Project Title:	**Cherry Tomatoes: The manipulation of truss branching**
Report:	**Final Report (June 1998)**
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CONTENTS

PRACTICAL SECTION FOR GROWERS

Objectives and background

Truss branching results in increased numbers of fruit on a truss and potentially increased yields as a result. The manipulation of truss branching has been shown to be possible through the use of reduced air temperatures. The aim of this project was to determine whether practical means of reducing air temperatures to increase truss branching could result in increased yields.

An earlier experiment has shown that by reducing 24 hour average air temperatures (lower day and night temperatures) it was possible to increase truss branching (Fussell 1997). Commercially this would not be acceptable because in order to lower day-time temperatures, increased ventilation would be necessary, resulting in losses of CO_2 and ultimately yield. Therefore, in this trial lower night-time temperatures were used in an attempt to induce truss branching.

The magnitude and duration of a temperature drop may both be important in inducing truss branching. Therefore the four main treatments in this trial comprised a control night vent temperature set-point of 18°C compared with 16°C lasting 7 nights, 16°C lasting 14 nights and 14°C lasting 14 nights.

Efforts aimed at increasing truss branching in the 1997 trial were therefore targeted at the period during which air temperatures are rising and naturally occurring levels of truss branching were falling in order to attempt to delay the decline in truss branching and hence increase yield.

It was surmised that if plants compensate for higher yields on branched trusses with lower yields on subsequent trusses, it might still be possible to increase yields by manipulating truss branching at the end of the season. A further experiment was done, in which an attempt was made to induce truss branching on the last few trusses before the plants were stopped through the use of increased night venting in the summer.

Truss branching could result in too many small fruits and hence reduce profitability even if increased yields were achieved, as a result of increased costs of picking and packaging. Truss pruning early in the season is likely to reduce fruit numbers and hence picking time and was investigated here.

Summary of results

By starting ventilation at 14°C at night in weeks 9 and 10 (24 February – 9 March) it was possible to increase truss branching on trusses that initiated during that period. However the small increase in yield from those affected trusses was not statistically significant. There was some evidence to suggest that increased levels of truss branching on those trusses resulted in lower levels of branching subsequently relative to other treatments.

The 14°C night vent treatment also had the effect of increasing fruit size in March.

The high external air temperatures during August made it impossible to achieve a substantial difference in air temperature between the two venting treatments. As a result, no significant effects on truss branching or yield were recorded. However, the slightly lower air temperatures that were achieved resulted in a significant increase in fruit size.

The removal of end flowers on trusses 1 – 15 did not have an adverse effect on yield but did result in significantly higher average fruit weights early in the season. The time taken to pick cherry tomatoes was shown to be dependent on fruit number rather than overall weight and therefore, by reducing the number of fruits to be picked, truss pruning resulted in a saving on labour costs.

Action points for growers

- Truss branching can be induced by reducing night-time air temperatures.
- Low temperatures will increase fruit size.
- Small increases in yield may be possible in the short term as a result of truss branching but they will not be perceptible by the end of the season.
- Increased truss branching in the summer is unlikely to be achievable due to high external temperatures.
- Truss pruning early in the season will increase fruit size without loss of yield and will result in savings on the costs of picking and packaging.

Practical and financial benefits from the study

This study has shown that truss branching, although it can be manipulated through the use of low air temperatures at night, is not likely to lead to significant yield gains. The effect of lower temperatures in the summer was to increase fruit size, which could be beneficial in terms of picking costs.

Truss pruning in the early part of the season would appear to be an economic measure, resulting in a saving of up to 5% on the costs of picking.

EXPERIMENTAL SECTION

Introduction

Truss branching is very common in cherry tomatoes, resulting in extra fruits on the branched truss. This phenomenon results in extra yield when that truss is harvested giving a benefit to the grower. Branched trusses may therefore be beneficial, particularly if they can be induced. However, it is possible that the extra fruit loading from the branched truss might reduce subsequent yields. Effective control of truss branching and hence fruit number would be a useful tool for matching fruit numbers to available light.

A first year of HDC funded experimentation at HRI Efford (PC 126) has demonstrated for long season cherry tomatoes the effect of low temperature in inducing truss branching as previously shown for young round tomato plants by Lewes (1953). Pulses of lower temperatures (3°C below control) lasting 7 days followed by 3 weeks of higher temperatures (1°C above control) resulted in peaks of branching on trusses that flowered 4 to 5 weeks after the pulse, presumably those trusses that were initiating during the pulse. Each peak was followed by 3 or 4 trusses where the level of branching was lower than the control, possibly reflecting the effect of higher temperatures during truss initiation.

Truss branching proved to be more common in the variety Favorita than Cherrybelle early in the season, but late in the season, (when overall levels of branching were lower), Cherrybelle had more branched trusses. The yield pattern for these two varieties reflected the pattern of truss branching in that Favorita yields were higher up until June, but thereafter Cherrybelle yields were higher, so that by the end of the season the yields for the two varieties were similar.

Plants with branched trusses generally produced a higher yield during the period that branched trusses were being picked, as a result of increased fruit number and in spite of a slightly reduced fruit size. No clear relationship between number of branched trusses per plant and total yield could be established. However the effect of branching on yield was small if branching occured very early in the season, perhaps when insufficient assimilate was available. This effect of timing of branching might have masked any relationship between number of branched trusses per plant and total yield.

Fruit size is important in cherry tomatoes. Fruit that are too large (>35mm diameter) are not sold as cherry tomatoes and produce lower returns. Fruit that are too small are less economic to produce because of the increased costs of picking and packaging per kg of fruit. Truss branching may result in too many small fruit and hence reduce profitability, even if increased yields were achieved. Truss pruning early in the season is likely to reduce fruit numbers, reducing labour costs on picking and packaging. Provided truss pruning results in increased fruit size without a significant yield reduction, it may prove to be a worthwhile operation for cherry tomato growers.

Materials and methods

Site details

The experiment utilised compartments 1-7 and 12 in F-Block at HRI Efford.

Treatments

Temperatures:	18°C for 14 nights (control)
	18°C for 7 nights then16°C for 7 nights
	16°C for 14 nights
	14°C for 14 nights

These treatments operated in weeks 9 and 10 (24 February - 10 March) in order to target trusses that were likely to result in higher yield and to attempt to extend the 'naturally occurring' period of truss branching. These temperature treatments were applied to whole compartments, with each being applied to one end compartment and one middle compartment.

Varieties:	Cherrybelle
	Favorita
Pruning:	Removal of ends of trusses up until truss 15
(Favorita only)	No pruning

The variety and pruning treatments were allocated randomly within each compartment.

Summer treatments:	Night ventilation temperature set point:	14°C
		18°C

These temperature treatments were applied equally to end and middle compartments and also equally to each of the spring temperature treatments.

