



NEWSLETTER

MAY 1991

**TAMPA BAY CHAPTER of the
RARE FRUIT COUNCIL INTERNATIONAL, Inc.**

EDITORIAL COMMITTEE: BOB HEATH
THERESA HEATH
ARNOLD STARK
LILLIAN STARK

PRESIDENT: LILLIAN STARK

CHAPTER MAIL ADDRESS: 313 PRUETT RD., SEFFNER FL 33584
(INCLUDING RENEWALS)

MEETINGS ARE HELD THE 2nd SUNDAY OF THE MONTH AT 2:00 p.m.

NEXT MEETING MAY 12, 1991

MEETING PLACE. RARE FRUIT COUNCIL INTERNATIONAL CLUBHOUSE.
313 Pruett Road, Seffner. Take I-4 to
Exit 8 North, S.R. 579, go one mile to
Pruett Road. (See McDonald School sign),
turn right (East). Go one mile. See
Clubhouse on left immediately past
McDonald School.

PROGRAM. GENE JOINER FROM THE WEST PALM BEACH
AGRICULTURAL EXTENSION SERVICE WILL GIVE
A SLIDE PRESENTATION OF TROPICAL FRUITING
TREES. Gene is very knowledgeable and is
an interesting speaker. For those who
have had the pleasure of hearing Gene in
the past, this should be a welcomed
presentation.

Also, we will need things for the tasting
table and trees for the raffle. See you
there!

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NEW MEMBERS:

Alyce & Ted Langley, 313 Gunlock Rd., Lutz, FL 33549 (813) 920-4746

Glenn & Colleen Burns, 5115 N. Socrum Loop Road, #458, Lakeland FL 33809
(813) 858-1877

Harry & Elisa Harter, 612 Kingston Ct., Apollo Beach, FL 33572
(813) 645-7123

Aloha Palms/Livenspire-Pueckler, 3026 Saffold Rd., Wimauma, FL 33598
(813) 634-8253

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THANKS... to Charles Novak, our Seed Chairman, for an inspiring display and
seed exchange set-up at our last meeting. We're looking forward to a
rejuvenated Seed Program under his leadership.

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CELL FUSION By Dr. Grossman

The technique that Dr. Grossman is taking advantage of in the laboratory is called protoplast fusion. A protoplast is simply a cell that has the cell wall removed by an enzyme. Once the wall of the cell has been removed you can do certain things such as fusing the cells of two different genus types together to make a hybrid that has all of the chromosomes from both parents. If each of the parent cells have 18 chromosomes, the new cell will have 36 chromosomes. This is the premier way of plant hybridization and of the 30 or so hybrids produced in this way throughout the world, the laboratory in Lake Alfred is responsible for about 20 of these.

Basically, they have approximately 15 genus types of citrus that they can use to go from a single cell back to a whole plant through embryonics and the embryos that are formed from a single cell are the same as we find in the cells of the citrus seed. The cultures are formed from the cells that they get directly from the ovules right out of the mature fruit. From the other plant with which they want to make a hybrid they use a leaf and perform a similar treatment with enzymes to separate the cells and remove the cell walls to get the naked cell. Then they mix the cells from both parents together, many thousands of them, treat them with a chemical called Polyethyleneglycol which causes the cells to adhere very tightly together. In this process, some of them fuse together to form single cells, after which they leach the chemicals off with a series of washes in a very complex medium which induces some of those that have not fused but are adhered, to fuse together. Through this process they end up with anywhere from 1 to 10% of the cells that have fused. But unfortunately many of these are not fused 1-to-1 but are fused 2, 3 and 4 together. They are interested, of course, in the 1-to-1 fusion. These can be identified under the microscope by noting the green chlorophyll from the leaf cells and the white starch bodies from the fruit cells.

The next trick, of course, is to get plants back from these individual cells. First they have to re-generate cell walls and then they have to start dividing and then you have to get them to differentiate into roots, stem, leaves, etc. Anywhere along the way things can go wrong so it's really a complex process to go from the first individual cells to a mature plant.

