Ecology and specialized plant interactions of the South American oil-bees *Chalepogenus* (Apidae: Tapinotaspidini)

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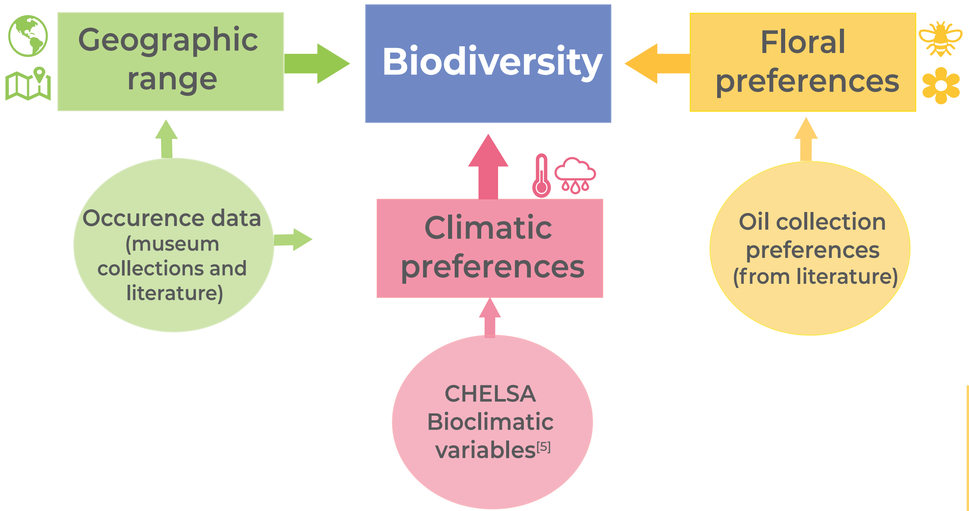
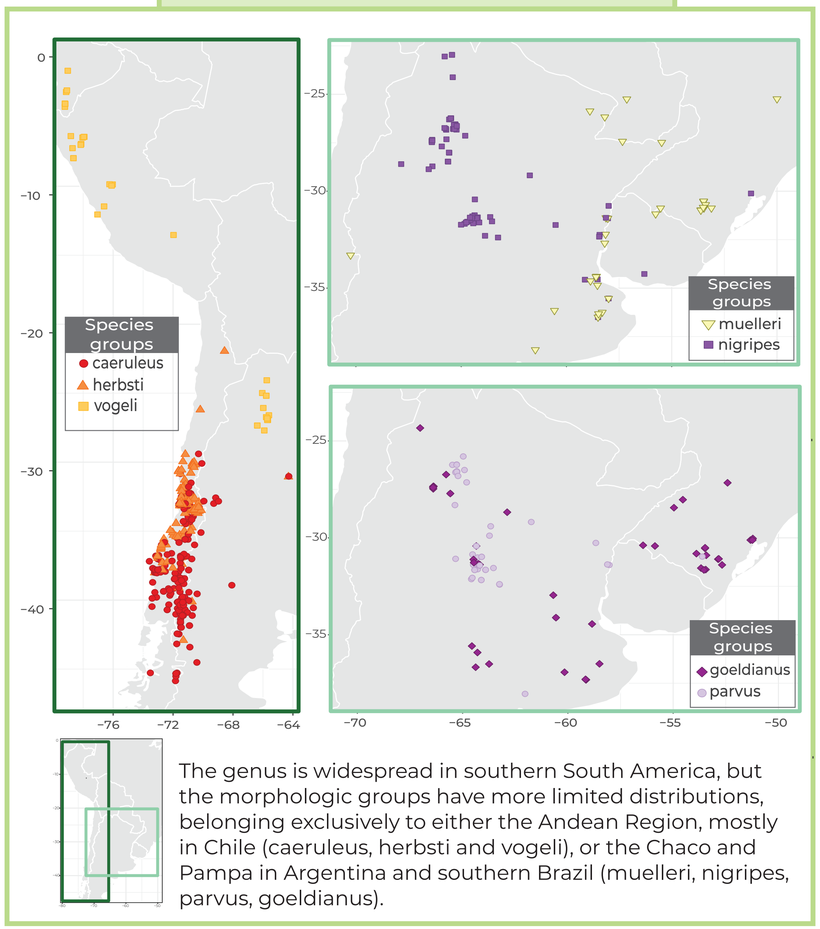
Background: Oil collecting bees from the South American genus *Chalepogenus* have specialized relationships with plants on which they collect floral oils[1]. The diversity of the genus can be thus driven by geographic, climatic and biotic interactions. However, the true range of the species, and their climatic and floral preferences have never been fully investigated. This is key to disentangling the evolution of the group. As a step towards this **here we aim to:**

1. Review this understudied genus
2. Investigate its abiotic (geographic range and climatic preferences) and biotic (floral preferences) characteristics

