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Coloured Shade Cloth and Plant Growth®

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INTRODUCTION

At last year's conference in Brisbane, coloured shade cloth was mentioned and discussed. I thought that this needed looking into with more depth. A Google Internet search for more information did not result in anything that was relevant.

So I decided to do a trial of my own, seeing if coloured shade cloth affects plant growth. At Advantage Plant Production, we prefer not to use chemicals to control growth and also try to minimise labour costs as much as possible. On top of this we are always looking for ways to produce better plants for our clients. So the option of using coloured shade cloth to regulate plant growth would be very beneficial.

I obtained shade cloth colours in grey, red, and blue. This was donated to me by the distributor, Polysack. Polysack claims the following with each colour:

Blue:

- The rhythm of plants is slowed down.
- More compact plants.
- Colour of leaves is darker than normal.
- Flowering can be postponed.

Grey:

- Refraction of direct light radiation.
- Blocks IR radiation.

Red:

- Leaf surface is larger.
- Stems are larger and thicker.
- Foliage volume is higher.
- Obtains early flowering without decreasing flower quality.
- Enhances root development.

METHODOLOGY

I chose to use chilli 'Explosive Ember' (*Capsicum annuum*) as my first trial plant. 'Explosive Ember' is our most popular ornamental chilli and is a fast grower and one that I thought should show any differences quickly.

I used 36 plants, nine for each treatment: no shade for control, red shade, blue shade, and grey shade. The shade cloth used has a nominal shade factor of 30%.

Three metal structures, which measured 1 m × 1 m × 70 cm high, were constructed and then covered on all sides and the roof with different coloured shade cloths. Then they were placed in a standard polyhouse structure, the usual growing environment for chillis.

Tubes (85 mm) of chillis were potted into 180-mm pots, making sure all were as uniform as possible. Each plant was trimmed to 7 cm high with four nodes. All plants were potted using the standard Advantage chilli mix (graded pine bark, with gypsum, trace elements, and dolomite added).

Each pot was fertilised with 12 g of Nutricote fertiliser, 8 g of orange (Nutricote Orange, controlled release fertilizer N13 : P5.7 : K9.1) fertiliser, and 4 g of blue [Nutricote Blue(N16 : P4.4 : K8.3)] fertiliser (2 parts orange, 1 part blue), the usual fertiliser regime for chilli plants.

All plants received the same amount of water during the trial, usually one flood per day (weather dependent). Each flood reached 100 mm high on every pot.

Three weeks later pictures were taken and measurements were made. I measured each plant's height and width and averaged the result. I also measured three leaves from each plant in length and width along with the internode length.

Another note I made was whether plants were producing flowers or fruit.

I also measured the plants at a point where they should be ready for sale, some 8 weeks (55 days) after potting.

RESULTS TRIAL 1: 'EXPLOSIVE EMBER' CHILLI

Plant height and width results for the controls and coloured shade cloth treatments are shown in Figs. 1 and 2.

Control.

Week 3. Plants maintained a steady growth, reaching a height of 15.5 cm and a width of 17.5 cm. Foliage had black tinge mixed with green (which is one of the desired features of 'Explosive Ember'). Plants were multi-branched, with a few flowers present, and buds were developing.

Week 5. Plants were still maintaining their steady growth and had reached 19.9 cm high and 22.2 cm wide. Foliage had formed more black in the leaves. Flowering had increased as did bud development. Fruit was starting to form. The plants also maintained multi-branching.

Week 8. Chilli plants reached a height of 21.8 cm and a width of 24.5 cm. The foliage had not changed in colour. Buds and flowers were still visible, and fruit had become fully developed.

Blue.

Week 3. Plants under blue shade had grown to 15 cm high and 17.5 cm wide. Foliage had more green than black (less desirable for sale). Flowers were present, and further buds were developing. The plants were multi-branched but appeared to be growing more upright.

Week 5. Plants had reached a height of 18.4 cm and a width of 23 cm. Foliage had still maintained more green than black in the leaves. Flowers were still present, with more being developed. Small fruit was beginning to appear.

Week 8. Plants had reached a height of 19 cm and a width of 24.3 cm. Leaf colour had not changed. Fruit had fully developed with more on the way. Flowers and buds were still being developed.

Grey.

Week 3. Plants had grown to 17.5 cm high and a width of 22.5 cm, having a more upright appearance. Foliage had a more vibrant green tone with very little black showing (taking away one of 'Explosive Embers' effects); the leaves also appeared broader than usual. Only a couple of flowers were open, but buds were developing.

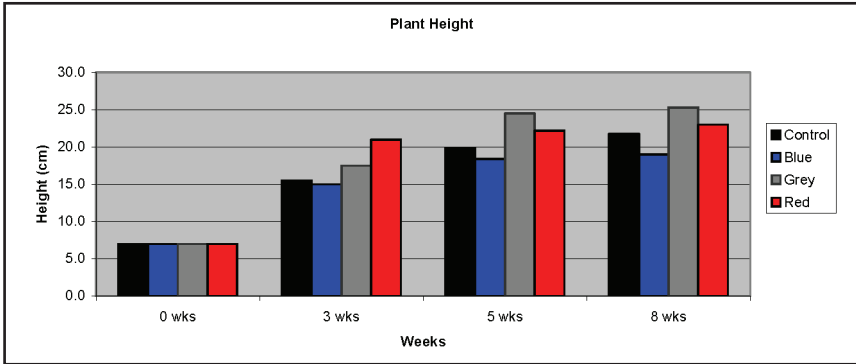


Figure 1. Plant height.

