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# 1973\_\_Field - environment studies on lupins

M. W. Perry

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EXPERIMENTAL RESULTS (Field Trials) 1973.

M.W. Perry.

"FIELD - ENVIRONMENT STUDIES ON LUPINS"

73PE2 "Karakin" Lancelin.

73PE3 "Gilros" North Bannister.

1. Precis of Experiments.
2. Climatic Data.
3. Development Data.
  - (a) Height (Graph only).
  - (b) Node numbers at Flower Initiation.
  - (c) Dates and Durations of Key Events.
  - (d) Flowering Dates.
  - (e) Seed Yields.
  - (f) Analysis of Split-Seed (Lancelin).
4. Dry Matter Production and Partition. (To follow).

## 1. Precip of the Experiments.

Field trials conducted in the past three years have implicated time of planting as a major factor controlling yields of Lupinus angustifolius. Differences in cultivar performance (Unicrop vs Uniharvest) consequent upon differing earliness genes have also been apparent between sites and planting times.

The aims of the experiments reported here were to examine the effects of site and time of planting on the patterns of development and dry matter partition of the two cultivars. Experimentation being sufficiently detailed to allow genotype-environment interactions to be clearly identified.

### SITES:

Lancelin - Deep yellow sand. Thermally typical of the sandplain areas between Perth and Geraldton.

Bannister - Fine gravel over Laterite. In terms of temperature this site is similar to the colder southern lupin producing areas.

I consider these sites are close to the extremes of environment likely to be encountered during winter lupin production in the South-West.

### DESIGN:

Experimental design was identical at the two sites. Two cultivars (Unicrop and Uniharvest) X eight planting times (10 May - 21 August) X three replicates. Plot size 6m x 2m = 12m<sup>2</sup>. Plant Density (sown) = 60m<sup>2</sup>.

### EXPERIMENTAL DETAIL:

Plots hand planted at fortnightly intervals. Not inoculated. Row spacing 17cm. Liberal fertiliser applied. Plots maintained essentially weed free by hoeing and hand pulling.

Sampling: (i) Weekly for seven weeks from emergence. Ten plants per plot dug up.  
(ii) Weekly from 8 weeks to maturity. Five plants per plot cut at ground level.