The summer night vent treatments commenced on 9 June and stopped on 10 September.

The experiment was laid out in accordance with the plan (Appendix 1).

Cultural details

Tomato (*Lycopersicon esculentum* Mill.) plants cv Favorita and Cherrybelle were sown on 18 November 1996 and delivered by the propagator on 9 December 1996. Slab contact was made on 18 January.

Plants were grown in the 'V'- system on Cultilene 1200 x 15 x 5cm AG mix glasswool slabs. A total of 8 slabs were laid end to end in each plot with 4 plants per slab. The initial plant population was 1.98 plants/m^2 (7994/acre) which was increased to 3.46 plants/m^2 (13,990/acre) after leaving sideshoots to develop on 3 out of 4 plants in week 6.

The CO_2 level was raised from ambient to a target 1000vpm (sunrise to sunset) during the winter period and to circa 450 vpm in the summer using pure CO_2.

Records

1. Total yield for whole plots (bulk)

2. The incidence of branched trusses

3. Fruit number and average fruit weight (from a sub-sample of plants)

4. Date of first anthesis for each truss (from a sub-sample of plants)

5. Date of first pick for each truss (from a sub-sample of plants)

6. Weekly calculation of fruit load from the above plus counts from a limited number of plots.

7. Dry matter budget - partitioning of dry matter between leaf, stem and fruit.

8. Picking time/kg of fruit (for weeks when fruit from trusses initiated during the treatment period are being harvested).

9. Fruit quality assessments to include internal composition, texture and shelf-life were undertaken targeted towards fruit from trusses initiated during the treatment period.

10. Monitoring of the glasshouse environment especially levels of solar radiation and temperature

11. Routine monitoring of applied and root zone solution pH and EC

12. Routine chemical analysis of applied and root zone solutions

Statistical analysis and explanation of statistical terms

Treatment effects on yield, average fruit weight, fruit quality variables and the proportion of branched trusses were assessed using analysis of variance. The truss branching data were not normally distributed and were converted to angular transformations before being analysed.

Throughout the body of this report and selected appendices a number of statistical terms are referred to; these are:

SED	=	The standard error of the difference when comparing two means in that column of data.

A statistical term easier to interpret:

LSD 5%	=	The least (minimum) difference when comparing two means within a given column that is required for the means to be statistically different at the 5% significance level.
N.S.	=	Not Significant
*	=	P<0.05, i.e. the probability of this result occurring by chance if there is no true treatment effect is equal to or less than 1 in 20 (5%).
**	=	P<0.01, i.e. the probability of this result occurring by chance if there is no true treatment effect is equal to or less than 1 in 100 (1%).
***	=	P<0.001, i.e. the probability of this result occurring by chance if there is no true treatment effect is equal to or less than 1 in 1000 (0.1%).

Results and discussion

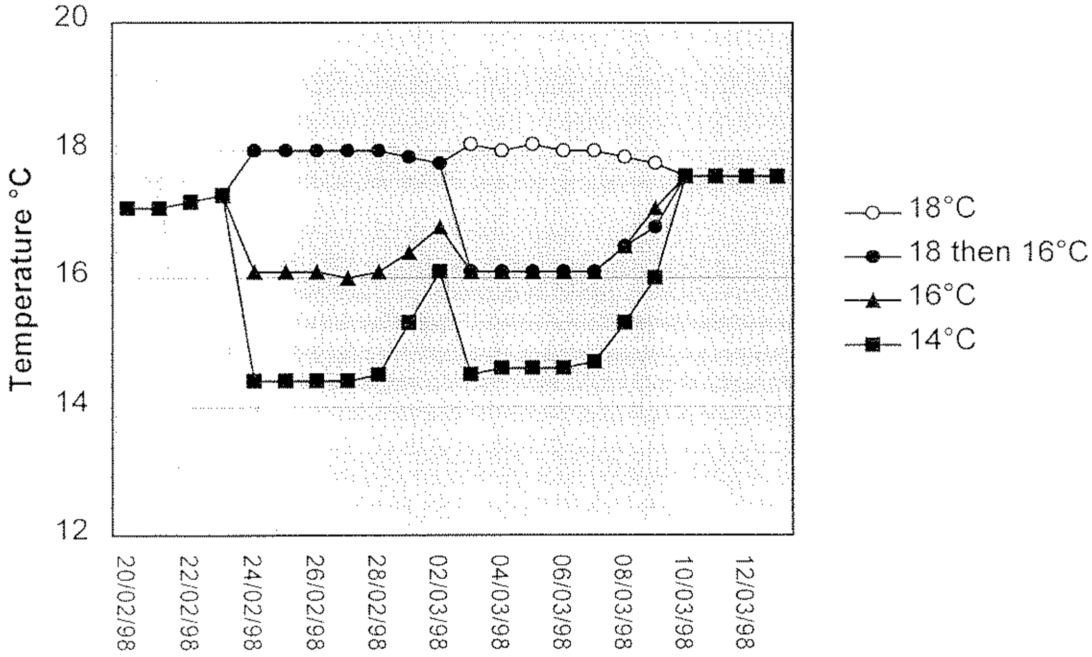
Achieved temperatures

Clear differences between treatments were achieved in night (Figure 1) and 24 hour average temperatures (Table 1) during the spring (weeks 9 - 10) treatment period. During this time trusses 6 - 8 were flowering. Assuming that flower initiation was occurring on the fourth truss above the one in flower, flower initiation would have been occurring on trusses 10 - 12 during the treatment period.

Table 1. Effect of night vent treatments on night and 24 hour average air temperatures in weeks 9 and 10 (24 February - 10 March).

14 night vent temperature	Week 9		Week 10	
	Night	24 hour	Night	24 hour
18°C	18.0	19.0	18.1	19.1
18°C then 16°C	18.0	19.0	16.1	18.2
16°C	16.1	17.2	16.1	18.1
14°C	14.5	16.9	14.6	17.2

Figure 1. Achieved night air temperatures weeks 8 - 12



The summer ventilation treatments resulted in differences of around 2°C in average night temperature from mid June to early July but the effect on 24 hour temperature at that time of year was small because of the short nights. Differences in night and 24 hour temperatures in August were small because of high external temperatures (Figure 2). Average night and 24 hour temperatures are shown in Table 2. During the summer treatment period, flowers initiating on trusses 27 and higher would have been subjected to the temperature treatments.

Table 2. Effect of summer night vent treatments on average night and 24 hour temperatures (weeks 24 – 35).

