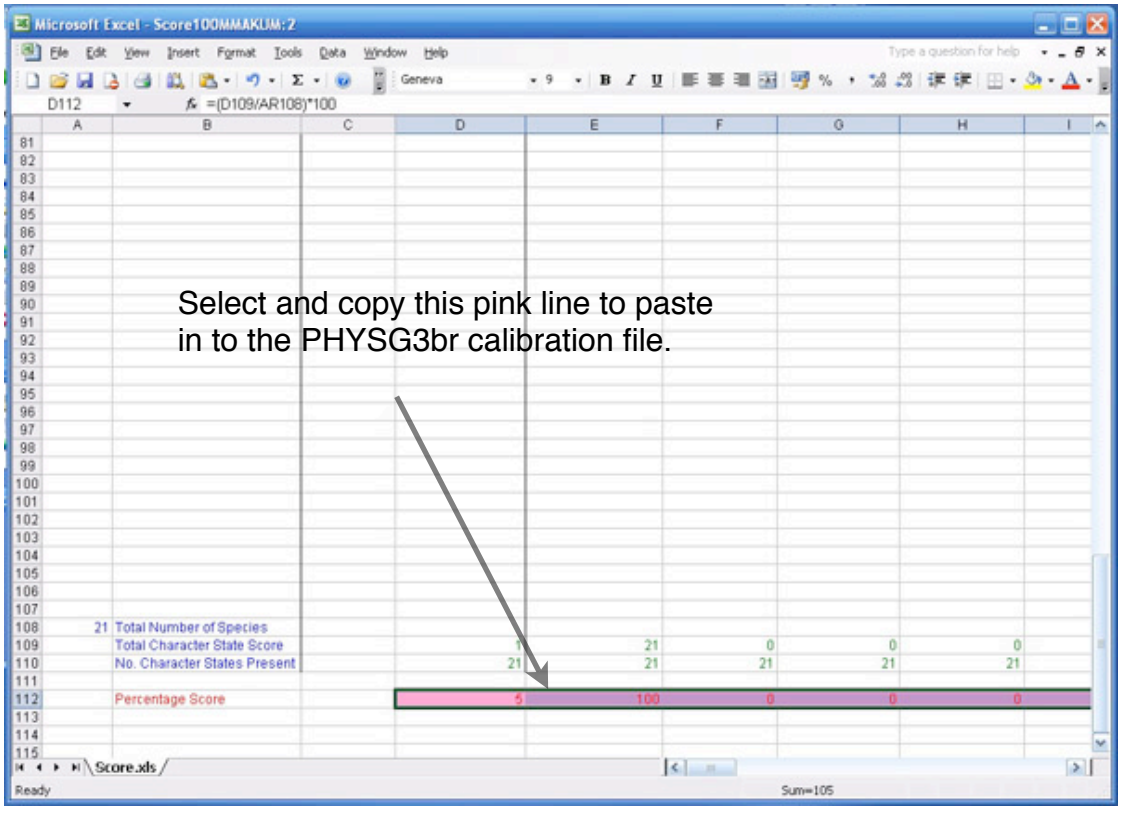
How to do a CLAMP Analysis

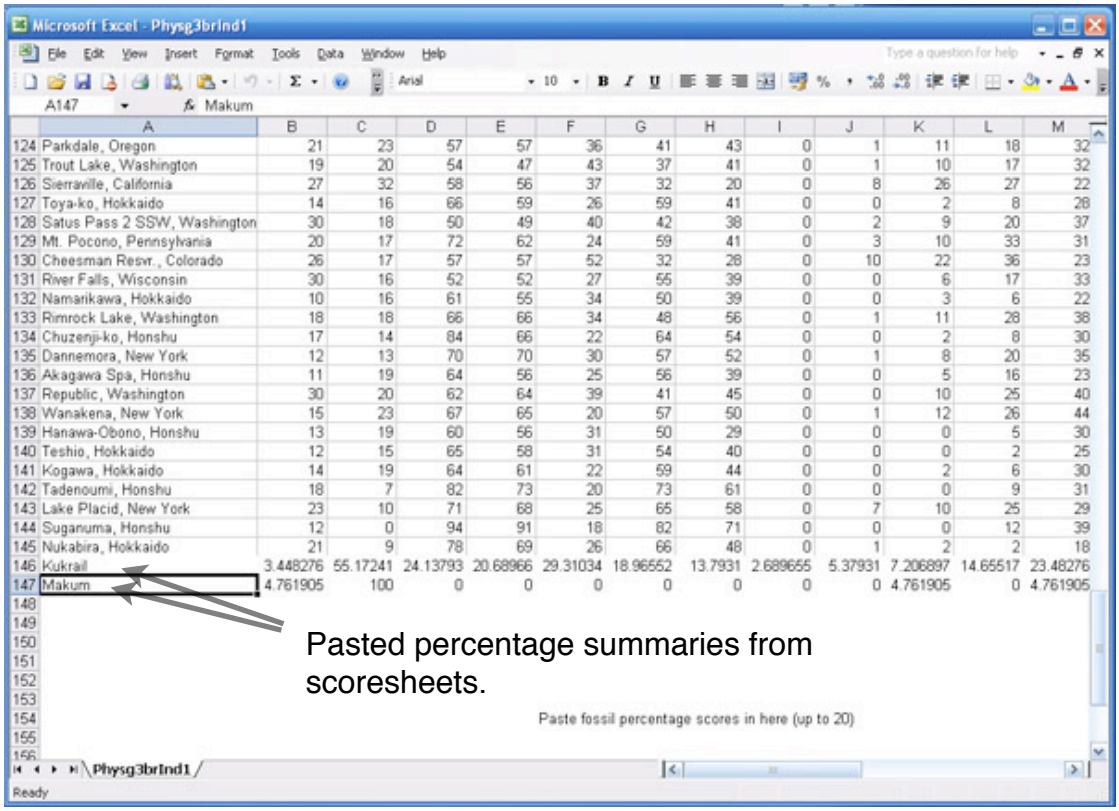
After scoring your fossil leaf assemblage, using the rules outlined in the downloads from the CLAMP website, you will have completed a **scoresheet** and will be ready to add your summary data from that scoresheet into the **PHYSG3br Calibration File**.



To do this, you highlight the whole of the **pink percentage score summary** in your fossil flora **scoresheet** and select '**copy**' from the edit menu.



You then open the **PHYSG3br file** and '**paste**' your copied line at the bottom of the PHYSG3br list of modern sites.



