BARK BURNING ON P. PINASTER

by

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In August 1970, a series of hot experimental spot fires were run in a sixteen year old stand of recently thinned P. pinaster in McLarty's plantation. These fires resulted in a number of trees being severely scorched.

During the burns the average head fire intensity was 170 B.T.U.'s per sec. ft., with an intensity range of 100 to 250 B.T.U.'sper sec. ft. An average head fire flame height of 4.0 ft. was recorded. Normal prescribed burns do not exceed 50 B.T.U.'s.

The burned area, of approximately one acre, contained 477 trees, 66 of which were final crop trees.

Two trees died within two months of burning, their bark thickness having been reduced to 0.2 of an inch at one foot above ground level. Severe crown scorch and a severe attack of Ips grandicaulis were evident.

Between August and December, 1971 a further seven trees had died; the nine dead trees representing 1.9 per cent of the total number of trees. After burning, the mean green crown height was 11 ft., with a range of 6 to 14 ft.

The mean G.B.H.O.B. for all the trees was 20.1 inches as compared with 24.0 inches for the final crop trees only. The mean girth of the nine dead trees was 14.2 inches, none of which were crop or dominant trees.

Nine live trees in the burned area, selected to match the girth of the nine dead trees, were compared for bark thickness at breast height and at the one foot level. Nine trees in an adjacent unburned area, also with matching girth, were used as a comparison. The results are given in table 1.

TABLE 1

MEAN GIRTH AND BARK THICKNESS

	Girth			Bark Thickness		
	Breast height	One foot	Difference	Breast height	One Foot	Difference
Dead Trees	15.7"	14.6"	-1.10"	0.53"	0.21"	-0.32"
Live Trees within burned area	15.9"	17.5"	+1.67"	0.54"	0.54"	0.0"
Trees in unburned area	15.6"	18.0"	+2.44"	0.54"	0.81"	+0.26"

It will be observed in table 1 that severe bark loss has occurred at the one foot level for burned trees. (See diagram).

Assuming 0.81" to be pre-burn bark thickness of the dead trees, the reduction is 0.60 of an inch as compared to only 0.27 of an inch for the live burned trees. This indicates that the dead trees were subjected to intense heat as a result of close burned thinning slash.

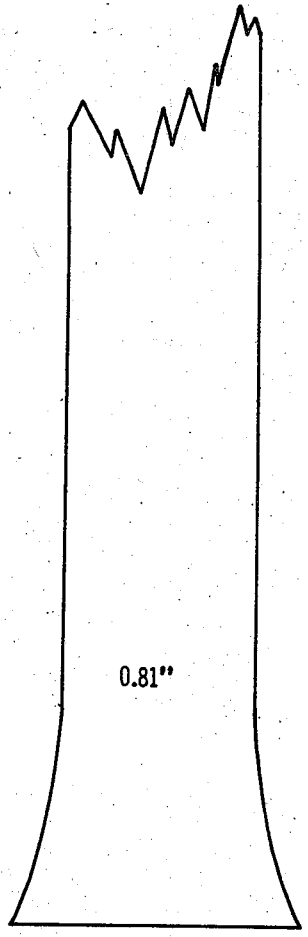
To illustrate bark loss through burning on final crop trees, nine trees were compared with nine trees of matching G.B.H.O.B. in an adjacent unburned area as shown in table 2.

TABLE 2

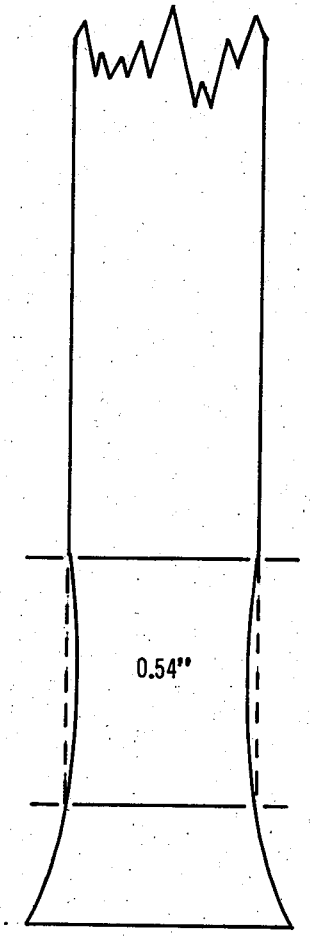
MEAN GIRTH AND BARK THICKNESS

	Girth			Bark Thickness		
	Breast height	One foot	Difference	Breast height	One foot	Difference
Trees unburned	20.4"	23.7"	+3.3"	0.66"	0.98"	+0.32"
Trees burned	20.4"	19.8"	-0.6"	0.69"	0.61"	-0.08"

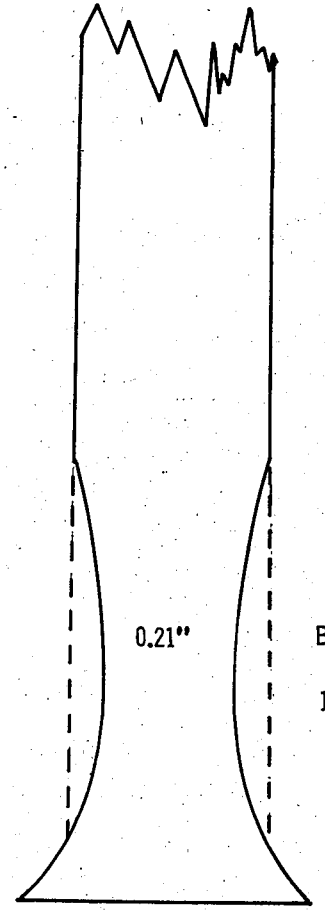
THE EFFECT OF BURNING ON BARK THICKNESS



UNBURNT TREES



LIVE BURNT TREES



DEAD TREES

BARK THICKNESS

1' LEVEL

Assuming 0.98 of an inch for the unburned crop trees to be the preburn bark thickness for the burned crop trees, (see Table 2) the remaining bark thickness of 0.61 of an inch is considerably greater than the 0.21 of an inch for the dead trees.

It would seem that when bark thickness is reduced to 0.21 of an inch, or less, this could be the critical limit at which P. pinaster cambium layer, cannot survive burning. It was noted that two of the dead trees with the greatest mean bark thickness remained alive until December.

It may be speculated that those trees which have suffered severe bark losses died from either one or a combination of reasons. Firstly the reduction in bark thickness has exposed the cambium to excessive and fatal heat, or the crown scorch observed has killed the growing buds and the upper stem cambium.

The mortality of the weak, suppressed trees is minimal considering the intensity of the fires were over five times that of a normal prescribed burn for a P. pinaster stand.