Summer night vent temperature	Weeks 24 -35	
	Night	24 hour
18°C	18.8	20.9
14°C	17.4	20.4

Figure 2a. Effect of summer night vent treatments on night air temperature

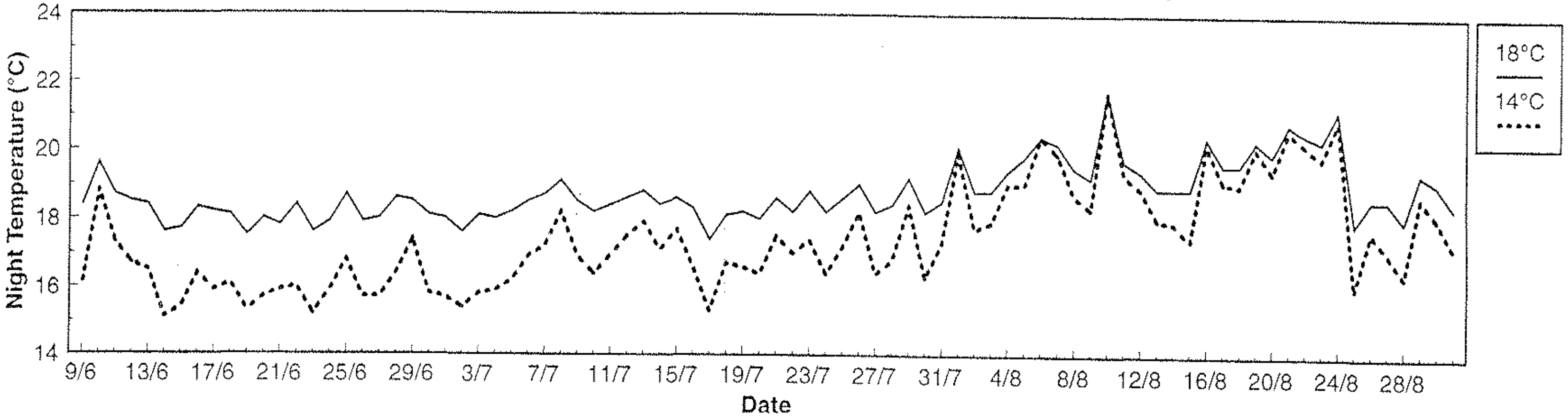
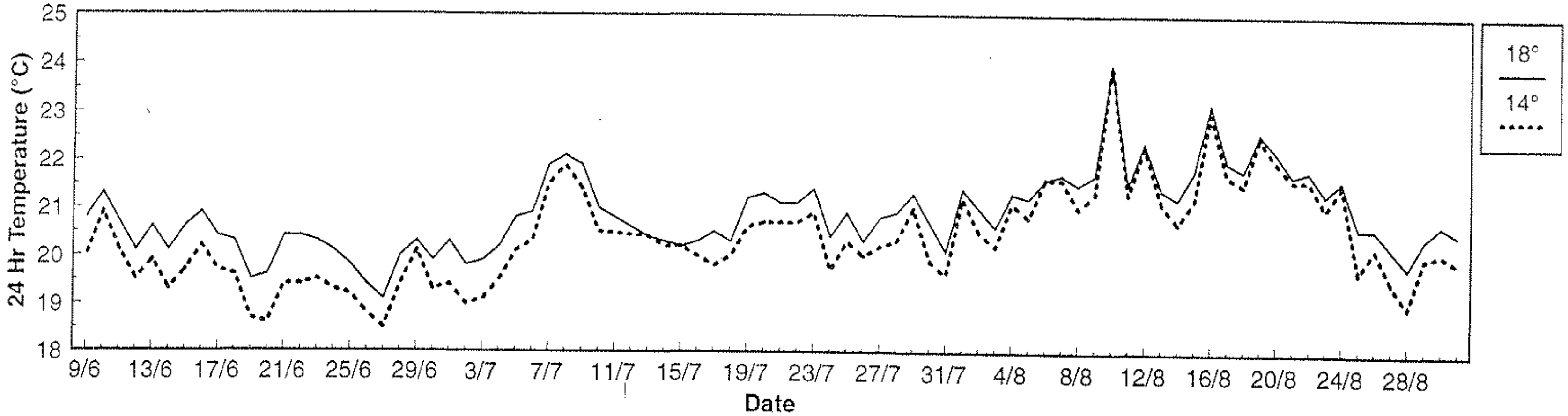


Figure 2b. Effect of summer nightvent treatment on average 24 hr temperature



Effects of spring night ventilation treatments

The spring night temperature treatments are likely to have coincided with the initiation of trusses 10, 11 and 12. Taking these 3 trusses together, there was a significant effect of the temperature treatments on subsequent truss branching. The 14°C for 14 nights treatment resulted in the highest proportion of truss branching (Table 3). The 16°C for 14 nights treatment resulted in a higher degree of branching than the 16°C for 7 nights treatment, although the difference was not statistically significant at the 5% probability level. This suggests that both the severity of the temperature drop and its duration are important in determining levels of truss branching.

Table 3. Effect of night ventilation treatments in weeks 9 and 10 on truss branching, on trusses 10 – 12 (those likely to have initiated during weeks 9 and 10).

14 night vent temperature	% truss branching untransformed (actual data)	% truss branching transformed data
18°C	50.87	45.50
18°C then 16°C	52.83	46.62
16°C	59.35	50.39
14°C	64.37	53.35
SED (3 d.f.)	-	1.395
LSD (5%)	-	4.438
Significance	-	*

