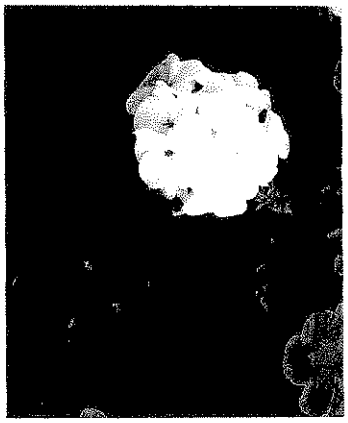
Bedding plants

74/94

FACT SHEET

Scheduling Summer Bedding



This fact sheet describes HDC funded work to develop sowing date schedules and examine the effects of temperature, photoperiod and light level on the growth and quality of bedding plants. Here, we describe the results of work on *Impatiens*, seed geranium and *Petunia*. We recommend temperatures for producing the crop and limitations to the selection of temperatures when more than one species is grown in the same greenhouse.

***Impatiens*, geranium and *Petunia* are three of our most important bedding lines. However, prior to this work practically nothing was known regarding their responses to temperature, photoperiod and light level.**

For all the species studied crops were sown on three dates between February and May and grown at one of six constant temperatures between 8 and 26°C. Time to flowering and plant quality were recorded.

Experiments were carried out on the following cultivars:–

Seed geranium cv Century Rose

Impatiens cv Super Elfin Blue Pearl

Petunia cv Blush Pink

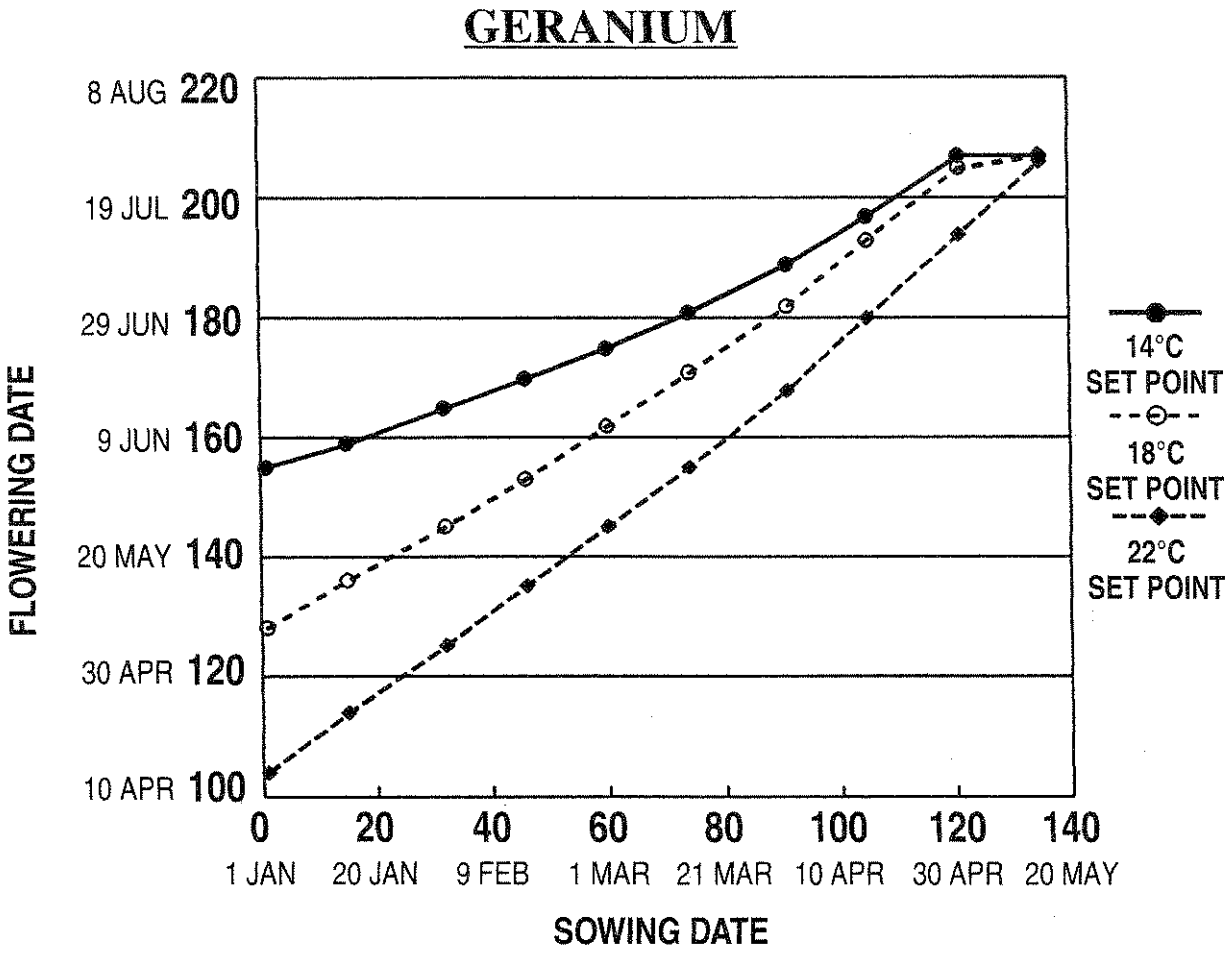
We would expect to find similar responses for other commercial cultivars of the same species.

