ABSTRACT

Studies were carried out on Cunupia Clay Soil (Tropical Inceptisol) in Trinidad to investigate the influence of different tillage practices in combination with field layout on wet season production of maize (*Zea mays L.*) and Cowpea (*Vigna unguiculata(L) Walp*) in two seperate experiments. The first experiment involved three tillage systems and two field layouts for the production of maize and Cowpea. The three tillage systems were: disc ploughing and harrowing (twice), disc ploughing and harrowing and rototilling and disc ploughing and rototilling. The field layouts were: ridge and furrow, and flat bedding. These tillage and field layouts did not show any appreciable variation in the yield of maize or cowpea. The various treatments had little or no effect on soil moisture, bulk density, shoot and root growth as well as total uptake of NPK in the leaves of both maize and cowpea. A high positive correlation (r=0.98) was found between yield of both maize and cowpea and dry matter.

The second experiment involved the effect of conventional and reduced tillage systems on maize production on cambered beds. The tillage systems were compared for two growing seasons of continuous maize. In the first growing season (i.e. major rainy season planting) the tillage systems compared were conventional, minimum and zero-tillage. Conventional tillage yields averaged 5.62 t/ha which was 65.8 per cent and 76.3 per cent greater that the zero-tillage and minimum tillage yields respectively. In the second growing season (i.e. minor rainy season planting), the conventional tillage plots were converted to zero-tillage treatment and designated (ZT_2). The minimum tillage was converted to conventional tillage and designated (CT_1) while the zero-tillage treatment in the first growing season

was maintained and designated (ZT_1). The yields recorded in the second growing season for the three tillage systems were not statistically different. The yield was lower in the major rainy season because of excess moisture, poor root growth, inefficient fertilizer uptake and possibly poor aeration. All treatments responded to increased N fertilization in the minor rainy season. The increased yields with N fertilization were, however, not statistically different. The yield response to increased N fertilization was 7.37 t/ha for zero-tillage plots, 10.83 t/ha for minimum tillage and 3.75 t/ha for conventional tillage plots. The effect of tillage was evident from the higher soil bulk density, shorter plant height and higher moisture content on zero-tillage plots compared to conventional tillage treatments. Plant height, dry matter and root dry weight correlated well with the grain yield of maize and are therefore good indications of grain yield.