

New Introductions from the Mountain Crop Improvement Lab

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Summary

The North Carolina State University Mountain Crop Improvement Laboratory (MCIL) is an integrated research and development driven program where faculty, staff, students, and interns work together to develop a greater understanding of plant breeding and genetics in a wide array of nursery, bioenergy and emerging crops. In this paper,

new plant introductions are discussed including native hydrangeas, new non-invasive introductions in *Spiraea japonica*, *Berberis sp.*, and *Miscanthus*, tough evergreen rhododendrons, new cold-tolerant evergreen azaleas, and deer-resistant *Illicium*.

INTRODUCTION

The Mountain Crop Improvement Laboratory (MCIL) led by Dr. Tom Ranney, is located in Mills River, NC. Housed within the Mountain Horticultural Crops Research and Extension Center and research farm, the MCIL shares in the larger mission of NC State to prepare students, create and apply unbiased knowledge through advances in science and technology, drive economic development, and improve the quality of life in North Carolina and the wider world.

The MCIL works in diverse plant groups with a focus on plant breeding and genetics in nursery and bioenergy crops. This includes the exploration of relationships within plant groups: genome sizing, ploidy surveys, cytology, plant phylogenetics, nomenclature etc., plant fertility and reproductive biology (including non-invasive potential), and the development of tissue culture protocols. As we look ahead to the

future, the MCIL is part of complex interdisciplinary teams and working groups hoping to apply gene-editing technologies to nursery and bioenergy crops.

Informed by our research, we utilize traditional plant breeding to improve native plants, develop non-invasive alternatives to weedy nursery crops, and expand the way popular woody shrubs and trees can be used within the landscape. We also train future plant scientists, breeders, enthusiasts, and educators.

A few introductions are highlighted below. See **Table 1** for a complete list of MCIL introductions.

Native Hydrangeas. *Hydrangea arborescens* is a popular, adaptable native hydrangea that blooms on new wood. The MCIL has five pink mophead introductions and two dwarf white mophead introductions (**Figs. 1 and 2**).



Figure 1. List of native *Hydrangea arborescens* pink mophead introductions from the MCIL: Invincibelle Mini Mauvette® pictured.



Figure 2. Compact white *Hydrangea arborescens* introductions from the MCIL.

Newer non-invasive introductions. *Spiraea japonica*, while not yet on invasive plant ban lists, is considered to be an emerging invasive. Double Play® Candy Corn® and Doozie® are non-invasive introduc-

tions with other exciting ornamental benefits, including bright foliage and continuous blooming (Figs. 3 and 4).



Figure 3. *Spiraea japonica* Double Play® Candy Corn®.



Figure 4. *Spiraea japonica* Double Play Doozie®.

Invasive *Berberis thunbergii* and *Miscanthus sinensis* have been banned in multiple states. Replicated, multi-year field trials of Sunjoy Todo™ and Mini Maroon® have shown these non-invasive barberries exhibit a 99% reduction in female fertility

compared to traditional *B. thunbergii* introductions (**Fig. 5**). Non-invasive *Miscanthus* introductions Bandwidth (compact introduction) and High Frequency exhibit attractive golden banding (**Fig. 6**).



Figure 5. *Berberis* Sunjoy Mini Maroon®.