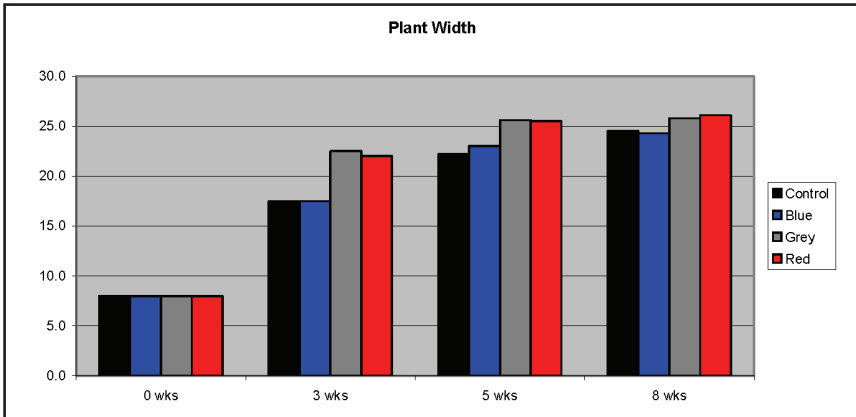


Figure 2. Plant width in centimetres.

Week 5. Plants had grown to 24.5 cm high and 25.6 cm wide, maintaining the upright appearance. The foliage was still growing the same colour and shape. Flower and bud numbers had risen, and fruit was beginning to appear.

Week 8. Plants had reached the height of 25.3 cm and a width of 25.8 cm. Leaf colour had slightly darkened, showing more black. Leaves were still broader than those of control. Fruit had fully developed with more forming, but flower numbers were decreasing.

Red.

Week 3. Plants grew to a height of 21 cm and a width of 22 cm. Plant internodes were slightly elongated, giving the upright appearance, but the plants remained multi-branched. Foliage had a good amount of black showing on the leaves (acceptable for desired look). Foliage also seemed to have broader leaves than those of control plants. No flowers were present, but buds were developing.

Week 5. Plants had grown to 22.2 cm high and 25.5 cm wide. Plants were more upright than those of control. Plant foliage had not changed, but flowers and fruit were present, with further bud development visual.

Week 8. Plant had reached the height of 23 cm and the width of 26.1 cm. Fruit was fully developed and appeared to be maturing faster than the other groups.

Pest Count. Yellow sticky traps were placed in all four sets of chilli plants for the last 3 weeks of the trial. No chemicals were sprayed to get a good indication if coloured shade cloth influenced insect numbers. Figure 3 shows results of which insects were present and how many were on each sticky trap.

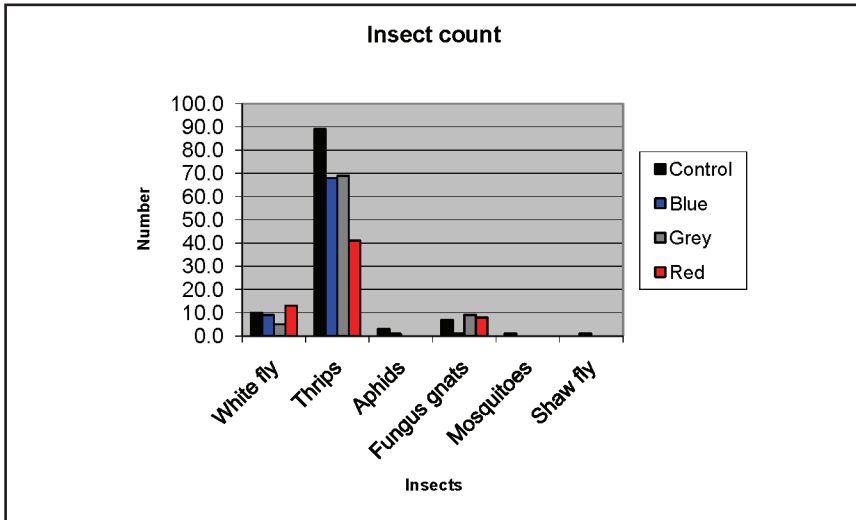


Figure 3. Insect counts.

CONCLUSION TRIAL 1: 'EXPLOSIVE EMBER' CHILLI

Control.

- Developed the best leaf colour.
- Attracted the most insects.

Blue.

- Grew the shortest in height.

Red.

- Produced more branching, which resulted in being the widest plant.
- Attracted the least thrips but slightly attracted less insects.
- Seemed to have the best overall results but not significant enough to give Advantage Plant Production a reason to install this product on a large scale.

