BC Seed Trials

Lacinato Kale Variety Trial 2016

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Contents

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Background and Objectives

The goal of the BC Seed Trials is to engage farmers in producing knowledge relevant to seed systems development in British Columbia. The central activity in this effort is a network of variety trials aimed at identifying superior crop varieties for fresh market farming and seed production. This report covers variety trials conducted in 2016 at the University of British Columbia Farm (UBC Farm) and on a group of organic and conventional farms, primarily in the BC Lower Mainland and Vancouver Island. More information about the BC Seed Trials can be found at www.bcseedtrials.ca.

Lacinato (also called dinosaur or Tuscan) kale is prized for its appearance, good flavour, and tenderness when cooked. Although many seed companies offer heirloom varieties named "Lacinato," these varieties are not all the same and may show significant variation for a number of traits. The varieties chosen for this trial represent distinct strains of lacinato which have been maintained or selected differently according to our correspondence with seed companies.

Priority characteristics for this trial included:

- Deep green colour
- Characteristic bubbled or "savoy" leaf texture
- Long leaves that are not too narrow or too broad, and do not curl up at the tips
- Open plant structure with minimal side sprouts
- Tall plants for easier harvest and leaf protection from soil and pathogens
- Ability to overwinter and produce a spring crop

Materials and Methods

Trial Design

We used a Mother-Baby trial design, which pairs larger, researcher-managed trials with a group of farmer-managed trials on participating farms. The UBC Farm, which is certified organic, served as the "mother" site, with each variety planted in three replications there. "Baby" sites (called "on-farm" sites henceforward) consisted of a single planting of all varieties, and two plantings of the check variety discussed below.

Kale trials were planted at 7 on-farm sites, including 4 farms that were certified organic and 3 that were not. Farmer participants were recruited through emails to agricultural list serves and through our existing networks. Farms that were not certified organic employed a range of ecological practices from using integrated pest management (IPM) to guide their use of conventional inputs, to complying with most organic standards but opting out of certification.

Planting Specifications

Farmers were given planting guidelines and allowed to vary the precise bed spacing based on their growing system.

Transplant Age	*Roughly 6-week-old seedlings*
Plot Size	*16 plants per variety*
Spacing	*18" between plants, usually in 2 rows per bed*

Planting and Harvest Dates

Kale was seeded in trays by each participating farmer and at the UBC Farm greenhouse for both the UBC Farm and Totem Field sites. Farmers were asked to seed and transplant kale as appropriate for mid-July planting, or to adjust as needed for a late fall harvest window. Kale was harvested roughly every week at UBC Farm and every other week at Totem Field where labor was more limited. Farmers harvested the kale according to their market needs. We aimed to carry out evaluations at the second or third harvest at each location.

Location	*Transplant Date*	*Harvest Window*	*Harvest Evaluation*
UBC Farm	*July 19*	*Aug. 15 – Oct. 15*	*Sept. 1*
Totem Field	*July 27*	*Aug. 25 – Oct. 25*	*Sept. 29*
On-Farm Sites	*July 1 – July 30*	*Aug. 1 – Oct. 30*	*Oct. 17 - 29*

Note: Weather information for 2016 trial regions can be found at www.bcseedtrials.ca.

Varieties and Seed Sources

Code	Type	Variety	Source	Certification
KL-01	Lacinato	Black Magic	Osborne	conventional
KL-02	Lacinato	Dazzling Blue	Wild Garden Seeds	organic
KL-03	Lacinato	Wild Garden Lacinato	Wild Garden Seeds	organic
KL-04	Lacinato	Lacinato	Osborne	organic
KL-05	Lacinato	Lacinato	West Coast Seeds	conventional
KL-06	Lacinato	Toscano (Check)	Johnny's Selected Seeds	organic
KL-07	Lacinato	Lacinato	Full Circle Seeds (BC)	organic
KL-08	Lacinato	Lacinato*	Eagleridge (BC)	organic
KL-09	Lacinato	Rainbow	Sugar Shack (BC)	organic
KL-10	Lacinato	Black Tuscan	Siskiyou	organic
KL-11	Lacinato	Nero di Tuscana	William Dam	conventional
KL-12	Lacinato	Cavolo Nero	Seeds from Italy/Franchi	conventional
KL-13	Lacinato	Dinosaur Kale*	Planting Seeds Project (BC)	organic
KL-20	Lacinato	Rainbow	Salt Spring Seeds (BC)	organic

