Factors Affecting New Guinea Impatiens Flowering

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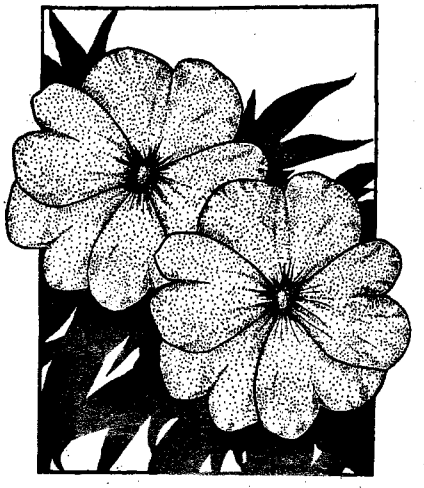
Introduction:

New Guinea impatiens *Impatiens hawkeri* Bull. are in the Balsaminaceae family. The original plants were collected from New Guinea, Java and Celebres. Original plants arrived at Kew Gardens in 1884. However, the use of the New Guinea impatiens did not increase greatly until after the collection trip of John Creech (Agriculture Research Service) and Russell Siebert (Longwood Gardens) in 1970. Few commercial floriculture species have had such a rapid increase in popularity and accelerated development.

This article summarizes critical issues related to flowering of New Guinea impatiens. In addition, two tables that identify superior cultivars as defined in several trial gardens in the U.S. (Table 1) and heat tolerant cultivars as defined by work conducted by Kerry Strope during her Masters thesis at the University of Minnesota (Table 2) are presented at the end



of the article.

Indigenous Environment:

The indigenous environment of the New Guinea impatiens is warm, humid and has relatively low light conditions. As a result, early introductions were heat and light sensitive and were not water stress tolerant with respect to growth and flowering. Original breeding focused on development of alternative flower olors and reducing plant height. Recent breeding efforts have focused on increased garden performance in full sun, producing seed-propagated cultivars, and developing water and heat stress tolerance with respect to flowering. Some of these advances have resulted from additional collections of New Guineas.

Flower Induction/Initiation:

New Guinea impatiens are non-photoperiodic plants, i.e. daylength does not affect whether or not plants flower. Flowering is affected primarily by temperature, irradiance/total daily light, and water stress. Each of these factors impacts the amount of photosynthesis a plant is capable of conducting (total plant carbohydrate) and/or carbon partitioning.

Older New Guinea impatiens cultivars had reduced flowering when day/night temperatures exceeded 76°F. This heat sensitivity is presumably because of high temperature reduction of photosynthesis or increased dark respiration. New cultivars are more heat tolerant and photosynthesis of these cultivars is probably less affected by high temperature.

The optimal temperature for maximum flowering in New Guinea impatiens is 68°F day and night temperature. As temperatures deviate from 68°F flower number and size decrease.

Reduced photosynthesis that results from low light conditions will also limit New Guinea impatiens flowering. Similarly, short day length can limit total plant carbohydrate status and reduce flowering.

Water stress can cause the stomata (pores) on the underside of a New Guinea impatiens leaf to close. As a result, photosynthesis can not occur. This can limit total flowering.

Table 1. Important points to remember when growing and/or finishing New Guinea impatiens.

Flower New Guinea impatiens at constant 68°F.
Increased light intensity (<3000 footcandles) encourages increased flowering.
Maintain pH between 6.0 and 7.0!
Apply overhead source of micronutrients.
Check media soluble salts and ammonium content regularly.
Apply 500 ppm Florel to eliminate flowering no later than 6 weeks prior to market date.
Control thrips and inspect plants for presence of INSV!

Media, Nutrition and Fertility:

Poor, non-aerated media can encourage root rots that will reduce the size of a plant's root system and limit growth and flowering. It is therefore, critical that media is sterile and well aerated.

