Saginaw Valley Research and Extension Center 2014 Pickling Cucumber Variety Trial

Ben Phillips Michigan State University Extension
One Tuscola St., Saginaw, MI 48607
Office: (989) 758-2502 Email: phill406@msu.edu

A pickling cucumber variety trial was planted at the Saginaw Valley Research and Extension Center (3775 S. Reese Road, Frankenmuth, MI 48734). Seminis, Nunhem's, and Rijk Zwaan seed companies generously donated publicly available parthenocarpic (seedless) and predominately female (standard or PF) cucumber seeds to the trial.

The 72 plots were split into four overlapping blocks. The northern block consisted of six replications of six predominately female varieties planted at a rate of one seed per 5 inches (Table 1). The southern block consisted of six replications of six seedless varieties planted at a rate of one seed per 7 inches (Table 2). Seedless varieties were not isolated from standards. The eastern block was sprayed for downy mildew, and featured three replications of each seedless and PF variety. The western block was not treated for downy mildew, and featured the same three replications of each variety as the eastern treated block. Curbit (3 pt/a), and urea (to supply 60 lb/a N) was applied to the disked field approximately two weeks before planting. The soil type was a Tappan-Londo loam with a poor-moderate drainage classification, typical of the pickling cucumber-growing region of Michigan's Saginaw Valley.

On June 27, 2014, cucumbers were machine-planted with a Monosem vacuum planter with one tablespoon of talc powder per bin. Each plot had four rows that were 27 feet long and 20 inches apart, with a 40-inch space (north-south), and a 5-foot break (east-west) between varieties. NQ5543, NUN53014, and Puccini cucumber varieties did not flow through the planter well and required hand-planting. On July 17, 2014, the cucumbers were thinned. Plots were hoed on July 17, and August 4. Protective sprays occurred on the eastern spray block with a backpack sprayer on July 17 (Bravo and Manzate), July 24 (Bravo and Cabrio), July 30 (Manzate and Previcur Flex), and August 6 (Bravo and Previcur Flex). The tank mixes featured rates of Bravo at 32oz/a, Manzate at 3lb/a, Cabrio at 16 oz/a, and Previcur Flex at 0.8oz/a.

Seedless cucumbers were harvested on August 13 (day 49), and PF varieties were harvested on August 15 (day 51). Measurements were taken on the same days as each respective harvest. Twenty feet of an inner row of each plot was destructively harvested by hand, and all cucumbers greater than the diameter of a Sharpie® marker cap were placed into a labeled container. Each container was then sent through a sorter to separate cucumber size classes: 4 (>2 inches), 3B (1.75-2 inches), 3A (1.5-1.75 inches), 2B (1.25-1.5 inches), 2A (1.06251.25 inches), and 1 (0.5-1.0625 inches). Cull tallies and harvest weights of each size class were measured separately within each plot, and 10 cucumbers were chosen randomly to measure their length and diameter. If there were fewer than 10 cucumbers in a size class, then they were all measured.

Results

Sprayed cucumbers were free of downy mildew for the duration of the trial, while the unsprayed northern block of PF cucumbers were naturally infested with the pathogen starting on July 30. Within one week, the pathogen had spread to the seedless cucumbers in the unsprayed southern

block. Additionally, seed coatings, talc powder, and hand planting played an important role in stand density. Three seedless varieties (NQ5543, NUN53014, and Puccini) were unsuccessfully planted with the Monosem vacuum planter when too much talc powder was added to the seed bins. Hand-planted plots did not germinate as well, or as densely as the mechanically planted plots. Total bushel/acre yield data includes culls, but excludes 1's. A better estimate of yield can be found by taking the percent of culls away from the bu/a estimate. Size class 1 was not weighed.

Two honeybee hives were placed 100 yards away for the entire summer, and they were active in all plots. This has been a problem for field-produced seedless varieties, causing misshaped fruit. However, cull rates were low in seedless varieties of this trial, and this may have been because they started flowering four days before standard varieties, before pollen became available from the standard plants.

