Results

Daniel Reyes

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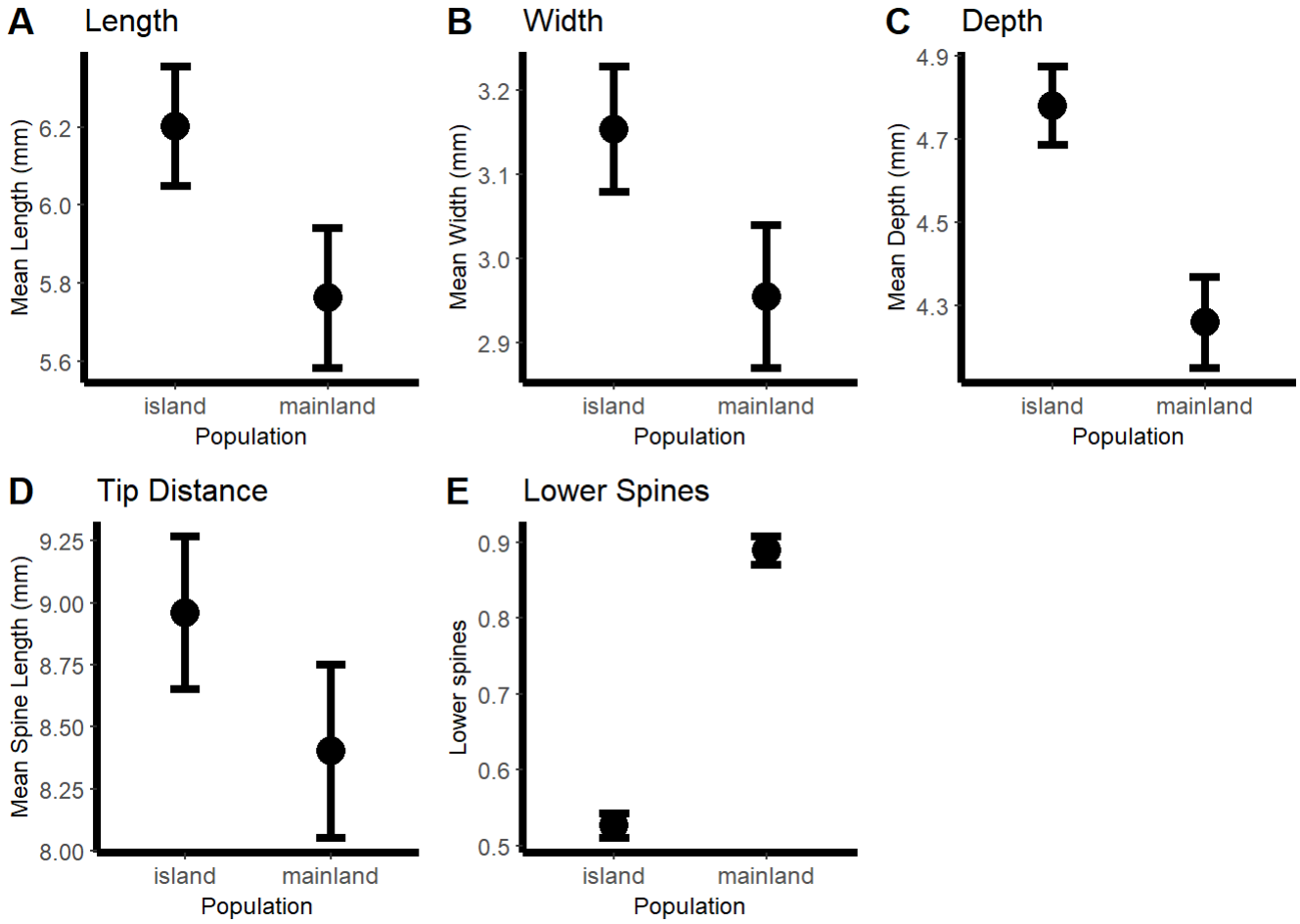
Results

Univariate analysis: trait ~ group + year

Model 1: Mainland/Island

Mericarp

We found that mericarps in island populations are larger but less spiny than mericarps in mainland populations. Mericarps on islands are 7% longer, 5% wider, 12% deeper than mainland populations (X^2 = 14.10, p = <0.001; X^2 = 12.43, p = <0.001; X^2 = 52.33, p = <0.001). Their upper spines are 6% more separated between them on island populations than on mainland (X^2 = 5.85, p = 0.015). However, lower spines are more common on mainland populations than on island populations (X^2 = 76.74, p = 0.001). The effect of year was significant on all traits (X^2 = 8.61, p = <0.001; X^2 = 8.16, p = <0.001; X^2 = 19.54, p = <0.001; X^2 = 0.091, p = <0.001).



Estimated means of mericarp traits between island and mainland populations.

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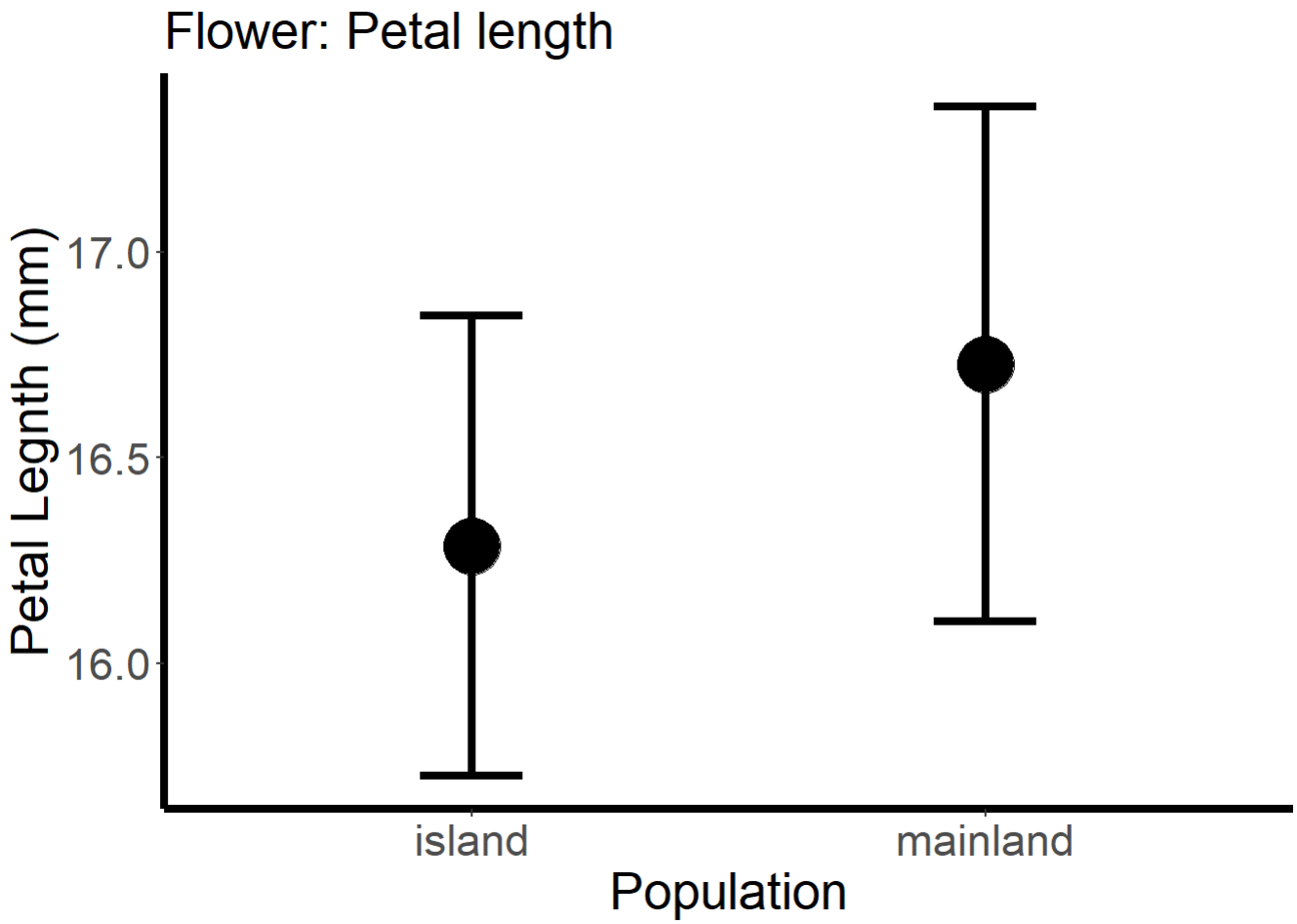
Flower