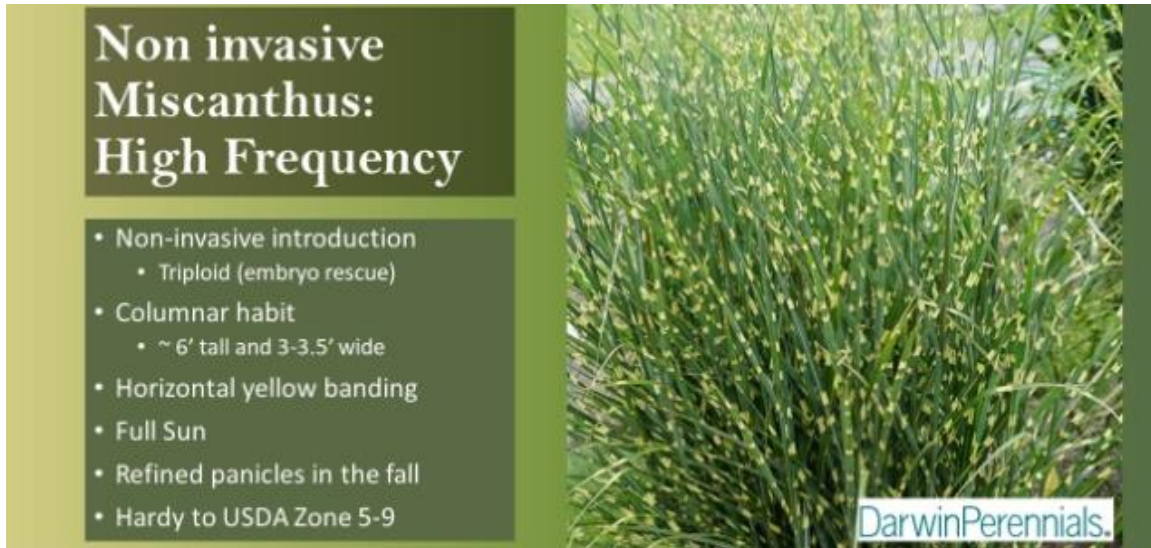


Figure 6. *Miscanthus sinensis* High Frequency.

Rhododendrons. The MCIL spends a lot of time evaluating evergreen rhododendrons and azaleas! MCIL introductions have been

selected for durability in the landscape and excellent container presentation (**Figs. 7 and 8**).



Figure 7. Rhododendron Dandyman Color Wheel®.



Figure 8. PJM rhododendron Blackhat™

Perfecto Mundo® Evergreen azaleas. The MCIL has been working on azaleas for over 15 years with a focus on cold-hardiness, longevity in bloom, floral coverage and strong field and container performance.

See **Table 1** for the complete list of Perfecto Mundo® azaleas (**Fig. 9**).



Figure 9. Perfecto Mundo Double Pink evergreen azalea.

Miscellaneous newer introductions. Some miscellaneous newer introductions include barberries with neon orange new

growth Sunjoy® Neo® and Orange Pillar (Fig. 10).



Figure 10. *Berberis* Sunjoy Neo®.

Illicium. *Illicium* is an exciting underrepresented genus with star-shaped flowers. Interspecific hybrid introductions Scorpio

and Orion are adaptable, reblooming, broadleaf evergreens with a dense habit (Fig. 11).



Figure 11. *Illicium* Scorpio and Orion.

Latest Introduction. Our newest introduction is El Niño™ Desert Orchard a unique intergeneric hybrid (*xChitalpa*) die-back

shrub to multi-stemmed tree with long racemes of showy purple flowers (Fig. 12).



Figure 12. Intergeneric hybrid *xChitalpa* El Niño™.

Table 1. Mountain Crop Improvement Lab Current Plant Introductions.

Plant Name	Species	Licensee	Cultivar	Patent	Zone	Height and Spread	Characteristics
Chocolate Fountain® silk tree	<i>Albizia julibrissin</i>	Star Roses and Plants	'NCAJ1'	USPP25813	6-10	15ft-20ft x 15ft	Purple weeping selection with pink flowers. Drought resistant once established.
Sunjoy Todo® barberry	<i>Berberis</i> hybrid	Proven Winners: Spring Meadow Nursery	'NCBX1'	USPP29504	4-8	2ft x 2ft	Compact dark purple foliage, reduced fertility 0% relative female fertility(2021), durable color, deer resistant
Sunjoy Mini Maroon® barberry	<i>Berberis thunbergii</i>	Proven Winners: Spring Meadow Nursery	'NCBT1'	USPP30330	4-8	3ft x 3ft	Compact purple red foliage, reduced fertility 99% reduction in relative female fertility; durable color, deer resistant
Sunjoy Neo™ barberry	<i>Berberis thunbergii</i>	Proven Winners: Spring	'NCBT2'	USPP33272	5-8	3ft x 3ft	Electric orange new growth fades to a deep orange, deer

