

SOIL SOLARISATION: A BRIEF INTRODUCTION

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OPSOMMING

Wortelvrot van avokado kan beheer word deur sonverhitting van nat grond onder helder poli-etileen gedurende die somermaande.

SUMMARY

Root rot of avocado can be controlled by solar heating of moist soil under clear polyethylene during the summer months.

Soil solarization is a means of controlling soil-borne plant pathogens by hydrothermal heating of the soil accomplished by covering moist soil with clear polyethylene sheeting during the summer months. Since the development of the technique by Katan, Greenberger, Alon & Grinstein (1976), numerous reports have been published on the use thereof for the pre-plant control of annual crops (Katan, 1980). South Africa, with its abundance of sunshine, is an ideal region for the application of this technique. Thus far, the only published report on soil solarization in this country is by Smith, Wehner & Kotzé (1984) who found that solarization significantly enhanced the development and yield of wheat growing in crater disease soil.

In contrast to annual crops, information on the control of root diseases of perennials by means of soil solarization is limited. Ashworth & Gaona (1982) reported the elimination of *Verticillium dahliae* Kleb. from 6 year old pistachio nut trees after mulching of the soil with clear polyethylene for 2 mo, while Stapleton & De Vay (1982) achieved a significant reduction of *Agrobacterium* in fallowed field soil tarped for 4,5 wk and planted with English walnut and peach. Recently, Pinkas, Kariv & Katan (1984) reported a 23-fold reduction in numbers of *Phytophthora cinnamomi* Rands in the soil after solarization for 6 wk. In naturally infested soil only 10% of the pathogen propagules survived 4h heating at 36°C.

Our work on citrus indicated that solarization can alleviate the replant problem to a certain extent. Extensive investigations are at present being conducted to establish the optimum conditions for this technique in fallowed fields, as well as in existing plantings. Although an attempt was made to investigate the effect of solarization on avocado root rot, severe drought conditions precluded any definite conclusions. Nevertheless, it has been established that heating of soil naturally infested with *P. cinnamomi* for 5 min at 55°C completely eliminated this pathogen.

For the successful application of soil solarization, the following aspects are of prime importance: 1) tarping should take place during the warm summer months, 2) sufficient moisture should be maintained in the soil; 3) existing trees should be dehorned to facilitate full exposure of the soil to the sun, 4) weeds should be controlled and 5) the

temperature of the soil should fluctuate from high to moderate to induce suicidal germination of the pathogen propagules.

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