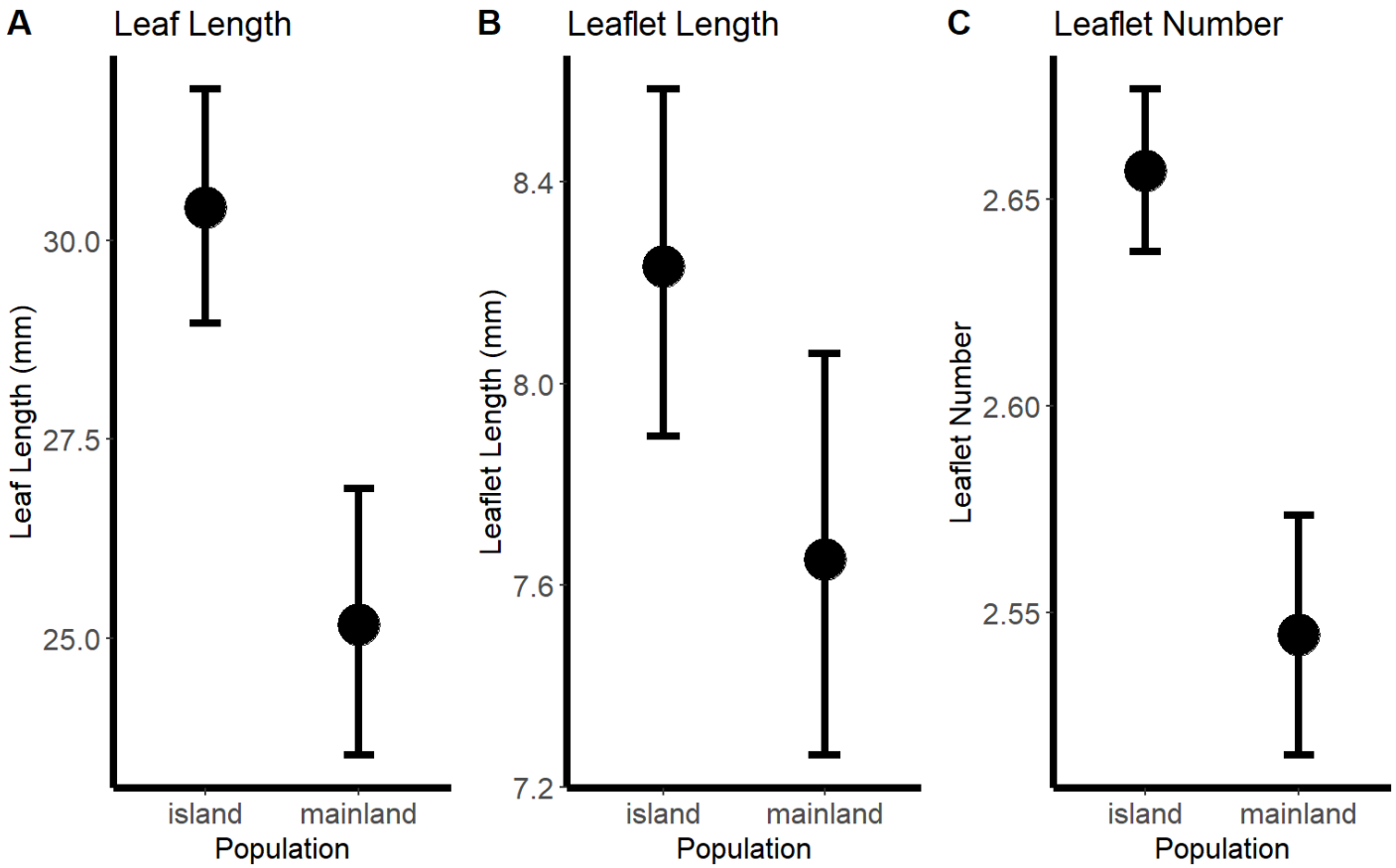
We found no significant differences between mainland and island populations on petal length (p = 0.299). However, there was a significant result for year (X^2 = 15.89, p = <0.001) between mainland and island populations.



Estimated means of petal length between island and mainland populations.

Leaf

We found that leaves in island populations are longer, and have more leaflets than leaves in mainland populations. Leaves on islands are 20% longer, their leaflets are 7.5% larger and they have approximately 11% more leaflets than mainland populations (X^2 = 21.86, p = <0.001; X^2 = 4.86, p = 0.027; X^2 = 39.61, p = <0.001). The effects of year were also significant for all three traits. (X^2 = 6.50 p = <0.001; X^2 = 4.86, p = <0.001).

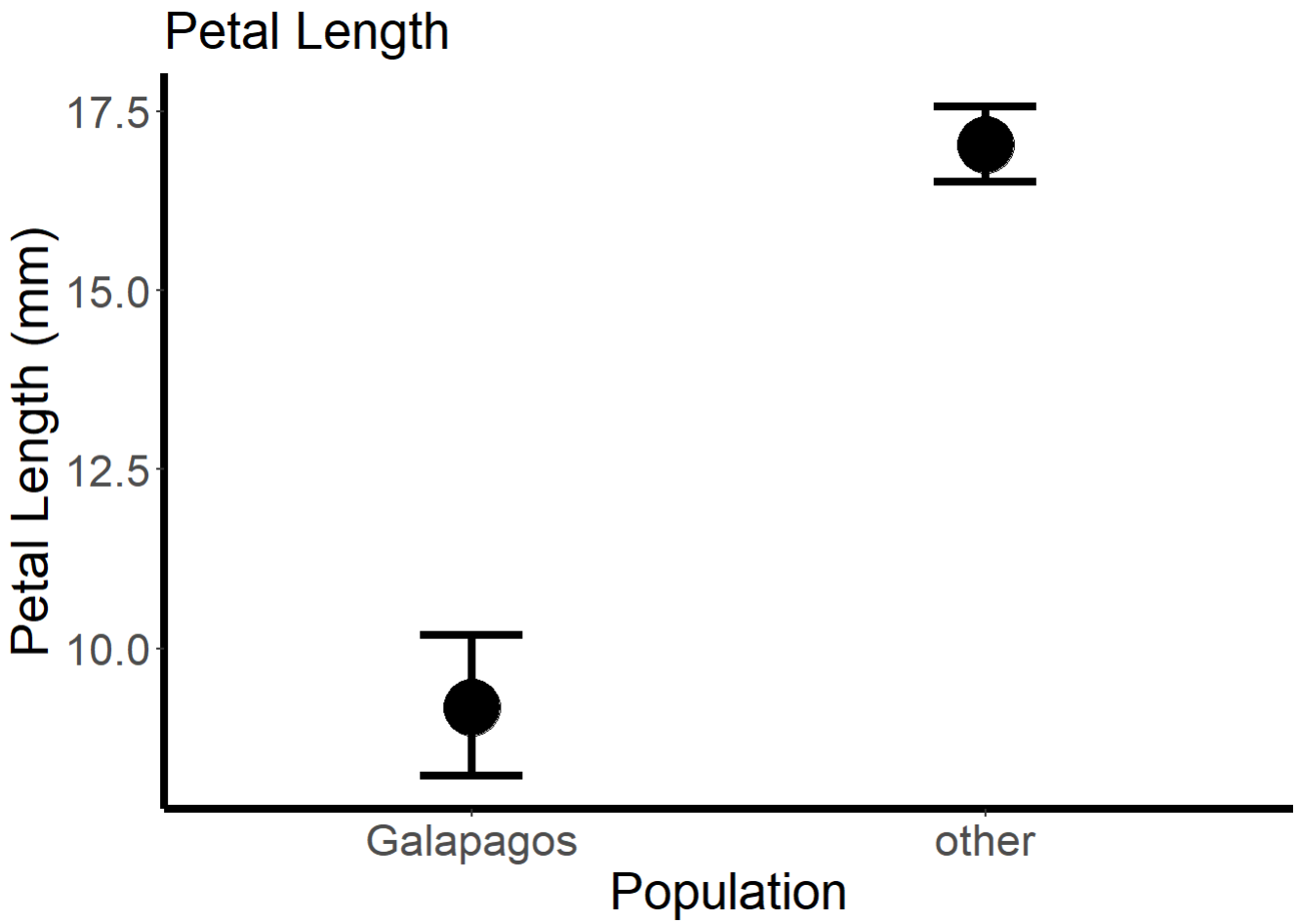


Estimated means of leaf traits between island and mainland populations.