Cucumbers sprayed for downy mildew yielded higher than the unsprayed cucumbers and contained fewer culls. This was more noticeable in PF cucumbers, which yielded between 1.56 and 2.24 times more when they were sprayed, and contained 1.6-2.45 times more culls when left unsprayed. Yields were significantly greater in sprayed plots of Expedition (3As: $P < 0.001$, 2Bs: $P = 0.009$) and Logan (2Bs: $P = 0.019$) (Figure 1). There was also a significant yield difference in Logan 2A's ($P = 0.017$) and Journey 2A's ($P = 0.003$). The highest yielding sprayed and unsprayed PF cucumbers were Expedition (501.3 bu/a) and Journey (290.97 bu/a). Seedless cucumbers experienced an increased yield factor between 0.84 and 1.77 when sprayed, and had 0.6-2.99 times more culls when left unsprayed. Yields were significantly greater in sprayed plots of Stravinsky (2Bs: $P = 0.009$) (Figure 1). The highest yielding sprayed and unsprayed seedless cucumbers were Gershwin (506.15 bu/a) and RZ09 (390.06 bu/a).

Overall, there was a higher yield proportion of 3A's across all varieties (0.36), but also within PF (0.39) and seedless (0.33) varieties. 2B's were the second highest proportion of yield class across all varieties (0.29), and within PF (0.26) and seedless (0.32) varieties (Table 2). Conventional PF cucumbers yielded 325.82 bu/a on average, while seedless cucumbers yielded 265.22 bu/a on average. Within the 3A size class, Expedition and Gershwin yielded significantly more than Puccini. Within the 2B size class, SV135CN, Stravinsky, Gershwin, and RZ09 yielded significantly more than NQ5543, NUN53014, and Puccini. Within the 2A size class, Logan yielded significantly more than NQ5543 and NUN53014. There were no significant differences in yield among varieties in the 3B or 4 size classes (Figure 2).

Acknowlegements

Special thanks to Paul Horny, Dennis Fleishman, Charlie Bauer, and Chad Bauer, who helped immensely with getting the crop in the ground. A more special thanks to my fiancée, Caitlin Burkman, for helping harvest and measure cucumbers for 14 hours on a Friday.