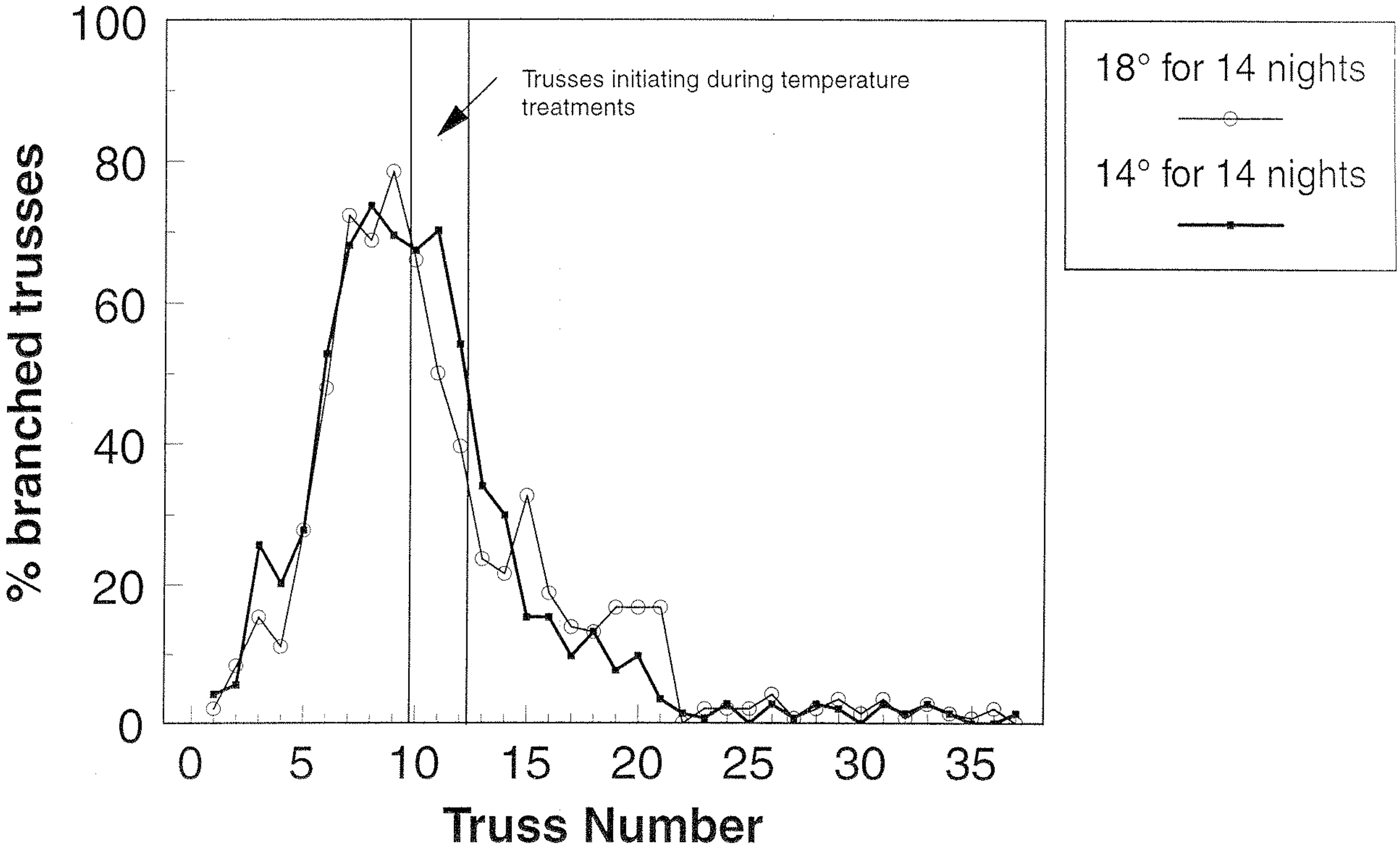
While the 14°C for 14 nights treatment did have the effect of delaying the decline in truss branching at that time of year, the data suggest that the higher incidence of truss branching on trusses 10 –12 might have resulted in lower levels of branching on later trusses relative to the 18°C for 14 nights treatment (Figure 3). However, the data for individual trusses were not significantly different (Appendix 2).

Although the 14°C for 14 nights treatment did result in the highest yield picked from trusses 10 – 12, the effect was not statistically significant. There was no apparent effect on average fruit weight (Table 4). Trusses 10 –12 were harvested during the first 3 weeks of May (weeks 19 – 21).

Table 4. Effect of night ventilation treatments in weeks 9 and 10 on yield and average fruit weight of fruit picked from trusses 10 – 12 (those likely to have initiated during weeks 9 and 10).

14 night vent temperature	Yield kg/m^2	Average Fruit Weight (g)
18°C	2.621	12.17
18°C then 16°C	2.657	12.01
16°C	2.574	11.88
14°C	2.814	12.11
SED (3 d.f.)	0.206	0.13
LSD (5%)	0.655	0.42
Significance	N.S.	N.S.

Figure 3. Effect of Spring temperature treatments on % branching



The effects of the spring night temperature treatments on truss branching and yield were so small that they were of no significance in terms of overall yield for the whole season. The average monthly yields for the spring night temperature treatments are listed in Appendix 3.

There was no evidence of the low spring night temperature treatments resulting in lower average fruit weights, as a result of increased truss branching, from the monthly gradeout figures (Table 5). However, there was a pattern of increasing fruit size with decreasing night temperature in March, although not statistically significant, which suggests a possible direct effect of lower temperatures increasing the size of fruit developing at the time.

In August there were significant differences between treatments in both yield and average fruit weight. There is no clear explanation for these differences.

Table 5. Effects of night ventilation treatments in weeks 9 – 10 on average fruit weights

	Average Fruit Weight (g)								
14 night vent temperature	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Total**
18°C	13.31	13.51	12.17	12.93	12.75	12.28	10.79	10.70	12.59
18°C then 16°C	14.54	13.25	12.34	12.84	13.46	12.53	10.70	10.34	12.76
16°C	14.79	13.12	12.02	12.92	14.26	13.66	11.98	11.12	13.07
14°C	16.20	13.37	11.98	12.99	13.72	13.57	12.10	12.18	13.05
SED (3 d.f)	0.75	0.80	0.19	0.36	0.57#	0.18#	0.55#	0.68#	1.45#
LSD (5%)	2.39	2.55	0.60	1.15	2.45	0.77	2.37	2.93	6.24
Significance	N.S.	N.S.	N.S.	N.S.	N.S.	*	N.S.	N.S.	N.S.

2 degrees of freedom only due to summer night vent treatments

Effects of summer night ventilation treatments

There were no significant effects of the summer night ventilation treatments on truss branching (Table 6). This was presumably because the achieved temperatures during this period were too high. Similarly there was no effect of the summer night vent treatments on overall yield (Table 7). However, although not statistically significant, there was an indication that the lower temperature treatment resulted in increased fruit size (Table 7).

Table 6. Effects of summer night vent treatments on truss branching (trusses 27 –37)

Summer night vent treatment	% truss branching untransformed (actual data)	% truss branching transformed data
18°C	4.77	12.61
14°C	5.14	13.10
SED (2 d.f)	-	6.525
LSD (5%)	-	28.08
Significance	-	N.S.

Table 7. Effects of summer night vent treatments on yield and fruit size (trusses 27 –37)

Summer night vent treatment	Yield (kg/m^2)	Average Fruit Weight (g)
18°C	6.562	11.87
14°C	6.631	12.86
SED (2 d.f)	0.256	0.245
LSD (5%)	1.101	1.05
Significance	N.S.	N.S.

The summer night ventilation treatment did not have any significant effect on monthly yields. (Appendix 4). The effect of the lower temperatures in increasing fruit size was significant in August and the trend was consistent from July onwards (Table 8).

Table 8. The effect of summer night vent treatments on monthly average fruit weight

Summer night vent treatment	Average fruit weight (g)			
	Jul	Aug	Sep	Oct
18°C	13.47	12.50	11.36	10.85
14°C	13.62	13.52	11.43	11.32
SED (2 d.f)	0.40	0.13	0.39	0.48
LSD (5%)	1.72	0.56	1.68	2.07
Significance	N.S.	*.	N.S.	N.S.

