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I. NOTES OF INTEREST

A. Vegetable Crops Calendar

The Twenty-second Annual Florida Tomato Institute will be held September 8, 1983 at the Sandpiper Bay Conference Center, Port St. Lucie, Florida. The Institute will precede the Annual Joint Tomato Committee/Exchange Conference at the same location on September 9-10, 1983. A program of the conference follows.

A room is set aside for the demonstration of both the FAST and FAIR computer systems. There will be people available both Thursday and Friday for help if anyone wishes to try the system themselves.

FLORIDA TOMATO INSTITUTE
Port St. Lucie, Florida
September 8, 1983

9:00 Registration and Coffee*  
(*courtesy of ICI Americas)

10:00 Introductory Remarks

10:15 The 1982-83 Tomato Season  
Wayne Hawkins, Florida Tomato Committee/Exchange, Orlando

10:30 Critical Needs for Research  
D. N. Maynard, Chairman, Vegetable Crops Dept., Gainesville

10:45 F.A.I.R., Florida Agricultural Information Retrieval System  
Ken Pohronezny, AREC, Homestead

11:00 F.A.S.T., Making the Freeze Forecast Available to the Private Sector  
J. F. Gerber, Executive Director Florida Agricultural Service and Technology Inc., Gainesville

11:15 Changing Input Costs on Tomatoes  
Jose Alvarez, AREC, Belle Glade

11:30 Federal Crop Insurance – A Pilot Program for Tomatoes –  
R. L. Brown, Collier County Extension Service, Naples

11:45 Discussion and Questions

12:00 Adjourn for Lunch
II. COMMERCIAL VEGETABLE PRODUCTION

A. Tropical Root Crop - Cassava

The following article is taken from a manuscript for a book chapter authored by S. K. O'Hair, AREC, Homestead, Florida. Due to its length the article is an extremely abridged version of part of the chapter; published here with consent of the author.

The tropical root crops cover a number of different plants of which cassava, the edible aroids and yams are the most important. Their value is in the production of starch-filled storage organs that serve as a low cost source of carbohydrates in the diets of many people in the tropics. Additionally, one to all are often
utilized in small farm mixed plantings in the tropics. With the movement of people from the tropics to Europe and North America, these crops are now found in non-traditional distant markets. Due to their relatively long growing season and requirements for warm temperatures for optimum growth, tropical root crop production in Europe and North America is limited to regions that have a long frost-free growing season such as Hawaii and Florida in the United States and Italy in Europe. Each crop has special qualities and growing requirements; therefore, each will be covered separately during the coming months.

Cassava

Cassava (Manihot esculenta L. Crantz) is one of the more important of the tropical starchy staples, being recognized internationally through the development of crop programs at the International Center for Tropical Agriculture (CIAT), Cali, Colombia and the International Institute for Tropical Agriculture (IITA), Ibadan, Nigeria. Also known as yuca (Spanish), manioc, tapioca (French) and mandico (Portuguese), it is a very adaptable crop and is considered to be outstanding in its food producing ability and economy of production. Originating in Brazil and Paraguay, production has spread throughout the tropics and subtropics, with wild Manihot species growing as far north as Arizona. In the U.S., cassava was used during the Civil War as a calorie source and as a substitute for corn starch. It has been grown along much of the Gulf of Mexico and as far north as Atlanta and Memphis. The enlarged roots are the plant part most often consumed. In parts of East and West Africa and Southern America the young tender shoots are cooked as potherbs.

A member of the family Euphorbiaceae, cassava is a short-lived perennial tropical shrub growing one to four meters tall. Adventitious roots varying in shape from long and slender to globose arise from stem cuttings and enlarge during the starch storage process.

The white starch-filled flesh of the root is crisp and uniformly fine grained. On a fresh weight basis, root starch concentration ranges from 5 to 40% depending on cultivar, environment and plant age. Cassava starch is 13 to 21% amylose and is considered to be easily digested and suitable as a partial substitute for maize or barley starch. Prepared in manners similar to potato, cassava provides low-cost calories to the diet. There is 0.9 to 2.4% protein in the peeled fresh root and 1.1 to 4.90% in the peel (the bark and phloem tissue), which is often discarded in the preparation process. Leaves are high in protein ranging from 19
to 40% on a dry weight basis. However, the sulfur amino acids are low or missing in roots and leaves. Thus, diets need the addition of other foods high in methionine to make the protein intake complete.

