

SCREENING OF ORNAMENTAL SWEETPOTATO (*IPOMOEA BATATAS*) CULTIVARS FOR INTUMESCENCE DEVELOPMENT

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Introduction and Objectives

- Intumescence is a physiological disorder that develops sporadically on the leaf tissue of some plant species, including ornamental sweetpotato (*Ipomoea batatas*), when plant exposure to UV light is blocked (Craver et al., 2014); **Figure 1**.
- Based on previous research (Craver et al., 2014) we observed that occurrence and severity of intumescence on ornamental sweetpotato is variable by cultivar. One recommendation to avoid the disorder would be for growers to produce cultivars that are less susceptible.
- We conducted a screening trial with 36 ornamental sweetpotato cultivars to 1) describe and characterize foliage type and plant growth; and 2) document occurrence, developmental timeline, and severity of intumescence on each cultivar.

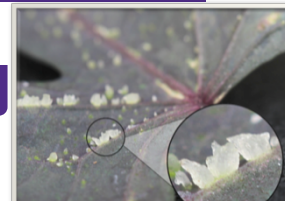


Figure 1. Intumescence development on ornamental sweetpotato leaf.

Materials and Methods

- Rooted cuttings of 36 ornamental sweetpotato cultivars (**Table 1**) were obtained from commercial suppliers. Liners were received on January 15, 21/22, and February 14, 2014. After receipt, 25 cuttings were potted in 11.43 cm diameter (465 ml volume) pots using Fafard #2 peat-based medium and were grown in a glass greenhouse at 22° C day : 20° C night with a constant 200 mgL⁻¹ N constant liquid feed using 20N-4.4P-16.6K.
- UV-blocking polyethylene film was used above benches and under the glass greenhouse glazing to filter UV radiation.
- Experimental design was randomized complete block with 6 blocks and 3 pots of each cultivar per block.
- Data was collected on one pot per block per cultivar at three times: 2, 4, and 6 weeks after each group of plants were introduced into the experiment.
- On each date, total number of leaves of each plant were counted. Next, each leaf was inspected for intumescence development and if the disorder was observed, the leaf was given a severity rating based on a predetermined scale (**Figure 2**). Leaf color and leaf shape (**Figure 3**), plant width and dry weights were also recorded (data not shown).



Figure 3. Variation of leaf shapes and leaf color observed in different cultivars.

Discussion and Conclusions

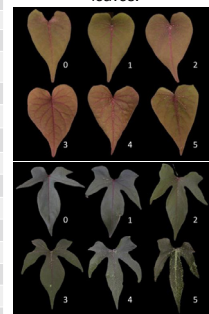
- Cultivars with >5% intumescent leaves were not considered commercially acceptable; 22% of the trialed cultivars fell into this category (**Table 1**). This practical information may aid greenhouse growers in avoiding production of these varieties as a means to avoid the disorder.
- 78% of the cultivars in this study developed none or minimal (<5%) intumescence that was not commercially significant (**Table 1**). Selection of cultivars from this longer list of non-symptomatic varieties for spring production is a practical strategy to avoid the disorder.
- Plants with 'yellow-green' foliage had significantly less intumescence development compared to 'variegated', 'red-bronze' and 'deep-purple' colored leaves based on a one-way ANOVA.
- 'Blackie' and 'Black Heart' are older cultivars with heavy incidence of intumescence development (**Table 1**). Alternatively, the standard yellow-green 'Margarita' did not develop intumescence. Perhaps these industry standards have been used in some of the breeding efforts to create new cultivars. Investigations of genetic heritage would be of interest to aid in understanding why some cultivars are susceptible to the disorder and others are not.
- This screening trial provides information for selection of susceptible varieties for future mechanistic research into the relationship between lack of UV light and the occurrence of this disorder.

Results

Table 1. Ornamental sweetpotato (*Ipomoea batatas*) cultivar characterization and incidence of Intumescence development after 6 weeks of greenhouse growth under UV-blocking polyethylene.

