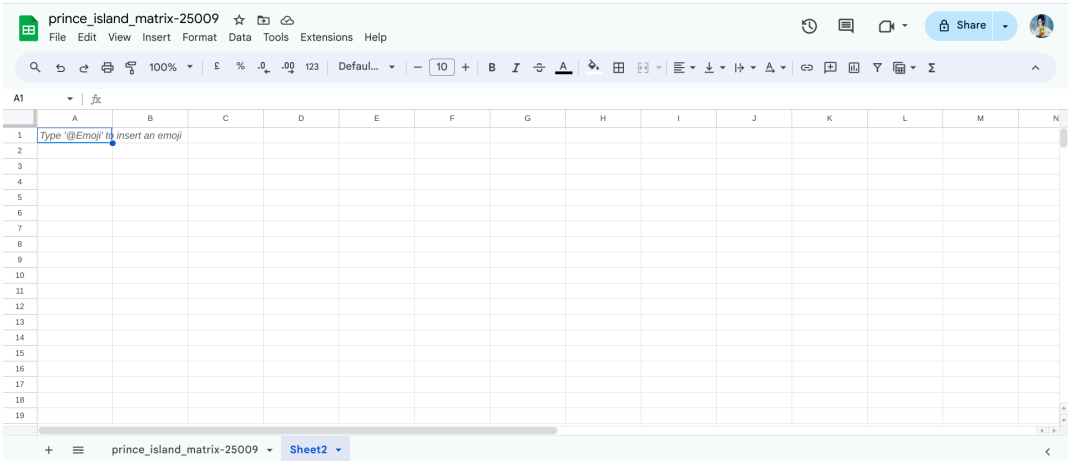
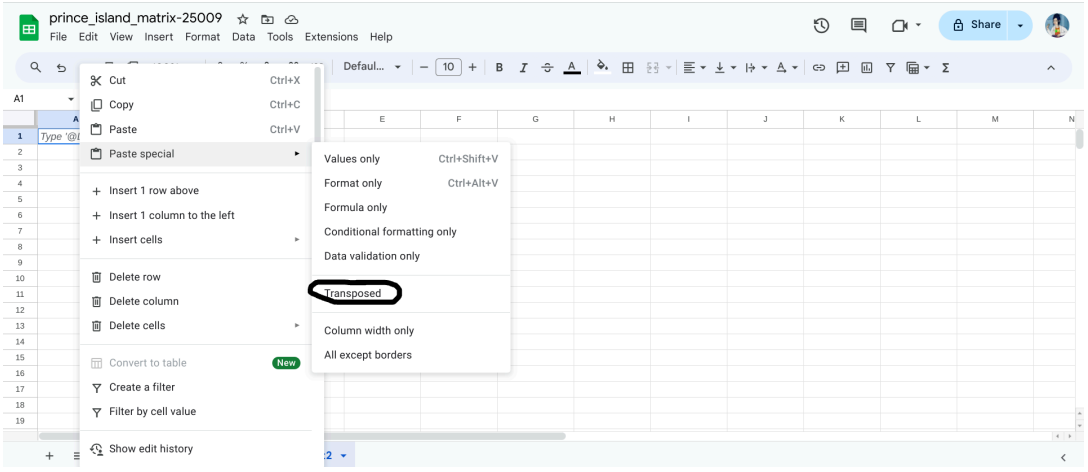
This document is a guide on how to rearrange your raw data in order to easily collect data, it is made for the activity ‘Angiosperm diversity in pollination systems’ however it should give you some idea of how to rearrange any raw data and some of the tools found in google sheets and microsoft excel

This guide uses google sheets, however the same functions are available in microsoft excel as shown in steps 4, 5, and 9

