THE EFFECTS OF DDT AND OF SODIUM MONOFLUORACETATE UPON PHYSARELLA OBLONGA MORGAN

THE efficacy of DDT as an insecticide has naturally aroused interest as to its possible use as a fungicide. Yet, so far as I am aware, the only published account of experiments dealing with this problem is that of D. O. Morris.[1] Since, for some time, I have been keeping cultures of the slime mold, *Physarella oblonga*, it occurred to me that it would be of interest to test the effect of DDT upon that organism.

About forty tests were made, most of them involving the use of DDT in acetone. DDT is practically insoluble in water, but is soluble in acetone to the extent of 52.5 ± 2.5 gms/1. A saturated solution of acetone was added to the warm agar culture so as to give an emulsion of known concentration. It was found necessary to evaporate the bulk of the acetone, since experiments demonstrated that it is highly toxic to Physarella. The experiment was also tried of growing Physarella upon plates dusted with dry DDT to the extent of about 40 mgs per sq. cm. of surface. The measure of growth was the time required for a 1 sq. cm. plasmodial transplant to cover the entire plate of 63.58 sq. cms.

Results are given in Table 1. These results indicate that: (1) Physarella grows as rapidly upon treated agar as upon that which is untreated, and (2) there is no correlation between rate of growth and the concentration of DDT. There was some indication that dry DDT delays growth, probably for mechanical reasons, but, on the other hand, it was interesting to note that subsequently the growing plasmodium completely covered the layer of dry powder. Likewise, subsequent growth upon the cultures composed of DDT emulsion was as vigorous as upon untreated cultures. Evidently DDT has no very pronounced effect upon *Physarella oblonga*.

TABLE 1

EFFECT OF DDT ON PHYSARELLA

No. of tests	Quantity DDT Treatment mgs/ml		Average rate of Growth 1 sq. cm. to 63.58 sq. cms.
4	In acetone	105.0	30 hours
4	" "	52.5	32 "
4	" "	26.2	32 "
4	" "	13.1	29 "
4	" "	6.5	27 "
4	" "	3.2	27 "
4	" "	1.6	32 "
4	Dry DDT on surface	40.0	50 "
3	Untreated controls		32 "

For purposes of comparison the effects of sodium monofluoracetate were considered. This substance is readily soluble in water and probably, like the salts of iodo-acetic acid, acts as an enzyme inhibitor. In any case its effect upon Physarella is pronounced. On cultures containing respectively 12.0, 10.5, 9.0, 7.5 and 6.0 mgs/ml, plasmodia developed and survived at least a week. On cultures containing only 0.75 mgs/ml of monofluoracetate, Physarella did fairly well. In no case, however, did the plasmodium spread characteristically over the plate. Instead it wandered about, the "posterior" portion dying out as the opposite margin advanced. The results, in this case, suggest antagonistic effects between the nutrients and toxic substance.

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[1] Jour. Counc. Sci. Indust. Res. Australia, 17, (4): 289–290, 1944.

RELATIONSHIP BETWEEN PATHOGENICITY AND pH TOLERANCE OF MICROORGANISMS

ACCORDING to hypotheses of Leise and James,[1] pathogenicity of bacteria and fungi seems to be related to tolerance for different degrees of pH; it may be possible to differentiate pathogenic from nonpathogenic microorganisms by growth in alkaline broth, and it may be possible to change a virulent microorganism into an avirulent one by an antitryptic agent. While these possibilities may apply to certain bacteria which the authors studied, they do not apply to all. For example, the pathogenic variant form of *Micrococcus tetragenus*[2] grew better in acid medium. The tolerance of other variant forms of the same strain varied in regard to pH, temperature, atmosphere and other circumstances. Changing a favorable environment for one variant of *M. tetragenus* to one unfavorable to it did not necessarily direct variation toward the form best suited to the changed conditions. Variants seemed to appear by chance, and if a variant appeared which found the new environment favorable, life of the strain was continued.

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[1] J. M. Leise and L. H. James, SCIENCE, 101: 437–438, 1945.

[2] H. A. Reimann, *Jour. Bact.*, 33: 513–523, 1937.

SLEEVE STOPPERS IN CLOSED SYSTEMS

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