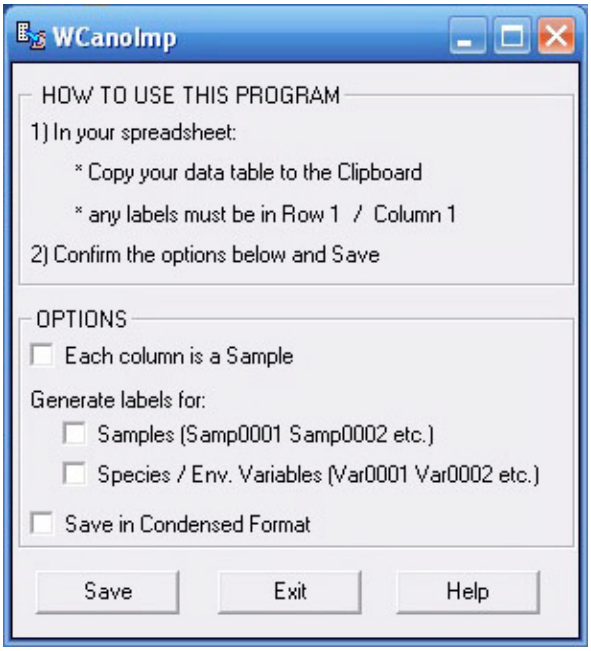
	A	B	C	D	E	F	G	H	I	J	K	L	M
124	Parkdale, Oregon	21	23	57	57	36	41	43	0	1	11	18	32
125	Trout Lake, Washington	19	20	54	47	43	37	41	0	1	10	17	32
126	Sierraville, California	27	32	58	56	37	32	20	0	8	26	27	22
127	Toya-ko, Hokkaido	14	16	66	59	26	59	41	0	0	2	8	28
128	Satus Pass 2 SSW, Washington	30	18	50	49	40	42	38	0	2	9	20	37
129	Mt. Pocono, Pennsylvania	20	17	72	62	24	59	41	0	3	10	33	31
130	Cheesman Resvr., Colorado	26	17	57	57	52	32	28	0	10	22	36	23
131	River Falls, Wisconsin	30	16	52	52	27	55	39	0	0	6	17	33
132	Namarikawa, Hokkaido	10	16	61	55	34	50	39	0	0	3	6	22
133	Rimrock Lake, Washington	18	18	66	66	34	48	56	0	1	11	28	38
134	Chuzenji-ko, Honshu	17	14	84	66	22	64	54	0	0	2	8	30
135	Dannemora, New York	12	13	70	70	30	57	52	0	1	8	20	35
136	Akagawa Spa, Honshu	11	19	64	56	25	56	39	0	0	5	16	23
137	Republic, Washington	30	20	62	64	39	41	45	0	0	10	25	40
138	Wanakena, New York	15	23	67	65	20	57	50	0	1	12	26	44
139	Hanawa-Obono, Honshu	13	19	60	56	31	50	29	0	0	0	5	30
140	Teshio, Hokkaido	12	15	65	58	31	54	40	0	0	0	2	25
141	Kogawa, Hokkaido	14	19	64	61	22	59	44	0	0	2	6	30
142	Tadenoumi, Honshu	18	7	82	73	20	73	61	0	0	0	9	31
143	Lake Placid, New York	23	10	71	68	25	65	58	0	7	10	25	29
144	Suganuma, Honshu	12	0	94	91	18	82	71	0	0	0	12	39
145	Nukabira, Hokkaido	21	9	78	69	26	66	48	0	1	2	2	18
146	Kukrail	3.448276	55.17241	24.13793	20.68966	29.31034	18.96552	13.7931	2.689655	5.37931	7.206897	14.65517	23.48276
147	Makum	4.761905	100	0	0	0	0	0	0	0	4.761905	0	4.761905

(***NB*** To avoid transferring any embedded equations, etc. use the '**paste special**' option and select '**values**' and '**OK**' before pasting. You then have to type in the **name of your fossil flora** alongside the pasted data in the sample names column of the PHYSG3br file.)

If you have other fossil floras you can similarly add these, up to 20 floras, to the PHYSG3br file.

You then have to **prepare the PHYSG3br file** with your added fossil data so that it can be read by the **CANOCO programme**.

To do this you **select** all of the data, including your added fossil data in the PHYSG3br file and '**copy**' it in to your computer's memory. You then launch the **WCanoImp1.0 programme** which is part of the CANOCO package.



When launched this programme will automatically recognise that you have copied data from your PHYSG3br Excel file and all you have to do is press '**save**' in the WCanoImp dialogue box. WCanoImp will then ask you to **name this new file**. I suggest you name it retaining the PHYSG3br identifier with

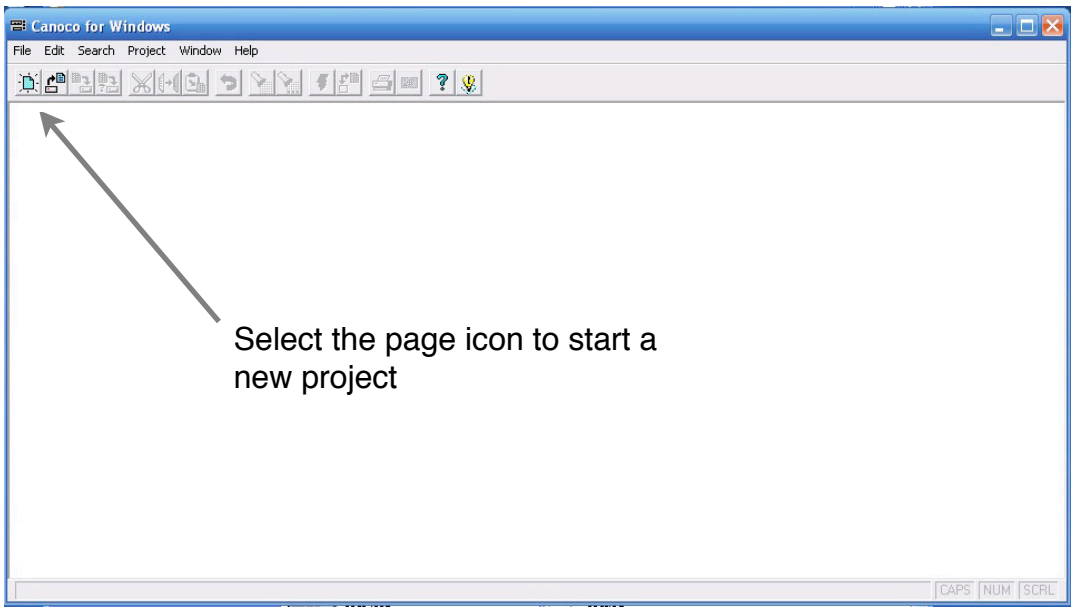
some additional characters that are meaningful to you to identify your data. You should also add the **.dta** extension to this file which tells CANOCO it is a data file it can read.

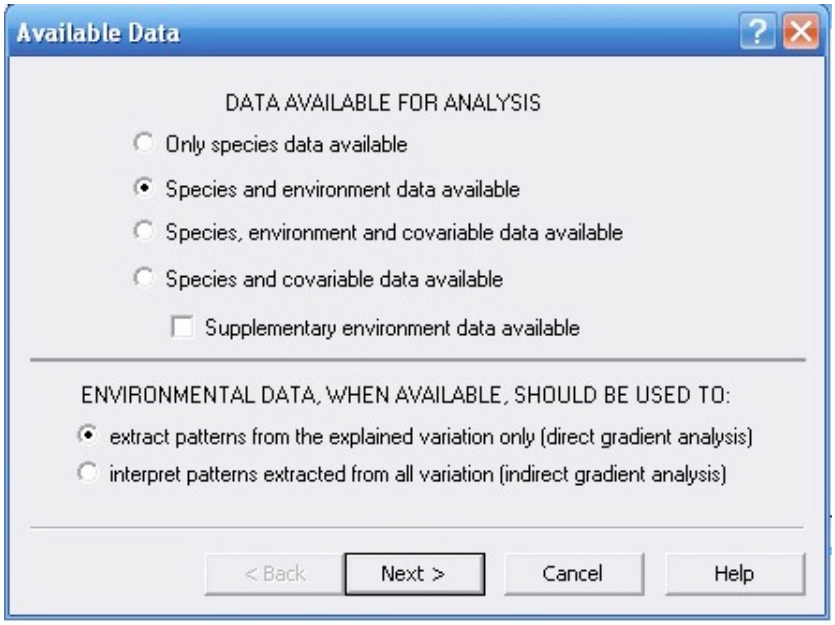
The next step in the process is to **convert the Meteorological data file MET3BR** from its existing Excel form into a **.dta** file. This is done in the same way as you did with the PHYSG3br file, that is select all of the data in the MET3BR file, copy it, open WCanoImp and save it with a file name with a .dta extension.