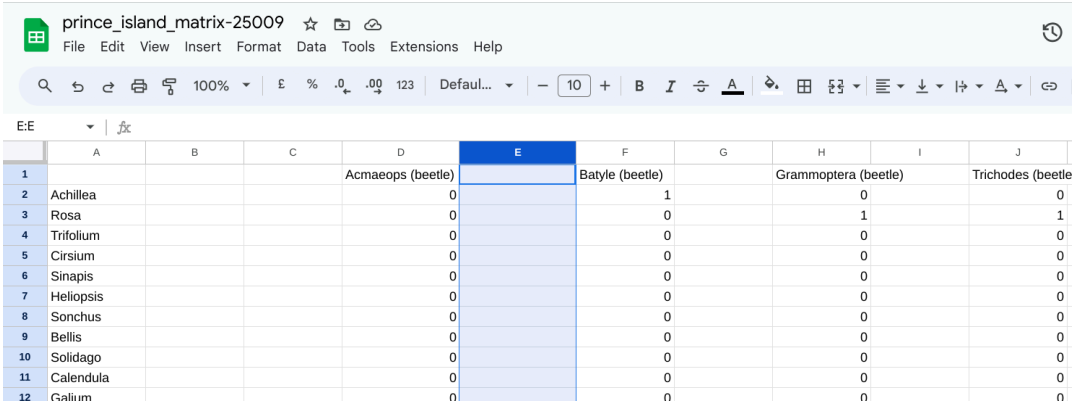
1. First, open a new sheet in the same file and highlight the entire data set in the original sheet and copy it:



2. Then right click, paste special, and transpose paste. This will rearrange so that the the columns and rows are switched:

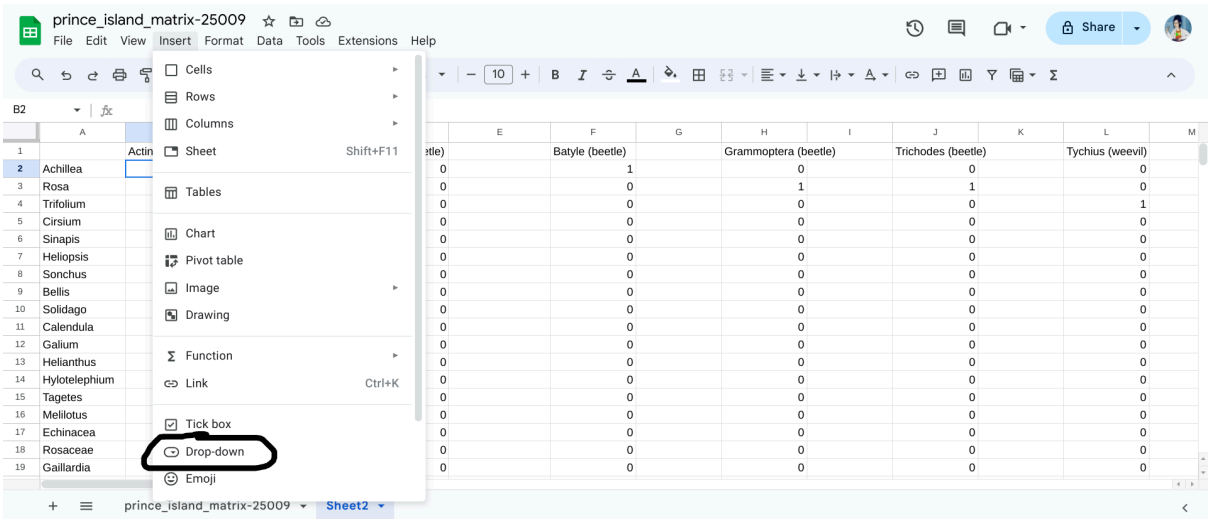


3. Then drag column C into D, right click column d and click ‘Insert column to the right’ So the data doesn’t look crushed:



