The Effect of Pruning on Growth and Flowering of *Lantana strigocamara* 'Balandrise' as a Landscape Groundcover, Part II: Effect of Late-Season Pruning

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Abstract

Severe late-season, height-reduction pruning of *Lantana strigocamara* 'Balandrise' (Lucky™ Sunrise Rose) to 15 to 20 cm tall to assess whether plants could be maintained low and compact without loss of flowering performance had significant but mixed results. Six months after pruning and at peak flower for pruned plants, the latter had significantly better overall quality; greater overall height increase; more and longer shoots; longer internodes; more leaves per shoot; more leaves until inflorescences formed; and more inflorescences than unpruned plants. Overall height, length, and width were not significantly different between pruned and unpruned plants. The results suggest that late-season pruning can lead to earlier and better floral display and enhanced overall quality the following growing season but, like early-season pruning, did not achieve the goal of low, compact, dense growth with enhanced floral display. This pruning did lead to earlier flowering and earlier increased overall quality than unpruned plants. However, this advantage is somewhat tempered by the four-month winter period when pruned plants tended to have poorer overall quality than unpruned plants and the fact that unpruned plants, after about a month past peak flowering of pruned plants, "caught up" to and equaled pruned plants in overall quality and surpassed them in the quantity of inflorescences per 15 × 15 cm square area. Consistent anecdotal evidence suggests that over the long term minimal and less severe pruning might result in plants of equal or better quality, a subject that needs further investigation.

Introduction

In Part 1 of this study, Hodel et al. (2024) investigated the effects of early-season pruning on growth and flowering of *Lantana strigocamara* 'Balandrise', with the objective to maintain low, compact, dense growth with enhanced floral display. We found that severe, early-season pruning did not result in the objective of lower, more compact, dense growth and enhanced flowering.

We wondered if periodic, lighter pruning throughout the growing season and/or late-season pruning after growth has peaked might be more effective in achieving and maintaining desirable, low, dense, compact, and floriferous plants. Here, in Part 2 of this study, we report on the effects of late-season pruning on growth and flowering of *L. strigocamara* 'Balandrise'.

Materials and Methods

Lantana strigocamara 'Balandrise'

Hodel et al. (2024) fully described and illustrated *Lantana strigocamara* 'Balandrise', including its growth characteristics and history and development by the Ball Horticultural Company (Ball FloraPlant), which markets it with the trade name Lucky™ Sunrise Rose. Here we provide a brief review of its growth and flowering characteristics.

Lantana strigocamara 'Balandrise' is a semi-woody, relatively low-growing, aromatic perennial with raspy-textured but attractive, dark green leaves handsomely contrasting with its showy, bright yellow-orange and purple-pink flowers in a bi-colored inflorescence (**Fig. 1**). Dirr (2011) and PP (2008) describe *L. strigocamara* as free-flowering from spring through autumn in cool- and cold-winter areas, where it is typically treated as an annual, nearly year-round in mild-winter subtropical regions, and year-round in tropical areas and greenhouses where it is treated as a perennial. In addition to its desirable, relatively low-growing habit and colorful and floriferous floral display, its tolerance of adverse environmental conditions is a much admired horticultural feature.

The bi-colored inflorescences of *Lantana strigocamara* 'Balandrise' are a striking and redeeming character, featuring individual flowers that first emerge and open bright yellow-orange at the top of the inflorescence then later change to purple-pink as they age and "move downward" in the inflorescence **(Fig. 2**). The bright yellow-orange and dark purple-pink flowers make a pleasing and complementary color combination.

Plants are moderately vigorous, semi-upright, and attain about 40 cm in height (BFP 2024), which applies to containerized plants after the first growing season with frequent pinching (S. Hernández Swofford, pers. comm., 2 August 2024). After several years of cultivation in mild-winter areas, these plants will grow taller than 40 cm because they easily survive winters in these areas, remain evergreen, and stems tend to "pile up" on each other with time, a common feature of lantanas in such areas. We surmise that they will likely attain at least 80 cm in height without remedial pruning every several years or yearly.

1. *Lantana strigocamara* ‘Balandrise’ makes an outstanding mass planting or groundcover. All photographs taken at Lakewood, CA and © 2025 by D. R. Hodel.

2. Inflorescences of *Lantana strigocamara* ‘Balandrise’ have newly emerging bright yellow-orange flowers at the top that later change to purple-pink as they age.