**Grown at UBC Farm only*

Evaluation

Evaluation criteria were developed by the research team with consultation from farmer participants and members of the BC EcoSeed Co-op, and using a province-wide survey of vegetable growers conducted in early 2016. Evaluations on the UBC Farm were led by Mel Sylvestre and Alexandra Lyon. Some evaluations at on-farm sites (particularly early-season monitoring) were carried out independently by farmers, while others were carried out jointly by farmers and the research team. Members of the research team including Lyon, Thoreau, and MacKinnon visited nearly all farms to jointly perform harvest evaluations and record farmers' overall impressions of the varieties.

Results

Growth Habit

Varieties exhibited distinct differences in terms of growth habit, which ranged for a clean, open plant structure to plants with numerous side shoots arising from the joints between the leaves and main stem (Table 1). Side shoots made harvest more time consuming and seemed to accompany smaller main leaves (Image 1). In addition to side shoots, some varieties were prone to twisted or deformed leaves, which were noted and included in variety descriptions and recommendations at the end of this report.

Image 1. *A messy plant structure with multiple side shoots (left) and a clean plant structure without side shoots (right).*

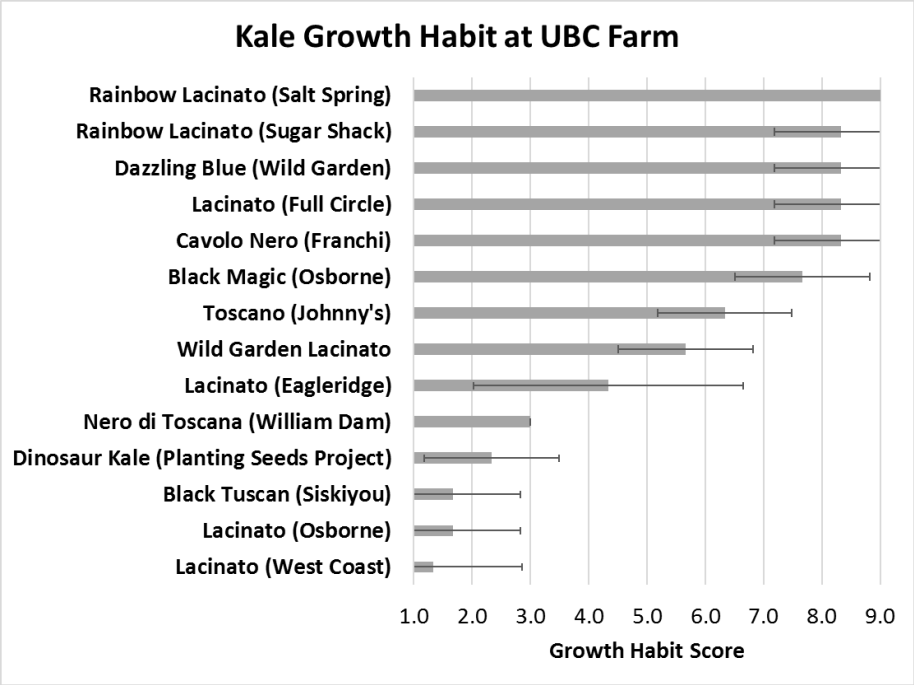

Figure 1. *Growth habit scores for 14 lacinato kale varieties grown at UBC Farm. Scores were assigned from 1 – 9; 1 = most side shoots (messiest habit) and 9 = least side shoots (cleanest habit). Error bars represent standard deviation.*

