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se and sh_2 Sweet Corn Germplasm Evaluation Results in 1999

Information on the Effect of Genotype and Growing Location on se- and sh_2-type Sweet Corn Crop Yield and Ear Traits in Ohio in 1999

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Matt Kleinhenz and Brenda Schult
Department of Horticulture and Crop Science
The Ohio State University
Ohio Agricultural Research and Development Center
Wooster, OH

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Project Summary

Market acceptance and grower return from sweet corn production depend on crop yield and quality. Marketable yield, ear traits, and kernel sugar content are important components of sweet corn crop quality. Sweet corn varieties are genetically predisposed to differ in these and other traits. Varieties also differ in their response to physical and chemical aspects of the growing environment, such as daily temperature cycles and mineral nutrient and soil moisture availability. More important, little is known about the influence of these factors on plant and ear traits, including kernel sugar content. Yield, ear traits, and kernel sugar content have significant implications to the grower and market. To be successful, Ohio sweet corn growers must have available varieties adapted to the state's conditions. This project was undertaken to assist Ohio sweet corn growers in identifying varieties with desirable traits.

Through the cooperation of private breeders, the Ohio Agricultural Research and Development Center, OSU Extension, the Dept. of Horticulture and Crop Science, and Ohio sweet corn and vegetable industries, 21 genotypes were tested at three locations in Ohio in 1999. Table 1 lists the genotypes (varieties, experimental lines) of yellow and white se- and sh_2-type sweet corn tested in 1999. Planting occurred on May 6-7 at OSU research stations in Celeryville, Fremont, and Wooster. Crop development was evaluated 2-3 times weekly. Total and marketable yield, ear traits, and kernel sugar content were recorded approximately 22 days after silking. Kernel sugar content was also measured 48 hr after harvest. A portion of ears from each plot were frozen on-site immediately after harvest or after 48 hr storage at room temperature by immersion in liquid nitrogen. Plots were featured in OSUE field days held at the Muck Crops and Vegetable Crops Research Branches in Celeryville and Fremont, respectively. Data have also been summarized in the Midwest Vegetable Variety Trial Report issued by Purdue University (and available through OSU).

Selected Results: The site by entry (SxE) interaction was significant for many traits studied, especially ear traits in the se group. Marketable yield criteria were influenced by site and entry but the SxE interaction was mostly not significant for marketable yield. Yield tended to be higher at Celeryville. In these experiments, ear traits for a given sweet corn variety or line appeared to be influenced by growing environment, especially if the variety or line was an se-type. In contrast, marketable yield tended to be less effected by the SxE interaction. Kernel sugar level data are incomplete at the time of this writing but will be presented at the Congress. In these experiments, sites differed primarily in soil type and cropping history and less in rainfall or heat unit accumulation. Marketable yield values tended to be greatest on the organic soils of Celeryville and least on the loamy soils of Fremont. Variety selection in sweet corn requires a balance among high production potential, specific desirable ear traits, and other factors. Growers are encouraged to develop and prioritize selection criteria appropriate for their production conditions.

Data from these studies will assist Ohio growers and members of allied industries in selecting varieties adapted to Ohio's unique growing conditions. These data will also provide breeders with information on the inheritance of specific traits and narrow versus broad adaptation of

individual varieties. Collaborating with breeders creates opportunities for the development of improved varieties, especially for Ohio conditions.

Materials and Methods

Table 1. List of se- and sh_2-type sweet corn entries tested at three locations in Ohio in 1999.

Type	#	Name	Kernel Color	Company
se				
	1	A&C64y	yellow	Abbott and Cobb
	2	Chief Ouray	yellow	Mesa Maize
	3	HMX5346E	yellow	Harris Moran
	4	Incredible	yellow	Crookham
	5	Pronto	yellow	Seneca Hybrids
	6	Spring Treat	yellow	Mesa Maize
	7	Sweet Riser	yellow	Harris Moran
	8	SX7202SEY	yellow	Seneca Hybrids
	9	Tablemaster	yellow	Mesa Maize
	10	Tuxedo	yellow	Mesa Maize
	11	HMX5349WE	white	Harris Moran
sh_2				
	12	A&C8100R	yellow	Abbott and Cobb
	13	ACX405	yellow	Abbott and Cobb
	14	ACX427	yellow	Abbott and Cobb
	15	Attribute GSS0966	yellow	Novartis/Rogers Brand
	16	GSS3587	yellow	Novartis/Rogers Brand
	17	Bandit	yellow	Harris Moran
	18	HMX6383S	yellow	Harris Moran
	19	Impulse	yellow	Novartis/Rogers Brand
	20	Morning Star	yellow	Harris Moran
	21	Ice Queen	white	Harris Moran

