PAK. J. SOIL SCI., VOL. 13 (1-4), 1997

STUDIES ON CROP STAND AND GRAIN YIELD OF MAIZE AS INFLUENCED BY SOIL CRUSTING IN DIFFERENT SOIL SERIES

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ABSTRACT

Experiments were conducted during Kharif 1995 under rainfed condition to study influence of soil crusting on maize crop stand, grain yield and to find out the appropriate method for management of soil crust. The soil series selected were: Guliana, Khaur, Missa, Pir Sabak, Balkassar and Khair. The treatments were: fertilizer, no hoeingfarm yard manure, no hoeing ; fertilizer, mulching, no hoeing; and fertilizer, hoeing. The nutrient content were kept the same in all treatments. The results revealed that soil crust intensity decreased from Khaur, Guliana, Missa, Pirsabak, Balkassar to Khair. The plant population was negatively correlated with soil crust intensity. The soil crusting increased with increase in clay and silt content and decrease in organic matter. The influence of parent materials on soil crust intensity was differential. The grain yield with selected treatments was different within a soil series. The economic analysis showed that hoeing is the best treatment for managing soil crust in Khaur, Gulaina and Misssa soil series; mulching and hoeing are equally good for pirsabak soil series and mulching is best for Balkassar and Khair soil series.

INTRODUCTION

A soil crust in a thin hard layer formed on the surface of the soil due to dispersive forces in the rain drop followed by drying. Due to wetting and impact of rain drops, the soil aggregates slake and soil particles, like clay and silt attached to larger grain get separated and [illegible]

(Sharma and Agarwal, 1980).

Soil crust is affected by its own water content and thickness, rate of drying, rainfall intensity and its duration, soil texture, type of clay (Sharma and Agarwal, 1980).

Soil crust impedes the emergence of young seedlings even when other factors like water, oxygen, soil temperature and planting depth are not limiting. The crust poses a serious hinderance to small seeded crops and inhibits emergence of even large seeded such as corn which normally have strong emergence force (Gerard, 1980). Restriction of seedling emergence take place due to mechanical resistance offered by soil crust to emerging seedlings. If the force of development of young seedlings fall short of the resistance of the soil crust, the seedlings can not push through the soil crust and bending of the seedling take place just beneath the soil crust (Gerard, 1980). A limiting value of soil curst strength inhibiting emergence also depend upon soil water contant. At a given soil crust strength, seedling emergence is low when soil water content is low (Morin *et al.*, 1981).

The soil crust can be managed by providing protective cover (e.g. gross or straw mulch) to soil surface which reduces the intensity of rain drops, decreases soil water