THE EFFECT OF BENZENE HEXACHLORIDE AND DDT DUSTS ON THE GERMINATION OF SUGARCANE

By J. DICK.

In Natal, cane setts are sometimes damaged in the soil by Dynastid beetles belonging to the genera *Temnorrhynchus* and *Heteronychus*. These insects destroy the eyes, or buds, of the cuttings, occasionally necessitating a considerable amount of replanting. Up to the present, infestation has not been sufficiently severe to justify the use of insecticides, but it has been thought advisable to prepare against a possible increase in the importance of these insects by collecting information on their control.

In Australia, where beetles of this family are among the major pests of sugarcane, soil treatment with benzene hexachloride or DDT has been stated to be effective against them. These materials can be placed in the furrows before planting or applied to the setts themselves. There does not, however, appear to be sufficient information on their possible effect on the germination of the setts. An experiment was therefore planned to test whether germination would be affected by treatment with either of these substances.

Materials and Methods.

Sticks of cane were cut into single-budded cuttings, $3\frac{1}{4}$ inches long. These were dipped in water, allowed to drain for a few minutes, and then shaken up with either Bexadust, a powder containing 0.5 per cent. of the gamma isomer of benzene hexachloride, or a 2.5 per cent. DDT agricultural dusting powder. The setts were then gently tapped, to remove excess powder, and planted. This method left the setts covered with a fairly uniform, thick coating of the powder, containing more of the insecticide than would normally be required. Weighing showed that the average amount of powder that adhered to the setts was 0.68 gm. for the Bexadust, and 0.53 gm. for the somewhat lighter DDT powder. The control setts were simply dipped into water, drained and planted.

The cuttings were planted in flat tins, 15 setts in each, and covered as uniformly as possible with soil.

The experiment consisted of four replications for the control and each treatment, repeated for two different varieties, Co.281 and N:Co.310. It was intended to treat this as a single experiment, but the slower germination of the Co.281 made it advisable to separate the results into two series, one for each variety.

Results.

Buds of the N:Co.310 series started to come through the soil five days after planting, and were counted every two days until no more emerged. The numbers of buds which had germinated by the seventh and seventeenth days, respectively, are shown in Tables I and II.

TABLE I.

N:Co.310.—Number of shoots 7 days after planting.

Tin No.	Control.	Bexadust.	DDT.
1	6	6	4
2	8	7	4
3	7	7	4
4	8	11	3
Totals	29	31	15

Significant difference between totals: 9.8 at 19 to 1
14.8 at 99 to 1

TABLE II.

N:Co.310.—Number of shoots 17 days after planting.

Tin No.	Control.	Bexadust.	DDT.
1	14	15	14
2	15	15	15
3	15	13	14
4	15	15	14
Totals	59	58	57

Significant difference between totals: 4.7 at 19 to 1
7.2 at 99 to 1

The figures in these tables show that the insecticides had no significant effect on the total germination, but that the setts treated with DDT were slightly retarded. When the plants were examined some weeks later no difference between them was apparent.

In the Co.281 series, shoots started emerging from the soil on the tenth day after planting. The numbers of shoots which had emerged by the fourteenth and twenty-fourth days, respectively, are shown in Tables III and IV.

TABLE III.

Co.281.—Number of shoots 14 days after planting.

Tin No.	Control.	Bexadust.	DDT.
1	4	7	7
2	7	4	5
3	5	5	4
4	6	4	6
Totals	22	20	22

Significant difference between totals: 10.4 at 19 to 1
15.7 at 99 to 1

TABLE IV.

Co.281.—Number of shoots 24 days after planting.

Tin No.	Control.	Bexadust.	DDT.
1	12	14	15
2	14	11	13
3	14	13	12
4	12	12	14
	—	—	—
Totals	52	50	54
	—	—	—

Significant difference between totals: 9.8 at 19 to 1
14.8 at 99 to 1

As far as Co.281 is concerned, these figures show that neither Bexadust nor DDT had any significant effect on germination.

Summary.

Tests showed that dusts containing 2.5 per cent. DDT or 0.5 per cent. gamma benzene hexachloride had no significant effect on the germination of two varieties of sugarcane.

REFERENCES.

[1] Mungomery, R. W. (1946): Report of the Division of Entomology and Pathology. Rep. Bur. Sugar Exp. Stas. Queensland, **46**, 31.

[2] Wallace, C. R. (1946): Tests with Benzene Hexachloride and DDT incorporated in the Soil for the Protection of Crop Plants from Black Beetle. J. Aust. Inst. Agric. Sci., **12**, no. 3, 96.

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The PRESIDENT stated that the paper had resulted from the question asked the previous year as to whether these insecticides had an effect on the germination of cane. Dr. Dick, after thorough investigation, had found that after some time germination was unaffected, but D.D.T. seemed to delay the germination of N:Co.310 but not that of Co.281. He wondered if Dr. McMartin could explain this.

Dr. MCMARTIN said that it was true that there was a difference in sensitivity between varieties of cane, but the explanation was not known to him.

Mr. SINCLAIR enquired if cane suffered through the depredations of white ants in South Africa. In Rhodesia, cane was severely attacked by these termites, and mercurial fungicidal dips did not seem to kill them.

Dr. DICK replied that he understood experiments were being carried out to study the effects of D.D.T. and benzene hexachloride on white ants. These tended to destroy setts, but did very little damage to growing cane in South Africa. In Australia, at least one species of white ant attacked growing cane.

As far as he was aware, fungicides were not insecticidal, but Dr. McMartin, in a paper a few years ago, had related that one grower had tried calcium arsenate as a fungicidal dip and had thus improved germination. It was just possible that in this case, some insect which was attacking the setts had been destroyed.

The PRESIDENT asked if Dr. Dick would say how long the insecticides would be effective.

Dr. DICK replied that D.D.T. is claimed to be effective for at least a month, while benzene hexachloride is supposed to decompose much quicker. In either case, however, he thought the effect would be long enough to protect the cane setts until they had germinated.

Dr. BATES pointed out that it was fortunate that sugarcane was resistant to many of the new chemicals now being used in agriculture, including the weed-killing hormone. Benzene hexachloride had caused him some trouble in Rhodesia, for when tobacco farmers used it at a rather delicate stage in growth, the plants no longer looked like tobacco. He would like to warn that there is a tendency for manufacturers to push such chemicals without adequate testing on a wide enough range of plants.

Dr. DICK said that similar remarks last year had given rise to the present paper. Petty and other Government entomologists were now working on this question, and a lot of work had been done on the effect of D.D.T. on insects, together with the effect on the plant and on the soil.

Mr. CHRISTIANSON asked if Dr. Dick had tried the effect on the germination of cane setts infested with mealie bugs. This pest was causing some people concern.

Dr. DICK replied that the two insecticides studied were said to kill the mealie bug, but he had done no work to prove this.