Although the processing of cassava roots into food items is not a major industry, there is potential for expanded use of such products. Cassava cakes, made from baked or fried grated root, and "fufu", made from cooked roots that have been pounded and slightly fermented, are sold commercially in some regions. Farin is a dried product that is used in the Caribbean as well as in Brazil, where it is known as farinha. In this case the roots are peeled and grated, followed by juice extraction through pressing and drying either in the sun or in a large heated pan. Much stirring is required during the latter method to prevent the product from burning. Once the farin is lightly browned, it can be stored for several months in a protected location. It can be reconstituted to make a porridge or sprinkled over stews, cooked vegetables or meats. Roots can be chipped, dried and processed into flour or they can be pelleted and used for animal feed. Cassava flour can be used as a partial substitute for cereal flour in the preparation of bread, with little or no noticeable effect.

Without processing, the root flesh and leaves may be toxic due to the presence of free and bound cyanogenic glucosides (HCN). The total HCN content varies considerably with cultivar, environment and plant age. Cultivars low and high in HCN are termed "sweet" and "bitter", respectively, due to a bitter flavor that accompanies the HCN. Levels in the peel, peeled root and leaves ranged from 5 to 77, 1 to 40 and 0.3 to 29 mg/100 g (fresh wt.), respectively. Juice extraction, cooking the leaves or roots, fermentation of fresh roots, or combinations of these are processing treatments that aid in reducing HCN levels to safe levels.

Toxicity from cassava may develop when considerable quantities are consumed over a period of time. This is particularly true if the prepared cassava has high HCN concentrations and the diet is poorly balanced nutritionally.

The largest producer of cassava is Brazil, followed by Thailand, Indonesia, Zaire and Nigeria. World production is currently over 122 x 10^6 Mt/annum, of which over 60% is produced in these countries. U.S. production is limited to backyard gardens in Hawaii and 30 to 150 ha in southern Florida. Yields vary considerably depending on cultivar, plant age at harvest and local environmental conditions, which include fertility, pest and disease presence and climate. Average world yields are 8.8 Mt/ha, while the highest experimental yields exceed 60 Mt/ha/annum. Thus, the potential for higher world yields is great.
Cassava grows best in warm tropical climates; however, cultivars have been selected for adaptation to mountainous, subtropical and other ecological zones. It grows well in many soil types, and it excels over other crops in production on marginal, unused lands. However, it does not tolerate saline or water-logged conditions.

Land is usually worked with a plow or hoe prior to planting. Stem cuttings 20 to 25 cm long are selected from the lower mature sections of healthy plants and planted either flat two to five cm below the soil surface or at a 45° angle to vertical position in the soil with the top one-third exposed. The preferred positioning varies with soil conditions and planting time. If the soil depth is shallow, or if it is dry and an extended dry period is likely, then horizontal planting with complete soil coverage is recommended. Otherwise, the latter positioning is preferred, since lodging potential is reduced with the even root distribution that develops around the base of the cutting. Stem polarity must be observed during the planting process, since the cutting will not survive if planted upside down. A fungicide and pesticide dip is recommended as well as careful handling of the cuttings prior to planting. Currently most cassava is planted by hand. However, machines are being developed to handle this task for large plantings. It is best to plant in moist soil at the start of the rainy season. Raised beds or mounds are advised for areas where drainage is poor, land is shallow or erosion is likely to be a problem. In the latter case, beds should follow the land contour. Plant spacing of 1/m² is common. However, mixed cropping is often practiced in the tropics. Mixed plantings can include other root crops, cucurbits, maize or beans as well as young more permanent plants such as bananas, plantains, citrus or cacao.

