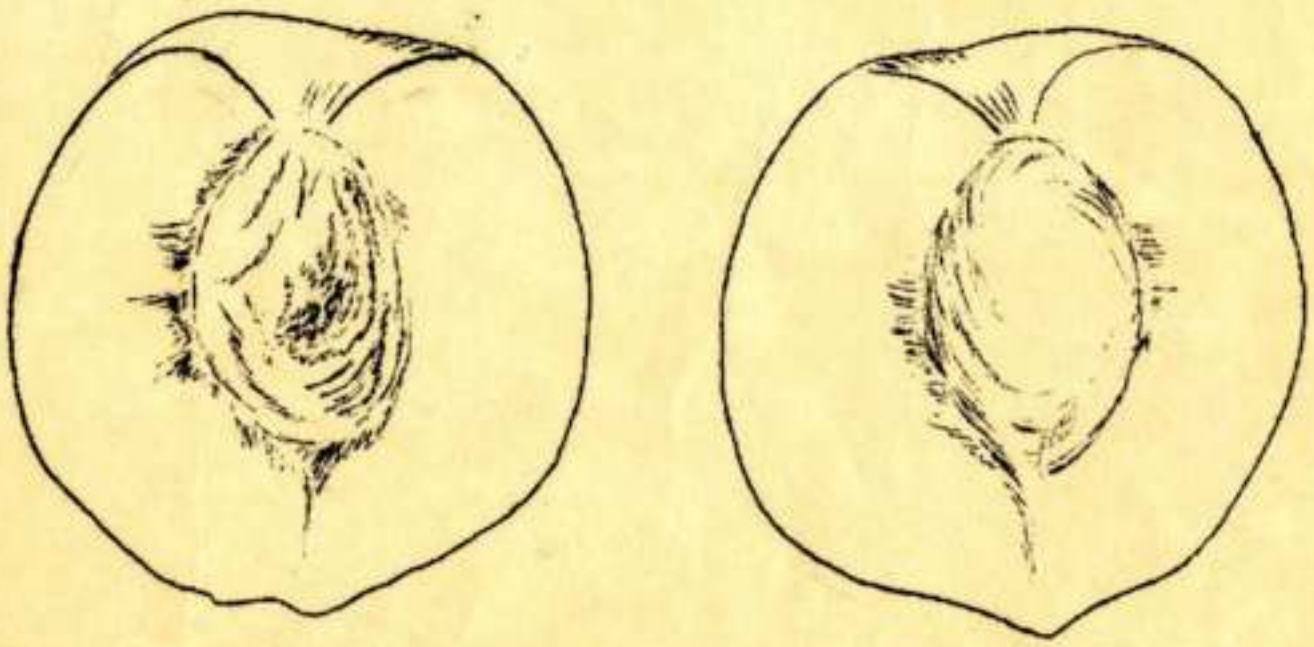
ANNUAL
PEACH SCHOOL
sponsored by

NORTH CAROLINA MUTUAL PEACH GROWERS SOCIETY, INC.

January 26-27, 1949

PINEHURST COUNTRY CLUB

PINEHURST, N. C.



ANALYZING THE PEACH SITUATION

Acknowledgments to:

North Carolina Agricultural Experiment Station of the N.C. State College,
North Carolina Agricultural Extension Service of the N.C. State College,
North Carolina Department of Agriculture,
U. S. Department of Agriculture, and
Representatives of Commercial Organizations.

Wednesday, January 26, 1949

MORNING SESSION

President C. D. Matthews, Presiding

10:00-10:30 - - Registration -

10:30-10:35 - Address of Welcome - Richard S. Tufts, President, Pinehurst Inc.

10:35-10:40 - Response to Welcome - J. Hawley Poole, Orchardist, West End.

10:40-10:45 - Purpose of School - J. Claude Epting, Agricultural Agent
Seaboard Air Line Railroad Company, Hamlet.

10:45-11:00 - Horticultural Progress Report of Peach Experiments -
M. E. Gardner, Head, Department of Horticulture
North Carolina State College, Raleigh

11:30-12:00 - New Peach Varieties - J. H. Weinberger, Senior Horticulturist
U. S. Horticultural Field Laboratory, Fort Valley, Ga.

12:00-12:15 - Panel - New Varieties in North Carolina - Leader, H. R. Niswonger
Extension Horticulturist, N. C. State College, Raleigh.