You now have 2 files **PHYSG3br etc .dta and MET3BR .dta** that are prepared for the CANOCO analysis.

The analysis is performed by launching **CANOCO for Windows**.

After launching you will see a **dialogue box** in the left hand side of the menu bar, click the **'page'** icon under '**file**' to begin a new project.

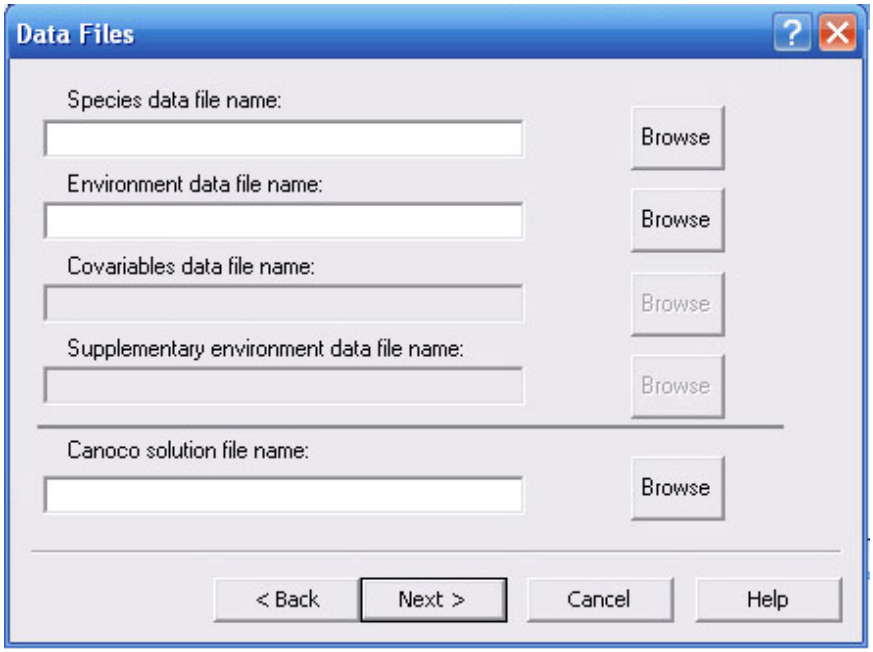




You will then see a dialogue box called '**available data**', in which the first option '**only species data available**' is automatically selected. Because you have both species and environment data available (PHYSG3br and MET3BR) you need to **select the 2nd option** in the dialogue box.

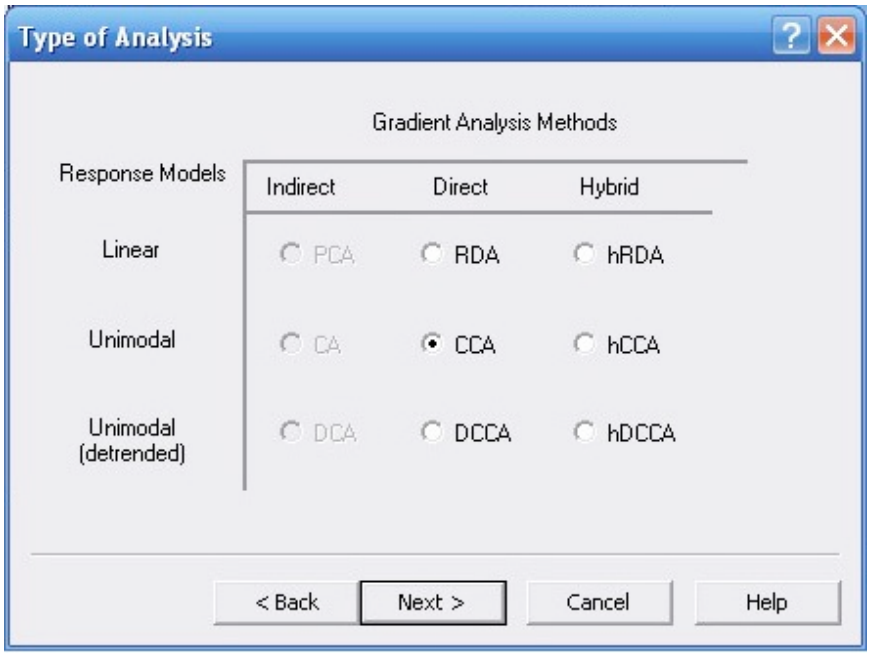
You then press '**next**'.

You will now be asked to **identify the species and environmental data files**. You can do this by clicking the '**browse**' button in turn to select the 2 files.

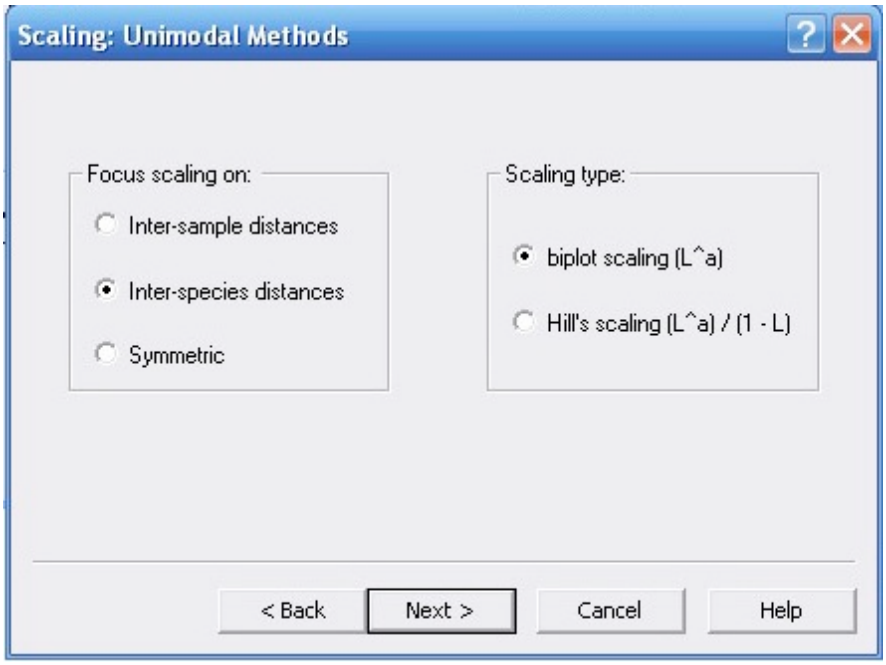


You then have to **provide a file name** for the **CANOCO Solution file**. This is the file that will contain the results of your analysis. You can call this anything you like that you can interpret as the results but I suggest that you include the letters '**sol**' in the name and you add the extension **.xls**, that will tell Excel that it is a file that it can read. Once you have done this select '**next**'.

