...ngs Resistance Trial No. 1.

No 1

COCOA CUTTINGS RESISTANCE TRIAL

Aim: To determine the resistance of ~~to~~ selections to vascular-streak dieback (Oncobasidium theobromae) of twenty-five Amitarco selections, ~~as cuttings~~.

Method: Cuttings of the 25 test selections were set in the propagator in October 1966 and field planted in July 1967. The cuttings were past their best planting age at this stage but planting had to be delayed because of a seven day spell. The design used was ~~a two rep~~ a 5x5 balanced lattice, repeated twice, with 5 trees per plot and a total of 12 replicates. An error at planting resulted in incomplete randomization of the selections so that, for example, KA2-66 is in the same corner of each replicate, and the same layouts are used for reps. 7-12 as for 1-6, respectively. More importantly, some pairs of selections are in adjacent plots in every block. The fact that the 12 replicates are scattered all over the station reduces the magnitude of this error in that any infection gradients would probably run in different directions at different sites.

The cuttings were planted at a spacing of 1.83 metres (actually 6 ft) square, in anticipation of meaningful results before competition effects became significant. ~~In September 1969 the~~ and were later thinned in such a way as to produce a diamond planting pattern of trees with a spacing of about 2.6 m apart. ~~square.~~ The five cuttings of each selection in each

* Symptoms of all infections were also described, on four occasions about 3 months apart during 1968. Growth measurements were made on all trees in July 1968 & again in July 1969, the indices measured being total height of plant and number of growing points. These measurements were taken to allow an objective assessment of relative vigour of the selections in the trial, as it is thought that the larger plants are liable to have more infections recorded against them simply because of their greater potential (leaf area) for infection.

In ~~July~~ June 1968, in an effort to increase the rate of ~~infection~~ dieback infection in the test ~~plants~~, pod shins were laid around & across replicates 6, 7, 10 & 12, while dieback prunings were distributed similarly through the other 8 replicates. Dieback prunings were used for the obvious reason. Pod shins were used because ~~At the dieback~~ at that time it was thought possible that the dieback disease resulted from infection of the branches by ~~Botryo the~~ Botryodiplodia theobromae.

Neither the pod nor the prunings produced any noticeable increase in infection rate. In the light of present knowledge of vascular-streak dieback this is not surprising.

~~plicate were planted in a continuous line~~
~~in June 1968 in an effort to increase the rate of infection and thus~~

The cuttings were inspected for dieback 6 weeks after planting out and thereafter every 4 weeks. All infected cuttings located at the first four readings would have died within a short time and were therefore removed ~~marked~~ ~~tagged~~ marked but were not ~~tested~~ as it was desired to observe the reaction of the various ~~clones~~ selections to the disease. Naturally, ~~for~~ some infected cuttings died, particularly in the early months of the trial. * Infections occurred at a very low rate for the first twenty readings, although sufficient information was gathered ~~collected~~ to allow the ~~clones~~ selections to be ranked with a ~~few~~ fair degree of certainty. During the period March - May 1969 a ten-fold increase in infections per reading occurred, corresponding with a marked increase in other trials in the area. Most ~~clones~~ selections retained their position on the scale although two or three were displaced a number of steps.

As the cuttings could not be raised under dieback-free conditions prior to field planting an exclusion period was allowed during which any infections recorded were not scored against the ~~clones~~ selections. ~~As~~ ~~they~~ ~~could~~ ~~throw~~ ~~out~~ ~~the~~ ~~assessments~~ ~~of~~ ~~infection~~ ~~rate~~ ~~over~~ ~~a~~ ~~replicate~~. This exclusion period covered the first two readings, as examination of the distribution of infections between two groups of replicates indicated that the pattern operating at the later readings was operative from the third readings onwards.

~~(Copies this. Bfes AEC's letter of 17/3/69 & enclose figures for later readings)~~

The ranking of the ~~clones~~ selections based on the number of infections which were recorded at readings 3 to 22 inclusive (November 1967 to May 1969) is given in Table 1. Following analysis of these results the selections were ranked on the basis of their adjusted treatment means (Table 2) (Tables 1+2 about here)

In September 1969 the block was thinned in such a way as to produce a diamond pattern of trees with a spacing of about 2.4 metres. This was done to reduce inter-tree competition and allow an assessment of production from the clones which had not yet been yield-tested.

Discussion

Both Table 1 & Table 2 indicate a wide range of resistance to V.S.d. Whether a clone is acceptable for commercial use or not depends not only on its position in Table 2 but also on its other characteristics, particularly yield. None of the light clones at the most resistant end of the Table is on the current distribution list as none is sufficiently productive for commercial use. The clones tested in Exp 30 which are being distributed to growers are KA2-101, K12, K82, K13, K24-106, K24-103 & K6-101.

Table 1. ~~Ranking of clones in KTC 3~~ Number of Infections per Selection (readings 3-22 inclusive).

Selection	No. of infections
KT 195	9
K24-101	18
KT 140	23
KA2-201	26
KA2-101	30
K74	37
K11-101	37
K82	38
K21	40
K24-106	45
KT 143	58
KA2-105	59
K6-101	62

Selection	No. of infections
~~K6-101~~	~~62~~
K28	64
K24-103	67
K4-101	69
K13	72
K73	79
K4	94
~~KT 48~~ K83	102
KA2-103	105
KA2-106	109
K6	120
K11	130
K1-102	134

Table 2 Ranking of clones on the basis of adjusted treatment means.

Selection	Adjusted treatment mean	Selection	Adjusted treatment mean
KT195	0.5675 ~~0.5675~~	K24-106	3.9155
KT143	1.5647 ~~1.5646~~	K73	3.9399
K24-105	1.6336	K4	4.0582
K4-101	1.6389	K24-103	4.1578
KA2-201	1.9998	K6-101	4.4827
K74	2.1624	K6	4.5319
K11-101	~~2.3090~~ 2.3090	KA2-106	4.6515
K28	2.3999	K1-102	5.2835
KA2-101	2.4385	K83	5.2845
KT140	2.4522	KA2-105	5.5619
K21	2.7533	KA2-103	6.5846
K82	3.1891	K11	7.9512
K13	3.4513		

L.S.D. = 0.53338 at 5% level.