Effects of variety on truss branching

The patterns for truss branching (Figure 4 and Appendix 5) and yield (Table 9) for Cherrybelle and Favorita were similar to those observed in 1996. Favorita produced more truss branching early in the season than Cherrybelle and gave a higher early yield, while Cherrybelle produced slightly more truss branching from about truss 20 onwards and had a higher later yield, with the end result that the two varieties produced similar total yields.

Table 9. Effects of variety and truss pruning on total yield

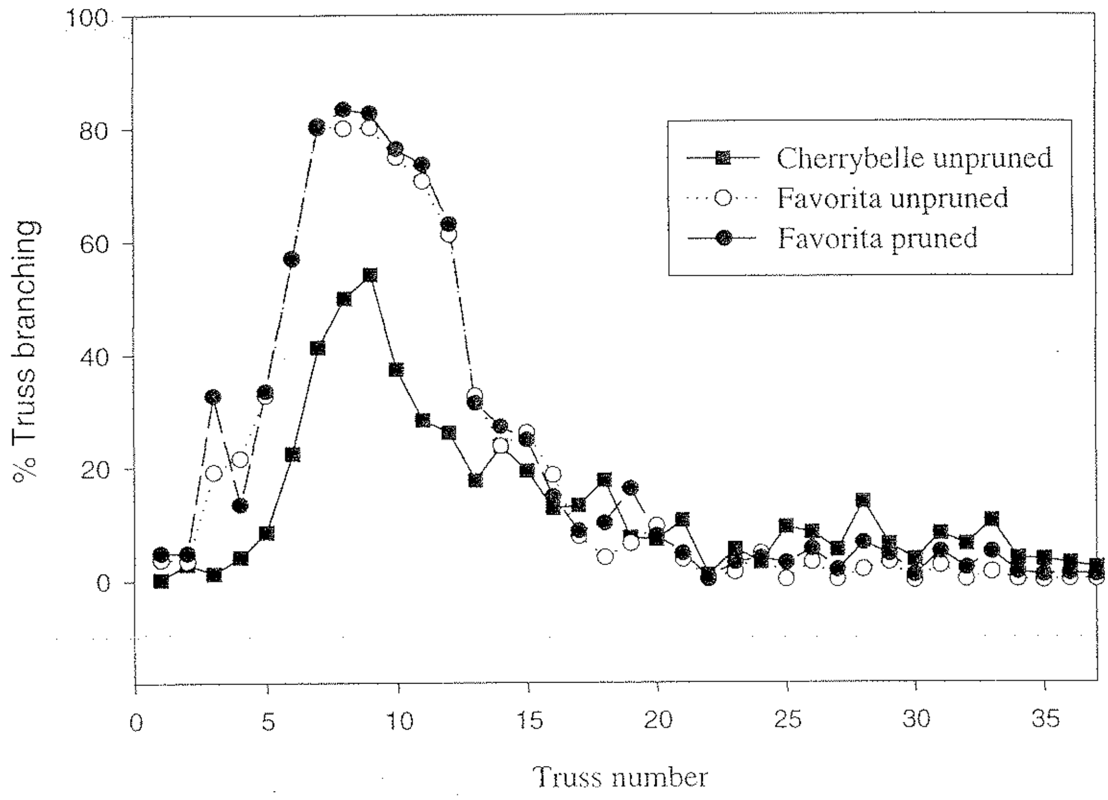
	Total Yield (kg/m^2)								
Variety /Pruning	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Total**
Cherrybelle	1.16	3.41	4.75	4.60	4.21	4.43	2.57	1.04	26.16
Favorita	1.19	3.83	5.36	4.17	3.99	4.58	2.04	0.75	25.91
Favorita pruned	1.10	3.77	5.44	4.16	4.11	4.61	2.09	0.82	26.10
SED (8 d.f)	0.07	0.12	0.15	0.09	0.09	0.08	0.16	0.04	0.52
LSD (5%)	0.16	0.28	0.35	0.21	0.21	0.18	0.37	0.10	1.20
Significance	N.S.	*	**	**	N.S.	N.S.	*	**	N.S.

The yield from the truss pruning treatment was slightly lower in March and April but higher for other months, although not significantly so. There was an indication that removing end flowers from trusses 1 – 15 had the effect of increasing average fruit weights in the early part of the season. (Table 10). There was also a tendency for Favorita to have higher average fruit weights than Cherrybelle.

Table 10. Effects of variety and truss pruning on average fruit weight

	Average fruit weight (g)								
Variety /Pruning	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Total**
Cherrybelle	12.79	12.56	12.27	12.93	12.51	12.78	11.75	11.32	12.43
Favorita	15.27	13.19	11.73	12.84	14.03	13.40	11.04	10.85	12.78
Favorita pruned	16.07	14.19	12.37	12.92	14.10	12.85	11.40	11.08	13.40
SED (8 d.f)	0.59	0.26	0.43	0.44	0.30	0.27	0.50	0.63	0.28
LSD (5%)	1.35	0.60	0.99	1.01	0.70	0.62	1.15	1.45	0.64
Significance	**	**	N.S.	N.S.	**	N.S.	N.S.	N.S.	*

Figure 4. Effect of variety and truss pruning on truss branching



Picking times and labour costs

On 19 May, (when picking was from trusses affected by the spring night vent treatments) the time taken to pick each plot, together with the weight of fruit and fruit number picked for each plot, were used to calculate the effects of the treatments on the efficiency of harvesting in terms of labour use. The rate of picking in terms of fruit per second was constant across treatments at 65 fruit per minute. However, the rate of picking in terms of weight per minute varied, being dependent on average fruit weight.

There were no marked differences in picking times between the Spring night vent treatments.

Taking the average fruit weight figures for the whole season, it can be assumed that labour costs for picking Cherrybelle were 2.7% higher than for Favorita and that truss pruning Favorita up until week 15 resulted in a 4.9% saving on picking costs. The labour costs of truss pruning must of course be considered, but are likely to be less than the increased cost of picking. In addition there is likely to be a considerable saving on the packaging costs as a result of having fewer fruit of larger size.

Effects of treatments on fruit loading

Weekly fruit load figures, calculated from flowering and pick records, do not support the view that there was a significant effect of the 14°C night treatment on the rate of increase in fruit load during the period of the treatments. The plot may suggest the contrary but it should be noted that the divergence of the 14°C treatment from the others started one or two weeks before treatments began for some reason (Figure 5).

It was apparent that the Favorita truss pruning treatment had a small but consistent effect of reducing fruit load, and that from week 15 the fruit load was much greater for Favorita than for Cherrybelle, perhaps as a result of increased truss branching in Favorita (Figure 6).

