



Plant growth regulators: available products and approvals, best practice and use, PGR mixtures, and integration into production programmes
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What I will cover

- **Approved products and situations**
- **Product selection, mixtures, and best practice**
- **Integration of PGRs into growth control strategies**
- **Summary**

Approved PGRs



CONTROL PRODUCT NAME	ACTIVE INGREDIENT(S)	CONCENTRATION	FORMULATION	MOA	FIELD/PROTECTED	FIELD RATE (max. approved rate listed)	PROTECTED RATE (max. approved rate listed)	ON LABEL	OFF-LABEL REQUIRED	EXPIRY DATE	Nº OF APPLICATIONS	MAX. TOTAL DOSE	SPECIFIC RESTRICTIONS	COMMENTS
Cerone (MAPP20711)	Ethephon	480g/l	SC	C, S	F/P	100ml/100lt*	100ml/100lt*	✗ <input type="checkbox"/>	2000/23	15-May-27	-	1.0L/ha/yr	The product must be applied in a minimum of 125 litre water per hectare.	
Terpal (MAPP16463)	Ethephon + mepiquat	155g + 305g/l	SC	C, S	F/P	200ml/100lt for* 1,000m ²	200ml/100lt for* 1,000m ²	✗ <input type="checkbox"/>	0151/18	15-Apr-28	-	2.0L/ha/yr	Before flowering, Maximum individual application of 100 litres 0.2% solution (200ml product in 100 L water) per 1000 m ²	Container grown plants only.
Configure (MAPP17523)	6-Benzyladenine	20g/l	SC	S	P	-	500ml/100lt*	✓ <input type="checkbox"/>	✗ <input type="checkbox"/>	15-Jan-29	3	-		Apply once at 40 l/ha or up to 3 times at 20 l/ha.

Approved PGRs



CONTROL PRODUCT NAME	ACTIVE INGREDIENT (S)	CONCENTRATION	FORMULATION	MORPHOLOGY	FIELD/PROTECTED	FIELD RATE (max. approved rate listed)	PROTECTED RATE (max. approved rate listed)	ON LABEL	OFF-LABEL REQUIRED	EXPIRY DATE	No OF APPLICATIONS	MAX. TOTAL DOSE	SPECIFIC RESTRICTIONS	COMMENTS
Stabilan 750 (MAPP09303)	Chlormequat	750g/l	SC	C, S	P	-	50ml/100lt*	✗ <input type="checkbox"/>	<u>1416/17</u>	31-Aug-29	2	-	Workers must wear SRSU gloves for handling the crops 48 days after treatment.	
B-Nine (MAPP19611)	Daminozide	850g/kg	SG	C	P	-	500g/100lt*	✓ <input type="checkbox"/>	✗ <input type="checkbox"/>	15-Mar-28	5	15kg/ha/yr		Plants should not be watered for 24hrs.
Dazide Enhance (MAPP16092)	Daminozide	850g/kg	SG	C	P	-	600g/100lt*	✓ <input type="checkbox"/>	✗ <input type="checkbox"/>	15-Mar-28	5	-		
Bonzi (MAPP17576)	Paclobutrazol	4g/l	SC	S	P	-	25ml/100lt	✓ <input type="checkbox"/>	✗ <input type="checkbox"/>	30-Nov-28	10	-	Workers must wear SRSU for handling the crops after treatment	The maximum concentration must not exceed 25 ml product per litre water

Approved PGRs



CONTROL PRODUCT NAME	ACTIVE INGREDIENT(S)	CONCENTRATION	FORMULATION	MOA	FIELD/PROTECTED	FIELD RATE (max. approved rate listed)	PROTECTED RATE (max. approved rate listed)	ON LABEL	OFF-LABEL REQUIRED	EXPIRY DATE	No OF APPLICATIONS	MAX. TOTAL DOSE	SPECIFIC RESTRICTIONS	COMMENTS
Pirouette (MAPP17203)	Paclobutrazol	4g/l	SC	S	P	-	30ml/100lt (250ml/100lt)	✓ <input type="checkbox"/>	1269/17	30-Nov-28	4 (1)	-	Workers must wear SRSU for handling the crops after treatment	
Regalis Plus (MAPP16485)	Prohexadione	100g/l	SG	S	F/P	416g/100lt	416g/100lt	✗ <input type="checkbox"/>	0175/15	30-Jun-28	-	(2.5kg/ha/crop)		requires EAMU 2153/19 for indoor use
Moddus (MAPP15151)	Trinexapac-ethyl	250g/l	EC	S	F/P	60ml/100lt	60ml/100lt	✗ <input type="checkbox"/>	3062/10	15-Jun-27	1	-		

ATTRIBUTES		PLANT GROWTH REGULATOR			
Active ingredient	<i>Chlormequat</i>	<i>Daminozide</i>	<i>Daminozide + Chlormequat</i>	<i>Ethephon</i>	<i>Paclobutrazol</i>
Activity level	+	+	++	+	+++
Multiple application needed	+++	+++	++	++	+
Application type					
Foliar spray	YES	YES	YES	YES	YES ¹
Drench	YES	NO	NO	NO	YES
Dips/soaks	plugs/liners	cuttings	-	-	bulbs,plugs/liners
Chemical absorption					
Ease of absorption	+	+	+	++	+++
Time (hours)	4h	18-24h	18-24h	12-16h	0.5-1.0h
Factors improving absorption	high humidity, limited air movement, cloudy days, early morning or late afternoon applications				
Translocation within plant	+++	+++	+++	-	+
Absorption site					
Leaves	+++	+++	+++	+++	++
Stems	+	-	+	-	++
Roots	+	-	-	+	+++
Typical concentrations					
Foliar sprays (mg/L)	0.6	2.5-5.0	1.5-3.0; 0.4-0.8	0.1 -0.5	1-200
Drench (mg active ingredient per pot)	0.1-0.2	-	-	0.01-0.1	0.01-8.0
Other factors					
Does pine bark substrates affect drenches?	-	-	-	-	++
Phytotoxicity potential	+++	+	+	++ (do not apply to stressed plants)	+
Overdose potential	+	++	++	++	+++
Optimum water pH	3.0-7.0	5.0-9.0	-	<5.0	4.0-9.0
Shelf life					
In the bottle	<2	<2	-	indefinite	<4
Mixed solution	<24h	<24h	<24h	<4h	<1 week



