Local Seeds for Local Needs

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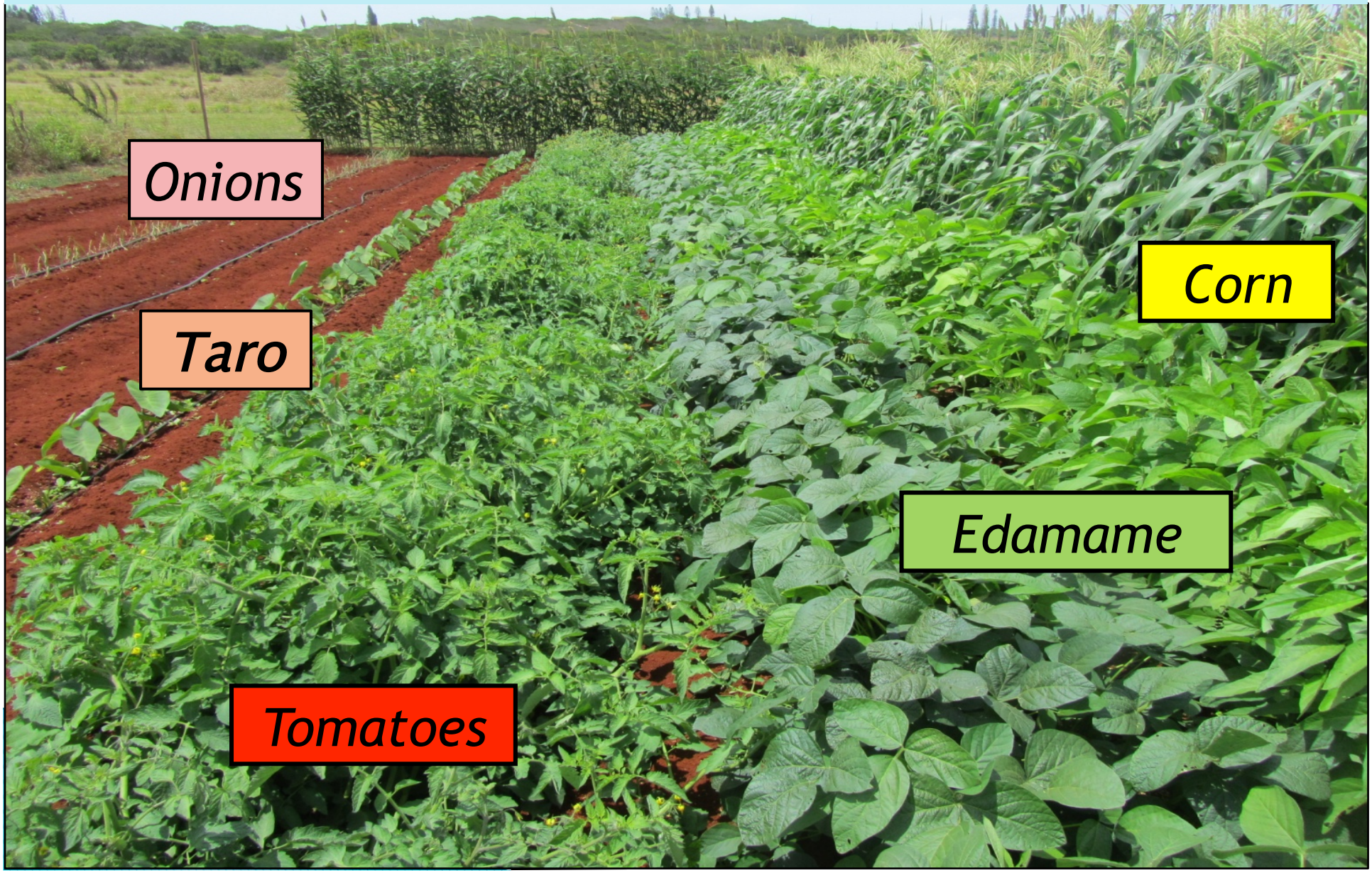
Farming Starts With Seeds



Thoughts to Consider

- *"I doubt that the direction of present-day seed breeding, selection, and genetic manipulation is favorable to the producer of high quality vegetables … For most crops the vigor and viability of seed grown under careful cultural practices of this organic production system will far excel seeds that are purchased… Seeds are the spark of the farm operation…"*

