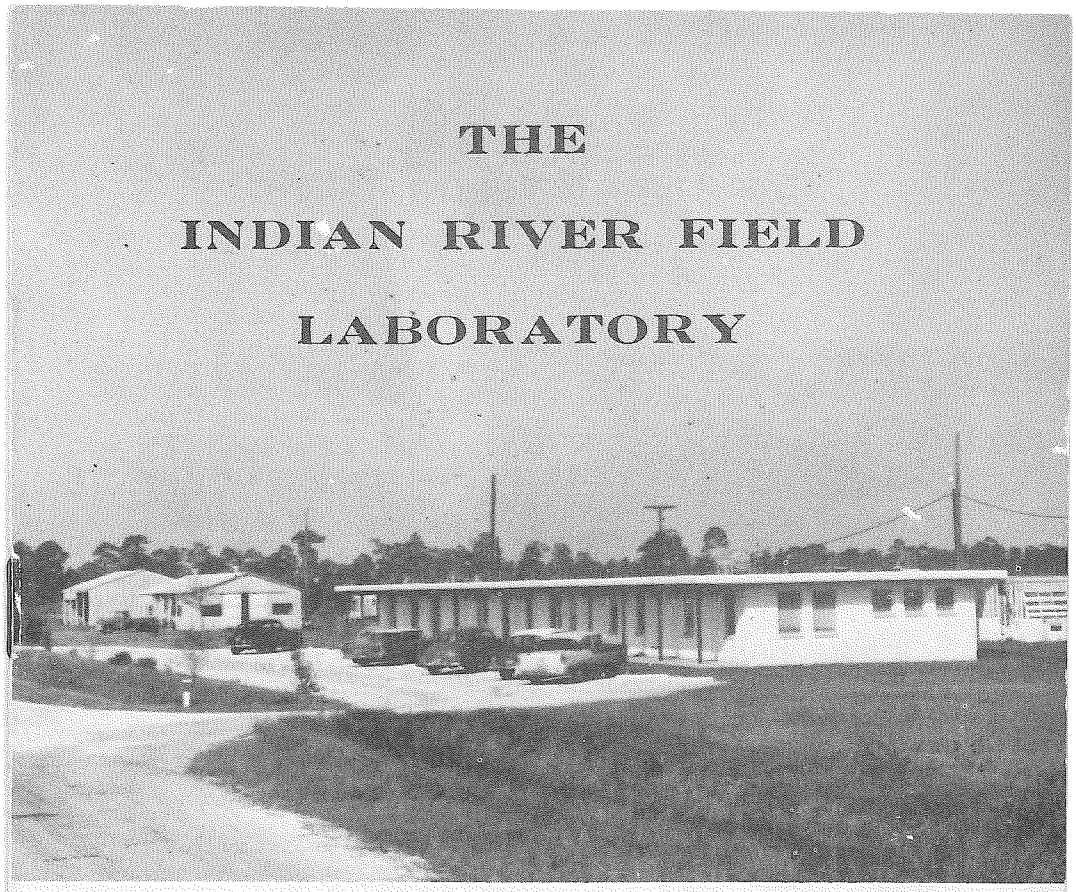
THE INDIAN RIVER FIELD LABORATORY

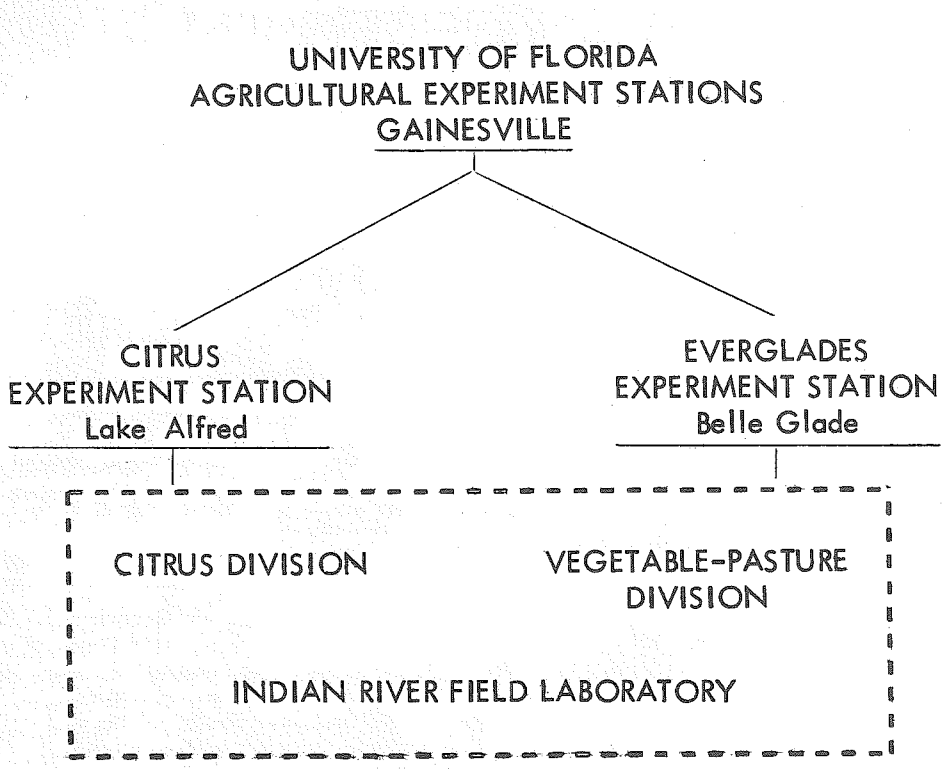


Its

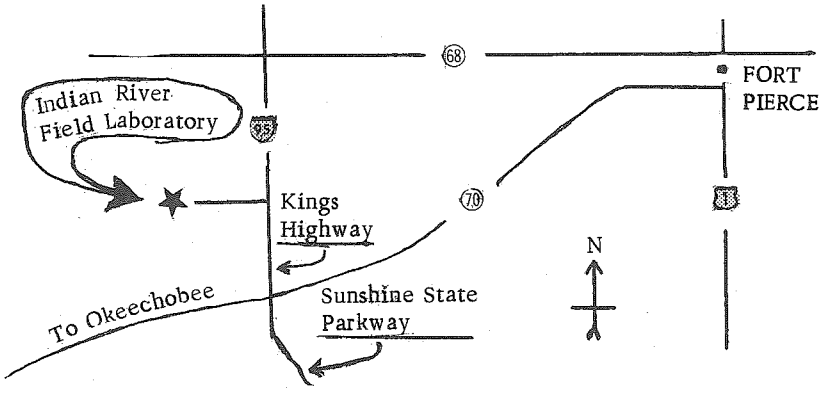
Past - Present - Future

A Special Report Prepared by Agriculturists
of The Indian River Area

JANUARY, 1961

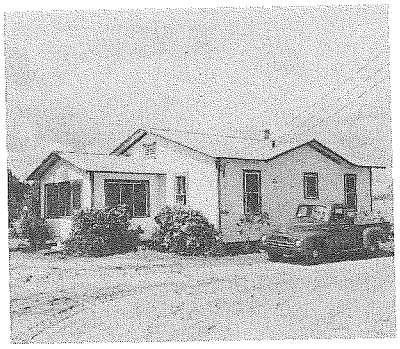


The laboratory is located about five miles west of Fort Pierce, Florida on Kings Highway (Interstate 95) between State Roads 68 and 70, and about one mile north of the entrance to the Sunshine State Parkway Turnpike.



HISTORY AND DEVELOPMENT

The Indian River Field Laboratory had its beginning in 1947. During that year Dr. W. T. Young, Assistant Horticulturist with the Citrus Experiment Station, Lake Alfred established research on an 80 acre plot which contained 35 acres of bearing grove belonging to St. Lucie County. Dr. Young conducted a citrus soil survey, water salinity studies, water table studies and fertility trials. In 1948 Dr. R. K. Voorhees, and in 1949 Mr. W. T. Long were assigned as resident staff members of the Citrus Experiment Station located at Fort Pierce. These men continued research begun by Dr. Young, and expanded the program to include nutritional sprays, insect control, cover crops and weed control in citrus.



Frame house on St. Lucie County citrus grove was converted into an office-laboratory for research staff in late 1940's.

The first major step toward the establishment of a permanent agricultural research laboratory was the execution of a renewable lease by St. Lucie County to the State Board of Education. This lease made the 80 acre plot available for both short-term and long-range research by scientists of the Citrus Experiment Station. The decision to lease the county acreage was not made until public opinion was sounded, including, in addition to agricultural people, a newspaper poll and the endorsement of a number of civic and professional organizations. The County Commissioners, Lane H. Jennings, Chairman; J. B. Brewer, R. L. Griffin, R. W. Leonard and M. A. Patrick, unaminously approved the execution of the lease in 1949.