Figure 5. Effect of Spring night vent treatments on calculated fruit load

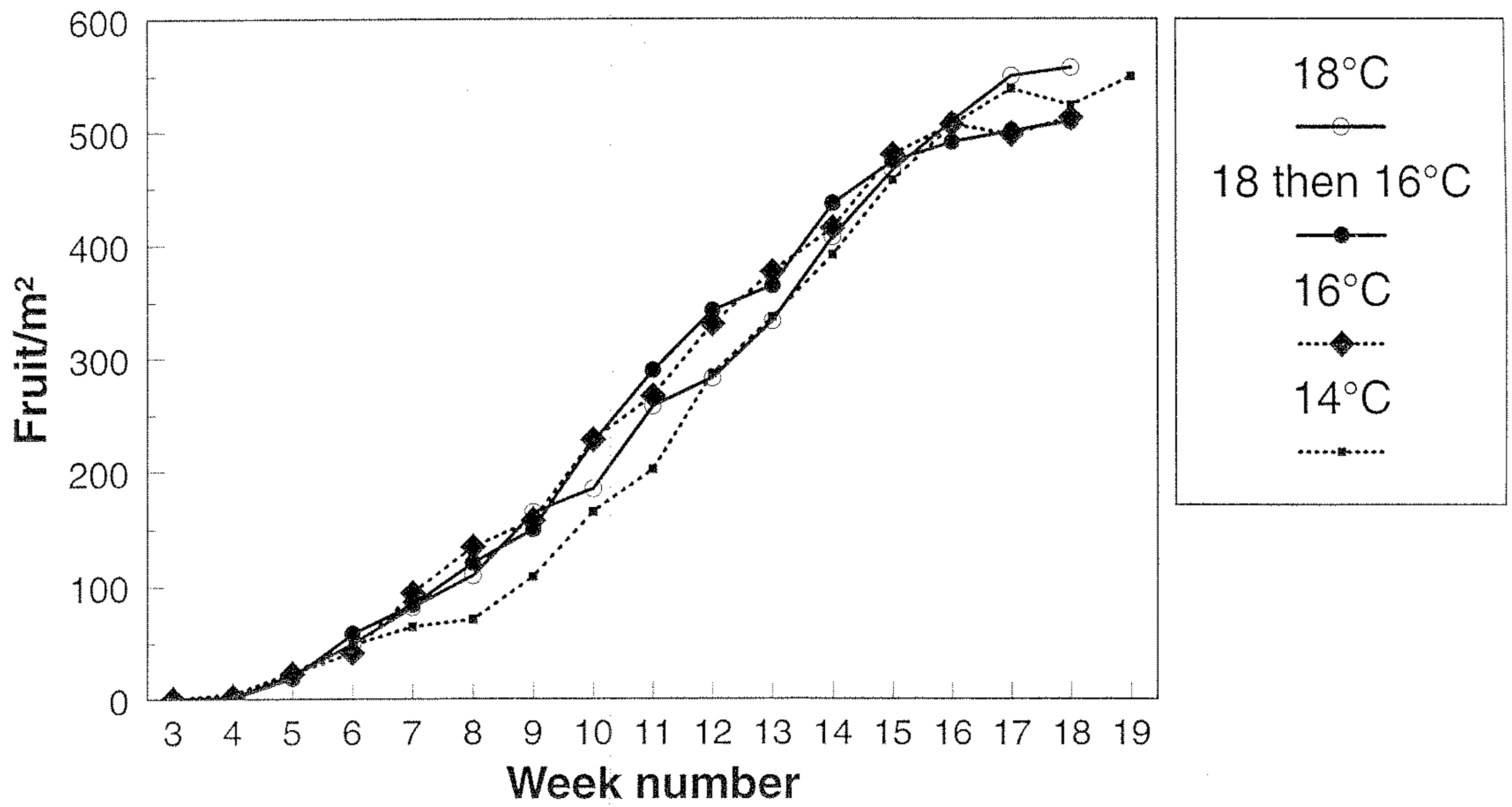
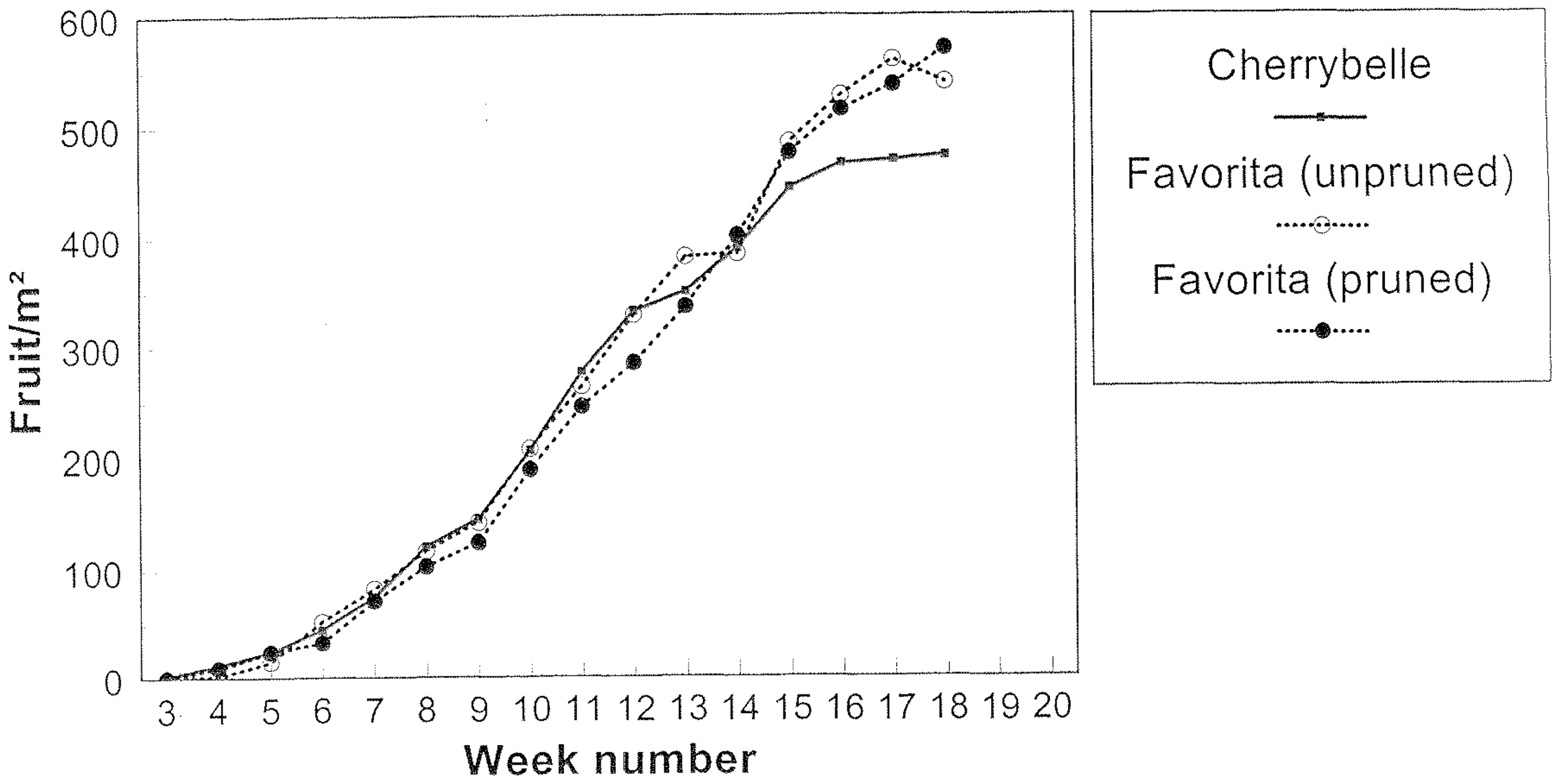


