Capsicum annuum L. Midnight Creeper™ and Solar Eclipse™

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The use of ornamental peppers as bedding and garden plants has attracted renewed interest in recent years. An abundance of genetic diversity in *Capsicum* L. for plant habit and fruit and leaf morphology provides new opportunities for plant breeders to meet demands for new cultivars. Ornamental peppers range in size and shape from short, compact plants with piquin-sized fruits such as ‘Holiday Cheer’ to plants as tall as 1 m with full-sized fruits such as ‘NuMex Mirasol’ (Stommel and Bosland, 2006). Nearly all ornamental peppers have been primarily developed based on unique fruit characteristics (Bosland and Votava, 2000). Selected breeding of *Capsicum* accessions has produced new breeding lines and cultivars that combine unique foliar attributes with diverse fruit and plant habit attributes (Stommel and Griesbach, 1993, 2004, 2005).

Horticultural crops have been selected and bred for a number of characters that enhance their visual appeal and suitability for various market applications. Consumer interest in dark purple to black-pigmented landscape and garden plants emerged at least a decade ago with the introduction of dark-leaved coral bells (*Heuchera sanguinea* Engelm. ‘Palace Purple’) followed by black-leaved *Canna* species, ornamental grasses (e.g., *Miscanthus* sp., *Pennisetum* sp.), and coleuses [*Solenostemon scutellarioides* (L.) Codd] (Armitage, 2002; Platt, 2004). In short season climates, black foliage provides long-lasting color and year-round color in warmer

climates. Black-pigmented plants create a stunning display when combined with soft pastel colors or vibrant reds, yellows, and oranges. Once a novelty, dark purple to black foliated garden plants are now standard elements to consider in garden design. The recent introduction of ‘Black Magic’ elephant ear [*Colocasia esculenta* (L.) Schott], ‘Blackie’ sweetpotato vine [*Ipomoea batatas* (L.) Lam.], and the All-America Selection ‘Black Pearl’ pepper (*C. annuum* L.) has created an increased demand for garden plants with novel foliage colors.

Most of the early cultivars of black-foliated ornamental peppers were not solidly colored but had purple leaves with brown through dark green coloration. Our breeding efforts ultimately produced pepper plants with solid, true black-pigmented foliage (Stommel and Griesbach, 2005).

In pepper, fruit characteristics are of primary importance for culinary applications, whereas foliar characteristics and growth habit are also of importance for ornamental applications. Delphinidin-3-p-coumaroyl-rutinoside-5-glucoside is the pigment responsible for the black color of pepper foliage (Lightbourn et al., 2007). Lightbourn et al. (2008) determined that high concentrations of delphinidin-3-p-coumaroyl-rutinoside-5-glucoside in combination with green chlorophyll pigments produced the characteristic black pigmentation observed in fruits and leaves of true black-hued ornamental pepper genotypes. Anthocyanin pigmentation in pepper is influenced by an incompletely dominant gene, *Anthocyanin* (*A*) (Peterson, 1959), and a second gene, *modifier of A* (*MoA*) that increases anthocyanin production (Deshpande, 1933).

The U.S. Department of Agriculture, Agricultural Research Service announces the release of two new pepper cultivars, ‘06C84’ (trademarked as Midnight Creeper™) and ‘07C114-1’ (trademarked as Solar Eclipse™). Midnight Creeper™ and Solar Eclipse™ are intended for ornamental applications. These new cultivars display unique combinations of foliar pigmentation, fruiting

attributes, and plant habit. Their black foliage, indeterminate prostrate (Midnight Creeper™), and upright (Solar Eclipse™) plant habits and vigor when grown under bedding plant conditions maximize their impact in the garden landscape. Midnight Creeper™ is attractive in mass plantings as a dense groundcover, whereas Solar Eclipse™ provides a novel foundation for garden designs.

Origin

Midnight Creeper™. Midnight Creeper™ is a clonally propagated F₁ hybrid selection derived from initial crosses between the USDA pepper germplasm line 90C44 (Stommel and Griesbach, 1993), the heirloom pepper ‘Christmas Cheer’, and a breeding line designated 94C27 that was selected from a population of the heirloom ‘Royal Black’ (Fig. 1A). Line 90C44 is a true-breeding genotype with compact upright growth habit, black foliage, and erect clusters of tabasco-type fruit that mature from black to red. ‘Christmas Cheer’ is a true-breeding variety with a prostrate growth habit, green foliage, and erect clusters of 1.5-cm diameter round fruit that mature from pale yellow to red. ‘Royal Black’ was typified in our observation plots as a bushy plant with variegated green, white, and purple foliage. Breeding line 94C27 was an atypical segregant with non-variegated purple foliage that was identified in an open-pollinated population of ‘Royal Black’. Line 94C27 produced solitary pendant tabasco-type pods that matured from purple to red.

