

**2012 CANR Research Report:
Non-invasive Nandina Cultivars for the Green Industry**

Gary W. Knox
University of Florida/IFAS
North Florida Research and Education Center
155 Research Rd.
Quincy, FL 32351
850/875-7100
Fax 850/875-7188
gwknox@ufl.edu

Introduction

Promotion, production and use of plants considered invasive have placed the Green Industry under scrutiny. The annual cost of invasive plants to the U.S. has been estimated at more than \$34 billion (Pimentel et al., 2005). An estimated 85% of woody plants now considered invasive were originally introduced for landscape purposes (Bell et al., 2003). The establishment of the National Invasive Species Council (1999) and its release of the National Invasive Species Management Plan (NISC, 2001) have major implications on the ability of the Green Industry to produce some current plants and introduce new plants. However, cultivars of species may have characteristics making them less invasive (Wood, 2007).

One strategy for the nursery industry is to identify and promote non-invasive cultivars of plants otherwise considered invasive. Availability of non-invasive cultivars will provide the Green Industry with a ready substitute to the invasive cultivars for continued use of these popular plants. Promotion and use of noninvasive cultivars will improve the industry's image and standing with environmental groups as well as federal, state or local governments.

Background

Previous research showed wide variation in growth and fruiting among cultivars of invasive ornamentals and regions of Florida (Knox 2010, 2011; Knox and Wilson, 2006; Wilson and Knox, 2006, 2009, 2010). These studies validate the importance of research to assess cultivars of ornamentals for invasiveness.

Nandina (*Nandina domestica*) is an extremely popular landscape plant in USDA Hardiness Zones 6-10. Introduced to the U.S. before 1804, the species has since escaped cultivation in nine states (USDA NRCS, 2008). Over 40 cultivars of *nandina* exist but research on invasiveness is only available for 11 selections (Knox and Wilson 2006).

Current CANR Funded Research

The overall objective of this research is to characterize the potential invasive impact (growth rate, flowering period, seed production, germination requirements) of *Nandina* cultivars as compared to the unimproved form ("wild type"). Eight selections of *Nandina domestica* (Table 1) were evaluated over a 3-year period for ornamental quality and potential invasive impact (growth rate, flowering period, seed production, germination requirements). Six selections have not been studied previously.

Field plantings of nine uniform plants of each were installed in 2008 under full sun conditions in north Florida (Quincy, USDA Cold Hardiness, 8b). Plants were spaced 1.2 m (4 ft) on center in beds covered with polyethylene landscape fabric. Plants were irrigated as needed and fertilized annually with 18 g (0.6 oz) of 12-month 15N-9P-12K Osmocote Plus. Plants were evaluated monthly for flowering and fruiting, and tri-monthly for visual quality based on a scale from 1 to 5 where 1=poor, and 5=excellent. Observations of flower initiation and fruit set were recorded monthly.

Selections producing more than 15% of wild type fruit numbers were considered potentially invasive and removed from the study.

New cultivar releases were obtained in 2012 to replace removed selections or add to the planting. Unfortunately, field space and budgets did not allow replanting of all selections; fruiting of newer additions will be audited over the long term to assess their fruitfulness, although direct comparisons cannot be made with the other long-established selections in the planting.

Results

Throughout the study, four *Nandina domestica* cultivars in north Florida did not produce fruit: 'AKA' Blush Pink™, 'Firehouse', 'Firepower' and 'Firestorm'™. Estimates of north Florida fruit production by 'Harbour Dwarf' and 'Monfar' (Sienna Sunrise™) showed reductions of 97% and 92%, respectively, compared to the wild type, likely qualifying them as non-invasive. 'Gulf Stream'™ in north Florida produced about 85% fewer fruit than the wild type, but this still resulted in significant numbers of fruit and this cultivar's non-invasive status may need to be re-assessed. Finally, 'Moyer's Red' and var. *leucocarpa* ('Alba') fruit numbers were about 62% and 67% fewer than the wild type. Fruiting reductions for these two cultivars were not sufficient to consider them non-invasive. Accordingly, 'Moyer's Red' and var. *leucocarpa* ('Alba') are considered invasive and were therefore removed from the planting. Of the five new cultivars planted in 2012, only 'Lowboy' produced fruit in 2012.

Plant quality ratings of selections planted in 2008 were highest for 'Gulf Stream'™, 'Monfar' (Sienna Sunrise™), and 'Harbour Dwarf'. Next best quality was associated with wild type and 'AKA' Blush Pink™. 'Firehouse', 'Firepower' and 'Firestorm'™ received the lowest quality ratings. It should be noted that all plants were planted in full sun in north Florida, and partial shade may have improved appearance of selections. Plant quality ratings of cultivars planted in 2012 were highest for Obsession® followed by Flirt®.

Long-term assessment of all cultivars is necessary to ascertain fruitfulness. This planting will remain in place as long as funding allows for continued observation and assessment of fruiting.

Acknowledgements

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Literature Cited and Other References

Bell, C.E., C.A. Wilen, and A.E. Stanton. 2003. Invasive plants of horticultural origin. *HortScience* 38:14-16.

Knox, Gary W. 2011. Non-invasive cultivars for the Green Industry. 2011 CANR Research Report. 5 pp.