Site

We conducted this study in Lakewood, California, about 27 km south-southeast of downtown Los Angeles and 11 km north of the Pacific Ocean coast at Long Beach. The site is classified as a Mediterranean climate, with long, warm, rainless summers and cool, moist winters. Average winter day/night temperatures are 19/7.5 C while summers are 29.5/18 C. Hottest days rarely exceed 38 C while coldest nights rarely go below 0 C. Average annual precipitation is about 300 mm, nearly all occurring from November through March. The soil is a deep, alluvial sandy to very sandy loam laid down by the nearby San Gabriel River over tens of thousands of years.

Methods

We used 28 plants from our previous 2024 study (Hodel et al. 2024) that we had planted in late 2022 and early 2023 from 3.8-ℓ (1-gallon) containers. From April through October, we irrigated the plants with about 20 mm of water once per week via drip irrigation, which is about 50% of ETo during this period (Snyder et al. 2012). We rarely irrigated the plants from November through March. We did not apply fertilizer or mulch.

The plants were about 30 cm tall and 60 cm wide by late 2023. In April, 2024 we pruned the plants to about 15 cm tall for Part 1 of our study. These pruned plants were about 45 cm tall by July 1, 2024 and by October were 50 to 60 cm tall (**Fig. 3**).

On November 1, 2024, at the end of the active growing season, the 28 plants were randomly divided into 14 pairs of two plants each, typically the two plants were side by side in adjacent rows or the two plants were adjacent to each other in the same row (**Fig. 4**). Pruning treatments were randomly applied to one of the two plants in each of the 14 pairs. We pruned back the selected plant of each pair to 15 to 20 cm tall and measured and recorded the height of all 28 plants (**Figs. 5**–**6**).

Six months later, on May 1, 2024, the pruned plants had attained peak flower (density and profuseness of inflorescences not increasing), and we recorded the following characters for all 28 plants (pruned and unpruned):

1. overall quality (1 to 5; 1 = dead or nearly so, 5 = optimum growth and floral display [primarily uniformity of growth and density and profuseness of inflorescences]);
2. overall height, length, and width of the plant;
3. quantity of shoots per plant (counted in a 15 × 15 cm square area in the middle of the plant);
4. selected five of the shoots in the 15 × 15 cm square area per plant and determined their:
    a. length;
    b. quantity of leaves;

3. By October, 2025, plants of *Lantana strigocamara* ‘Balandrise’ were 50 to 60 cm tall and well beyond peak flower and starting to decline.

4. On 1 November 2025, 14 pairs of plants of *Lantana strigocamara* ‘Balandrise’ were selected and one of each pair was pruned to 15 to 20 cm tall.

5. The pruned plant of each of the 14 pairs of *Lantana strigocamara* ‘Balandrise’ was reduced to 15 to 20 cm in height. Note the unsightly exposed branches and twigs.

6. The plot of *Lantana strigocamara* ‘Balandrise’ showing the pruned and unpruned plants on 1 November 2024.

   c. quantity of leaf pairs until inflorescences formed.
5. quantity of inflorescences with open flowers per plant (counted in a 15 × 15 cm square area in the middle of the plant).

Statistical Analyses

We entered the data into an Excel spreadsheet (Microsoft Corporation, Richmond, WA) and, in the case of multiple measurements of the same character on the same plant, determined means and standard deviations for pruned and unpruned plants for these characters:

1. overall quality;
2. overall height, length, and width;
3. change in overall height;
4. quantity of shoots per plant;
5. shoot length;
6. quantity of leaves per shoot;
7. internode length;
8. quantity of leaf pairs formed until inflorescences formed;
9. quantity of inflorescences per plant.

We compared means using one-way analysis of variance and employed a standard type I error of $P<0.05$. **Table 1** contains the means and standard deviations for each character and the probability of a significant difference.

Results and Discussion

Late-season, height-reduction pruning of *Lantana strigocamara* 'Balandrise' to 15 to 20 cm tall to assess whether plants could be maintained low, dense, and compact without loss of flowering performance had significant but mixed results. By May 1, 2025, six months after pruning and at peak flower for pruned plants, the latter had significantly better overall quality; greater overall height increase; more and longer shoots; longer internodes; more leaves per shoot and more leaves until inflorescences formed; and more inflorescences than unpruned plants. Overall height, length, and width of plants were not significantly different between pruned and unpruned plants (**Figs. 7–8**) (**Table 1**). However, by June 1, 2025, unpruned plants equaled pruned plants in overall quality and had significantly more inflorescences per 15 × 15 cm square area than pruned plants (**Table 2**).