Realizing the need for research on vegetables and pastures, a group of growers and representatives of agricultural businesses headed by Cornelius van der Lugt and Charles D. Kime next worked toward the addition of a vegetable and pasture research division of the laboratory. The severe late blight epidemic of 1948-1949 which destroyed thousands of acres of Indian River tomatoes brought to a head the push for research on tomatoes. Several important conferences were held with officials of the University of Florida and State legislators. From these meetings evolved the second major step toward a permanent agricultural research laboratory for the Indian River area. The North St. Lucie River Drainage District donated to the State Board of Education 720 acres of agricultural land adjoining the 80 acres leased from St. Lucie County. This valuable contribution provided ample acreage not only for immediate needs, but for future expansion of the research program into any field of agriculture which may be of importance to the Indian River area. It also provided State owned land on which State financed buildings could be constructed.

Some of those who were active in arranging, or who attented a conference with Dr. J. Hillis Miller, President of the University of Florida for the purpose of assuring the acceptance of the 720 acres were Willard M. Fifield, Director and Dr. J. R. Beckenbach, Associate Director of the Florida Agricultural Experiment Stations; D. H. Saunders, State Representative; C. van der Lugt, Chairman of the North St. Lucie River Drainage District; Charles D. Kime, County Agricultural

Agent and Dan McCarty of Fort Pierce. Completion of the transaction is recorded in a letter from Director Willard M. Fifield dated November 6, 1951 which acknowledged receipt of the deed to the 720 acres of land.