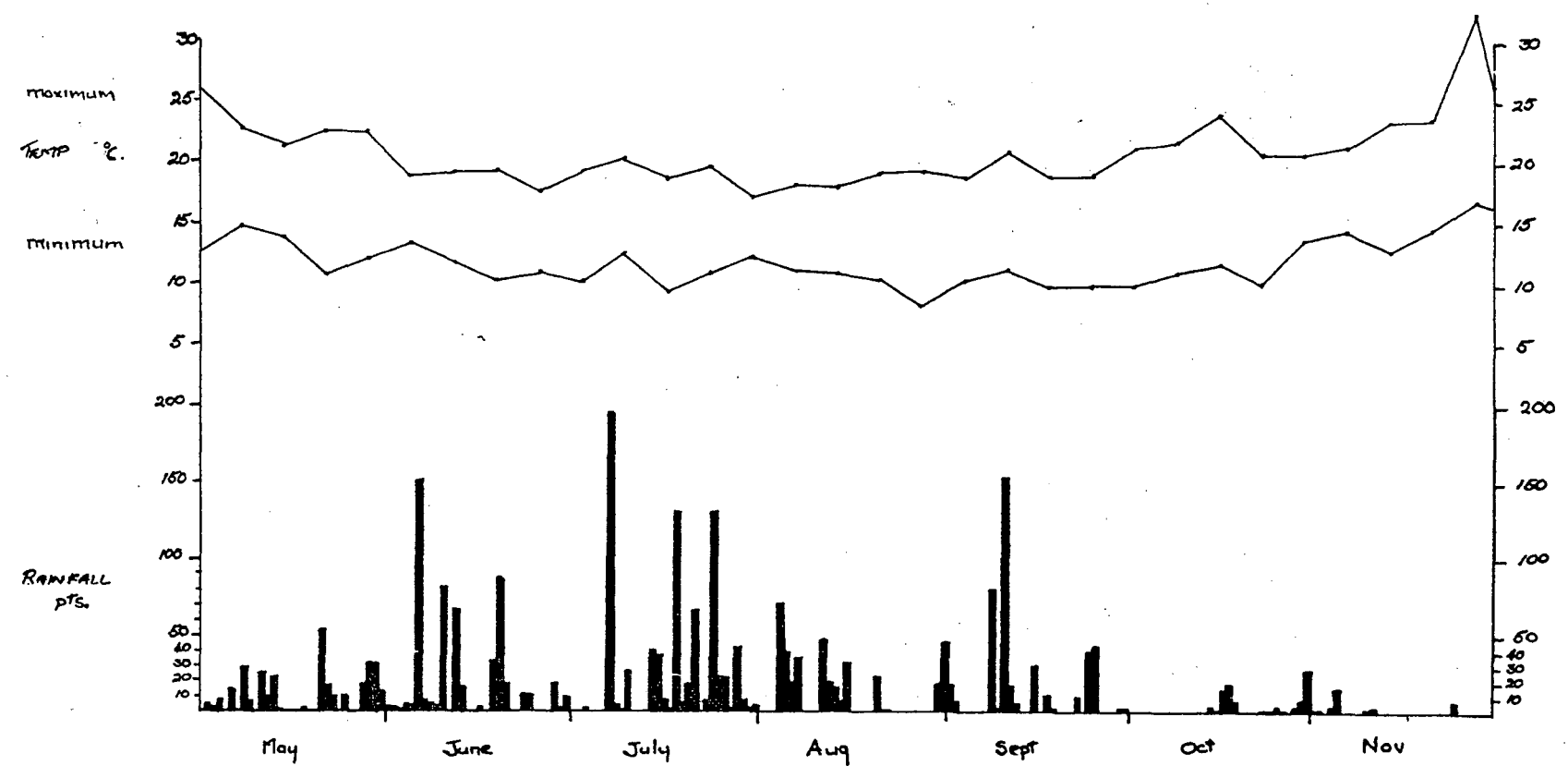
Sampling was continuous from one end of the plot, thus sampled plants were exposed to an "edge" for one week before removal. They were never visually different from the bulk of the plot.

- Division: Samples were brought to Perth each week and -
- (1) 3-5 plants/plot dissected for leaf development and Initiation of flowers.
  - (2) Height and bud length measured.
  - (3) Plants divided into the various orders of laterals and floral parts.
  - (4) Components dried and weighed.

Observations: (With M.L. Poole.) Plots were observed each week and details of growth, flowering and pod development were recorded.

