In May of this year three plants of a population of more than 3000 going into the second growing season exhibited symptoms of severe leaf distortion, yellowing, shortening of internodes, and necrotic flecking of the leaves. Leaves and stems of terminal shoots which are turgid and flexible in healthy plants were very brittle in the afflicted plants. Expressed sap rubbed onto test plants as described above yielded positive symptoms of TRSV.

In some plant species, tobacco ringspot virus infection causes typical local lesions, and also ring and line pattern symptoms which some plant virologists refer to as the "acute phase." Some of these species will recover or pass into a "chronic phase" in which the plants are virtually symptomless but still retain 10 to 20% of the virus content of the "acute phase" (6). Whether clone 2B-59 ever exhibited the "acute phase" is unknown. However, that TRSV can be found in birdsfoot trefoil does suggest that other, more common forage legume viruses may play the same role, in the stand persistence problem, as experienced elsewhere on red clover (4).

Literature Cited

1. CHAMBERLAIN, E. E. 1939. Pea streak (Pisum virus 3). New Zealand J. Sci. Tech. 20A: 365-381.
2. FRAZIER, N. W., and H. H. P. SEVERIN. 1945. Weed-host range of California aster yellows. Hilgardia 16: 621-650.
3. FREITAG, J. H. 1962. Leafhopper transmission of western aster yellows virus to legumes and solanaceous plants. Phytopathology 52: 128-133.
4. GOTH, R. W., and R. D. WILCOXSON. 1962. Effect of bean yellow mosaic on survival and flower formation in red clover. Crop Sci. 2: 426-429.
5. KLOSTERMEYER, E. C., and J. D. MENZIES. 1951. Insect transmission of alfalfa witch's-broom virus to other legumes. Phytopathology 41: 456-458.
6. PRICE, W. C. 1964. Strains, mutation, acquired immunity, and interference. pp. 93-117. In M. K. Corbett and H. D. Sissler (Ed.) Plant Virology. University Florida Press, Gainesville.
7. SEVERIN, H. H. P. 1934. Weed host range and overwintering of curly-top virus. Hilgardia 8: 263-280.

CROPS RESEARCH DIVISION, AGRICULTURAL RESEARCH SERVICE, UNITED STATES DEPARTMENT OF AGRICULTURE, BELTSVILLE, MARYLAND

REACTION OF WHITE CLOVER AND FIVE OTHER CROPS TO PRATYLENCHUS SCRIBNERI[1]

Norman A. Minton[2]

Abstract

Pratylenchus scribneri Steiner, 1943 were recovered from roots of white clover, tall fescue, alfalfa, bahiagrass, forage sorghum, and browntop millet approximately 6 months after inoculation. Inoculated plants of one or more varieties of white clover, forage sorghum, bahiagrass, and tall fescue grass grown in the greenhouse yielded significantly less forage than control plants on one or more of the five harvests. P. scribneri did not significantly reduce yields of alfalfa and millet. White clover was more severely affected than the other plants.

[1]Cooperative investigations of Crops Research Division, Agricultural Research Service, United States Department of Agriculture and the Department of Botany and Plant Pathology, Agricultural Experiment Station, Auburn University, Auburn, Alabama.
[2]Research Nematologist, Crops Research Division, Agricultural Research Service, United States Department of Agriculture.
Author's address: Coastal Plain Experiment Station, Tifton, Georgia.

INTRODUCTION

We found Pratylenchus scribneri Steiner, 1943 in large numbers in declining stands of white clover in Alabama. This species was first reported to be causing serious injury to potatoes (5). It was later found to be injuring amaryllis (2, 3) and to be associated with several other crops (1, 4). The results of our host-range and pathogenicity studies with this nematode follow.

MATERIALS AND METHODS

Greenhouse studies were made with the following crops and cultivars: White clover (Trifolium repens 'Pilgrim', 'Regal' and 'Louisiana White'); tall fescue (Festuca elatior 'Kentucky 45-50'); alfalfa (Medicago sativa 'Hairy Peruvian'); bahiagrass (Paspalum notatum 'Argentine'); forage sorghum (Sorghum vulgare 'Lindsey 101 F' and 'Yieldmaker'); and browntop millet (Panicum fasciculatum (common)).