As a result of other meetings concurrent with those involving the gift of land, the Everglades Experiment Station transferred Norman C. Hayslip to Fort Pierce in 1950 to survey the needs, and to establish a research program on vegetables and pastures, with special emphasis on tomato production. Hayslip and Dr. W. T. Forsee, Jr. had previously made a survey of the "old land" problems in 1947. The early work of accumulating equipment and preparing land for research plots required the assistance and cooperation of many local people since State funds were not available at that time.

Another milestone in the history of this Laboratory was the adoption of the official name, the "Indian River Field Laboratory". The Laboratory was "established to serve the research needs of Florida with special emphasis on a five county area comprising Martin, Okeechobee, St. Lucie, Indian River and Brevard Counties".

By the end of 1951 the Indian River Field Laboratory was firmly established to conduct research on citrus, vegetables and pastures. However, much was needed to bring the new research unit up to the standards required for an effective and efficient scientific research center of the type that would attract and hold capable specialists and adequately serve the agriculture of the Indian River area. Gradual but steady progress was made year by year through the resources and efforts of the Agricultural Experiment Station, and the continued backing and cooperation of the agricultural and business people throughout the five county area. Much of the support was coordinated by the County Agricultural Agents in each of the five counties comprising the Indian River area.

A Plant Pathology position was created soon after the vegetable-pasture division was added in order to give emphasis to tomato and other vegetable diseases. This position was first held by Mr. W. D. Hogan followed by Dr. J. F. Darby in 1951. Dr. Darby worked with sweet corn and tomato diseases. In 1954 Dr. D. M. Coe replaced Dr. Darby who was transferred to Sanford, and in 1957 Dr. R. E. Stall replaced Dr. Coe. In order to expand research on pasture and grain production, Dr. A. E. Kretschmer, Jr. was transferred from the Everglades Station in Belle Glade to this Laboratory in 1955.

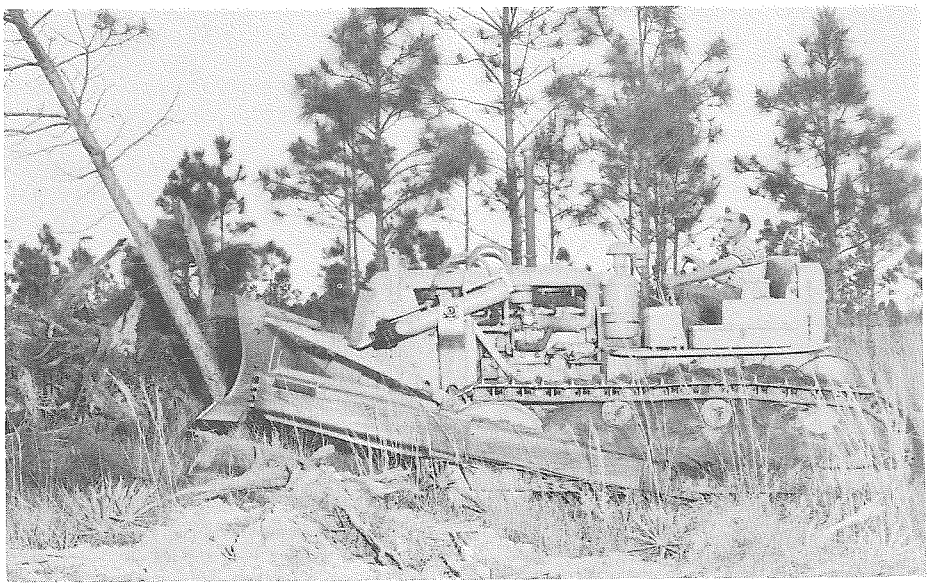
During the early 1950's Dr. Herman J. Reitz and W. T. Long initiated research in citrus rootstocks, studies of depth of rooting of citrus trees and a long-time study of the timing of scalicide sprays. In 1951 Dr. R. K. Voorhees resigned, and in 1952 Dr. Frank J. Reynolds joined the citrus group to conduct research on citrus diseases. Mr. W. T. Long and Dr. Frank J. Reynolds resigned in 1954. Dr. J. R. King in 1955 was appointed Assistant Entomologist and was active in the expansion of research facilities at this Laboratory. In 1956 Drs. R. R. Hunziker and M. Cohen filled vacancies in the citrus section. Also in 1956 Mr. Harold Holtsberg made the Laboratory his headquarters in his work with the Citrus Insect Survey Research Project. Dr. J. R. King resigned from the staff in 1960.

The final milestone bringing this brief history up to date was the construction of a $62,000 modern office-laboratory unit completed in 1960. This unit was added to a previously constructed $20,000 greenhouse-laboratory building. This facility, completely air conditioned, provides office and laboratory space for the entire staff. Three greenhouses round this research center out to be one of which the Indian River area can be justly proud.

Because people and groups of the Indian River area have played such a major role in the establishment and development of this agricultural research center a history would be incomplete without acknowledgement of these supporters. No list can be complete because so many individuals are involved, however, some of those who have supported the Laboratory are as follows:

C. van der Lugt, C. D. Kime, D. H. Saunders, Senator Harry Kicliter, Dan McCarty, M. E. Williams, Rudolph Mattson, Leslie Scott, Alto Adams, Sr., W. R. Goodwin, L. R. Becker, O. C. Minton, R. Buckalew, Norman G. Platts, H. H. Willis, Paul Hood, J. R. Graves, Buster Hancock, Luther Chandler, Cecil Barber, Jack Peters.