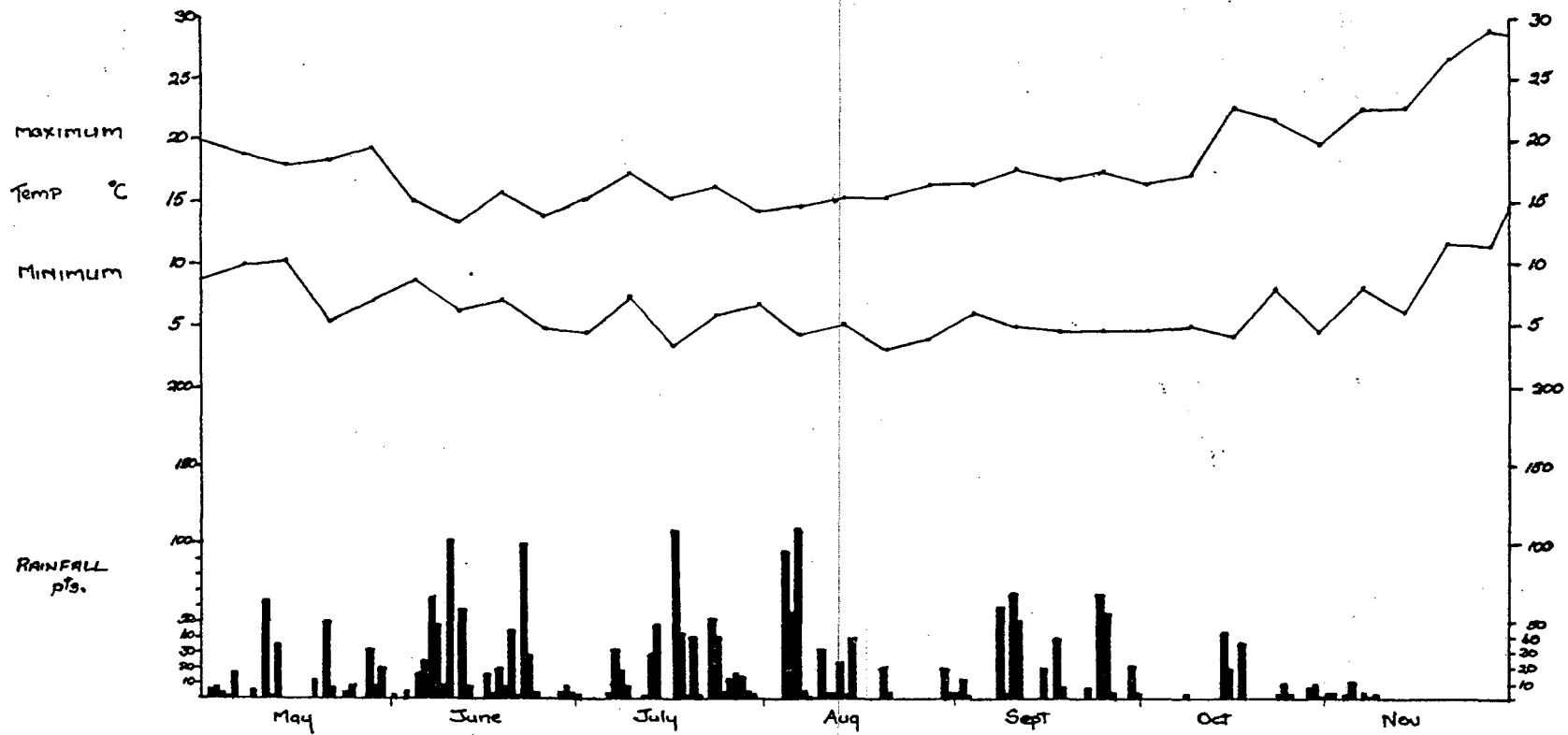
Lancelin

Fig 1(a) Weekly mean maximum and minimum temperatures (°C) and daily rainfall (pts) for Lancelin