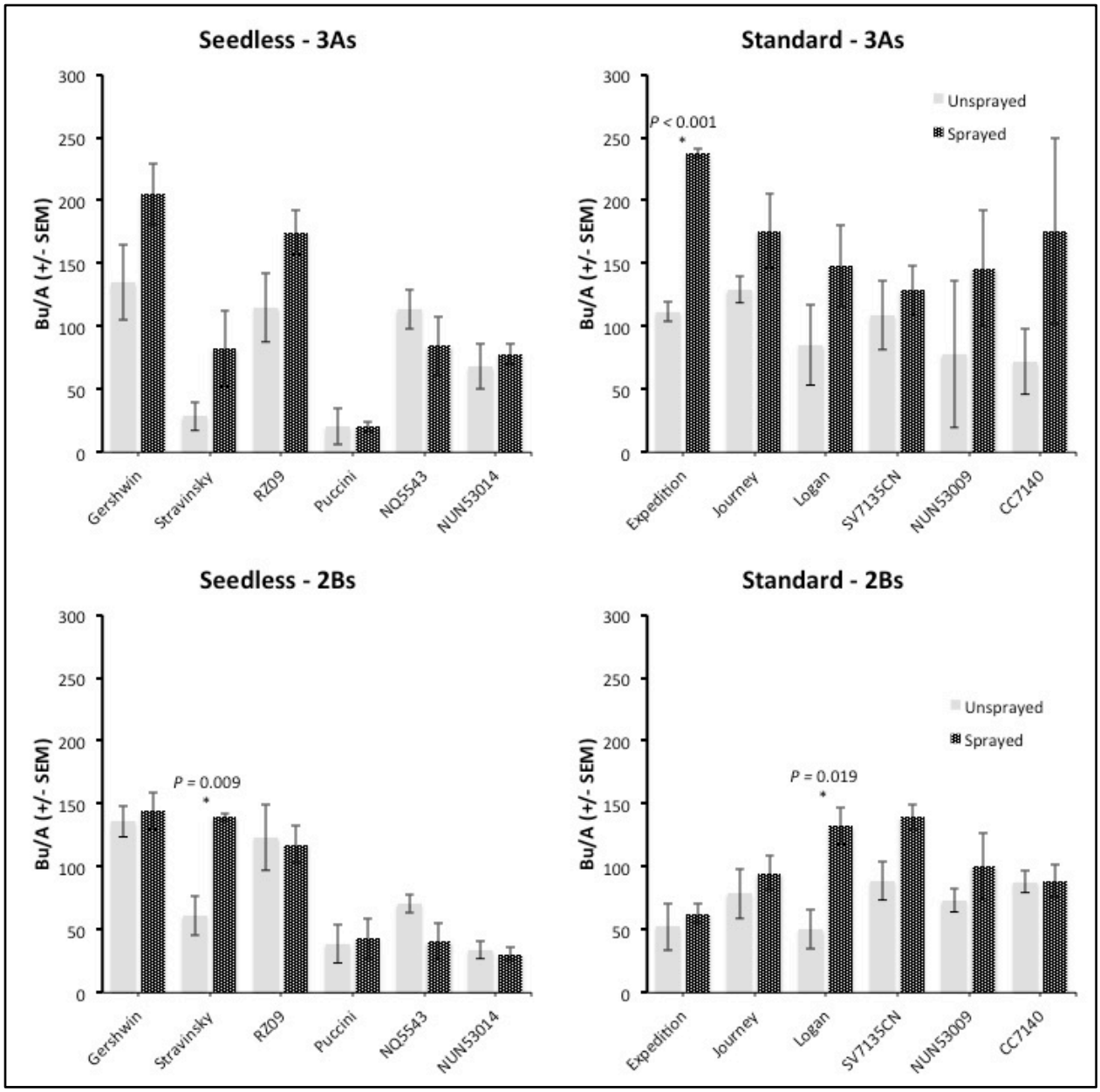

Figure 1. Performance in bushels/a (Bu/A) of 3As and 2Bs from six sprayed and unsprayed standard cucumber cultivars, and six sprayed and unsprayed seedless cucumber cultivars planted at the Saginaw Valley Research and Extension Center, Frankenmuth, Michigan. The trial was planted at 20-inches between rows, 5 inches in-row for standards, and 7 inches in-row for seedless. Protective sprays occurred on the eastern spray block with a backpack sprayer on July 17 (Bravo and Manzate), July 24 (Bravo and Cabrio), July 30 (Manzate and Previcur Flex), and August 6 (Bravo and Previcur Flex). The tank mixes featured rates of Bravo at 32oz/a, Manzate at 3lb/a, Cabrio at 16 oz/a, and Previcur Flex at 0.8oz/a. Seedless cucumbers were harvested at 49 days and standards were harvested 51 days after planting.

