

11-2023

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### Recommended Citation

Guan, Wenjing and Nowaskie, Dennis, "2023 Seeded Watermelon Cultivar Evaluation in Indiana" (2023).  
*Midwest Vegetable Trial Reports*. Paper 252.  
<https://docs.lib.purdue.edu/mwvtr/252>

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## 2023 Seeded Watermelon Cultivar Evaluation in Indiana

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### Introduction

Indiana ranks sixth in watermelon production in the U.S., following Florida, Georgia, Texas, California, and North Carolina in 2022. Watermelon season in Indiana usually starts after 4 July and lasts until the end of September. A total of 7,000 acres of watermelons were planted in 2022 with a production value of \$71 million. Watermelons grown in Indiana are primarily red flesh seedless, and a small portion of personal-sized red flesh seedless. Seeded watermelons are typically not grown in large acreages, but they may be used as pollenizer plants for growing seedless watermelons.

### Materials and Methods

The 2023 seeded watermelon cultivar trial included 15 cultivars. Cultivar names, seed sources, and fruit characteristics are listed in Table 1.

A randomized complete block design with three blocks was used for the trial. Each block had guard rows of watermelons planted on both sides (Figure 1). Watermelon plots were planted on 40-ft beds that were spaced on 8-ft centers. Cultivars were randomly assigned to each row within a block. Each experimental plot had ten plants, grown with 4-ft in-row spacing.

Soils of the experimental fields are Henshaw silt loam with 1.5% organic matter and no vegetable crops have been grown in these fields in the past 30 years. Granular fertilizers at a rate of 325 lb/acre urea (46-0-0) (150 lb/acre nitrogen), 300 lb/acre potash (0-0-60) (150 lb/acre potassium), 7 lb/acre boron 14.3% (1 lb/acre boron) and 10 lb/acre Zinc 10% LS (1 lb/acre zinc) were pre-plant broadcast applied. Plants were grown on raised beds covered with black plastic mulch. Drip tapes with a 12-inch emitter spacing and a flow rate of 0.22 gpm/100 feet were used for irrigation. At transplant, each seedling received approximately one cup of starter fertilizer solution using Brandt Plant Start 8-27-2 at a rate of 4 quarts per acre.

Watermelon seeds were planted in 50-cell black seeding flats filled with a peat-based potting medium on 18 Apr. Transplants were grown in greenhouses at the Southwest Purdue Agricultural Center (SWPAC) and transplanted in the field on 17 May.

Fungicides used include Initiate<sup>®</sup> 720, Aprovia Top<sup>®</sup>, Inspire Super<sup>®</sup>, Presidio<sup>®</sup>, Ranman<sup>®</sup>, Rally<sup>®</sup>, Miravis<sup>®</sup> Prime, Rampart<sup>®</sup>, Zampro<sup>®</sup>, Quadris<sup>®</sup> Top, and Orondis<sup>®</sup> Ultra. They were rotationally sprayed to control foliar diseases and Phytophthora in watermelons. Insecticide Oberon<sup>®</sup> 25C was sprayed once to control two-spotted spider mites.

Harvests were conducted on 18 Jul., 24 Jul., 31 Jul., and 7 Aug. Fruit were weighed individually. Three fruit per cultivar per replication were collected at the second harvest for quality measurement. Fruit size and rind thickness were recorded. Soluble solids contents (SSC%) were measured with a digital refractometer. Flesh firmness was measured using a force gauge (FT 011) with 11 mm diameter tip. Hollow heart severity was evaluated using a 1-5 scale: 1. none; 2. carpel separation evident; 3. one large gap evident; 4. more than 2 large gaps; 5. severe.

Male flowers were counted five times in the season (4 June, 9 June, 14 June, 22 June, 5 July). On 4 June and 9 June, data was collected on three individual plants in each plot. The averages of the three plants were used for statistical analyses. On 14, 22 June, and 5 July, the data was collected inside a 2-ft-side square.

Analysis of variance was performed using JMP Pro 16. Fisher's least significant difference test ( $\alpha = 0.05$ ) was conducted for multiple comparisons of different measurements among watermelon cultivars.