Luncheon - - - Compliments of Taylor Chemical Company

AFTERNOON SESSION

M. Edmund Aycock, Presiding

1:30-2:00 - New Insecticides - Bruce Gleissner - Entomologist
American Cyanamid Company, New York, N. Y.

2:00-2:20 - Oriental Fruit Moth Studies - J. H. Cochran, Research Entomologist
South Carolina Experiment Station, Clemson, S. C.

2:20-2:50 - Peach Insects - Studies in North Carolina - C. F. Smith, Entomologist
Experiment Station, N. C. State College, Raleigh

2:50-3:00 - Recess -

3:00-3:30 - Control of Brown Rot and Bacterial Spot - J. C. Dunegan, Sr. Patholcgis.
U. S. Department of Agriculture, Beltsville, Md.

3:30-4:00 - Peach Diseases - Studies in North Carolina - C. N. Clayton, Pathologist
Experiment Station, N. C. State College, Raleigh

4:00-4:30 - Equipment for Concentrate Spraying - Dr. Philip Garman, Entomologist
USDA Connecticut Agric. Expt. Station, New Haven, Conn.

4:30-5:00 - Panel - 1949 Spray Recommendations - Leaders, J. T. Conner, Extension
Entomologist, and H. R. Garris, Extension Pathologist
N. C. State College, Raleigh

5:00 - Rail Refrigerator Fan Car on Exhibit - N & S Station

Wednesday, January 26, 1949

EVENING SESSION

C. D. Matthews, Presiding

6:30 - Annual Banquet - Compliments of Taylor Chemical Company

- Speaker -

L. Y. Ballentine - Commissioner of Agriculture

Looking Ahead in North Carolina Agriculture

Business Meeting Moving Pictures

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Memoranda

Thursday, January 27, 1949

MORNING SESSION

J. Hawley Poole, Presiding

9:30-10:00 - Peach Fertilization and Pruning -
Roy J. Ferree, Extension Horticulturist
Clemson College Extension Service, Clemson, S. C.

10:00-10:30 - Fruit Tree Fertilization-Light Soils-Walter Reuther, Principal Horticulturist, USDA, Orlando, Florida

10:30-11:00 - Orchard Balance & Management - D. L. White, Orchardist, McBee.

11:00-11:15 - Recess

11:15-11:35 - The Peach Business Today and Whats Ahead -
F. P. Abbott, Ass't. General Agricultural Agent
Seaboard Air Line Railroad, Savannah, Ga.

11:35-11:45 - Bank of Cooperatives Interest in Processing - George E. Prince
Vice-President, Bank of Cooperatives, Columbia, S. C.

11:45-12:00 - Fruit & Vegetable Processing Studies in North Carolina -
Ivan D. Jones, Research Professor in Horticulture
North Carolina State College, Raleigh

12:00-12:30 - Technical Processing Procedures -
L. O. Van Blaricom, Research Specialist, Clemson
College Agricultural Experiment Station, Clemson, S. C.

Display of Fruits & Vegetables - Jones and Van Blaricom

Luncheon - - - Compliments of Riverside Manufacturing Company

AFTERNOON SESSION

J. Claude Epting, Presiding

1:30-2:00 - Inspection of Rail Refrigerator Car - N & S Station

2:00-2:15 - Availability of New Rail Refrigeration Equipment - H. B. Nash
District Agent, Fruit Growers Express, Wilmington, N. C.

2:15-2:45 - Importance of Claim Prevention to Producers - Walter S. Jensen, Mgr.
Railroad Perishable Inspection Agency, New York, N. Y.

2:45-3:15 - The Future in Marketing & Packaging - H. T. Westcott, Acting Dir.
Div. of Markets, N. C. Dept. of Agriculture, Raleigh

3:15-3:30 - Recess

3:30-4:00 - Future Experimental Work on Peaches - R. W. Cummings, Assoc. Dir.
North Carolina Experiment Station, Raleigh

