

by

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Introduction

Results obtained from a previous study have shown that the equipment commonly used in the jarrah forest may transport large volumes of diseased soil for considerable distances. The potential for initiating new infections varied greatly between the units tested. It is probable that soil type will affect the quantity of soil carried by logging units, and thus influence the likelihood of initiating a new infection. The trial described tested this particular aspect of logging hygiene.

Method

The tests were run in the Mundaring Division, five miles north-east of the Mundaring Weir Headquarters. They were carried out in early winter, after appreciable falls of rain. A Bedford 3 ton standard gang truck fitted with a single set of duals was used. The soils were a sand, a lateritic gravel and a loam occurring within a plantation area not affected by P. cinnamomi.

The truck was driven over each soil and then driven in second gear for 10 chains along a nearby gravelled road. A 50% sample (one track) of the soil falling onto the road was collected, air dried and weighed. At the ten chain mark, the truck was washed clean, the soil collected onto a tarpaulin, air dried and weighed.

The unit bogged in the loam soil and had to be towed onto the gravelled road. The gravel test was conducted in a gravel pit where deep piles of coarse gravel occurred. Although the wheels sank and span on the gravel, the truck did not bog. Initially, the truck drove over the sandy soil with great ease. In a subsequent run, the truck was made to drive through a fairly deep hole, where it bogged, and had to be extracted by towing.

Results

In the preceding fortnight, the meteorological station at Mundaring Weir had recorded a fall of 592 points, 126 of which fell in the 48 hours prior to the trial.

Details of the three soils are shown in Table 1, and the data indicates considerable differences between the soil types tested.

TABLE 1**SOIL MECHANICAL ANALYSIS AND MOISTURE CONTENT PERCENT**

Soil Type	Moisture Content (percent)	Gravel (percent)	Mechanical Analysis of Particles < 2mm Diameter	
			Sand (percent)	Silt and Clay (percent)
LOAM	61.5	3.0	74.5	25.5
GRAVEL	19.8	49.9	65.0	35.0
SAND	17.7	NIL	86.0	14.0

The weights of soil carried and dropped by the 3 ton Bedford truck are shown in Table 2.

TABLE 2**WEIGHT OF SOIL (AIR DRY) CARRIED BY THE BEDFORD 3 TON TRUCK**

Soil Type	Approximate soil weight on unit at beginning (lbs.)	Soil weight lost between 0 and 7½ chains (lbs.)	Soil weight on unit at 10 chains (lbs.)
LOAM	100	53	47
GRAVEL	19	5	14
SAND (Second Run)	8	4	4
SAND (First Run)	NIL	NIL	NIL

The table indicates that the quantity of soil carried by the Bedford varied considerably between soil types. It appears that the amount carried is dependent on both the moisture content of the soil and the percent of fines (silt and clay) in the soil. Of the three soils tested, the very wet and heavy textured loam was particularly hazardous from a hygiene point of view.

The pattern of spread for the three soil types is shown graphically in Figure 1. In the loam soil, a rapid fall-off of soil loss with distance travelled occurred. In all soil types, peak losses occurred between 1½ and 3½ chains, i.e. as the truck began to gather speed.

For purposes of comparison, the weights of soil carried by different types of units, in different soil types and seasons, are shown in Table 3.

TABLE 3

WEIGHT OF SOIL (AIR DRY) CARRIED BY DIFFERENT UNITS, IN
DIFFERENT SOIL TYPES AND SEASONS

Unit	Soil Type	Season	Soil moisture content %	Approximate soil weight on unit at beginning (lbs.)	Soil weight lost between 0 and 7½ chains (lbs.)	Soil weight on unit at 10 chains (lbs.)
CHEVROLET 15 cwt. Truck (Singles)	Loam	Summer	22%	26	19	7
LAND ROVER	Loam	Summer	22%	12	3	9
BEDFORD 3 Ton Truck (Duals)	Loam	Winter	61.5%	100	53	47
BEDFORD 3 Ton Truck (Duals)	Sand	Winter	17.7%	8	4	4

Discussion

The data presented indicates considerable differences between the three soil types tested. Although care was taken in the sampling and washing process, some soil was inevitably lost. These losses were small and could not materially alter the trends obtained. The soil falling onto the road could be readily distinguished due to its colour and wetness and was easily handled except for some of the smallest particles. The truck was washed at ten chains so as not to interfere with the samples on the road. As the soil losses between 7½ and 10 chains were small, the calculated soil weight on the unit at the beginning should be reasonably accurate.

The soils were above field capacity at the time of the trial. This, and the deliberate bogging of the truck in the sandy soil, indicate that the conditions tested were relatively severe. The biggest difference between soil types was due to the duals packing with soil in the loam site whereas this did not occur on either of the other two soil types.

Clod size is likely to affect the survival of *P. cinnamomi* in diseased soil. It was only in the case of the loam soil that large clods were deposited on the road. These were sprayed out from between the duals, particularly as the truck began to gather speed. Very few larger clods were observed beyond 3 chains. Soil type also affects the ease of washing and it was readily apparent that the heavier textured soils were more difficult to wash off the unit than was the lighter textured sand.

It is interesting to observe (Table 3) that, as the result of soil type, a potentially more hazardous unit (a truck with duals) in a potentially more hazardous season (winter), may in fact

be less dangerous, from a hygiene point of view, than a Land Rover or a truck without duals. It is most probable that the difference between the soil types tested would be even greater in summer, when the likelihood of picking up any sand or gravel would be extremely low.

Conclusion

A careful selection of the site, the soil type, the time of year and the type of logging unit can markedly reduce the likelihood of spreading P. cinnamomi during logging operations. Care in the planning of a logging operation is just as important an aspect of logging hygiene as is the washing down of dirty equipment prior to its transfer into healthy areas.

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