CHAPTER 10C

Soil Management for Efficient Water Use: Soil-Profile Modification Effects on Plant Growth and Yield in the Southeastern United States\(^1\)

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I. INTRODUCTION

Since soils in the southeastern United States developed under wide ranges of rainfall amounts, parent materials, lengths of growing seasons, and kinds of vegetation, their varieties in this region are endless. This discussion will be limited to that part of the southeastern United States that lies east of the Mississippi River and in the Atlantic Coastal Plains. This region has most of the agricultural soils of southeastern United States. The Coastal Plains belt is about 240 km wide along the Atlantic seaboard and about 640 km wide in the Gulf of Mexico. The topography ranges from plateaus at low elevations to broad, swampy flats (Buol, 1973).

II. SOIL AND CLIMATIC FACTORS

The abundance of rainfall for plant growth, high temperatures, and soil water leaching are the main factors controlling the development of these soils. Mean annual temperature of the area ranges from 15 to 20°C and mean precipitation ranges from 100 to 120 cm year\(^{-1}\), with erratic distribution during the growing season. Total evaporation potential ranges from 120 to 150 cm year\(^{-1}\) and water deficits occur in some areas, particularly those with sandy soils. The long, hot summers and short, mild winters facilitate rapid rates of chemical, physiological, and biological weathering. Climatic conditions favor high rates of microbial activity, even during the cold season; therefore organic matter is rapidly oxidized, producing much

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