

Galen, C. and Butchart, B. 2003. Ants in your plants: effects of nectar-thieves on pollen fertility and seed-siring capacity in the alpine wildflower, *Polemonium viscosum*. *Oikos* 101: 521-528. Very interesting methods (involving a moat around a 'flower island')! Ants secrete a compound that inhibits pollen hydration. Evidence for a negative effect on male fitness due to ant interaction with pollen.

Goulson, D., J.C. Stout, S.A. Hawson, J.A. Allen. 1998. Floral display size in comfrey, *Symphytum officinale* L. (Boraginaceae): relationships visitation by three bumblebee species and subsequent seed set. 1998. *Oecologia* 113: 502-508. Not really much about nectar robbing, except identifying the particular nectar robber of plant species, but it will come up in keyword searches. Can ignore for the most part.

Irwin, R.E. and A.K. Brody. 1998. Nectar robbing in *Ipomopsis aggregata*: effects on pollinator behavior and plant fitness. *Oecologia* 116: 519-527. Very dense methods, but seemingly thorough body of work on this particular system (see next four papers below). Found negative effects on plant fitness (lower fruit and seed set) and visitation rate.

Irwin, R.E. and A.K. Brody. 1999. Nectar-robbing bumble bees reduce the fitness of *Ipomopsis aggregata* (Polemoniaceae). *Ecology* 80(5) 1703-1712. Tests both male and female fitness. Evidence for reduced fitness for both. As above, methods very intensive. Uses low and high levels of nectar robbing to control experiments instead of robbed and unrobbed.

Irwin, R.E. 2000. Hummingbird avoidance of nectar-robbled plants: spatial location or visual cues. *Oikos* 91: 499-506. Shows that hummingbirds definitely avoid plants with higher levels of nectar robbing. Was not able to determine how, but rules out a number of visual cues.

Irwin, R.E. and J. E. Maloof. 2002. Variation in nectar robbing over time, space, and species. *Oecologia* 133: 525-533. Comparison of nectar robbing levels between four species of plants. Found high variation between species and within species over time and space. Findings may have implications on floral trait selection.

Irwin, R.E. 2003. Impact of nectar robbing on estimates of pollen flow: conceptual prediction and empirical outcomes. *Ecology* 84(2) 485-495. Had the most difficult in interpreting this last paper. Although there was evidence for a positive effect due to possible outcrossing, author insists that this effect is outweighed by

reduced pollinator visits. I was not entirely convinced that there was no bias in the discussion.

- Inouye, D. W. 1983. The ecology of nectar robbing. Pages 153-173 in B. Bentley and T. Elias, editors. The biology of nectarines. Columbia University Press, New York, New York, USA.** Essential reading for the topic of nectar robbing. Outlined here are all of the work done up to this point. A good place to start.
- Inouye, D. W. 1980. The terminology of floral larceny. Ecology 61(5) 1251-1253.** Start here. A quick overview of terms. Makes reading subsequent papers much easier.
- Kudo, G., T. Maeda and K. Narita. 2001. Variation in floral sex allocation and reproductive success within inflorescences of *Corydalis ambigua* (Fumariaceae): pollination efficiency or resource limitation? Journal of Ecology 89: 48-56.** Gets hits on keyword searches for floral larceny, but not very useful.
- Lara, C and J. Ornelas 2001. Preferential nectar robbing of flowers with long corollas: experimental studies of two hummingbird species visiting three plant species. Oecologia 128: 263-273.** Interesting paper on possible pressure on plants to maintain a certain corolla length. Maybe a paper to explore future work?
- Maloof, J.E. and D.W. Inouye. 2000. Are nectar robbers cheaters or mutualists? Ecology 81(10) 2651-2661.** Excellent review of work before 2000. Highly recommended as an initial read to understand basic questions that have been explored and what possible future work may help to gain a deeper understanding of nectar robbing behavior.
- Maloof, J.E. 2001. The effects of a bumble bee nectar robber on plant reproductive success and pollinator behavior. American Journal of Botany 88(11): 1960-1965.** Very cool methods. Controls nectar robbing using commercial bumble bee colonies to remove possibility of human scent marking of flowers. Tests female fitness. Found no negative effects, and nectar robbers were not pollinating.
- McDade, L.A., and S. Kinsman. 1980. The impact of floral parasitism in two neotropical hummingbird-pollinated plant species. Evolution 34(5): 944-958.** Classic paper. Cited by nearly every paper I read. Not particularly convincing, but one of the first to do any experimentation on the change in nectar levels due to robbing.
- Navarro, L. 2000. Pollination ecology of *Anthyllis vulneraria* subsp. *vulgaris* (Fabaceae): nectar robbers as pollinators. American Journal of Botany 87(7): 980-985.** More of a pollination paper than thorough exploration into the effect of nectar robbing (no experiments per se, and therefore no control). Found a positive effect, but also observed nectar robbers pollinating.

- Navarro, L. 2001. Reproductive biology and effect of nectar robbing on fruit production in *Macleania bullata* (Ericaceae). *Plant Ecology* 152: 59-65.** Again, more convincing as a pollination ecology paper than a nectar robbing paper. Found a negative effect.
- Roubik, D.W. The ecological impact of nectar-robbing bees and pollinating hummingbirds on a tropical shrub. *Ecology* 63(2): 354-360.** Much cited in recent literature. Early paper giving evidence for negative effects of nectar and pollen robbing. Nectar robber exhibits aggressive behavior toward pollinator.
- Stout, J.C., J.A. Allen and D. Goulson. 2000. Nectar robbing, forager efficiency and seed set: Bumblebees foraging on the self incompatible plant *Linaria vulgaris* (Scrophulariaceae). *Acta Oecologica* 21(4-5): 277-283.** Found neutral effect of nectar robbers on plant. Found long-tongued bees to be the legitimate pollinator and short-tongued bees to be the nectar robbers consistently. Discussed possibility that the high abundance of both pollinators and nectar robbers could account for effects. Convincing paper.
- Traveset, A., M.F. Willson, and C. Sabag. 1998. Effect of nectar-robbing birds in fruit set of *Fuchsia magellanica* in Tierra Del Fuego: a disrupted mutualism. *Functional Ecology* 12: 459-464.** Often cited in the more recent literature. Authors found a negative effect on fruit set. The most interesting part of this investigation was that the authors also measured nectar robbing levels in rare flower morphs of this plant. Found evidence for lower nectar robbing on rarer flower morphs. Evolutionary implications?
- Utelli, A., and B.A. Roy. 2001. Causes and consequences of floral damage in *Aconitum lycoctonum* at high and low elevations in Switzerland. *Oecologia* 127: 266-273.** Interesting idea. Not very convincing, however. Investigating 4 separate populations to include abiotic effects of plant fitness to better understand the effect of the nectar robber. Turns out lower elevation populations had high damage due to beetles. No evidence for any effect of nectar robbers at high elevations.