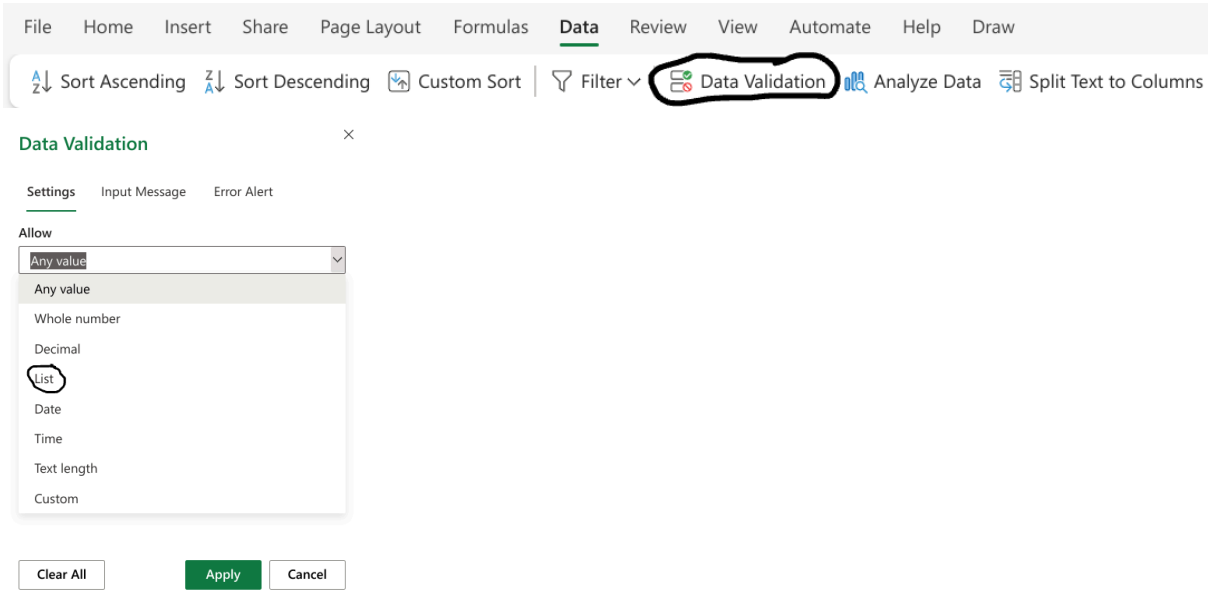
	A	D	E	F	H	J
1		Acmaeops (beetle)		Batyle (beetle)	Grammoptera (beetle)	Trichodes (beetle
2	Achillea	0		1	0	0
3	Rosa	0		0	1	1
4	Trifolium	0		0	0	0
5	Cirsium	0		0	0	0
6	Sinapis	0		0	0	0
7	Heliopsis	0		0	0	0
8	Sonchus	0		0	0	0
9	Bellis	0		0	0	0
10	Solidago	0		0	0	0
11	Calendula	0		0	0	0
12	Galium	0		0	0	0

4. Click on cell B2, go to insert and choose ‘drop down’ this will allow you do categorise each flowering plant into actinomorphic/zygomorphic and monocot/eudicot:

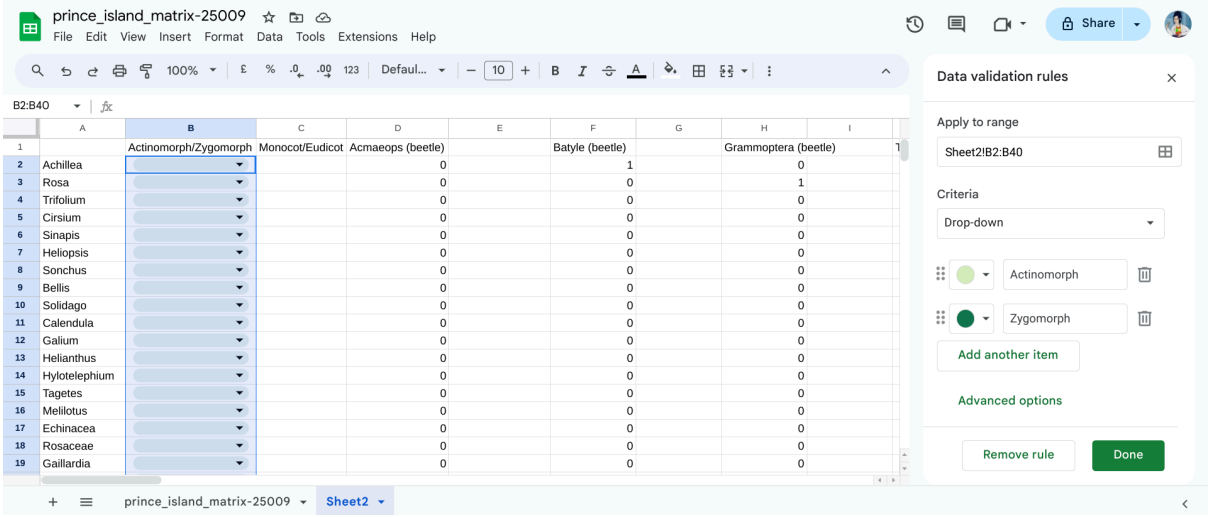


	A	E	F	G	H	I	J	K	L	M
1			Batyle (beetle)		Grammoptera (beetle)		Trichodes (beetle)		Tychius (weevil)	
2	Achillea	0	1		0		0		0	
3	Rosa	0	0		1		1		0	
4	Trifolium	0	0		0		0		1	
5	Cirsium	0	0		0		0		0	
6	Sinapis	0	0		0		0		0	
7	Heliopsis	0	0		0		0		0	
8	Sonchus	0	0		0		0		0	
9	Bellis	0	0		0		0		0	
10	Solidago	0	0		0		0		0	
11	Calendula	0	0		0		0		0	
12	Galium	0	0		0		0		0	
13	Helianthus	0	0		0		0		0	
14	Hylotelephium	0	0		0		0		0	
15	Tagetes	0	0		0		0		0	
16	Melilotus	0	0		0		0		0	
17	Echinacea	0	0		0		0		0	
18	Rosaceae	0	0		0		0		0	
19	Gaillardia	0	0		0		0		0	

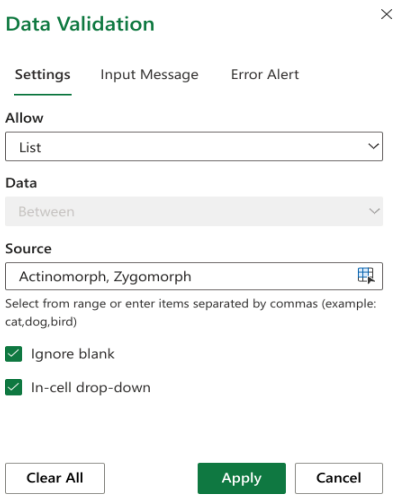
Or if you are using excel it is found in ‘Data’ and then ‘Data validation’, when presented with the settings, click the drop down and select ‘List’



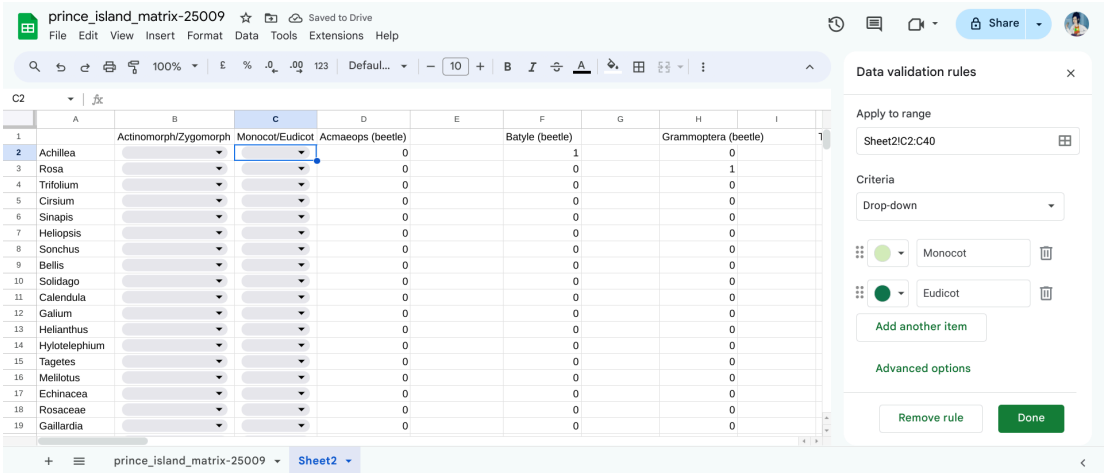
5. When you click ‘drop down’ you are presented with this screen, input the information (you can choose different colours but it is easier if you keep them different), then click done:



If you are using excel, when on the data validation settings screen, after clicking on list, enter the two options separated by a comma in the text box and click apply, then drag the box down using the small green square on the bottom right of the cell to apply it to the entire column.

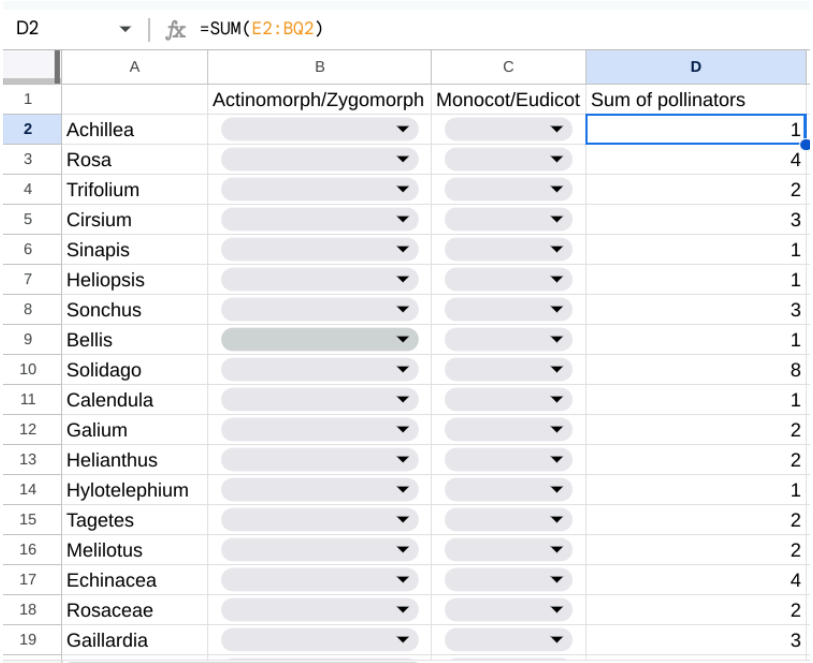


6. Then do the same for column C and click done:



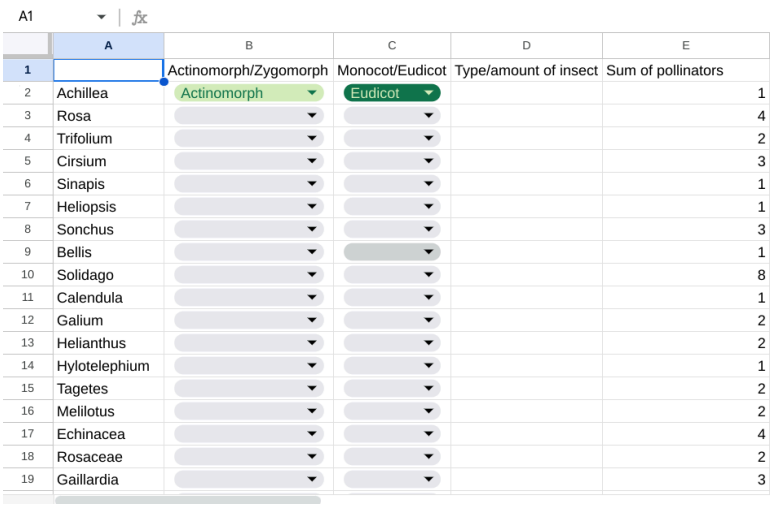
Now use google to collect all your data regarding the flower unit types, once you have done this follow the next set of steps on the next page to help make it easier to collect your pollination data