Midnight Creeper™ combines anthocyanin-pigmented foliage from 90C44 and 94C27 and upright-oriented small, round fruit and prostrate growth habit from ‘Christmas Cheer’. Early generation selections focused on identification of individuals with blackish green-pigmented foliage and prostrate growth habit. Recurrent selection for increased intensity of foliar anthocyanin pigmentation resulted in black foliage progeny. Concurrent selection was practiced for solitary round upright-oriented fruit. Selection was also practiced for an indeterminate vigorous growth habit that would perform well season-long under bedding plant conditions. Midnight Creeper™ is an F₁ hybrid release resulting from a sibcross of F₅ single plant selections. Routine virus indexing is practiced to maintain virus-free plant stocks.

Midnight Creeper™ was trialed under field conditions as both a bedding and container plant in Dearing, GA (heat zone 9) (American Horticultural Society, 1997) and Beltsville, MD (heat zone 7). When grown solitary or massed, growers noted Midnight Creeper’s™ spreading black foliage and small brightly colored upright-oriented fruit (Fig. 2A–C). Midnight Creeper™ is a release made available from a cooperative research and development agreement with McCorkle Nurseries (Dearing, GA) to develop new pepper germplasm with novel fruit, foliage, and plant growth habit.

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Mention of trade names or commercial products is solely for the purpose of providing specific information and does not imply recommendation or endorsement by the United States Department of Agriculture.

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Fig. 2. Whole plant and closeup images of Midnight Creeper™ and Solar Eclipse™: (A) linear row of multiple Midnight Creeper™ plants; (B) and (C) closeup of Midnight Creeper™ highlighting immature black fruit, mature red fruit, and black foliage; and (D) single plant of Solar Eclipse™.

Table 1. Comparative data for Midnight Creeper™, Solar Eclipse™, and ‘Black Pearl’ ornamental pepper plant habit and foliar and fruit morphology.^z

Attribute	Cultivar		
	Midnight Creeper™	Solar Eclipse™	Black Pearl
Plant			
Height (cm)	39 ± 2 ^y	115 ± 3	31 ± 1
Diameter (cm)	98 ± 3	92 ± 2	45 ± 1
Height/diameter	0.40 ± 0.01	1.3 ± 0.1	0.70 ± 0.02
Leaf			
Length (cm)	4.5 ± 0.3	8.8 ± 0.5	8.2 ± 1.3
Width (cm)	2.4 ± 0.1	4.2 ± 0.1	3.5 ± 0.5
Length/width	1.9 ± 0.1	2.1 ± 0.1	2.4 ± 0.1
Color, RHS #	Black, 202A	Black, 202A	Black, 202A
Fruit			
Length	1.2 ± 0.1	2.4 ± 0.1	1.6 ± 0.1
Diameter at calyx (cm)	0.8 ± 0.1	0.8 ± 0.1	0.9 ± 0.1
Diameter at midpoint (cm)	1.2 ± 0.1	0.8 ± 0.1	1.6 ± 0.1
Fruit/cluster	1	1	5.8 ± 0.4
Color, RHS # immature	Black, 202A	Black, 202A	Black, 202A
Mature	Red, 46A	Red, 46A	Red, 46A

^yData represent up to eight observations collected from 2006 trials in Beltsville, MD.

^zMean ± SE.

RHS = Royal Horticultural Society.

1.3 cm). Average fruit pericarp thickness is 1.3 mm (range, 1.0 to 1.5 mm). Fruit of ‘Black Pearl’ are similar in shape and color but are larger and borne in clusters of five to seven. ‘Black Pearl’ fruit average 1.6 cm in diameter (range, 1.3 to 1.7 cm).

Midnight Creeper™ produces a flush of full-sized black fruit in ≈70 d from transplanting and a flush of mature red fruit in ≈90 d after transplanting under good growing conditions (see “Culture” section). Additional fruit will continue to develop and ripen up until frost. Delayed fruit maturity and indeterminate growth habit ensures season-long ornamental interest. Taste evaluations indicated that fruit are extremely hot (i.e., pungent). Because Midnight Creeper™ is intended for ornamental applications, Scoville pungency units were not determined.

Midnight Creeper™ was trouble-free for disease and insect pests under field conditions in Maryland and Georgia. Controlled testing was not conducted. Under greenhouse conditions, green peach aphid, *Myzus persicae* (Sulzer), and western flower thrips,

Frankliniella occidentalis (Pergande), colonization necessitated control measures.

