GROWTH CONSIDERATIONS IN CONTROLLED BURNING OF THE JARRAH FOREST

by G.B. PEET

The reasons commonly associated with favouring Spring above Autumn as a season for controlled burning include: inflammability of the ground wood, difficulty in holding an edge, and lack of soil and bark moisture.

Perhaps a more important consideration lies in the form of annual growth of jarrah, and the ability to conduct controlled burning when the trees are most able to withstand fire damage.

Three growth factors are thought to influence the period when maximum benefit is obtained from controlled burning:-

(1) Periods when growth is at a peak.
(2) Period of leaf replacement.
(3) Period of maximum fire resistance.

It is probable that (3) is dependent on (1) and (2) and this hypothesis is discussed below.

(1) Peak Growth Periods

Work by Podger and Loneragan indicates that jarrah forms annual growth rings. The form of annual growth could be an important factor in limiting damage from controlled burning.

The expected form of annual growth is shown on Graph 1. The graph was drawn from the average monthly growth of 30 plots located in a dense jarrah pole stand near Dwellingup. Each plot contains five dominant or co-dominant poles, fitted with band dendrometers, and mean plot GBHOB growth is recorded every month. The term "monthly growth" is not strictly correct as the measurement period fell on the 13th. day of each month, e.g. growth in May is the period between 13th. May and 13th. June. However listing by month will serve these purposes.

Growth data obtained by Podger has shown a flush in Spring and Autumn, and the trend is further supported by results from the Willowdale sample tree (Loneragan).

Accepting the trend in Graph 1, annual growth can be described as follows:

(a) Growth at some level is maintained throughout the year except in December when there is evidence of dormancy.
(b) Most of the growth occurs in two flushes, one in Spring with a peak in October, and one in Autumn with a peak in May.
(c) Growth is maintained, but at a low level, during the Winter and Summer months.

(2) Leaf Replacement

Graph 2 shows a monthly trend in terminal leaf moisture content of jarrah saplings. The sudden rise in December is associated with leaf replacement, i.e. the young leaves are succulent and have a high moisture content.

(3). Period of Maximum Fire Resistance

Hare(1961) states - "season of burning may influence not only direct fire damage but the ability of the plant to recover from injury by sprouting or refoliation". He also states "food reserves seem to have a direct effect on heat resistance as well as on sprouting capacity." Julander concluded that any treatment that increased food reserves improved the resistance of the plant to heat.

The annual growth trend in jarrah indicates build up of food storage probably occurs in the Winter months. This Winter food storage would be released in the energy required for the Spring growth flush, in Summer leaf replacement, and in the Autumn growth flush.

From a controlled burning viewpoint, trees could be expected to be most resistant to fire damage in Spring, and least resistant in Autumn.

Discussion

It is thought that resistance to fire damage resulting from food storage build up will favour Spring burning. The period of leaf replacement again favours Spring burning.

Autumn scorch will probably inhibit wood production for the current year, because leaf replacement is delayed until the following Summer.

Reasonable normality of growth could be expected after a late Spring burn. This burn will only affect the tail of the Spring growth flush, and it takes place before leaf replacement.

Assuming these hypothesis are correct every effort should be made to complete the major part of the burning programme in late October and November, i.e. at the tail end of Spring growth and before leaf replacement.

Trees are probably least fire resistant in Autumn, and a scorch before the Autumn - early Winter growth flush is likely to inhibit growth during that year. It would follow that Autumn burning is an unsound silvicultural practice, although some burning is undoubtedly necessary for fire protection e.g. cleaning out flats and gullies which won't burn in Spring.

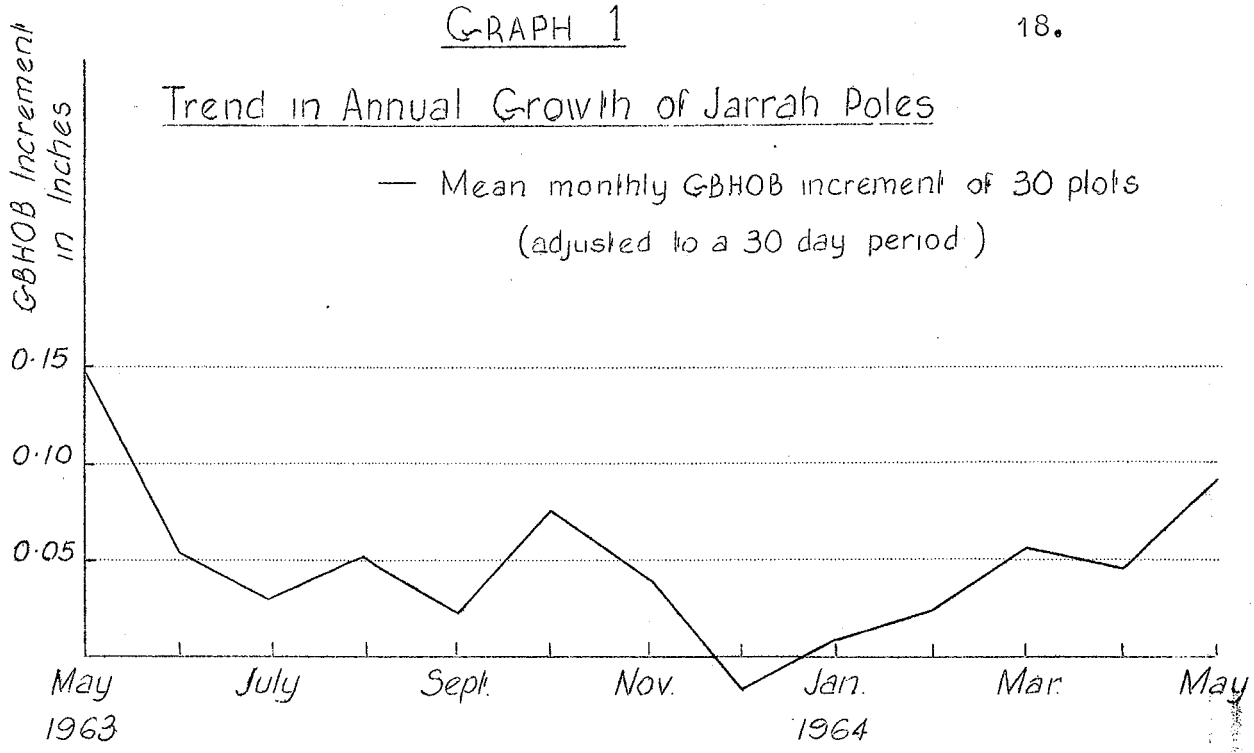
REFERENCES

Loneragan, O.W. and Podger, F.D. (personal communication)

U.S., Agric., Dept. of. Sthn. For. Exp. Stn. Occ. paper 183 "Heat effects on living plants". by R.C. Hare.

GRAPH 1

Trend in Annual Growth of Jarrah Poles



GRAPH 2

Monthly Trend in Terminal Leaf Moisture Content of Jarrah Saplings