Plot Establishment. Eleven se- and ten sh_2-type sweet corn varieties or experimental lines were planted at three locations in northern Ohio in 1999. Plots were established at the OARDC in Wooster (Wayne County) on May 7, Muck Crops Research Branch in Celeryville (Huron County) on May 8, and Vegetable Crops Research Branch in Fremont (Sandusky County) on May 8. A randomized complete block design with four replications was employed. Organic soils predominate at Celeryville while loams and silty loams predominate at Fremont and Wooster, respectively. Plots were seeded with a modified John Deere planter and contained four 25-ft rows on 30-in centers. The planter delivered 2.4 seed/ft/row. Ends of plots were separated by two feet at planting. Endosperm type (se, sh_2) experiments were separated by a minimum of 250 ft at each location.

Plots were shortened by hand to 15 ft in Celeryville and Fremont and 20 ft in Wooster after seedling establishment. All plots were also thinned by hand to contain 1.1 ± 0.17 plants/foot of row at the same time.

Plot Maintenance. Standard soil, nutrient, and pest management practices were employed. Irrigation dates were: June 15 (Fremont, se and sh_2), June 18 (Wooster, se and sh_2), and July 26 (Wooster, sh_2 only). Plots in Celeryville were not irrigated. Approximately 0.75 in water was applied in each irrigation.

Measurement of Plant and Ear Traits. Readiness for harvest was assessed by counting days from silking (target = 22) and visual examination of ears in each plot. Height to the top of the tassel and collar of the ear were measured on five mature plants in the center two rows per plot. Traits were then measured on ears from the ten center plants in the center two rows of each plot. The following data were collected for each plot at harvest: total weight of all ears from twenty plants, total number and weight of marketable ears. The following data were collected on five *individual* marketable ears per plot: ear length, ear diameter, number of rows of kernels per ear, and shank length. Non-marketable ears had incomplete tip fill or displayed evidence of disease, insect, or animal damage.

Statistical Analyses. Data from se and sh_2 experiments were analyzed separately. Analyses of variance were completed to test site, entry, and site by entry effects on sweet corn marketable yield and plant and ear traits. Effects were considered significant if $p \leq 0.10$.

Results

General Influence of Site and Entry. The site by entry (SxE) interaction was significant for 5 of 8 overall traits in se experiments and 3 of 8 overall traits in sh_2 experiments (Table 2). Likewise, the SxE interaction was significant for 4 of 6 ear traits in se experiments and 3 of 6 ear traits in sh_2 experiments. Marketable yield was impacted by site and entry but the SxE interaction was not significant, except for the number of marketable ears from 20 plants in the se group (Table 2).

Stand Establishment and Maturity. Relative percent emergence was highest for both endosperm types at Fremont (Table 3). Overall, relative percent emergence was highest in the sh_2 experiments compared to the se experiments (Table 3). The range of days to harvest was similar in both endosperm types although the overall days to harvest was slightly lower for the se group compared to the sh_2 group (Table 4).

Marketable Yield. Overall marketable yield, whether calculated as percent by weight of all ears removed from a plot (Table 5) or as the number of marketable ears taken from 20 plants in the plot (Table 6), was similar in the se and sh_2 groups. Percent marketable yield by weight tended to be higher at Celeryville (Table 5). Most varieties produced approximately 85% marketable yield by weight (Table 5) and approximately 15 marketable ears out of 20 plants per plot (Table 6).

Ear Traits. Overall total ear length, including the shank, was 40 cm (approx. 16 inches) in the se and sh_2 groups (Table 8). However, the highest (42 cm) and lowest (37 cm) total ear length differed by 12% in the se group and 21% (37 cm vs. 47 cm) in the sh_2 group (Table 8).

Overall ear height was greater in the sh_2 group than in the se group (Table 9). Ear height ranged from 36 cm to 71 cm in se entries (a difference of 49%) and from 53 cm to 69 cm in sh_2 entries (a difference of 23%). Ear height tended to be greatest at Celeryville (Table 9).

