FURTHER RESULTS OF:

POLLARDING & FERTILIZER TREATMENTS TO KARRI SEED TREES-HAYLES SEED ORCHARD (1982)

JULY 1987

A. HART & K. SCLATER

HAYLES SEED ORCHARD (KARRI)

Follow-up Report on Girdling and Nitrogen Fertilizer Treatments by R Breidahl (1982)

ORIGINAL TREATMENT

1. The original treatments in this seed orchard were carried out in November 1982 according to treatment Table 1. R Breidahl re-inspected these treatments after approximately 9-12 months, and recorded that they had had little apparent effect. He assumed that up to that time, no bud initiation had taken place ie. at age 10. Recent observations would suggest that this may not have been the case.

2. Due to loss of tag numbers, re-inspection of all treated trees has not been possible. Trees were photographed before felling for seed collection from these treatments and sketches from the colour slides have been made for comparisons of results of treatments.

3. Results of Treatments

3.1 Treatments have been assessed in comparison to the quantity and quality of seed plus chaff and clean seed harvested during June 1987, 5 years after treatment. Details are set out in Table 2. It is assumed that collections in 1984 took seed then available.

Approximate positions of trees harvested for seed are shown in Sketch Map 1.

3.2 EFFECTS OF TREATMENTS

3.2.1 Extra "Nitrogen"

Very variable and only two (2) trees checked by felling. The heavier seeding tree was on the lower slope and closest to the apiary site. It seems no coincidence that this tree exhibited a more symmetrical crown development than the other which produced poorly.

..../2

3.2.2 Extra Nitrogen Plus Girdling

Indications from the treatment are that heavier girdling with 'N', have produced a greater quantity of seed compared to those trees with a heavier girdling only. (Refer Table 2).

3.2.3 Severe and Light Girdling Only

Generally, these trees (tagged 2, 6, 5 & 7) exhibited crowns which did not carry seed worth collecting. Severe girdling resulted in a largely dead crown (as in tag tree 6) or much reduced crown development, being confined to a bunched top with 'scarious' type limbs towards the base of the crown (as in tag tree 2). Lighter girdled trees (no. 5 & 7) appear to have better developed crowns of greater depth but insufficient seed worth collecting.

3.2.4 Pollarded Tree No. 14 (1977)

It is noted that pollarded trees if not maintained as such are a waste of time.

3.2.5 Untreated Trees

Of the three (3) trees sampled, one tree was on each of three (3) topographical positions ie. upper slope (U/S), mid slope (M/S) and lower slope (L/S), represented by trees no.s 3, 8 & 18 respectively. (See sketch plan of tree position). The only apparent difference between these trees is that tree no. 8 was the only tree with a well balanced symmetrical crown.

The other two tree crowns were either unbalanced or apical in shape with side limbs aborted, suggesting the effect of competition for light and space generally reduced crown development and subsequent seed yielding capacity to 3.81 grms and 14.04 grm respectively. Tree no. 8 yielded 16.29 grms.

..../3

Sketches of these crowns (Appendix 1) indicate the nature of crown development.

Soil analysis revealed that, surface potassium 'K' levels in soils adjacent to these trees can be shown to have an inverse linear relationship to the green weight of seed capsules for the three topographical positions of U/S, M/S and L/S. This relationship is very tenuous being based on three (3) trees only. It did not hold for total seed and chaff yield or weight of clean seed.

Purity of the seed sample was highest for tree no. 8 at approximately 45.8% pure seed by weight.

CONCLUSIONS

1. Within generalised limits it seems likely that the treatments given to the trees sampled have influenced seed yield on the following rating:

   1.1 Severe girdling only - least seed production.

   1.2 Light girdling only - less seed production compared to control.

   1.3 Extra nitrogen and girdling - does not appear greatly different to control so that the combination has been nullifying in effect.

   1.4 Extra nitrogen - results very diverse and possibly effects of 'N' on tree growth depend on spacing and soil moisture levels as crown development has been quite different.