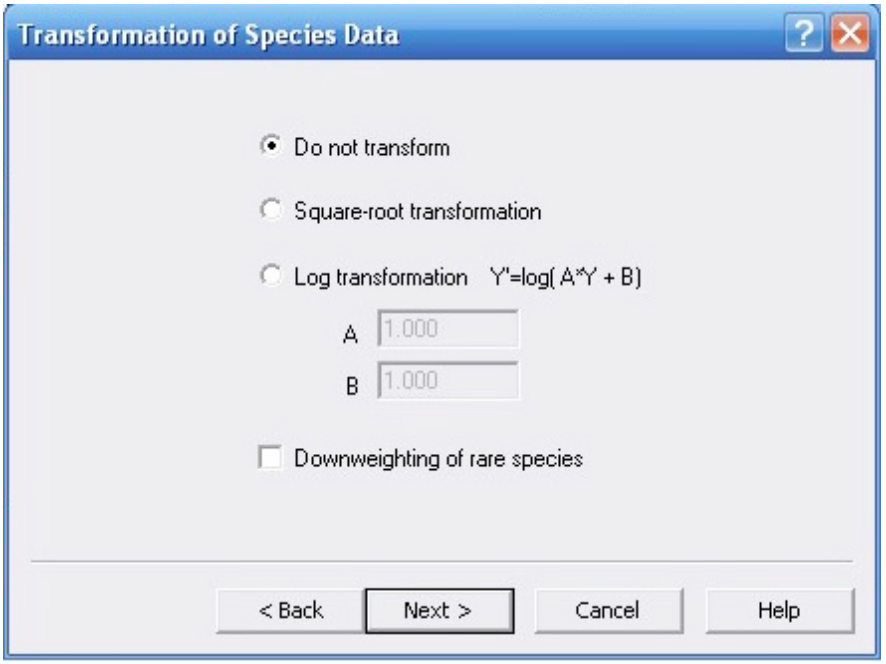
The next **dialogue box** will automatically selected **CCA** as the type of analysis. This stands for **Canonical Correspondence Analysis** and it is what you will use to do CLAMP.



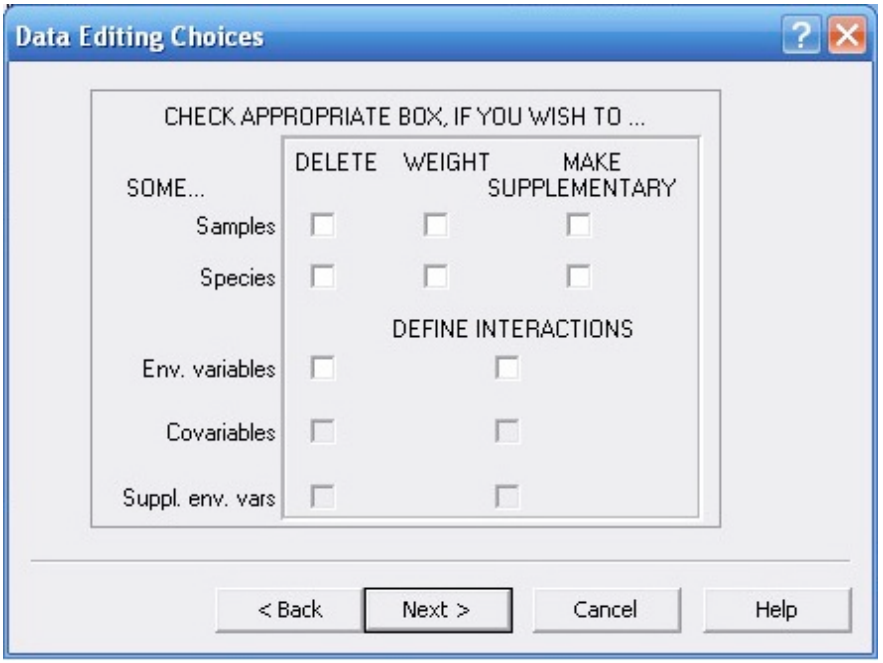
So merely press the '**next**' button.



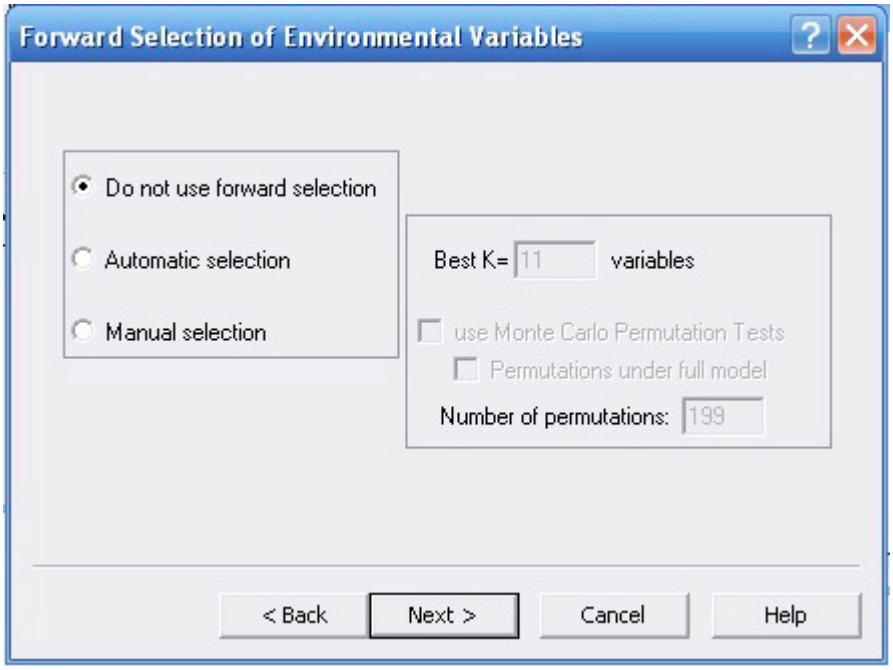
The next **dialogue box** also offers **Default Options**, so just click '**next**'.



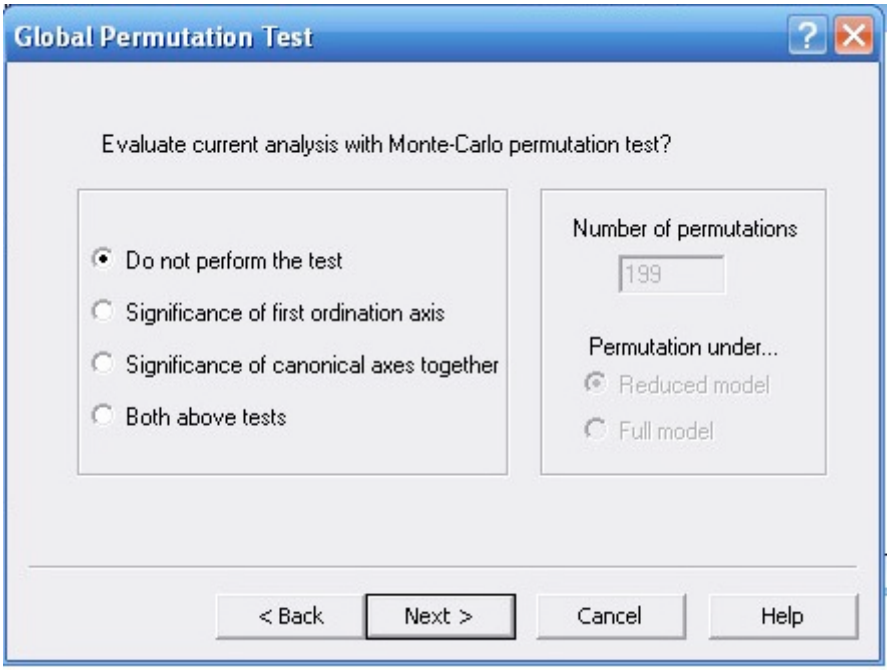
The same is true of the next dialogue box,