Model 2: Galapagos/Other Islands

Flower

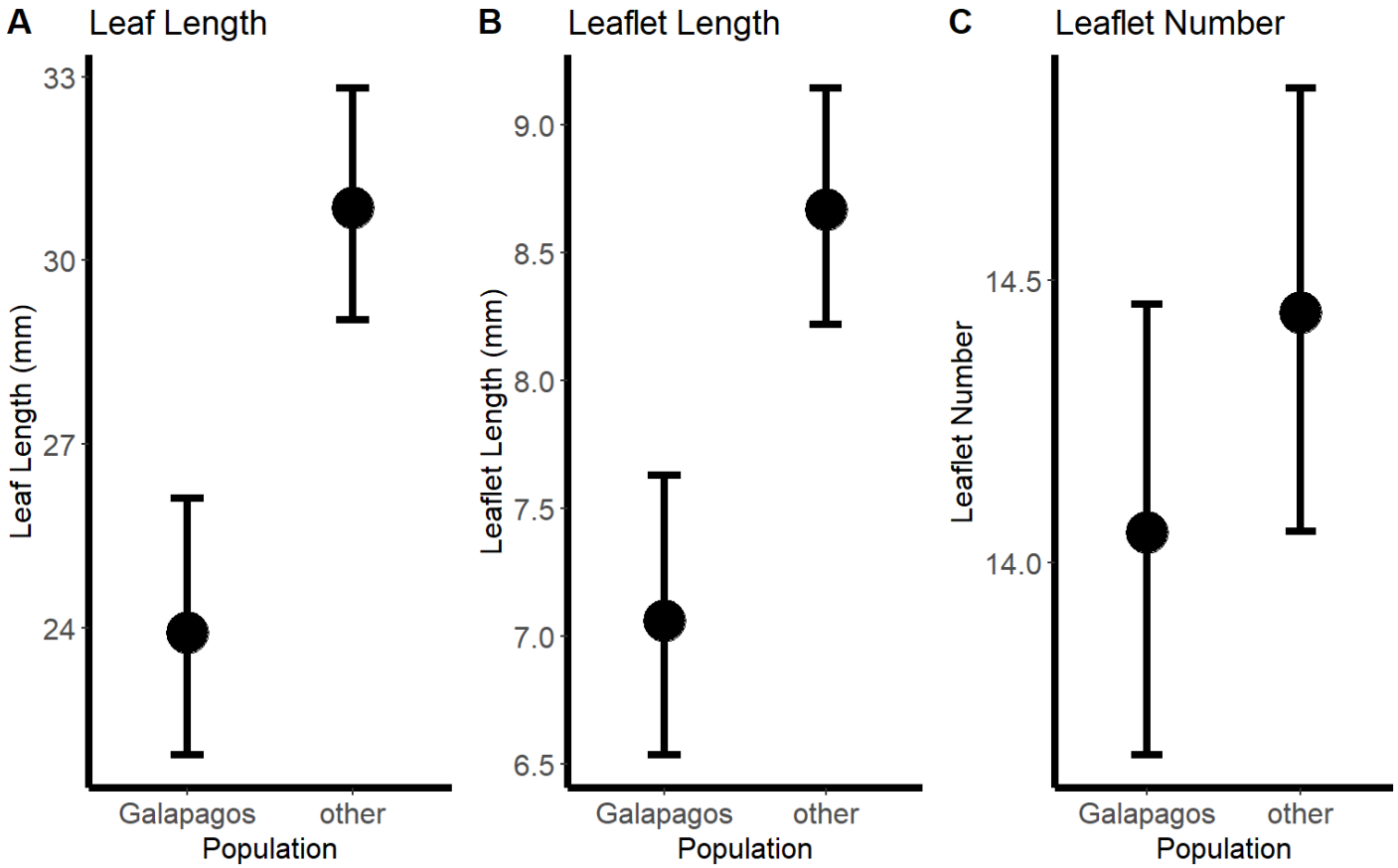
We found that *Tribulus* flowers in the Galapagos are smaller than flowers of populations from other islands. Petal length of *Tribulus* on the Galapagos is 46% shorter than petals from other islands (X^2 = 156.39, p = <0.001). The effect of year has also significant between the two groups (X^2 = 10.13, p = 0.0014)



Estimated means of petal length between the Galapagos and other islands populations.

Leaf

We found that leaf length of population from the Galapagos are smaller than populations from other islands. Leaves are 22% shorter and leaflets are 18.5% shorter compared to other island populations (X^2 = 20.39, p = <0.001; X^2 = 17.20, p = <0.001). However there were not significant differences for the number of leaflets between Galapagos and other island populations (p = 0.17). The effect of year was not significant for both leaf and leaflet length (p = 0.44, p = 0.347).

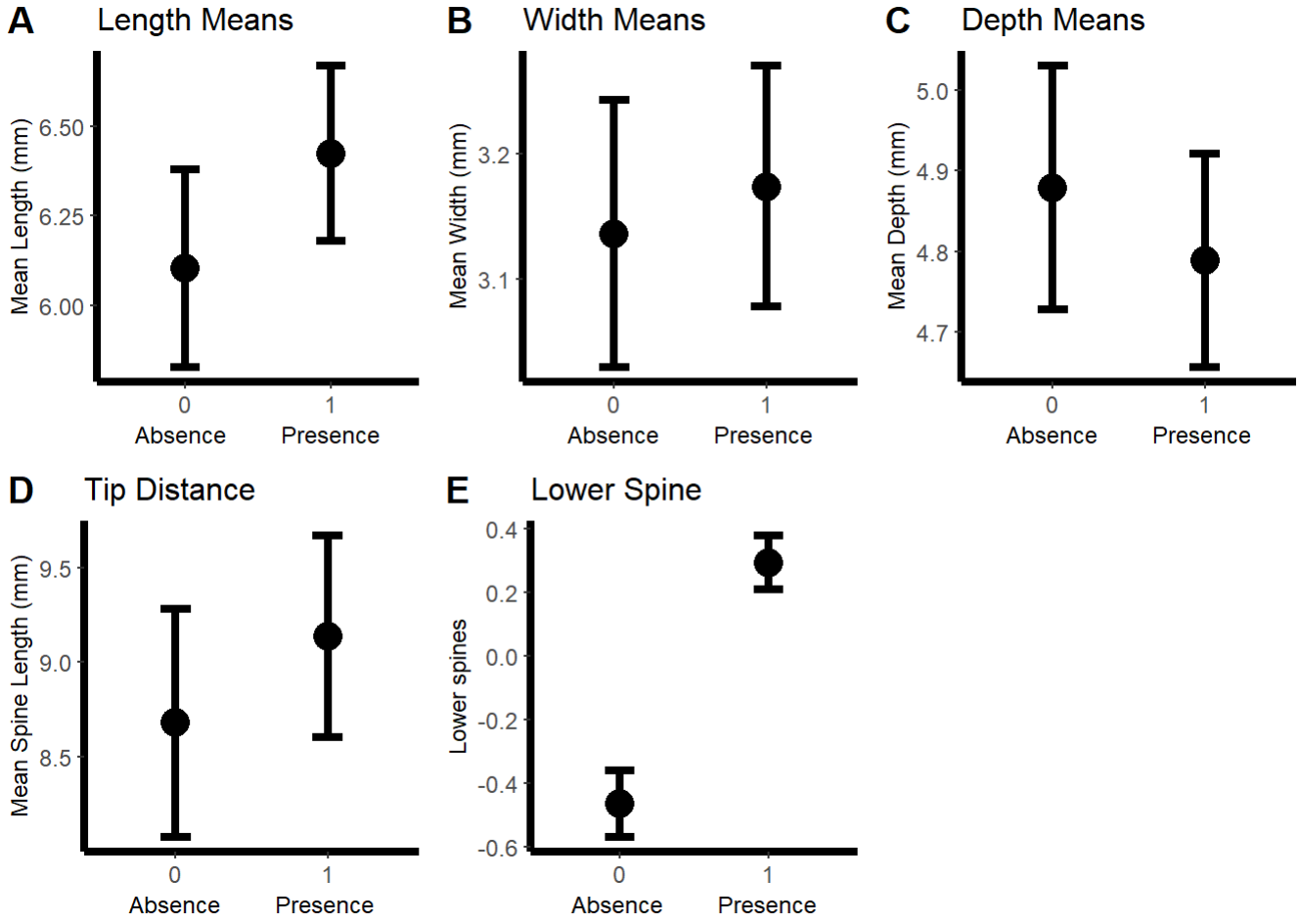


Estimated means of leaf traits between the Galapagos and other island populations.