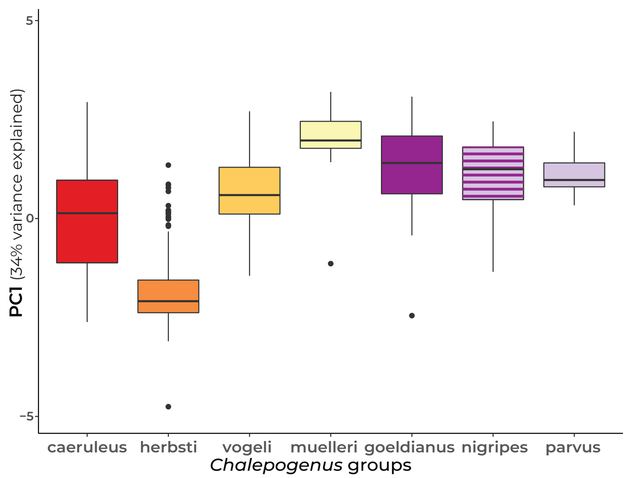


Geographic range: groups are clustered



The genus is widespread in southern South America, but the morphologic groups have more limited distributions, belonging exclusively to either the Andean Region, mostly in Chile (caeruleus, herbsti and vogeli), or the Chaco and Pampa in Argentina and southern Brazil (muelleri, nigripes, parvus, goeldianus).

Climatic preferences: most groups different



Bioclimatic variables	PC1 Eigenvalues
Annual Precipitation	**0.516**
Precip. of Warmest Quarter	**0.444**
Precip. of Coldest Quarter	0.109
Annual Mean Temperature	0.028
Isothermality	-0.079
Mean Temp. of Driest Quarter	-0.299
Mean Diurnal Range	**-0.421**
Precipitation Seasonality	**-0.501**

Climatic PC1 values show that most groups are significantly different from each other (Wilcoxon test: $p < 0.05$, different colors), except for group nigripes (dashed). Colors are the same as shown in the maps, and color families refer to the floral preferences.
Groups herbsti and muelleri experience the most extreme precipitations and temperatures.

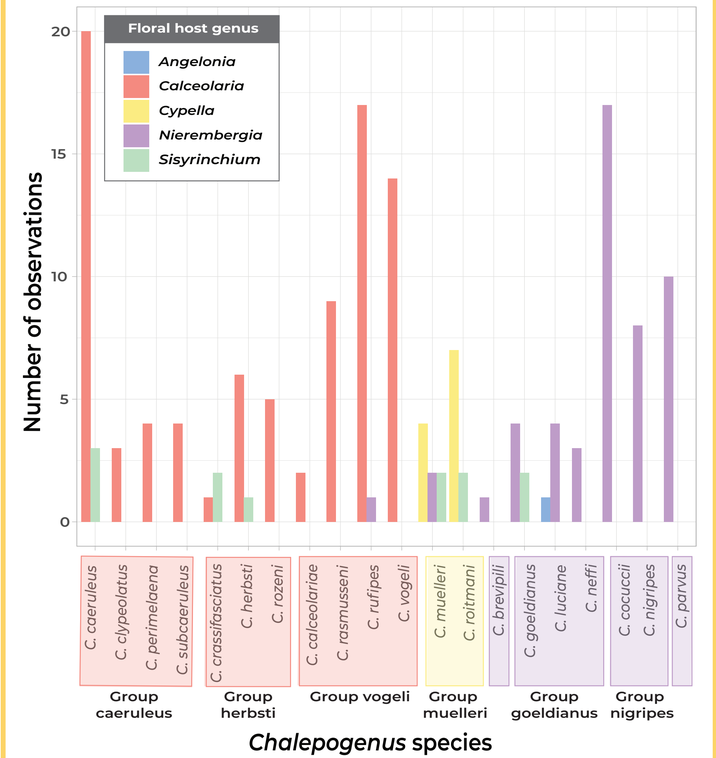
Conclusion:

The current taxonomic groups of *Chalepogenus* reflect their floral and climatic preferences, with some of the groups (muelleri and herbsti) displaying distinct preferences.

The morphological groups that visit *Calceolaria* are also the only ones occurring in the Andean region, and closer to the Pacific coast, while species specialized on *Nierembergia* occupy the southern South American grasslands.

Future work will include resolving the phylogeny of the genus and testing these ecological factors in an evolutionary framework.

Floral preferences: correspond to groups



References: 1. A.Roig-Alsina, Rev. Mus. Argentino Cienc. Nat. 1, 67–101 (1999). **2**. S. Vogel, Ölblumen und ölsammelnde Bienen, vol. 7. **3**. A.Sérsic, Stapfia. 82, 1–121 (2004). **4**. A.Cocucci, Plant Syst. Evol. 174, 17–35 (1991). **5**. D. Karger et al., Sci. Data. 4, 1–20 (2017).

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