		Meadow Nursery					resistant, low maintenance.
Sunjoy® Orange Pillar barberry	<i>Berberis thunbergii</i>	Proven Winners: Spring Meadow Nursery	'NCBT3'	PPAF	4-8	4ft x 3ft	Same electric new growth as Neo™ but with an upright habit. Deer resistant.
Pearl Glam® beautyberry	<i>Callicarpa</i> hybrid	Proven Winners: Spring Meadow Nursery	'NCCX2'	USPP28312	5-8	4ft-5ft x 3ft-4ft	Unique purple foliage, upright form, fall and winter interest with white flowers and purple fruit.
'Aphrodite' sweetshrub	<i>Calycanthus</i> hybrid	Proven Winners: Spring Meadow Nursery	'Aphrodite'	USPP24014	5-9	5ft-8ft x 6ft-8ft	Large red-pink fragrant flowers. Vigorous and easy to grow.
'Venus' sweetshrub	<i>Calycanthus</i> hybrid	Proven Winners: Spring Meadow Nursery	'Venus'	USPP15925	5-9	5ft-6ft x 6ft-8ft	Fragrant white flowers in the summer, vigorous selection
'Chastity'	<i>Campsis ×tagliabuana</i>	Various	'Chastity'	Not patented	5-9	15ft-30ft (spreads)	Non-invasive triploid selection with 99% reduction in fertility. Large orange/peach flowers bloom throughout the summer
Carolina Sweetheart™ red-bud	<i>Cercis canadensis</i>	Star Roses and Plants	'NCCC1'	USPP27712	4-9	15ft x 15ft	Tricolor foliage that emerges electric pink with white foamy variegations. Fades to green and white. Incredibly unique. Native.
Double Take® Orange flowering quince	<i>Chaenomeles speciosa</i>	Proven Winners: Spring Meadow Nursery	'Orange Storm'	USPP20950	5-9	4ft-5ft x 3ft-4ft	Orange double flowers, thornless, extended flowering, fruitless, largest flowers
Double Take® Peach flowering quince	<i>Chaenomeles speciosa</i>	Proven Winners: Spring Meadow Nursery	'NCCS4'	USPP30231	5-9	4ft-5ft x 3ft-4ft	Peach double flowers, thornless, extended flowering, fruitless
Double Take® Pink flowering quince	<i>Chaenomeles speciosa</i>	Proven Winners: Spring Meadow Nursery	'Pink Storm'	USPP20920	5-9	4ft-5ft x 3ft-4ft	Pink double flowers, thornless, extended flowering, fruitless

Double Take® Scarlet flowering quince	<i>Chaenomeles speciosa</i>	Proven Winners: Spring Meadow Nursery	'Scarlet Storm'	USPP20951	5-9	4ft-5ft x 3ft-4ft	Crimson double flowers, thornless, extended flowering, fruitless
El Niño™ Desert Orchid	<i>xChitalpa</i>	Proven Winners: Spring Meadow Nursery	'NCXC1'	PPAF	6-9	5ft-8ft x 4ft-6ft	Large, orchid like, purple flowers.
Sugartina® 'Crystalina' summer-sweet	<i>Clethra alnifolia</i>	Proven Winners: Spring Meadow Nursery	'Crystalina'	USPP21561, Can4160	4-9	2ft-3ft x 2ft-3ft	Fragrant white flowers in mid-summer. Yellow fall color, compact. Attracts butterflies
Winecraft Black® smokebush	<i>Cotinus coggygria</i>	Proven Winners: Spring Meadow Nursery	'NCCO1'	USPP30216	4-8	4ft-6ft x 6ft-10ft	Semi-dwarf smokebush with deep purple foliage that darkens to a near black. Bright orange fall color. Rounded habit.
Lucky Leprechaun® dogwood	<i>Cornus elliptica</i>	Star Roses and Plants	'NCCE1'	USPP28998	7-9	13ft x 5ft	Disease resistant, evergreen dogwood, strong bloomer, compact upright form
Yuki Cherry Blossom® deutzia	<i>Deutzia</i> hybrid	Proven Winners: Spring Meadow Nursery	'NCDX1'	USPP25916	5-8	1ft-2ft x 1ft-2ft	Extra heavy bloomer in pink, attractive fall color, tight form, compact
Yuki Snowflake® deutzia	<i>Deutzia</i> hybrid	Proven Winners: Spring Meadow Nursery	'NCDX2'	USPP28347	5-8	1ft-2ft x 2ft-3ft	Extra heavy blooming variety with a profusion of white flowers in spring, attractive fall color, tight form
Snow Day® 'Blizzard' pearlshrub	<i>Exochorda</i>	Proven Winners: Spring Meadow Nursery	'Blizzard'	USPP23329	3-8	6ft x 7ft	Large flowers, compact plant. Can be trained as a small tree or a shrub.
Legend of the Small®	<i>Fothergilla ×intermedia</i>	Proven Winners: Spring Meadow Nursery	'NCFI1'	USPP34139	5-9	2.5ft x 2-4ft	Compact, small-leaved selection that produces a profusion of fragrant white flowers in spring and bright fall color in yellows, oranges and reds; native