   1.5 Untreated - as indicated these seed yields are variable but overall more consistent than other treatments, due to treated trees not being properly managed. If treatments are properly managed seed yields should improve.

..../4

2. Despite the effects of treatments given, one of the strongly associated features of good seed capsule yield appears to be vigor and symmetry of the crown together with depth of the crown.

   This suggests that adequate spacing for uninterrupted crown development is of prime concern in setting up karri trees for seed yields of best return.

   Best results would appear to accrue from adequate spacing from an early age to encourage full and deep crown development.

3. There seems little value in heavy or light girdling in isolation. It is of interest that the effects of this treatment were not apparent till approximately 3-4 years after treatment. (cf R Breidahl's comments at about 12/18 months after treatment).

4. The tenuous inverse linear relationship between weight of capsules and surface 'K' in soils is not applicable in relation to seed and chaff and clean seed yields which could be due to 'selfing' or other factors of competition eg. light, proximity to hives, soil moisture and soil organic matter.

   What the threshold levels of 'K' should be is unknown. However, other observations indicate that floral activity is closely associated with ashbed where phosphorous 'P' and 'K' levels are invariably higher than elsewhere. As an initial approximation, it would seem that 'K' levels should be around 100 ppm or better at the soil surface and total about 200 ppm in the top metre of the soil profile.

5. Nitrogen fertilizer effects on crown development and/or seed production are not fully known. Girdling effects and the age of implementation are not fully understood with regard to seed crop development.

..../2

6. Factors of unknown significance are the proximity of the apiary site to tree no. 15 (treated with extra 'N') and spacing accorded treated trees after treatment.

A J HART & K SCLATER

17 July 1987

AJH/KS:SF

BUD INITIATION TRIALS (KARRI)

AIM:

To stimulate the initiation of flower buds in a ten year old karri seed orchard (Hayles). This is to be a preliminary trial to test methods before commencing a much longer trial at Jaesches SO.

METHOD:

Fourty trees (40) at Hayles Seed Orchard (20 km SE of Manjimup) were selected for the study. The criteria for selection were:

1. The trees should be healthy and of roughly similar size.

2. They should have all received the same treatments in the past.

3. They should not have produced buds previously?

There was three (3) treatments (and a control) with ten (10) trees in each. The trees in the three treatments were marked with blue plastic tape and an aluminium tag (marked from 1-30). The trees were randomly located within the seed orchard as were the ten control trees (which were only marked with the blue plastic tape).

The three treatments were:

1. Nitrogen application.)

2. Girdling.) See tree no.s as per Table 1

3. Nitrogen & girdling.)

The nitrogen was applied in the form of Ammonium sulphate at the rate of 10 kg/tree. The girdling consisted of two 2-3 cm wide half girdles on opposite sides of the tree and spaced about 10-15 cm apart. Girdling was done using a stanley trimmer which was not ideal. A heavier knife would be far more satisfactory, particularly if this treatment was attempted on a large scale.

TABLE 1

The treatments were randomly allocated to the thirty trees as such:

	TREATMENT		
	Nitrogen	Girdling	N + G
	1	2 (light)	3
	8	5 (light)	4
	10	6 (severe)	9
	17	7 (light)	11
Tree nos	18	12	16
	20	13	19
	21	14	22
	24	15	25
	26	23	27
	30	29	28

(After: R Breidahl)

The treatments were carried out on 22/11/82. Ten untreated controls were marked with blue tape.

(See further details attached).