Summary. A sum-based rank of entries across all locations is provided in Table 10. The rank of each entry for relative percent emergence and marketable yield across all locations was identified from data in Tables 3, 5, and 6. For example, *Spring Treat* had the highest relative percent emergence among se entries across all locations and was given a rank of "1." HMX5346E had the lowest relative percent emergence among se entries across all locations and was given a rank of "9." A lower sum rank may suggest favorable emergence and yield across the locations employed in these experiments but it is not necessarily a predictor of performance at other locations. Rankings of other ear traits (based on data in Tables 8 and 9) are also shown in Table 10 but are not included in the numerical sum rank.

Discussion

In these experiments, ear traits for a given sweet corn variety or line appeared to be influenced by growing environment, especially if the variety or line was an se-type (Table 2). In contrast, marketable yield tended to be less effected by the SxE interaction. In these experiments, sites differed primarily in soil type and cropping history and less in rainfall or heat unit accumulation. Marketable yield values tended to be greatest on the organic soils of Celeryville and least on the loamy soils of Fremont. Variety selection in sweet corn requires a balance among high production potential, specific desirable ear traits, and other factors. Readers are encouraged to develop and prioritize selection criteria appropriate for their production conditions.

Table 2. Analyses of variance results for experiments studying the impact of planting site and genotype (variety, experimental line) on sweet corn ear traits and yield in Ohio in 1999. For study details, consult materials and methods.

	---------- length (cm.) -----------			Height (cm) to Ear	Ear diam. (cm.)	No. rows kernels	--- Marketable Yield --- No. ears per 20 plants	percent by weight
	Ear	Shank	Total Ear					
	---------- Pr > F ----------							
se Experiments								
Source								
Site (S)	<0.0001	<0.0001	<0.0001	<0.0001	0.3531	0.0924	0.0003	0.0144
Entry (E)	<0.0001	0.0142	0.0002	<0.0001	0.0094	<0.0001	<0.0001	0.0585
S x E	**0.0042**	**0.0683**	**0.0129**	**<0.0001**	0.7315	0.3727	**0.0002**	0.1728
sh_2 Experiments								
Source								
Site (S)	0.4527	0.0013	0.0606	<0.0001	0.2195	<0.0001	0.0001	0.0011
Entry (E)	0.0001	0.0001	<0.0001	<0.0001	0.9632	<0.0001	<0.0001	0.0040
S x E	0.1462	**0.0010**	**0.0056**	0.6497	0.4599	**0.0480**	0.2811	0.7293

Table 3. Relative percent emergence (%)[1] of se- and sh_2-type sweet corn entries planted at three sites in Ohio in 1999. All entries, except 11 and 21, are yellow.

se Entry		Celeryville	Fremont	Wooster	Entry
1-	A&C64y	94 ±3	84 ±8	87 ±18	88 ±5
2-	Chief Ouray	74 ±6	86 ±5	75 ±6	78 ±7
3-	HMX5346E	52 ±8	88 ±4	79 ±9	73 ±19
4-	Incredible	83 ±17	85 ±9	86 ±13	85 ±2
5-	Pronto	91 ±9	91 ±8	82 ±12	88 ±5
6-	Spring Treat	99 ±4	96 ±6	100 ±57	98 ±2
7-	Sweet Riser	99 ±6	90 ±4	82 ±12	90 ±9
8-	SX7202SEY	92 ±11	84 ±10	75 ±15	84 ±9
9-	Tablemaster	90 ±9	88 ±8	83 ±6	87 ±4
10-	Tuxedo	97 ±8	94 ±13	72 ±8	88 ±14
11-	HMX5349WE (white)	100 ±2	100 ±10	88 ±6	96 ±7
					se overall
	Site	88 ±14	90 ±5	83 ±8	87 ±10

sh_2 Entry		Celeryville	Fremont	Wooster	Entry
12-	A&C8100R	94 ±2	99 ±10	91 ±11	95 ±4
13-	ACX405	91 ±9	87 ±12	88 ±12	89 ±2
14-	ACX427	81 ±3	97 ±8	94 ±2	91 ±9
15-	Attribute GSS0966	90 ±7	98 ±6	85 ±5	91 ±7
16-	GSS3587	77 ±1	95 ±9	88 ±9	87 ±9
17-	Bandit	83 ±9	90 ±9	88 ±8	87 ±4
18-	HMX6383S	88 ±12	97 ±10	90 ±2	92 ±5
19-	Impulse	93 ±9	98 ±9	95 ±9	95 ±3
20-	Morning Star	66 ±24	90 ±8	84 ±10	80 ±13
21-	Ice Queen (white)	100 ±12	100 ±18	100 ±6	100 ±0
					sh_2 overall
	Site	86 ±10	95 ±5	90 ±5	91 ±8

[1] Relative percent emergence (%) is the percent emergence of each entry at each site relative to the highest absolute percent emergence at the same site (≤100%). For example, if the highest absolute percent emergence at a site equaled 90% and the absolute percent emergence of a different entry equaled 80%, the relative percent emergence of the same entry would equal 89%. See sample calculation below.

