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DEPARTMENT OF AGRICULTURE

WESTERN AUSTRALIA

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PLANT RESEARCH DIVISION

FEBRUARY 1973

This report summarizes progress and data available for the following investigations

1. Lupin Growth Analysis
2. Rape Growth Analysis
3. Fallow Re-assessment
4. Wheat Variety - Root Growth Study

1. Lupin Growth Analysis

Aim: To obtain background growth data

Location: R. Illich, Gingin

Soil Type: Deep yellow sand

History: Old pasture land

Seeding Rate: 150 kg/ha

Fertilizer

Application: 525 kg/ha Superphosphate

Plant height, plant weight, leaf area, node number, lateral number and moisture profile data were obtained weekly for the Unicrop and Uniharvest varieties of lupin sown on the 6th and 22nd of June 1972. Plant height was used as an indicator of growth pattern and is shown as such in Figures 1 and 2 for the June 6 and June 22 sowings respectively.

Comments

1. No difference between Unicrop and Uniharvest in early growth pattern.
2. With earlier flowering, Unicrop plant height shows rapid increases sooner after planting than Uniharvest. Differences only slight with the June 22 sowing.
3. Maximum plant, stem and inflorescence heights greater with Uniharvest than Unicrop with both sowings.
4. Uniform inflorescence height increase with Unicrop at the June 6 sowing. The greater inflection of the curve with Uniharvest gave relatively lower rates immediately following flowering and later higher rates. These differences not evident with the June 22 sowing.

Main inflorescence height was used as an indicator of flowering. Data were derived on this basis to describe relative maturities at the June 6 (Table 1) and June 22 (Table 2) sowings.

Comments

1. Later sowing accelerated flowering by 12 and 8 days with Uniharvest and Unicrop respectively.
2. Though Uniharvest at the June 6 sowing was 11 days later than Unicrop in respect of flowering, 20% of maximum inflorescence height was achieved 19 days later than in Unicrop. This increase in maturity difference was only slight with the June 22 sowing.
3. If inflorescence height is a valid indicator of flowering, the sharp rise with Uniharvest implies greater sensitivity to adverse environmental conditions in respect of flower survival on the main inflorescence.

Total inflorescence weights (pods, seeds and stalks of all spikes) were similar for both varieties at the final harvest (31st October) of the June 6 sowing. These were markedly lower with Uniharvest than Unicrop with the June 22 sowing.

Moisture profile data have as yet to be processed.

TABLE 1 - DATA DERIVED FROM INFLORESCENCE HEIGHTS

First Sowing - 6th June 1972

Date of achievement of:	Days from planting:		DIFFERENCE
	UNI HARVEST	UNICROP	
Flowering	83	72	11
5% *	90	76	14
10%	97	79	18
20%	102	83	19
30%	104	85	19
40%	106	88	18
50%	107	91	16
60%	110	94	16
70%	112	98	14
80%	114	103	11
90%	119	109	10
95%	123	112	11
100%	132	118	14

* Percentage of maximum inflorescence height

<u>Length of interval (Days)</u>	<u>UNI HARVEST</u>	<u>UNICROP</u>
5 - 95% inflorescence height	33	36
10 - 90% inflorescence height	22	30

TABLE 2 - DATA DERIVED FROM INFLORESCENCE HEIGHTS

Second Sowing - 22nd June 1972

Date of achievement of:	Days from planting:		DIFFERENCE
	UNIHARVEST	UNICROP	
Flowering	71	64	7
5% *	79	69	10
10%	82	72	10
20%	87	76	11
30%	89	79	10
40%	92	82	10
50%	95	84	11
60%	97	86	11
70%	100	88	12
80%	104	92	12
90%	109	96	13
95%	114	98	16
100%	122	104	18

* Percentage of maximum inflorescence height

<u>Length of interval (Days)</u>	<u>UNIHARVEST</u>	<u>UNICROP</u>
5 - 95% inflorescence height	35	29
10 - 90% inflorescence height	27	24

FIGURE 1.
PLANT AND PLANT COMPONENT HEIGHT.
FIRST SOWING GINGIN - 6th JUNE 1972.
CURVES FITTED BY EYE.