Model 3: Finch Beak

Mericarp

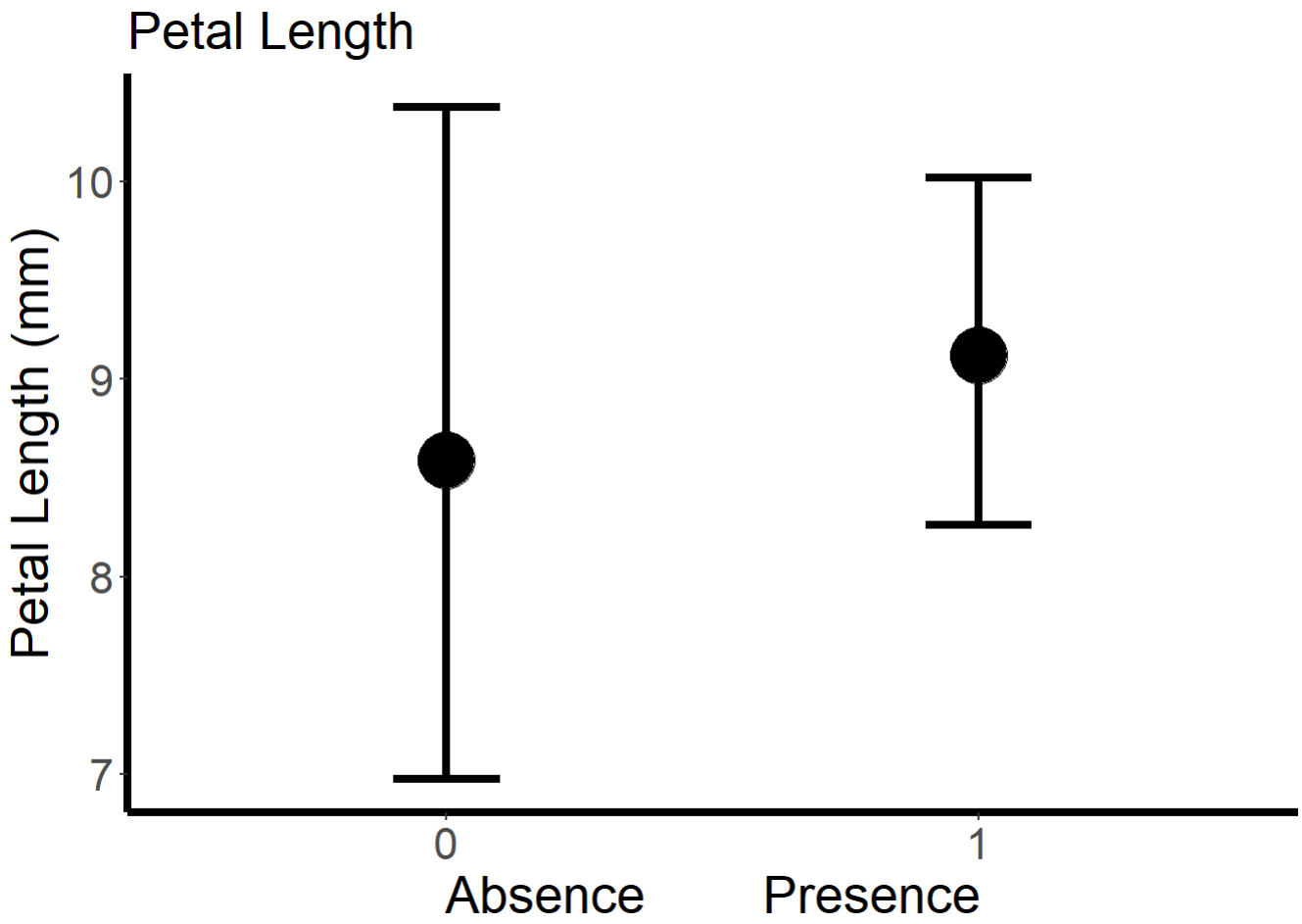
The presence of large beak finch species, *Geospiza magnirrostris* and *Geospiza cornirostris* was significantly associated with the presence of lower spines (X^2 = 125.47, p = <0.001). However, mericarp length, width, depth and spine tip distance were not significant (p = 0.08, p = 0.58, p = 0.37, p = 0.25). The effect of year was significant for lower spines (X^2 = 17.414, p = <0.001) but not significant for the other traits (p = 0.69; p = 0.32; p = 0.11; p = 0.94).



Estimated means of mericarp traits between finch beak communities. 1 = Presence of large finch species, *Geospiza magnirrostris* and *Geospiza cornirostris*. 0 = Absence of large finch species.

Flower

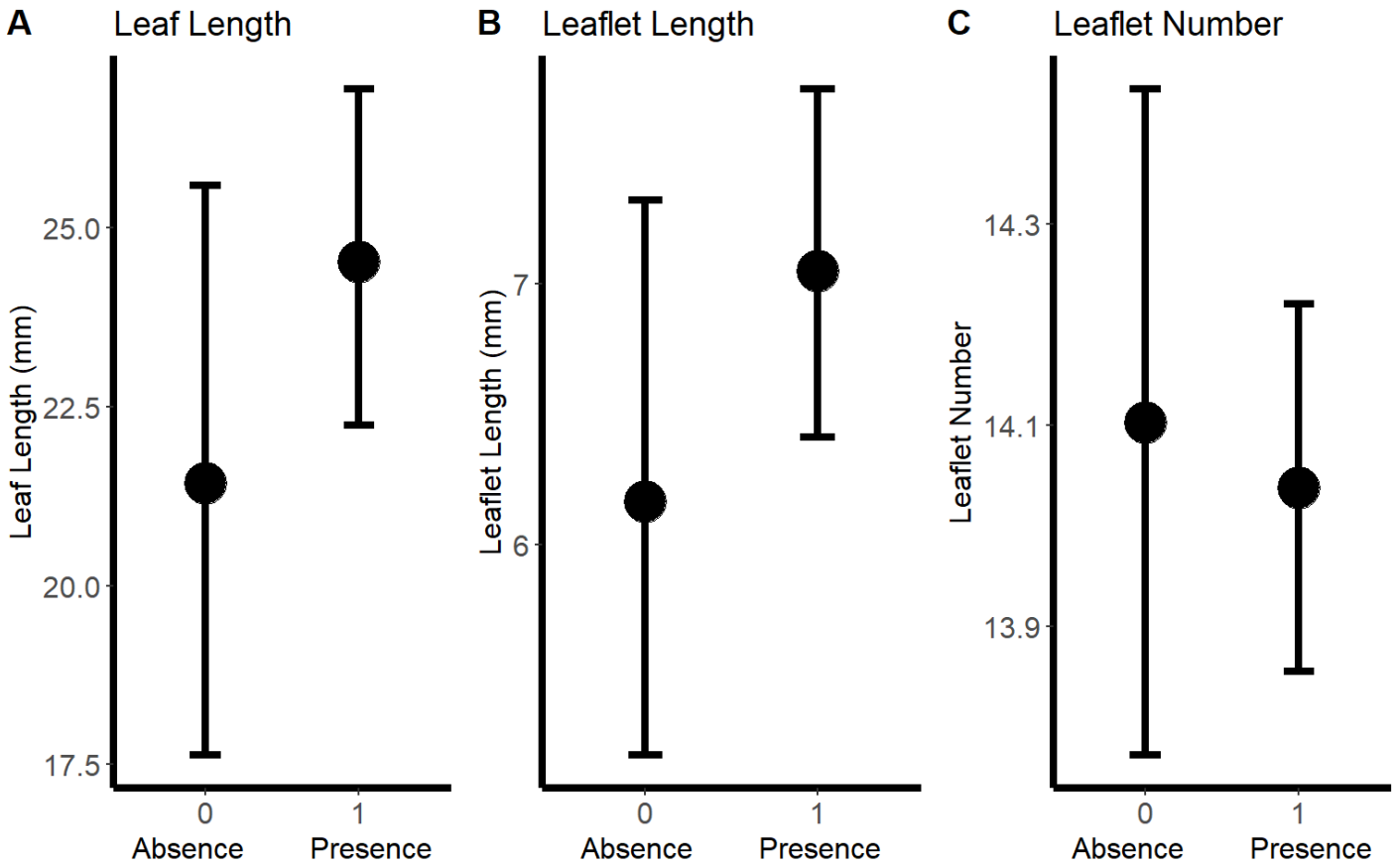
There was no statistically significant difference for petal length and year between islands with large beak finches present and absent (p = 0.55; p = 0.009)



Estimated means of petal length between finch beak communities. 1 = Presence of large finch species, *Geospiza magnirrostris* and *Geospiza cornirostris*. 0 = Absence of large finch species.

Leaf

There is not statistically significant difference between islands with large finch beak species present and absent for all three leaf traits, leaf length, leaflet length and leaf number (p = 0.17; p = p = 0.15; p = 0.73). However there was a significant effect of year for leaf length and leaflet number (X^2 = 12.85, p = <0.001; X^2 = 11.98, p = <0.001). The effect of year for leaflet length was barely significant (X^2 = 3.7091, p = <0.0542).



Estimated means of leaf traits between finch beak communities. 1 = Presence of large finch species, *Geospiza magnirrostris* and *Geospiza cornirostris*. 0 = Absence of large finch species.

