Seed Viability & Why and How to Do Variety Trials

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Seed production protocol

1. Selection, breeding,
2. Pre-basic
3. Basic seed,
4. Seed increase (sometimes by farmers)
5. Variety release, registration
6. Quality maintenance
7. Distribution
8. Seed certification programs

Seed types

1. Certified
2. Parent seed
3. Quality declared seed
4. Informal sector (among neighbors)

Labeling requirements Keywords

noxious weed, restricted weed seed,
pure seed (label), inert matter,
treated seed,
tested seed, certified seed

Label info may include

- Name
- Percent pure seed
- Percent weed seed and inert matter
- Lot number
- Origin, state or country
- Statement if treated, and product name, and caution statement
- germination % & date

Minimum quality standards

No contamination
(weeds, other crops, dirt, others)
Disease Free
True to type (unique)

OP seed
Ongoing selection to limit segregation

Goal of Variety Trials

Expression of the plant due to genetics or to the environment

Benefits of Variety Trials

- Evaluate organic seed sources
- Expand market potential (crops and seasons), risk management
- Address crop stresses (climate, pests)
- Evaluate range of diversity

Industry Trends-- Breeders and Farmers
Look at the future 5-10 years ahead:
Consumers looking for:

- Novelty, Specialties
- Convenience (packaging)
- Taste
- Eye appeal
- Nutrition
- Health Benefits
- local - the 'hottest' segment of ag industry (USDA, 2010)
- grow your own
- organics

Planning Variety Trials

- Prioritize crops

- Source varieties and seed:
  seed companies/catalogs,
  local varieties, OMRI, NPGS,
  seed exchanges.
  Call the seed company, ask for advice.

- Include a check or control

Experimental Design

- Observational (non-replicated) trials:
  screen varieties,
  evaluate sources, check trueness to type

vs

- Replicated trials
  (results are not due to environment alone)

Field Layout

- Randomize and replicate to account for field variability.
- Example replicated trial, 5 varieties

5	3	2
4	5	1
3	2	4
2	1	5
1	4	3

Population Numbers
to assess genetic variability

- Corn 30
- Brassicas 30
- Carrots 50
- Radishes 50
- Tomatoes/pepper 10
- Squash, cucumbers 10
- Beans 30

(source: OSA Farm Variety manual)

Consistent Treatments

- Growing seedlings
- Transplanting/planting
- Irrigation
- Cultivation
- Fertilization
- Pest management
- Harvesting

Marking and mapping the trial

- Proper labeling, stakes
- Make a map of the field on paper
- Record basic cultural information, planting date, plot size, rep distribution,

Trial Evaluation

- Log sheet
- scoring (index) vs measuring
  Scoring may be more valuable and quicker-
- All on same date, scoring system
  Scale of 1-9
  (1= least, 9= most desirable),

Traits to Consider

- Vigor
- Pest tolerance
- Weed competition
- Fertility utilization
- Flavor/quality
- Uniformity

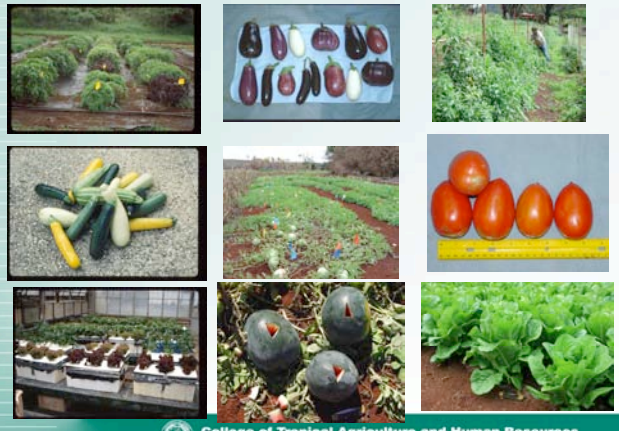
Collaborative Research Trials

Hawaii Trial Network, on different islands to compare several microclimates and production niches; trial database with trial network to follow performance on different microclimates.

(Micaela Colley, HI Public Seed Conf. 2010)

- Lettuce
- Tomato

Variety Trials



Tomato N calibration study

2 cultivars x 5 Nitrogen rates x 5 replications= 50 plots total

Leafy crop variety trial with 5 Phosphorus rates

- 15 experiments over 2 years
- 3 cultivars
- 5 P rates (0-400 lbs P/Acre, as TSP)
- 3 locations
- 3 elevations
- 3 soil types
- Over warm & cool growing seasons

Phosphorus calibration experiments

P → Expt. 1, 60 & 700 ft elevation

1st planting	2nd planting	3rd planting

P → Expt. 2, 60 & 700 ft elevation

1st planting	2nd planting	3rd planting

P → Expt. 3, 2,200 ft elevation

1st planting	2nd planting	3rd planting

Results overview, out of 39 individual cultivar P trials:

- 64% of trials showed response to P.
- Response to P at low, medium, and high elevations was 45, 73 and 100%, respectively.
- Varietal response to P was 66% for Mizuna, 58% for Joi Choi, and 50% for Quing Choi

Romaine Lettuce Variety Trials in Hawaii

Four Evaluation Trials:
Two Winter trials
Two Summer trials

Sites:
Oahu, Molokai, Lanai

Seed Companies:
Hazera, Johnny's, Nunhems, Orsetti, Rijk Zwaan, Seminis, Siegers, Syngenta, Western Pacific Seed

Top Yielding varieties

Winter (Poamoho)	Winter (Molokai)	Summer (Poamoho)	Summer (Poamoho)
Ceasar	41-64RZ (2)	Tall Guzmaine (2)	Concept
Jericho (2)	Heavy Hrt	Barracuda	Jericho
41-40RZ	Brave Hrt	Triple Play	Fresh Ht
Lital	Tall Guzmaine	41-64RZ	Green Towers

cv Lital (Hazera)
(Spring, cooler months, light green foliage)

cv Brave Heart (Seminis)
(Molokai, Spring, cooler months)

cv Concept (Johnny's)
(Summer Poamoho)

Bamby (Johnny's)
(baby, specialty, cooler?, Waimea)

Ceasar (Western Pacific)
(Poamoho, harvest early March)

Ceasar
(Poamoho harvest May 31, 2005)

cv Tall Guzmaine Elite (Siegers/Enza Zaden)
(Poamoho, Summer & Spring (Early yields); Molokai, Spring)

cv Barracuda (Siegers)

March 10th Poamoho
23rd rank in yield
1.98 lbs
15.1 inches length
1.5 in core diam

Aug. 4th Poamoho*
2nd rank in yield
1.3 lbs
13.3 inches length
1.3 in core diam

cv Jericho (Johnny's)
High yields in Spring
High yield but bolting in the summer

cv 41-64 RZ or 'Helvis RZ' (Rijk Zwaan)

Poamoho, Summer

Molokai & Lanai, Spring

Seedless/baby Watermelon Cultivar Trial