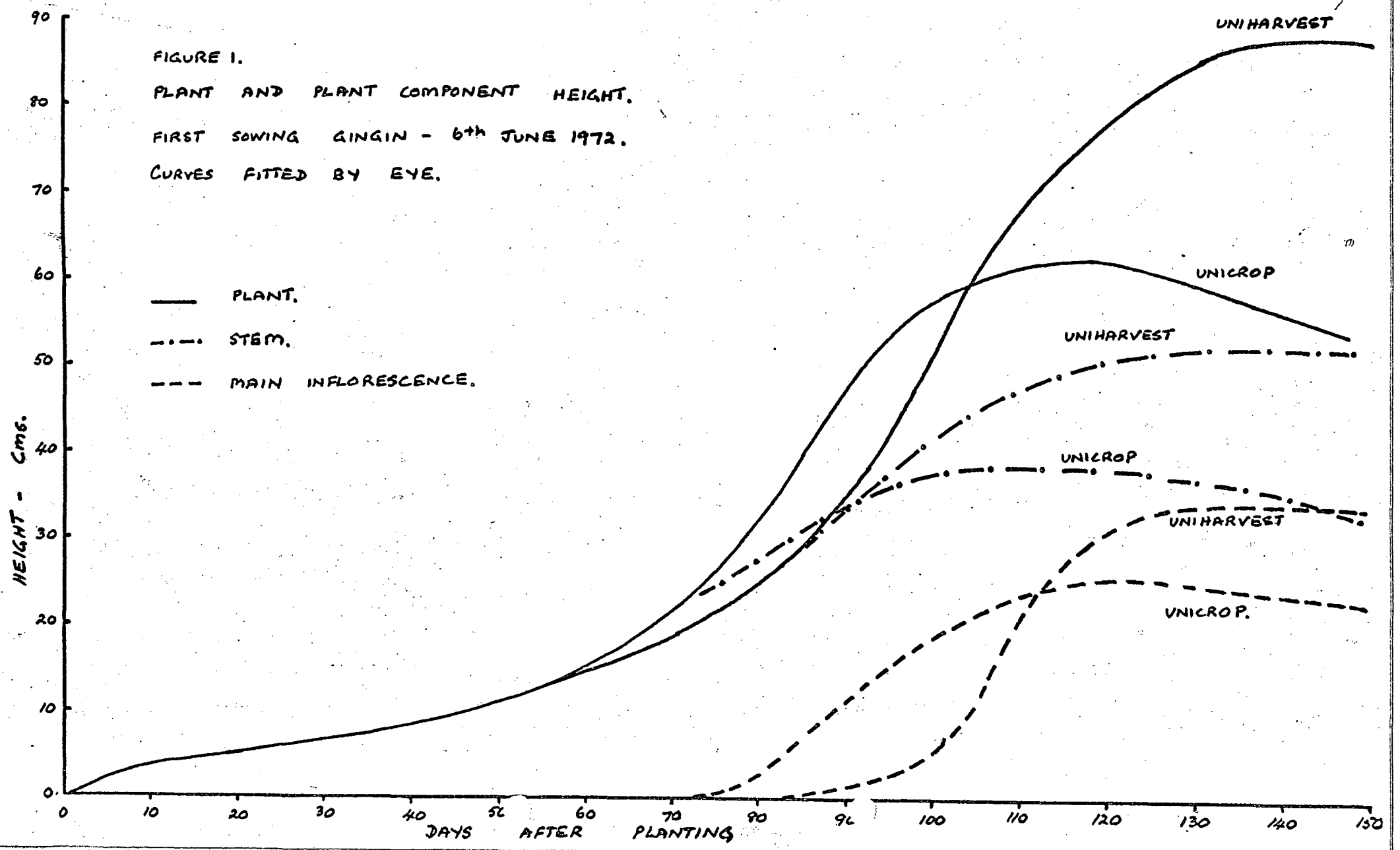
