

method did not necessarily add new species to the total census, although for particular methods, species that were rarely collected by one method were common in another.

Considering that the study area was sampled by 17 different methods and that a relatively large number of samples was taken, the total species count probably represents a nearly complete census. This conclusion is additionally supported by an asymptote value of 136.4 species (Fig. 10.1r) for the curve for all methods combined, which implies that the combination of 54 samples from all 17 methods obtained 98.3 percent of the asymptote.

Extended Sampling Experiment

The species-accumulation curves for the 500 Winkler extraction samples are shown in Fig. 10.2. As above, this graph also shows ICE, jackknife, and M-M estimators of species richness based on successively larger numbers of samples. The agreement between the predicted M-M asymptotic value and the actual maximum value encountered in the 500 samples is shown in Table 10.3. This table also shows the ICE and jackknife asymptotes, as well as the predicted percentages of the M-M asymptotic value that would be obtained if 10, 20, 30, 40, 100, 200, 300, 400, and 500 samples were taken.

If we were to compare the M-M asymptote value of 136.4 species for this extended sampling experiment (carried out in the 60-year-old cocoa plantation) with the asymptote value of 69.5 species obtained for only the Winkler extraction samples from the sampling methods experiment (carried out in the 20-year-old cocoa plantation), we might be led to conclude that ant species richness is higher in the 60-year-old cocoa plantation. In fact, this disparity is probably an artifact of the greater number of Winkler extraction samples that were taken in the extended sampling experiment, in which an average of 67.7 species was collected with 54 pooled samples. This value is quite close to the

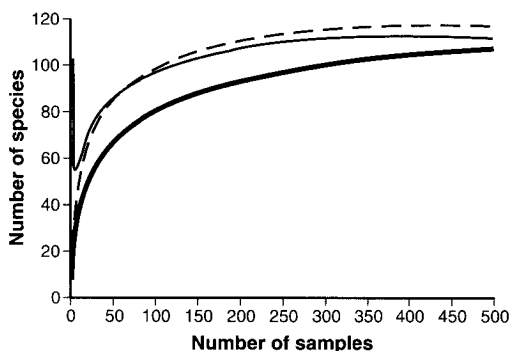


Figure 10.2. Assessment of Winkler sampling methods in Brazil. Lines follow the same convention as in Fig. 10.1.

observed total of 63 species for 54 Winkler sack samples in the sampling methods experiment. When the species-accumulation curve for the 54 Winkler sacks in the sampling methods experiment is extrapolated out to 500 samples using the logarithmic equation of Soberón and Llorente (1993), 109.9 species are predicted. This is also quite close to the 107 species observed in the extended sampling experiment. But perhaps the most telling argument against a significant difference in species richness between the 20- and 60-year-old plantations is the similarity in richness estimates of 134.6 species for the former (based on all sampling methods combined) and 136.4 for the latter (based on the full complement of 500 Winkler extraction samples). It is particularly noteworthy that the first 100 samples yielded over three-quarters of the species that were ultimately sampled by this procedure, and that the last 200 samples yielded very few additional species.

Sample Size Experiment

For both the Berlese funnel and Winkler sack samples, number of individual ants, total number of ant species, and mean number of ant species per sample generally increased with increasing litter sample size. However, although