

# The Seed to Kitchen Collaborative and SeedLinked: Identifying Improved Winter Squash Varieties for Organic Direct-Market Growers

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## INTRODUCTION

With support from the NCR-SARE Partnership grant program (award #2022-38640-37486), MSU-UPREC, the Seed to Kitchen Collaborative and SeedLinked trialed eleven varieties of winter squash (*Cucurbita moschata*) at two university research stations and fifteen farms across Wisconsin and Michigan in 2023. Results of nine entries are reported here, highlighting differences in yield, quality and flavor among the varieties under organic management.

## METHODS

Variety trials were conducted during the 2023 growing season at the UW-Madison Spooner Agricultural Research Station in Spooner, WI, the MSU Upper Peninsula Research and Extension Center in Chatham, MI, (MOSA certified organic) and on fifteen private farms in WI and MI using organic methods (Figure 1). The station trial design was an RCBD with 2-3 replications. On-farm trials were unreplicated.

At Chatham, squash was seeded in the greenhouse on May 19<sup>th</sup> and transplanted into landscape fabric on June 9<sup>th</sup>. The soil type was Ruse-Ensign-Nykanen complex fine sandy loam and the previous crop was a pea-oat cover crop. 800 lbs/a 10-0-4 feather meal and 100 lbs/a 0-0-50 potassium sulfate were broadcast and incorporated with a roto-tiller pre-plant. Row spacing was 16 ft and in-row spacing was 24 in. Squash was harvested September 27<sup>th</sup> and cured before sensory data collection.

At Spooner, squash was seeded in the greenhouse on May 23<sup>rd</sup> and transplanted on June 13<sup>th</sup>. The soil type was Mahtomedi-Cress complex loamy sand and the previous crop was a cereal rye cover crop. 667 lbs/a 4-3-2 composted poultry manure, 445 lbs/a 12-0-0 feather meal and 294 lbs/a 0-0-50 potassium sulfate were broadcast and incorporated with a roto-tiller pre-plant. Row spacing was 9 ft and in-row spacing was 24 in. Squash was harvested October 9<sup>th</sup> and cured before sensory data collection.

At both locations, fruit was graded as marketable or unmarketable, counted and weighed. Varieties were blinded and presented to researchers, growers, chefs and others for sensory evaluation (n=43). Here we report yield and grade data from the two university locations and sensory data from all locations. Data were analyzed using ANOVA and Tukey's HSD test in the agricolae package for R, at alpha = 0.10. Sensory factors were rated on a scale of 1 (low/bad) to 5 (high/good).

Table 1. Winter Squash Performance per Plant in 2023. Yield and grade data collected from university locations (n=5) and sensory data from all participants (n=43). Varieties labeled with the same letter are not significantly different at alpha = 0.10.

Variety	Marketable Count	Marketable Weight (lbs)	Unmarketable Count	Unmarketable Weight (lbs)	Individual Fruit Weight (lbs)	Appearance (1-5)	Texture (1-5)	Sweetness (1-5)	Overall Flavor (1-5)									
Autumn Crown	11.90	abc	41.30	a	0.70	a	2.20	a	3.46	bc	3.50	a	2.46	c	2.35	bc	2.42	c
Autumn Frost	15.80	a	54.48	a	2.40	a	3.98	a	3.47	bc	3.92	a	3.76	a	3.45	a	3.93	a
Black Futsu	12.30	abc	30.89	a	2.00	a	5.68	a	2.49	c	3.41	a	3.47	ab	3.18	ab	3.78	a
Cheese Pumpkin	4.33	c	55.39	a	1.33	a	10.73	a	12.31	a	3.62	a	3.41	abc	2.59	bc	3.5	a
Doran Round	7.90	bc	34.18	a	1.50	a	3.50	a	4.14	bc	3.86	a	3.61	a	3.44	a	3.82	a
Gouda	10.60	abc	30.20	a	1.80	a	2.02	a	2.81	bc	3.70	a	3.47	ab	2.82	abc	3.46	ab
Long Island Cheese	4.80	c	43.53	a	0.40	a	2.40	a	10.39	a	3.67	a	3.57	ab	2.79	abc	3.42	ab
Seminole	14.60	ab	35.45	a	3.50	a	3.72	a	2.50	c	3.74	a	2.80	bc	2.28	c	2.7	bc
Tetsukabuto	8.70	abc	40.38	a	2.00	a	9.58	a	4.89	b	3.69	a	3.12	abc	2.81	abc	3.47	a

