

A more detailed report of this work will be published elsewhere.

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*Note added in proof.* On prolonged incubation in basal medium, *A. macrocytogenes* fixed some nitrogen in the complete absence of calcium, for example, 3.2 mgm./25 ml. after 7 days incubation at 25° C.

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### A Physiological Effect of Triethanolamine on the Development of *Sclerotium rolfsii* (Sacc.)

SINCE triethanolamine was found to be an excellent emulsifier<sup>1</sup> it has been widely used in this capacity and also as an esterifying substance for plant regulators and herbicides of low solubility<sup>2,3</sup>.

In work (unpublished) carried out in this laboratory the triethanolamine salt of maleic hydrazide was found to effect abscission of olive leaves more severely than the sodium salt of this substance at equal concentrations. Similar results were obtained with 2,4-D and MCP<sup>4</sup>. As a result of these observations it was decided to study its independent influence on biological processes. Such an investigation seemed particularly desirable in view of the wide use of triethanolamine as a solvent for growth substances.

The effect of triethanolamine was studied on *Sclerotium rolfsii* (Sacc.) grown on potato dextrose agar<sup>5</sup> containing increasing concentrations of the substance. The effect was determined by measuring the diameter of cultures at constant time-intervals, and by determining the first appearance and total of new sclerotia.

The appearance of new sclerotia on the medium is delayed at the higher concentrations and their total number is reduced (Table 1). No germination of sclerotia took place at concentrations in excess of 2,000 p.p.m. triethanolamine in the media.

No significant influence of triethanolamine on the rate of growth of the mycelia was noted. However, when germination of the sclerotia did occur, it was delayed and slowed up. By planting normal mycelia on a media containing a concentration of triethanolamine as high as 3,840 p.p.m. the mycelium still

developed into normal cultures, the final amount of new sclerotia was somewhat lower.

The effect of triethanolamine on *S. rolfsii* seems to be primarily a fungistatic one; when sclerotia which failed to germinate after 8½ days on media containing high concentrations of triethanolamine (3,840 p.p.m.) were transferred to control media, they developed into normal cultures but for a slightly lower production of new sclerotia in comparison to the control cultures.

The effect of triethanolamine on the germination of the sclerotia and the development of new ones in *S. rolfsii* seems to be rather specific. These effects appear to be somewhat independent from general growth reactions for the rate of growth of the mycelia after full germination of the sclerotia was not affected.

This leads to the conclusion that triethanolamine is not an inert solvent as commonly presumed<sup>2,3</sup>, but rather has a definite effect at least, on the physiology of *S. rolfsii*.

A more detailed paper will be published elsewhere.

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### A Die-back of Cacao Seedlings in Nigeria caused by a Species of *Phytophthora*

IN September 1954 a die-back disease was seen on cacao seedlings growing in Agricultural Department nurseries established in various localities of the western region of Nigeria. There is no previous record of this disease in Nigeria, but it has reappeared in the nurseries in subsequent years. The disease caused considerable losses in these years, and in a particular nursery as many as 70 per cent of the young seedlings were killed. A species of *Phytophthora* has been established as the causal agent, and when inoculated into healthy cacao pods the symptoms produced were identical to those of black-pod disease caused by *Phytophthora palmivora* (Butl.) Butl.

The symptoms of this cacao seedling disease are similar to those caused by *P. palmivora* in Costa Rica<sup>1</sup> and in Surinam<sup>2</sup>. However, in these territories this pathogen also attacks the leaves and stems of mature cacao trees, whereas in Nigeria, except for the observations of Thorold<sup>3</sup> on the production of sporangia on cacao tree chupons following artificial inoculation, there is no evidence of *P. palmivora* affecting any part of the cacao seedling or the mature tree other than the pods.

In Nigeria the initial symptom is a brown discoloration of the tip of one or more of the leaves of the seedling. 1–2 days later, first the petiole blackens and wilts, and then the upper part of the stem. The discoloration frequently spreads down to the cotyledons, and at this stage the upper part of the stem may collapse due to necrosis. The disease may usually be detected about 17 days after germination, and the seedlings appear to be highly susceptible for a further period of 17 days. Seedlings which have escaped infection for a period of 42 days from

Table 1. THE EFFECT OF TRIETHANOLAMINE ON THE DEVELOPMENT OF *Sclerotium rolfsii*

Triethanolamine Concentrations in p.p.m.	Culture Diameter after 4 days (mm.)	Sclerotia First appearance (days)	Total No. formed
0	78	5	388
120	69	5	378
240	60	5	360
480	53	5	334
960	15	7	230
1,920	0	11	190
3,840	0	nil	0