Seed Geranium

- Time to flowering was most rapid at high temperatures (approx 26°C). Time to flowering was also affected by photoperiod, with plants under long-days (15 hours/day; equivalent to May) flowering 13 days earlier than at an 8 hour day (equivalent to February). A schedule was developed to predict the flowering of geranium (see Figure 1). This schedule assumes set point temperatures of 14, 18 and 22°C, and average outside temperature conditions.
- Your schedule can be determined by taking a ruler, lining it up on your required maturity date, and from the curve for your chosen set point temperature, reading the appropriate sowing date from the opposite axis.
- Unlike other species, higher temperatures tended to produce the shortest plants. However, temperatures above 26°C induced a chlorophyll degradation that bleached the leaves . This suggests that later in the season the best structures for the production of geraniums are those with adequate ventilation. In terms of other quality factors, geraniums were relatively unaffected by temperature. Thus, reasonable quality geraniums can be produced over a range of temperatures from 16 to 22°C. However, it should be noted that flower number per stalk tended to decrease with increasing temperature.

PROJECT N° PC74

Horticultural Development Council
18, Lavant Street, Petersfield, Hampshire GU32 3EW
Tel: (01730) 263736 Fax: (01730) 265394



Impatiens

Of the three species described here *Impatiens* was most sensitive to temperature.

- Time to flowering was found to be difficult to predict, and therefore a sowing date schedule is not presented here. This was because *Impatiens* initiate a flower in every node and a large proportion of them abort. However, the node at which flowers aborted was not predictable, such that flowers could be formed on very small, even plug plants, or much larger plants. It was, however, observed that flower drop tended to increase at temperatures greater than 22°C; hence flowering was delayed. Photoperiod (daylength) appeared to have no effect on time to flowering. Due to the unpredictable nature of this flowering response, further MAFF funded work is ongoing to increase our understanding of the mechanisms responsible, so that reliable schedules can be developed in the future.
- Plant quality was very sensitive to temperature (see plate 1). The optimum temperature for maximising plant compactness, plant weight, leaf area and flower size was 16-18°C (Plate 1). Increased leaf zonation was also observed at these temperatures. However, even small reductions in temperatures below 16°C severely retarded plant growth (see Figure 2). This clearly suggests that when producing a number of bedding species in the same greenhouse, that include *Impatiens*, then the temperature should not be lower than 16°C. At temperatures higher than the optimum for flowering (up to 22°C) plants of acceptable quality could be produced, but they tended to be more elongated and therefore less compact.