Sample Calculation of Relative Percent Emergence

	------ Percent Emergence ------	
	Absolute	Relative
Entry A	90 (highest at site)	100
Entry B	80	89 (90x = 8000, x = 89)

Table 4. Number of days from planting to harvest of se- and sh_2-type sweet corn entries planted at three sites in Ohio in 1999. All entries, except 11 and 21, are yellow.

se Entry		Celeryville	Fremont	Wooster	Entry
1-	A&C64y	74	77	76	76 ±1.5
2-	Chief Ouray	77	81	79	79 ±2.0
3-	HMX5346E	81	77	79	79 ±2.0
4-	Incredible	84	88	91	88 ±3.5
5-	Pronto	74	77	76	76 ±1.5
6-	Spring Treat	74	74	72	73 ±1.2
7-	Sweet Riser	81	74	76	77 ±3.6
8-	SX7202SEY	81	84	83	83 ±1.5
9-	Tablemaster	81	88	91	87 ±5.1
10-	Tuxedo	77	81	83	80 ±3.1
11-	HMX5349WE (white)	81	84	83	83 ±1.5
					se overall
	Site	79 ±3.6	80 ±5.1	81 ±6.1	80 ±5.0

sh_2 Entry		Celeryville	Fremont	Wooster	Entry
12-	A&C8100R	84	88	91	88 ±3.5
13-	ACX405	81	81	84	82 ±1.7
14-	ACX427	88	84	84	85 ±2.3
15-	Attribute GSS0966	84	88	91	88 ±3.5
16-	GSS3587	81	81	76	79 ±2.9
17-	Bandit	84	84	76	81 ±4.6
18-	HMX6383S	88	84	91	88 ±3.5
19-	Impulse	77	77	84	79 ±4.0
20-	Morning Star	88	88	91	89 ±1.7
21-	Ice Queen (white)	81	81	84	82 ±1.7
					sh_2 overall
	Site	85 ±3.7	84 ±3.7	85 ±5.9	84 ±4.4

Table 5. Percent marketable ears by weight (%)[1] of se- and sh_2-type sweet corn entries planted at three sites in Ohio in 1999. All entries, except 11 and 21, are yellow.

se Entry		Celeryville	Fremont	Wooster	Entry Avg.	Row LSD $_{(0.10)}$
1-	A&C64y	93	83	69	82	31
2-	Chief Ouray	78	77	88	81	9
3-	HMX5346E	82	69	81	77	22
4-	Incredible	89	85	79	84	10
5-	Pronto	85	80	86	84	7
6-	Spring Treat	99	71	77	82	13
7-	Sweet Riser	94	73	84	84	15
8-	SX7202SEY	66	72	84	74	18
9-	Tablemaster	87	79	86	84	15
10-	Tuxedo	89	89	89	89	11
11-	HMX5349WE (white)	94	89	96	93	11
					se overall	
	Site Avg.	87	79	84	83	
	Column DMRT $_{(0.10)}$	12	17	22		

sh_2 Entry		Celeryville	Fremont	Wooster	Entry Avg.	Row LSD $_{(0.10)}$
12-	A&C8100R	88	82	92	87	12
13-	ACX405	85	82	80	82	12
14-	ACX427	91	75	88	85	10
15-	Attribute GSS0966	86	73	87	82	15
16-	GSS3587	96	90	94	94	8
17-	Bandit	84	73	78	78	23
18-	HMX6383S	92	86	90	89	6
19-	Impulse	92	82	80	85	11
20-	Morning Star	86	92	90	89	9
21-	Ice Queen (white)	93	84	91	89	6
					sh_2 overall	
	Site Avg.	90	82	87	86	
	Column DMRT $_{(0.10)}$	10	15	13		

[1] Percent marketable ears by weight is the total weight of the marketable ears divided by the total weight of all ears harvested for each entry at each site from eighty plants.