'Sweet Tea'	<i>xGordlinia grandiflora</i>	Various	'Sweet Tea'	Not patented	7-10	20ft-30ft x 8ft-10ft	Large showy white flowers visible July-September with delicate fragrance. Often works best as a multi-stem tree. Unique intergeneric hybrid.
Incrediball® Blush smooth leaf hydrangea	<i>Hydrangea arborescens</i>	Proven Winners: Spring Meadow Nursery	'NCHA4'	USPP28280	3-8	4ft-5ft x 5ft-6ft	Strong stems with exceptionally large light pink blooms; long bloom season. Blooms on new wood; native.
Invincibelle Garnetta® smooth leaf hydrangea	<i>Hydrangea arborescens</i>	Proven Winners: Spring Meadow Nursery	'NCHA6'	USPP33142	3-8	2.5ft x 2.5ft	Compact, season-extending deep garnet buds that open to pink, blooms a bit later than other members of the series; native
Invincibelle Limetta® smooth leaf hydrangea	<i>Hydrangea arborescens</i>	Proven Winners: Spring Meadow Nursery	'NCHA8'	USPP30431	3-8	3ft-4ft x 3ft-4ft	Cheery chartreuse flowers fade to light green. Plant has a compact form and long bloom season; native.
Invincibelle Mini Mauvette® smooth leaf hydrangea	<i>Hydrangea arborescens</i>	Proven Winners: Spring Meadow Nursery	'NCHA7'	USPP30358	3-8	3ft-4ft x 4ft-6ft	Strong stems with purple pink blooms and a long bloom season; native
Invincibelle Wee White® smooth leaf hydrangea	<i>Hydrangea arborescens</i>	Proven Winners: Spring Meadow Nursery	'NCHA5'	USPP30296	3-8	1ft-2.5ft x 3ft	Dwarf Annabelle type with strong stems and a compact habit; native.
Invincibelle® Ruby smooth leaf hydrangea	<i>Hydrangea arborescens</i>	Proven Winners: Spring Meadow Nursery	'NCHA3'	USPP28317	3-8	3ft-4ft x 4ft-6ft	Strong stems and a compact form. Brightest of the Invincibelle series with bright pink flowers; native
Invincibelle® Spirit II smooth leaf hydrangea	<i>Hydrangea arborescens</i>	Proven Winners: Spring Meadow Nursery	'NCHA2'	USPP28316	3-8	4ft-4.5ft x 4ft-6ft	Strong stems, pink blooms, long bloom season, benefits Breast Cancer Research Foundation; native
Orion Star Flower	<i>Illicium hybrid</i>	Star Roses and Plants	'NCIH2'	USPP29938	6-9	5ft x 5ft	Broad leaf evergreen rebloomer

