



Organic Seed Alliance

*Advancing the ethical development and stewardship
of the genetic resources of agricultural seed*

PO Box 772, Port Townsend, WA 98368

California Organic Kale Variety Trial 2013-2014



Table of Contents

Materials and Methods	3
Results and Discussion	3
Conclusions	3

Materials and Methods

Pinnacle Organic Farm is located about four miles east of Hollister, California, in northern San Benito county. The soil texture is clay to silty clay loam.

See Table 1 for average high and low temperatures and rainfall for Hollister throughout the year.

Eight varieties of Lacinato-type kale (*Brassica oleracea*) were grown and evaluated for vigor and productivity. Other important traits, such as disease and pest resistance, were not tested because these stresses did not exist. Also, no culinary traits were considered, such as tenderness and flavor.

Varieties were direct-seeded within a larger production field of kale on August 16, 2013, and again on October 15, 2013, using a Jang precision seeder. Approximately eight seeds per foot were sown. At the time of each planting the soil was dry and somewhat rocky. Overhead irrigation was used throughout the season. Pinnacle Organic Farms' primary lacinato kale variety, 'Lacinato' from Wild Garden Seed, was included in the trial.

Each variety was replicated twice in the field. Each plot was 20 bed-feet with two rows per bed (i.e., 40 row-feet per plot and 80 row-feet per variety). There were 24 inches between rows and 54 inches between bed centers. There were no gaps between plots.

Table 2 lists the kale varieties, sources, and owner/breeder (if applicable).

Results and Discussion

First Sowing: Observations made two months after planting (Oct 15, 2013) confirmed a wide difference in plant vigor and growth rate among the varieties (see Table 3). The first harvest of leaves occurred on November 12, 2013. Table 4 summarizes yield information for that harvest. This crop was harvested two more times later that winter, but data was not collected.

Second Sowing: The later kale planting was never harvested because of insect damage and slow winter growth. Nevertheless, observations were made regarding leaf biomass and degree of bolting (see Table 5).

Overall ranking (based on vigor, growth, and yield across two planting dates)

1. **'Tuscano' (Johnny's)** The highest yielder for both dates and largest individual leaves. Earliest bolter.
2. **'Lacinato' (Wild Garden)** Very consistent high yield across both reps in first sowing and also second sowing. Second earliest bolter.
3. **Black Magic' (Osborne)** Rapid early growth and high yielder, although big difference in yield across reps.
4. **'Black Tuscan' (Family Farmer Seed Cooperative)** Rapid grower. Low overall yield from first sowing because of one poor rep. High yielder for second sowing.
5. **'Nero di Tuscano' (Snow)** A rapid grower and high yielder for the first sowing, but only mediocre performer for second sowing. Latest bolter.
6. **'Lacinato' (Snow)** Low yielder in first sowing due to low plant number, but generally okay. Small, less vigorous plants from second sowing. Latest bolter.
7. **'Nero di Tuscano' (Franchi)** Slow growing. Smallest leaves and low yielding although one rep in first sowing had high yield. Poor performance for second sowing.

8. **'Black Tuscan' (Bavicchi)** Slow growing. Many weak looking plants. Smallest leaves. Low yielding. Latest bolter.

Conclusions

It is obvious that there are clear differences among the eight varieties of Lacinato-type kale evaluated with regard to vigor and productivity. The least productive variety yielded two thirds (0.67) as much as the most productive variety, which can partly be explained simply by the number of plants in a plot. However, the size of individual leaves, the number of leaves per plant, and overall plant vigor are all significant factors determining yield. Three of the four highest rated varieties happen to be from organic seed. While this doesn't prove that organic seed is inherently better, it does imply that the quality of seed grown organically is at least on par with the seed grown conventionally. Roguing out weak individuals and selecting for improved vigor during the seed production phase can reap real benefits to the producer of the subsequent fresh crop.