Grey.

- Plants grew taller under grey shade cloth.
- Plants grew wider.
- Produced less colour in foliage.
- Had little effect on pest deterring.

RESULTS TRIAL 2: PELARGONIUM IVY

For my second trial I used pelargonium ivy (*Pelargonium peltatum* 'Eclipse'). This time I potted plants from 85-mm tubes to a 140-mm pot (the size pot the plants are sold in). I used 12 plants for each colour and 12 under no shade cloth for control. Eight grams of Nutricote Red (N13 : P5.7 : K9.1) fertiliser was placed in each pot. Plants were trimmed to three nodes, trying to get every plant close to the same size as much as possible. I only took measurements at the end of this trial because the final result was what I was looking for, which was to see if coloured shade cloth had an affect on plant growth.

Measurements.

- All plants from each group were measured for height.
- Three leaves from every plant were measured then averaged to get a final leaf measurement for each colour.
- Three internodes from each plant were measured then averaged to get an internode measurement from each colour.
- A number of flowers and buds were counted from every plant then added up to get a number of flowers from each group.
- A number of branches for each plant were counted to get a total count of branches for each colour.

Results.

Control. Plants grew to an average height of 25.5 cm. Internodes grew to an average length of 3.3 cm (ideal for this plant cultivar), and the average leaf length and width was 7.2 cm × 5.9 cm (as expected and expectable size for this cultivar). This group of plants produced 39 branches, 25 flowers, and 42 buds.

Blue. This group of plants grew to an average height of 28.2 cm. Internodes grew to an average length of 5.1 cm. Average leaf size of 7.5 cm × 5.5 cm. Number of branches counted was 52. This group of plants produced 33 flowers and 36 buds.

Grey. Plants under grey shade cloth grew to an average height of 29.3 cm. Internodes grew to an average length of 5.9 cm. Leaves of this group grew to an average of 7.1 × 7.7 cm. Number of branches counted was 38. Number of flowers produced was 23 and 32 buds were also produced.

Red. This group of plants grew to an average height of 30.4 cm. Internodes grew to an average length of 5.6 cm. Average leaf size was 6.7 × 7.7 cm. Amount of branches counted was 54. Flowers produced were 37, and buds produced were 48.

Conclusion.

Control.

- Grew shortest in height.
- Produced shortest internodes.

Blue.

- Produced longest leaves

Grey.

- Produced longest internodes.
- Grew wider leaves.
- Grew the least branches.
- Grew the least flowers and buds.

Red.

- Grew the tallest.
- Produced the shortest leaves.
- Grew wider leaves.
- Produced the most branches.
- Produced the most flowers and buds.

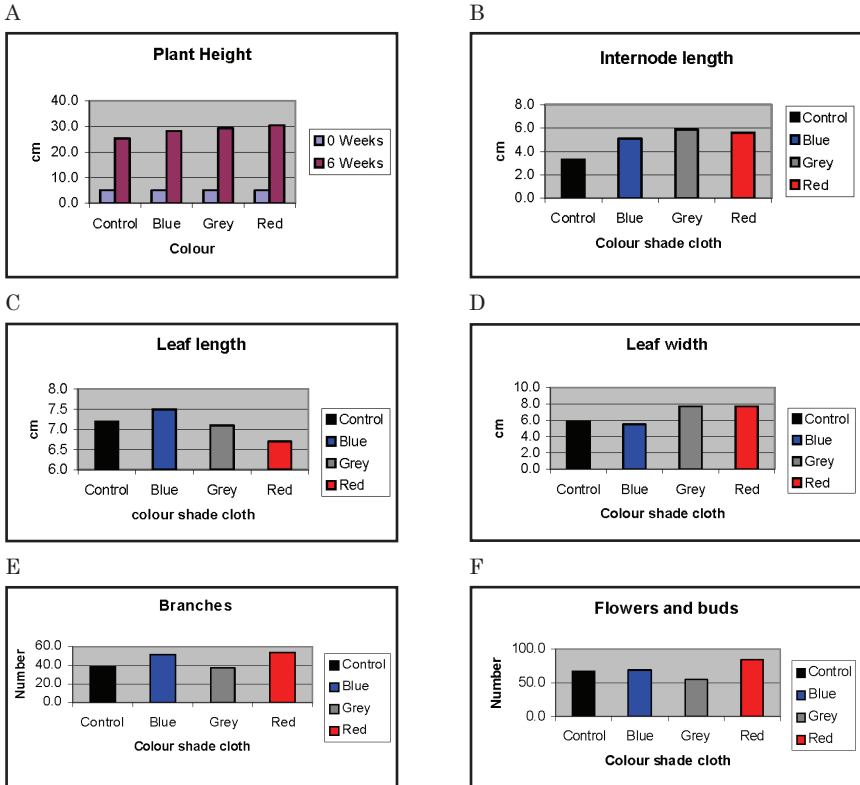


Figure 4A-F. Plant height (A), internode length (B), leaf length (C), leaf width (D), branches (E), and flowers and buds (F) for pelargonium ivy.