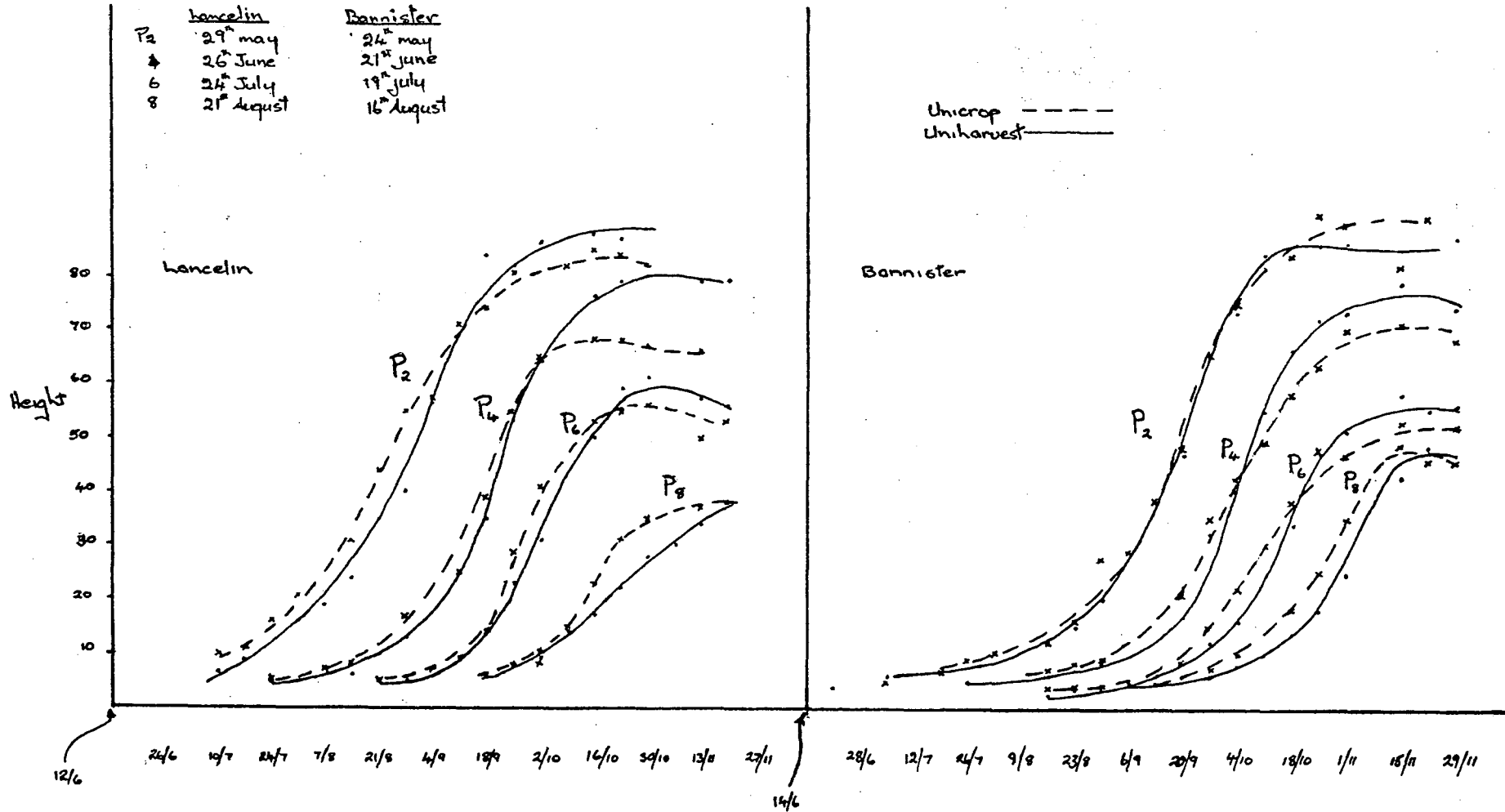
( Wandering

Fig 1(b) Weekly mean maximum and minimum temperatures  
(°C) and daily rainfall (pts) for wandering 16 km S.E. of  
North Bannister



36) Fig 2 Height of crop canopy

P = planting number Plantings 1,3,5,7 omitted for clarity





3 (b) NODE NUMBERS AT FLOWER INITIATION.

Planting Date	Lancelin		Planting Date	Bannister	
	Unicrop	Uniharvest		Unicrop	Uniharvest
15/5	21	33	10/5	20	28
29/5	21	32	24/5	20	25
12/6	21	32	7/6	20	24
26/6	21	31	21/6	19	24
10/7	21	30	5/7	19	24
24/7	21	30	19/7	19	24
7/8	21	36	2/8	20	25
21/8	21	39	16/8	21	30

Numbers refer to the leaf number attained at flower initiation.

3 (c) DATES AND DURATIONS OF KEY EVENTS - UNICROP.