7. In order to make it easier to create your bipartite graph when it comes to it, right click on column C and 'Insert column to right' and create a column which sums each row, using the formula displayed and dragging it down all 40 rows using the small blue circle:



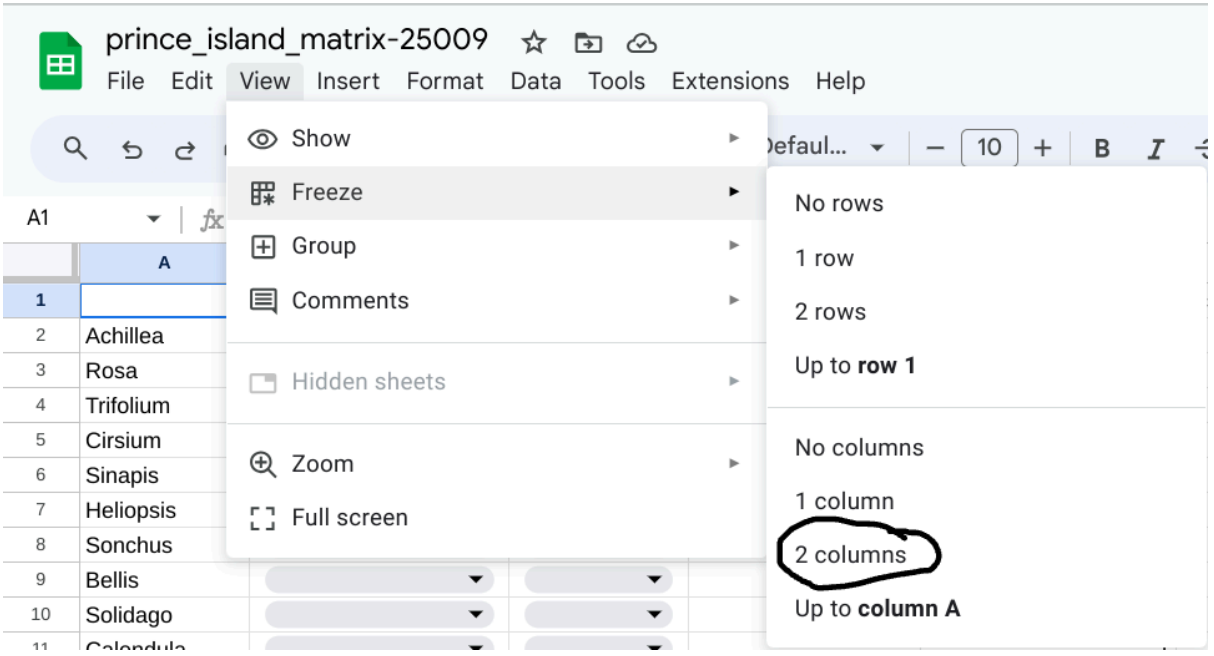
	A	B	C	D
1		Actinomorph/Zygomorph	Monocot/Eudicot	Sum of pollinators
2	Achillea			1
3	Rosa			4
4	Trifolium			2
5	Cirsium			3
6	Sinapis			1
7	Heliopsis			1
8	Sonchus			3
9	Bellis			1
10	Solidago			8
11	Calendula			1
12	Galium			2
13	Helianthus			2
14	Hylotelephium			1
15	Tagetes			2
16	Melilotus			2
17	Echinacea			4
18	Rosaceae			2
19	Gaillardia			3