DiGiorgio Fruit Company, American Fruit Growers, Nevins Fruit Company, Turner Machine, Fort Pierce Growers, Cherokee Products Company, North St. Lucie River Drainage District, Florida Power and Light Company, Indian River Citrus League.



Clearing land for vegetable and pasture research plots in 1950.

Directors of State Farmers Market, St. Lucie County, State Road Department, Rotary, Kiwanis, Business and Professional Women, Junior Chamber of Commerce, Fort Pierce Chamber of Commerce.

Willard M. Fifield, Dr. J. R. Beckenbach, Dr. R. V. Allison, Dr. W. T. Forsee, Jr., Dr. A. F. Camp, Dr. Herman J. Reitz, C. R. Boyles, J. T. Oxford, Forrest McCullars, Hugh Whelchel, Marcel Boudet, L. M. Johnson, Jack McCown, Cooperating staff members of the Citrus and Everglades Stations, and many cooperating growers.

The Indian River Field Laboratory has always worked in close cooperation with manufacturers and suppliers of agricultural products, extension personnel, growers and ranchers. This teamwork among those most interested in the expansion and betterment of agriculture has resulted in major strides which have had a healthy influence on the economy of the Indian River area.

The following pages will illustrate the type of research at the Indian River Field Laboratory and a few of the major accomplishments since its beginning in 1948.

CITRUS RESEARCH

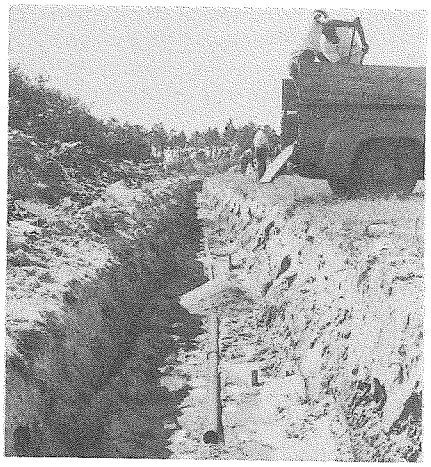
SCOPE OF RESEARCH

The Citrus Division works for the improvement of production methods and the solution of the production problems peculiar to the Indian River area. At the same time it cooperates with its parent organization, the Citrus Experiment Station at Lake Alfred in the study and solution of problems common to all citrus in Florida.

HIGHLIGHTS OF RESEARCH

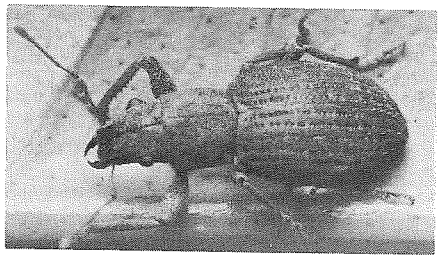
1. Fertilization - Results of nutrition studies at Fort Pierce have greatly influenced the fertilizer recommendations made to the citrus growers of Florida. Separate nitrogen recommendations have been made for grapefruit and oranges: 0.25 to 0.3 pounds per box for grapefruit and 0.4 pounds per box for oranges.

2. Drainage - Studies of fluctuation in the level of the water table in groves in the Indian River area have been basic to the establishment of effective water control programs. Spacing of deep tile at from 150 to 200 feet has been established for Charlotte sands and for similar light soils.



Experimental deep tile drainage line being installed at the Indian River Field Laboratory.

3. Root Damage by the Rose Beetle - Discovery of the damage to citrus roots caused by larvae of the Fuller's rose beetle has uncovered a major cause of tree decline in Florida citrus and, in particular, in the Indian River area. The rose beetle caused much of the injury previously ascribed to water damage. Research has also shown how to correct this condition by the proper application of soil pesticides.



The Fuller's Rose Beetle, only one-third of an inch long, seen here in the adult stage, has caused extensive damage to the roots of trees in the Indian River area and elsewhere.

4. Fruit-Piercing Moth - Mysterious damage to citrus fruit was traced to the action of a night-flying moth which sucked the juice in fruit on the tree after puncturing a tiny hole. Research showed that this moth could be controlled by eradicating its host plant, the pond apple, Annona glabra.

5. Grassy Spot Disease - This disease caused almost complete winter defoliation of many groves, especially of

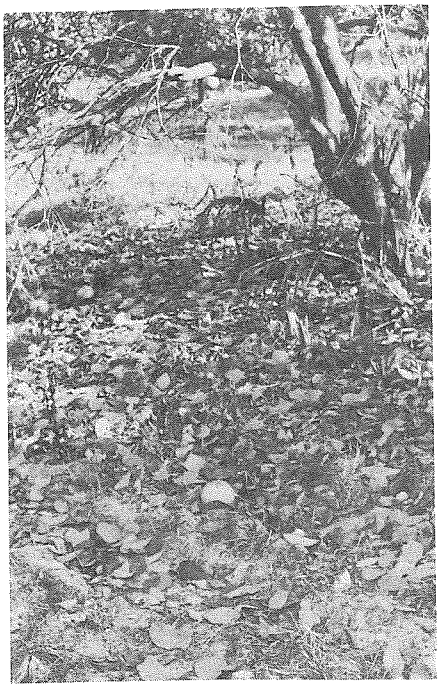
young grapefruit. Work on this disease has helped establish a practical program for its effective control through the proper timing of copper or oil sprays.