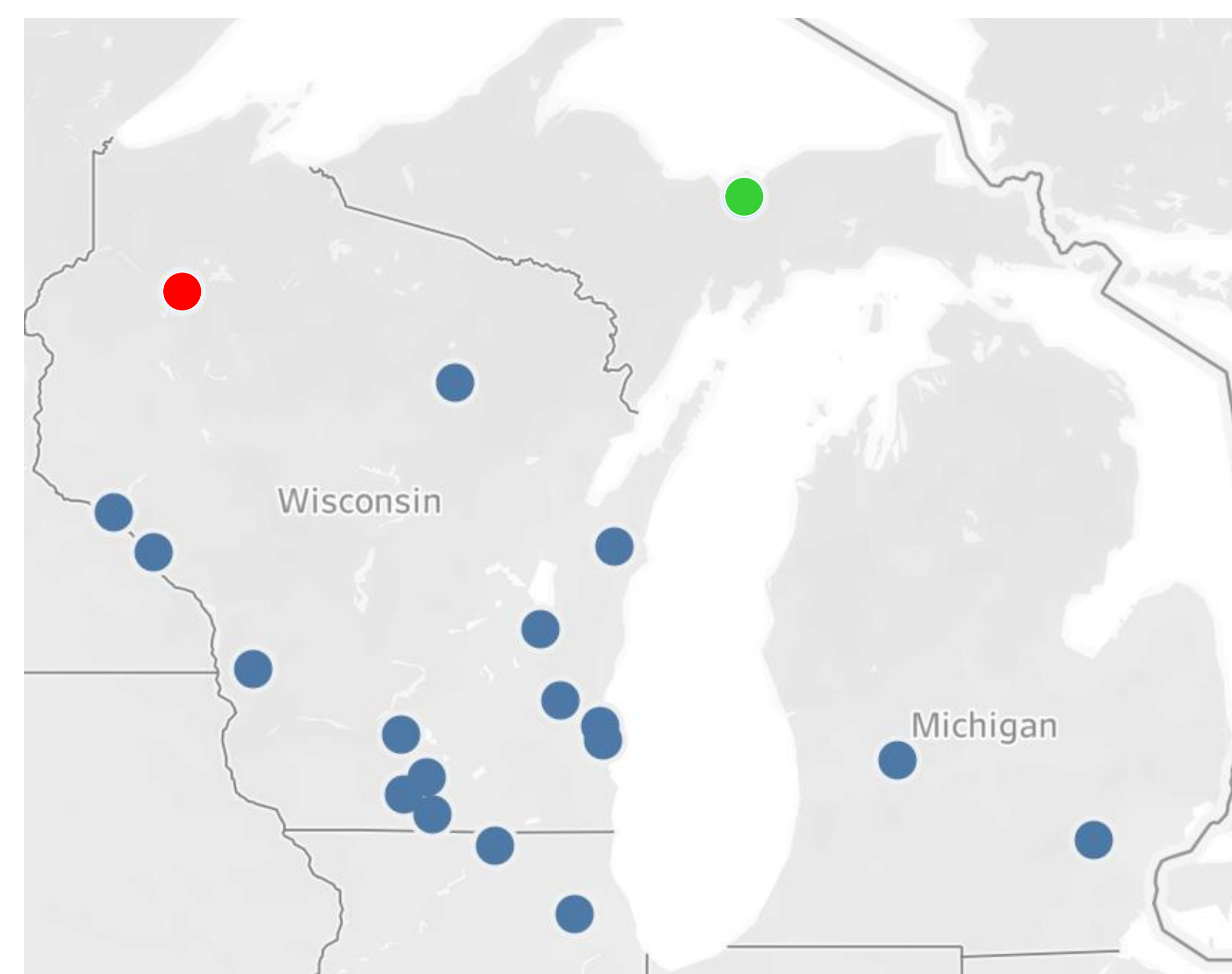


Fig 1. Trial Locations in Wisconsin, Michigan and beyond

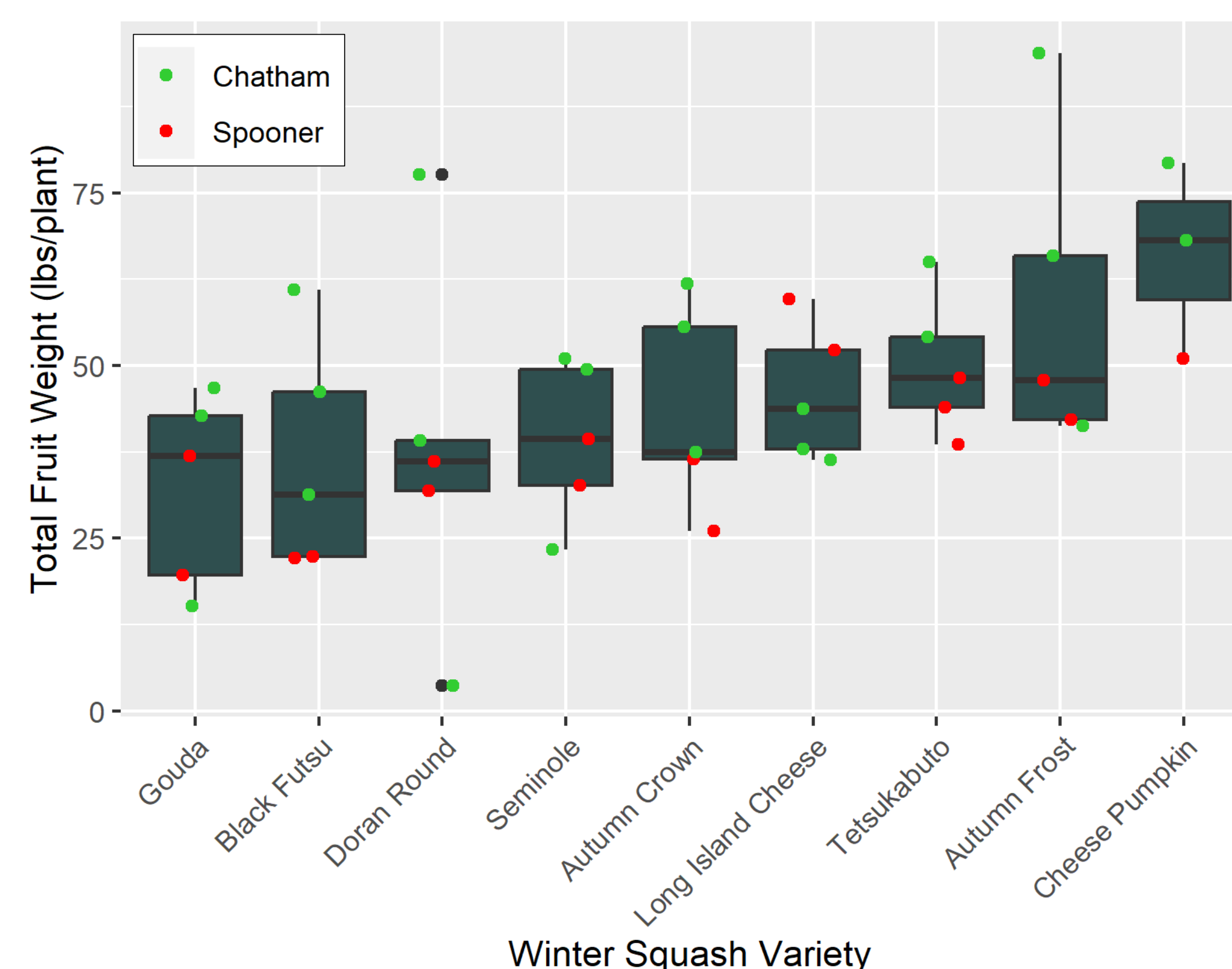


Fig 2. Total Fruit Weight per Plant by Variety

## RESULTS and DISCUSSION

Varieties differed significantly in total fruit count ( $p = 0.004$ ), total fruit weight (Figure 2.,  $p = 0.073$ ), individual fruit weight ( $p < 0.0001$ ), and marketable fruit count ( $p = 0.002$ ) per plant, as well as texture ( $p < 0.001$ ), sweetness ( $p < 0.0001$ ) and overall flavor ( $p < 0.0001$ ) (Table 1).

Mean fruit count per plant was 12.13 (2.00 – 31.50) with 10.37 fruit being marketable and 1.76 fruit being unmarketable due to immaturity, rodent damage or disease. Mean total fruit weight per plant was 44.55 lbs (3.70 – 95.20 lbs) with 39.96 lbs being marketable and 4.60 lbs being unmarketable. Mean individual weight of marketable fruits was 4.83 lbs (1.85 – 13.68 lbs). Mean overall flavor on a 1-5 scale was 3.41 (1.00-5.00). Autumn Frost, Black Futsu, Doran Round and Tetsukabuto were among the best performers across all parameters.

This research highlights specialty *C. Moschata* winter squash varieties with superior adaptation to organic production systems in the Upper Midwest and improved flavor to support direct-to-consumer sales. Although these findings represent only one year of research, the results are fairly robust based on the diversity of research station and on-farm environments under which the trials were conducted.



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