# More specialized species with single generations have larger brains

Despite the increasing understanding of the insect brain, it still remains unknown which selective pressures are responsible for its evolution. In this study, we investigated which ecological and life-history factors might have shaped brain size evolution in bees. To do so, we built a unique dataset of 93 species of bees sampled in North America and Europe and used phylogenetically informed correlations and evolutionary reconstructions to elucidate which factors might explain current variation in brain size. First, our results show that brain size in this taxon is constrained primarily by body size. However, further changes in relative brain size can be explained be explained by different life-history and ecological strategies: more specialized species with single generations had larger brains – relative to body size - than generalists and multi-generation species. In contrast, other proposed causes, like the degree of sociality, were not related to brain size, suggesting that the selective forces that influence brain size might not be the same across different taxonomic groups. These results constitute a huge advance as brain evolution has been seldom studied in insects, and never with such comprehensive sample sizes within a well-defined ecologically important taxon.

**Fig. 1.** A female of an early bumblebee (*Bombus pratorum*) feeding on a sunset foxglove (*Digitalis obscura*).
Photo credit: Curro Molina.

**Reference:**

Sayol, F., Collado, M.A., Garcia-Porta, J., Seid, M.A., Gibbs, J., Agorreta, A., San Mauro, D., Raemakers, I., Sol, D., Bartomeus, I. (2020) Feeding specialisation and longer generation time are associated with relatively larger brains in bees. *Proc. R. Soc. B* 20200762

**Link to the study**:

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