



Welcome to the webinar!

- The webinar will start at the top of the hour.
- Find a handout of the slides in the “handouts” section of your gotowebinar control panel.
- To type in a question, use the question box on your control panel.
- The webinar is being recorded and you can find it in our archive within the next 2 weeks at <http://www.extension.org/pages/25242> and on the eOrganic YouTube channel








ORGANIC seed ALLIANCE

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

www.seedalliance.org

Organic Seed Course July 2017 Webinar: Trials and Selection

Jared Zystro, Organic Seed Alliance



Jared Zystro, Organic Seed Alliance



Jared Zystro, Organic Seed Alliance, MESA

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In the next hour

- Variety Trials
- Basics of on-farm selection



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How to Conduct a Meaningful Trial



Learning how to evaluate crop varieties is the first
step in growing seed and breeding



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Why do farmers conduct trials?

- Learn which varieties perform well on your farm
- Identify varieties with interesting quality traits
- Identify the varieties that can resist challenges



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Planning your trial

- Prioritize crop(s)
- Identify goals
- What, When, and How to Evaluate



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Planning your trial

- Popular and important commercial varieties in your region
- OP and F1 standards
- Potential breeding material
- Your own material
- Susceptible and resistant varieties



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Randomization and Replication



- 3 reps is standard
- First rep can be in "order"
- Mix up order for other reps

*Include border rows if possible



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Using a block design

BDR	BDR	BDR	BDR	BDR
BDR	6	4	5	BDR
BDR	5	2	1	BDR
BDR	4	6	4	BDR
BDR	3	1	2	BDR
BDR	2	4	6	BDR
BDR	1	5	3	BDR
BDR	BDR	BDR	BDR	BDR

BDR	BDR	BDR	BDR	BDR
BDR	6	3	1	BDR
BDR	4	2	5	BDR
BDR	5	6	4	BDR
BDR	3	1	2	BDR
BDR	2	4	6	BDR
BDR	1	5	3	BDR
BDR	BDR	BDR	BDR	BDR

- Orient along the length or width of the field depending on conditions
- Include border rows



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Soil = Environmental Variation



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Consistent Field Conditions



Consider:

- Soil type
- Irrigation
- Cultivation
- Fertility
- Harvesting
- Mid-field, same crop
- Always strive to do any treatment on the same day. But always treat by block if any possible differences in treatment are necessary across time.

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Consistent Field Conditions



Other Considerations:

- NOT optimum conditions
- NOT a beauty contest
- Non-optimum will reveal best workhorse varieties
- Challenge trial with stress, disease, drought, etc.
- Grow under conditions of intended use

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Marking and Mapping the Trial

- Always make a field map
- Put in “breaks” between varieties
- Consider using multiple marking techniques
- Orient datasheet to field map



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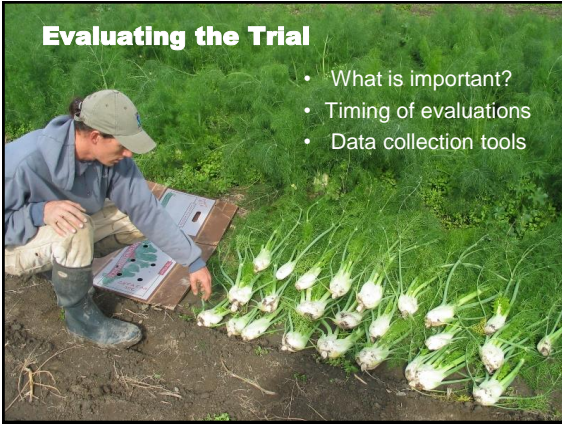
Rep13	13	14	38	Moskvich	NC12	LB8-7
	12	15	37	Crim.3pt	Stellar	RomaVF
	11	16	36	IronLady	S200	PlumRegal
	10	17	35	Mt.Merit	PlumPerfect	Oroma
Rep12	9	18	34	PlumRegal	Mt.Merit	RomaVF
	8	19	33	Moskvich	IronLady	PlumPerfect
	7	20	32	S200	NC12	LB8-7
	6	21	31	LB8-3	Crim.3pt	Oroma
Rep11	5	22	30	Stellar	LB8-3	Oroma
	4	23	29	Stellar	Mt.Merit	LB8-7
	3	24	28	Crim.3pt	Moskvich	PlumPerfect
	2	25	27	IronLady	NC12	PlumRegal
	1	26		S200	RomaVF/Paste	Extra



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Evaluating the Trial

- What is important?
- Timing of evaluations
- Data collection tools



When to Evaluate a Trial

- Score trial at multiple times depending on objectives
- Measuring vs scoring
- Project dates to score based upon timing of planting
- Keep watch so crop doesn't get ahead of you



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Typical Traits to Evaluate

- Plant height
- Plant stature
- Days to maturity
- Harvestable yield
- Color
- Flavor
- Texture
- Storage life
- Uniformity



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How to assign a Score for each trait

- Use a 1-5 or 1-9 scale
- 1 = poorest, 5/9 = best
- Pre-set vs relative
- Always "set" the trial by walking the trial and finding the 1, 5, 9 first
- Use all the numbers in the range, esp. 1 & 9
- 1,3,5,7,9 & use even #s for in between



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2016 NOVICE Cabbage Trial Scoring Guide