Not all these performance characters are desirable and/or meet the objectives of low, dense, compact growth while maintaining optimal flowering. For example, the greater overall height increase, longer shoots with longer internodes, and more leaves per shoot and more leaves until

7. A view of the plot of *Lantana strigocamara* ‘Balandrise’ on 1 May 2025 showing pruned plants (abundant flowers) and unpruned plants (paucity of flowers).

8. Unpruned plant (left) and pruned plant (right) of *Lantana strigocamara* ‘Balandrise’ on 1 May 2025 showing the better overall quality and floral display of the latter.

Table 1. The effect of late-season pruning on growth and flowering of *Lantana strigocamara* 'Balandrise', Lakewood, California, at peak flowering of pruned plants, 1 May 2025.

Treatment	Character	Standard Deviation	P Value*
	Mean Overall Quality (1 to 5)		
Pruned	4.0	0.6	<0.001
Unpruned	2.1	0.3	
	Mean Overall Height (cm)		
Pruned	45.1	10.2	NS
Unpruned	46.4	8.5	
	Mean Overall Length (cm)		
Pruned	81.6	6.6	NS
Unpruned	81.4	11.4	
	Mean Overall Width (cm)		
Pruned	82.5		NS
Unpruned	82.0		
	Mean Overall Height Increase (from 1 November 2024 to 7 May 2025) (cm)		
Pruned	25.1	9.8	<0.001
Unpruned	3.9	5.4	
	Mean Quantity of Shoots (per 15 × 15 cm square area)		
Pruned	8.7	1.1	<0.05
Unpruned	7.4	2.0	
	Mean Shoot Length (cm)		
Pruned	18.9	5.5	<0.001
Unpruned	6.8	1.6	
	Mean Quantity of Leaf Pairs per Shoot		
Pruned	8.1	0.9	<0.001
Unpruned	5.3	0.5	
	Mean Internode Length (cm)		
Pruned	2.3	0.5	<0.001
Unpruned	1.3	0.3	
	Mean Quantity of Leaf Pairs per Shoot Until Inflorescence Formed		
Pruned	4.9	0.6	<0.001
Unpruned	3.5	0.6	
	Mean Quantity of Inflorescences (per 15 × 15 cm square area)		
Pruned	12.2	3.6	<0.001
Unpruned	2.2	1.9	

*Probability of a significant difference between the means. NS = Not significant.

9. At peak flower, pruned plants of *Lantana strigocamara* 'Balandrise' were dome shaped with even, dense, uniform shoot growth and dense, colorful inflorescences.

inflorescences formed are not typically indicative of low, dense, compact growth. Conversely, more shoots and more inflorescences are indicative of dense growth and enhanced flowering.

Pruned Plants

Pruned plants were in a period of inactive growth from the time of pruning on 1 November 2024 until about 1 March 2025 when new-season growth gradually began to resume. During this period and because of pruning, plants held fewer leave, which helped to expose their tan branches and twigs **(Fig. 5**). Thus, the overall quality of pruned was moderately less desirable than that of unpruned plants, which tended to have more leaves although we did not quantify this difference.

Pruned plants attained peak flowering about 1 May 2025 (**Figs. 7**–**8)**, about two months after growth resumed, and, at that time, exhibited significantly better overall quality than unpruned plants. Pruned plants showed uniform growth and flowering responses. Plants were dome shaped with even, dense, uniform shoot growth sporting lush, dark green leaves and dense, colorful inflorescences (**Fig. 9**).

10. Unpruned plants of *Lantana strigocamara* ‘Balandrise’ typically had more leaves, which tended to conceal the unattractive, tan branches and twigs.

11. With regrowth, unpruned plants of *Lantana strigocamara* ‘Balandrise’ initially had uneven growth and inflorescences mostly on the plant’s perimeter.

Unpruned Plants

Like pruned plants, unpruned plants were in a period of inactive growth from 1 November 2024 until about 1 March 2025 when growth gradually began to resume; however, new-season growth was still slower than that of pruned plants. During the four-month winter period of inactive growth, unpruned plants typically had more leaves, which tended to conceal the unattractive, tan branches and twigs (**Fig. 10**). Thus, overall appearance of unpruned plants during this four-month winter period was moderately more desirable than that of pruned plants although we did not quantify this difference.