Excessively low or high total nutrition will limit flowering. Common nutritional problems of New Guinea impatiens that impact flowering are identified below:

1) Ammonium Toxicity—General leaf edge yellowing of lower leaves. Occurs when ammonium-based fertilizers are used during low light periods of the year. Leach and switch to a nitrate-based fertilizer.

2) Boron/Zinc Deficiency—Young leaf distortion and general stunting of growth. Overhead water with fertilizer containing boron and/or apply Borax (0.5 oz/100 gal, or Solubor 0.25 oz/100 gal.).

3) Iron/Manganese Toxicity—Upper leaf distortion, necrosis or leaf edge burn on lower leaves. Occurs when pH is below 5.8 and micronutrients are present in media. Increase pH to >6.0 to solve.

Growth Regulators:

The presence of ethylene on or around plants inhibits New Guinea impatiens flower initiation/development. It is for this reason, that we apply Florel (500 ppm) to New Guinea impatiens to eliminate undesirable early flowering. Do not apply later than 6 weeks prior to the marketing date.

Insects and Diseases:

Tomato spotted wilt virus (TSWV)/ impatiens spotted wilt virus (INSV) by Western flower thrips are a major problem in New Guinea impatiens production and they both limit flowering. There is no cure for either virus. Symptoms include stunting of plant growth and/or spotting of foliage. Control by removing infected plants and controlling thrips. Control thrips by using the following rotation: 1) Tank mix of Avid (8oz/100 gal.) + Azatin (10-16 oz/100 gal) or Neemazad (2.5 oz/100gal) twice, five to seven days apart. 2) Apply a tank mix of Thiodan + a Pyrethroid (Decathlon, Talstar, Tame, Topcide) twice, five to seven days apart. 3) Apply Mesurol 75WP (8-16 oz/acre) twice, five to seven days apart. 4) start over.

Postharvest

The effects of high temperature stress on New Guinea impatiens flowering are expressed weeks after the actual stress occurs. In other words, high temperature stress at the end of the production cycle or during shipping can often be expressed in the consumers garden. Similarly, infestation with viruses during production often have effects that are realized in the consumers garden as well. For this reason, growers must be concerned with stresses that are imposed on New Guinea impatiens plants at the end of the production cycle and during retailing. Although plants may look well and are flowering, delayed effects of stress can reduce consumer satisfaction with this product at their home.

Table 1. Superior Garden Performance Across the Country.

Series	Cultivar	Source
Celebration	Lavender Glow	Ball Floraplant
Celebration	Apricot	Ball Floraplant
Celebration	Electric Rose	Ball Floraplant
Anguillia	Cherry Rose	Ecke
Antigua	Scarlet	Ecke
Celebrette	Peach	Ball Floraplant
Celebrette	Pink Jewel	Ball Floraplant
Harmony	Flame	Fischer
Bull Pretty Girls	Flora	Fischer
Harmony	Light Purple	Fischer
Melissa	Light Coral	Ecke
Minuet		Fischer
Multi-Petal (dbl)	Orange	Oglevee
Papete	Fuchsia	Ecke
Petticoat	Fire	Dummen
Riviera	Pink	Dummen
Paradise	Timor	Ecke
Paradise	Antiqua	Ecke
Paradise	Tonga	Ecke
Paradise	Tarawa	Ecke
Pure Beauty	Aglia	Ecke
Deka	White	Oglevee
Paradise	Pearl White	Ecke

Table 2. Superior heat tolerance in the greenhouse (K. Strope, M.S. Thesis, 1999, University of Minnesota).

Series	Cultivar	Source
Celebration	Cherry Red	Ball Floraplant
Celebration	Rose	Ball Floraplant
Lasting Impressions	Shadow	Oglevee
Lasting Impressions	Rhapsody	Ogelvee
Celebration	Deep Coral	Ball Floraplant
Celebration	Deep Pink	Ball Floraplant
Celebration	Salmon	Ball Floraplant
Paradise	Moorea	Ecke
Celebration	Red	Ball Floraplant