Knox, Gary W. 2010. Non-invasive cultivars for the Green Industry. 2010 CANR Research Report. 5 pp.

Knox, G.W. and S.B. Wilson. 2006. Evaluating north and south Florida landscape performance and fruiting of ten cultivars and a wild type selection of *Nandina domestica*, a potentially invasive shrub. *J. Environ. Hort.* 24(3):137–142. September 2006.

National Invasive Species Council. 2001. National invasive species management plan. <
http://www.invasivespecies.gov/main_nav/mn_NISC_ManagementPlan.html>, retrieved 14 February 2012.

Pimentel, D., Zuniga, R., and Morrison, D. 2005. Update on the environmental and economic costs associated with alien-invasive species in the United States. *Ecological Economics*. 52: 273-288.

USDA, NRCS. 2008. The PLANTS Database. National Plant Data Center, Baton Rouge, LA 70874-4490 USA. <<http://plants.usda.gov>>, retrieved 14 February 2012.

Wilson, S.B. and G.W. Knox. 2006. Landscape performance, flowering, and seed viability of fifteen *Miscanthus sinensis* taxa grown in northern and southern Florida. HortTechnology 24:137-142

Wilson, S. B. and G.W. Knox. 2009. Evaluating landscape performance and flowering of ten *Pennisetum* taxa in north and south Florida Landscape Performance of Green Fountain Grass Alternatives Grown in Northern and Southern Florida. HortTechnology 19(2): 471-476.

Wilson, Sandra B. and Gary Knox. 2010. Assessing the Invasive Potential of 12 *Ligustrum Sinense*, *Ligustrum Lucidum* and *Ligustrum Japonicum* Cultivars Grown in Northern and Southern Florida. HortScience 45(8):S161. (Abstr.)

Wood, T. 2007. Ban all plants. The Plant Hunter, May 16, 2007. <<http://plantquest.blogspot.com/2007/05/gardeners-are-not-bad-guys.html>>, retrieved 14 February 2012.

Table 1. List and descriptions of *Nandina domestica* selections and cultivars obtained for this study.

Trade Name	Cultivar Name (if different)	Description
Planted in 2008		
Nandina (Wild type or species form)		Broadleaf evergreen shrub growing 6 – 8 ft. tall; bluish-green leaves turning blush to reddish purple in winter, depending on the selection.
var. <i>leucocarpa</i> (aka 'Leucocarpa' or 'Alba')		Whitish fruit and lighter green foliage, otherwise similar to the species; grows 5 – 6 ft. tall.
Blush Pink™	'AKA'	A sport of 'Firepower' with each growth flush sporting red coloration. Blush red colored foliage is long-lasting in contrast to the typical lime-green colored new growth of 'Firepower'. Selected at the Magnolia Gardens Nursery tissue culture facility and introduced in 2008.
'Firehouse'		Chosen for its excellent red fall color; this dwarf variety holds that red fire engine color all winter long. This compact mounding form has bright green spring foliage. Selected by Greenleaf Nursery.
'Firepower'		Dwarf similar to 'Atropurpurea Nana' but without contorted leaves; Foliage turns brilliant red in fall and winter.
'Firestorm™		This cultivar's color and soft texture distinguish it from traditional dwarf nandinas. In winter, leaves turn deep red and in summer, new growth is red and contrasts with mature, green foliage. 'Firestorm™' reaches 3 1/2 feet tall and 3 feet wide. Allegedly derived from 'Gulf Stream™'. Introduced by Plant Development Services Inc.

Trade Name	Cultivar Name (if different)	Description
'Gulf Stream' TM		Extremely dense growth. Does not "sucker" like 'Harbour Dwarf'. Dwarf growing 3 – 3 ½ ft. high; variable red-green winter coloration.
Sienna Sunrise TM	'Monfar'	Intense fiery red new foliage cools to lush medium green in summer; red highlights reappear in fall and winter; Slow growth 3 feet tall, 2 to 3 feet wide.
Planted in 2012		
Atomic Fireball TM	'Kaydee'	This sport of 'Firepower' features bright red winter color on a dwarf, ball-shaped plant. This selection is slow growing and more compact than 'Firepower', growing up to 18 inches tall and wide.
Flirt [®]	'Murasaki'	This selection has deep red new growth with foliage holding its red color well into summer. Grows 2 ft tall and wide. Said to be an improved form of 'Harbour Dwarf'. Patented (PP# 21391).
'Lowboy'		Considered an improvement over 'Compacta', this selection has a dense, broad-mounded habit, growing 3-4 ft tall and wide in 10 years. It is described as having bronze to bluish green foliage turning reddish purple in winter. Patented (PP# 5560).
Obsession [®]	'SEIKA'	This selection is a sport of Gulf Stream TM and said to be improved in that it has more intensive red color on new growth and the red foliage color lasts into summer. Upright, compact grower to 3-4 ft tall and wide. Patented (PP# 21891).
	(twisted leaves)	This unnamed selection was propagated by cuttings from a plant at J.C. Raulston Arboretum, Raleigh NC, in 2006. Petioles and leaves are severely twisted and contorted. This selection's ultimate height is unknown but suspected to be less than 5 ft. The parent plant was observed to flower and fruit, though in relatively low numbers.