

CONCLUSIONS

Netting appears to be the most severely limited method for obtaining absolute density estimates of resident birds in a deciduous forest. The placing and tending of the nets requires considerable effort and man-hours, and the cost of nets and other equipment and possibly additional personnel for extensive studies, makes this approach the most expensive (Table 6). Compared to the effort involved, the sample size is very small (Figure 7), and the resulting data may be inaccurate due to differential susceptibility of species to net capture or to net shyness, as well as all the other general limitations of mark and recapture techniques. Some behavioral idiosyncracies of different species can be overcome by placing nets at higher levels in the forest, but this would add proportionally greater time and cost. The considerable effort involved in netting puts severe limitations on the number of nets, that can be used, and thus also limits the size of the area than can be sampled. Applied to species with large or overlapping territories, such small sample areas may yield overestimates of densities. Netting does, of course, offer some advantages, such as opportunities to obtain age information and physiological data, and if the area sampled is large enough, territory limits can be defined, but for the majority of investigators, netting

appears to be limited in application to sampling populations for relative abundance and to banding.

Grid censusing, intended in this study to be used for intensive and essentially complete coverage, also requires considerable time in the initial preparation of the study area. Since a number of repetitions would be required to derive a mean or optimal number of detections per census on which to base a density, the amount of time used in the actual censusing would also be substantial. In addition, as seen in Figure 7, the amount of effort per detection made was greater for grid censusing than for transects. The grid method also shows a greater variability in census to census totals than the transect (Figure 7). For the most abundant species within the study area, significantly larger densities were obtained by grid censusing than by transect. This discrepancy may be a function of both increased accuracy due to the thorough nature of the grid method and to the doubling error problem discussed previously. Species of lower sample size all showed grid densities smaller than the transect values.

The primary advantage of the grid census is that it can, if applied over a sufficiently large area with enough repetitions, provide the most accurate density values. In addition, the grid plots may be used to determine actual territory sizes. However, due to the large amount of

time involved in preparation and censusing, this method is impractical in many situations, particularly where more general ecological studies are undertaken and effort must be devoted to other groups in addition to birds.

The results of this study do not provide substantial proof of the superiority of the accuracy of the transect method in determining absolute densities. An equal number of species for both methods compare favorably with the Audubon Breeding Bird Census control densities (Table 7). However, from a number of standpoints, the transect is decidedly more effective. First, it is the least time-consuming. No preparation of the study area is required other than familiarization with the route to be utilized and with the species which will be encountered. Also, once standardized Coefficients of Detectability have been established, a minimal number of repetitions would be required. Even for situations for which no C.D. value has been established, the transect may be the most effective method, as was the case in this study. The transect method yielded a greater number of detections per unit of effort as well as less variability than the grid approach. (Figure 7, Table 7, Table 8). And finally, this method makes optimum use of auditory cues, which Colquhoun (1940) characterizes as the most important aspect of conspicuousness in the woodland community.