values were low in May (0.7), increased to a peak of 0.97 in July, and dropped to 0.85 in September. The shape of this k_c' curve is similar to that of an annual crop as it goes through its growth and maturity stages. Turfgrass k_c' was more constant because of its annual growth pattern. In the summer months, k_c varied from 0.85 in April and September to a peak of 0.92 in June and July. Winter k_c for pasture dropped to 0.45 in January.

The corn ET data in Figure 5 were divided by Penman ET_p data from Milton, Florida, to obtain corn k_c'. The corn growing season for those data extended from April 21 through August 15 (Doss et al. 1962). The resulting data were plotted in Figure 11. The k_c' and k_c for corn started the season at about the same values of 0.42. The peak k_c' of 1.23 was larger than the peak k_c value of 1.08. However, the k_c' curve lagged behind the k_c curve for about 10% of the growing season, or about 12 days.

4.0 APPLICATION OF POTENTIAL EVAPOTRANSPIRATION CONCEPTS TO IRRIGATION MANAGEMENT

4.1 IRRIGATION TO PREVENT CROP YIELD REDUCTIONS

Assuming that other factors, such as fertility levels, pest or disease activity, and climatic parameters, are not limiting, crop growth and yield are maximized by maintaining optimum soil water content throughout the growing season. Optimum soil water content for plant growth is normally that near field capacity, such that capillary water potentials are high and water can readily be removed from the soil by plants, yet not so high that gaseous diffusion in the soil is restricted.

Many researchers have shown that crop dry matter production is directly related to water use by the crop throughout its growth cycle (Briggs and Shantz, 1914; Staple and Lehane, 1955; Allison et al., 1958; Chang, 1968; Tanner, 1981; Tanner and Sinclair, 1983; deWit, 1958; Stanhill, 1960; Viets, 1962; Arkley, 1963; Chang et al., 1963; Hanks et al., 1969). On the other hand, it has been found that for grain and fruit yields, sensitivity to drought varies with physiological growth stage (Hiler and Clark, 1971; Sudar et al., 1981). These yield relationships are discussed under separate subheadings in the following sections.

4.1.1 Dry Matter Yield

Dry matter yield was related to cumulative transpiration by deWit (1958) as

$$Y = \frac{K_m C T}{E_o} \tag{21}$$