Figure 6. Effect of variety and truss pruning on calculated fruit load



Dry matter partitioning

The temperature treatments had little effect on the partitioning of dry matter between stem, leaf and fruit. As in 1996 Cherrybelle produced slightly less dry matter in the stem and more in the leaf than Favorita and a higher proportion of dry matter was partitioned into fruit in Cherrybelle (Table 11).

Table 11. Effect of variety on the partitioning of dry matter between stem, leaf and fruit.

	Total dry matter (g/m^2)				% of total dry matter		
	Stem	Leaf	Fruit		Stem	Leaf	Fruit
Cherrybelle	710	714	2115		20.1	20.2	59.7
Favorita	800	659	2048		22.9	18.8	58.3

Fruit quality

The fruit used in the assessments were harvested on from trusses 9 and 10. These trusses were expected to be the ones most affected by the Spring night vent treatments. However, in fact the trusses affected were trusses 10 – 12. The sample was therefore unlikely to reveal differences resulting from the Spring night vent treatments.

There were no effects of the temperature treatments on internal composition, texture or shelf-life. However there were some marked differences between the two varieties . Cherrybelle was much softer and less force was needed to penetrate its skin than Favorita (Table 12). Cherrybelle also had a higher weight loss during shelf-life than Favorita. The truss pruning treatment did not have any obvious effects, although there was an indication that truss pruning resulted in slightly firmer fruit.

Table 12. Effect of variety and truss pruning on weight loss during shelf-life and firmness

Variety/Pruning	% Weight Loss after 6 days	Force required to penetrate (N)	Firmness (N/mm)
Cherrybelle	2.42	5.02	0.85
Favorita	2.17	5.68	1.01
Favorita pruned	2.21	5.35	1.07
SED (8 d.f)	0.069	0.120	0.028
LSD (5%)	0.159	0.276	0.065
Significance	*	**	***

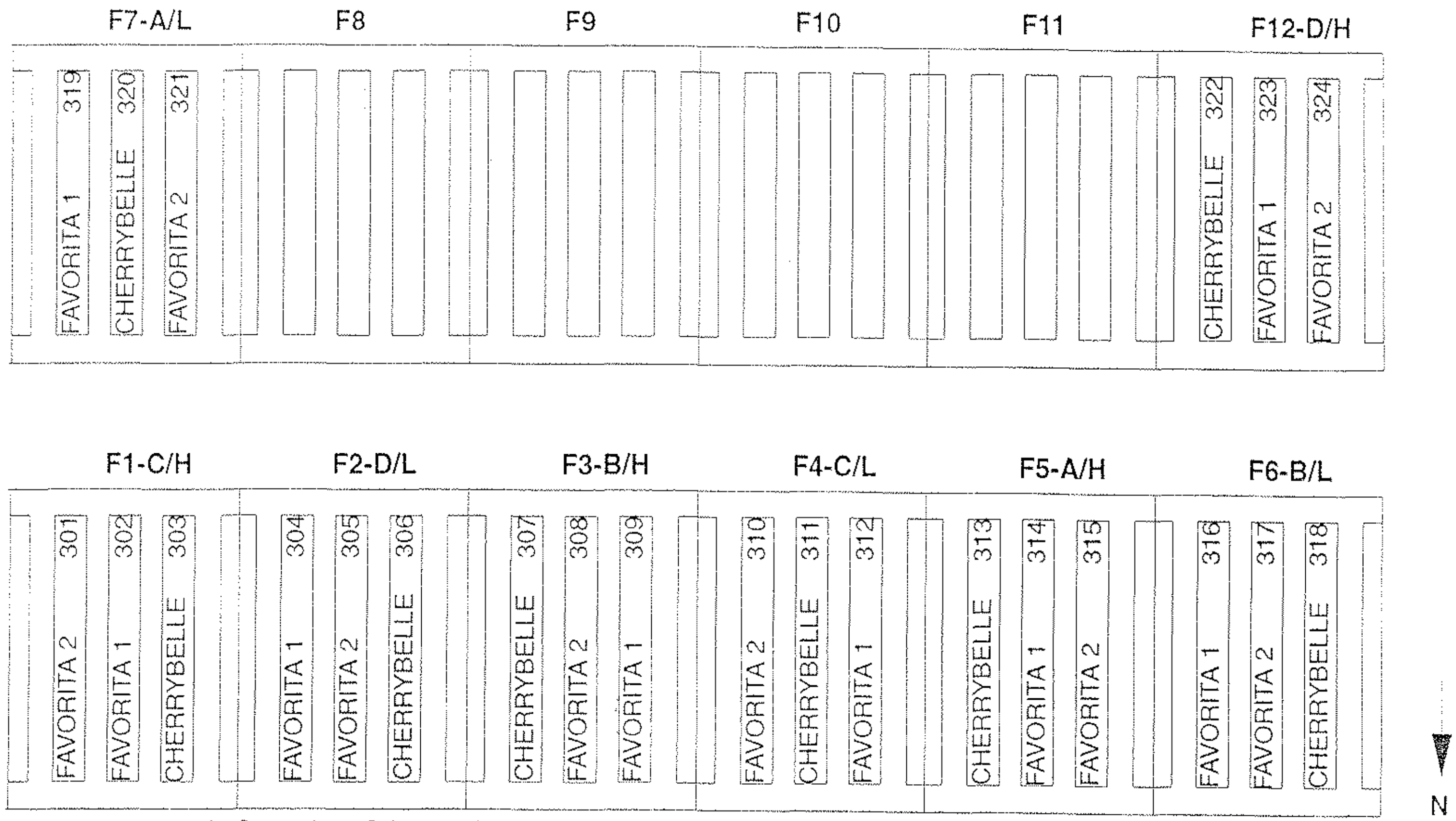
Conclusions

The experiments carried out in year 1 of this project demonstrated that low 24 hour average temperatures (as a result of lower day and night temperatures) could induce truss branching in cherry tomatoes. This year 2 study has shown that truss branching can be induced through the use of low night temperatures alone. This would be important for the grower because lower air temperatures during the day brought about by increased venting would also result in losses of CO_2. However, the impact of this small increase in truss branching on yield was not significant.

