

# Effect of Length of Sampling Period on Numbers of Bees Captured

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## *Introduction*

Bee researchers have suggested that in many sites there are distinct morning and afternoon communities of bees. In developing a protocol for sampling bees using pan traps, we decided to sub-sample in time. We determined that it was critical to start by 9:00 am and suggested that pan traps (bowls) be picked up after 3:00 pm. By deciding to use this sampling regime, we recognized that we would miss early morning or early evening flying bees.

In this report, we compare the abundance of bees caught using a limited sample (9:00 am -5:00 pm) versus the abundance of bees caught in a 24 hour period.

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This study investigates the effect of duration of sampling and of the distance between bowls on the abundance and diversity of bees captured. We try to determine what distance and what sampling duration is the most appropriate for maximum capture rate and yields the most cost-effective sampling.

## **Methods:**

Bees were captured using 6 oz Solo brand bowls painted with Krylon brand fluorescent yellow. Each bowl was filled with soapy water. Approximately 1 tablespoon of Dawn dishwashing liquid was added to a 3-gallon jug of water and that mix distributed to bowls in the field. On each sampling day we set out two transects of 10 bowls. Bowls were placed on the ground 5m apart within a uniform habitat. Bowls were left out in the field for either 24 hours ("24 hours") or set out prior to 9:00 a.m. and picked up after 5:00 pm ("banker's hours"). Treatments were alternated regularly within the transect. We calculated the average number of bees / pan trap per treatment. We analyzed the data as a paired t-test using SPSS using transect acted as the subject in the analysis. We replicated this experiment six times from early April until late May 2003. A preliminary power analysis indicated that a sample size of 6 replicates was necessary to detect a 20% increase in number of bees / pan trap, with an Alfa level of 0.5 and power = 0.8. A sample size of 8 is needed to detect a 10% increase (1-sided t-test).

### Study Area:

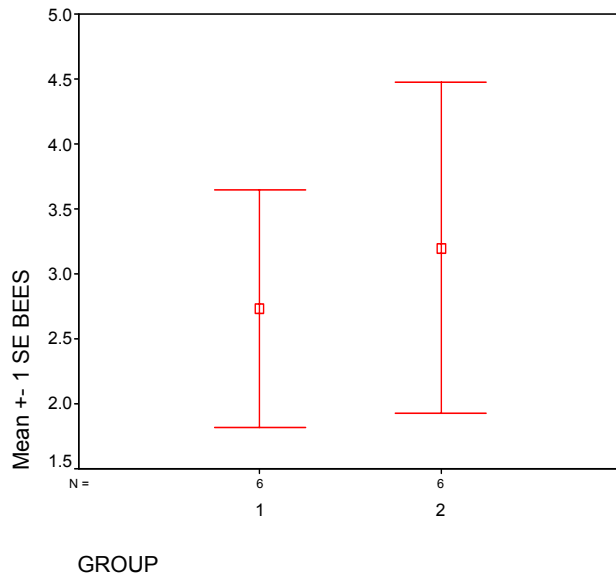
Sampling was conducted at Glen Canyon Park in San Francisco, California, U.S.A. Elevations in Glen Canyon Park range from approximately 100m to 200 m above sea level. We conducted most of the sampling on the steep eastern slope of the Canyon, which houses a grassland community, because we observed the greatest abundance of bees in this area of the park. While annual European grasses dominate the community, native wild flowers including *Escholzia californica* (California Poppy), *Sisyrinchium bellum* (blue-eyed grass), *Sidalceae malvaeflora* (checker-bloom) and *Wyethia angustifolia* (mule's ear) are strongly represented. Native Lupines are also very common. Other important plants found on the eastern slope include *Toxicodendron diversilobum* (poison oak), *Baccharis pilularis* (coyote brush), *Mimulus aurantiacus* (sticky monkey flower), and *Scrophularia californica* (California bee plant). Native bees in Glen Canyon Park commonly visit many of these flowering plants.

### Results:

There paired t-test indicates there was no significant difference in the number of bees caught per bowl between the banker's hours and the 24 hour treatments.

Table T-test on number of bees caught per bowl on transects set out 24 hours vs. banker's hours

	n	Mean	Std. Error	df	t	Sig. (1-tailed)
Banker's hours	6	2.33	0.65			
24 Hours	6	2.9	1.21			
<i>t</i> -test				5	-0.698	0.26



Group 1 = Banker's hours; Group 2 = 24 hours treatment