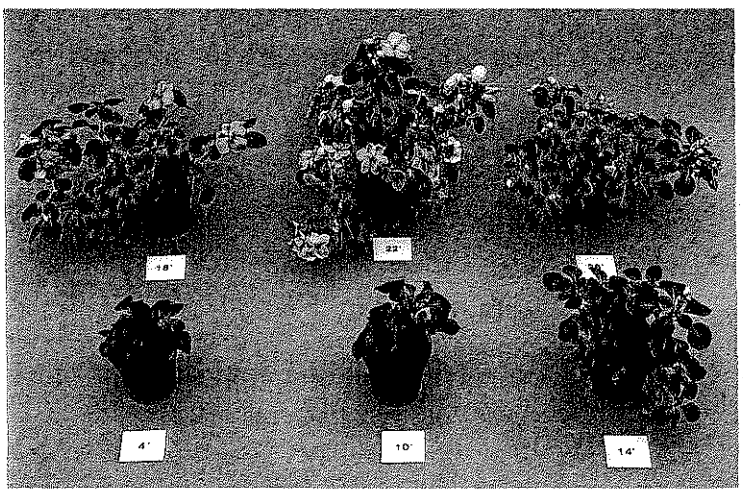


Plate. 1 The effect of temperature on quality of *Impatiens*. The figures on the plate show set point temperatures of 4,10,14,18,22 & 26°C, actual recorded temperatures were 14, 15, 17, 21, 23 and 26°C.