Dr. Grossman next showed us several slides of the separation of the cells from the ovules and the leaf, the naked cells after the cell walls have been removed, the fusion of cells into 1-on-1 new cells and various and sundry other combinations through the callousing of the growing cells and the development of roots and stems into growing plants in the ground. We could see the green chloroplast and the starch bodies in the cells. There are several avenues to pursue in this type of research and Dr. Grossman began discussing these avenues first with the importance of developing root stock for citrus that has specific characteristics not available in existing rootstock.

Dr. Grossman spends about half his time working on new root stock and the other half working on new fruit types. As we know, the primary problem with citrus in the northern limits of citrus growing in Florida is cold hardiness. Dr. Grossman indicates that his idea is to develop a root stock that makes a tree go completely dormant in the winter time and a tree that is dwarf so that the conventional cold protection methods may be used to advantage, such as the use of elevated micro-sprinkler systems to protect the tree with water during freezing weather, and that will also produce a very productive tree. For the Indian River area, they are trying to develop a root stock from the sour orange that is resistant to the tristeza virus. Sour orange is the most popular root stock in the Indian River area because they have a high pH soil and sour orange does exceptionally well on a high pH soil. But unfortunately tristeza is becoming epidemic there and they cannot use sour orange root stock anymore. So at Lake Alfred they are making hybrids with sour orange in the hopes of developing a sour orange that will work with the high pH and also resist the tristeza virus.

There are two techniques they use with the cell fusion method to produce a root stock. The first one is to simply make hybrids between existing root stocks that complement each other. For example, if you have one that is resistant to blight and one that is resistant to tristeza, simply fuse those together and hope you get resistance to both diseases. They have several of these fusions now that are in field trials and that they are hoping give good results. Every root stock presently being used has some problem that they are hoping to get rid of. They are working with Cleo, Sour Orange, various types of Rough Lemon, and, of course, Trifolia Orange and Flying Dragon.

The second method is to make wide hybrids. They are using several citrus relatives, different genera that they know are graft compatible with citrus and have a whole range of traits that they would like to incorporate into citrus root stock but that do not make good root stock on their own. They hope by hybridizing these plants, they may overcome some of the horticultural problems. At this point they're making good progress in this endeavor.

One of the first hybrids they produced was a cross between the Hamlin Sweet Orange and the Flying Dragon. In field trials the tree has been subjected to 18° for four hours and below 22° for some 10 hours at Lake Alfred in the Christmas freeze of 1989 with no damage whatsoever. It is obviously extremely cold hardy and it also transmits some of this cold hardiness to the scion. Dr. Grossman showed us a slide of a one year old Valencia grafted onto this root stock, planted in Sebring where it endured temperatures of approximately 21° for a number of hours. Under these conditions Valentias on Rough Lemons were completely destroyed. The trees on the hybrid root stock were defoliated by the freeze but within three or four weeks new growth was visible. He had slides showing the trees last summer, and this past winter they had a considerable number of fruit and the fruit quality was excellent for a young tree. So this root stock would seem to be an excellent candidate for colder areas. It looks like it will produce a small, productive tree that can be protected easily by water and can be planted in high density. They are presently planting a large cold hardy experiment in Volusia County this fall. Two other hybrids that will be tested in Volusia are the Cleopatra/Swingle hybrid and the Cleopatra/Flying Dragon hybrid. Cleopatra is a very popular root stock at this time but it takes too long to bring producing trees into production and it has some susceptibility to tristeza. The Flying Dragon can take care of both of those problems. Swingle is also a very popular root stock at this time and it does fairly well against blight.

The two methods they're using to propagate the root stock are tissue culture and rooting cuttings in mist beds. Among the wider combinations they're working on are crosses made with Severinia Boxiflora and Severinia Boxifolia, the Chinese Box Thorn. The Severinia produces cold hardiness, nematode resistance. They have also produced by fusion a sweet orange and Meiwa kumquat cross. As you know, we can eat the entire fruit of a kumquat and if we can produce a sweet orange whose skin and rind we can eat, it should be very interesting. The trees from this cross are less than a year old and they have 42 of them planted out that are all identical so they should be able to find out about these fruit pretty soon. They are also testing this cross for root stock because Fortunella, the kumquat, has good cold hardiness.