Univariate ANOVA table summary

Model	Dataset	Trait	Chisq	P
Model 1: Mainland/Island	Mericarp	Length	14.1013891	0.0001732
		Year Length	8.6192264	0.0033263
		Width	12.4375510	0.0004208
		Year Width	8.1604112	0.0042815
		Depth	52.3335494	0.0000000
		Year Depth	19.5424240	0.0000098
		Tip Distance	5.8539558	0.0155421
		Year Tip Distance	0.0915133	0.7622621
		Lower Spines	76.7444476	0.0000000
Model 1: Mainland/Island	Flower	Petal Length	1.0773450	0.2992922
		Year Petal Length	15.8994511	0.0000668
Model 1: Mainland/Island	Leaf	Leaf Length	21.8618750	0.0000029
		Year Leaf Length	6.5024760	0.0107724
		Leaflet Length	4.8651444	0.0274045
		Year Leaflet Length	8.6928194	0.0031947
		Leaf Number	39.6192434	0.0000000
Model 2: Galapagos/Other Islands	Flower	Petal Length	156.3980600	0.0000000
		Year Petal Length	10.1334553	0.0014560
Model 2: Galapagos/Other Islands	Leaf	Leaf Length	20.3974384	0.0000063
		Year Leaf Length	0.5726341	0.4492141
		Leaflet Length	17.2063072	0.0000335
		Year Leaflet Length	0.8816053	0.3477624
		Leaf Number	1.8644732	0.1721094
Model 3: Finch Beak Presence/Absence	Mericarp	Length	3.0175412	0.0823683
		Year Length	0.1566561	0.6922540
		Width	0.2771715	0.5985612

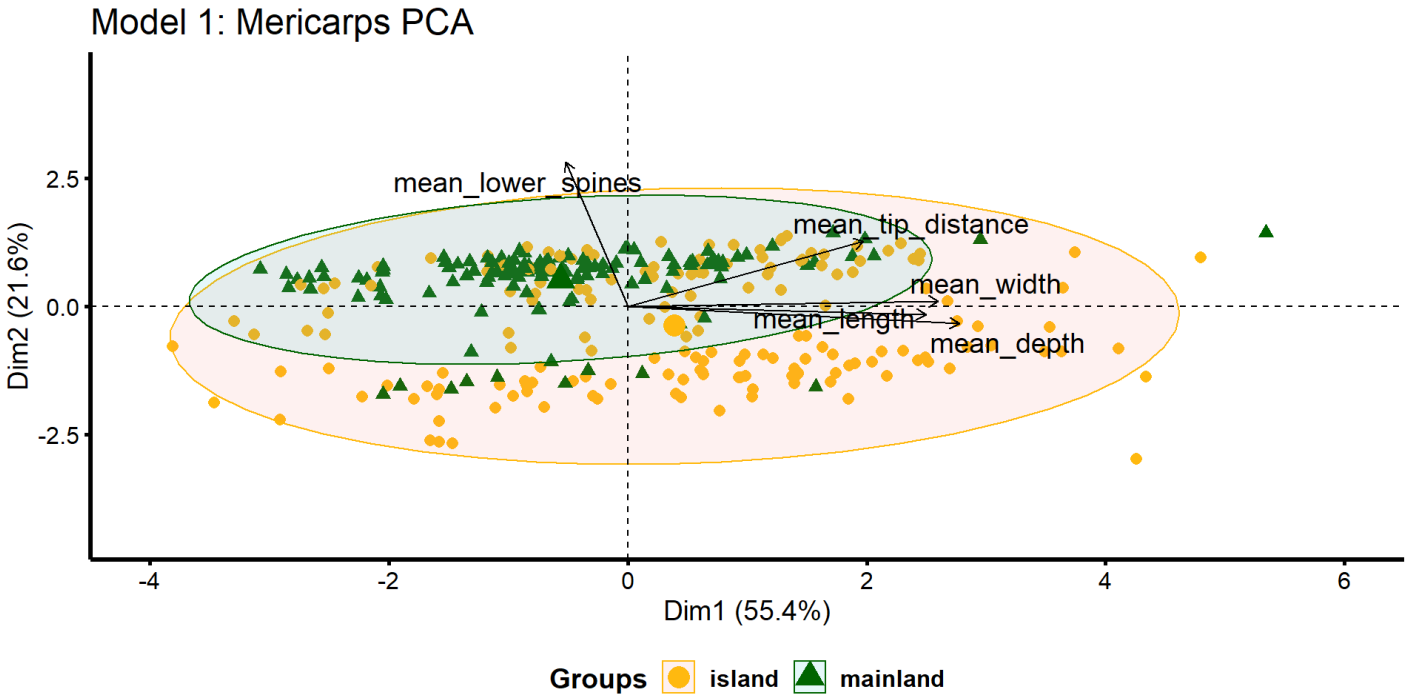
Model	Dataset	Trait	Chisq	P
		Year Width	0.9632845	0.3263607
		Depth	0.7951283	0.3725539
		Year Depth	2.4684788	0.1161503
		Tip Distance	1.3132890	0.2518000
		Year Tip Distance	0.0048628	0.9444054
		Lower Spines	125.4793305	0.0000000
		Year Lower Spines	17.4141521	0.0000301
Model 3: Finch Beak Presence/Absence	Flower	Petal Length	0.3459436	0.5564184
		Year Petal Length	6.7203092	0.0095321
Model 3: Finch Beak: Presence/Absence	Leaf	Leaf Length	1.8787000	0.1704800
		Year Leaf Length	12.8564770	0.0003363
		Leaflet Length	2.0279931	0.1544244
		Year Leaflet Length	3.7091102	0.0541162
		Leaf Number	0.1126053	0.7371973
		Year Leaf Number	11.9862382	0.0005359

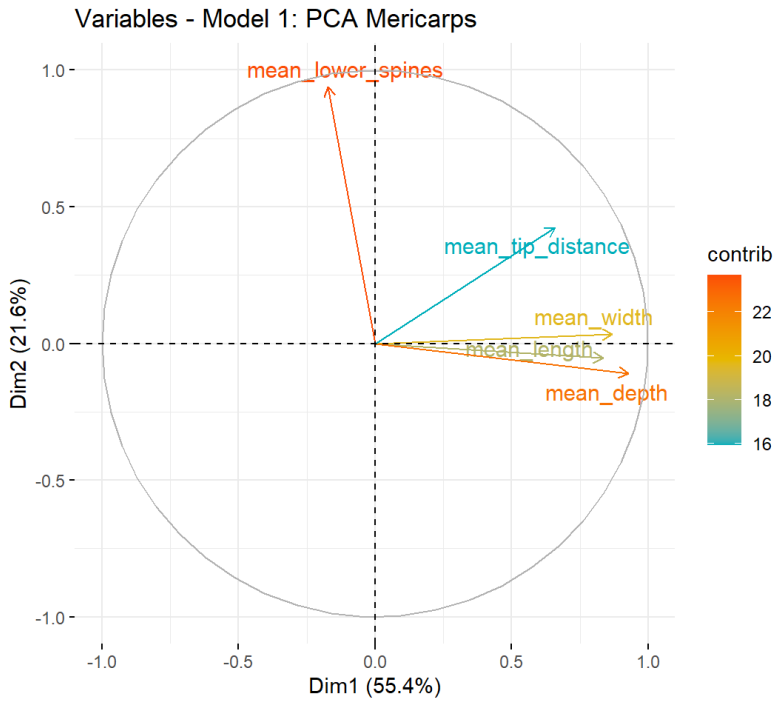
Multivariate analysis: trait ~ group + condition(year)