Plant Height

Height and yield data were taken twice during the harvest season, on Sept. 23 and Nov. 8. Results below are from the earlier date. Plant heights were measured from eight plants per plot, from where the main stem met the soil to the tip of the first leaf larger than 1", in other words from the ground to the growing point (Figure 2). ***Note:*** *Further analysis of the differences in height and weight will be included in an additional updated document which will also include overwintering evaluations to be performed in Spring 2017.*

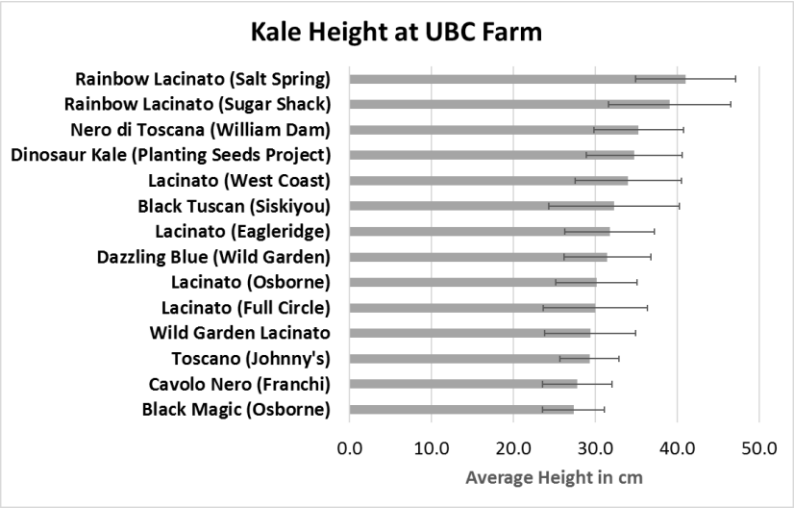

Figure 2. *Average plant height of 14 lacinato kale varieties grown at UBC Farm, approximately 4 weeks after first harvest.*

Yield

Yield was measured as the total marketable weight harvested from each plot during a single harvest event (Figure 3). Plants were harvested as evenly as possible at each harvest in order to maintain an even growth rate between varieties, but differences in the heaviness of the previous harvest influenced yield when measured in this manner.

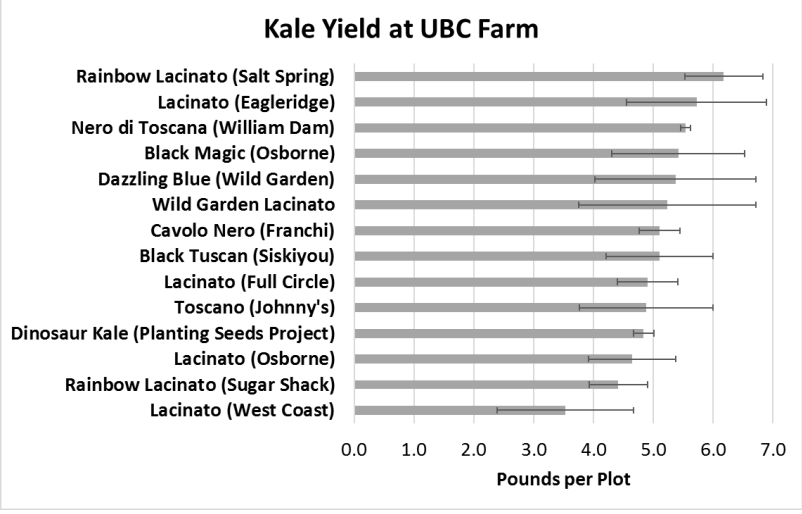

Figure 3. *Average yield from a single harvest of 14 lacinato kale varieties grown at UBC Farm, approximately 3 weeks after first harvest.*

Leaf Appearance

The varieties presented distinct differences in leaf appearance. We observed differences in leaf width, leaf shape, leaf colour, and savoy texture. While variation existed within varieties, there were clear differences between varieties as well. In addition, some varieties were more prone to undesirable characteristics such as curled leaf tips or bare stems. Some of these qualities are pictured in Image 2, and the typical leaf appearance of each variety is included in the variety descriptions on page 7.