In some even wider selections they've tried a cross between the Wampi and Hamlin Sweet Orange. They were able to obtain two plants which grew to about 6" high and then both died, possibly due to a genetic breakdown due to the wide genetic diversity of the pair. They tried the Indian Wood Apple from Sri Lanka with citrus. They obtained plantlets but they all died, apparently due to some kind of fungal disease they were susceptible to. The plant in these wide crosses seemed to be half way between the two parents.

Dr. Grossman showed us slides of the Severinia crossed with the Hamlin Orange. The Severinia has very small leaves and the cross had leaves intermediate between it and citrus. None of the wide hybrids have yet flowered or produced fruit. They presently have some very large trees in the greenhouse and hopefully they will flower and fruit. It will be very interesting to see what kind of fruit results. The fruit of the Severinia is a small black fruit about 3/8" in diameter, with thin skin and one seed, and of course, we all know what citrus looks like. At this point we will just have to imagine what something intermediate between the Severinia and Sweet Orange would be.

He showed us a slide of one of the Severinia/Sweet Orange crosses, a tree growing in the planting. It is a full healthy looking plant which loses most of its leaves in the winter, semi-deciduous, but comes back in the spring and looks great again through the summer. The deciduous characteristic is strange because neither the Sweet Orange nor the Severinia are deciduous.

Dr. Grossman next explained the method of crossing citrus to get new citrus varieties that may be exceptional for eating. The first way is to produce tetraploids between two citrus fruit types. In this first stage you may get a hybrid you can eat directly, but most importantly, you may produce a breeding parent that can be used in a tetraploid/diploid sexual cross to generate seedless triploid progeny. Anytime you cross a plant that has 36 chromosomes with one that has 18, you get a new progeny that has 27 chromosomes and, in citrus, this odd number or triploid characteristic always produces seedlessness because the odd number prevents all the chromosomes from lining up and this interferes with seed development. To make a real impact on the fruit market and to expand the market internationally, citrus fruit will need to be seedless. Europe will not accept any mandarins, tangelos, tangerines, tangors that have seeds. So Dr. Grossman feels like seedlessness is a high priority and that is why they are focusing their efforts in that direction. It will still be about 10 years before we see the result of their seedless experiments because they are presently generating the tetraploid parents. There aren't any others available here although there are some available in California.

They are using the cell tissue technique and certain other techniques to get tetraploids and as soon as they start producing pollen they will then have a collection of mono-embryonic citrus types which means they produce all hybrid seeds. All the poly-embryonic citrus produce seeds that are true to type, the same as the tree that we got the seeds from. When they have a collection of very good to eat fruit types, they may take pollen from the tetraploid and develop thousands of triploid hybrid seedlings that they can evaluate.

The next slide was one that came from an experimenter in Italy. They have been growing a cross between a Clementine Mandarin and a tetraploid Sweet Orange for about 10 years. This is one they are about ready to release and it is a very pretty, very tasty fruit as we could see from the slides. There are no seeds, which shows us the potential for the 4-X/2-X cross of new seedless citrus varieties.

In Italy they are only working with a very limited number of parents but Dr. Grossman and his group are working with a very wide range of parents to produce better size, color, taste, etc. They feel they are just scratching the surface. Other crosses which they have recently produced are crosses between Cleo and Sour Orange, several Rough Lemon with Sweet Orange crosses, Rough Lemon with Cleo, Sweet Orange fused with Dancey Tangerine and many other crosses.



PLANT RAFFLE: April.