Table 6. Number of marketable ears per 20 plants of se- and sh_2-type sweet corn entries planted at three sites in Ohio in 1999. All entries, except 11 and 21, are yellow.

se Entry		Celeryville	Fremont	Wooster	Entry Avg.	Row LSD $_{(0.10)}$
1-	A&C64y	18	16	17	17	1.6
2-	Chief Ouray	7	13	15	12	2.2
3-	HMX5346E	12	10	14	12	4.3
4-	Incredible	15	16	14	15	2.2
5-	Pronto	14	14	15	14	2.2
6-	Spring Treat	17	14	14	15	3.0
7-	Sweet Riser	10	13	16	13	2.8
8-	SX7202SEY	10	13	16	13	4.0
9-	Tablemaster	14	15	17	15	3.2
10-	Tuxedo	17	17	16	17	3.0
11-	HMX5349WE (white)	16	16	18	17	2.0
					se overall	
	Site Avg.	13	14	16	15	
	Column DMRT $_{(0.10)}$	2.5	3.7	3.2		

sh_2 Entry		Celeryville	Fremont	Wooster	Entry Avg.	Row LSD $_{(0.10)}$
12-	A&C8100R	16	12	18	15	4.5
13-	ACX405	14	14	14	14	4.0
14-	ACX427	12	9	16	12	3.2
15-	Attribute GSS0966	15	12	17	15	3.7
16-	GSS3587	18	17	17	17	2.2
17-	Bandit	14	12	13	13	5.5
18-	HMX6383S	18	16	17	17	2.2
19-	Impulse	17	14	17	16	2.5
20-	Morning Star	15	17	18	17	1.9
21-	Ice Queen (white)	17	15	17	16	1.5
					sh_2 overall	
	Site Avg.	16	14	16	15	
	Column DMRT $_{(0.10)}$	3.1	4.5	3.0		

Table 7. Ear length (cm.) of se- and sh_2-type sweet corn entries planted at three sites in Ohio in 1999. All entries, except 11 and 21, are yellow.

se Entry		Celeryville	Fremont	Wooster	Entry Avg.	Row LSD $_{(0.10)}$
1-	A&C64y	36	31	29	32	1.5
2-	Chief Ouray	32	28	29	30	2.2
3-	HMX5346E	32	30	27	30	2.4
4-	Incredible	31	28	28	29	1.9
5-	Pronto	31	31	30	31	2.3
6-	Spring Treat	33	28	31	30	3.2
7-	Sweet Riser	35	30	32	32	2.4
8-	SX7202SEY	33	30	29	31	2.6
9-	Tablemaster	33	30	28	30	2.3
10-	Tuxedo	36	30	31	32	1.9
11-	HMX5349WE (white)	34	32	30	32	2.1
					se overall	
	Site Avg.	33	30	29	31	
	Column DMRT $_{(0.10)}$	1.8	2.6	3.0		

sh_2 Entry		Celeryville	Fremont	Wooster	Entry Avg.	Row LSD $_{(0.10)}$
12-	A&C8100R	31	32	29	31	1.9
13-	ACX405	35	32	43	37	17
14-	ACX427	34	35	32	34	3.3
15-	Attribute GSS0966	28	32	27	29	1.8
16-	GSS3587	31	29	26	28	1.4
17-	Bandit	28	29	28	28	2.0
18-	HMX6383S	30	31	28	30	2.3
19-	Impulse	33	26	27	28	3.0
20-	Morning Star	28	31	28	28	1.9
21-	Ice Queen (white)	31	32	30	31	1.6
					sh_2 overall	
	Site Avg.	31	31	30	30	
	Column DMRT $_{(0.10)}$	2.0	3.0	11		

Table 8. Total ear and shank length (cm.) of se- and sh_2-type sweet corn entries planted at three sites in Ohio in 1999. All entries, except 11 and 21, are yellow.