## **Results and Discussion**

Marketable yields of the watermelons ranged from 47,065 to 32,625 lbs/acre. Cultivar #284, Jamboree, #271, NUN22103, 800 and #282 had the highest yields by weight. The top-yielding cultivars also had relatively larger fruit. #271 had the largest fruit with an average fruit weight 22.5 lb, followed by Jamboree (20.0 lb), #282 (19.9 lb), 800 (19.7 lb) (Table 2). The majority of fruit of all the cultivars were harvested on 24 July (Figure 2). Except for Sweet Punch and Sweet Dream, which formed oval-shaped fruit, the other cultivars produced oblong fruit. Sangria and Jamboree produced fruit with the greatest length to width ratio (Table 4). Sweet Punch had a solid dark-green rind, and Sweet Dream had a tiger-striped rind pattern. When seeded and seedless cultivars are grown together, it is crucial fruit characteristics such as shape and rind pattern can easily separate the fruit. Symptoms of Hollow Heart were found on cultivars Sweet Dream, Jamboree and Estrella (Table 4).

Cultivars started to bloom in early June. On 4 June, #271 produced the most male flowers, followed by #282 (Table 3). Nun22104, Nun 22103, Nun 22102, Virgo, SSX8585, Sweet Punch and #284 did not have male flowers on that date. In the following observational dates, we did not detect significant differences in male flowers among the evaluated cultivars (data not shown). We observed much more flowers in the adjacent SP7 rows (a non-edible pollenizer plant used in growing seedless watermelon, which was not part of the evaluation) compared to the seeded watermelon cultivars evaluated in the trial.

## **Acknowledgments**

Seed companies that provided financial support for the trial include BASF, Hazera, US Agriseeds and HighMark. Brandt Consolidated, Inc. donated the Plant Start fertilizer.

Southwest Purdue Agricultural Center employees Dean Haseman, Barbara Joyner, Angie Thompson, Bill Davis; graduate student Emerson Luna; and SWPAC summer helpers provided technical assistance for the trial. Dr. Dan Egel, Purdue Extension plant pathologist, provided suggestions for fungicide application and reviewed the report; Charlie Rohwer, a scientist at the University of Minnesota, also reviewed this report; Alex Helms, assistant director of Purdue Agricultural Centers, took the drone picture.

Table 1. Cultivar names, seed sources and rind patterns of standard-sized seedless watermelons in the 2023 cultivar evaluation trial at Southwest Purdue Agricultural Center in Vincennes, IN.

<b>Cultivar</b>	<b>Seed Source</b>	<b>Rind Patter</b>	<b>Fruit Shape</b>
NUN 22104	BASF	Striped	Oblong
800	BASF	Striped	Oblong
NUN 22103	BASF	Striped	Oblong
NUN 22102	BASF	Striped	Oblong
Virgo	Hazera	Striped	Oblong
Estrella	SWPAC-Seedway	Striped	Oblong
Sangria	SWPAC-Seedway	Striped	Oblong
Jamboree	SWPAC-Seedway	Striped	Oblong
SSX8585	SWPAC-Seedway	Striped	Oblong
Sweet Punch (USAW 16134)	US Agriseeds	Solid dark green	Oval
Sweet Dream (USAW 16364)	US Agriseeds	Tiger-striped	Oval
#220	HighMark	Striped	Oblong
#271	HighMark	Striped	Oblong
#282	HighMark	Striped	Oblong
#284	HighMark	Striped	Oblong

Table 2. The marketable and total yields of seeded watermelons in the 2023 watermelon cultivar evaluation at Southwest Purdue Agricultural Center in Vincennes, IN.

