

Long-term studies of solitary bees

What the euglossines are telling us

David W. Roubik
Smithsonian Tropical Research Institute; Balboa, Republic of Panama

Workshop on Solitary Bees: Conservation, Rearing and Management for
Pollination

Beberibe, Ceará April 26-30, 2004



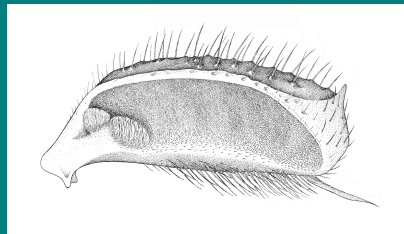
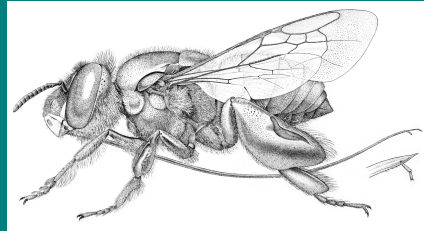
Baiting is the key method



Long-term commitment is also important

The Historical Perspective

- Studies in Panama (1954-2004)
- Taxonomic progress
- Chemical components of orchid and aroid fragrances that attract male euglossines
- User/loser friendly multipurpose bees



The Community Perspective

- *How effective ARE baiting studies?*
- *How many species?*
- *How diverse?*



Euglossine bee communities in five Neotropical forests
(In each site, a few euglossine species do not come to any bait.)

No. individuals, spp.	Baiting*	Locality	No. Species est. S.D., max**	Simpson D_S §
21,842, 44	56, 16, 365	PAN: BCI	44, 0; 44 (49)	0.853
2418, 38	26, 8, 365	BR: Manaus	39, 2; 43	0.837
1121, 43	18, 5, 6	EC: Yasuní	46, 3; 52	0.912
951, 30	4, 5, 5	BO: Madidi	38, 6; 50	0.829
200, 27	1, 5, 1	CR: Las Cruces	37, 5; 47	0.924
195, 33	2, 5, 2	PAN: Santa Rita	39, 2; 43	0.945

*No. baiting days, No. different chemicals employed, and period performed (days)
 **Chao estimate of total species; given by $S_{est} = S_{obs} + (a^2/2b)$, where a = species observed only once, b = species observed only twice, S = total species (estimate observed).
 The SDev is derived from variance, given by $V_{est} = b [a/b/4 + (a/b)^3 + (a/b)^2/2]$; Southwood and Henderson 2000
 § Simpson Diversity, unbiased estimator; given by $D = (N/N-1) (1 - \sum f^2)$, where f is the frequency of individual species in a collection of N individuals; Lande et al. 2000.

The Ecological Perspective

- *What is a pollination niche?*
- *How do they arise?*
- *Where do the participants come from?*
- *Niche taxonomy?*