8. Add another column to the right of column C for which insect types were seen pollinating the flower:



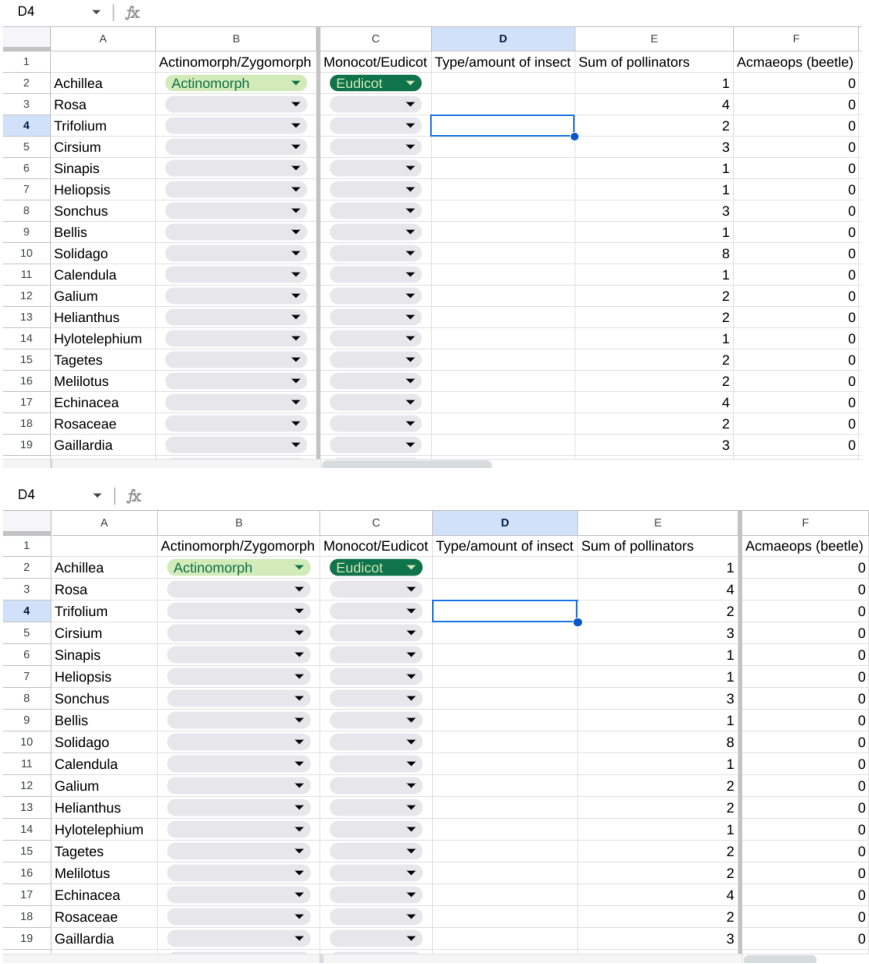
	A	B	C	D	E
1		Actinomorph/Zygomorph	Monocot/Eudicot	Type/amount of insect	Sum of pollinators
2	Achillea	Actinomorph	Eudicot		1
3	Rosa				4
4	Trifolium				2
5	Cirsium				3
6	Sinapis				1
7	Heliopsis				1
8	Sonchus				3
9	Bellis				1
10	Solidago				8
11	Calendula				1
12	Galium				2
13	Helianthus				2
14	Hylotelephium				1
15	Tagetes				2
16	Melilotus				2
17	Echinacea				4
18	Rosaceae				2
19	Gaillardia				3

9. Then freeze the columns, this allows them to scroll alongside you:



If you are using excel, the freeze option can still be found in view, however simply select a cell in column E, this will allow the first set of columns to scroll with you