SUMMARY OF SEED YIELDS 5 YEARS AFTER TREATMENTS - TABLE 2

Tree No.	Treatments 11/1982	Wt. of Clean Seed (Grms)	Total Wt. of Seed & Chaff (Grm)	Purity %	Topo Position	Crown Type & Description
7/1	+ 'N'	N/A	1.02	N/A	M/S	Thin - unbalanced
-/8	"	"	N/Available	"	M/S	Reasonably balanced
15/17	"	23.86	82.00	29.1	L/S	Medium density (Double leadered but balanced)
10/9	+ N + G	1.41	6.04	23.3	M/S	Medium - deep crown - balanced lighter girdling
12/16	"	3.49	15.38	22.7	M/S	Thin, unbalanced & heavier girdling
19/25	"	0.613	3.08	19.9	L/S	Thin to medium etiolated unbalanced - lighter girdling (High Chaff content)
-/2	Severe Girdling Only	No data nor seed				Crown mori-bund
-/6	"	"				"
-/5	Light Girdle)	No data nor seed				unbalanced crown
-/7	" ")					
14/-	Pollarded 1977				M/S	Open thin Crown
18/-	Untreated	0.380	3.81	10.0	L/S	Medium density unbalanced
8/-	Untreated	7.46	16.49	45.8	M/S	Well balanced medium density
3/-	Untreated	2.18	14.04	15.5	L/S	Medium density apical type side limbs aborted.

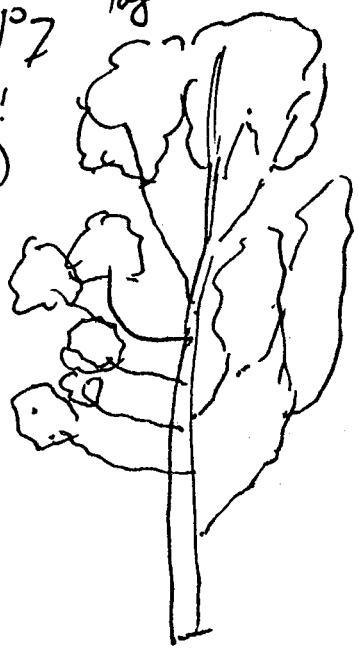
NOTE: 1. M/S = Mid slope, U/S = Upper slope etc.
2. 7/1 = 1st digit is free No at harvest 5/87 - second digit is tag No from R BREIDAHL'S treatments 11/82.

— SKETCHES OF CROWNS OF KARRI TREES TAGGED IN HAYLES 5/82 from COLOR SLIDE

APPENDIX 1

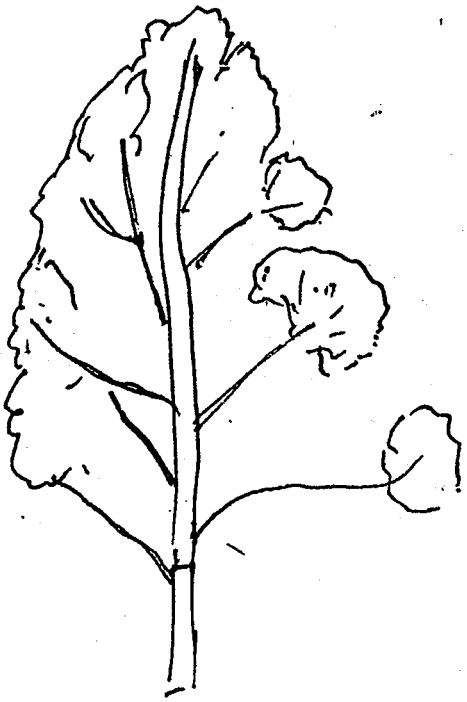
TREE N°7 Tag 1.

