

Bedding Plant Height Control Strategies

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North Carolina growers use a number of strategies to control bedding plant height. Common non-chemical strategies for height control include: cool temperatures (DIF), withholding fertilizer and/or water, and adjusting crop timing. A more detailed discussion about Best Management Strategies for Height Control is in NC State University Horticulture Information Leaflet 529 (available at: http://www.ces.ncsu.edu/depts/hort/floriculture/crop/crop_PGR.htm).

Table 1 lists some common plant growth regulators (PGRs) and rates used by North Carolina bedding plant growers. The two most commonly used

PGRs are B-Nine and Bonzi. Growers vary in their growing strategies and the rates used vary accordingly. Wholesale growers tend to use more active chemicals (Bonzi and Sumagic) and higher rates. Grower should be aware that high rates of Bonzi and Sumagic can curtail new leaf expansion. The residual effects of the PGR can even last until the plant's roots become fully established in the landscape. Rates may vary by location and growers should adjust to their own conditions. Always follow label directions. Additional information about labeled rates is also contained in HIL 529.

Table 1. Types of plant growth regulators and rates used by North Carolina bedding plant growers.

Crop	Chemical Type	Foliar Spray Rates (number of times applied)	Stage of Development Chemical Applied
Ageratum	B-Nine	5,000 ppm	Used as needed to tone and harden.
	First: B-Nine Followed by: Bonzi	1,500 ppm 10 ppm	Applied 3 weeks after transplant. Applied when plants are 3/4ths finished size to hold (2 to 3 weeks).
	B-Nine + Bonzi	2,500 ppm + 20 ppm	Apply combination 10 to 14 days after transplant, every week until sales - unless plants show no signs of stretch.
	Bonzi	3 ppm	Applied as needed depending on plant growth and weather.
	Bonzi	20 ppm weekly	Applied 2 weeks after transplanting 288 plugs.
	Bonzi	30 ppm as needed	Apply near finish.
	Bonzi	30 ppm applied once	Applied 2 weeks after transplanting 384 plugs.
Alyssum	Sumagic	3 to 5 ppm	Applied as needed depending on plant growth and weather.
	B-Nine	3,000 ppm, once	Applied 3 weeks after transplanting.
	B-Nine	5,000 ppm, once	Applied 10 days after transplanting 384 plugs.
	B-Nine	5,000 ppm	Used as needed to tone and harden.
Begonia	Bonzi	20 ppm, applied once or twice if needed	Seeds direct sown in flats. Bonzi applied 5 to 6 weeks later.
	B-Nine	5,000 ppm	Used as needed to tone and harden.
	First: B-Nine Followed by: Bonzi ¹	1,500 ppm 5 ppm (light mist)	Applied 4 weeks after transplant. Applied when plants are at finished size to hold (2 to 3 weeks).
	Bonzi ¹	3 to 5 ppm	Used only if need to stop growth.

¹ Caution: Bonzi is not recommended for begonias because it is extremely active. Stunting can even occur from spray drift.