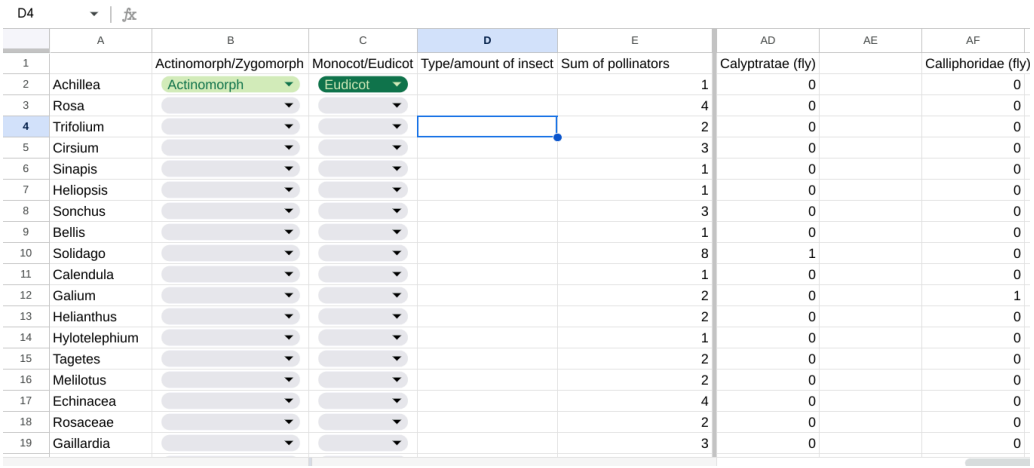
10. A grey bar will appear in between columns B and C, grab the bar and drag it along so it is in between column E and F, this means the first 5 columns will scroll with you, allowing you to easily input all the data required:



	A	B	C	D	E	F
1		Actinomorph/Zygomorph	Monocot/Eudicot	Type/amount of insect	Sum of pollinators	Acmaeops (beetle)
2	Achillea	Actinomorph	Eudicot		1	0
3	Rosa				4	0
4	Trifolium				2	0
5	Cirsium				3	0
6	Sinapis				1	0
7	Heliopsis				1	0
8	Sonchus				3	0
9	Bellis				1	0
10	Solidago				8	0
11	Calendula				1	0
12	Galium				2	0
13	Helianthus				2	0
14	Hylotelephium				1	0
15	Tagetes				2	0
16	Melilotus				2	0
17	Echinacea				4	0
18	Rosaceae				2	0
19	Gaillardia				3	0

	A	B	C	D	E	F
1		Actinomorph/Zygomorph	Monocot/Eudicot	Type/amount of insect	Sum of pollinators	Acmaeops (beetle)
2	Achillea	Actinomorph	Eudicot		1	0
3	Rosa				4	0
4	Trifolium				2	0
5	Cirsium				3	0
6	Sinapis				1	0
7	Heliopsis				1	0
8	Sonchus				3	0
9	Bellis				1	0
10	Solidago				8	0
11	Calendula				1	0
12	Galium				2	0
13	Helianthus				2	0
14	Hylotelephium				1	0
15	Tagetes				2	0
16	Melilotus				2	0
17	Echinacea				4	0
18	Rosaceae				2	0
19	Gaillardia				3	0

11. Then you can scroll along the sheet and collect all of the data you need:



	A	B	C	D	E	AD	AE	AF
1		Actinomorph/Zygomorph	Monocot/Eudicot	Type/amount of insect	Sum of pollinators	Calyptratae (fly)		Calliphoridae (fly)
2	Achillea	Actinomorph	Eudicot		1	0		0
3	Rosa				4	0		0
4	Trifolium				2	0		0
5	Cirsium				3	0		0
6	Sinapis				1	0		0
7	Heliopsis				1	0		0
8	Sonchus				3	0		0
9	Bellis				1	0		0
10	Solidago				8	1		0
11	Calendula				1	0		0
12	Galium				2	0		1
13	Helianthus				2	0		0
14	Hylotelephium				1	0		0
15	Tagetes				2	0		0
16	Melilotus				2	0		0
17	Echinacea				4	0		0
18	Rosaceae				2	0		0
19	Gaillardia				3	0		0

From here you can start with collecting your data and creating your bipartite graphs!

Sam young - 2024