4:00-4:15 - School Highlights - J. Claude Epting

Adjournment

DISCUSSION OF MIST BLOWERS AND OTHER MACHINES FOR APPLYING CONCENTRATES

Philip Garman

Connecticut Agr. Exp. Station

Partly, if not largely, because of high labor costs, there is a tremendous interest in mist blowers in the Northeast. At the moment none appears ready for general marketing. There have been some successful experiments and some failures, but successes now appear to be on the increase. We believe both insects and diseases can be controlled with mist or concentrate application perhaps as well as with more dilute sprays. The first mist blowers developed have, of necessity, been modifications of existing machines and have been constructed by adding pump and solution tank to a duster, or a duster to a sprayer altered to meet requirements. Discovery of DDT and the rather unusual properties thereof helped the process along. Recently it has been found in the case of fruit trees that the same deposit of dormant oil can be obtained with less material thrown at the tree than is possible with conventional high pressure sprayers. But there are disadvantages as well as advantages and the unfavorable side will have to be overcome by intelligent operation or improvements in design. Before going on, it may be well to list good and bad points.

Apparent advantages lie in:

(1) Ease of operation compared with standard outfits.
(2) The small amounts of water or solution carried and the large number of trees sprayed with one filling.
(3) Lack of removal of previous sprays (important in the fruit game).
(4) Feasibility of combining dust and spray machines in one outfit.
(5) Speed of operation.

Disadvantages are:

(1) Difficulty of operating in moderate winds. (Mists do not settle well in windy periods).
(2) Concentrates are usually not agitated sufficiently. (This is being rapidly overcome).
(3) Complete cover in all parts of the tree is sometimes difficult to obtain even in quiet periods due to lack of flexibility in the machines.
(4) Some of the nozzles used are definitely unsuited to the application of concentrates. (Mechanical improvements are being made rapidly).

In 1947 we believed that the main difficulties were mechanical rather than chemical. We are still of that belief. We have seen the development of the Cornell Spray-duster, a concentrate machine capable of covering all parts of the trees as grown in the western New York area. You are acquainted with the speed sprayer. This machine is essentially a mist blower employing dilute instead of concentrate mixtures. Only minor changes are necessary to convert it into a concentrate mist-blower. We understand the manufacturer already has nozzle assemblies adequate for the purpose.

Airplanes are not well suited to our hilly orchards in Connecticut, but have been used successfully in tobacco fields. I can see no reason, however, why they cannot be used on peaches in reasonably level country and give excellent results. Some of the newer chemicals should moreover be tremendously helpful here.

Formulations. There has been considerable argument among specialists as to the best concentration of this or that pesticide to use in concentrate machines, and the final answer is not known. We have been using about 2 pounds total solids per gallon which may be too high. With our conditions concentrates of this type do not begin to spread out on the leaves (unless a spreader is used), until the concentration reaches 1/2 to 1 pound per gallon. Also, to reduce the amounts applied per acre it appears desirable to adjust the concentration so that say 1 gallon, the amount necessary to do a good job on a fairsized apple tree, will carry the same amount (possibly less) than 15-20 gallons of dilute spray. A solution carrying 10 pounds total solids per 100 gallons applied at the rate of 15 gallons per tree would mean that 1 1/2 pounds were directed at the tree. Consequently, if we used 1 1/2 pounds in a gallon of concentrate per tree we would be applying the pesticide at the same rate. Actually our dose for apples is usually 8 pounds per 100 gallons, which would mean 1.2 pounds per gallon of concentrate. For reasons of simplicity, we have adopted for some materials the following rule -- apply the concentrates at 10 times the dilute strength. Simply substitute for 8 pounds in 100 gallons, 8 pounds in 10 gallons. If you want to go higher, add spreader or suspending agents. The 10X concentrate is particularly suitable for T.E.P., nicotine, Puratized, or hormones.

Materials to prevent evaporation. In the shade tree game wherever mists have to travel long distances before they reach the foliage evaporation in transit may occur so that instead of reaching the leaves as a concentrate the insecticide-fungicide may be in dry form and it may be in such small particles that it will not remain. Mr. Potts, originator of the mist-blower-concentrate method of pest control, believes certain agents are necessary to prevent evaporation. He suggests glycerin, or certain vegetables or mineral oils. We have tried various oils, both with Fermate-lead arsenate and sulfur-lead arsenate, but have had difficulties with the sulfur-oil lead arsenate combinations. Of materials such as glycerin we are skeptical but they may be alright in small amounts. It is our belief, therefore, that great caution should be observed in using agents to prevent evaporation because of delayed burn, or fruit injury. Considerably more extensive studies need to be made of them than we now have.