TRA 'N! (1982)

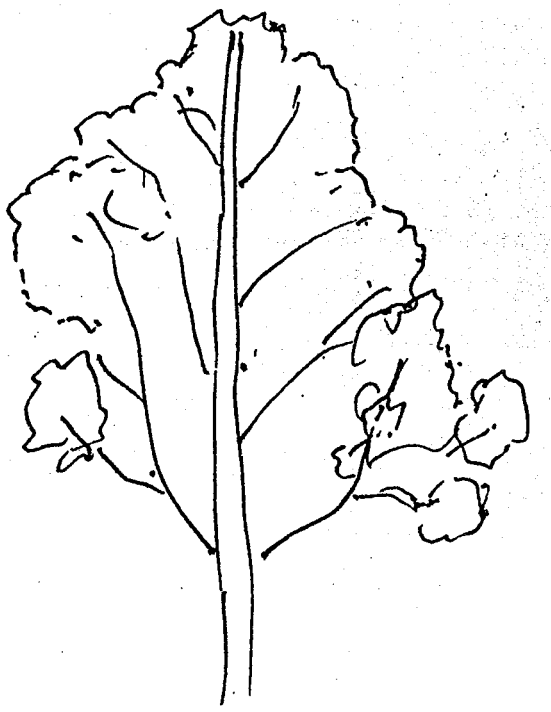


TAG N° 2 GIRDLED (SEVERE)

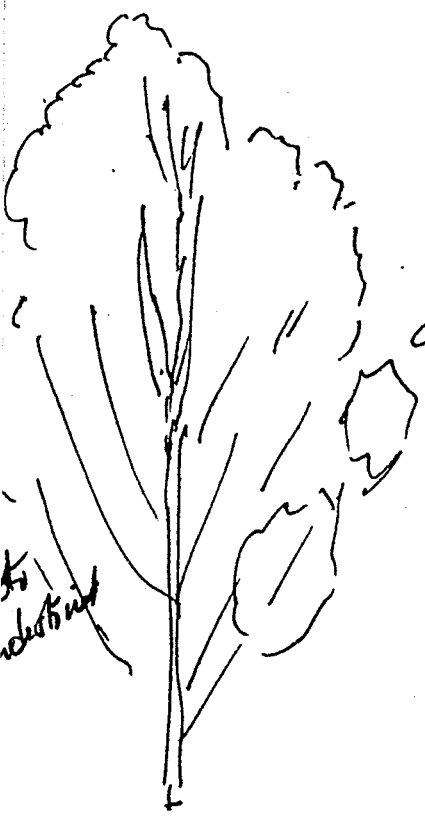
TAG N°5 LIGHT GIRDLE



TAG N° 7 (Plot 8) LIGHT GIRDLE

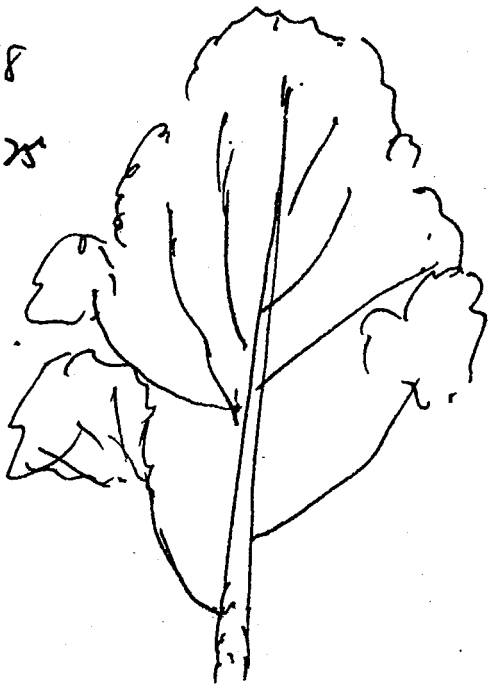


TREE N°10 (TAG N° 9) LIGHT GIRDLE +'N'