		DATE				DURATION (LAYS)			
		PL	IN	FF	TF	PL-IN	IN-FF	PL-FF	DF
Lancelin	P1	15/5	19/6	31/7	9/10	35	42	77	70
	P2	29/5	1/7	13/8	16/10	33	43	76	64
	P3	12/6	17/7	28/8	14/10	30	42	77	47
	P4	26/6	28/7	7/9	16/10	32	41	73	39
	P5	10/7	14/8	20/9	18/10	35	37	72	28
	P6	24/7	28/8	2/10	23/10	35	35	70	21
	P7	7/8	9/9	12/10	4/11	33	33	66	23
	P8	21/8	18/9	20/10	10/11	28	32	60	21
Bannister	P1	10/5	21/6	23/8	2/11	42	63	105	71
	P2	24/5	11/7	9/9	5/11	43	60	102	58
	P3	7/6	19/7	21/9	1/11	42	64	106	41
	P4	21/6	31/7	28/9	5/11	40	59	99	38
	P5	5/7	14/8	4/10	10/11	40	51	91	37
	P6	19/7	23/8	10/10	14/11	35	48	83	35
	P7	2/8	12/9	22/10	17/11	41	41	81	26
	P8	16/8	25/9	29/10	21/11	40	34	74	23

PL - Planting  
 IN - Initiation  
 FF - First Flower  
 TF - Termination of Flowering  
 DF - Duration of Flowering

3 (c) DATES AND DURATION OF KEY EVENTS - UNI HARVEST.

		DATE				DURATION (DAYS)			
		PL	IN	FF	TF	PL-IN	IN-FF	PL-FF	DF
Lancelin	P1	15/5	17/7	27/8	9/10	63	41	104	43
	P2	29/5	24/7	4/9	16/10	56	42	98	42
	P3	12/6	7/8	13/9	16/10	56	37	93	33
	P4	26/6	17/8	20/9	20/10	52	34	86	30
	P5	10/7	31/8	4/10	27/10	52	34	86	23
	P6	24/7	11/9	13/10	3/11	49	32	81	21
	P7	7/8	2/10	30/10	18/11	56	28	84	19
	P8	21/8	12/10	13/11	24/11	52	32	84	11
Bannister	P1	10/5	10/7	13/9	8/11	61	65	126	56
	P2	24/5	20/7	17/9	9/11	57	59	116	53
	P3	7/6	4/8	30/9	8/11	58	57	115	39
	P4	21/6	15/8	6/10	13/11	55	52	107	37
	P5	5/7	28/8	11/10	15/11	54	44	98	35
	P6	19/7	7/9	21/10	16/11	50	44	94	26
	P7	2/8	22/9	28/10	21/11	51	36	87	24
	P8	16/8	9/10	10/11	28/11	54	32	86	18

PL - Planting  
 IN - Initiation  
 FF - First Flower  
 TF - Termination of Flowering  
 DF - Duration of Flowering

3 (d) FLOWERING DATES - LANCELIN

PLANTING DATE		PRIMARY		FIRST ORDER		SECOND ORDER		THIRD ORDER	
		S*	T	S	T	S	T	S	T
Unicrop	15/5	31/7	4/9	19/8	20/9	6/9	25/9	25/9	9/10
	29/5	13/8	11/9	28/8	25/9	16/9	9/10	9/10	16/10
	12/6	28/8	2/10	11/9	8/10	4/10	14/10	-	-
	26/6	7/9	9/10	25/9	12/10	9/10	16/10	-	-
	10/7	20/9	13/10	5/10	16/10	14/10	18/10	-	-
	24/7	2/10	23/10	12/10	25/10	-	-	-	-
	7/8	12/10	1/11	23/10	4/11	-	-	-	-
	21/8	20/10	8/11	30/10	10/11	-	-	-	-
Uniharvest	15/5	27/8	30/9	11/9	5/10	30/9	9/10	-	-
	29/5	4/9	7/10	20/9	9/10	6/10	16/10	-	-
	12/6	13/9	11/10	27/9	14/10	8/10	10/10	-	-
	26/6	20/9	16/10	9/10	20/10	-	-	-	-
	10/7	4/10	23/10	16/10	27/10	-	-	-	-
	24/7	13/10	2/11	23/10	3/11	-	-	-	-
	7/8	30/10	10/11	13/11	18/11	-	-	-	-
	21/8	13/11	24/11	-	-	-	-	-	-