Spreaders. Spreaders incorporated in concentrates serve two purposes. First they enable one to put more solids in a gallon of mixture and second they spread the mixture after it hits the foliage. From work done so far, it would appear as if spreaders were essential features in concentrate formulations. Our most successful experiments all carried some spreading agent. It is possible to incorporate both spreaders and adhesives but, of course, we must guard against changes in efficiency, too rapid weathering and foliage and fruit injury. Recent tests indicate that spreaders of the type of Ultrawet operate efficiently at about 1 ounce to four gallons of concentrate, carrying four pounds of solids. If we figure this back to our previous rule of thumb (10X hydraulic), it would mean 1/4 pound per 100 gallons or 1/4 pound in 10 gallons or 1 ounce in 2 1/2 gallons. Since our tests were made in the fall when all sprays spread easily, we may have to figure 1 ounce to 2 1/2 gallons of solution carrying 2 1/2 pounds of solids instead of 1 ounce to 4.

PEACH - FUNGICIDAL SPRAY EXPERIMENT

Elberta variety, Eagle Springs, N. C.
C. N. Clayton, N. C. Agr. Experiment Station, Raleigh, N. C.

Spray Program a/	Bacterial spot index on fruit	Fruits infected with				Spray-injured fruits
		Bacterial spot	Scab	Brown rot		
				At harvest	4 days later	
		%	%	%	%	%
A. Phygon, last 3 sprays	47	84	1	0	7.9	10
B. Dry lime-sulfur, last 3 sprays	42	86	1	0.6	8.8	2
C. Wettable sulfur, 4 sprays	50	89	2	0.3	11.2	4
D. Zerlate, last 2 sprays	47	81	2	3.4	22.2	4
E. Zerlate, last 3 sprays	46	83	1	1.3	23.8	13
F. Zerlate, last 4 sprays	50	87	3	1.1	26.8	23
G. None	53	86	42	12.3	47.5	0
L.S.D. (19:1)	12				22.2	

a/ Benzene hexachloride (10% gamma) 2-100 used on all plots in petal-fall (PF) on March 29 and again (1) on April 5. Fungicidal applications made on (2) April 15, (3) 27, (4) June 16, and (5) July 8. Harvest July 20-26.

Spray Programs

A. Sul+Zn+L+Ars, 6-4-8-2-100, 2; Phygon XL, 1.5-100, 3 and 5; Phygon XL+Ars, 1.5-2-100, 4.
B. Sul+Zn+L+Ars, 6-4-8-2-100, 2; Dry L-S+L, 2-3-100, 3; Dry L-S+L+Ars, 2-8-2-100, 4; Dry L-S+L, 4-8-100, 5.
C. Pan Peach 16-100, 2 and 4; Sul 6-100, 3 and 5.
D. Sul+Zn+L+Ars, 6-4-8-2-100, 2; Sul, 6-100, 3; Zerlate+Zn+L+Ars, 2-4-8-2-100, 4; Zerlate, 2-100, 5.
E. Sul+Zn+L+Ars, 6-4-8-2-100, 2; Zerlate+Zn+L+Ars, 2-4-8-2-100, 4; Zerlate, 2-100, 3 and 5.
F. Zerlate+Zn+L+Ars, 1.5-4-8-2-100, 2; Zerlate, 1.5-100, 3; Zerlate+Zn+L+Ars, 2-4-8-2-100, 4; Zerlate, 2-100, 5.
G. None after BHC in PF and 1.

Sul=wettable sulfur; Zn=zinc sulfate; L=hydrated lime; L-S=dry lime-sulfur; Ars=lead arsenate; BHC=benzene hexachloride.
3 replicates (12-tree) of each spray program were used.

A week after 3 application, yellow spots and shot-holing had appeared on about 1% of the leaves of lime-sulfur sprayed trees. By July 8 more arsenical injury was evident in bacterial spots on Phygon and lime-sulfur sprayed trees than on other plots. Bacterial spot was uniformly distributed and very severe on all plots causing more than 50% defoliation before harvest. In this experiment there was practically no blossom blight and a very low level of inoculum of the brown rot fungus until near harvest.

In another test dry lime-sulfur, 2-100, applied on peach trees of 3 varieties caused much foliage injury. Temperature at time of application about middle 80's During the following 10 days it was rainy and the humidity was very high. Bioquin on peaches caused typical copper injury to leaves. Bitter rot was found on peaches at havest in two orchards.