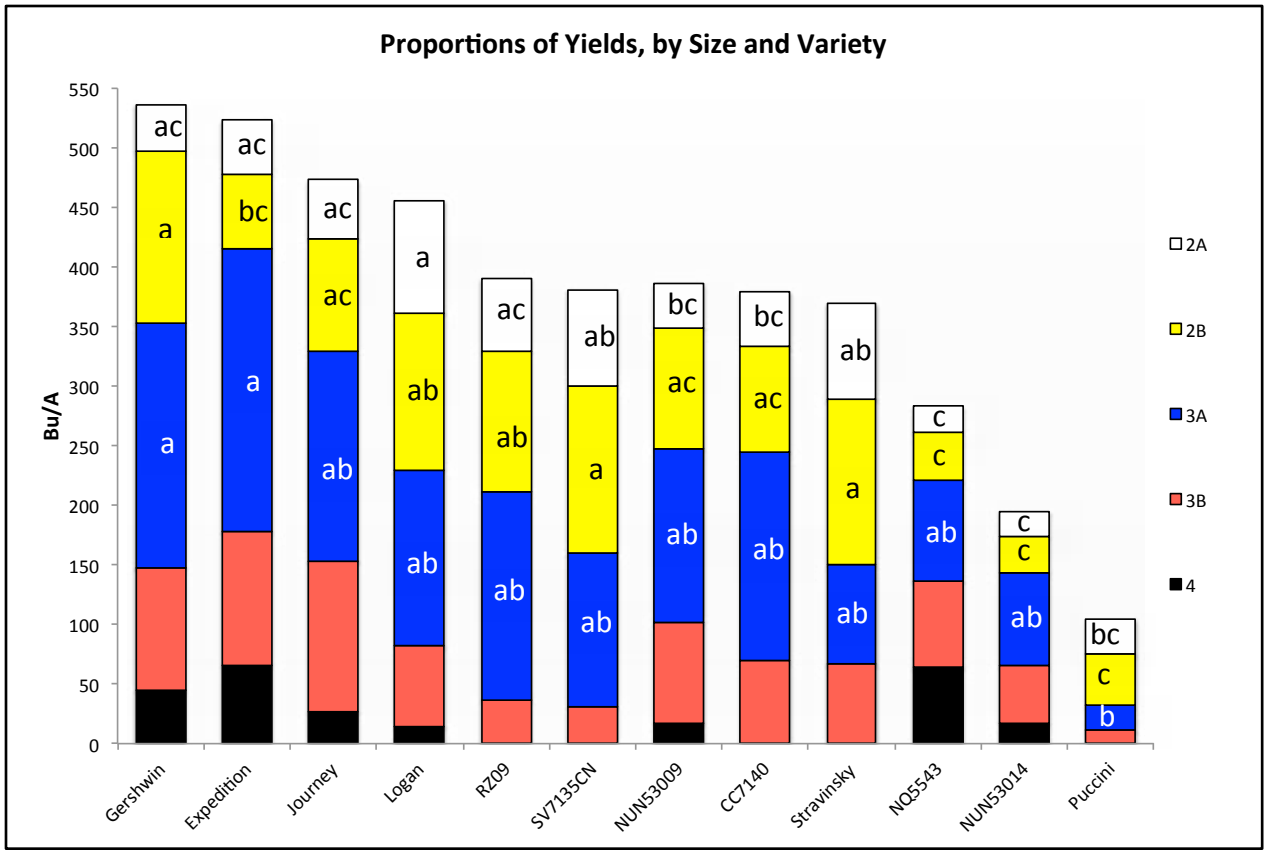

Figure 2. Performance in bushels/a (Bu/A) of from 12 sprayed cucumber cultivars planted at the Saginaw Valley Research and Extension Center, Frankenmuth, Michigan, and the proportion of sizes 2A, 2B, 3A, 3B, and 4. Matching letters within similarly colored sections of bars indicate no significant differences. The trial was planted at 20-inches between rows, 5 inches in-row for standards, and 7 inches in-row for seedless. Protective sprays occurred on the eastern spray block with a backpack sprayer on July 17 (Bravo and Manzate), July 24 (Bravo and Cabrio), July 30 (Manzate and Previcur Flex), and August 6 (Bravo and Previcur Flex). The tank mixes featured rates of Bravo at 32oz/a, Manzate at 3lb/a, Cabrio at 16 oz/a, and Previcur Flex at 0.8oz/a. Seedless cucumbers were harvested at 49 days and standards were harvested 51 days after planting.

Table 1. Performance in bushels/a (Bu/A) of 12 sprayed cucumber cultivars planted at the Saginaw Valley Research and Extension Center, Frankenmuth, Michigan, and the proportion of sizes 2A, 2B, 3A, 3B, and 4. The trial was planted at 20-inches between rows, 5 inches in-row for standards, and 7 inches in-row for seedless. Protective sprays occurred on the eastern spray block with a backpack sprayer on July 17 (Bravo and Manzate), July 24 (Bravo and Cabrio), July 30 (Manzate and Previcur Flex), and August 6 (Bravo and Previcur Flex). The tank mixes featured rates of Bravo at 32oz/a, Manzate at 3lb/a, Cabrio at 16 oz/a, and Previcur Flex at 0.8oz/a. Seedless cucumbers were harvested at 49 days and standards were harvested 51 days after planting.