Table 1. Continued.			
Crop	Chemical Type	Foliar Spray Rates (number of times applied)	Stage of Development Chemical Applied
Celosia	B-Nine + Bonzi	2,500 ppm + 20 ppm	Apply combination 10 to 14 days after transplant, every week until sales - unless plants show no signs of stretch.
	First: B-Nine Followed by: Bonzi	3,000 ppm 20 ppm	Applied 3 weeks after transplant. When plants are 3/4ths finished size to hold (2 to 3 weeks).
	B-Nine or Bonzi	5,000 ppm 15 ppm	Used as needed to tone and harden. Used to stop growth.
	Bonzi or B-Nine	20 ppm, applied twice 5,000 ppm, applied twice	Either one used (not both). Applied 2 to 3 weeks after transplanting 288 plugs.
	Bonzi	15 to 45 ppm, as needed	Near finish.
	Bonzi	45 ppm applied once	Applied 10 days after transplanting 384 plugs.
	Sumagic	5 ppm	Applied as needed depending on plant growth and weather.
Dusty Miller	B-Nine	2,500 ppm, applied twice	Applied 3 weeks after transplanting 288 plugs.
	B-Nine	5,000 ppm	Used as needed to tone and harden. Cool temperatures also used.
	B-Nine + Bonzi	2,500 ppm + 20 ppm	Apply combination 10 to 14 days after transplant, every week until sales - unless plants show no signs of stretch.
	First: B-Nine Followed by: Bonzi	3,000 ppm, applied twice 20 ppm, applied once	Applied 2 and 4 weeks after transplant. When plants are finished size to hold (2 to 3 weeks).
	Bonzi	3 to 5 ppm	Applied as needed depending on plant growth and weather.
Geranium, Seed	Cycocel ²	1,250 ppm, applied every 10 days if needed	Start applications 2 weeks after transplant.
	Cycocel	1,500 ppm, applied once	--
	Cycocel Bonzi Florel	1,000 ppm, or 3 ppm, or 350 ppm	Applied after transplant. Applied after transplant. Applied after transplant.
	First: B-Nine Followed by: Bonzi	5,000 ppm, applied twice 5 ppm	Applied 2 and 4 weeks after transplant. When plants are 3/4ths finished size to hold (2 to 3 weeks).
	² Caution: High rates of Cycocel (>1,500 ppm) can cause yellowing of the foliage (phytotoxicity).		
Impatiens	B-Nine + Bonzi ³	2,500 ppm + 20 ppm	Apply combination 10 to 14 days after transplant, every week until sales - unless plants show no signs of stretch.
	Bonzi	1 to 3 ppm	Applied as needed depending on plant growth and weather.
	Bonzi	15 to 45 ppm.	Higher rates used with warm temperatures. Applied at finish.
	Bonzi	15 to 22 ppm, applied once	Used as needed to tone and harden.
	Bonzi	20 ppm, applied weekly	Start applications 1 week after transplant.
	Bonzi	20 to 30 ppm, applied 2 or 3 times at 10 to 14 day intervals	Applications start 2 weeks after transplanting.
	Bonzi	30 ppm, applied once	Applied 2 weeks after transplanting 384 plugs.
	Bonzi	35 ppm, applied once	Used to stop growth.
	Bonzi	5 ppm DRENCH, applied once	Applied at finish to hold crop.
	Sumagic	3 to 5 ppm	Applied as needed depending on plant growth and weather.
	³ Caution: High rates of Bonzi can result in delayed flowering of impatiens.		

Table 1. Continued.			
Crop	Chemical Type	Foliar Spray Rates (number of times applied)	Stage of Development Chemical Applied
Marigold	B-Nine	5,000 ppm	Used as needed to tone and harden.
	B-Nine + Bonzi	2,500 ppm + 20 ppm	Apply combination 10 to 14 days after transplant, every week until sales - unless plants show no signs of stretch.
	Bonzi or B-Nine	20 ppm, applied weekly if needed. or 5,000 ppm, applied weekly if needed	Applications start 2 to 3 weeks after transplanting 288 plugs.
	First: B-Nine Followed by: Bonzi	5,000 ppm, applied once 5 ppm, applied once	Applied 3 and 4 weeks after transplant. When plants are finished size to hold (2 to 3 weeks).
	Bonzi	30 ppm, applied once	Used to stop growth.
	Bonzi	15 to 60 ppm, depending on variety	Tall varieties receive higher rates.
	Bonzi	30 ppm, applied once	Applied 2 weeks after transplanting 384 plugs.
Petunia	B-Nine + Bonzi	2,500 ppm + 20 ppm	Apply combination 10 to 14 days after transplant, every week until sales - unless plants show no signs of stretch.
	First: B-Nine Followed by: Bonzi	5,000 ppm, applied once 30 to 60 ppm, applied once	Applied when the plants are dime sized. Only applied if needed during periods of high temperatures.
	Bonzi	3 to 5 ppm	Applied as needed depending on plant growth and weather.
	Bonzi	20 ppm, weekly	Applications start 2 weeks after transplanting 288 plugs.
	Cool Temperatures + Bonzi	Used as primary control 22 ppm, applied once if needed	Used to tone and harden. Used to stop growth.
	Bonzi	20 to 30 ppm, applied 2 or 3 times at 10 to 14 day intervals	Applications start 2 weeks after transplanting.
	Bonzi	30 ppm, applied twice	First application made 1 week after transplanting 384 plugs and the second one occurs the following week.
	Bonzi	5 ppm DRENCH, applied once	Applied at finish to hold crop.
Salvia	Sumagic	5 ppm	Applied as needed depending on plant growth and weather.
	A-Rest	33 ppm, applied 2 or 3 times	Applications start 2 weeks after transplanting 288 plugs.
	B-Nine	5,000 ppm	Used as needed to tone and harden.
	B-Nine + Bonzi	2,500 ppm + 20 ppm	Apply combination 10 to 14 days after transplant, every week until sales - unless plants show no signs of stretch.
	Bonzi	3 to 5 ppm	Applied as needed depending on plant growth and weather.
	Bonzi	20 to 60 ppm	--
	Bonzi	20 to 30 ppm, applied 2 or 3 times at 10 to 14 day intervals	Applications start 2 weeks after transplanting.
	Bonzi	30 ppm, applied once	Used to stop growth.
	Bonzi	60 ppm, applied once	First application made 1 week after transplanting 384 plugs.
Bonzi	5 ppm DRENCH, applied once	Applied at finish to hold crop.	

