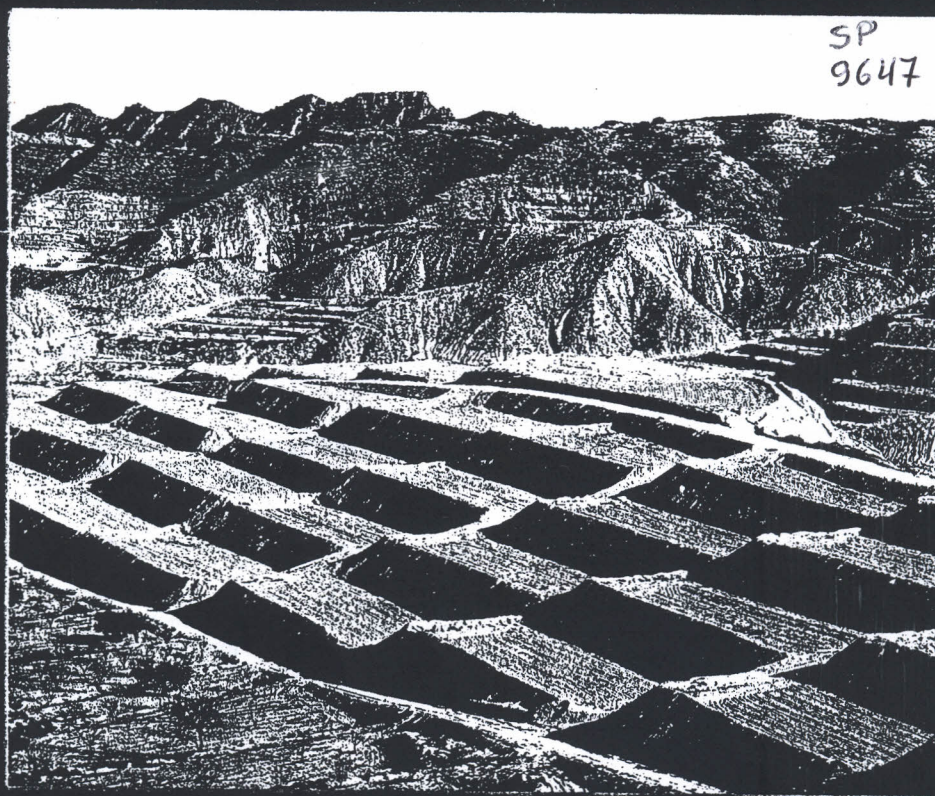


SUSTAINABLE USE AND MANAGEMENT OF SOILS IN ARID AND SEMIARID REGIONS

(Volume II)

Ángel Faz - Roque Ortiz - Ahmet R. Mermut
• EDITORS •



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Effects of the synthetic
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EFFECTS OF THE SYNTHETIC POLYMERS APPLICATION ON THE CHEMICAL PROPERTIES OF SALINE-ALKALI SOIL

Gisbert, J.M.²; Souza, L.¹; Gómez L.D.²; ^{Lopes}Coelho, P.R.¹ and Ibáñez, S.²

1. Embrapa Mandioca e Fruticultura, Caixa Postal 007, 44380-000: Cruz das Almas-Bahía-Brasil.

2. Universidad Politécnica de Valencia. E.T.S.I. Agrónomos. Unidad Docente de Suelos. Cnmo. de Vera s/n.
46.022-Valencia. España.

Introduction

The areas recovery economically no producing is a growing need at present. The most relevant problem in the areas to recover is caused it by salts, especially the content in sodium of the soil.

In this work is studied the effect of the use of two synthetic anionic polymers of the maleic acid, dispersed clay flocculation and stabilizing the aggregates of the soil, according to the common production system in the region where was developed the experiment, planted of cotton. The objective is to recover the chemical saline-alkali soils properties, using synthetic polymers, in levels and systems of application for extensive cultivation.

Material and Methods

The experimental area is located in Lebrija (Seville, Spain), with subtropical Mediterranean climate and soil classified as Entisol and pending <2%; in fallow from toward eight years and is not considerate viable economically for the agrarian development, was subdivided in plots from among 2,400 and 6,000 m².

The treatments were accomplished with two synthetic polymers, "S" (spersal) and "B" (belsperse), used in several levels, with minimal content of 33% of maleic acid (according to the manufacturers, the FMC), 47-53% of solid contents, anionic polymers, pH between 1 and 2, soluble in water and in methanol. They were applied pulverized in the surface of the soil, to field capacity, 30 days before the sowing the first time and after the germination the second. The level of the polymers in l/ha, before the sowing (as) and after the sowing (ds) were: S0: 4(as) and 4(ds); S1: 8(as); S2: 16(as); S3: 26(as); S4: 8(as) and 4(ds); B1: 8(as); B2: 15(as).

The samplings were accomplished in June/96, four months after the application of the polymer, and in March/97, beginning of the preparation for a new sowing. The samples were taken at random within each treatment, accomplishing five repetitions for each one of the depths, 0-25 cm and 25-50 cm. They were analyzed the levels of Ca, Mg, N and K in the saturation extract and in the colloidal complex, being determined of sodium adsorption ratio (SAR), exchangeable sodium percentage (ESP), the electrical conductivity (CE) and the pH of the extract.

Results and Discussion

In June/96 all were saline-alkali soils for the two depths. In March/97, for the depth of 0-25 cm, the S0, S1, S2, S3 and S4 treatments they were not already saline soils neither sodics soils. For the depth of 25-50 cm all the treatments stayed saline-alkali, except S2 that happened to not saline. The SAR values show that there was selectivity between treatments in relationship to the wash of Ca+Mg and of N.

The polymers acted with more efficiency in the depth of 0-25 cm due to great adsorption level to which are submitted are in touch with soil and also by the high clay level of the soil, which makes to reduce the mobility of the polymers.

The crop of the cotton shows that the only treatments that reached the economically viable productivity were S1 and S2, with 2.05 and 2.10 t/ha respectively, what indicates better quality chemistry.

Conclusions

The S1 and S2 treatments reduced the salinity ($CE < 4$ dS/m) and the sodicity ($SAR < 15$) below the limit values in the depth of 0-25 cm, arriving the S2 treatment to decrease the salinity limit between 25-50 cm.

The salts wash of the radical zone of the cotton (0.5 m) was not reached fully, but at the same time that the treatments S1 and S2 they have surpassed the limit productivity of the economic viability of the cultivation.

Is necessary to determine the responsible mechanisms that provoke the pH increase and the increase in the CO_3^{2-} and HCO_3^- levels, in saline-alkali soils, calcareous, treated with synthetic polymers, designing experiences in laboratory that they could eliminate the various interventions from other factors that occur in field.

Other factors, as the rainfall or the intense use of machinery for the preparation of the new sowing, they can have altered the expectations.

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