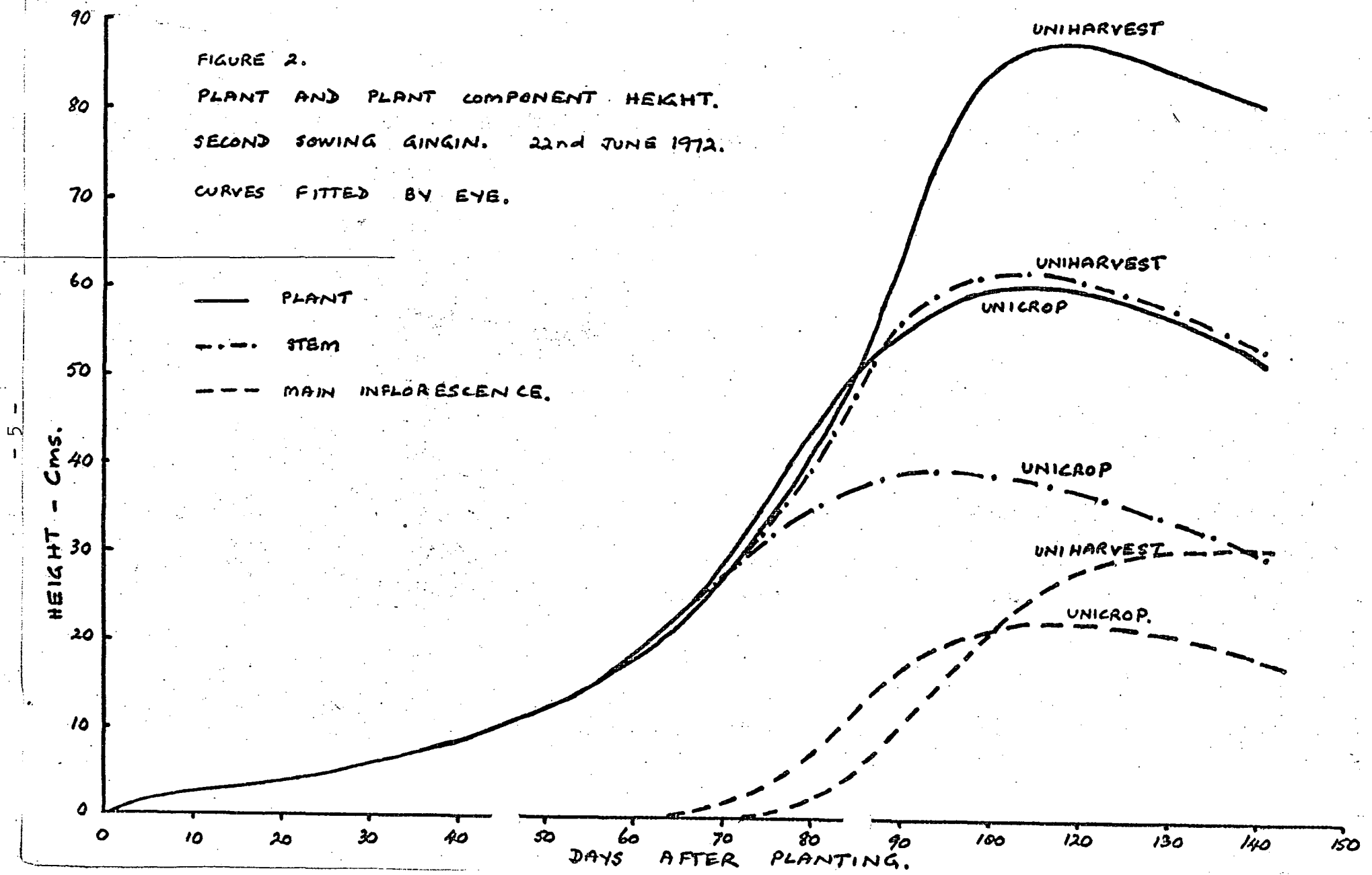


