

KTC 33 - Lowered Nursery Dieback Trial

Introduction: Observations on many seedling plantings and early results from ^{gettings +} seedling resistance trials indicate that, regardless of the resistance of a mature tree, its ^{seedling or vegetative} progeny may ~~have a very low level of resistance~~ experience high infection rates when subjected to a high infection risk. Consequently, under conditions of heavy inoculum load, it would be desirable to protect seedlings from infection until they reach ~~a size at which~~ ^{a size at which} infections can be ~~cut out~~ ^{pinned} out without destroying the bulk of the tree. [Infections have never been recorded in seedlings raised in the insectary, which has a ~~solid~~ ^{polythene} sheet roof and fly-screen walls, and an attempt was made to duplicate this experience in the field by using covers of clear polythene film. The absence of infections in the insectary may be ~~explained by~~ ^{due to either} the absence of inoculum ^{and/or} the absence of the necessary environmental conditions.

Treatments: With the above in mind the trial was designed with five treatments as follows:-

1. Seedlings raised in the insectary, water being applied twice - weekly to the soil only.
2. Seedlings raised in the insectary, water being applied twice - weekly to the leaves.
3. All seedlings raised under a clear polythene roof under leucaena shade, water being applied

(2)

twice weekly to the soil only.

4. Seedlings raised under a clear polythene roof under leucaena shade, water being applied ~~to~~ twice-weekly to the leaves.

5. Seedlings raised under leucaena shade, subject to rain-water only.

There were 4 replications of a randomized ~~block~~ design, 100 seeds being planted per treatment. Seeds ~~was~~ ^{were} extracted from open-pollinated pods of K23, a susceptible clone, and bulked, mixed and ^{on 1st September 1967} planted into ~~position~~ plastic bags previously placed into their trial positions. The ¹⁰⁰ plastic bags of each plot ~~and in 10 lines of 10 bags each~~ ^{in the field treatments, they were about 3 metres} were contiguous ~~and~~ ^{9-10 feet} from those of other plots ~~in the field~~ ^{while in the insectary treatments, they were 60-90 cm} from those of other plots.

The polythene covers were supported by ^{ridged} brush material frames which covered a ground area of approximately $1.8\text{ m} \times 1.8\text{ m}$ ~~6 feet x 6 feet~~. The ridge of each frame was approximately 1.6 m ~~1.6 ft~~ ^{above} high and in the direction of the prevailing winds while the sides were about 1.2 m ~~1.2 ft~~ high. The polythene cover was laid across the ridge and extended about 60 cm ~~2 feet~~ over each side but did not extend appreciably over the ends of the ridge. Seedlings were therefore protected from deposition of spores by sedimentation but spores could presumably reach

Table 1. Total seedlings, ^{as at 11/4/80} & number of infected seedlings ~~as at 1st April 1968~~ to that date.

Treatment	Total seedlings	Infected seedlings
1	362	0
2	357	0
3	373	1
4	357	1
5	335	155

N.B. Variation in the number of seedlings per treatment resulted from ^{percentage} germination differences.

them by impaction from the ends and, to a lesser degree, from the sides.

Results

The trial was terminated on 1st April 1968 when the seedlings were 7 months old. Details of ~~the~~ ^{total} seedlings and ^{number of} infected seedlings to that date are given below in Table 1.

(Table 1 about ~~plot~~ here)

Treatment	1	2	3	4	Total
	T I	T I	T I	T I	
1	Total 91	79	94	98	362
	Infected 0	0	0	0	0
2	Total 91	83	85	98	357
	Infected 0	0	0	0	0
3	Total 89	96	97	91	373
	Infected 1	0	0	0	1
4	Total 91	97	98	71	357
	Infected 0	0	1	0	1
5	Total 75	93	96	71	335
	Infected 33	43	43	36	155

N.B. Variations in seedlings per plot were brought about by germination differences, 100 seeds being planted per plot.

These results are very clear-cut. Infected seedlings were not removed as they were detected during the course of the trial so that there is the possibility that earlier-infected seedlings acted as sources of later infections. However, ~~this would~~ ^{their influence} would not be confined to the plot in which they were located and ~~the~~ external sources of infection would still be operating so their removal, ~~would~~ ^{while} it may have produced a lower infection rate in the plots of treatment 5, would not have decreased the ^{magnitude} significance of the reduction in infection brought about by ~~the~~ ^{the polythene} plastic covers to

any great extent. In addition, it is likely that non-removal of infected seedlings would be the practice in at least some commercial holdings.

Trouble was experienced in keeping the polythene covers intact ^{and} every cover at least once during the trial either was torn by wind or belled during rain and broke ~~the~~ its supports. Later frames were constructed by using galvanised water pipe and ~~key~~ ^{clamps}. These proved perfectly suitable provided the polythene was fastened securely at the sides. This was done by ~~rolling~~ ^{rolling} the ends ^{around a coverstrip, tacking} ~~between two coverstrips~~ another to the first and wiring them to stakes driven into the ground.

It seems clear that from the number of infections occurring in the ^{plots} ~~seedlings~~ of treatment five that there was ample inoculum in the trial area. It is reasonable to assume that some of this inoculum made contact with the seedlings under the polythene by infraction due to the action of ~~seed~~ wind currents. The fact that only two infections occurred in 730 seedlings of treatments 3 & 4 suggests that ~~the~~ suitable environmental conditions were not ^{pertaining} ~~available~~.

Thus, ~~covers~~ raising cocoa seedlings under clear polythene sheets provides virtually complete protection from vascular-streak dieback.