the one after that,

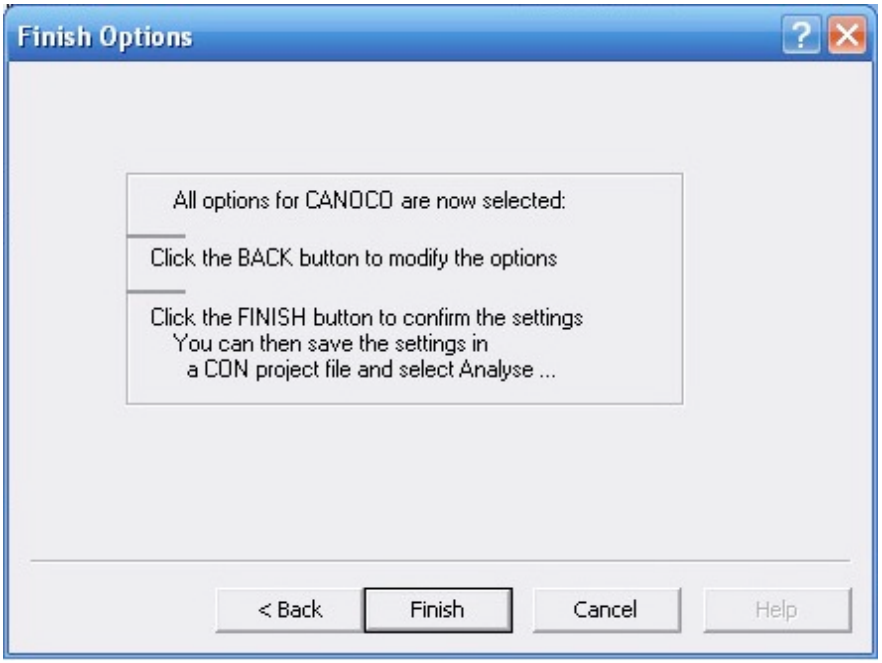


the one after that,

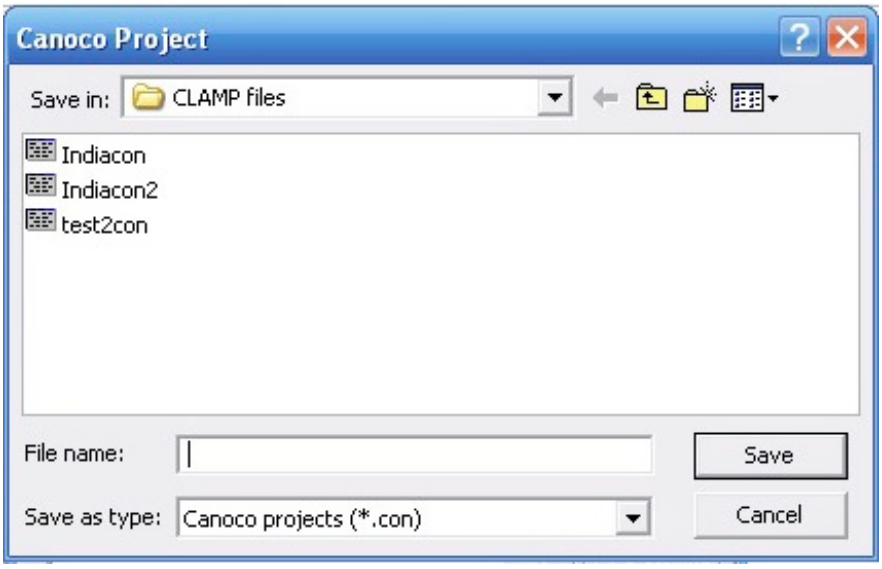


and the one after that, ie 4 times '**next**'.

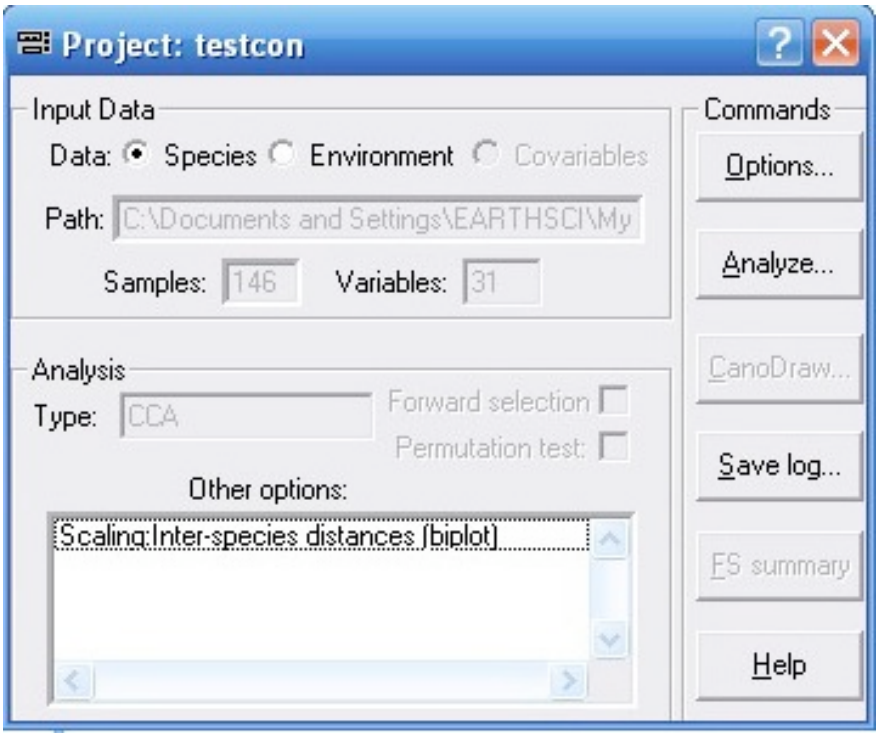
You should now see a dialogue box entitled ‘finish options’ and assuming that you have followed these instructions all you need to do is select ‘**finish**’.



The next dialogue box asks you to give a file name that summarises the set up of this particular project. Again you can call it anything you like, but I suggest you include the letters ‘con’ in the file name. Select ‘**save**’.

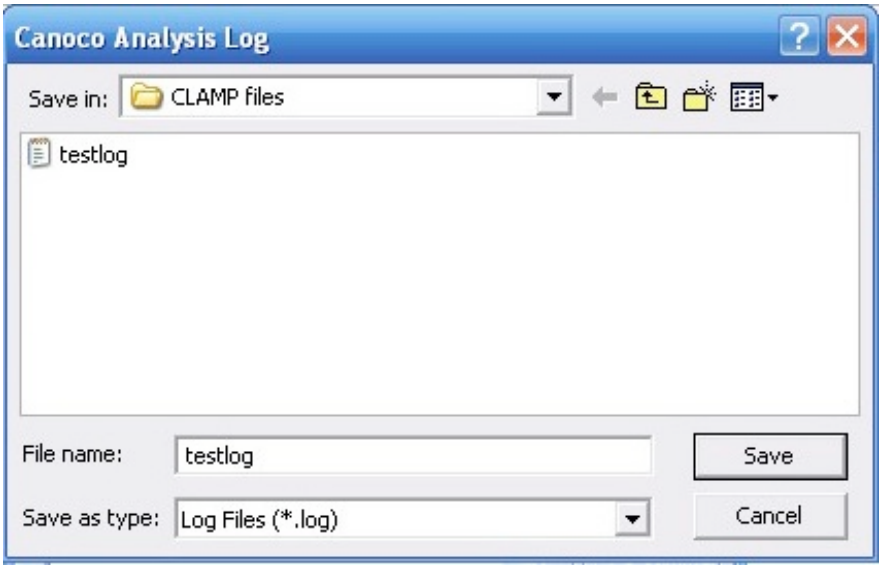


You will then see a dialogue box with the name of the project and a button on the right hand side which says '**analyse'**. Click this to do your analysis.