6. Best Rootstocks - The choice of a rootstock is one of the crucial decisions which a grower must make in planning a new grove and in selecting replant trees for an established grove. The merits of different rootstocks are best judged in scientifically planned plantings in which different stocks are compared under uniform conditions over a period of years. Selection of the best rootstocks will vary with the citrus fruit grown and with soil conditions. Sixteen rootstock plots are currently maintained for study. New plantings are set out from time to time to investigate new rootstocks and new varieties of citrus fruits on different soil types.

7. Better Fruit Program - Revised recommendations for best methods of controlling pests and diseases in citrus groves, published annually, combine the observations of citrus research agencies in Florida. The Citrus Division cooperates in preparing recommendations for the Indian River area.

8. Water Quality - Frequent surveys of the quality of irrigation and spray water have defined areas of excessive salt concentration. The slow increase in salt content of some sources has been demonstrated.

9. Spray Machinery - Studies of spray coverage by the Citrus Division have shown the failure of most commercial spray machines to cover foliage at the tops of tall trees. Modifications of air-blast sprayers have been designed and constructed which greatly improve top coverage. Commercial versions of these modifications should soon be available.



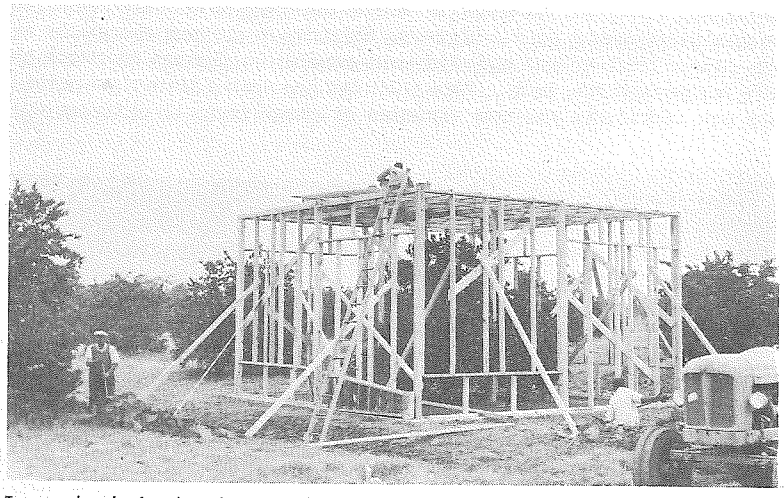
Failure to control greasy spot disease was responsible for the serious leaf fall seen here. Diseased leaves fell after a mild freeze while healthy leaves did not.

10. Virus Diseases - Many diseases of citrus trees, previously a mystery, have been shown in recent years to be caused by virus diseases. Research at the Citrus Division has helped widen understanding of these diseases.

11. Liming - Difficulty of neutralizing acid subsoil by surface-applied lime has been demonstrated. Desirability of plowing under lime during land preparation prior to planting has been established.

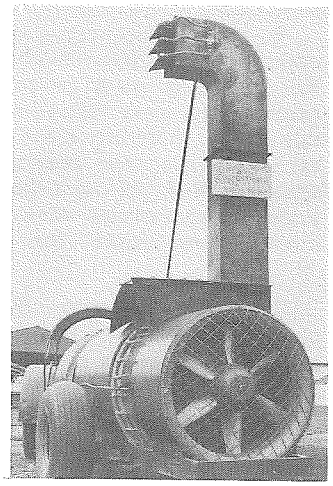
12. Weed Control in Ditches - The widespread use of drainage ditches in groves in the Indian River Area creates a special problem in the control of weeds. Weed control materials and methods have been tested over a number of years to determine the best procedure for for control of ditchbank weeds. Ultimately it is hoped that materials which can be used safely in groves near trees will also be available.

13. Disease Control - Citrus growers must protect their groves from fungus disease to insure the highest returns for their fruit. Melanose, scab and brown rot diseases are serious problems in many Indian River plantings. The Citrus Division is constantly watching for new and better methods for controlling these and other diseases. New materials and methods are tested in experimental plots where they are compared with older means of disease control.

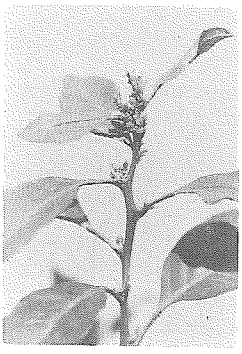


To assess the role of wind as a factor in producing blemishes on fruit this structure, later covered with a plastic film, was built around a tree in the experimental grove.

14. Mite Control - Citrus plantings must be protected from the various insect-like mites such as citrus rust mites and the different spider mites. In recent years many new materials have appeared which give improved control of these pests. The Citrus Division in cooperation with the Citrus Experiment Station has evaluated these new materials and has helped prepare new recommendations for mite control.



An early experimental model of a modification of the air-blast sprayer designed to improve spray coverage in the tops of trees.



An infestation of broad mites caused the multiple budding and suppression of growth seen on this citrus plant.

FUTURE GOALS

Citrus groves are long time investments which, when properly planned, produce revenue for many years. It is the research goal of the Citrus Division to continue to contribute information which will help produce long-lived, high-yielding, high quality, citrus groves.