In the tropics, fertilizer is not generally used unless cash crops are also in the same planting. Cassava responds most to phosphorus fertilization. It has been demonstrated that VA mycorrhiza benefit cassava by scavenging for food and supplying phosphorus to the roots. Excessive fertilization can reduce root yields by encouraging top growth at the expense of starch deposition in the roots. If available and needed, a (6-12-12) analysis fertilizer is generally applied in split applications of 750 kg/ha at planting or soon after and again one or two months later. Unless rainfall is minimal, less than 750 mm, cassava does not respond to supplemental irrigation. In drought situations, cassava survives by dropping its leaves to conserve moisture. New leaves develop when rains return.

Weed competition during the early stages of plant growth is a major factor leading to yield reduction. Pests and diseases are numerous and highly regional with the exception of a few.
Bacterial blight and brown leaf spot are the most common disease. Mites, thrips and whiteflies are the most common arthropod pests. Several nematodes have been found in association with cassava. However, only root-knot on some genotypes has consistently been associated with damage when soil populations are high. Genetic resistance has been identified for many of the pests and disease, and hybrids are being developed with these resistances. When disease resistance is not present, yields can be reduced by 50% if healthy, pathogen-free cuttings are not utilized.

Harvesting begins 8 to 10 months after planting with plants being pulled from the ground by hand as the demand for roots develops. Plants can be left in the ground for several years with the roots becoming larger each year. Problems with this are that the roots become fiberous and have a lower starch concentration. Carbohydrates are translocated from the root to support leaf growth at the beginning of the next season and later are deposited as starch only in newly formed root parenchymatous tissue near the outside of the root. Thus tissue produced during the previous season looses and never regains its high starch concentration. Pre-harvest removal of the upper stems and leaves instills lengthened postharvest storage life to the roots. The mechanisms for this are not yet understood. Otherwise, harvested roots will maintain good quality for only a few days after harvest. Internal breakdown with flesh darkening and localized rotting are the most common postharvest problems. In the tropics, marketing takes place in local street markets whereby a days supply of roots is harvested and sold from a sidewalk stand. Some fresh roots are shipped to the larger cities and even exported by air to North American and European markets.

III. HOME VEGETABLE GARDENING

A. Reaching Our Home Horticulture Clientele

Extension works with both agricultural and non-agricultural groups. Home gardeners are generally included in the latter group. According to a national survey by the USDA, "A Profile of Clientele Served by County Agricultural and Natural Resources Extension Staffs", both groups receive a large amount of time from Extension personnel.

Those of you agents who are concerned most with the large suburban non-agricultural audience in your county may be interested in how you work with them in your programs as compared with how others around the country work with them.
By far the greatest number of people reached by agricultural agents is in the non-agricultural audiences, comprising 68 percent of the audience reached. Commercial farmers reached make up only 12 percent of Extension's audience nationally.

Agents in 562 counties surveyed said they are reaching these non-agricultural people through the following media:

Percentage of suburban nonagricultural audience reached by:

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<thead>
<tr>
<th></th>
<th>Radio/TV</th>
<th>News</th>
<th>Phone</th>
<th>Publications</th>
<th>Magazines</th>
</tr>
</thead>
<tbody>
<tr>
<td>Radio/TV News</td>
<td>36.7</td>
<td>35.4</td>
<td>23.9</td>
<td>23.8</td>
<td>20.8</td>
</tr>
<tr>
<td>Office visits</td>
<td>16.2</td>
<td></td>
<td></td>
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<tr>
<td>Mail</td>
<td>15.1</td>
<td></td>
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<tr>
<td>Meetings</td>
<td>10.2</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Demonstrations</td>
<td></td>
<td></td>
<td></td>
<td>7.8</td>
<td></td>
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<tr>
<td>Site Visits</td>
<td></td>
<td></td>
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<td></td>
<td>7.4</td>
</tr>
</tbody>
</table>

It is interesting to note that the same methods were used with about equal effectiveness for both urban and rural counties. For commercial farmers, direct mail was the most widely used method, comprising 70 percent of the contacts made by extension.