Table 1. Continued.			
Crop	Chemical Type	Foliar Spray Rates (number of times applied)	Stage of Development Chemical Applied
Snapdragon	Cool Temperatures + B-Nine	Used as primary control 5,000 ppm, applied once if needed	Use to tone and harden. Used as needed to tone and harden.
	B-Nine + Bonzi	2,500 ppm + 20 ppm	Apply combination 10 to 14 days after transplant, every week until sales - unless plants show no signs of stretch.
	Bonzi or B-Nine	20 ppm, applied weekly if needed or 5,000 ppm, applied weekly if needed	Applications start 2 weeks after transplanting 288 plugs.
	B-Nine + Bonzi	5,000 ppm, applied once + 30 ppm, applied twice	Applied 2 weeks after transplanting. Applied at weeks 4 and 6.
	Bonzi	3 ppm	Applied as needed depending on plant growth and weather.
	Bonzi	60 to 90 ppm	Used for tall varieties.
	Bonzi	90 ppm	Used for tall varieties. Applied 10 days after transplanting 384 plugs.
	Bonzi	5 ppm DRENCH, applied once	Applied at finish to hold crop.
Verbena	B-Nine + Bonzi	3,000 ppm, applied once + 30 ppm, applied once	Applied 2 or 3 weeks after transplanting. Applied at finish to hold crop.
	Bonzi	3 to 5 ppm	Applied as needed depending on plant growth and weather.
	Bonzi	20 ppm, applied weekly if needed	Applications start 2 weeks after transplanting 288 plugs.
	Bonzi	45 ppm, applied once	First application made 2 weeks after transplanting 384 plugs.
	Sumagic	3 to 7 ppm	Applied as needed depending on plant growth and weather.
Vinca⁴	B-Nine	2,500 to 3,750 ppm	Higher rates used if stretching occurring. Apply 10 to 14 days after transplant, every week until sales - unless plants show no signs of stretch.
	B-Nine	5,000 ppm	Used as needed to tone and harden.
	B-Nine	5,000 ppm	Applied weekly if temperatures are high. Less often during cool temperatures. Applications start 3 weeks after transplanting 288 plugs.
	Sumagic	2 ppm	Applied as needed depending on plant growth and weather.
	Sumagic	10 ppm, applied once	First application made 2 weeks after transplanting 384 plugs.
	Sumagic	10 ppm, applied twice	First application made 3 weeks after transplanting and the second one occurs 2 weeks later.
	⁴ Caution: Bonzi is not recommended for vinca because it can cause spotting of the foliage, especially at high temperatures.		

Recommendations for the use of chemicals are included in this publication as a convenience to the reader. The use of brand names and any mention or listing of commercial products or services in this publication does not imply endorsement by the North Carolina Cooperative Extension Service nor discrimination against similar products or services not mentioned. Individuals who use chemicals are responsible for ensuring that the intended use complies with current regulations and conforms to the product label. Be sure to obtain current information about usage and examine a current product label before applying any chemical.