\* S = Start      T = Termination

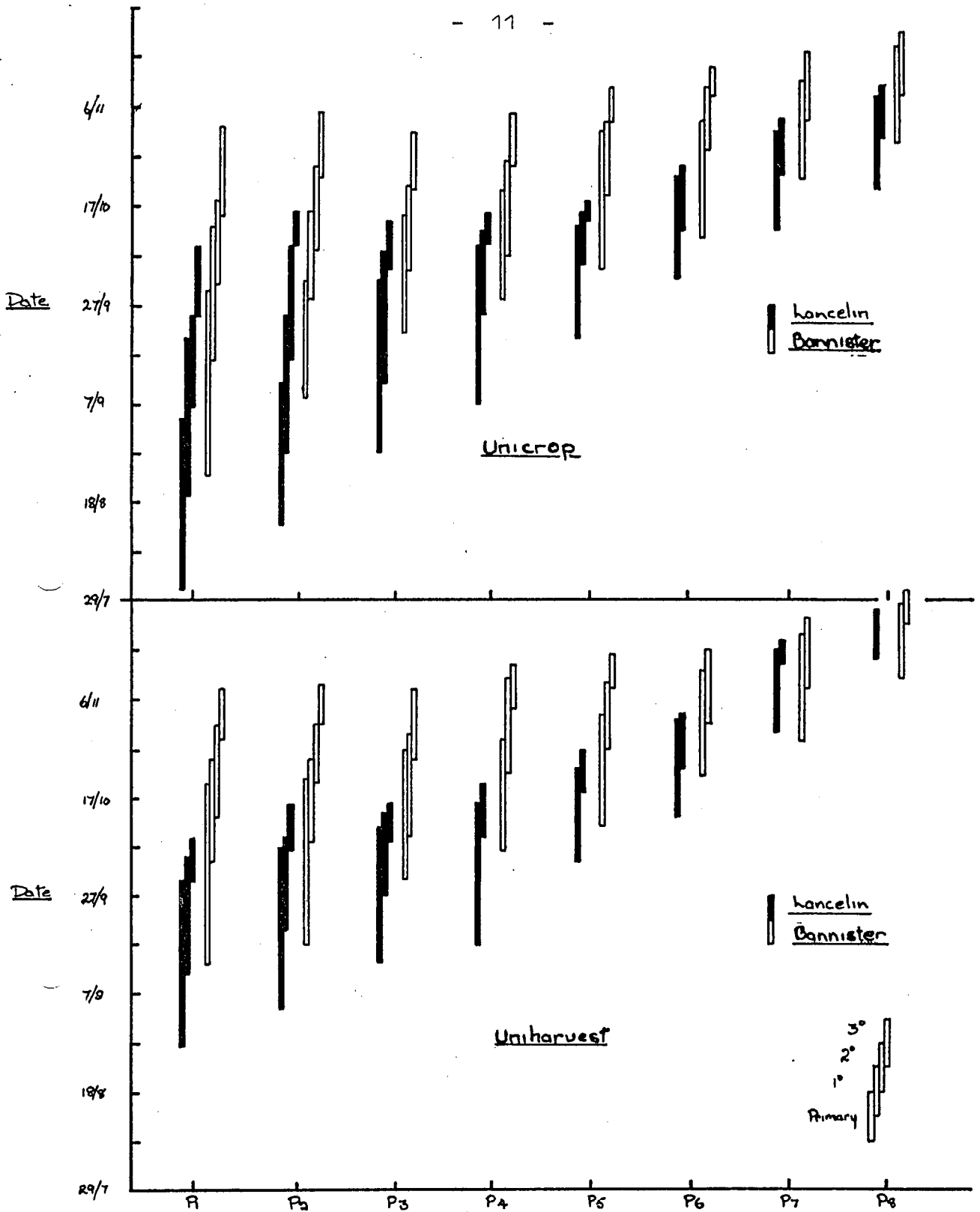
Note: Dates refer to Start and Termination of Flowering on a PLOT basis. Start and finish of flowering on the Primary spike was very uniform but as high order laterals were reached inter-plant variability increased and durations indicated by the table one slightly longer than individual plant flowering times.