Trait	Descriptions	Score
Heads/Borers	Highly resistant to borer damage (0 borer damage)	5
	Medium resistant to borer damage (1-2 borer damage)	3
	Medium susceptible to borer damage (3-4 borer damage)	1
	Very susceptible to borer damage (5+ borer damage)	0
Heads/Insects	Highly resistant to insect damage (0 insect damage)	5
	Medium resistant to insect damage (1-2 insect damage)	3
	Medium susceptible to insect damage (3-4 insect damage)	1
	Very susceptible to insect damage (5+ insect damage)	0
Heads/Insects	Highly resistant to insect damage (0 insect damage)	5
	Medium resistant to insect damage (1-2 insect damage)	3
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Heads/Insects	Highly resistant to insect damage (0 insect damage)	5
	Medium resistant to insect damage (1-2 insect damage)	3
	Medium susceptible to insect damage (3-4 insect damage)	1
	Very susceptible to insect damage (5+ insect damage)	0
Overall Marketability	Strongly preferred	5
	Preferred	3
	Like	1
	Strongly disliked	0
Taste	Highly preferred	5
	Preferred	3
	Like	1
	Disliked	0
Texture	Highly preferred	5
	Preferred	3
	Like	1
	Disliked	0
Appearance	Highly preferred	5
	Preferred	3
	Like	1
	Disliked	0



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Measuring traits



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Recordkeeping

- **Keep a good research log**
 - Variety names with seed source
 - Planting/transplanting dates
 - Emergence, maturity, evaluation dates
 - Annotated notes
 - Paper and electronic copies



Data Analysis

- **Descriptive statistics**
 - Mean, median, mode
 - No "statistical significance"
- **Measurement of error and confidence interval**
 - Requires statistical software
 - May need assistance
 - Know if differences are NOT due to chance



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Making sense of the data

Carrot Top Height (1-9)

Variety	Rep 1	Rep 2	Rep 3	Average
Nelson	3	5	1	3.0
Bolero	7	9	3	6.3
Scarlet Nantes	8	7	7	7.3
Yaya	5	5	5	5
Nantes Fancy	3	3	1	2.3



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Kale Trial - Seven Seeds Farm, Williams OR, Evaluated June 20th and September 12th 2009

Variety	Source	Vigor	Uniformity	Flavor	Disease	Pest Suscept	Overall	# off-type
Winterbor F1	JSS	9	3	7	7	3	5.8	3
Red Russian	ABBO	9	9	5	5	5	6.6	0
Red Russian	UPR	7	7	5	5	1	5	1
✓ Red Russian	SSF	9	9	5	5	7	7	0
Toscana	JSS	3	7	7	9	5	6.2	0
✓ Lacinato	WGS	7	7	7	7	7	7	0
Starbor F1	JSS	5	5	3	7	5	5	3
Ripbor F1	JSS	3	9	5	5	3	5	0
✓ Blue Vates	ABBO	5	9	5	7	5	6.2	0



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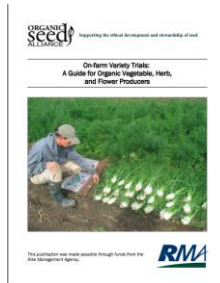
Trials are Ongoing

- Don't wait until you are "done" or near done to compare
- Compare to best varieties available
- Always test the newest varieties from good sources
- Trial two years if possible, eliminate poorest performers
- Best results from multiple trials across years and locations



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Helpful Resources



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Maintaining and improving varieties through selection



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Selection

- A key aspect of seed production is selecting the plants that you will allow to make pollen and seed



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Why Select?

- Some plants may be inferior:
 - Smaller, disease prone, poor yield
- Some plants may not match the varietal “type”:
 - Wrong color, shape, habit



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Managing Selection – Preventative measures

- Staying attentive to isolation distances – for your crops, your neighbor's crops, volunteers, and weeds
- Careful cleaning of equipment between seed lots



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Managing Selection – The stock seed concept

Stock seed: grown specifically to be used to grow a seed crop

- versus -

Production seed: grown for sale

- Can come from intensive selection within production seed or from separate grow-out



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When to select?

- Selection can happen multiple times from seedling stage through finished seed
- Identify best times to evaluate key traits
- Selection made prior to pollination is more effective



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Types of selection

- Negative Mass Selection – “Rouging”
- Positive Mass Selection
- Progeny / Family Selection



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Negative selection

- Low percentage removed
- Can be done with production crop
- More effective in self-pollinated crop than cross-pollinated crop



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Mass selection

Selecting individuals from a population

Tips:

- Select before pollination
- Large population
- Uniform conditions
- Select from quadrants

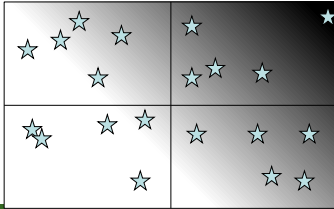


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Mass selection

- Select evenly from quadrants



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Family selection



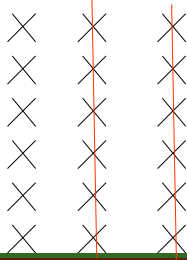
- Select plants from pop.
- Save seed in individual bags
- Plant individual rows next season

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Family selection - step 2

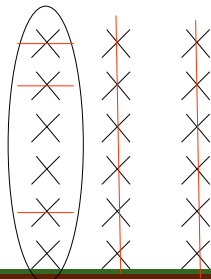
- Select best families.
- Eliminate poor families



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Family selection - step 2

- Select best families
- Eliminate poor families
- Eliminate poorest plants from selected rows



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Organic Breeding and Seed Intensive

- August 10th in Davis CA
- Expert organic plant breeders: Dr. William Tracy and Dr. Julie Dawson
- All day with lecture and field components.
- Register at seedalliance.org/events



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- Find all upcoming and archived webinars at <http://www.extension.org/pages/25242> and on the eOrganic YouTube channel
- Have an organic farming question? Use the eXtension Ask an Expert service at <https://ask.extension.org/groups/1668/ask>
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- Thank you for coming!