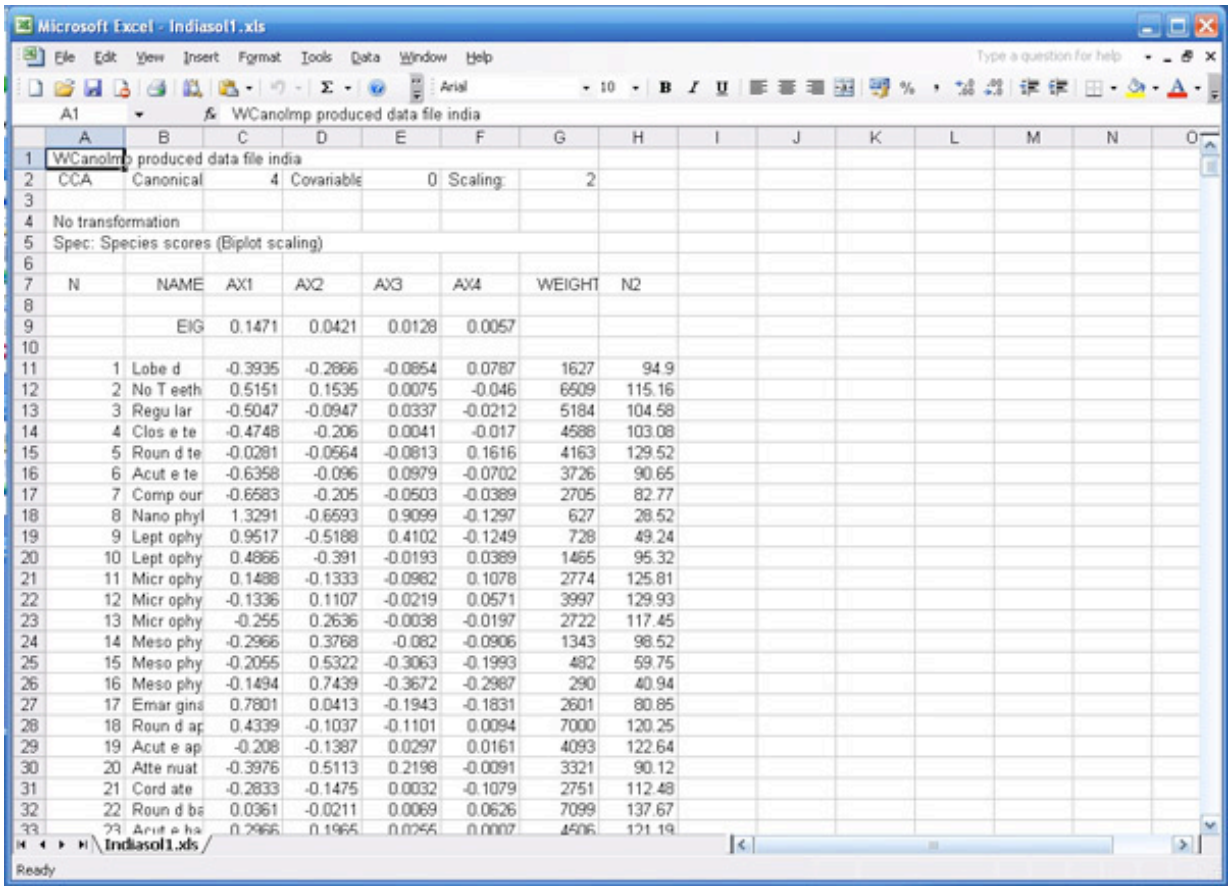


The analysis should take no more than 1 second.

To save a log of the analysis diagnostics press '**save log**' and the next dialogue box will ask you to name the Log File.



When you have done this you can close the dialogue boxes for CANOCO that are open and you can examine the results of your analysis by opening the **solution file** in Excel.



