## 

## 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 Broccoli Variety Trial 2013-2014 



Funding for this project was provided by Columbia Foundation and Gaia Fund

Materials and Methods.......................................................................................................................................... 3
Results and Discussion ..... 3
Conclusions. ..... 3

## Materials and Methods

Coke Farm, owned and operated by Dale and Christine Coke, is located near San Juan Bautista, California, in northern San Benito County. The soil is a loam. See Table 1 for average high and low temperatures and rainfall for San Juan Bautista throughout the year.

Thirteen varieties of open-pollinated, public domain broccoli were evaluated during the fall and winter of 2013-2014. Traits observed included plant size, rate of growth, maturity date, head quality, side shoot production, and plant health. See Table 2 for a list of the broccoli varieties planted in this trial.

Seed was planted on August 15, 2013, at Headstart Nursery in Gilroy, California. Soil-less mix included peat, perlite, and vermiculite. Seedlings were transplanted into the field on September 18, 2013, in double rows 18 inches apart with in-row plant spacing of 18 inches. Two repetitions were planted for each variety. Each rep included 50 plants (i.e., 100 plants per variety). There were no planting gaps between individual plots. The plants were located on the edge of a lettuce field, and the rep closest to the edge of the field was directly underneath a canopy of Black Walnut trees.

## Results and Discussion

The first noted observations occurred on November 12, 2013. All varieties looked relatively healthy, although some aphid pressure was evident throughout the field. Central heads were beginning to form on some of the earliest maturing plants. First head harvest was estimated to be two weeks later. Plant heights varied widely, ranging from 7 to 20 inches. Nevertheless, some varieties were clearly taller than others, and overall plant architecture differed across varieties.

The Black Walnut trees very likely had a detrimental effect on broccoli growth, as plants nearest the trees were stunted compared to those farther away. Setting out transplants during the third week of September was probably two to three weeks too late for optimum growth. Most of the varieties were just beginning to form heads when a severe cold spell in late November greatly slowed down or stopped growth altogether. Therefore, optimum head production was never realized.

Despite these shortcomings, evaluations were made on November 22, 2013, and January 22, 2014, that describe overall plant size, main head size and shape, bead size, side shoot production, maturity class, and degree of flowering. See Table 3 for evaluation data.

## Conclusions

This trial demonstrated a range of phenotypes within open-pollinated broccoli varieties.
Plant height and architecture: Some of the varieties were tall, big-framed plants, including 'Cavalo Broccolo’, 'Early Green’, ‘OSU Composite’, ‘Vitaminaya’ and 'Waltham 29’. Others were short but broad-framed (stocky), including 'Atlantic', 'Myer’s Best' and 'Solstice'. Still others were short with smaller frames, including 'Nutribud' and 'Umpqua'. Medium-sized plants included 'Common Ground' and 'East Coast Selection'. 'Tonus' was variable.

Head type and size: Varieties with a dominant, medium, or large central head with minimal side shoots included 'Atlantic', 'Nutribud', 'Tonus' and 'Umpqua.' Varieties with small to medium main heads and many side shoots included ‘Cavalo Broccolo', ‘Early Green’, 'East Coast Selection', ‘OSU Composite’, ‘Waltham 29', and 'Vitaminaya.' Varieties with a moderate amount of side shoots and small- to medium-sized main heads included 'Solstice' and 'Common Ground.'

Maturity Class: Early maturing varieties included 'East Coast Selection', 'Myer’s Best’, 'Nutribud’, and 'Solstice.' Medium maturing varieties included 'OSU Composite', 'Early Green' and 'Umpqua.' Late maturing varieties included 'Atlantic', ‘Cavalo Broccolo', ‘Tonus' and 'Waltham 29.' ‘Common Ground' and 'Vitaminaya' were of variable maturity.

|  | Sep | Oct | Nov | Dec | Jan |
| :--- | :---: | :---: | :---: | :---: | :---: |
| Avg High Temp $\left({ }^{\circ} \mathrm{F}\right)$ | $82^{\circ}$ | $74^{\circ}$ | $69^{\circ}$ | $62^{\circ}$ | $69^{\circ}$ |
| Avg Low Temp $\left({ }^{\circ} \mathrm{F}\right)$ | $54^{\circ}$ | $45^{\circ}$ | $40^{\circ}$ | $30^{\circ}$ | $38^{\circ}$ |
| Precipitation (inches) | 0 | 0.02 | 0.36 | 0 | 0.22 |

Note: The weather station is located about six miles east of field location (San Juan Bautista)
Table 1. Average high and low temperatures and rainfall for San Juan Bautista.

| Name | Seed Type |  |
| :--- | :---: | :--- |
| Atlantic | Conventional | Victory Seeds |
| Cavalo Broccolo | Organic | Franchi Seeds |
| Common Ground | Organic | Jim Myers/Oregon State University |
| Early Green | Organic | Seeds of Change |
| East Coast Selection | Organic | Jim Myers/Oregon State University |
| Myer's Best | Organic | Oatsplanter Farm |
| Nutribud | Organic | Peace Seedlings |
| OSU Composite | Organic | Jim Myers/Oregon State University |
| Solstice | Organic | Uprising Seeds/Lupine Knoll |
| Tonus | Conventional | Nikitovka |
| Umpqua | Organic | Adaptive Seeds |
| Vitaminaya | Conventional | Nikitovka |
| Waltham 29 | Organic | Gourmet Seed International |