FIGURE 2.
PLANT AND PLANT COMPONENT HEIGHT.
SECOND SOWING GINGIN. 22nd JUNE 1972.
CURVES FITTED BY EYE.



- 5 -

2. Rape Growth Analysis

Aim: To obtain background growth data
Location: R. Illich, Gingin
Soil Type: Deep yellow sand
History: Old pasture land
Seeding Rate: 14 kg/ha
Fertilizer 525 kg/ha Superphosphate
Application: 276 kg/ha Urea

Data in the manner of the lupin growth analysis trial are available for the Arlo and Turret varieties of rape sown on the 6th and 22nd of June 1972. Due to poor weed control and considerable insect damage the data are suspect and have therefore not been collated.

3. Fallow Re-assessment - 72M29

Aim: To re-examine case for fallow as an agronomic practise in Western Australia

Location: Merredin Research Station

Soil Type: Merredin clay loam

History: Old pasture land - 7 years of barrel medic

The proposed programme included an establishment year and an assessment year for three adjacent sites which were to be used in successive years. The following treatments were to be imposed during the establishment year.

1. Maximum moisture conservation treatment - to be cultivated with first rains and subsequently when necessary for weed control. Long Fallow.
2. Minimum moisture conservation treatment - to be sown to wheat.
3. Chemical fallow - to be sprayed prior to seed set. Hay freeze.
4. Mechanical fallow - to be cultivated after seeding operations. Standard fallow operation for the area.
5. Pasture - to be left in pasture.
6. Short fallow - left in pasture and cultivated only if summer rain eventuates.

The area established in 1972 is to be assessed for yield in 1973.

Samples have been taken for pre-establishment soil nitrogen and pasture protein analysis subsequent to spraying (Gramoxone) in early October. Analyses of these are not yet at hand. Moisture profile data were obtained at monthly intervals commencing on 10th August 1972. Moisture log data for 30, 45 and 60 cm. depths are presented in Table 3. No differences were apparent at greater depth. Rainfall data are provided in Table 4.

Comments based primarily on 30 cm. data

1. Moisture conservation was best with the long fallow.
2. Mechanical fallow was of some advantage. Cultivation was in early September.
3. Chemical fallow was not much better than the pasture treatments.
4. Driest conditions prevailed under the crop treatment.
5. Differences started developing in mid-September.
6. Treatment differences low due to low rainfall conditions. Moisture penetrated to around 45 cms. at best.

TABLE 3 - SUMMARY MOISTURE LOG DATA
FALLOW RE-ASSESSMENT - 72M29

A. 30 cm. depth

	10th August	13th September	4th October	25th October	29th November
Chem. fallow	23460*	19752	18526	18034	17939
Short fallow	23480	18452	17004	16898	17213
Long fallow	23957	21746	22293	21297	20320
Pasture	22260	18280	17206	17138	17430
Mech. Fallow	21863	20348	20482	20092	19135
Crop	23495	18966	16569	16244	16201

B. 45 cm. depth

Chem. fallow	19620	18366	17974	17934	18245
Short fallow	19349	17843	17036	17302	17730
Long fallow	19753	19641	19558	19169	19020
Pasture	18756	17922	17339	17456	17576
Mech. fallow	18506	17953	18702	18117	18050
Crop	18272	17586	16538	16616	16768

C. 60 cm. depth

Chem. fallow	18288	17865	17665	17939	17949
Short fallow	18175	17920	17716	17744	17911
Long fallow	17990	18926	18417	18434	18636
Pasture	17711	17949	17670	17703	17614
Mech. fallow	17587	17456	17878	17842	18556
Crop	16752	17195	16922	16899	17623

* Minute counts with neutron moisture meter
Volumetric moisture data will be available with
calibration of soil type. Wetness increases with
count

TABLE 4 - RAINFALL* DATA - MERREDIN RESEARCH STATION

	1972	AVERAGE
January	0	124
February	3	142
March	170	206
April	84	206
May	180	373
June	595	521
July	256	485
August	279	356
September	168	221
October	46	178
November	79	124
December	0	127
TOTAL	1,860	3,063

* mm of rainfall

4. Wheat variety - Root growth study

Aim: To look at early root growth and subsequent root penetration to depth in 19 varieties of wheat.

Location: R. Illich, Gingin

Soil Type: Deep yellow sand

History: Old pasture land

Seed of each variety was sown on the 22nd of June at 5 cm. spacing in rows 18 cm. apart in 5.00 x 1.08 m plots. Superphosphate and urea were applied by hand at the rate of 330 and 276 kg/ha respectively. Plant root systems were sampled at 2 and 3 day intervals to 30 days after planting. Root number data have been obtained for 6 plants per variety per sampling. Root length data are as yet incomplete.

Comments

1. Variety differences in early root growth with respect to root number not evident.
2. Between plant variation very high and would serve to mask variety differences if any did exist.
3. Time of initiation of secondary, tertiary and other root components did not show significant variation between varieties.

Core samples were taken at weekly intervals from 4 - 10 weeks after planting and subsequently at 2 - 3 week intervals. The objective was to follow depths of root penetration.

Comments

1. Surprisingly, maximum depths of penetration were of the order of 90 - 120 cm. only. Experience from previous years was that 180 cm. was achieved comfortably in deep yellow sands. Location in relatively high rainfall area would seem to have played a part. This aspect is to be investigated in 1973.
2. Due possibly to reduced depth of penetration there were no variety differences overall.
3. As with maximum depths of penetration there were no apparent differences in pattern of penetration to depth.

Moisture data are available for 9 of the 19 varieties of wheat. These have yet to be processed.

March 13, 1973
DT:WM