Microsoft Excel - Indiasol1.xls

File Edit View Insert Format Tools Data Window Help

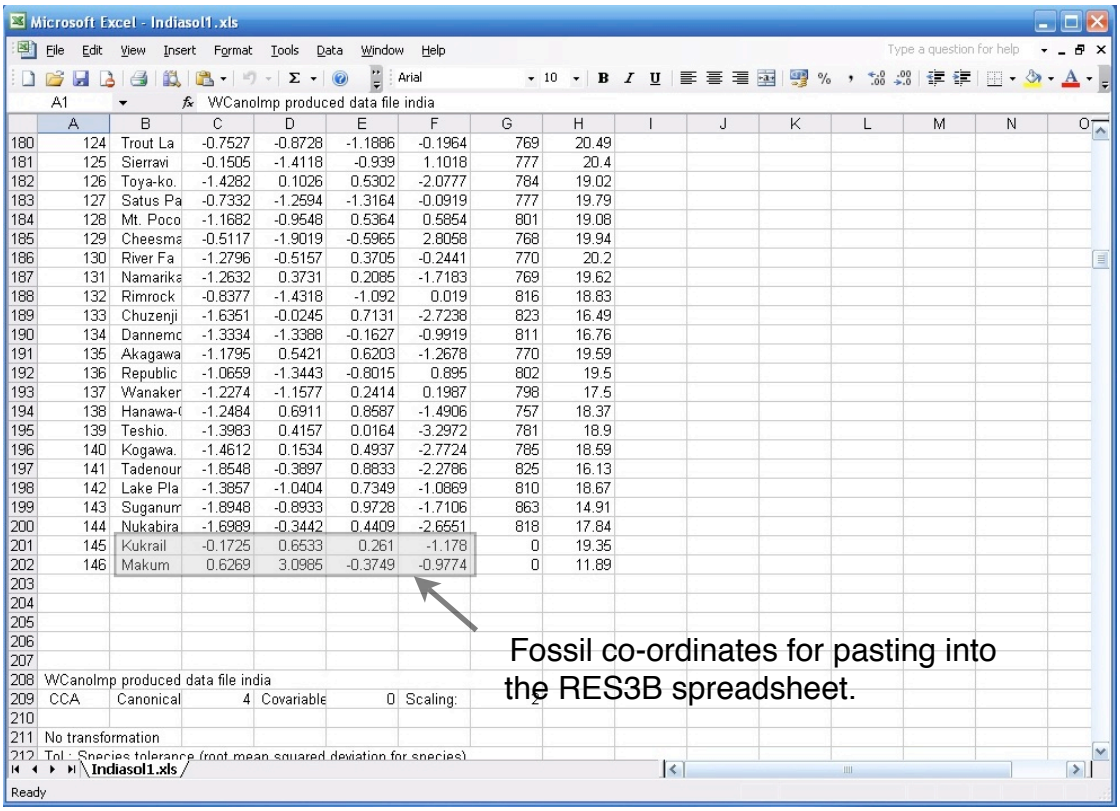
A1 WCanoImp produced data file india

	A	B	C	D	E	F	G	H
1	WCanoImp produced data file india							
2	CCA	Canonical	4	Covariable	0	Scaling:	2	
3								
4	No transformation							
5	Spec: Species scores (Biplot scaling)							
6								
7	N	NAME	AX1	AX2	AX3	AX4	WEIGHT	N2
8								
9		EIG	0.1471	0.0421	0.0128	0.0057		
10								
11	1	Lobe d	-0.3935	-0.2886	-0.0854	0.0787	1627	94.9
12	2	No T eeth	0.5151	0.1535	0.0075	-0.046	6509	115.16
13	3	Regu lar	-0.5047	-0.0947	0.0337	-0.0212	5184	104.58
14	4	Clos e te	-0.4748	-0.206	0.0041	-0.017	4588	103.08
15	5	Roun d te	-0.0281	-0.0564	-0.0813	0.1616	4163	129.52
16	6	Acut e te	-0.6358	-0.096	0.0979	-0.0702	3726	90.65
17	7	Comp our	-0.6583	-0.205	-0.0503	-0.0389	2705	82.77
18	8	Nano phyl	1.3291	-0.6593	0.9099	-0.1297	627	28.52
19	9	Lept ophy	0.9517	-0.5188	0.4102	-0.1249	728	49.24
20	10	Lept ophy	0.4866	-0.391	-0.0193	0.0389	1465	95.32
21	11	Micr ophy	0.1488	-0.1333	-0.0982	0.1078	2774	125.81
22	12	Micr ophy	-0.1336	0.1107	-0.0219	0.0571	3997	129.93
23	13	Micr ophy	-0.255	0.2636	-0.0038	-0.0197	2722	117.45
24	14	Meso phy	-0.2966	0.3768	-0.082	-0.0906	1343	98.52
25	15	Meso phy	-0.2055	0.5322	-0.3063	-0.1993	482	59.75
26	16	Meso phy	-0.1494	0.7439	-0.3672	-0.2987	290	40.94
27	17	Emar gina	0.7801	0.0413	-0.1943	-0.1831	2601	80.85
28	18	Roun d ap	0.4339	-0.1037	-0.1101	0.0094	7000	120.25
29	19	Acut e ap	-0.208	-0.1387	0.0297	0.0161	4093	122.64
30	20	Atte nuat	-0.3976	0.5113	0.2198	-0.0091	3321	90.12
31	21	Cord ate	-0.2833	-0.1475	0.0032	-0.1079	2751	112.48
32	22	Roun d ba	0.0361	-0.0211	0.0069	0.0626	7099	137.67
33	23	Acut e ba	0.2966	0.1965	0.0255	0.0007	4506	121.19

Indiasol1.xls

Ready

The first line of the solution file displays any information you added to identify this particular analysis. The first data array displays the coordinates in Axis 1 through 4 of the leaf characters. The second data array displays the coordinates in axis 1 through 4 of the PHYSG3br modern samples with the addition (from Sample 145 onwards) of any fossil samples you added.



Microsoft Excel - Indiasol1.xls

File Edit View Insert Format Tools Data Window Help

A1 WCanoImp produced data file india

	A	B	C	D	E	F	G	H
180	124	Trout La	-0.7527	-0.8728	-1.1886	-0.1964	769	20.49
181	125	Sierravi	-0.1505	-1.4118	-0.939	1.1018	777	20.4
182	126	Toya-ko.	-1.4282	0.1026	0.5302	-2.0777	784	19.02
183	127	Satus Pa	-0.7332	-1.2594	-1.3164	-0.0919	777	19.79
184	128	Mt. Poco	-1.1682	-0.9548	0.5364	0.5854	801	19.08
185	129	Cheesma	-0.5117	-1.9019	-0.5965	2.8058	768	19.94
186	130	River Fa	-1.2796	-0.5157	0.3705	-0.2441	770	20.2
187	131	Namarika	-1.2632	0.3731	0.2085	-1.7183	769	19.62
188	132	Rimrock	-0.8377	-1.4318	-1.092	0.019	816	18.83
189	133	Chuzenji	-1.6351	-0.0245	0.7131	-2.7238	823	16.49
190	134	Dannemc	-1.3334	-1.3388	-0.1627	-0.9919	811	16.76
191	135	Akagawa	-1.1795	0.5421	0.6203	-1.2678	770	19.59
192	136	Republic	-1.0659	-1.3443	-0.8015	0.895	802	19.5
193	137	Wanaker	-1.2274	-1.1577	0.2414	0.1987	798	17.5
194	138	Hanawa-(	-1.2484	0.6911	0.8587	-1.4906	757	18.37
195	139	Teshio.	-1.3983	0.4157	0.0164	-3.2972	781	18.9
196	140	Kogawa.	-1.4612	0.1534	0.4937	-2.7724	785	18.59
197	141	Tadenour	-1.8548	-0.3897	0.8833	-2.2786	825	16.13
198	142	Lake Pla	-1.3857	-1.0404	0.7349	-1.0869	810	18.67
199	143	Suganum	-1.8948	-0.8933	0.9728	-1.7106	863	14.91
200	144	Nukabira	-1.6989	-0.3442	0.4409	-2.6551	818	17.84
201	145	Kukrail	-0.1725	0.6533	0.261	-1.178	0	19.35
202	146	Makum	0.6269	3.0985	-0.3749	-0.9774	0	11.89
203								
204								
205								
206								
207								
208	WCanoImp produced data file india							
209	CCA	Canonical	4	Covariable	0	Scaling:		
210								
211	No transformation							
212	Tol : Species tolerance (root mean squared deviation for species)							

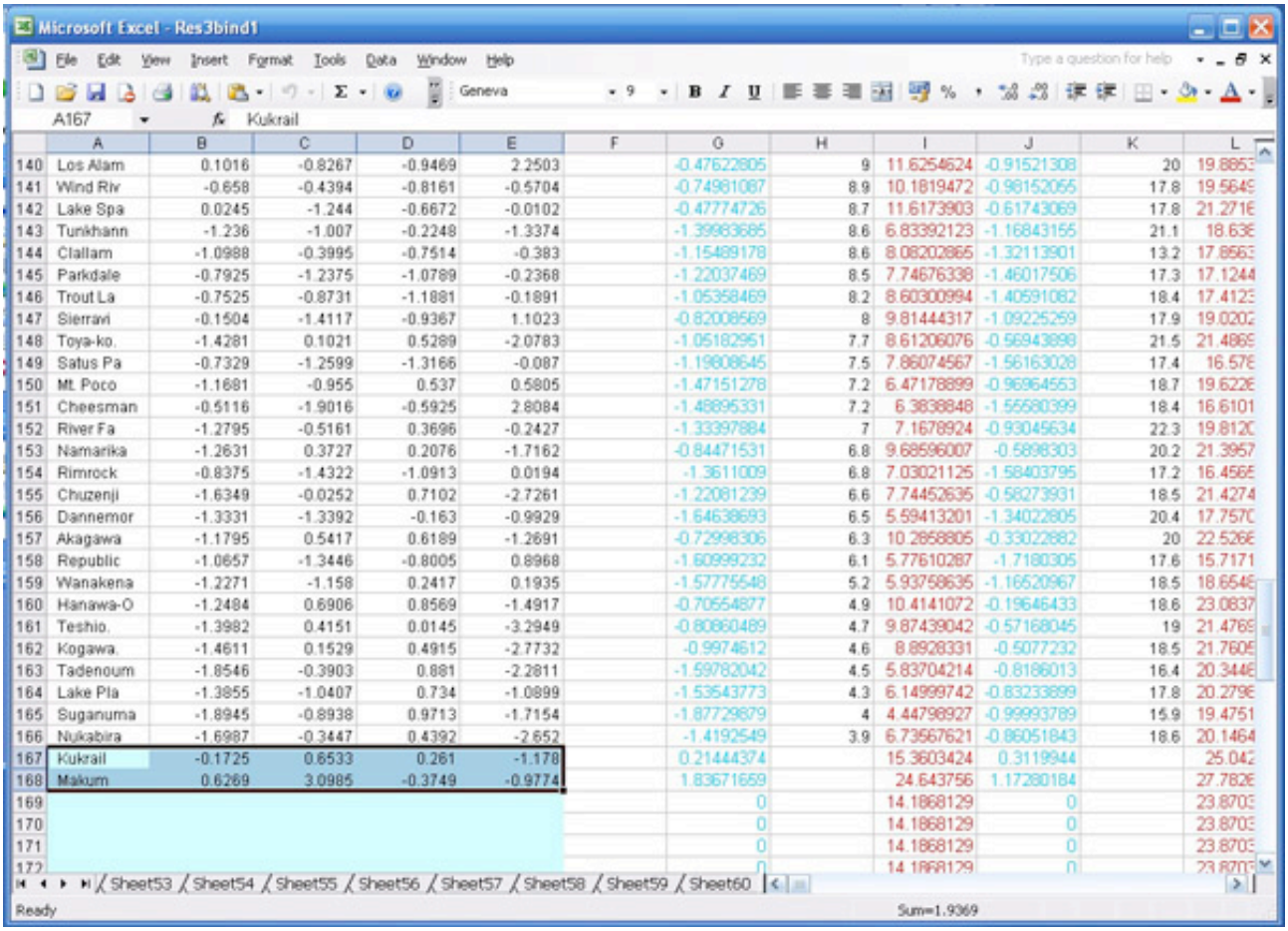
Indiasol1.xls

Ready

Fossil co-ordinates for pasting into the RES3B spreadsheet.