Image 2. *Clockwise from top left: (1) A range of leaf widths from too narrow to too wide, (2) Examples of leaves with a desirable medium width, (3) Undesirable curled tips, (4) Leaves with undesirable bare stems.*

Variety Descriptions

'Cavolo Nero' (Franchi/Seeds from Italy): A top performer across sites in terms of productivity, uniformity, and leaf appearance. Nice dark colour with good leaf shape in terms of size and width.

'Toscano' (Johnny's Selected Seeds): This variety was one of the best at UBC Farm though its performance was more variable at other farm sites. Very few or no side shoots, uniform plant structure with large, attractive leaves. In some locations, leaf shape and size varied significantly between plants. Some twisting and curled tips.

‘Black Magic’ (Osborne): Very deep dark green colour with good leaf shape and texture, but plants tended to be stunted or shorter, especially later in the season. Some appearance of leaves with bare stem toward the base of leaves (“lollipop leaves”).

‘Wild Garden Lacinato’ (Wild Garden Seeds): Uniform, open plant structure, with good dark colour and even texture but shorter leaves.

‘Lacinato’ (Osborne): Leaf shape in this variety was highly variable, with many plants exhibiting leaves that were too leggy or too stubby. Leaves were also prone to yellowing, and the plants had heavier side shoots.

‘Lacinato’ (West Coast Seeds): Leaves had good savoy texture but were very narrow, and almost too upright, making for bushy, dense plants that were also very prone to side shoots. Somewhat prone to curled leaf tips and bare “lollipop” stems.

‘Lacinato’ (Full Circle Seeds): Some good leaves but variable in terms of plant height and leaf shape. Heavier side shoots.

‘Lacinato’ (Eagleridge): Tall, upright leaves in some locations, more varied leaf shape in others. Leaves tended to be very narrow. Prone to side shoots.

‘Black Tuscan’ (Siskiyou Seeds): Very narrow leaves with rough leaf edges. Uniform plants with upright leaves, but somewhat prone to side shoots. One instance of bolting and root maggot susceptibility.

‘Nero di Tuscana’ (William Dam): Highly variable leaf shape, with some plants having very good leaf appearance in terms of colour and width. Prone to large side shoots.

‘Dinosaur Kale’ (Planting Seeds Project): Good lacinato characteristics in terms of leaf shape and texture. Somewhat variable leaf and plant size, with some side shoots.

‘Dazzling Blue’ (Wild Garden Seeds): This variety, described in the WGS catalog as a cross between ‘Rainbow Lacinato’ and a traditional green lacinato, has sturdy plants with large leaves. There is notable variation between plants, with some with most exhibiting beautiful purple midribs but some showing white midribs. There is also a range of textures from smooth to savoyed. It had very few side shoots.

‘Rainbow’ (Sugar Shack Seeds, Salt Spring Seeds): The original ‘Lacinato Rainbow’ was developed by Frank Morton (Wild Garden Seeds) from a cross between a red curly kale and an OP lacinato. It is now grown by several small seed companies in BC. In appearance, ‘Lacinato Rainbow’ cannot be classified as a true lacinato, as it has broad, ruffled leaves more characteristic of a Siberian kale. It produces a mix of attractive green and purple leaves, with fairly uniform plant structure but mixed leaf shape and colour. Both ‘Rainbow’ entries in this trial performed fairly well in terms of vigour, plant structure, and productivity. Some growers found the strain from Salt Spring Seeds to be larger and more resilient to various field conditions.