Cultivar	Marketable Yield (lbs/acre)		Marketable Yield (count/acre)		Total Yield (lbs/acre) <sup>z</sup>		Total Yield (count/acre)		Avg Fruit wt. (lb)	
#284	47065	a <sup>y</sup>	2586	c	48062	a	2677	c	18.4	b-e
Jamboree	46246	ab	2314	cde	47100	ab	2360	cd	20.0	b
#271	45901	abc	2042	de	48065	a	2178	d	22.5	a
NUN 22103	45371	a-d	2450	cd	46891	ab	2541	cd	18.7	b-e
800	44592	a-e	2269	cde	46667	ab	2450	cd	19.7	bcd
#282	41077	a-f	2087	de	41786	abc	2133	d	19.9	bc
Sangria	39397	b-g	2178	cde	41734	abc	2314	cd	18.2	b-e
Sweet Dream (USAW 16364)	39379	b-g	4991	a	39625	c	5037	a	7.9	f
NUN 22104	38993	c-g	2042	de	40770	bc	2133	d	19.3	b-e
SSX8585	38421	d-g	2269	cde	39414	c	2360	cd	16.9	e
Estrella	38243	d-g	2223	cde	40814	bc	2360	cd	17.2	de
NUN 22102	37857	efg	1997	e	39048	cd	2087	d	19.0	b-e
#220	37085	fg	2133	de	38189	cd	2223	cd	17.4	cde
Virgo	36424	fg	1997	e	39013	cd	2223	cd	18.3	b-e
Sweet Punch (USAW 16134)	32625	g	3403	b	32625	d	3403	b	9.6	f

<sup>z</sup> Culls were less than 10% of the total yields. Wild animal damage was the primary factor causing culls.

<sup>y</sup> Means within a column followed by the same letter do not differ significantly at  $P < .05$ .

Table 3. Male flower count of seeded watermelons in the 2023 watermelon cultivar evaluation at Southwest Purdue Agricultural Center in Vincennes, IN.

Cultivar	Male flower count per plant <sup>z</sup>	
#271	2.67	a <sup>y</sup>
#282	1.00	b
800	0.33	bc
Estrella	0.33	bc
Sangria	0.33	bc
Jamboree	0.33	bc
Sweet Dream (USAW 16364)	0.33	bc
#220	0.33	bc
NUN 22104	0	c
NUN 22103	0	c
NUN 22102	0	c
Virgo	0	c
SSX8585	0	c
Sweet Punch (USAW 16134)	0	c
#284	0	c

<sup>z</sup> The data was collected on 4 June. The average of male flowers on three plants were presented. In the following observational dates (9 June, 14 June, 22 June, 5 July), no significant difference in male flower numbers was detected among watermelon cultivars.

<sup>y</sup>Means within a column followed by the same letter do not differ significantly at  $P < .05$ .

Table 4. Fruit quality characteristics of seeded watermelons in the 2023 watermelon cultivar trial at Southwest Purdue Agricultural Center in Vincennes, IN.

Cultivar	Length (cm)		Width (cm)		Length: Width		Rind (cm)		Soluble solids content (°Brix)		Firmness (lbs-force)		Hollow Heart	
	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE
800	35.6	de <sup>z</sup>	23.4	ab	1.52	ef	1.81	a-d	9.81	de	2.69	bc	1.11	bc
#220	34.6	de	22.1	cd	1.57	ef	1.64	b-e	9.98	b-e	2.62	bc	1.11	bc
#271	40.5	ab	23.6	a	1.71	c	1.91	ab	9.83	cde	2.11	de	1.11	bc
#282	36.7	cd	23.2	ab	1.58	ef	1.56	cde	10.11	b-e	2.33	cde	1.11	bc
#284	35.2	de	23.4	ab	1.51	ef	1.66	b-e	9.83	cde	2.46	cd	1.00	c
Estrella	34.6	de	21.9	cd	1.58	ef	1.52	d-g	10.11	b-e	2.58	cd	1.22	abc
Jamboree	41.6	a	22.1	cd	1.88	ab	1.72	b-e	10.47	a-d	1.93	e	1.39	ab
NUN 22102	33.2	e	22.5	bc	1.48	f	1.62	b-e	10.79	ab	2.51	cd	1.11	bc
NUN 22103	36.2	cd	22.6	abc	1.60	de	2.1	a	9.28	e	2.7	bc	1.00	c
NUN 22104	40.0	ab	23.4	ab	1.71	cd	1.54	c-f	10.01	b-e	2.66	bc	1.11	bc
Sangria	39.6	ab	20.2	e	1.99	a	1.64	b-e	10.71	abc	2.3	cde	1.00	c
SSX8585	38.6	bc	21	de	1.84	b	1.5	efg	11.28	a	2.36	cde	1.11	bc
Sweet Dream (USAW 16364)	21.1	f	20.2	e	1.05	g	1.26	fg	10.04	b-e	3.36	a	1.44	a
Sweet Punch (USAW 16134)	22.4	f	20.7	e	1.08	g	1.24	g	10.07	b-e	3.07	ab	1.00	c
Virgo	36.4	cd	23	abc	1.58	ef	1.83	abc	10.47	a-d	2.56	cd	1.00	c

<sup>z</sup> Means within a column followed by the same letter do not differ significantly at  $P < .05$ .



