Molecular analysis of speciation genes

2 M.Sc. studentships

Petunia exserta is pollinated by hummingbirds

Petunia axillaris is pollinated by nocturnal hawkmoths

Petunia exserta is a rare species, found only in few sandstone towers in south-eastern Brazil. *P. exserta* is closely related to *P. axillaris*, which is a common weed in Argentina, Uruguay and Brazil. The two species are partly reproductively isolated, but hybridization with *P. axillaris* remains a major threat to P. exserta and may drive the species to extinction.

P. exserta flowers are red, produce no odor and have exserted stigmas. In contrast, *P. axillaris* flowers are white and strongly scented, and the relative position of anthers and stigma is different. The flower phenotypes of the two species reflect the difference in their reproductive biology. *P. exserta* is pollinated by hummingbirds while *P. axillaris* is pollinated by nocturnal hawkmoths. We have crossed the two species in the laboratory and are studying the genes that cause the difference in flower phenotype. The project will study how *P. exserta* lost its fragrance, how it regained its red color, and how these traits affect pollinator preference.

Methods

- Classical genetics, QTL mapping
- Phenotypic analysis by gas chromatography and mass spectrometry
- Molecular genetic analysis of candidate genes
- Animal behavior experiments
- Field work in South America

Literature

1. Stuurman, J., Hoballah, M.E., Broger, L., Moore, J. and Kuhlemeier, C. Dissection of floral pollination syndromes in Petunia. Genetics 168: 1585-1599 (2004).
2. Galliot, C., Stuurman, J., and Kuhlemeier, C. The genetic dissection of floral pollination syndromes. Curr. Op. Plant Biol. 9: 78-82 (2006).
3. Hoballah, M.E., Gübitz, T, Stuurman, J., Broger, L., Barone, M., Mandel, T., Dell'Olivo, A., Arnold, M., and Kuhlemeier, C. Single-gene mediated shift in pollinator attraction in Petunia. Plant Cell (2007)

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