	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar
Average High Temp (°F)	81°	82°	74°	69°	62°	69°	65°	70°
Average Low Temp (°F)	55°	54°	45°	40°	30°	38°	45°	46°
Precipitation (inches)	0	0	0.02	0.36	0	0.22	1.69	0.53

Note: The normal rainfall from October to March is 12.56" whereas the actual rainfall during the period of the kale trial was 2.82"

Table 1. Monthly average high and low temperatures and rainfall, Hollister, California (August 2013 - March 2014).

Name	Seed Type	Source/Producer
'Lacinato'*	Organic	Wild Garden Seeds
'Black Magic'	Conventional	Osborne Seeds/Tozer Seed
'Nero di Tuscano'	Conventional	Snow Seeds/Anseme Seeds
'Lacinato'	Conventional	Snow Seeds/CN Seeds
'Tuscano'	Organic	Johnny's Selected Seeds
'Black Tuscan'	Organic	Family Farmer Seed Cooperative/Lupine Knoll Farm
'Nero di Tuscano'	Conventional	Franchi Seeds
'Black Tuscan'	Conventional	Bavicchi Seeds

Note: All seed in this trial was open-pollinated

* This was the grower's variety in the surrounding field

Table 2. Lacinato entry names and sources

Variety (source)	Ranking (1 = largest)	Comments
'Black Magic' (Osborne Seeds)	1	Most consistent, 10-12" tall
'Black Tuscan' (Family Farmer Seed Cooperative)	2	Mostly 8-10", some 12" tall
'Nero di Tuscano' (Snow Seeds)	3	Fairly consistent size, some 12" tall
'Lacinato' (Wild Garden Seeds)	4	Fairly consistent size, some 12" tall
'Tuscano' (Johnny's)	5	Variable, range from small to large
'Lacinato' (Snow Seeds)	6	Variable, range from small to large
'Black Tuscan' (Bavicchi)	7	6-9" tall, small leaves, low vigor
'Nero di Tuscano' (Franchi)	8	6-9" tall, small leaves, low vigor

Table 3. Plant size ranking of two-month-old plants.

Variety	Total number of plants	Total weight (lb)	Pounds/plant Rep 1	Pounds/plant Rep 2	Pounds/plant Average	Comments
'Tuscano' (Johnny's)	71	22.3	0.29	0.34	0.31	Largest individual leaves, highest yields
'Nero di Tuscano' (Snow)	71	20.75	0.29	0.29	0.29	Consistently good yields
'Lacinato' (Wild Garden)	72	19.55	0.3	0.25	0.27	Consistently good yields
'Lacinato' (Snow)	64	15.35	0.21	0.27	0.24	
'Black Magic' (Osborne Seeds)	83	19	0.18	0.27	0.23	Large yield difference between reps, plants within a rep very consistent
'Nero di Tuscano' (Franchi)	70	16.05	0.14	0.3	0.23	Smallest individual leaves
'Black Tuscan' (Bavicchi)	80	17.25	0.26	0.18	0.22	Smallest individual leaves
'Black Tuscan' (Family Farmer Seed Cooperative)	79	15.75	0.16	0.24	0.20	Large yield difference between reps, plants within a rep very consistent

Table 4. First harvest - November 12, 2013 (88 days after planting).

Variety	Amount of Biomass 1=most	Degree of Bolting 1=most	Comments
'Tuscano' (Johnny's)	1	1	Good stand, med-large plants
'Black Magic' (Osborne Seeds)	2	3-4	Good stand, med-large plants
'Lacinato' (Wild Garden Seeds)	3	2	Good stand, med-large plants
'Black Tuscan' (Family Farmer Seed Cooperative)	4	3-4	Good stand (rep 1), OK stand (rep 2), med-large plants
'Nero di Tuscano' (Snow Seed)	5	6-8	OK stand, small-med plants
'Nero di Tuscano' (Franchi)	6	5	Spotty stand, med plants
'Black Tuscan' (Bavicchi)	7	6-8	Spotty stand, small-med plants
'Lacinato' (Snow)	8	6-8	Weak stand, small plants

Table 5. Second sowing - observations on March 15, 2014 (130 days after planting).

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Reference as:

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