Model 1: Mainland/Island

Mericarp

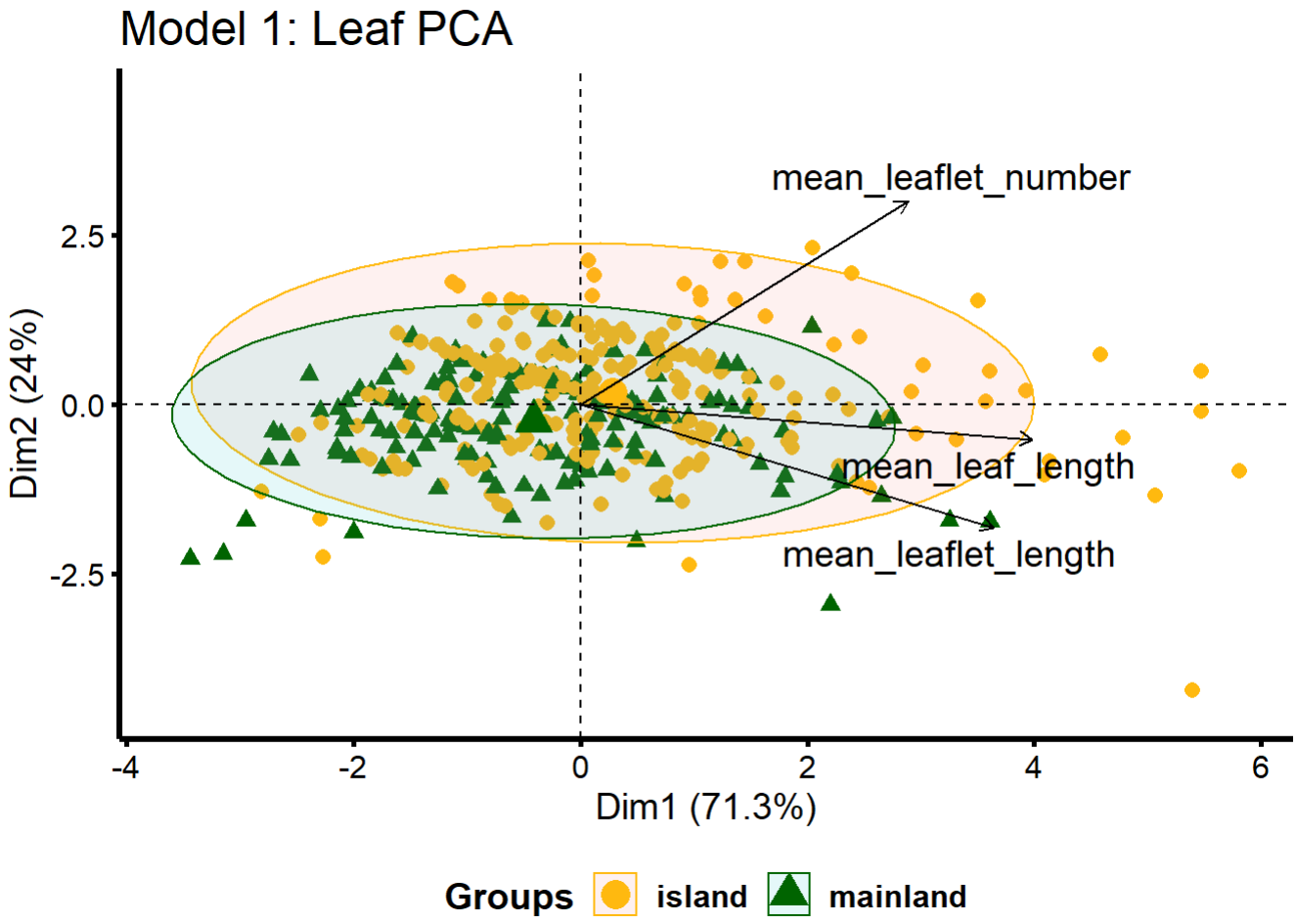
We observed that mericarps from islands and mainlands populations differed in size and number of spines. Mericarps on islands are larger than mericarps on the mainland with depth being the variable that contributes more to the variation of mericarp size. For spines, the presence of lower spines was more related to mainland populations than to island populations and was the variable that contribute to most of the variation between the two groups.

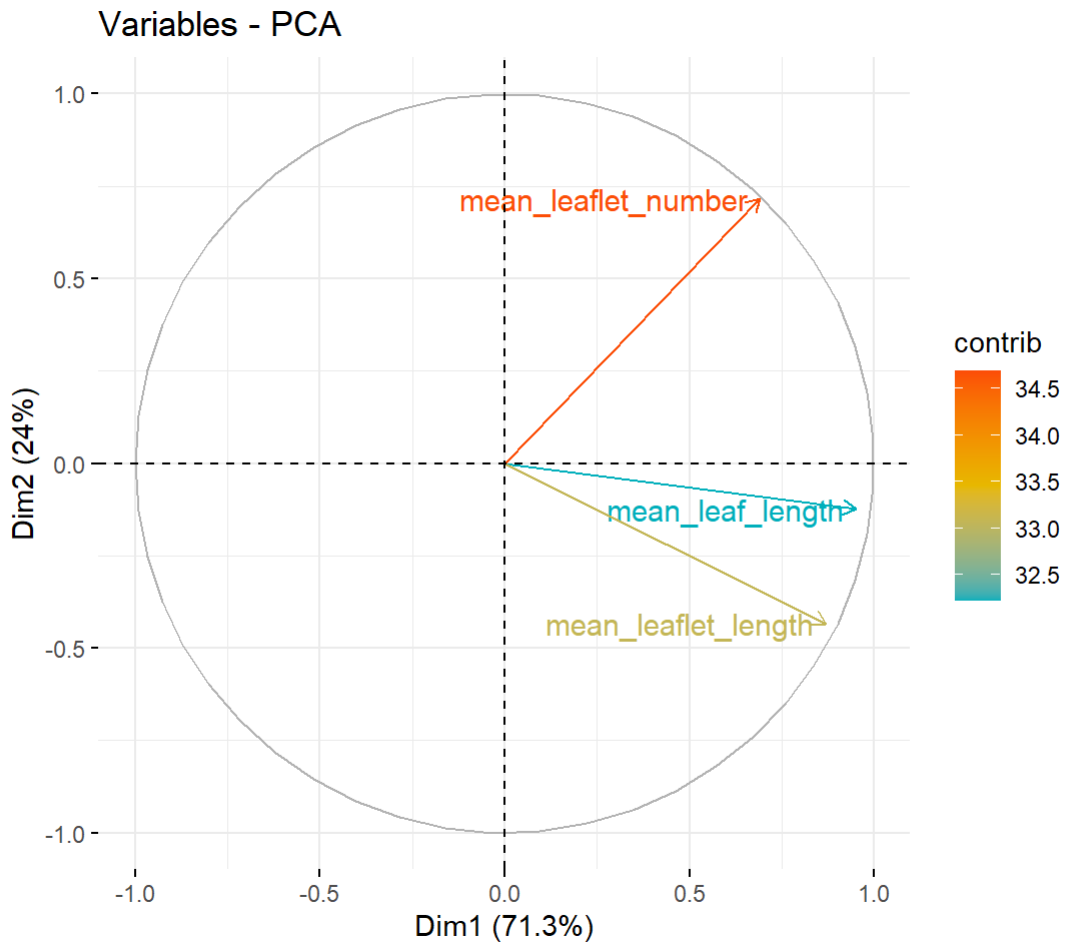




Leaf

Leaves are larger on islands than in the mainland. This size difference also contributes to the number of leaflets present, with island populations habving more. This trait is the main difference between the two groups.





