

Plant Growth Regulation

The increased choice of more dwarf and compact varieties available from breeders has reduced the need for some specific growth regulation in plant production. However, many varieties do benefit from growth control.

NON CHEMICAL GROWTH REGULATION

It must always be remembered that the three best growth regulators are light, temperature and moisture. By skilful control of these, good quality plants can be achieved with a minimal use of chemical regulation.

The majority of bedding plants respond better to a dry rather than wet growing regime. This will help to produce plants which are more sturdy and compact, with reduced leaf vegetative growth and the ability to initiate more flowers. Plants grown in drier conditions will also be less susceptible to disease problems such as Pythium, Rhizoctonia and Botrytis.

It is always important to control optimum growing temperature with regard to the particular crop being grown. Where effective temperature control can be maintained it is possible to use manipulation of the night and day temperature to control the growth habit of some plant types. Recently, such temperature control methods are being more widely used. The difference between day and night temperature, known as “DIF”, may be reversed so that plants are being grown at warmer temperatures at night than in the daytime. This can cause reduced height growth. If the temperature at dawn, for the first couple of hours at daylight, can be maintained some 3 - 4°C lower than the night-time temperature, then good growth control can be achieved.

In our trial production, we have found that this method has been effective when growing the following items:

	Night Temperature	Dawn Drop	Day Temperature
Pansy/Viola	7°C	0°C	4°C
Impatiens, Petunia, Salvia, Ageratum	16°C	12°C	12°C

This has worked effectively for our early season production, but is not so practical in the warmer months. The use of this negative DIF as described may also delay flowering for a few days. When applying DIF it is important to be able to accurately monitor temperatures. Too severe negative DIF can result in plants becoming chlorotic. If this happens, the problem can be reversed simply by returning to temperatures higher in the daytime than night for a few days.

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Culture Information

CHEMICAL GROWTH REGULATION

Chemical growth regulants are commonly used by the bedding plant grower as a means of producing more compact plants, with the added bonus - in some cases - of improving foliage colour and reducing the amount of space required per plant. There may be a slight delay in flowering, but this can be offset by earlier sowings.

The chemical growth regulators are applied as a fine spray, usually absorbed through the leaf that has been wetted to the extent that formation of large droplets or excessive run off is avoided. 'Spray to glisten' is a term often used to describe the required amount of solution to be used.

Growth regulants should only be applied in the cool of the day to healthy plants which have been well watered beforehand and when the foliage is dry. Treated plants should not be watered for 24 hours after spraying. No other chemicals should be applied with growth regulants.

With certain crops, such as Geranium, the application of a growth regulator at the highest concentration will possibly result in marginal leaf scorch. For this reason some growers prefer to spray a weaker solution on a more regular basis. We recommend this policy unless you are absolutely conversant with the use of these products.

A common belief is that an application of a growth regulant that worked well one season will automatically work on the same crop the following year. There can be variation for several reasons: incorrect mixing or application, differing stages of growth, changes in feeding or watering practices or incorrect light and temperature management, all of these will influence the effectiveness of the chemical used.

For a chemical plant growth regulator to be effective, it must be absorbed by the plant and applied when and where new growth occurs. Growth regulators cannot make plants smaller, so it is important to apply sooner rather than later. The overall purpose of application is to check and control growth.

The two main chemical growth regulants are:

DAMINOZIDE	Supplied in soluble powder form which contains a wetting and spreading agent.
PACLOBUTRAZOL (BONZI)	A good response is achieved on Pansy, Geranium and Petunia, but the mode of action differs from that of the above chemical. The product is effective mainly by systemic action via the stem and only to a lesser extent by leaf absorption. It is essential, therefore, to 'drift' the spray through the crop rather than apply to run-off. Too much chemical applied to foliage and running off into the compost can have a severe regulating effect, with permanent inhibition. Plants to be treated must be under no stress and the foliage must be dry.

With the increase in use of modules for seedling production there is sometimes a requirement for holding the plants back for a few days prior to transplanting. Growth regulators can be used for this purpose, but only at very low concentrations (eg. Daminozide at 1000 ppm) on certain crops. This treatment will also encourage stronger root and shoot growth once the seedlings are transplanted, providing supplementary liquid feeding is given.

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Culture Information

IMPORTANT:

The following growth regulators have been used on our trials. Their suggested application rates are based on Daminozide at 85% a.i. and paclobutrazol at 0.4% ai.

Genus	Recommended Growth Regulator	Dilution Rate	Remarks
Ageratum	Daminozide	1500 - 3000 ppm	Pack grown plants – spray at 4 true leaves. Repeat 14 - 21 days later.
Argyranthemum Madeira	Paclobutrazol	4 – 8 ppm	Effective if applied as drench.
Dahlia	Daminozide	2500 - 3000 ppm	Spray taller varieties when first bud appears.
Dianthus	Paclobutrazol	250 - 500 ppm	Apply Paclobutrazol only once per crop.
Impatiens	Daminozide	3000 - 4000 ppm	21 days after transplanting, then twice weekly, stopping before buds appear.
Mesembryanthemum	Daminozide	2500 - 3000 ppm	Spray at 5 th true leaf stage.
Mimulus	Daminozide	2500 - 3000 ppm	Spray at 4 - 6 true leaf stage.
Nemesia	Daminozide	2500 - 3000 ppm	Spray when plants cover the box. Only if necessary.
Nicotiana	Daminozide	2500 - 3000 ppm	Spray at 4 - 6 true leaf stage. Only if necessary.
Petunia	Daminozide	3000 - 4000 ppm	Spray when plants cover box. Repeat twice weekly, stopping before buds appear.
Salvia	Daminozide	2500 ppm	Spray at 4 - 6 true leaf stage, when plants are 5 - 10cm high.
Sweet Pea	Daminozide	4000 ppm	
Zinnia	Daminozide	3000 ppm	Two weeks after transplanting. Only if necessary.

To achieve the recommended dilution rate, add the amount of concentrate to each litre of water.

Daminozide at 85% a.i. Dazide	Paclobutrazol at 0.4% a.i. Bonzi
1000 ppm 1.18 g/litre	2 ppm = 0.5 ml/l
2500 ppm 2.94 g/litre	4 ppm = 1 ml/l
3000 ppm 3.53 g/litre	8 ppm = 2 ml/l
5000 ppm 5.88 g/litre	16 ppm = 4 ml/l

Further information on the products mentioned in this Culture Focus Sheet is available from distributors or your wholesale supplier.

NOTE:

Always refer to manufacturers' recommendations for use of chemical growth regulants. The information in this Culture Focus Sheet is based on our own experience with the products in our own growing conditions.

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