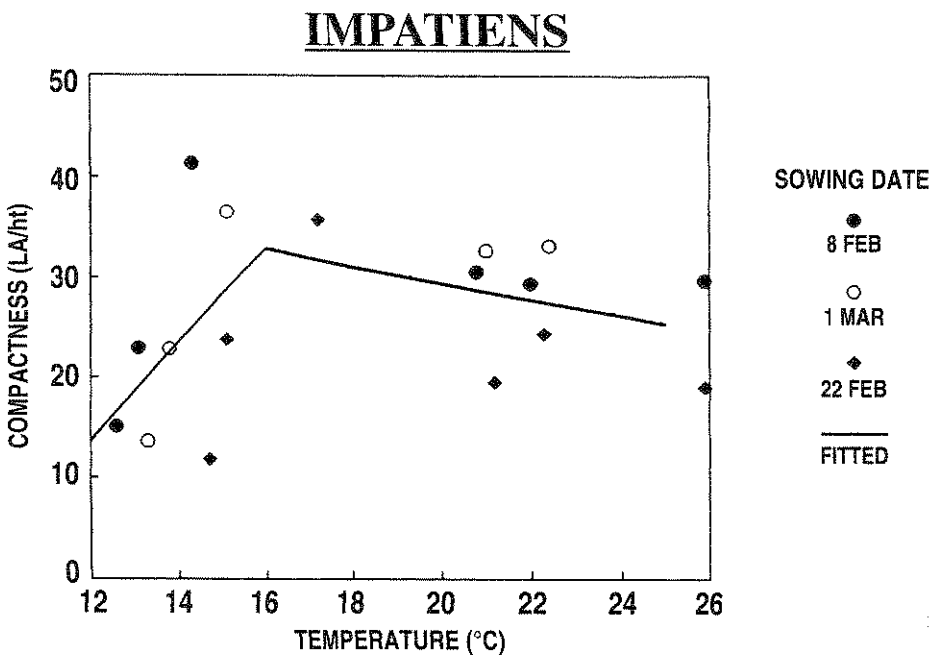


Figure. 2

Petunia

- Time to flowering of *Petunia* was affected by both temperature and photoperiod (daylength). The optimum temperature for fastest flowering was around 26°C. Time to flowering was strongly affected by daylength, such that at **15 hours/day plants flowered 18 days earlier than those at 9 hours/day** (see plate 2). A sowing date schedule has also been developed for *Petunia*, (Fig 3 - overleaf) this allows for production set point temperatures of 14, 18 and 22°C.
- Unlike other species, daylength had a dramatic effect on the quality of *Petunia*, plants grown under long days (15 hours/day) were taller and had fewer branches than those under short days (9 hours/day) but were still of an acceptable quality. We would not advise extending daylength beyond 15 hours/day with tungsten lights.
- Temperature also had considerable effects on quality (see plate 3). Cooler temperatures (14–18°C) tended to produce the most compact plants, however, temperatures below 10°C severely retarded plant growth. At higher temperatures (more than 20°C) branch length was reduced and only the main axis elongated. *Petunia* were, however, slightly more cold tolerant than *Impatiens* and could be produced at temperatures between 14 and 20°C depending on the mix of other species in the greenhouse.

Further work, funded by MAFF and HDC, is ongoing to develop sowing date schedules, and examine factors affecting quality, for a wider range of bedding species including *Salvia, Antirrinhum, Marigold* and *Impatiens*. We also aim to produce a simple to operate computer program that predicts the optimum temperatures for mixes of different plants in the same greenhouse.

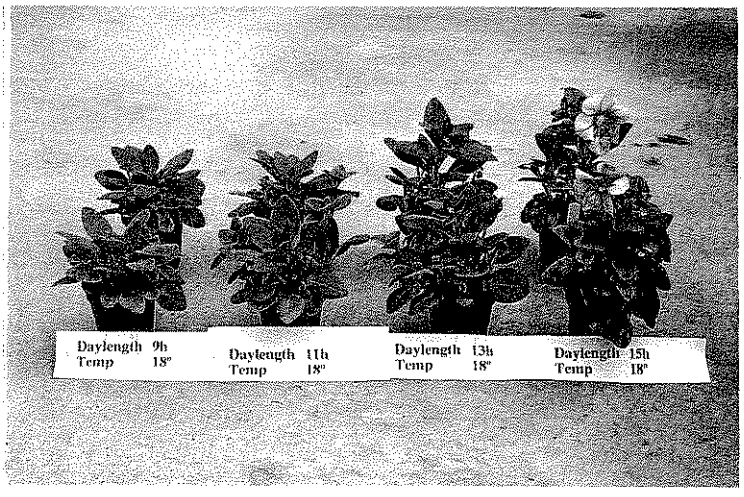


Plate. 2 The effect of photoperiod on flowering and quality of *Petunia.*

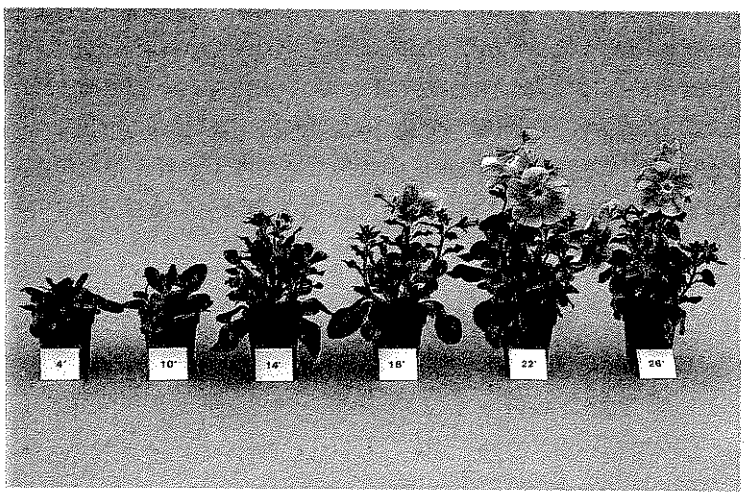


Plate. 3 The effect of temperature on quality of *Petunia.* The figures on the plate show set point temperatures of 4,10,14,18,22 & 26°C, actual recorded temperatures were 14, 15, 17, 21, 23 and 26°C.