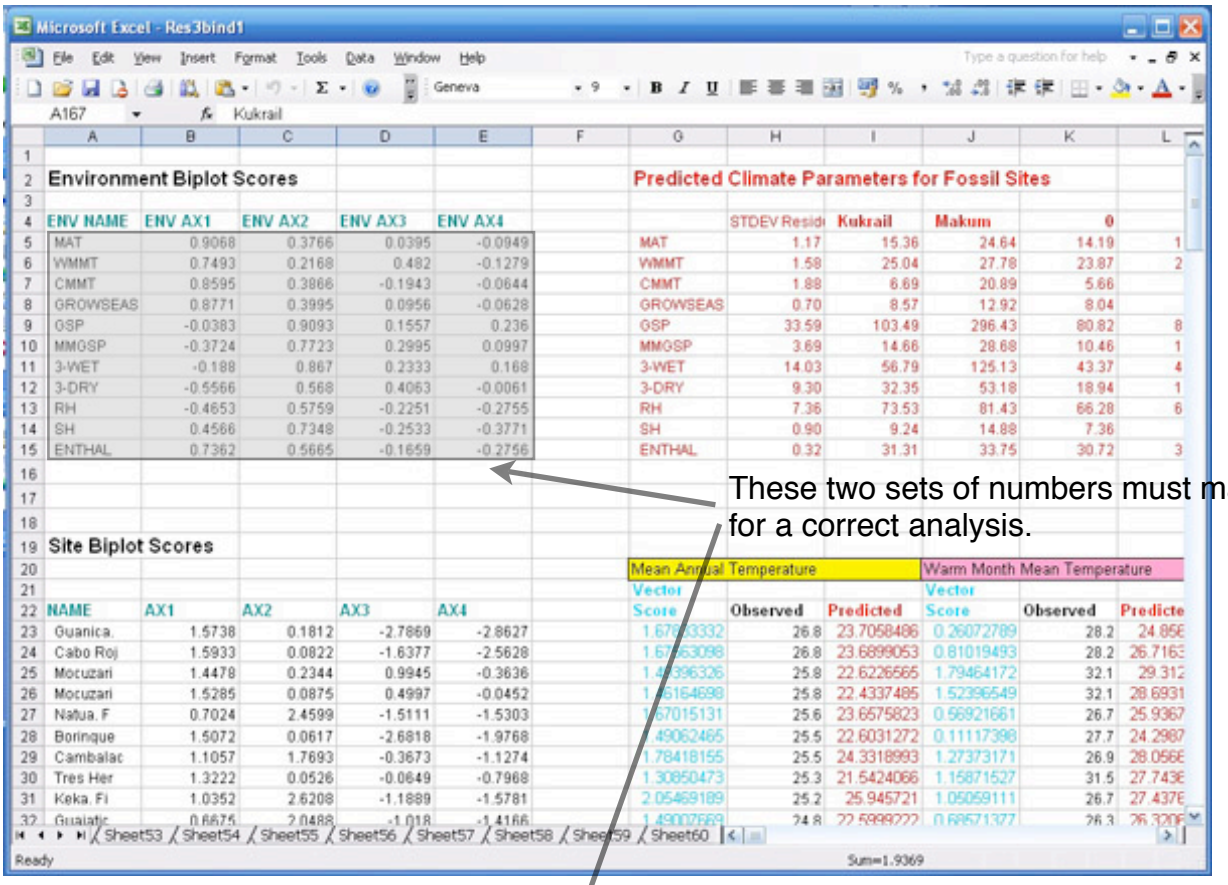
You now need to **highlight the names of your fossil samples and the coordinates for axis 1 through 4** for these and 'copy' them.

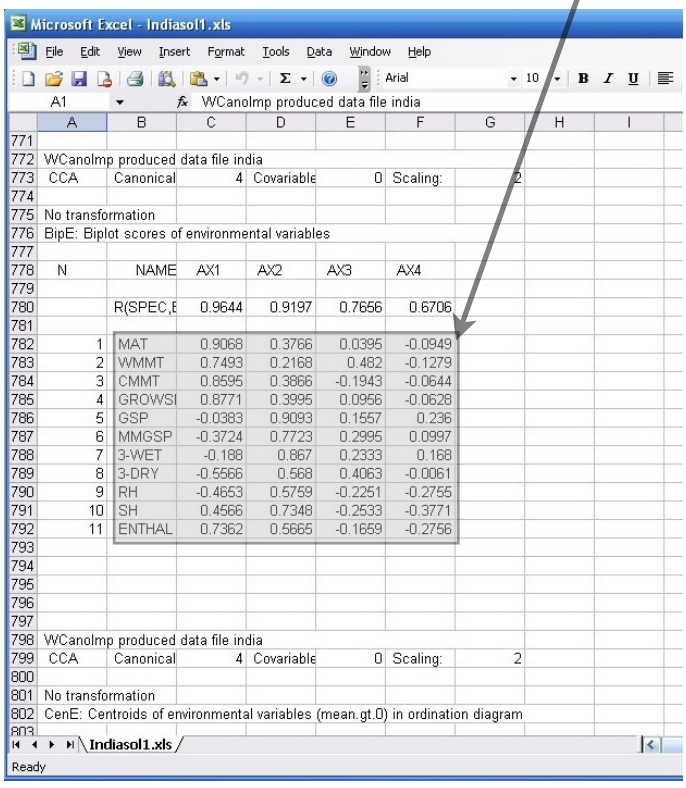
You need to launch the spread sheet **RES3B** which will convert those coordinates into palaeoclimate data. Open RES3BR and at the bottom of the list of coordinates for the PHYSG3br modern calibration sites you will see a blue area beginning on line 167 where you **paste in the names and coordinates of your fossil sites** using 'paste special' and the 'values' option.



Save this RES3B spreadsheet with a new name so as not to overwrite the original (if you do you will need to download a new one from the CLAMP website).

Scroll back to the top of the RES3B spreadsheet and you will see in red the predicted climate parameters for your fossil sites.





One **important check** that you should carry out to insure that all is well with your analysis is to compare the environment **biplot scores** to the left of your predicted climate parameters with those produced during your analysis. To do this go back to your **solution file**, scroll down through the various data arrays until you reach the '**environment biplot**' score array, it is about three quarters of the way down the document, and confirm that the values in this array match those in the RES3BR spreadsheet. If they do, all is well. If they do not, you should go back and check your analysis to ensure you are using the correct calibration sets and no errors have crept in during the analysis.

RAS/TEVS 16/03/08