only in the field or planted edge. These ant assemblages can be used to monitor ant communities in these different land uses and to detect further changes, even if fairly subtle, in habitats and their microclimates.

Amazon

In the Brazilian Amazon, ground-dwelling ants were collected in three 1-ha forest fragments, in three 10-ha fragments, in two 100-ha fragments, and in one continuous forest area. In each of these nine fragments a 1-ha plot was delimited and, within this, a total of 36 sampling points, distributed at intervals of 20 m, were established. Three methods of ant sampling were used: litter extraction, pitfall traps, and soil samples.

Of the three methods, litter sampling was the most efficient in terms of the number of species collected. The mean number of species collected per plot was significantly greater in the litter than in the pitfall traps and soil, whereas the number of species collected in the pitfall traps was greater than that in the soil (ANOVA, $F_{2,16} = 29.87$, $P < 0.001$; Table 15.3). Although the number of species recorded per fragment was greater in the litter samples than in the pitfall traps, the total number of species recorded by each of these two methods in all nine forest plots studied was quite similar, and both yielded greater numbers than collections from the soil samples (Table 15.3). Litter sampling was also the best method to predict overall ant species richness (number of species collected using the three methods combined) in each of the study plots.

The number of species that were unique to each method ranged from 20 to 43 species, a number that usually represented more than 20% of all species collected by that method (Table 15.3). This observation indicates that these methods are complementary. Their use in combination, therefore, better characterized the ant fauna of the fragments. Species of Cerapachyinae, for instance, were recorded mostly in the soil samples, whereas those in the Ecitoninae were mostly recorded in the pitfall traps. On the other hand, many Myrmicinae were only recorded in the litter samples (Table 15.3).

Table 15.3 Number of Ant Species Collected Using Three Different Sampling Methods in Forest Fragments near Manaus, Brazil

Subfamily	Litter Samples	Pitfall Traps	Soil Samples
Myrmicinae	96	82	53
Ponerinae	33	36	33
Formicinae	11	12	12
Dolichoderinae	3	5	0
Ecitoninae	1	5	1
Cerapachyinae	2	0	5
Pseudomyrmecinae	1	2	0
Leptanilloidinae	0	0	2
Total (unique)	147 (43)	142 (39)	106 (20)
Mean ± SD	54.2 ± 11.6	45.7 ± 7.9	30.3 ± 5.6

No consistent changes in species diversity were found in response to variations in fragment area. It must be stressed, however, that these results reflect a lack of relationship between the *density* of ant species (number per unit area) and forest area, not in overall species *number* and forest area, as the latter relationship is clearly positive and significant. Within two of the three sites studied, the density of ant species increased as forest area increased, whereas in the third site the opposite trend was found. Differences in the history of fragment isolation (resulting in different matrix habitats) may have accounted, at least in part, for these conflicting results (Vasconcelos and Delabie 2000).

Ordination of the study plots according to their similarities in species composition indicated that forest fragmentation does affect the composition of the ground-dwelling ant community. A "site effect" on species composition was also detected, indicating some degree of