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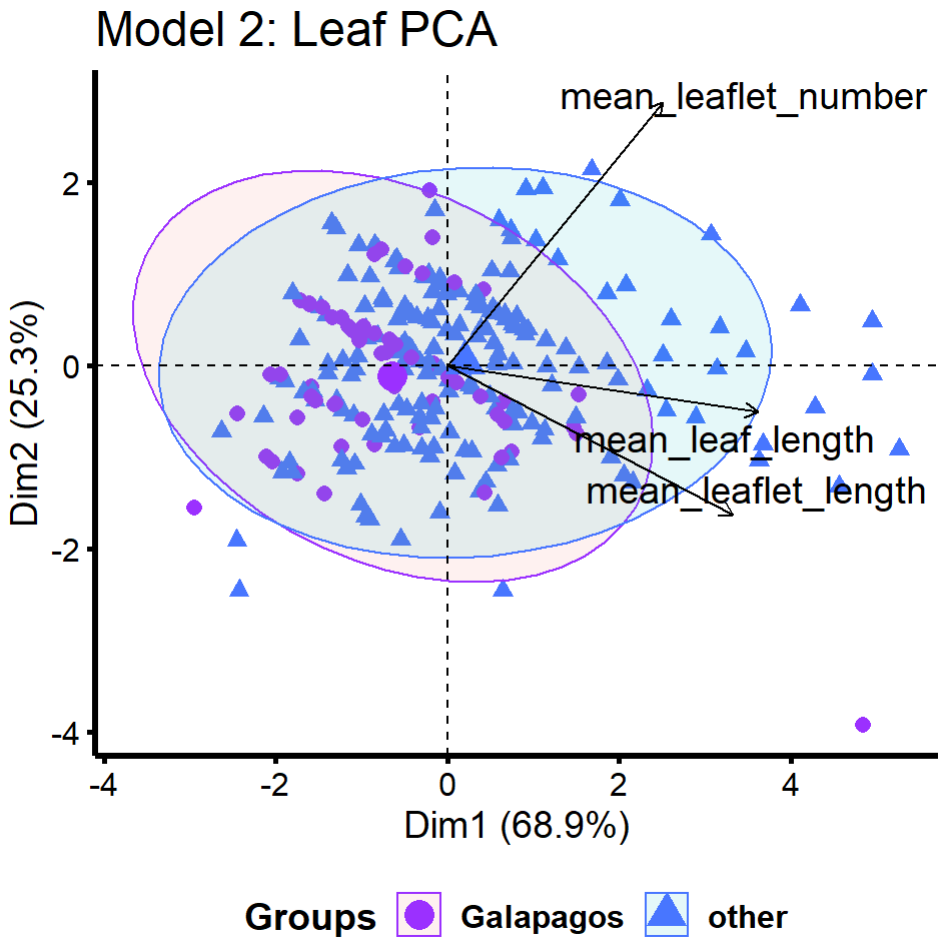
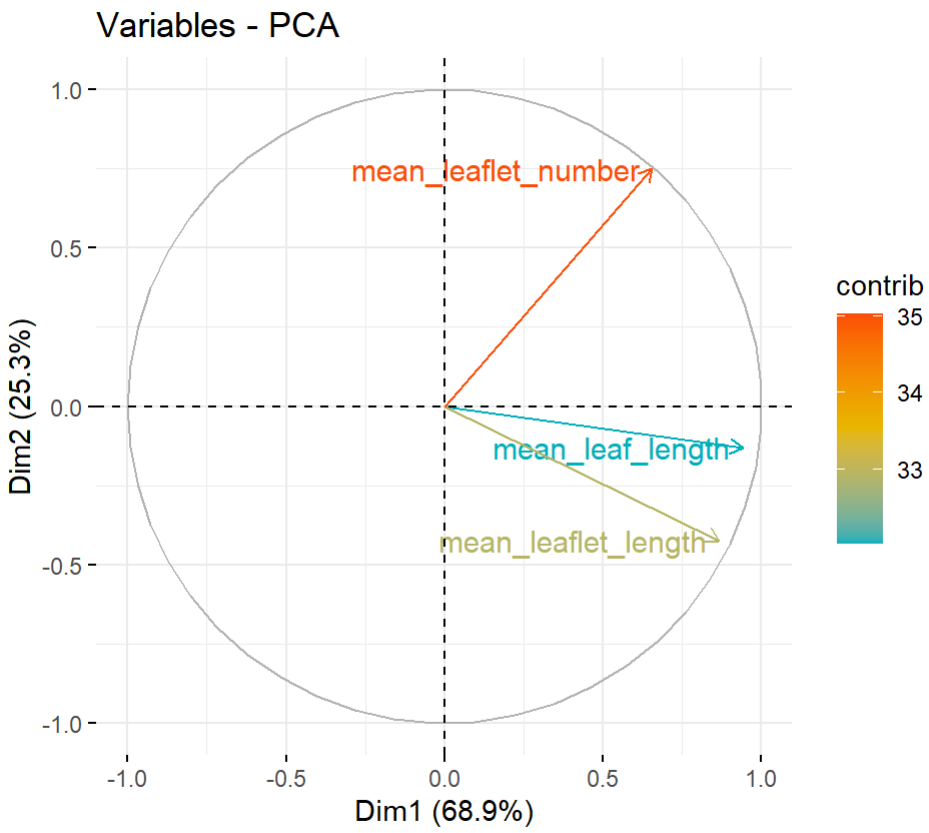
Model 2: Galapagos/Other

Leaf

Leaves from the Galapagos Islands are smaller than other island populations. *Tribulus* leaves in the Galapagos are smaller and have less leaflets than other Islands.