							with white star-anise like flowers
Scorpio Star Flower	<i>Illicium</i> hybrid	Star Roses and Plants	'NCIH1'	USPP29939	6-9	5ft x 5ft	Broad leaf evergreen rebloomer with red star-anise like flowers
Golden Ticket® privet	<i>Ligustrum</i> (vicary privet)	Proven Winners: Spring Meadow Nursery	'NCLX1'	USPP27301	5-9	4ft-6ft x 4ft-6ft	Gold-leafed, fragrant reduced fertility privet that is durable and compact.
Bandwidth maiden grass	<i>Miscanthus sinensis</i>	Darwin Perennials	'NCMS2B'	USPP29460	5-9	3ft x 2ft	Highly reduced fertility, attractive yellow banding on a compact plant; good in the ground or in containers
My Fair Maiden™ maiden grass	<i>Miscanthus sinensis</i>	Darwin Perennials	'NCMS1'	USPP26387	6-9	3ft-4ft x 7ft-9ft	Reduced fertility selection with an attractive vase-shaped form and showy flowers.
High Frequency™ maiden grass	<i>Miscanthus sinensis</i>	Darwin Perennials	'NCMS3'	PPAF	5-9	6ft-7ft x 3ft	Tall, columnar variegated miscanthus with bright yellow banding; non-invasive introduction.
Mercury™ Magnolia	<i>Magnolia</i>	J Frank Schmidt	'NCMX1'	USPP29218	5-8	25ft x 15ft	Deep pink buds open lavender. Flowers up to a month later than traditional <i>M. soulangiana</i> , greatly reducing flower loss to frost. Deciduous.
Good Vibes Mahonia	<i>Mahonia</i> hybrid	Star Roses and Plants	'NCMH1'	USPP34442	7b-9	4ft x 2ft	Compact habit with dense branching; soft, dark evergreen foliage with a refined look; and long racemes of showy yellow flowers produced sporadically in fall, winter, and spring.
Groovy Glow Mahonia	<i>Mahonia</i> hybrid	Star Roses and Plants	'NCMH2'	USPP34443	7b-9	4ft x 2ft	Compact habit; narrow, evergreen foliage; showy racemes with multicolored flowers that bloom sporadically

							throughout fall, winter, and spring; and showy red new foliage
Pink Cascade® weeping cherry	<i>Prunus</i> hybrid	J Frank Schmidt	'NCPH1'	USPP27579	5-8	12ft x12ft	Easy to grow weeping cherry with a prolific spring show of light pink flowers; orange fall color.
Javelin® Pear	<i>Pyrus</i>	J Frank Schmidt	'NCPX1'	USPP26539	5-8	35ft x10ft	Fastigate pear with purple new growth in the spring. Fire-blight resistant. Excellent urban tree.
Chastity® Pear	<i>Pyrus</i> × <i>triploida</i>	J Frank Schmidt	'NCPX2'	USPP30788	5-8	35ft x 25ft	A non-invasive flowering pear with dark green flossy foliage, orange/red fall color and profuse white flowers in spring.
Perfecto Mundo® Double Pink evergreen azalea	<i>Reblooming Azalea</i>	Proven Winners: Spring Meadow Nursery	'NCRX3'	USPP32819	6-9	3ft x 3ft	Double shell pink, strong rebloomer, lacebug resistant, sun tolerant, compact form; generally adorable
Perfecto Mundo® Double Purple evergreen azalea	<i>Reblooming Azalea</i>	Proven Winners: Spring Meadow Nursery	'NCRX4'	USPP33205	6-9	3.5ft-3.5ft	Reblooming, evergreen double purple azalea with large flowers and an extended bloom time.
Perfecto Mundo® Double White evergreen azalea	<i>Reblooming Azalea</i>	Proven Winners: Spring Meadow Nursery	'NCRX5'	USPP33900	6-9	3ft x ft	Reblooming azalea with large clean white double flowers and extended bloom time. Dense habit.
Perfecto Mundo® Double Dark Pink evergreen azalea	<i>Reblooming Azalea</i>	Proven Winners: Spring Meadow Nursery	'NCRX7'	USPP33923	6-9	2.5ft-3ft x 3ft-4ft	Reblooming azalea with large dark pink double flowers and dark green foliage. Exceptionally long in flower.
Perfecto Mundo® Orange evergreen azalea	<i>Reblooming Azalea</i>	Proven Winners: Spring Meadow Nursery	'NCRX6'	USPP33945	6-9	3ft-4ft	Reblooming azalea with bright orange-red single flowers with a dense, rounded habit.