Solar Eclipse™. The plant habit of Solar Eclipse™ is unique. Plants produce greater than three basal shoots that have an indeterminate upright growth habit (height/diameter, 1.3). Growth is vigorous. Plants average 92 cm in diameter (range, 89 to 95 cm) and 115 cm in height (range, 110 to 119 cm) 90 d posttransplanting. ‘Black Pearl’ plants are much smaller (45 cm diameter, 31 cm height, 0.70 height/diameter). Leaves and stems of Solar Eclipse™ are glabrous and glossy. Roots are fibrous. Leaves are simple, entire, symmetrical, and lanceolate with an apiculate tip. Mature leaves average 8.8 cm in length (range, 8.2 to 9.8 cm) and 4.2 cm in width (range, 4.0 to 4.4 cm). Petiole length averages 2.5 cm (range, 2.1 to 3.1 cm). Adaxial leaf surface is black (202A). ‘Black Pearl’ has slightly smaller but similar shaped and colored leaves (8.2 cm in length, 3.5 cm in width).

Solar Eclipse™ produces very few flowers and fruit when grown under summer field

conditions (range, 5 to 10 fruit per plant). Hence, fruit are not a prominent feature of Solar Eclipse™. Flowers are self-compatible, hermaphroditic, pentamerous, and hypogynous. The purple (81A) flowers average 1.6 cm in diameter (range, 1.5 to 1.7 cm) and have purple filaments, styles, and anthers. Flowers of ‘Black Pearl’ are similar. Fruit of Solar Eclipse™ are borne solitary and upright. Immature fruit are black (202A) and mature to red (46A). Fruit are set late in the season and so few of the fruit present mature to red before the first killing frost in Maryland. Fruit are tabasco-shaped and average 2.4 cm in length (range, 2.3 to 2.7 cm), 0.8 cm in width at the midpoint (range, 0.7 to 0.9 cm), and 0.8 cm in width at the calyx (range, 0.8 to 0.9 cm). Fruit have two to three locules and average fruit pericarp thickness is 0.8 mm. Fruit pedicels average 2.2 cm (range, 2.1 to 2.3 cm). Fruit of ‘Black Pearl’ are similar in color but are round, larger (1.6 cm diameter), and are borne in clusters. Solar Eclipse™ fruit were described as very hot (i.e., pungent) in routine taste evaluations. Because Solar Eclipse™ produces few fruit and is intended for ornamental applications, Scoville pungency units were not determined.

Solar Eclipse’s™ black foliage and indeterminate tall growth habit provide a striking compliment in mixed ornamental plantings for the summer and fall garden. Little or no flowering/fruit set and delayed fruit maturity contribute to season-long usefulness.

Similar to Midnight Creeper™, disease and insect problems were not evident during field trials of Solar Eclipse™ in Maryland and Georgia. Green peach aphid and western flower thrips colonization in the greenhouse necessitated control measures.

Culture

Midnight Creeper™ and Solar Eclipse™ are best used as bedding plants where maximum plant vigor is attained. Midnight Creeper’s™ spreading indeterminate growth habit, black foliage, and brightly colored erect fruit provide an attractive ornamental display. Trial growers noted that this display is particularly striking in mass plantings of Midnight Creeper™ (Fig. 2A). Solar Eclipse’s™ tall upright indeterminate growth habit and black foliage provide an attractive backdrop in companion plantings with low-growing annuals of contrasting color. Although intended for bedding plant production, outdoor container trials indicate that Midnight Creeper™ is suitable for container gardening under high light conditions. Intensity of black foliar pigmentation in pepper is reduced under short-day, low-light conditions (Lightbourn et al., 2007; Stommel and Griesbach, 2005).

Plants of both cultivars are best established from greenhouse-grown transplants. Plants suitable for transplanting (15 to 20 cm tall) are ready in 6 weeks from shoot tip cuttings. Plants prefer a well-drained loam or sandy loam soil with some organic matter and

a pH range of 6.2 to 6.8. Adequate drainage reduces the incidence of infection by soil-borne diseases, including phytophthora root rot. Similar to culinary peppers, ornamental peppers are warm season crops requiring minimum daytime temperatures of 18 to 21 °C. Best growth is achieved at higher temperatures up to 32 °C. Plants grow poorly in the 5 to 15 °C range and are frost-susceptible (Bosland, 1999; Love, 1987). Midnight Creeper™ and Solar Eclipse™ do not require pinching or application of growth regulators to maintain their growth habit.

Availability

Midnight Creeper™ and Solar Eclipse™ are available from McCorkle Nurseries, 4904 Luckey's Bridge Road, Dearing, GA 30808. Plant patent applications have been submitted for '06C84' (Midnight Creeper™) and '07C114-1' (Solar Eclipse™). It is requested that appropriate recognition be made if this germplasm contributes to the development of a new breeding line or cultivar.

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