PASTURE AND GRAIN RESEARCH

SCOPE OF RESEARCH

Grass and legume variety testing, liming and fertility studies, and cultural methods receive major attention. Proper fertility methods on pastures and grains following tomatoes is a special study. Advance trials are carried to ranchers in area for testing under grazing.

HIGHLIGHTS OF RESEARCH

1. Clovers - Research with clovers was begun in 1950 resulting in use of white clovers by ranchers in area. Early fall plantings, and S-1 and Nolin's Improved white clover varieties were proved generally superior.

2. Field Corn - 60 to 90 bushels of field corn per acre were produced with 90 pounds of N per acre and no P or K following fall tomatoes. Corneli 54 was found adapted to this area and produced 100 bushels per acre with close spacings and careful water control.

3. Grasses - Based on variety trials, Coastal Bermudagrass, Pensacola and Argentine bahiagrasses and pangolagrass are recommended for planting in this area.

4. Timing Fertilizer Applications - Fall fertilization of pangolagrass and bahiagrass at different dates has helped to determine when is best time to fertilize.

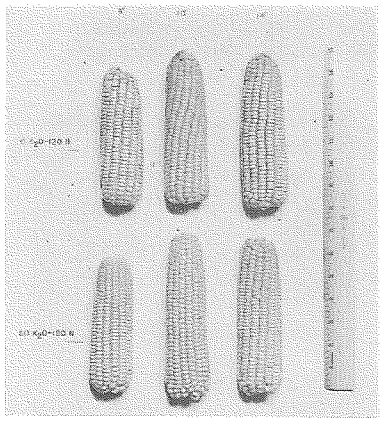
5. Phosphorus Aids Clover Establishment - Extra P resulted in more rapid establishment of white clover on virgin soils.

6. Introductory Nursery - Hundreds of new legume varieties have been established in a screening test to determine their usefulness in the pasture program.

FUTURE GOAL

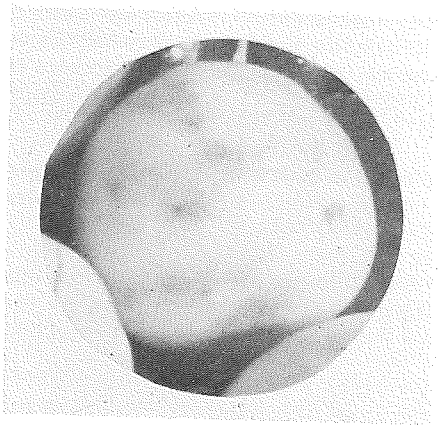
To help develop the Indian River area as a leader in quality beef and dairy products through high nutritive year-around pastures and economically produced grains for finishing beef animals.

First successful clover in Indian River area at I.R.F.L. in 1950. Clovers are now major pasture legumes.



Corneli 54 field corn produced following a fall tomato crop. Good ears were produced with the addition of N to soil which contained adequate P and K left by tomato crop.

VEGETABLE RESEARCH



Through tomato breeding graywall resistance was discovered.

SCOPE OF RESEARCH

Tomato production problems receive major emphasis including disease control, breeding, fertility and cultural methods. Diversification is encouraged by research with other vegetable crops. Long range research is designed to develop profitable means of repeating tomatoes and other vegetable crops on the same soils with minimum losses due to diseases, insects, virus, nematodes and water damage.

HIGHLIGHTS OF RESEARCH

1. "Old Land" Problems - These have been identified to include soil borne and virus diseases, soil insects, weeds and grasses, nematodes and erosion of plant beds.

2. Tomato Breeding - Cooperation in state-wide tomato breeding and variety testing programs played an important role in the release of "Manalucie", "Indian River" and "Manapal" varieties - all highly resistant to fusarium wilt, gray leaf spot and graywall.

3. Liming - Proper liming has increased tomato yields and reduced blossom-end rot.

4. Botrytis Gray Mold - Emerging as a major threat to tomatoes in 1950, this disease has been conquered as a result of:

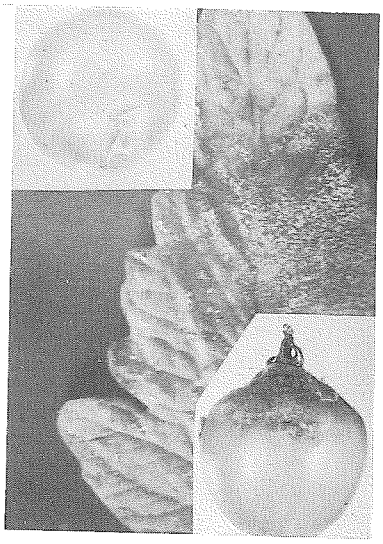
A - Discovery that use of maneb, zineb or nabam increased the disease. B - Chemical control research from which evolved a control by use of dichlone or Dyrene, and C - Discovery that proper liming prevents the development of Botrytis.

5. Gray Leaf Spot - Dyrene, a discarded chemical, was found to give excellent control of gray leaf spot on tomatoes.

6. Ghost Spot - The cause of ghost spot on tomatoes was found to be Botrytis spores. The fruit blemish was controlled by use of dichlone or Dyrene.