Symptomatic Cultivars	Leaf Color	General Leaf Shape	Intumescent Leaves/Total Leaves	% Intumescent Leaves
'Blackie'	deep-purple	palmete, longer, thin lobes	294/443	67 a
'South of the Border Chipotle'	variegated; deep-purple w/ green splotches	heart-shaped	124/359	35 b
'Sweet Caroline Bronze'	red-bronze	palmete, shorter, thick lobes	214/640	35 b
'Tricolor'	variegated; pink-white-green	shield-shaped	296/1141	26 bc
'Black Heart'	deep-purple	heart-shaped	105/442	24 bc
'Sweet Caroline Sweetheart Red'	red-bronze	heart-shaped	126/603	21 cd
'Desana Bronze'	red-bronze	heart-shaped	99/510	19 cd
'Sweet Caroline Sweetheart Light Green'	yellow-green	heart-shaped	57/639	9 de
'Sweet Caroline Green Yellow'	variegated; green w/ yellow-white streaking	palmete, longer, thin lobes	31/725	4 e
'Desana Compact Red'	green	palmete, shorter, thick lobes	19/472	4 e
'Sidekick Black'	deep-purple	palmete, longer, thin lobes	30/810	4 e
'Sweet Georgia Bronze'	red-bronze	shield-shaped	9/627	1 e
'Bright Ideas Rusty Red'	red-bronze	shield-shaped	7/643	1 e
'Sweet Georgia Heart Light Green'	yellow-green	heart-shaped	9/851	1 e
'Bright Ideas Black'	deep-purple	palmete, longer, thin lobes	6/659	1 e
'Bright Ideas Lime'	yellow-green	palmete, shorter, thick lobes	7/944	0.7 e
'Sweet Caroline Sweetheart Purple'	deep-purple	heart-shaped	8/1281	0.6 e
Non-Symptomatic Cultivars				
'Desana Lime'	yellow-green	heart-shaped		
'Margarita'	yellow-green	heart-shaped		
'Sidekick Black Heart'	deep-purple	heart-shaped		
'Sidekick Lime'	yellow-green	heart-shaped		
'Sweet Georgia Heart Purple'	deep-purple	heart-shaped		
'Sweet Georgia Heart Red'	red-bronze	heart-shaped		
'Sweet Georgia Bullfrog'	variegated; deep-purple w/ green splotches	palmete, longer, thin lobes		
'Illusion Emerald Lace'	yellow-green	palmete, longer, very thin lobes		
'Illusion Garnet Lace'	red-bronze	palmete, longer, very thin lobes		
'Illusion Midnight Lace'	deep-purple	palmete, longer, very thin lobes		
'FloraMia Nero'	deep-purple	palmete, shorter, thick lobes		
'South of the Border Chihuahua'	yellow-green	palmete, shorter, thick lobes		
'South of the Border Guacamole'	green	palmete, shorter, thick lobes		
'Sweet Caroline Light Green'	yellow-green	palmete, shorter, thick lobes		
'Sweet Caroline Raven'	deep-purple	palmete, shorter, thick lobes		
'Sweet Caroline Red'	red-bronze	palmete, shorter, thick lobes		
'Sweet Georgia Light Green'	yellow-green	palmete, shorter, thick lobes		
'Sweet Georgia Deep Purple'	deep-purple	palmete, shorter, thick lobes		
'Sweet Caroline Bewitched'	deep-purple	shield-shaped		

Figure 2. Rating scale used to assess intumescence severity using cordate (top) and lobed (bottom) shaped leaves.



Reference and Acknowledgements

Craver, J.K., C.T. Miller, K.A. Williams and N. Bello. 2014. Ultraviolet radiation affects intumescence development in ornamental sweetpotato (*Ipomoea batatas*). HortScience. 49:1277-1283.

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