<u>PLANT NAME</u>	<u>DONOR</u>	<u>WINNER</u>
Celeste fig	F. Honeycutt	Maggie Maquetta
Conadria fig	F. Honeycutt	Stark
Plantain	F. Honeycutt	F. Pupello
Cassava (Yucca)	B. Heath	F. Pupello
Star Apple	B. Heath	B. Pearson
Rio Grande Cherry	B. Heath	?
Tree Tomato	B. Heath	N. McCormack
Cattleya guava	B. Heath	N. McCormack
Chinese Chestnut	F. Pupello	P. Zmoda
Cattleya Guava, yellow	Charles Novak	Bob Wente
Cattleya Guava, yellow	Charles Novak	B. Pearson
Chayote	Charles Novak	Maggie Maquetta
Chayote	Charles Novak	N. McCormack
Banana, Lady Finger	Walter A. Vines	N. McCormack
Banana, Lady Finger	Walter A. Vines	F. Honeycutt
Banana, Lady Finger	Walter A. Vines	F. Honeycutt
Banana, Lady Finger	Walter A. Vines	?
Queens lily (Cureuma)	George Riegler	Al Hendry
Queens lily (Cureuma)	George Riegler	Leo Cotter
Queens lily (Cureuma)	George Riegler	?
Loquot	Janet Conard	?
Papayas	Janet Conard	Monica Brandies
Sweet Basil	Janet Conard	Monica Brandies
Sweet Basil	Al Roberts	Al Hendry
Sweet Basil	Al Roberts	Alice Burhenn
Pink Papaya seeds	Janet Conard	?
Aloe	Nancy McCormack	Al Hendry
Aloe	Nancy McCormack	F. Honeycutt

Hospitality Table: April

Lillian Stark: Carambola Walnut bread, Mulberry Pecan Bread

Janet Conard: Friendship Cake

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We regret to report the death of long time member Robert Eugene Lee on April 8, 1991. In the past Robert had been a regular meeting attender and worked hard at our tree sales. We will miss him. Our most sincere condolences to his wife, Doris, and family.

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The USF Botanical Garden Show and Sale was a big success for us. We showed up early in the rain to set up and expected the worst. But the public came out en masse, and the rain clouds disappeared by 10:30 AM, and we had a great day! We spoke to a lot of people about fruiting plants, our big tree sale in October (that's October 13- so don't forget), and our club. Some of our members brought plants for sale, and the club treasury gained about \$300. Most importantly, we have some new members as a result of this event. Club members participating were: Frank & Alice Burhenn, Tony Gricius, Bob Heath, Al Hendry, Frank Honeycutt, George Riegler, Bill Ryland, Lillian Stark, Paul Zmoda, Jud Newcomb.

Tom Economou has written to let us know that the July Fruit, Flower, and Rain Forest Safari is filled up. But, for those who wish to go to COOL Costa Rica on another of his exciting trips, there is an excursion planned August 14-24. Cost for the 11 day tour, including airfare from Miami is \$1,004. For more information contact Nature Trail, Inc, P.O.Box 450662, Miami, Fl 33145, (305)285-7173.

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THANK YOU THANK YOU THANK YOU THANK YOU THANK YOU THANK YOU

We have received contributions toward our building fund from friends and members and we'd like to acknowledge and thank them now. If you haven't yet made your contribution, please do it now. Then we will have the great pleasure of thanking you in print too! We really do need the support of everyone in this project.

Sponsor (\$500 and up): Marian Van Atta, author of "Living off the Land", "Wild Edibles", and "Growing & Using Exotic Foods", has most generously contributed \$500 as sponsor of our library.

Patron (\$499-\$200): Celso and Elise Gomez-Sanchez

Contributor (\$199-\$100): Al Hendry

Friend (less than \$100): Marvin Aronovitz, Meta Blanton, Tom Economou, Rhea Hurwitz, Doug King, Lewis Maxwell, Max & Virginia Means, Chris Moyer, Lottice Shipley, Robert & Lillian Wente

For more information about levels of giving or any other information about the building fund, contact Lillian Stark.

Tampa Bay Chapter, RFCI
313 Pruett Rd.
Seffner FL 33584



FIRST CLASS MAIL

P. JUDSON NEWCOMBE
314 DEER PARK AVE.
TEMPLE TERRACE, FL 33617