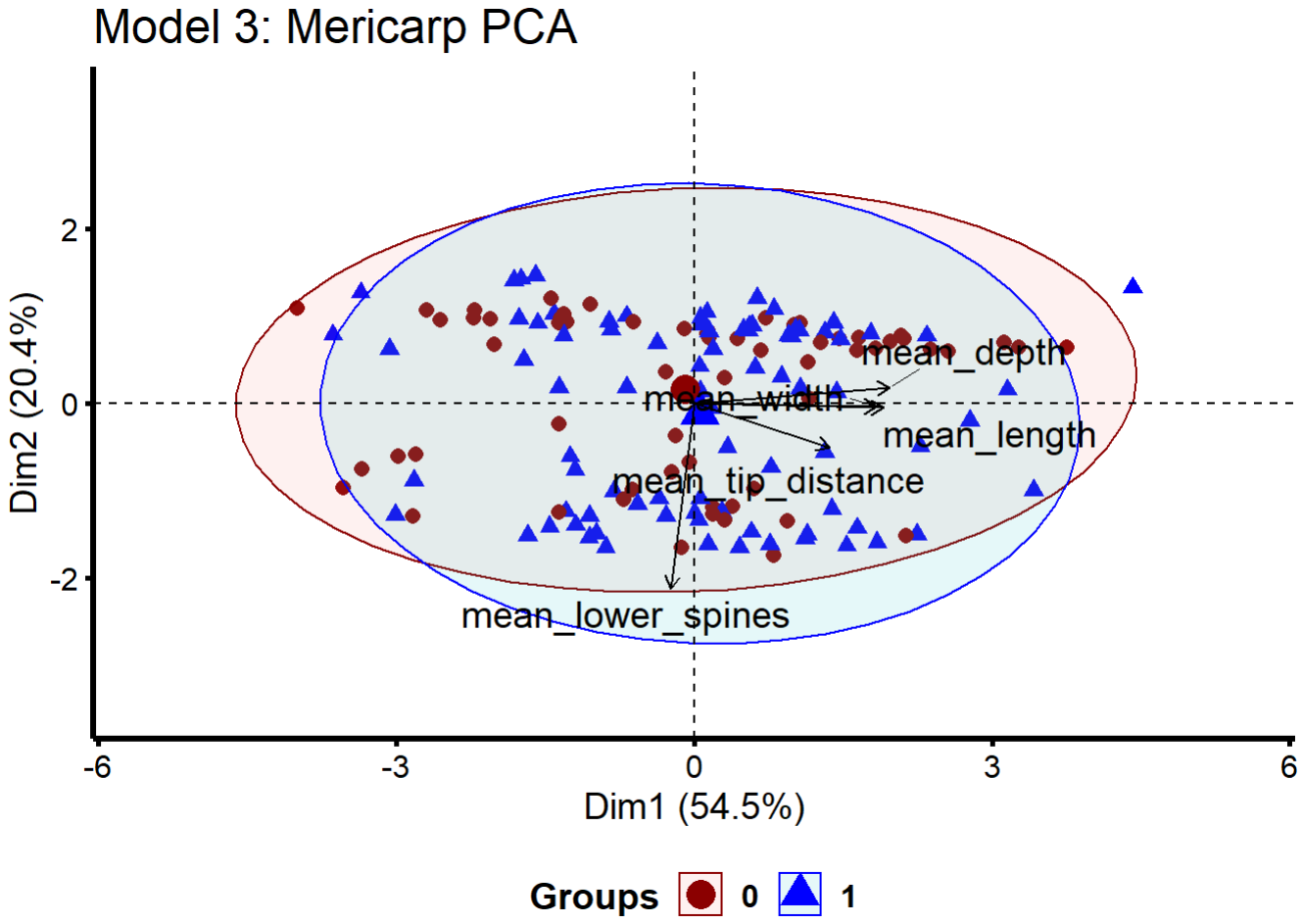


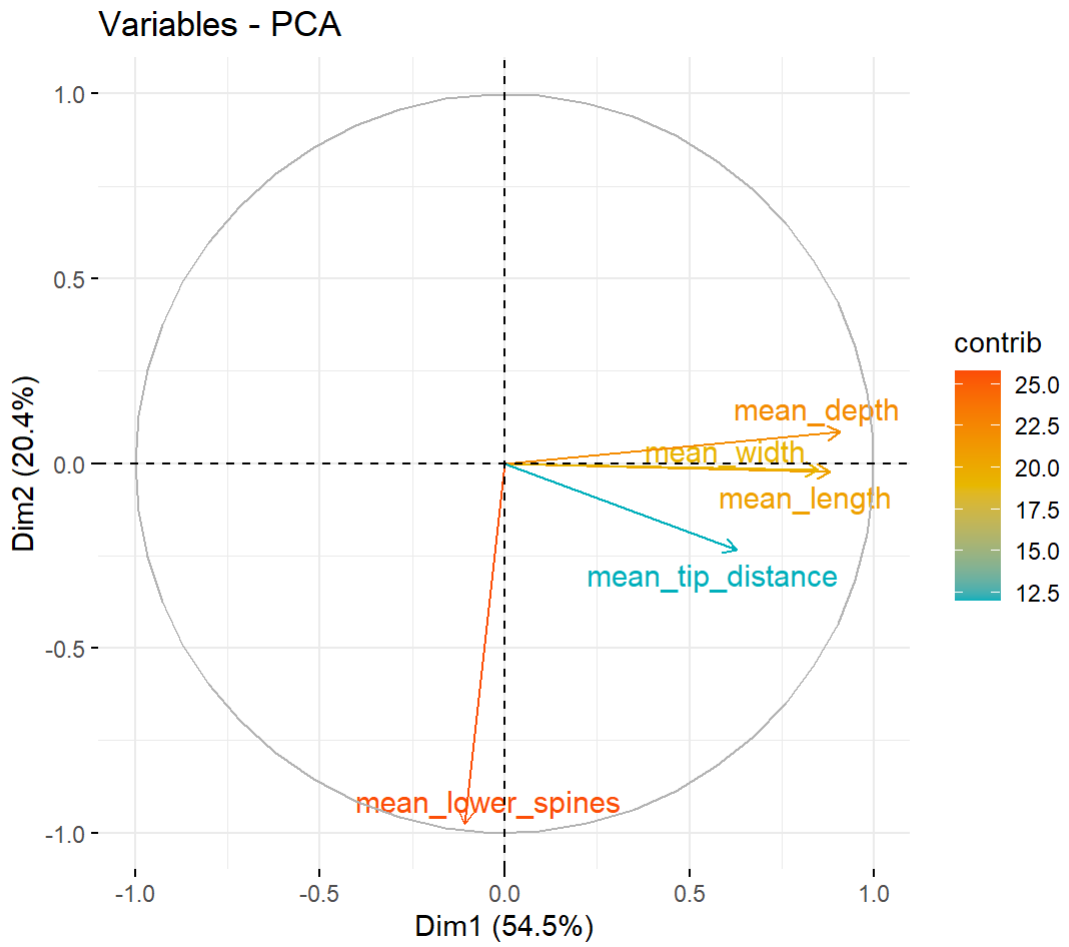


Model 3: Finch Beak

Mericarp

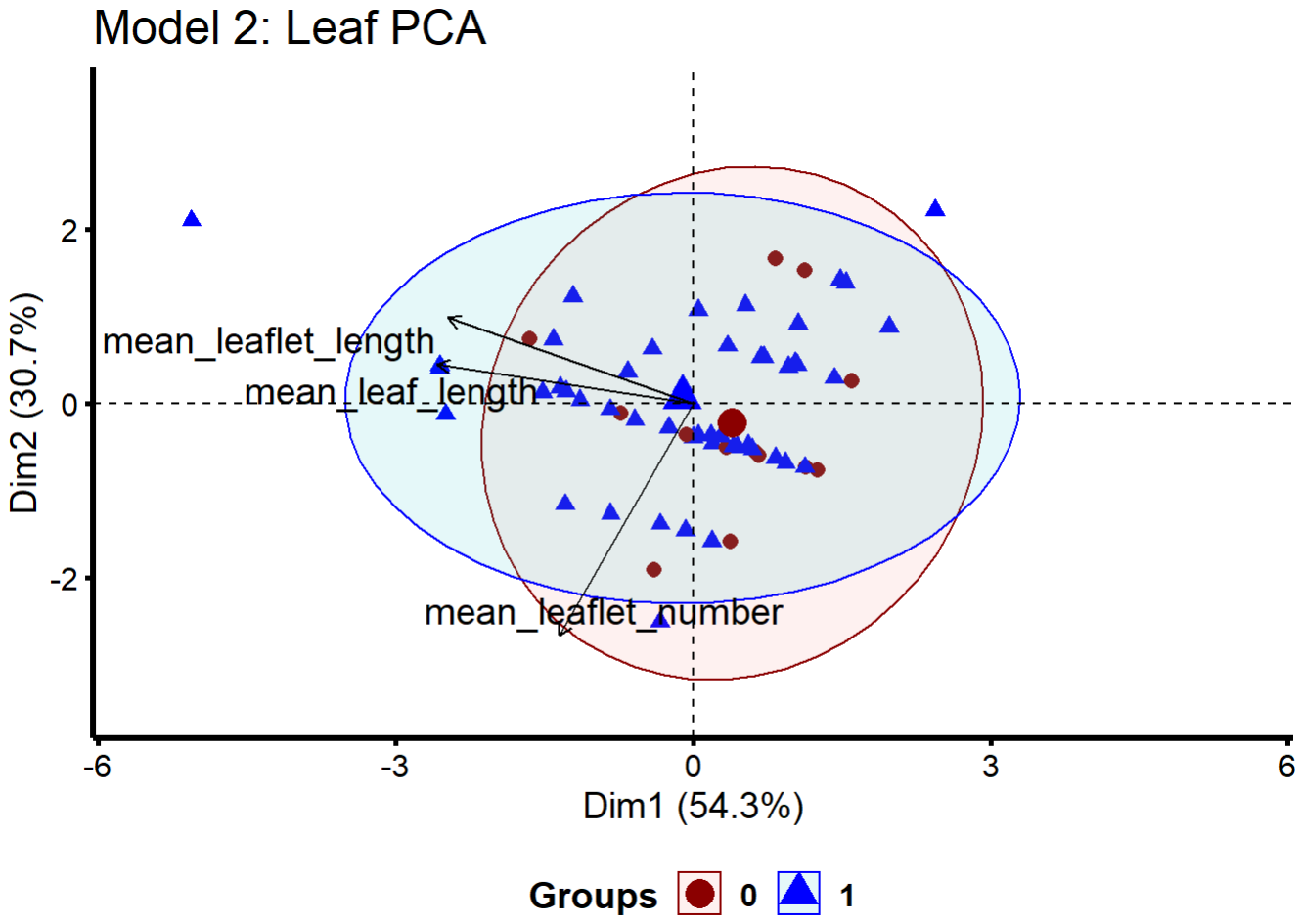
The presence of lower spines is by far the trait that contributes most to the differences between groups. This means that the presence of lower spines are associated with large beak finches. Mericarp size contributes 54% of the variation but is not particularly associated with any group.

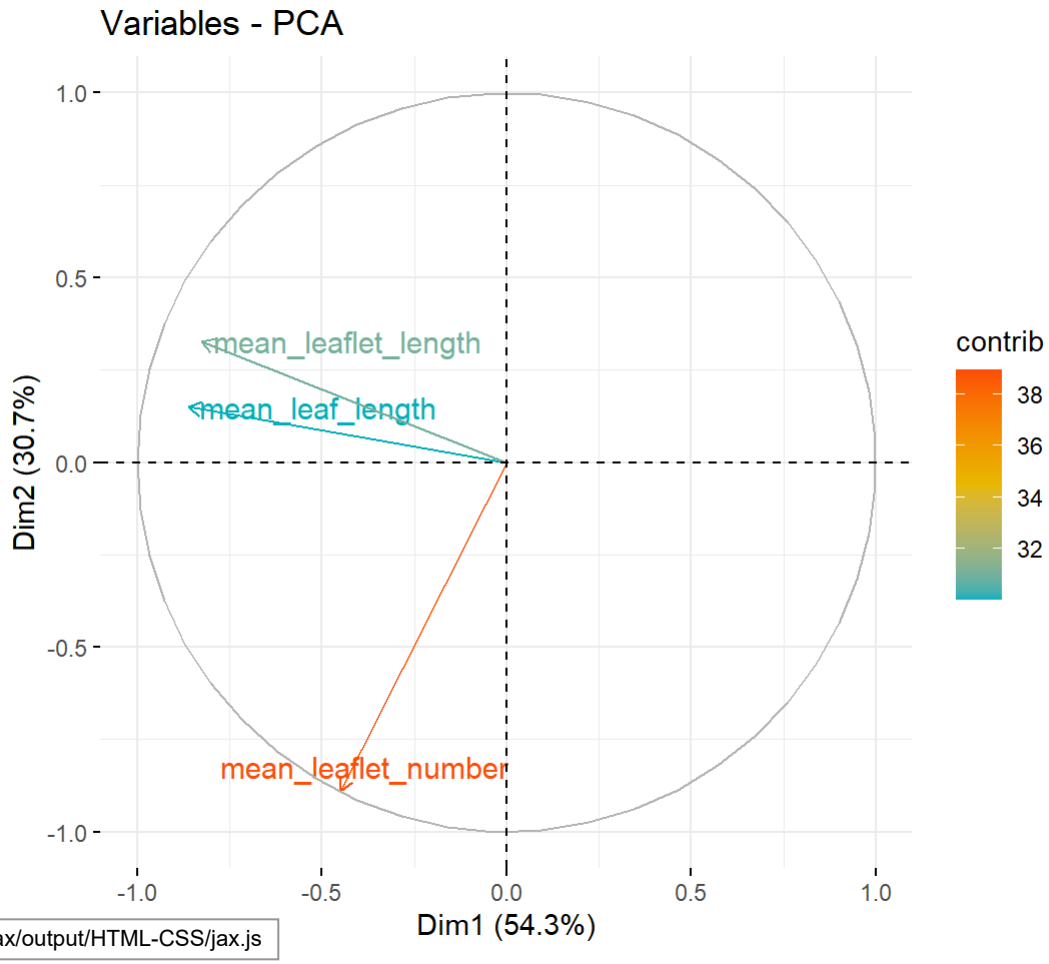




Leaf

Leaf size and leaflet number is not particularly associated with any group of finches.





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