Comparative Effects of Two Bacterial Growth Preventives, Acid (pH 4) and Rose Bengal Plus Streptomycin, on the Nature of Soil Fungi Developing on Dilution Plates

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A previous study (6) was carried out to determine whether the common acid agar used for estimating numbers and kinds of soil fungi by the dilution plate method could be improved by substituting for the acid other bacterial growth preventives which would not appreciably change the reaction of the medium. Rose bengal alone, as recommended by Smith and Dawson (8), allowed large numbers of bacterial colonies to develop from most soils tested. A combination of rose bengal (1:15,000 to 1:30,000) and streptomycin (30 µ per milliliter of medium) almost completely inhibited bacterial growth in all soils tested and had little effect on the fungi other than that of reducing the size of many colonies. On the basis of ease of identification of the fungi, number and size of bacterial colonies occasionally developing, numbers and kinds of fungi, and the size of the fungus colonies, Waksman's peptone dextrose agar (9) containing rose bengal (1:30,000) plus streptomycin (30 µ per milliliter) was chosen as the best of the media tested for plating soil fungi. The study reported in the present paper was carried out to test this new medium on a relatively large number of soils, and to compare the numbers and kinds of fungi developing on the plates with those growing on the same medium acidified to pH 4 to prevent growth of bacteria and streptomycetes.

METHODS

Soil samples were taken with a 1-inch sample tube from 40 southern California citrus orchards representing a wide range of soil types and geographical locations. In each orchard 20 borings were made. All soils were sampled at depths of 0 to 6, 6 to 18, 18 to 36, and 36 to 48 inches; and the 20 samples from each depth were combined, mixed, and subsampled. Final samples were plated the day they were obtained, or were placed in the refrigerator and plated the following morning. Plates were poured from appropriate dilutions in replicas of six for samples from the first two depths, and in replicas of three for samples taken below 18 inches. The plates were incubated, and numbers and kinds of fungi were determined as in the previous study (6).

RESULTS

The rose bengal plus streptomycin was essentially as effective as the acid in preventing growth of bacteria and streptomycetes on the fungus agar plates from all the soils tested.

A condensed summary of the major results of the platings is recorded in Table 1. In comparison with the acid, the rose bengal plus streptomycin increased by 54%, 37%, 36%, and 22%, respectively, the number of fungus colonies developing on plates of soil from the four depths 0 to 6, 6 to 18, 18 to 36, and 36 to 48 inches. Individual soil platings showed a range of 0 to

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2 Some of the fungus cultures were kindly examined by Dr. O. A. Plunkett of the University of California, Los Angeles.