Here is a brief summary of some of the methods and techniques presently included in Florida home horticulture extension programs.

1. **Radio**
   A. Prepared message - agent goes to the station and reads it "live" or "taped for airing".
   B. Prepared message - taped and sent to the station for airing (by IFAS-Gainesville or by Agent).
   C. Interview format - live: agent is questioned "live-on-the-air".
   D. Interview format - taped: agent interview is taped for later airing.
   E. Talk show - local live-on-the-air call in questions and answers.

2. **Television**
   A. Interview show (live or taped - agent is host).
   B. Interview show (live or taped - agent is guest).
   C. Cable channel - Extension in county has exclusive use of the channel.
   D. Video tape made by t.v. staff for later use.
   E. Video tape made in Gainesville by IFAS for agent to use on his show.
   F. Video tape made in Gainesville by IFAS and sent to t.v. station for airing (agent may not be involved).
   G. Regular t.v. programming from U.F., like the Old Sunshine Almanac.
3. **Video-tape**

A. Fairly expensive video cassette players required for showing tapes at meetings or other events.
B. Make tape yourself if you have a camera.
C. Video tapes prepared at Gainesville are sometimes available to agents.
D. Video tapes, such as "IFAS Vegetable Gardening Tips" are made in Gainesville and sent directly to t.v. stations.
E. Tapes may be filed and used when timely.
F. Used in meetings, self-help clinics, etc.
G. Many county facilities outside extension have V.C. equipment for loan or rent.

4. **Teleconference**

A. Lecture or conference via telephone to distant audience.
B. Requires simple, inexpensive hook-up equipment.
C. Provides live participation.
D. Variety of visuals may be used by prior arrangements.
E. From speaker's standpoint, telelecture eliminates costly travel and expenditure of time.
F. From viewer's standpoint, telelecture broadens inputs from several speakers.

5. **Slide/Cassette Tape Programs**

A. Involves slide show synchronized to a narrated cassette tape.
B. Tape may be shown and slides shown by separate equipment, and coordinated by agent, or synchronized electronically.
C. Ideal for lobby displays.
D. Great for self-teaching with minimum monitoring.
E. Allows preparation of a complete instructional program for showing by an inexperienced person.
F. Agent may prefer to narrate slides rather than use the cassette tape.

6. **Dial-A-Tape**

A. Secretary responds to phone request for information by playing a short cassette tape message.
B. A timely gardening tip-of-the-day may be recorded and heard by dialing an advertised number.
7. **Microcomputers**
   
   A. Extension personnel everywhere are looking for ways to utilize computers in programming for home horticulturists. Data banks, filing, and use of software on gardening, such as garden planning, are some of the possibilities. Expect a rapid increase in gardening related software development in the next few years.

   B. IFAS is providing vegetable gardening programs to be used by commercial computer subscription services in South Florida.

8. **Master Gardener Program**

   A. Florida, like many other states, is rapidly expanding the MG program (over 15 counties now).

   B. Involves volunteers training to become extension helpers, and giving 50 hours or more of personal time to educational activities.

9. **Demonstrations**

   A. Successful gardening techniques may be demonstrated by Extension in a number of ways. Most involve a model garden located strategically, as near the ag centers, community garden sites, or downtown.

   B. Excellent method for use by Master Gardeners.

10. **Other Common Methods Not Involving One-on-One**

    A. Newsletters/circular mail
    
    B. Newspaper/magazine articles
    
    C. Publication hand-outs - dispensed from racks
    
    D. Meetings, clinics, camps

As defined in the U.S.D.A. Profile Survey, "a county program consists of the total Extension educational effort with mass media, meetings, tours, bulletins, and other information as planned and carried out by county leadership with clientele groups". Because the non agricultural group is the largest, representing 87 percent of the adult population, and receives only 11 percent of total Extension staff time (see USDA Misc. Pub No. 1415), mass media methods must be expanded and utilized to their fullest extent if Extension is to continue to make the sort of impacts our supporters expect of us. We are reaching only 13 percent of our audience as compared with 70 percent of the commercial farmers.

(Stephens)
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