SUMMARY OF WORK ON FRUIT INSECTS IN NORTH CAROLINA - 1948

Clyde F. Smith

PEACH INSECTS

Peach tree borer -

DDT, parathion and a combination of DDT and parathion were used in varying number of sprays and at different dates (Table 1) to determine their effectiveness in the control of the peach tree borer.

The experiment was conducted on the Elberta variety using plots 6 x 6 trees and replicated 4 times. The materials were applied only to the trunk of the trees with a power sprayer. The number of living borers was checked October 27, 1948 on the four center trees of each plot. Thus four border rows separated the experimental plots.

The data in Table 1 indicate that good control was obtained with three or four applications of DDT, four applications parathion or two applications of DDT and parathion. This control compares favorably with that obtained with ethylene dichloride or propylene dichloride. The DDT and/or parathion treatments have the advantage, however, of killing the borers before they cause any damage to the trees.

No injury was observed to trees in any of the plots.

TABLE 1: PEACH TREE BORER CONTROL - 1948
Page McAuley - Candor, N. C.

PLOT NO.	MATERIAL		POUNDS PER 100 GAL	DATES APPLIED	TOTAL BORERS 16 TREES
1	Check		---	----	96
2	DDT	50%	8	5/28-7/13	4
				8/13-9/13	
3	Parathion	25%	2	5/28-7/13	
				8/13-9/13	5
4	DDT	50%	8	5/28	19
5	DDT	50%	8	7/13	14
6	DDT	50%	8	8/13	19
7	DDT	50%	8	9/13	42
8	Parathion	25%	2	5/28	29
9	Parathion	25%	2	7/13	34
10	Parathion	25%	2	8/13	38
11	Parathion	25%	2	9/13	19
12	DDT	50%	8	7/13-8/13	16
13	Parathion	25%	2	7/13-8/13	24
14	DDT	50%	8	7/13-8/13	1
	Parathion	25%	2		
15	DDT	50%	8	8/13	21
	Parathion	25%	2		
16	DDT	50%	8	5/28-7/13	
				8/13	5

Plum curculio -

Tests were conducted to determine how quickly Alorco cryolite, Kryocide, Pan-Peach (acid lead arsenate, sulfur and safeners), chlordane, parathion, chlorinated camphene, Bis (methoxyphenyl) trichloroethane and benzene hexachloride (various formulations) would kill the plum curculio and how long the residue would remain effective.

In the field tests, the materials were applied with a power sprayer and the curculios were caged on the tree in sleeve type cages. Ten curculios were placed in each cage and placed on the tree at different times after spraying. None of the spray material was placed on the curculios.

In order to check the effectiveness of the materials as contact insecticides 10 curculios were shaken for 5 seconds in a vial containing the solution being tested. They were then poured out on a screen and the excess material removed by rubbing a towel on the opposite side of the screen. The curculios were then placed under petri dishes over a screen frame and supplied pieces of unsprayed peach for food.

Results of work to date indicate that parathion and benzene hexachloride offer the most promise of giving satisfactory control of the plum curculio.

The other materials which have been tested have either given very erratic control or required too long to kill the curculios. Bis(methoxyphenyl) trichloroethane has not been tested sufficiently to draw definite conclusions.

Benzene hexachloride usually gave good knock-down but the curculios often revived when they did not remain in contact with the material. This further emphasizes the necessity of wetting the ground as well as the tree when spraying with benzene hexachloride. Benzene hexachloride may also cause an off-flavor in peaches and this will limit its use on peaches.

Benzene hexachloride (25% gamma) was not as effective (at the same gamma concentration) as benzene hexachloride containing 6 to 12% gamma.

Parathion showed the most promise - as a contact insecticide it killed 100% of the curculios within 24 hours when used at the rate of 4 ounces or more of 25% wettable powder per 100 gallons of water. However, much of its effectiveness as a residual spray was lost within 7 days after application. This is also borne out by chemical residue analyses which have indicated that no measurable amount of parathion is left on the fruit 30 days after application.

Scale Insects -

Special experiments were not made on scale insects on peach but observations on trees receiving parathion (25%) 1 lb per 100 gal) April 12, 19 and August 16 indicated that good control of scales (San José and White Peach) was obtained.