Key areas for getting the best of PGRs

- Scheduling and production strategy
- 'Strength' of active substance
- Timing of applications
- Product choice and dose rate
- Weather conditions at, before, during and after applications (also irrigation)
- Drench v spray
- Spray quality and droplet size
- Coverage and water volume
- Use of adjuvants and foliar fertilisers



Some examples



Varietal response

- Every species or variety responds differently
- Generally, the choice is based on grower experience
- Some PGRs delay flowering
- Behaviour of PGR under different conditions needs to be considered
- Results are dependent on factors mentioned previously
- Lots of data from the US and literature (note US gallon)

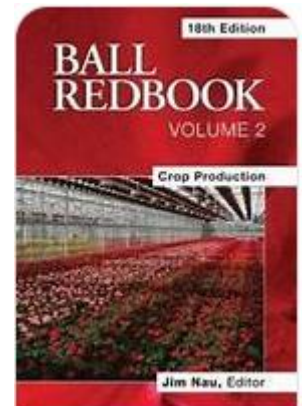


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PGR mixtures

- Most common mixture daminozide* + chlormequat (3g + 0.8ml)
- Usually used as first treatment followed by daminozide
- Second most common paclobutrazol + daminozide* (1.5ml + 3ml) as spray
- Trinexapac-ethyl and prohexadione, mainly used for trees and shrubs (trinexapac on conifers or grasses)
- Ethephon tends to be used on herbaceous perennials often with daminozide (not on fuchsia)
- Caution with ethephon as it can abort flowers!
- *(label states not to mix daminozide)



Integration of PGRs in strategies

Considerations:

- ✓ Crop family and genera
- ✓ Situation (outdoor, polythene, glasshouse)
- ✓ Weather conditions
- ✓ Crop specification (height, branching, number of flowers etc.)
- ✓ Growing media (bark content, coir content, CEC etc)
- ✓ Production beds (ebb and flow benches, MyPex over soil, capillary matting and MyPex etc.) (Potential to absorb or recycle PGR drench applications)
- ✓ Age (or stage) of the crop – plugs/liners vs finished crop
- ✓ Any mechanical, nutritional or environmental interventions
- ✓ Pest and disease pressure
- ✓ Stress...

Test plot trial – Salvia ‘Hot Lips’ 1L

- 104 plug potted and grown on outdoor bed, week 29 (14th July) into 1L
- Peat-free mix 4.0kg CRF + 0.8kg base
- 25 plants per plot
- 12 treatments including ‘UNTREATED’
- MyPex over sand
- Overhead irrigation (no specific regime)
- All plots had single pinch on 29th August at 8cm height above pot



Test plot trial – Salvia ‘Hot Lips’ 1L



<u>TREATMENT</u>	<u>CONCENTRATION</u> <u>/ L</u>	<u>WATER</u> <u>VOLUME/ ha</u>	<u>WATER</u> <u>VOLUME /</u> <u>PLOT</u>	<u>11/08/2025</u>	<u>15/08/2025</u>	<u>22/08/2025</u>
1. Untreated	N/A	N/A	N/A			
2. B-Nine	3g	600	60ml	✓	✓	✓
3. B-Nine + Cycocel	3g + 0.8ml	600	60ml	✓	✓	
4. B-Nine + High K	3g +3g	600	60ml	✓	✓	✓
5. B-Nine + Bonzi	3g + 2.5ml	600	60ml	✓	✓	✓
6. Bonzi (spray)	5ml	600	60ml	✓	✓	✓
7. Bonzi (spray) + Elasto	5ml + 2.5ml	600	60ml	✓	✓	✓
8. Bonzi (drench)	5ml	2,000	200ml	✓		✓
9. Bonzi + Cycocel	2.5ml + 0.8ml	600	60ml	✓	✓	
10. High K	3g	600	60ml	✓	✓	✓
11. Brushing	N/A	N/A	N/A	✓	✓	✓
12. Regulated deficit irrigation (RDI)	N/A	N/A	N/A	✓	✓	✓

Test plot trial – Salvia ‘Hot Lips’ 1L



Test plot trial – Salvia ‘Hot Lips’ 1L



Test plot trial – Salvia ‘Hot Lips’ 1L



1

Bonzi lead

2

Cultural lead

3

B-Nine lead

Summary

- If you think you should apply PGRs = YOU ARE TOO LATE!
- The product choice and application method is crucial for each species/variety
- Coverage and application techniques are crucial
- Daminozide, paclobutrazol and chlormequat remain key actives
- BUT, some adjustment to fertilisers both foliar and liquid feeding could be beneficial
- Brushing carries some risk depending on plant species but perhaps needs to be done early before shoot extension and more gently
- Finally, it's a combination of activities that form a strategy and not relying on PGRs alone

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