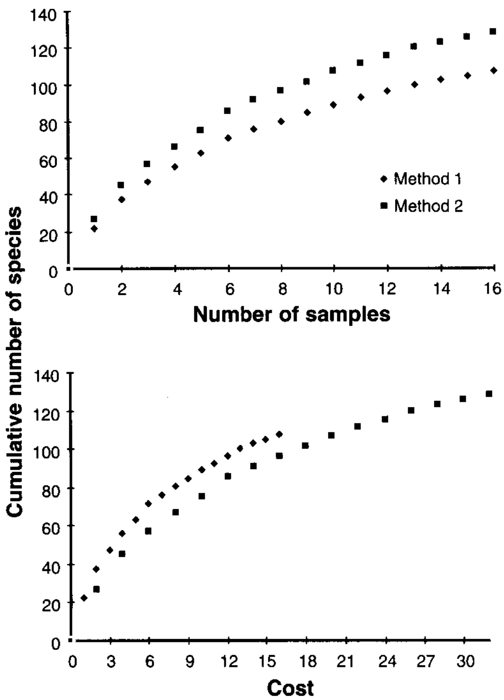

Figure 13.4. Comparing methods that differ in cost. Method 2 may appear more efficient based on number of samples (upper figure), but if method 2 samples cost twice as much as those for method 1, it is actually less efficient (lower figure).

species-accumulation curves are quite similar, showing that one habitat is not especially more productive of ant species new to the inventory than the other (Fig. 13.3). The combined curve is not steeper than the within-habitat curves, and so if only 8 samples are to be taken there is no advantage to stratifying by forest age.

Comparing methods is somewhat problematic. One can apply the method described earlier, comparing combined and separate species-accumulation curves. However, if the samples differ greatly in some measure of cost, then comparing species-accumulation curves based on number of samples may be meaningless. To compare the inventory efficiency (the steepness of the species-accumulation curve) of different methods, a common currency should be used. Ideally that currency is the direct monetary cost of each sample. Instead of plotting cumulative species against number of samples, plot cumulative species against the cost of obtaining them (Fig. 13.4). Calculate the cost by multiplying the number of samples by the average cost per sample. Proxies of direct monetary cost, such as sample processing time or number of mounted specimens, may also be used (Longino and Colwell 1997).

Is One Group of Samples More Diverse Than Another?

To answer this question, one must first define "diverse." Magurran's review (1988) is a full and highly readable treatment of ecological diversity and its measurement. A graphical depiction of ecological diversity is a rank abundance plot (Fig. 13.5). All the species in a sample are ranked from most abundant to least abundant. Each species has a rank (1 = most abundant species, 2 = second most abundant species, and so on), which is plotted on the horizontal axis, and an abundance, plotted on the vertical axis. Two separate features of this curve are considered components of diversity: (1) the total length of the curve, meaning the number of species in the sample, and (2) the evenness in abundance, meaning the general steepness of the slope going from most to least abundant species. More even distributions (shallower slope) are defined as more diverse.

Numerous measures of diversity somehow reduce this distribution to one number, being variously influenced by species richness, species evenness, or both. In spite of a voluminous literature directed at the development of diversity indexes, many ecologists believe they have failed to add much to our understanding of community ecology. It is difficult to claim that a diversity value is an estimate of a community parameter, one that can be compared to similar