Perfecto Mundo® Epic Coral evergreen azalea	<i>Reblooming Azalea</i>	Proven Winners: Spring Meadow Nursery	'NCRX10'	PPAF	6-9	3ft-4ft x 4ft-5ft	Reblooming azalea with exceptionally large flowers in a soft pink. Long in flower, strong rebloomer; dense habit.
Perfecto Mundo® Red evergreen azalea	<i>Reblooming Azalea</i>	Proven Winners: Spring Meadow Nursery	'NCRX8'	USPP33922	6-9	2.5 ft x 3ft-4ft	Reblooming azalea with a dense, compact habit and an explosion of single red flowers in the spring and fall.
Perfecto Mundo® Epic Pink evergreen azalea	<i>Reblooming Azalea</i>	Proven Winners: Spring Meadow Nursery	'NCRX9'	PPAF	6-9	3ft-4ft x 4ft-5ft	Reblooming azalea with large deep pink single flowers and dark green foliage. Long in flower, dense habit.
Black Hat™ PJM Rhododendron	<i>Rhododendron</i> hybrid	Proven Winners: Spring Meadow Nursery	'NCRX2'	USPP31898	4-8	3ft x 3ft	Compact PJM type with dark winter foliage. Consistent flowering year to year with extended bloom time.
Dandyman Color Wheel™ Rhododendron	<i>Rhododendron</i> hybrid	Proven Winners: Spring Meadow Nursery	'NCRX1'	USPP31150	5-9	8ft x 8ft	Sun-tolerant evergreen Rhododendron with unique color-changing pink to white flowers; thrives in tough conditions.
Mountain Schimlinia	× <i>Schimlinia</i>	Various	'Schima Lina Ding Dong'	None	5-9	12ft x 6ft	Intergeneric hybrid between <i>Schima remote-serrata</i> and <i>Franklinia alatamaha</i>
Double-play® Candy Corn® spiraea	<i>Spiraea japonica</i>	Proven Winners: Spring Meadow Nursery	'NCSX1'	USPP28313 P2	4-7	2ft-2.5ft x 3ft	Interesting multi-tone foliage transitioning from bright orange red to chartreuse gold. Bright magenta flowers, low maintenance; non-invasive.
Double-play® Doozie® spiraea	<i>Spiraea japonica</i>	Proven Winners: Spring Meadow Nursery	'NCSX2'	USPP30953 P3	3-8	3ft x 3ft	A revolutionary spiraea: a dense, continuous bloomer with red new growth; seedless.

Sweet Talker™ viburnum	<i>V. bodnantense x suspensum</i> hybrid	Proven Winners: Spring Meadow Nursery	'NCVX4'	USPP33229	7-8	8ft-10ft [upright]	Fragrant pink flowers in early spring, handsome evergreen foliage. Easy to grow, tolerant of heat and salt.
Yang™ viburnum	<i>V. davidii x V. pro-pinquum</i> hybrid	Proven Winners: Spring Meadow Nursery	'NCVX3'	USPP33203	7b-9	2ft x 4ft	Shade tolerant, deer tolerant evergreen foliage plant with white flowers and blue fruit (with Yin). Foliage is blue-green.
Yin™ viburnum	<i>V. davidii x V. pro-pinquum</i> hybrid	Proven Winners: Spring Meadow Nursery	'NCVX2'	USPP33479	7b-9	2ft x 2ft-4ft	Shade tolerant, deer tolerant evergreen foliage plant with white flowers and blue fruit (with Yang). Foliage is blue-green.
Shiny Dancer® viburnum	<i>Viburnum</i>	Proven Winners: Spring Meadow Nursery	'NCVX1'	USPP28095	6-8	3ft-5ft x 3ft-5ft	Compact selection with red flush in the spring. Shiny, heavily-textured foliage turns to deep burgundy in the fall. Needs 'Huron' or 'Chippewa' to fruit
Steady Eddy®	<i>Viburnum plicatum</i> var. <i>tomentosum</i>	Proven Winners: Spring Meadow Nursery	'NCVP1'	USPP33899	5-8	5ft x 5ft'	An improvement on 'Summer Snowflake' with dense flowering and good display in containers.
My Monet® 'Sunset' weigela	<i>Weigela florida</i>	Proven Winners: Spring Meadow Nursery	'Sunset'	USPP23212	5-7	1ft-1.5ft x 1ft-1.5ft	Dwarf weigela with variegated foliage, rosy pink new growth. Bright reds and oranges in the fall.
Juke box®	<i>xPyra-comeles</i>	Proven Winners: Spring Meadow Nursery	'NCXP1'	USPP31409	7-9	2ft-3ft x 2ft-3ft	Boxwood alternative with unique foliage, durable, low maintenance