Note: All seed in this trial was open-pollinated and without intellectual property restrictions
Table 2. Broccoli entry names and sources.

| Variety | Plant Size/Architecture | Head Description | Maturity Class/\% <br> Flowering - 1/22/14 |
| :--- | :--- | :--- | :--- |
| Atlantic | Short; stocky; short inter- <br> nodes; big, rounded leaves | Large, convex, crown cut type; <br> small, tight beads; few sideshoots | Late; <5\% flowering |
| Cavalo Broccolo | Tall; large frame; dissected <br> leaves | Small main head; large, loose <br> beads; many sideshoots; | Late; 50-70\% flowering |
| Common Ground | Short-medium | Large, loose purple heads; large <br> beads; long stems; some sideshoots | Variable; 5-50\% flowering |
| Early Green | Tall; medium-large frame; <br> elongated internodes | Small main head; tight, medium <br> sized beads; long stems; many <br> sideshoots | Medium; 20-40\% flowering |
| East Coast Selection | Short-medium; stocky | Big, loose, large-beaded main <br> head; many sideshoots | Early; 80-100\% flowering |
| Myer's Best | Variable size; generally <br> short | Big, loose, large-beaded main head | Early; 40-75\% flowering |
| Nutribud | Short; small frame; short <br> internodes | Medium-sized; medium-beaded <br> main head; few sideshoots | Early; 20-50\% flowering |
| OSU Composite | Tall; medium-large frame; <br> short internodes | Medium-sized; tight-beaded main <br> head; many sideshoots | Early-mid; 10-20\% flower- <br> ing |
| Solstice | Short-medium; stocky | Small main head; medium-sized <br> beads; some sideshoots | Early; 80-100\% flowering |
| Tonus | Variable; long internodes | Medium sized, medium-beaded <br> main head; few sideshoots | Late; 50-80\% flowering |
| Umpqua | Short; small frame; short <br> internodes | Medium sized, medium-beaded <br> main head; few sideshoots | Medium-late; 50-80\% flow- <br> ering |
| Vitaminaya | Tall; medium-large frame | Small main head; variable-sized <br> beads; long stems; many sideshoots | Variable; 20-25\% flowering |
| Waltham 29 | Tall; large frames | Small main head; large, loose <br> beads; some sideshoots | Late; 5-30\% flowering |

Table 3. Broccoli characteristics from observations on November 22, 2013 and January 22, 2014.


Coke Farm broccoli trial November 22, 2013.


Christine Coke, co-owner of Coke Farm, with OSA's Steve Peters (left) and Jared Zystro (right).

'Common Ground’ November 22, 2013.

'Vitaminaya' November 22, 2013.

'Early Green' November 22, 2013.


OSU Composite November 22, 2013.


Waltham 29 November 22, 2013.

'Cavalo Broccolo' November 22, 2013.

‘Solstice' November 22, 2013.


East Coast Selection November 22, 2013.

'Myer’s Best' November 22, 2013.

'Umpqua' November 22, 2013.

'Atlantic' November 22, 2013.
‘Tonus' November 22, 2013.
'Nutribud' November 22, 2013.


'Common Ground’ January 22, 2014

'Vitaminaya' January 22, 2014.

'Early Green' January 22, 2014.


OSU Composite January 22, 2014.


Waltham 29 January 22, 2014.

‘Cavalo Broccolo’ January 22, 2014.

‘Solstice’ January 22, 2014. Central head.

'Solstice’ January 22, 2014. Side shoots (after central head is cut).


East Coast Selection January 22, 2014.

'Myer’s Best' January 22, 2014

'Umpqua' January 22, 2014.

‘Atlantic' January 22, 2014.

'Tonus' January 22, 2014.

'Nutribud' January 22, 2014.

# Authors and Project Participants: 

Christine Coke, Coke Farm
Dale Coke, Coke Farm
Steve Peters, Organic Seed Alliance
Jared Zystro, Organic Seed Alliance
Photos courtesy of Moria Peters

## Reference as:

Coke, C., Coke, D., Peters, S., Zystro, J. 2015. California Organic Broccoli Variety Trial 20132014. Organic Seed Alliance, Port Townsend, WA

## Educational Materials

This publication is protected under Creative Commons licenses: Attribution, Non-Commercial \& Share Alike.

We believe in protecting intellectual property (IP) in a manner that promotes creativity and innovation in the interest of the public good. We encourage you to learn more about the Creative Commons, the Open Source movement, and other alternative IP models.

Regarding this material, Organic Seed Alliance is the original author and license holder. You are free to copy, distribute, display, and perform the work, and to make derivative works under the following conditions:

Attribution. You must give the original author credit.
Noncommercial. You may not use this work for commercial purposes.

Share Alike. If you alter, transform, or build upon this work, you may distribute the resulting work only under a license identical to this one.

- For any reuse or distribution, you must make clear to others the license terms of this work.
- Any of these conditions can be waived if you get permission from the copyright holder.

Your fair use and other rights are in no way affected by the above.
For PDF versions of this and other seed publications, please visit us at www.seedalliance.org Organic Seed Alliance •2015