Eliot Coleman

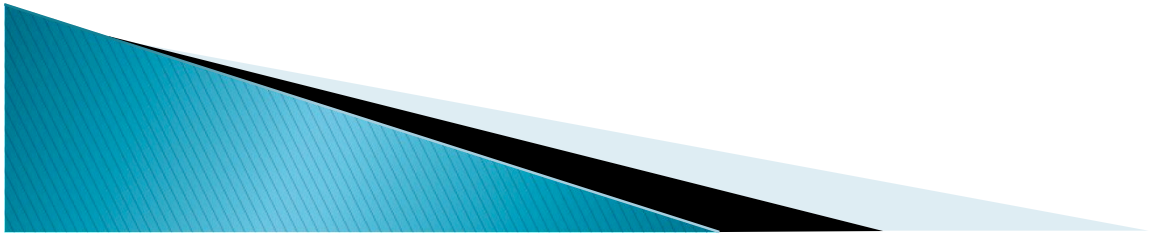
Maine Organic Farmer & Author

The Lost Art of Seed Saving

Mainland Seed Breeding Priorities

Mainland U.S. vegetable breeding priorities include:

- *Earliness due to short growing season.*
- *Cold tolerance to protect against early threat of frost.*



Hawaii's Breeding Priorities

Hawaii's breeding priorities includes:

- *Ability to weather hot, humid tropical conditions and warm nights. Temperature differential between day and night is small.*
- *Resistance to diseases due to costs of controlling an array of diseases.*

Many mainland varieties are not well adapted to Hawaii's unique weather conditions.

Basic Premise

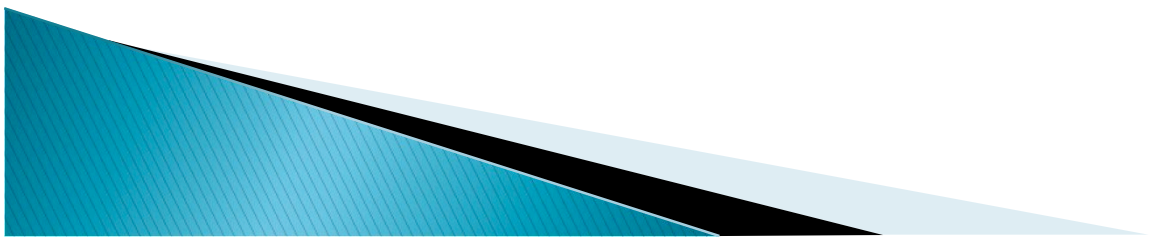
- Many vegetables originated in tropical areas of the continents, such as the Fertile Crescent (Mesopotamia), then evolved and adapted to colder conditions. These include mustard, coles, carrot, beets, and others. Need to tease our the tropical genes or attributes to develop vegetables for Hawaii's unique weather conditions.

Lettuce

Many Colors, Shapes, and Tastes

Lettuce Challenges in Hawaii

- **Tip burn**: High temperatures accelerate metabolic rate, affecting water uptake and calcium delivery especially to extremities. High nitrogen can aggravate tip burn by creating Ca:N imbalance.
- **Early bolting**: Result of heat stress. Plants think they're about to die, and will bolt or flower to perpetuate itself.
- **High temperatures**: Heat stress increases milk (lactose) production, adversely affecting taste.



Tipburn on Manoa Lettuce

Premature Bolting – Red Flamingo

Kauwela, Bolt-Tolerant Hawaiian

Sierra, Heat-Tolerant Lettuce

Manoa Leopard

- Manoa (Green Mignonette) – Heat-tolerant heirloom from the mid-1800's. Soft leaves with juicy crunchy midrib. Compact plant, ideal for single serving lettuce. Grown in Hawaii for over 100 years. Adapted to tropical lowland conditions.

- Leopard (Merlot X Dark Green Romaine X Flashy Troutback) – Colorful leaf, some spotted, with excellent disease resistance, including Sclerotinia and Downy Mildew.