3 (d) FLOWERING DATES - NORTH BANNISTER.

PLANTING DATE		PRIMARY		FIRST ORDER		SECOND ORDER		THIRD ORDER	
		S *	T	S	T	S	T	S	T
Unicrop	10/5	23/8	30/9	16/9	13/10	1/10	18/10	15/10	2/11
	24/5	8/9	2/10	28/9	16/10	8/10	25/10	25/10	5/11
	7/6	21/9	15/10	4/10	21/10	20/10	1/11	-	-
	21/6	28/9	20/10	7/10	26/10	25/10	5/11	-	-
	5/7	4/10	1/11	19/10	3/11	3/11	10/11	-	-
	19/7	10/10	3/11	28/10	10/11	8/11	14/11	-	-
	2/8	22/10	11/11	3/11	17/11	-	-	-	-
	16/8	29/10	18/11	8/11	21/11	-	-	-	-
Uniharvest	10/5	13/9	20/10	4/10	25/10	13/10	1/11	29/10	8/11
	24/5	17/9	21/10	8/10	25/10	20/10	1/11	1/11	9/11
	7/6	30/9	27/10	9/10	30/10	25/10	8/11	-	-
	21/6	6/10	29/10	22/10	10/11	4/11	13/11	-	-
	5/7	11/10	3/11	27/10	9/11	8/11	15/11	-	-
	19/7	21/10	12/11	1/11	16/11	-	-	-	-
	2/8	28/10	19/11	8/11	21/11	-	-	-	-
	16/8	10/11	25/11	21/11	28/11	-	-	-	-

\* S = Start

T = Termination



3(d). Fig. 3. Dates and durations of flowering from successive planting times.

The primary spike and successive orders of laterals are depicted as shown in the lower right of the figure.

3 (e) SEED YIELDS

PLANTING DATE		UNICROP		UNI HARVEST	
		g/m <sup>2</sup>	% of P1	g/m <sup>2</sup>	% of P1
Lancelin	15/5	270	100	244	100
	29/5	257	95	226	93
	12/6	283	105	224	92
	26/6	203	75	174	72
	10/7	184	68	142	58
	24/7	164	61	112	46
	7/8	85	32	25	10
	21/8	48	18	-	-
Bannister	10/5	386 (1 rep)	100	374 (1 rep)	100
	24/5	356	92	357	96
	7/6	276	72	278	75
	21/6	236	61	234	63
	5/7	184	48	166	44
	19/7	95	25	97	26
	2/8	74	19	91	24
	16/8	60	15	49	13

NOTE: (i) Area harvested 2m<sup>2</sup> from the centre of each plot. Figures are the means of three replications.

(ii) To convert to kg/ha multiply by ten. However small plot yields should be extrapolated with caution.

3 (f) SPLIT SEED ON LANCELIN PLOTS. 73 PE 2.

PLANTING DATE	UNICROP		UNI HARVEST	
	% Split*	% S/EE**	% Split	% S/EE
15/5	4	1	5	5
29/5	9	4	8	7
12/6	15	5	22	14
26/6	15	2	31	10
10/7	27	13	33	17
24/7	40	11	15	11
7/8	25	12	-	-
21/8	-	-	-	-

\* Split - refers to seed with a split coat but otherwise apparently normal.

\*\* S/EE - Shrivelled and "Embryo Extruded Seed".

NOTE: Figures given are the means of three replications.