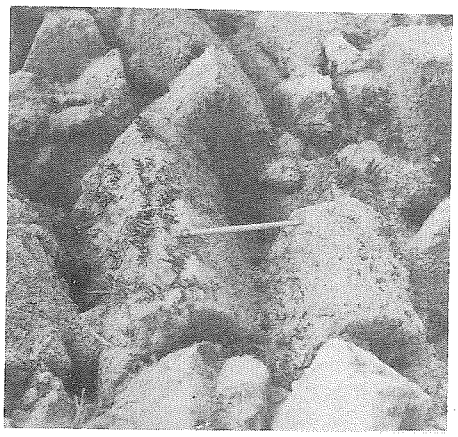
FUTURE GOAL

To play some part in establishing a permanent winter vegetable industry in the Indian River area by re-using the better soils at reasonable intervals.



Botrytis gray mold, once a major threat, can now be controlled due to research at I.R.F.L.

VEGETABLE -PASTURE ROTATION



Pangolagrass burned then disked in preparation for tomatoes. Additional disking prepares soil for vegetables. The disked sod incorporated into vegetable beds prevents erosion and waterlogging.

SCOPE OF RESEARCH

A long range study dealing with the adaptation of pasture grasses and legumes to rotation with vegetables; studies on cultural methods of transforming pastures into vegetable seed beds and vegetable farms into improved pastures; determination of disease, nematode, virus and insect levels as influenced by various rotations; and fertility requirements of crops involved in the rotation system.

HIGHLIGHTS OF RESEARCH

1. Pangolagrass Was Found To Be The Most Promising variety for use in rotation with vegetables because it is easily established, has no viable seeds, competes well with pest grasses and weeds and acts as a good soil conditioner in preventing erosion.

2. Tomato Soil Rot caused by Rhizoctonia has been severe following clovers, but of no significance following pangolagrass or Pensacola bahiagrass.

3. Root Knot Nematodes, Meloidogyne Incognita Acrita, have been rapidly eliminated in soils planted to pure stands of pangolagrass. Root extract trials have indicated that mature pangolagrass roots contain a nematocidal material.

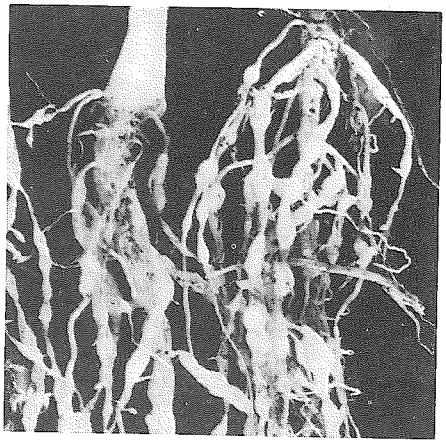
4. Pangolagrass Was Found To Be The Most Productive Grass for cattle in the Indian River area making it more desirable in the rotation.

5. Residual Fertilizer left from vegetables has been converted into good quality grass by supplementing improved pasture grasses planted following vegetables with nitrogen and some potash for a period of three to four years.

6. Best Cultural Method appears to be that of sprigging pangolagrass into sides of vegetable beds near harvest time, then breaking beds down after the grass has begun to grow and vegetable harvest is complete. The removal of all top growth in a pasture followed by disking has been found most effective in preparing pasture land for vegetable production.

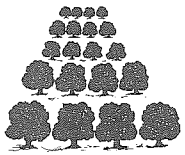
FUTURE GOAL

To develop a rotation system which will be of mutual advantage to cattlemen and vegetable producers and allow the reuse of the better soils for the production of tomatoes and other vegetables at reasonable intervals without excessive losses due to diseases, weeds, nematodes and erosion.



Rotation studies led to discovery of root knot nematode control by use of pangolagrass.

1948 Economic Growth of Indian River Area 1960



6.6 Million Boxes

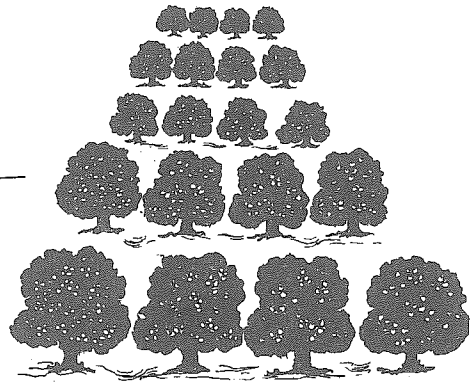
33,000 Acres

$12,700,000.00

THE INDIAN RIVER AREA

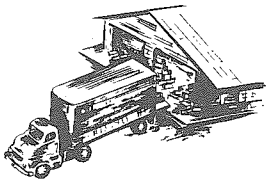
(Data on tomatoes and cattle include Okeechobee County)