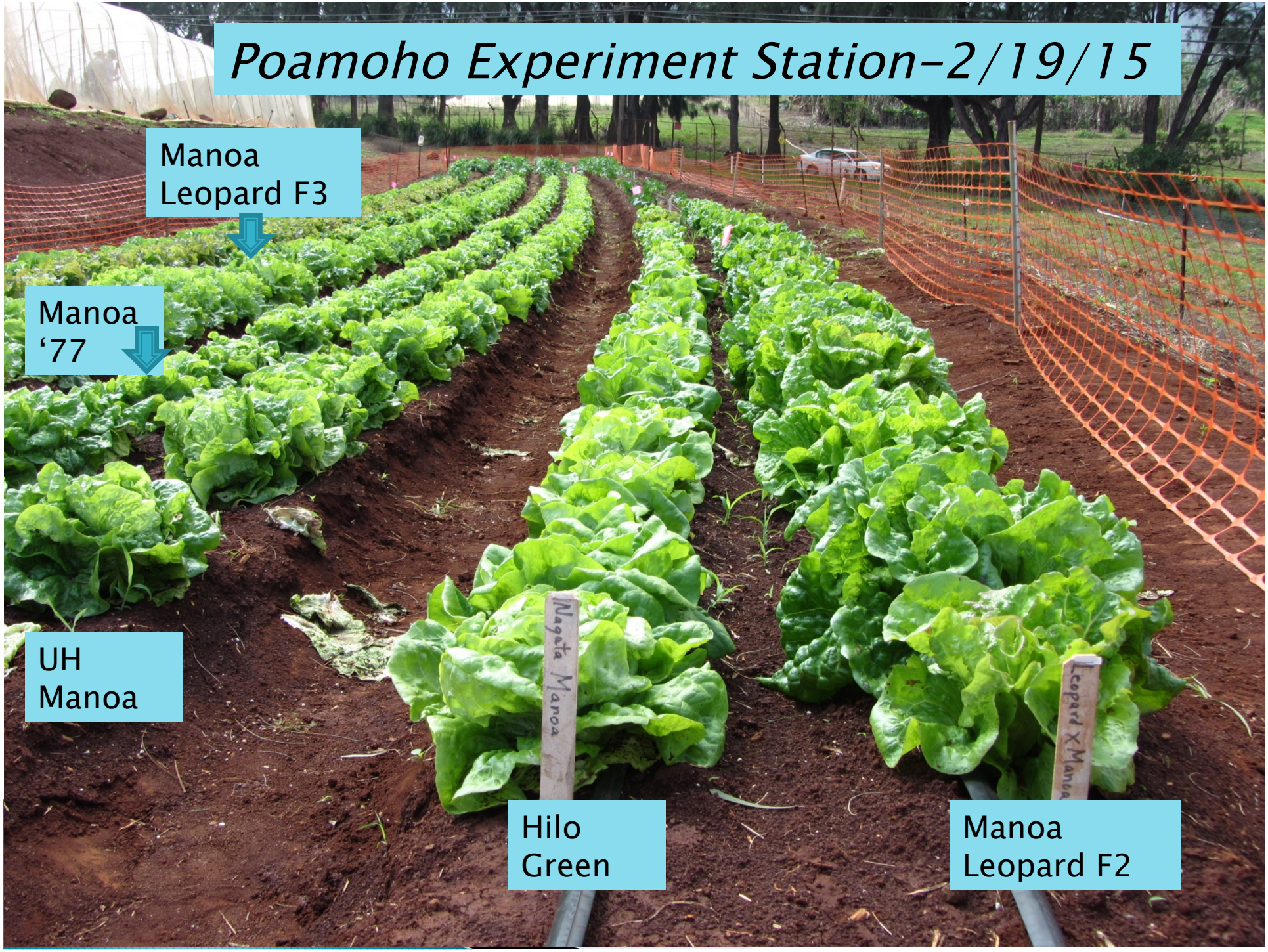
Lettuce – Manoa Leopard

Lettuce – Leopard

Lettuce – Manoa Leopard

Selecting for Tolerance to Tip Burn & Premature Bolting

Manoa Leopard: Heat-Tolerant Individuals

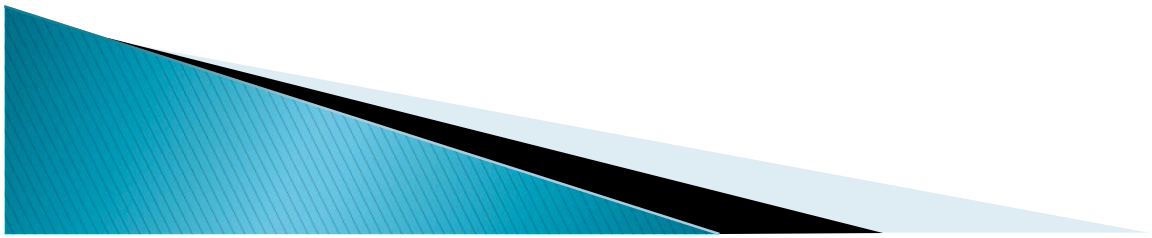

Poamoho Experiment Station-2/19/15
Manoa Leopard F3
Manoa '77
UH Manoa
Hilo Green
Manoa Leopard F2
Nagata Manoa
Leopard X Manoa

Hilo Green

(Rex X Little Gem) X Manoa

Annuals and Biennials

- Annual – completes life cycle in one year.
- Biennial – requires two years to complete life cycle, and will overwinter. Requires cold snap or vernalization to trigger flowering.
- BUT, some biennials may act as annuals in Hawaii.
- Examples: SOME kale, carrots, radish, and chard varieties, maybe others.



Spinach, Long Standing Bloomsdale

Kale or Cauliflower Seed?

