

- square of tissue paper, and the ants that were attracted were collected after 4 hours.
11. Cassava flour bait (24-hour). As in (10), except that the baits were inspected after 24 hours.
  12. Sugar bait (4-hour). A small amount of dilute sugar solution was placed on a square of tissue paper, and the ants that were attracted were collected after 4 hours.
  13. Sugar bait (24-hour). As in (12), except that the baits were inspected after 24 hours.
  14. Orange peel bait (4-hour). A small piece of orange peel was placed on a square of tissue paper, and the ants that were attracted were collected after 4 hours.
  15. Orange peel bait (24-hour). As in (14), except that the baits were inspected after 24 hours.
  16. Dead wood inspection. A rotting branch near the sampling point was cut open and the ants within were collected.
  17. Dried cocoa pod inspection. A rotting cocoa pod near the sampling point was cut open and the ants within were collected.

A number of additional sampling methods were used to collect ants from other strata in the plantation. These included chemical knock-down and beating of trees, meat and sardine baiting in trees, inspection of dried cocoa pods on trees, inspection of fallen epiphytic bromeliads, and direct observation over fixed time intervals. The ant collections resulting from these methods are outside the scope of this chapter and will be reported in a subsequent publication.

### Extended Sampling Experiment

To investigate the effect of number of samples on the number of species obtained, an extended set of soil and litter samples were collected in a nearby plantation of 60-year-old cocoa. This area differs from the 20-year-old plantation described previously in two important ways:

(1) the cocoa is grown in a less “manicured” way, is shaded by around 15 species of native overstory rainforest trees, and thus constitutes a more structurally diverse habitat than the 20-year-old plantation; and (2) no pesticides have been applied to it for 30 years. In this plantation, 500 Winkler extractions were collected from 1-m<sup>2</sup> samples of litter taken from randomized points in a 0.87-ha area.

### Sample Size Experiment, 60-Year-Old Brazilian Cocoa Plantation

To investigate the influence of litter sample size on the number of species obtained, a set of samples was taken from the same 60-year-old plantation described previously, but using different litter sample sizes. Samples of 0.01 m<sup>2</sup>, 0.04 m<sup>2</sup>, 0.25 m<sup>2</sup>, and 1 m<sup>2</sup>, each replicated 20 times, were collected and extracted by Berlese funnels over 24 hours. An identical sampling regimen using Winkler extraction methods was also undertaken, except that additional samples of 2 m<sup>2</sup> were also taken.

### Data Analysis

All ants from each experiment were initially sorted to the level of morphospecies, then identified to genus and, where possible, to species. For each sampling method, we constructed a matrix of individual ant species by individual samples and determined the frequency of each species in the samples. Standard diversity analyses were then carried out on the resulting data sets. See Chapter 13 and Magurran (1988) for additional background on the statistical analyses described in this section.

The incidence-based coverage estimator (ICE) (Lee and Chao 1994; Chazdon et al. 1998) and the first-order jackknife estimator (Heltshe and Forrester 1983) are nonparametric approaches for estimating species richness in the local community from which the samples were taken, that is, for estimating how many