$64,500,000.00



15.3 Million Boxes

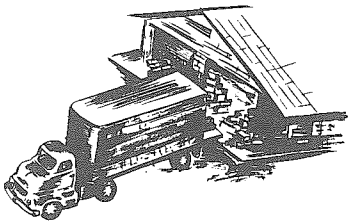
72,000 Acres



1,500,000 Bu. Tomatoes

$7,000,000.00

$9,600,000.00



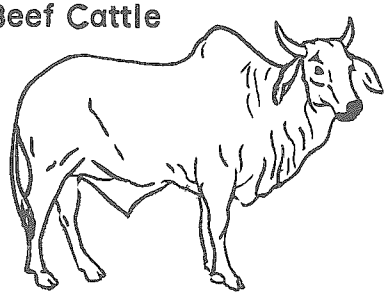
2,600,000 Bu. Tomatoes

85,000 Beef Cattle

$1,700,000.00

$4,500,000.00

150,000 Beef Cattle



438,000 Acres Pasture

726,000 Acres Pasture

ECONOMIC VALUE OF AGRICULTURAL RESEARCH IN THE INDIAN RIVER AREA

Work of the Experiment Station has a profound influence on the value of agricultural production. Following are examples of accomplishments which are of significant economic value:

Citrus yields per acre in Florida were about twice as high during the decade 1950-59 as in the decade 1920-29. Most of the increase was due to advances such as improved methods of fertilization, using minor elements, improved methods of pest and disease control and a better understanding of production principles. It is reasonable to estimate that half of these advances resulted from experiment station studies in Florida. This means that in 1960 alone more than $15,000,000 in citrus revenue in the Indian River Area could be attributed to production improvements introduced by the Florida Citrus Experiment Station of which the Citrus Division of this Laboratory is a part.

In 1950 Botrytis was the most serious disease facing the tomato industry. It threatened to wipe out the production in this area. Spray and liming programs, developed by the Indian River Field Laboratory have reduced this disease to a minor problem.

Every year citrus growers sustain hundreds of thousands of dollars of losses in production and losses due to de-grading of fruit because of inadequate coverage of trees with conventional spray equipment. The Indian River Field Laboratory has pioneered in the development of modifications of spray equipment which will measurably improve spray coverage.

Clovers, so necessary to cattlemen in the area for an efficient winter feeding program, were evaluated and varieties adaptable to the area were selected. Fertilizer schedules were worked out. This program, started in South Florida by the Range Cattle Station, was expanded and adjusted for this area by the Indian River Field Laboratory.

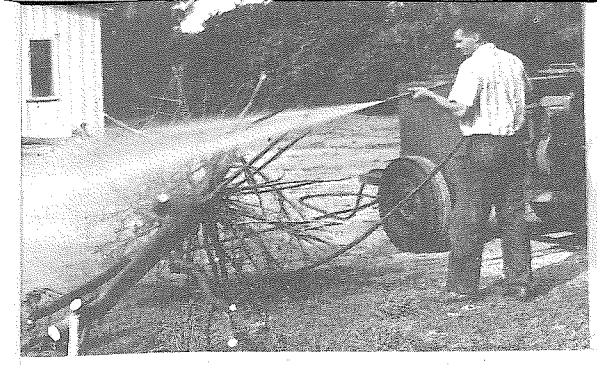
In 1957 and 1958 many young grapefruit groves lost virtually all of their leaves because of infestations of greasy spot disease. Research with spray materials and studies of spray timing by the Indian River Field Laboratory have made such losses preventable.

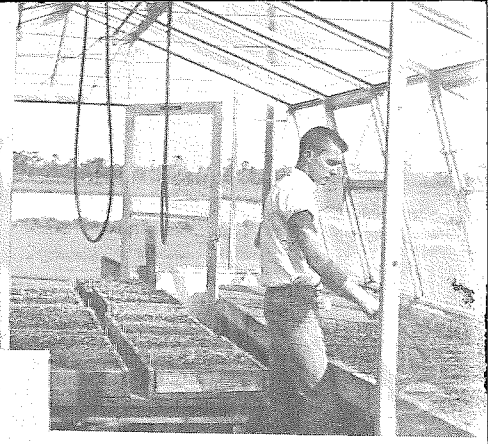
Gray wall may cause up to 50% loss in tomato crops. This fruit disorder costs South Florida tomato growers hundreds of thousands of dollars almost every year. Through a tomato breeding program varieties have been developed that are highly resistant to this condition.

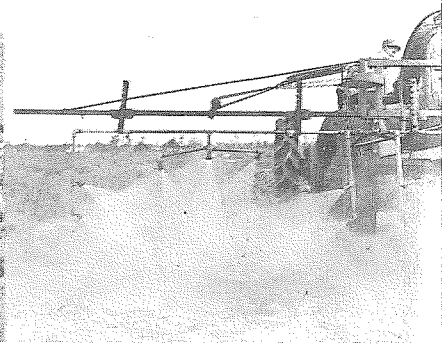
The citrus root weevil has in past years caused tremendous losses in citrus. As much as 50% loss of production has occurred in some groves. Research at the Laboratory discovered the problem and developed methods which adequately control this damaging insect.

It is difficult to put a monetary value on some of the other work done by research people. For example, one of the benefits derived from an experiment station is that the problems of the area are under continuous observation. New problems can be quickly detected and efforts promptly made to solve them. The value of this service is great, but it is hard to express that value in money. It is also not easy to state in dollars the value to the grower of the educational effort of research people through the r seminar talks, magazine articles, bulletins and field days.

Many other services of the Indian River Field Laboratory are likewise obviously helpful to agriculture and yet it is impossible to estimate their monetary value to the economy of the area. Some such services are: the testing of new crops, new methods and new materials; help, through the Extension Service, with the individual problems of farmers and cattlemen; development of safer methods of operation.







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