With new-season growth, unpruned plants initially had lower overall quality than pruned plants because growth was conspicuously uneven and not uniform, mostly confined to the perimeter of the plants, resulting in a roughly bowl-shaped form with uneven perimeter growth and much reduced center growth. Even when inflorescences began appearing, they were initially predominantly confined to the plant perimeter because that is where most of the new growth was, and flowers are produced on new growth (**Fig. 11**). Thus, the centers of the unpruned plants were mostly devoid of flowers initially, which contributed to the earlier and lower overall quality of unpruned plants. The poorer overall quality or appearance of unpruned plants continued for at least a month after pruned plants had attained peak flower and optimal overall quality. Unpruned plants eventually attained peak flower on 1 June 2025, about four weeks after pruned plants, at which time it was difficult to discern between pruned and unpruned plants. The latter equaled pruned plants in overall quality and height and had significantly more inflorescences per 15 × 15 cm square area than pruned plants (**Figs. 12–13**) (**Table 2**).

Comparison of Parts 1 and 2 Results

We are unable to compare individual values and treatments between Parts 1 (early-season pruning) and 2 (late-season pruning) because they were separate studies and occurred nearly a year apart. Nonetheless, we can still compare general trends, and similarities and differences are present between the two. In both parts of the study, pruned plants had significantly more shoots, longer internodes, and more leaves until inflorescences were produced than unpruned plants. However, Parts 1 and 2 differed in a few growth performance characters. In Part 1, pruned plants initially had significantly shorter shoot lengths and fewer leaves per shoot than unpruned plants while in Part 2 pruned plants had significantly longer shoot lengths and more leaves per shoot than unpruned plants. However, in Part 1, the initially shorter shoot lengths and fewer leaves per shoot of pruned plants eventually equaled and surpassed those of unpruned plants.

12. By 1 June 2025, unpruned plants of *Lantana strigocamara* ‘Balandrise’ had attained peak flower, and it was difficult to discern between pruned and pruned plants.

13. By 1 June 2025, it was difficult to discern pruned plants (left) from unpruned plants (right) of *Lantana strigocamara* ‘Balandrise’.

Table 2. The effect of late-season pruning on growth and flowering of *Lantana strigocamara* 'Balandrise', Lakewood, California, at peak flowering of unpruned plants, 1 June 2025.

Treatment	Character	Standard Deviation	P Value*
	Mean Overall Quality (1 to 5)		
Pruned	3.6	0.5	NS
Unpruned	3.8	0.3	
	Mean Overall Height (cm)		
Pruned	51.7	10.1	NS
Unpruned	49.4	7.1	
	Mean Quantity of Inflorescences (per 15 × 15 cm square area)		
Pruned	9.9	6.6	<0.03
Unpruned	13.1	11.4	

*Probability of a significant difference between the means. NS = Not significant.

In Part 1, peak flower for unpruned plants occurred first, about seven weeks before peak flower of pruned plants. Conversely, in Part 2, peak flower for pruned plants occurred first, about four weeks before peak flower of unpruned plants. In Part 1, at peak flower, pruned plants averaged nearly 10 inflorescences per 15 × 15 cm square area while unpruned plants averaged 17 inflorescences per 15 × 15 cm square area. In Part 2, at peak flower, pruned plants averaged slightly more than 12 inflorescences per 15 × 15 cm square area while unpruned plants averaged a little more than two inflorescences per 15 × 15 cm square area. However, after about a month, unpruned plants attained peak flower and equaled pruned plants in overall quality and surpassed them in quantity of inflorescences per 15 × 15 cm square area.

In Part 2, after a four-month winter period of non-activity, late-season pruning invigorated growth, leading to more and longer shoots with more leaves and longer internodes, more leaves until inflorescences formed, earlier flowering, and initially more inflorescences and a greater overall quality than unpruned plants. However, after about four weeks, unpruned plants equaled pruned plants in overall quality and surpassed them in quantity of inflorescences per 15 × 15 cm square area; these different growth and flowering responses confirm that pruning can be a growth retarding as well as invigorating practice (Cappiello 2019, Cutler 2003, Downer 2023, Fair 2020, Harris et al. 2004). Whether pruning will invigorate or retard growth, or do both, depends on several factors, including species, species condition, pruning severity, and time of year of pruning.