Figure 1. Overview of the 2023 seeded watermelon cultivar trial at Southwest Purdue Agricultural Center in Vincennes, IN. The picture was taken on June 28 by Alex Helms.



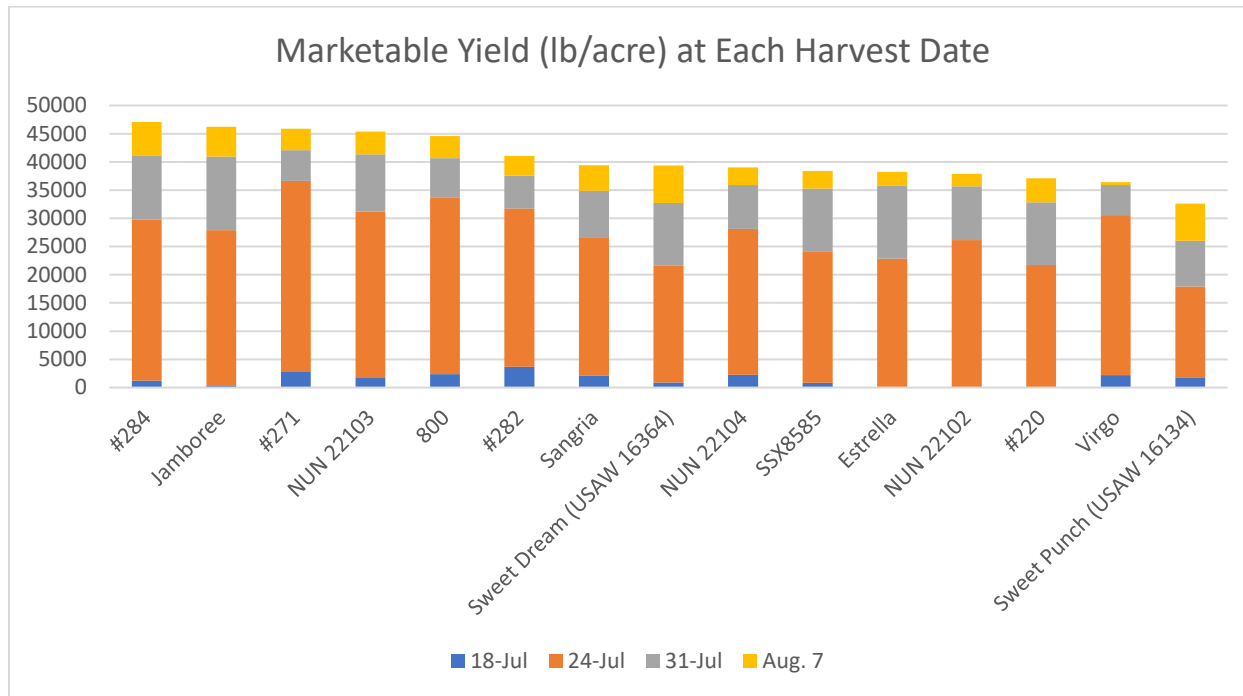
















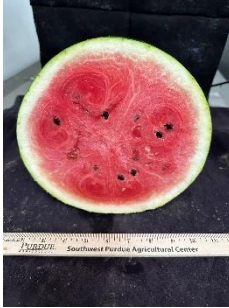





Figure 2. Marketable yield (lbs/acre) at each harvest date of seeded watermelons in the 2023 watermelon cultivar trial at Southwest Purdue Agricultural Center in Vincennes, IN.

<p>NUN 22104</p>		
<p>800</p>		
<p>NUN 22103</p>		
<p>NUN 22102</p>		
<p>Virgo</p>		

Estrella		
Sangria		
Jamboree		
SSX8585		
Sweet Punch (USAW 16134)		


Sweet Dream (USAW 16364)		
#220		
#271		
#282		
#284		

Figure 3. Exterior and interior of seeded watermelon cultivars in the 2023 watermelon trial.