Cover crop, intercrop and manure residues can help protect the soil from erosion, as well as increase organic matter content and water retention, and the efficiency of N use (Karlen et al., 1992). Crop diversity may improve soil quality by increasing the amount, quality and diversity of residues returned to the soil, and by lengthening the time that roots are actively growing in the soil.

Many believe that the robustness of agricultural systems can be improved by imitating natural ecosystems; however, little information has been gathered on crop and residue diversity or its impact on soil quality. Much opportunity exists in Michigan for increasing crop diversity within the traditional corn-based (Zea mays L.) system. Knowledge of physical, chemical, and biological measures of soil quality will serve as a base for recommendations and accelerated adoption of increased crop diversity.

**APPROACH**

Farmers worked cooperatively with researchers to select matched field sites for comparisons of low and high diversity cropping systems. Cropping history, including manure application, was obtained for the 4-yr period prior to soil evaluation. Final site selection for paired comparisons was based on cropping history as well as similarity in topography, aspect, soil type, and distance between paired sites (Table 19–1). A corn field immediately adjacent to the Living Field Laboratory (Kellogg Biological Station, Hickory Corners, MI) was used as a control for the study.

The number of residue sources was determined by considering each crop, cover crop species and manure application. For example, continuous corn for 5

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