Comparative Effectiveness of Various Organic Insecticides
Against The Oriental Fruit Moth

By - James H. Cochran

Table 1. - Materials used in tests on Oriental fruit moth.

Treat. No.	Material	Pounds Per 100 Gallons	
		1st Application June 16 & 17	2nd Application June 30
1	DDT, 50% Wettable	2	2
2	DDT, 50% Wettable	2	1
3	Methoxy analog of DDT, 50% Wettable	2	2
4	DDD, 50% Wettable	2	2
5	Parathion, 25% Wettable	3/4	3/4
6	Parathion, 25% Wettable	3/8	3/8
7	Check - Untreated	-	-

Table 2. - Comparative effectiveness of various organic insecticides against the Oriental fruit moth and curculio.

Treat. No.	Material	Per cent Wormy Peaches	Per cent OFM Injured Peaches	Per cent OFM Larvae	Per cent Curculio Grubs
1	DDT	36.33	10.00	4.00	27.00
2	DDT	46.00	9.00	2.33	31.00
3	Methoxy analog of DDT	20.67	11.53	5.33	4.67
4	DDD	31.67	12.33	5.00	14.00
5	Parathion	9.33	2.76	1.33	3.00
6	Parathion	16.67	9.33	1.33	8.00
7	Check - Untreated	39.67	17.67	9.00	17.33
Least significant difference 5%		9.88	3.31	2.02	8.04
Least significant difference 1%		13.00	4.36	2.76	10.58

Summary

DDT, the methoxy analog of DDT, DDD, and parathion were tested in the field against the Oriental fruit moth and second brood curculio on peaches.

Parathion and the methoxy analog of DDT were the only two materials that showed promise against both insects.

All of the treatments gave a significant reduction of Oriental fruit moth over the untreated check.

Parathion was more effective against the Oriental fruit moth than DDT.

DDT was slightly more effective against the Oriental fruit moth than the methoxy analog or DDD.

There was no significant difference in the results from applying a dosage of 2 pounds of a 50 per cent wettable DDT in two applications and a dosage of 2 pounds in the first application with 1 pound in the second.

Relative Susceptibility of Peach Varieties to Bacterial Spot on Leaves

(Based on ratings made in 1946 and 1948 on non-replicated plots in variety orchard at Eagle Springs, North Carolina)

Slightly susceptible	Moderately susceptible	Quite susceptible	Very susceptible	Extremely susceptible
Cumberland	Mikado	Hardee	Salberta	Goldeneast
Mayflower	Early Elberta	Golden Jubilee	Midway	Brackett
Belle of Georgia	Redbird	Pioneer	Elberta	Golden Globe
Early Hiley	Early-Red-Fre	Buttercup	Red rose	Herbhale
Hiley	Colora	Delicious	Redhaven	Best May
Hope Farm	Oriole	Fair Beauty	Valiant	New Day
Sunbeam	Eclipse	Friendship	Veteran	Triogem
Marigold	Lizzie	Gage Elberta	Early Halehaven	Rio Oso Gem
		Raritan Rose	Halehaven	Sunhigh
		Southhaven	White Hale	Fireglow
		Vedette	Shipper's Late Red	
		Slappy		
		Rochester		
		Redelberta		
		Radiance		
		Early Rose		
		Fisher		

Ratings on varieties listed below were on young 3-year-old trees.

Wilma	Muir	Kalhaven	Augbert	Roberta
Sunday Elberta		Barbara	New Elberta	Gemmer's Elberta
Tena		Indian Chief	Lovell	September Elberta
Foster		Heath Cling	Early east	Madison Co.
Polly		Murray Beauty	Dixigem	Frankie
Golden Beauty		Briggs Red May	Carolyn	Fay Elberta
		Summit Elberta	Shalil	St. John
		Yunnan	Early Rochester	Sullivan's Elberta
			Nectar	Redskin
				Texelberta
				Jerseyland
				Babcock
				Early Triogem
				Ark. Black
				Early Imperial

This is only a preliminary report for the ratings are not absolute. Too, the reactions of the various varieties, particularly for those rated slight to moderate, may change as the trees become older and are exposed to more inoculum of the causal bacterium.

Prepared by: C. N. Clayton, Plant Pathology Section in cooperation with Dept. of Horticulture, N. C. Agricultural Experiment Station

CNC/bfc
Jan. 20, 1949