se Entry		Celeryville	Fremont	Wooster	Entry Avg.	Row LSD $_{(0.10)}$
1-	A&C64y	49	41	37	42	2.5
2-	Chief Ouray	41	36	37	38	4.3
3-	HMX5346E	43	38	34	38	3.3
4-	Incredible	40	35	35	37	2.8
5-	Pronto	40	42	39	40	4.1
6-	Spring Treat	42	35	39	39	5.5
7-	Sweet Riser	47	39	42	43	3.8
8-	SX7202SEY	42	38	38	39	5.5
9-	Tablemaster	43	42	34	40	5.5
10-	Tuxedo	45	38	40	41	3.4
11-	HMX5349WE (white)	44	42	38	41	4.0
					se overall	
	Site Avg.	43	39	37	40	
	Column DMRT $_{(0.10)}$	3.7	5.0	4.9		

sh_2 Entry		Celeryville	Fremont	Wooster	Entry Avg.	Row LSD $_{(0.10)}$
12-	A&C8100R	41	42	38	40	3.4
13-	ACX405	47	41	52	47	16
14-	ACX427	47	48	42	46	6.3
15-	Attribute GSS0966	37	45	34	39	3.6
16-	GSS3587	40	37	33	37	3.0
17-	Bandit	37	40	36	38	4.1
18-	HMX6383S	40	41	36	39	3.4
19-	Impulse	42	31	37	37	5.8
20-	Morning Star	34	41	36	37	3.3
21-	Ice Queen (white)	40	42	38	40	2.7
					sh_2 overall	
	Site Avg.	40	41	38	40	
	Column DMRT $_{(0.10)}$	3.8	5.3	10		

Table 9. Height (cm.) to primary ear collar of se- and sh_2-type sweet corn entries planted at three sites in Ohio in 1999. All entries, except 11 and 21, are yellow.

se Entry		Celeryville	Fremont	Wooster	Entry Avg.	Row LSD $_{(0.10)}$
1-	A&C64y	48	34	28	37	5
2-	Chief Ouray	41	44	44	43	8
3-	HMX5346E	42	34	38	38	5
4-	Incredible	79	65	69	71	9
5-	Pronto	45	34	30	36	7
6-	Spring Treat	47	33	30	37	5
7-	Sweet Riser	54	43	46	48	4
8-	SX7202SEY	69	45	53	56	4
9-	Tablemaster	73	66	58	66	9
10-	Tuxedo	62	52	45	53	5
11-	HMX5349WE (white)	78	58	70	68	6
					se overall	
	Site Avg.	58	46	46	50	
	Column DMRT $_{(0.10)}$	8	6	7		

sh_2 Entry		Celeryville	Fremont	Wooster	Entry Avg.	Row LSD $_{(0.10)}$
12-	A&C8100R	77	62	66	69	8
13-	ACX405	60	54	50	55	6
14-	ACX427	58	48	53	53	8
15-	Attribute GSS0966	71	65	68	68	4
16-	GSS3587	58	53	51	54	4
17-	Bandit	74	59	72	68	11
18-	HMX6383S	70	63	64	65	9
19-	Impulse	61	55	53	56	6
20-	Morning Star	70	62	63	65	11
21-	Ice Queen (white)	58	54	57	57	8
					sh_2 overall	
	Site Avg.	66	58	60	61	
	Column DMRT $_{(0.10)}$	11	7	8		

Table 10. Estimate of overall performance of se- and sh_2-type sweet corn entries planted at three sites in Ohio in 1999 based on relative percent emergence and marketable yield. An explanation of the ranking system is given in the Materials and Methods section. All entries, except 11 and 21, are yellow.

Type	Entry	High Relative % Emergence	- High Marketable Yield - % by Weight	# of marketable ears / 20 plants	Sum Rank	Long Ears	Low Ear Height
se							
	1 - A&C64y	4	4	1	9	2	2
	2 - Chief Ouray	8	5	6	19	6	4
	3 - HMX5346E	9	6	6	21	6	3
	4 - Incredible	6	3	3	12	7	10
	5 - Pronto	4	3	4	11	4	1
	6 - Spring Treat	1	4	3	8	5	2
	7 - Sweet Riser	3	3	5	11	1	5
	8 - SX7202SEY	7	7	5	19	5	7
	9 - Tablemaster	5	3	3	11	4	8
	10 - Tuxedo	4	2	1	7	3	6
	11 - HMX5349WE	2	1	2	5	3	9
sh_2							
	12 - A&C8100R	2	3	3	8	3	8
	13 - ACX405	5	5	4	14	1	3
	14 - ACX427	4	4	6	14	2	1
	15 - Attribute GSS0966	4	5	3	12	4	7
	16 - GSS3587	6	1	1	8	6	2
	17 - Bandit	6	6	5	17	5	7
	18 - HMX6383S	3	2	1	6	4	6
	19 - Impulse	2	4	2	8	6	4
	20 - Morning Star	7	2	1	10	6	6
	21 - Ice Queen	1	2	2	5	3	5

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