KALE – Lacinato (foreground) and Lacinato Rainbow

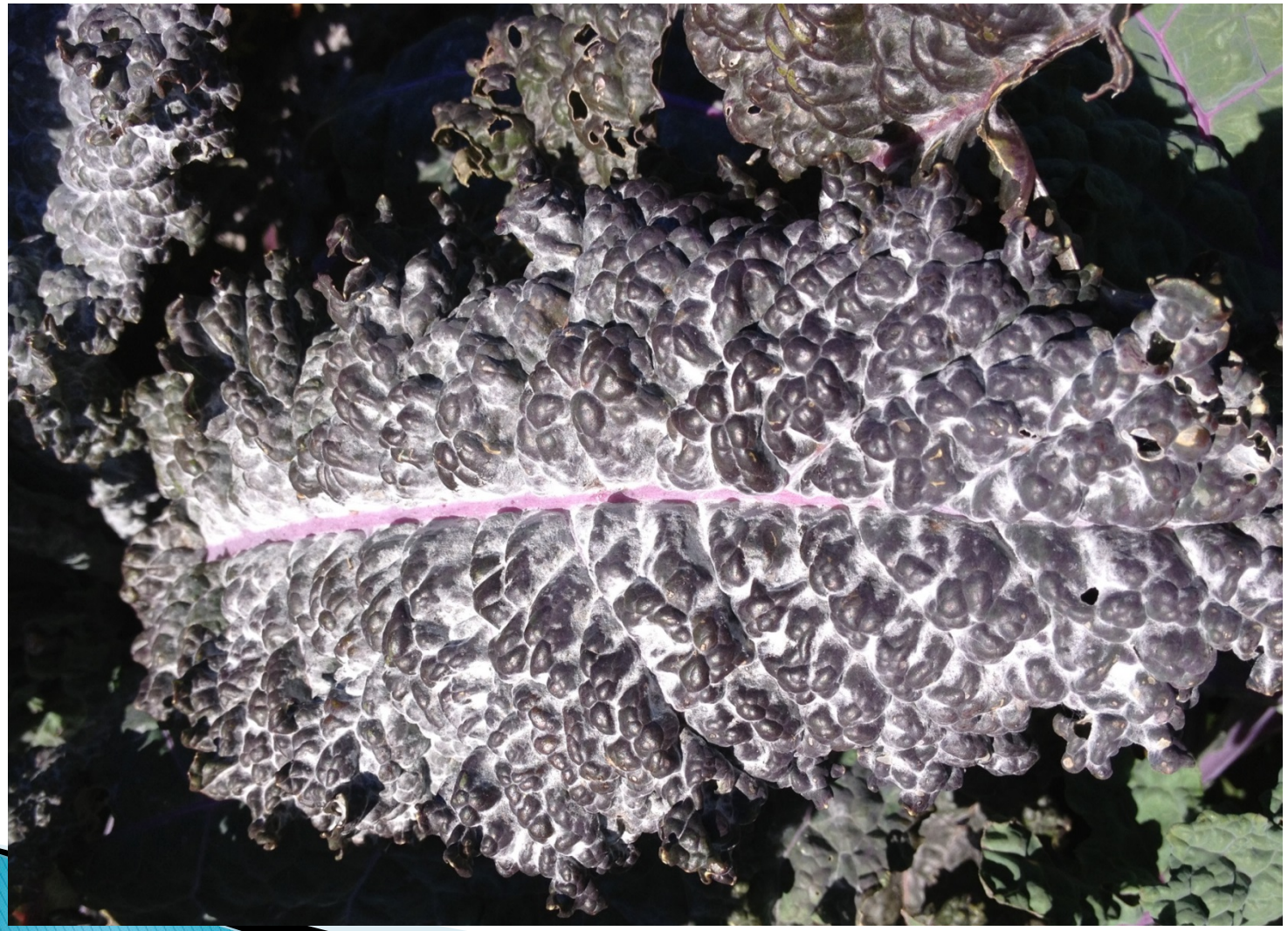
Lacinato Rainbow
(Lacinato X Red Bor)

Kale in Flower

Kale Seed

Harvesting Kale Seed

Powdery Mildew



Powdery Mildew Resistance

Chinese Mustards – Pak Choy

Drying Mustard Seed

Swiss Chard – Mountain Spinach

Carrots – Cosmic Purple

Carrot Seed

Carrot Seed

Koba Green Onion Seed
Volcano Research Station

Green Onion Seed Heads

Akakai – Hawaiian Shallots

Akakai Grown as Green Onions

Healani Tomato Seed
Volcano Research Station

Blossom-End Rot

Blondkopfchen (Blond Girl)

Tomato ‘Indigo Rose‘
Jim Myers – Oregon State

Tomato ‘Black & Blue’

Siberian Tiger (foreground)

Seed Security is Food Security

Acknowledgements

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