Variety	Co.[1]	Type[2]	Fruit/ Plant[3]	Plants/A	Bushels/Acre[3]						Proportions of Yield				
					Total	4	3B	3A	2B	2A	4	3B	3A	2B	2A
Gershwin	RZ	Parth	3.43	27,473.68	506.15	45.17	102.49	204.99	144.27	39.35	0.09	0.20	0.40	0.29	0.08
Logan	NU	PF	1.44	81,473.68	445.92	14.57	67.52	147.67	132.12	93.75	0.03	0.15	0.33	0.30	0.21
Journey	SM	PF	1.40	71,526.32	455.63	26.23	126.78	175.84	94.72	49.55	0.06	0.28	0.39	0.21	0.11
Expedition	SM	PF	1.80	61,578.95	501.30	65.58	112.21	237.53	62.66	45.17	0.13	0.22	0.47	0.13	0.09
RZ09	RZ	Parth	3.40	27,000	390.06	0.00	36.92	174.38	117.55	61.20	0.00	0.09	0.45	0.30	0.16
SV7135CN	SM	PF	1.45	73,421.05	381.31	0.00	31.57	128.72	139.41	81.61	0.00	0.08	0.34	0.37	0.21
NUN53009	NU	PF	1.11	68,210.53	375.00	17.49	84.03	146.21	100.55	38.37	0.05	0.22	0.39	0.27	0.10
CC7140	SM	PF	1.22	70,578.95	356.54	0.00	69.22	175.36	88.41	46.63	0.00	0.19	0.49	0.25	0.13
NQ5543	NU	Parth	2.00	20,842.11	240.45	64.12	72.38	84.52	40.80	21.37	0.27	0.30	0.35	0.17	0.09
Stravinsky	RZ	Parth	3.10	27,947.37	324.97	0.00	67.03	82.58	139.41	80.63	0.00	0.21	0.25	0.43	0.25
NUN53014	NU	Parth	1.43	24,157.89	183.61	17.49	47.60	78.21	30.60	21.37	0.10	0.26	0.43	0.17	0.12
Puccini	RZ	Parth	1.12	27,000	97.15	0.00	11.66	20.40	42.75	30.12	0.00	0.12	0.21	0.44	0.31

[1]Seed companies: SM=Seminis, NU=Nunhems, RZ=Rijk Zwan.
[2]Type of fruit set: standard predominantly female (PF), or seedless parthenocarphic (Parth).
[3]Total bushels/acre includes culls, but excludes 1's.

Table 2. Length and diameter (L:D) ratios and cull percentages of sizes 2A, 2B, 3A, and 3B from 12 sprayed cucumber cultivars planted at the Saginaw Valley Research and Extension Center, Frankenmuth, Michigan. The trial was planted at 20-inches between rows, 5 inches in-row for standards, and 7 inches in-row for seedless. Protective sprays occurred on the eastern spray block with a backpack sprayer on July 17 (Bravo and Manzate), July 24 (Bravo and Cabrio), July 30 (Manzate and Previcur Flex), and August 6 (Bravo and Previcur Flex). The tank mixes featured rates of Bravo at 32oz/a, Manzate at 3lb/a, Cabrio at 16 oz/a, and Previcur Flex at 0.8oz/a. Seedless cucumbers were harvested at 49 days and standards were harvested 51 days after planting.

Variety	Co.[1]	Type[2]	L:D ratios				Cull%				
			3B	3A	2B	2A	3B	3A	2B	2A	Total
Gershwin	RZ	Parth	2.59	2.80	2.82	3.09	11.11	6.25	9.55	21.74	7.17
Logan	NU	PF	2.69	3.07	3.21	3.29	8.33	4.12	15.53	25.42	16.18
Journey	SM	PF	2.84	2.94	3.01	3.13	6.67	15.08	21.87	26.68	18.61
Expedition	SM	PF	3.02	3.14	3.19	3.26	0.00	11.76	19.00	22.40	11.98
RZ09	RZ	Parth	2.75	2.89	3.07	3.23	0.00	11.11	12.50	13.13	7.46
SV7135CN	SM	PF	2.68	3.04	3.22	3.17	25.00	0.00	13.14	22.12	13.47
NUN53009	NU	PF	3.06	3.18	3.30	3.31	0.00	18.52	9.29	30.30	13.18
CC7140	SM	PF	2.88	3.07	3.06	3.04	0.00	11.11	15.85	25.19	14.58
NQ5543	NU	Parth	2.95	3.03	3.25	3.50	0.00	14.29	16.54	25.76	13.01
Stravinsky	RZ	Parth	2.71	2.92	3.04	3.18	0.00	0.00	12.53	13.51	10.17
NUN53014	NU	Parth	2.94	3.51	3.47	3.38	0.00	14.17	25.00	28.85	10.61
Puccini	RZ	Parth	3.00	2.57	2.64	2.78	0.00	0.00	6.25	25.00	14.63

[1]Seed companies: SM=Seminis, NU=Nunhems, RZ=Rijk Zwan.
[2]Type of fruit set: standard predominantly female (PF), or seedless parthenocarphic (Parth).