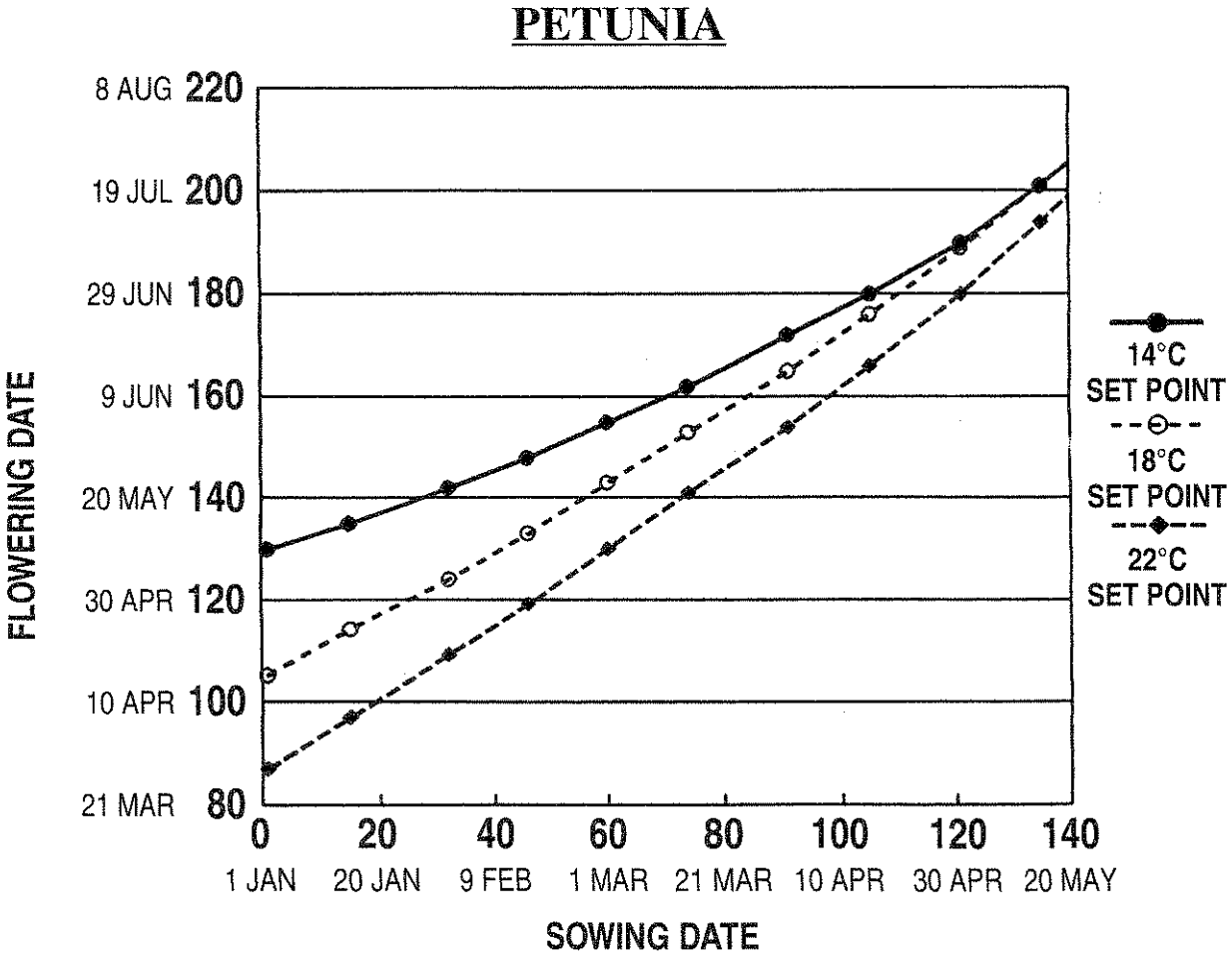


Figure. 3

This work was conducted by Dr. Simon Pearson, Dr. Paul Hadley and Dr. Ann Parker at the University of Reading with assistance from Stuart Coutts of Four Oaks Nurseries Ltd and David May formerly of ADAS.