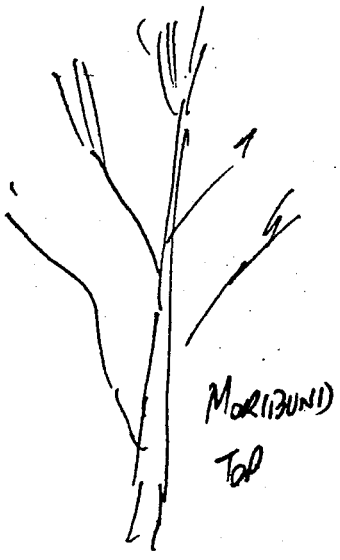


C/HT. 19.8
C/DIAM: 17.25

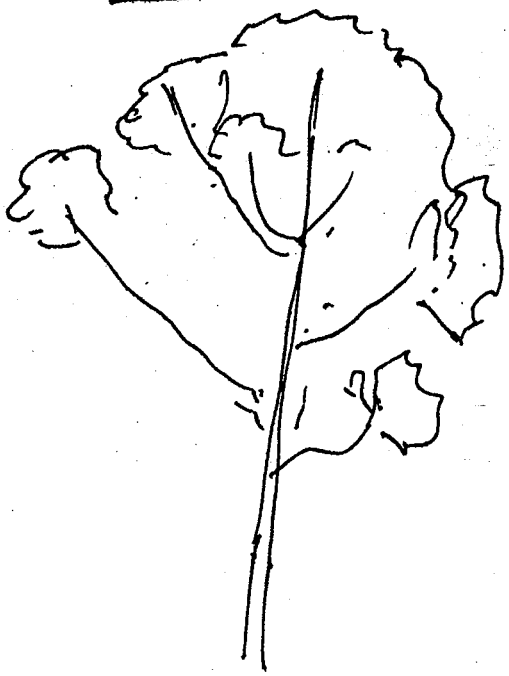
TAG N° 8 ~~TREAT~~ +'N' only.



TAG N°6 SEVERE GIRDLING

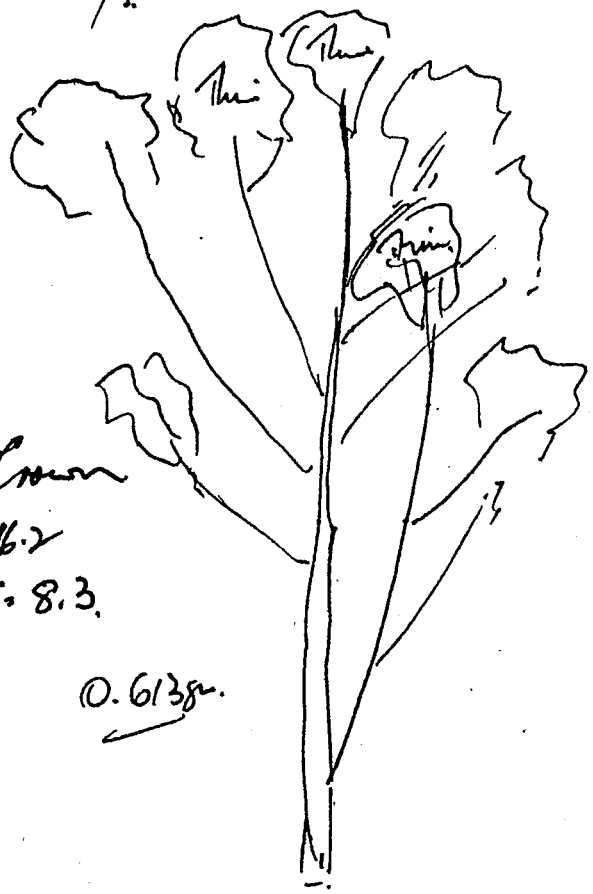


TREE N°12 TAG N° 16 - LIGHT GIRDLING +'N'



25.

TREE N°19 (TAG N°) LIGHT GIRDLING +N.



Med Crown
C/HT. 16.2
C/DIAM. 8.3.

0.613m.

- HAYLE'S SEED ORCHARD -

SKETCH MAP of POSITIONS of TREES FELLED for SEED - MAY 1987
WITH R. BREIDAHL'S EXPTAL N°s of 1982 (TAG N°)

NOT TO SCALE
APPROX. SLOPE : 4°-5°