The use of reduced night ventilation set points in summer, in order to attempt to increase truss branching, was not successful in this trial. The short nights and high external temperatures ensured that average temperatures were not low enough to induce significant amounts of truss branching.

This trial has shown that truss pruning in the early part of the season is likely to be beneficial to cherry tomato growers because of its effect on increasing average fruit weight and hence increasing the efficiency of picking.

Appendix 1. Trial Plan



Spring nightvent treatments:
A=Control 18°C for 14 nights
B=18°C for 7 nights then 16°C for 7 nights
C=16°C for 14 nights
D=14°C for 14 nights

Summer nightvent:
H=18°C
L=14°C

Sub-treatments :

Cherrybelle - no pruning
Favorita 1 - no pruning
Favorita 2 - removal of ends of trusses up until week 15

Plant Density(plants/acre) = 8,000 to 14,000

Appendix 2. Effect of 14 night vent treatments on truss branching for trusses 9 – 20.

	Transformed % truss branching						
Truss	**18°C**	**18°C then 16°C**	**16°C**	**14°C**	**SED (3 d.f.)**	**LSD (5%)**	**Significance**
9	61.8	58.3	58.1	56.9	4.73	15.05	N.S.
10	53.6	48.5	53.5	55.6	1.81	5.76	N.S.
11	44.5	45.8	49.6	58.2	5.64	17.95	N.S.
12	38.3	45.7	48.5	47.4	2.32	7.38	N.S.
13	28.5	28.7	32.9	35.2	2.53	8.05	N.S.
14	26.8	31.9	28.3	32.9	4.89	15.56	N.S.
15	33.3	31.3	28.8	22.3	3.80	12.09	N.S.
16	23.8	25.1	20.5	22.8	4.35	13.84	N.S.
17	20.2	16.4	18.9	17.6	2.85	9.07	N.S.
18	17.0	15.1	23.8	17.6	2.12	6.75	N.S.
19	22.9	24.0	11.3	14.5	5.90	18.78	N.S.
20	23.0	14.3	13.0	16.2	7.07	22.50	N.S.

Appendix 3. Effects of spring night temperature treatments on total yield

	Total Yield (kg/m²)								
14 night vent temperature	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Total
18°C	1.11	3.71	4.99	4.41	4.10	4.01	2.12	0.87	25.35
18°C then 16°C	1.20	3.89	5.25	4.19	3.92	4.87	1.94	0.91	26.18
16°C	1.21	3.82	5.20	4.35	4.42	4.59	2.50	0.88	26.96
14°C	1.08	3.26	5.29	4.29	3.95	4.68	2.37	0.81	25.74
SED (3 d.f)	0.05	0.25	0.32	0.50	0.29#	0.12#	0.385#	0.18#	1.45#
LSD (5%)	0.16	0.80	1.02	1.59	1.25	0.52	1.66	0.77	6.24
Significance	N.S.	N.S.	N.S.	N.S.	N.S.	*	N.S.	N.S.	N.S.

2 degrees of freedom only due to summer night vent treatments

Appendix 4. Effect of summer night ventilation treatments on monthly yields

	Total Yield (kg/m²)			
Summer night vent treatment	Jul	Aug	Sep	Oct
18°C	4.20	4.47	2.37	0.85
14°C	4.01	4.61	2.10	0.88
SED (2 d.f)	0.21	0.12	0.27	0.13
LSD (5%)	0.90	0.52	1.16	0.56
Significance	N.S.	N.S.	N.S.	N.S.

Appendix 5. Effect of variety and truss pruning on truss branching (data transformed)

	Transformed % truss branching					
Truss	Cherrybelle (unpruned)	Favorita (unpruned)	Favorita (pruned)	SED (8 d.f.)	LSD (5%)	Significance
1	2.9	11.2	12.7	3.65	8.42	N.S.
2	9.9	10.7	12.7	4.37	10.08	N.S.
3	6.5	26.0	34.9	3.50	8.07	***
4	11.8	27.7	21.5	4.78	11.02	*
5	17.0	34.9	35.4	4.64	10.70	**
6	28.3	49.0	49.1	3.63	8.37	***
7	40.0	63.8	63.5	4.90	11.30	**
8	45.0	63.4	65.9	3.29	7.59	***
9	47.4	63.5	65.4	2.46	5.67	***
10	37.7	59.9	60.9	3.76	8.67	***
11	32.2	57.2	59.1	2.19	5.05	***
12	30.8	51.5	52.6	2.47	5.70	***
13	24.9	34.9	34.1	4.39	10.12	N.S.
14	29.2	29.2	31.5	3.39	7.82	N.S.
15	26.1	30.8	29.9	2.44	5.63	N.S.
16	20.9	25.6	22.7	2.62	6.04	N.S.
17	21.4	16.2	17.2	2.23	5.14	N.S.
18	24.9	11.6	18.6	2.97	6.85	**
19	15.9	14.8	23.7	1.88	4.34	**
20	15.6	18.0	16.3	4.00	9.22	N.S.
21	19.0	11.1	12.6	2.88	6.64	N.S.
22	5.6	2.3	4.0	3.32	7.66	N.S.
23	13.6	6.9	10.2	6.93	15.98	N.S.
24	10.2	12.5	11.4	2.30	5.30	N.S.
25	17.9	2.3	10.1	1.64	3.78	***
26	16.9	10.2	13.6	5.72	13.19	N.S.
27	13.4	2.3	7.8	3.75	8.65	*
28	21.9	7.9	14.9	3.01	6.94	*
29	14.6	10.2	12.4	3.99	9.20	N.S.
30	11.1	0.0	5.5	3.75	8.65	*
31	16.7	9.2	13.0	2.56	5.90	*
32	14.6	2.3	8.5	3.44	7.93	*
33	18.9	6.9	12.9	6.15	14.18	N.S.
34	11.4	2.3	6.9	7.07	16.30	N.S.
35	11.1	0.0	5.5	3.89	8.97	*
36	10.0	2.6	6.3	1.61	3.71	*
37	8.6	2.6	5.7	22.50	51.89	N.S.

REFERENCES

Fussell, M. (1997) Cherry Tomatoes: An examination of the causes of truss branching and fruit splitting. *HDC Project Report PC 126 Year 1, pp53.*

Hurd, R.G. & Cooper, A.J. (1967) Increasing flower number in single-truss tomatoes. *Journal of Horticultural Science* **42**, p 181-188.

Hurd, R.G. & Cooper, A.J. (1970) The effect of early low temperature treatment on the yield of single-inflorescence tomatoes. *Journal of Horticultural Science* **45**, p 19-27.

Lewis, D. (1953) Some factors affecting flower production in the tomato. *Journal of Horticultural Science* **28**, p 207-220.

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