U.S. Vegetable Laboratory

A Research Unit of the Agricultural Research Service

The in-house research agency of the U.S. Dept. of Agriculture

Mark W. Farnham
Acting Research Leader
U.S. Vegetable Laboratory

- **Established in 1936 under Title 1, Section 4, of the Bankhead-Jones Act (approved by Congress on June 29, 1935)**

- **Former names**
  - Southeastern Regional Vegetable Breeding Laboratory
  - U. S. Vegetable Breeding Laboratory
U.S. Vegetable Lab Statistics

- FY-2010 budget: $4.4 million
- Number Scientists: 10
- FTE for FY-2010: 45
- Research Farm: 450 acres
## Scientific Disciplines

### Plant Pathology
1. **Nematology** *(J. Thies)*
2. **Bacteriology** *(P. Wechter)*
3. **Virologist** *(K. Ling)*
4. **Watermelon pathology** *(C.S. Kousik)*

### Genetics and Breeding
1. **Pea/pepper** *(R. Fery)*
2. **Cole crops** *(M. Farnham)*
3. **Watermelon** *(A. Levi)*

### Agronomy
1. **Weed science** *(H. Harrison)*

### Genetics and Breeding
1. **Whiteflies** *(A. Simmons)*
2. **Sweetpotato breeding/ host plant resistance** *(D. M. Jackson)*

### Entomology
U.S. Vegetable Lab Mission

• Regional vegetable crops research facility

• Overall objective
  – Respond to major agricultural problems experienced in the production and marketing of quality vegetables
  – Southeast and nationally

• Two broad problem areas
  – Cultivar/germplasm development
  – Pest control
Crops of Interest

- Broccoli**
- Pepper**
- Sweetpotato**
- Watermelon**
- Southern Peas**
- Snap bean
- Cabbage
- Cauliflower
- Collard
- Cucumber
- Greens/leafy veggies
- Melon
- Tomato

**Major breeding program
Prominent Vegetable Cultivars

Snap bean
- Contender
- Extender
- Provider

Watermelon
- Charleston Gray
- Congo
- Garrisonian

Tomato
- Homestead
- Southland

Muskmelon (Melon)
- Gulfstream
- Planters Jumbo
- Mainstream

Pea
- Wando

Southernpea
- Charleston Greenpack
Development of root-knot nematode resistant pepper varieties

- **Root-knot nematodes** are a major pest of peppers

- The major control method is soil fumigation with methyl bromide (12% of preplant usage in U.S.)

- The **ideal alternative control** measure is the development and use of **resistant varieties**

- Single gene resistance (N)

Susceptible pepper root with extensive galling
Bell Pepper Cultivar Releases

‘Carolina Wonder’, a USDA-developed, root-knot nematode resistant bell pepper (1997)

‘Charleston Belle’, a USDA-developed, root-knot nematode resistant sweet bell pepper (1997)
Genetically Improved Broccoli

Heat Susceptible

Heat Tolerant
Insect-Resistant ‘Ruddy’

Insect-Susceptible ‘Beauregard’
Research Opportunities with Collard Greens, the American Cole Crop

or

One Man’s Adventure in the Collard Patch

Mark Farnham
U.S. Vegetable Laboratory
Charleston, SC
Collard is a *Brassica oleracea* L. species member.

This species includes cabbage, broccoli, cauliflower, kale, Brussels sprouts, and others.
Origin of Collard Greens is uncertain

- Ancestors most likely from the Mediterranean
- Europeans consider collard an American cole crop
- The name “collard” may derive from the term “cole wort”
- Akin to a nonheading cabbage
Source of this picture is text entitled Tacuinum Sanitatis written in the 14th Century AD.
Evidence indicates collard is a close relative of common cabbage

- Although classified in same group as kale, fingerprinting studies indicate close similarity with cabbage
- Cabbage and collard are historical neighbors in the Southeast
- A common type of landrace in the Carolinas is called a “cabbage collard”
Types of Collard Varieties

Heirlooms

- Saved by individual growers/gardeners
- Becoming more difficult to find
- Not available for sale
- Open pollinated
- Heterogeneous, no two plants alike
- Most heirlooms are unique
Improved populations

- Usually result from selection/breeding
- Produced by Seedsmen
- Relatively inexpensive seed
- Open-pollinated
- Heterogeneous, no two plants alike
- Examples include Vates, Champion, Georgia
Types of Collard Cultivars

**Hybrids**

- Developed through plant breeding
- Seed produced by specialized growers
- Controlled cross of selected parents (inbreds)
- Expensive seed
- Takes many years to develop parents
- Homogeneous, all plants are the same
- Examples include Top Bunch, Blue Max, Flash
Transfer of Disease Resistance from cabbage to collard

- Heading of cabbage is recessive to the nonheading characteristic of collard
- **Durable Fusarium yellows resistance (and possibly black rot tolerance) in cabbage should be easily transferred to collard**
- Hypothesis: Cabbage by collard hybrids could serve as viable collard cultivars
Do You Save Collard Seed?

Few people save seed anymore, since they can buy new and relatively cheap seed at the store every year. But there are good reasons that most American farmers and gardeners once saved “heirloom” seed from their best tomatoes, corn, and, yes, collards. They were trying to preserve tasty and unusual varieties. And they wanted crops that were well adjusted to local soil and climate. “Heirloom” seed are those collected from fields and gardens each year for planting the next year, sometimes extending this tradition over generations.
Collard Seed Savers in NC and SC

Map by Edward H. Davis, Emory & Henry College, 2006.
Source: Field work by authors; ArcGIS software package.
Is an identified Heirloom unique?

• Obviously, a distinct appearance would indicate that it is
• The name of the heirloom could provide evidence
• The story behind the sample may also provide clues
## Names can be telling

<table>
<thead>
<tr>
<th>Susan Turner collard</th>
<th>Yellow cabbage collard</th>
<th>Crinkle Leaf collard</th>
<th>Cabbage collard</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hard headed c.c.</td>
<td>Granny Hobb’s collard</td>
<td>Fuzzy’s cabbage collard</td>
<td>Bill’s Pea Ridge collard</td>
</tr>
<tr>
<td>Big Daddy greasy green</td>
<td>Old fashioned blue stem</td>
<td>Dark cabbage collard</td>
<td>Old Timey collard</td>
</tr>
<tr>
<td>Beggar’s Choice</td>
<td>White cabbage collard</td>
<td>Old mountain collard</td>
<td>Morris Header</td>
</tr>
</tbody>
</table>
Oral Histories often indicate something distinct

Grace Summersett
Charleston Co., SC
(85 y.o., 1993)
Mother saved it
Grandmother saved it

Henry Mizelle
Martin Co., NC
(^90 y.o., 2006)
Wife saved for 60 y
Aunt Martha Jane Jones
(1940’s)

Eric Morris
Scotland Co., NC
(2006)
Lawrence M.
Fairley M.
Elisha M.
(1920’s)
Majority of Seed Savers we have found are 70+ years old. The seed resource they hold will likely be lost in the future.