Pruning can invigorate when it removes shoot tips where auxins (plant growth regulators) are produced that normally suppress growth on lower lateral shoots and buds to maintain dominance of the apical shoot tips (Cappiello 2019, Cutler 2003, Downer 2023, Wade and

Westerfield 2022). Pruning off the shoot tip allows these lateral shoots and buds to grow and develop. Also, pruning off shoots allows the root system to supply the remaining shoots, buds, and leaves with more water and mineral nutrients, which can lead to increased growth (Cappiello 2019, Harris et al. 2004, Wade and Westerfield 2022). Pruning off shoots can allow more light to reach lower shoots and buds, also enhancing their growth (Wade and Westerfield 2022). Pruning can affect the carbohydrate-nitrogen balance in the plant and impact growth. Pruning decreases carbohydrates stored in shoots and stems and produced in leaves, which can increase nitrogen and lead to more growth (Cutler 2003).

Conversely, pruning can retard growth simply because shoot and leaf removal reduce photosynthetic activity, which generates carbohydrates for plant growth (Cappiello 2019, Cutler 2003, Downer 2023, Harris et al. 2004).

In Part 2 we found that pruning invigorated rather than retarded growth unlike in Part 1 where it initially retarded growth. The differences in growth response and flowering between Parts 1 and 2 are likely due to the time of year when pruning occurred. Timing can affect whether pruning will invigorate or retard growth. Generally, pruning just prior to periods of naturally rapid growth leads to vigorous regrowth while pruning done after most growth is complete for the season reduces subsequent growth and plant size (Cappiello 2019, Cutler 2003, Downer 2023, Fair 2020, Harris et al. 2004). However, we found mostly the opposite to be true for both Parts 1 and 2 of this study; late-season pruning (Part 2) resulted in increased rather than reduced growth the following growing season while early-season pruning (Part 1) resulted in reduced growth initially followed by increased growth later.

As we found in Part 1 of our study, *Lantana strigocamara* 'Balandrise' seemed to be a well behaved, moderate grower when unpruned but once pruned its behavior changed to become a slightly more vigorous grower. By removing shoot tips, pruning invigorated growth, increasing the quantity of lower, lateral shoots, and lengthening their internodes resulting in crowded, lanky, taller growth. Pruning also opened up the plant, allowing more light to reach the lower, newly invigorated lateral shoots, enhancing their development. The increased shoot density with longer internodes on pruned plants is due to the invigoration of lateral shoots and buds, so many in a given area that crowding and insufficient light enhanced their stretched out, lanky nature. With no thinning of resulting regrowth, shoots can become or will continue to be crowded, stretched out or lanky, and spindly (Fair 2020, Harris et al. 2004).

Severity of pruning can affect whether pruning will invigorate or retard growth. A vigorous shoot needs heavier pruning to reduce its growth while a less vigorous shoot needs lighter pruning (Harris et al. 2004). Frequent, heavy pruning can stunt growth, even leading to death while light,

14. Pruned only once in three years since their planting, and then not severely, these plants of *Lantana strigocamara* 'Balandrise' tended to be shorter, more compact, and have equal or superior overall quality and more inflorescences than the more frequently and severely pruned plants in the current study.

frequent pruning will limit plant growth without exacting a negative response (Downer 2023, Harris et al. 2004), or it can invigorate growth as we have shown in these two studies.

Conclusions and Future Work

We conclude that severe, late-season pruning, like similar early-season pruning did not result in the objective of lower, more compact growth and enhanced flowering of *Lantana strigocamara* 'Balandrise'. This pruning did lead to earlier flowering and earlier increased overall quality than unpruned plants. However, this advantage is somewhat tempered by the four-month winter period when pruned plants had poorer overall quality than unpruned plants and the fact that unpruned plants, after about a month, equaled pruned plants in overall quality and surpassed them in floral display.

Anecdotal observations of two adjacent plots of *Lantana strigocamara* 'Balandrise', which have been pruned only once in three years since their planting, and then not severely, showed that they tended to be shorter, more compact, and have equal or superior overall quality and more inflorescences per 15 × 15 cm square area (**Fig. 14**), suggesting that more infrequent and less severe pruning might be the key to meeting the objective of lower, more compact growth and enhanced flowering. We want to investigate the effects of infrequent, light pruning in a future study.

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