A culture of P. scribneri[3] obtained from roots of white clover plants growing at the Plant Breeding Unit, Tallassee, Alabama was increased in the greenhouse on susceptible crops. Nematodes for the experiment were collected from roots and soil by standard laboratory procedures. The nematodes were washed in tap water to reduce contamination by other microorganisms, and the "wash-water" was applied to the control pots.

Eight-inch pots were filled to within 3 inches of the top with a sandy soil that had been steam-sterilized, limed, and fertilized. The soil in each pot received either 30 ml of water containing approximately 2000 nematodes or 30 ml of "wash-water." A 1 3/4-inch layer of soil was then applied and the seeds were sown. The same amount of soil by weight was placed in all pots. The experiment was replicated four times in a randomized block design.

A water suspension of symbiotic nitrifying bacteria was applied to the white clover pots when seedlings emerged. Fertilizer containing both major and minor elements was applied as needed.

The plants were grown for 5 to 6 months and five forage harvests were made at approximately monthly intervals. All plants were clipped 2 inches above the soil, except browntop millet and forage sorghum which were clipped to 4 inches. Ovendry weights were made of all forage clippings. Statistical differences were determined by Duncan's multiple range test.

At termination of the experiment, the soil was washed from the roots and the entire root systems were incubated 72 hours in a mist chamber to recover nematodes. The number of nematodes was estimated from counts obtained from aliquots.

RESULTS AND DISCUSSION

P. scribneri were recovered at termination of the experiment from roots of all inoculated plants (Table 1). More were obtained from white clover than from other plants. Relatively low numbers were recovered from browntop millet, forage sorghum, alfalfa, and bahiagrass. The number from tall fescue was intermediate.

The number of nematodes recovered was probably a small percentage of the total present in the roots and soil because the roots were incubated for only 72 hours. Infected roots usually yield nematodes for several days in a mist chamber. Also, no estimate was made of the number of nematodes in the soil.

Nematodes were also recovered from roots of control plants of all crops except alfalfa, bahiagrass, and tall fescue. Nematode eggs were apparently introduced into the control pots in the "wash-water" because initial microscopic examination of the "wash-water" did not reveal larvae or adults. Although high numbers were recovered from some of the control plants, forage yields of inoculated plants in many instances were significantly less than controls. Differences in yields of inoculated plants and contaminated controls apparently resulted from the difference in initial levels of inoculum. Yield differences probably would have been greater if the controls had not been contaminated.

Dry forage weights are presented in Table 1. Nematode inoculated Pilgrim clover yielded less than control plants on all harvest dates. Except for the first harvest, yields of inoculated Regal clover were also reduced. Inoculated Louisiana white clover yielded less than control plants on all except the first two harvest dates. For sorghum, yields of inoculated Lindsey 101 F plants were less than control plants at the last harvest, and those of Yieldmaker were

[3]Identification confirmed by Dr. Morgan Golden, Nematology Investigations, Beltsville, Maryland.

Table 1. Mean number of Pratylenchus scribneri recovered from roots of several crop plants and mean ovendry weight, in grams, of forage harvested.

Plant and variety	Thousands of nematodes	Forage harvest number				
		1	2	3	4	5
White Clover						
Louisiana White						
Control	28	7.4	3.7	3.3	2.8	2.4
Inoculated	33	7.2	3.3	1.0*	1.3*	1.2
Pilgrim						
Control	33	9.2	4.4	2.8	2.6	2.4
Inoculated	20	6.9*	3.1*	1.0*	1.4*	1.3*
Regal						
Control	61	7.7	4.1	3.3	3.0	2.3
Inoculated	18	7.5	3.6*	1.2*	1.7*	1.3*
Alfalfa						
Hairy Peruvian						
Control	0	4.0	4.7	4.5	4.5	6.3
Inoculated	3	4.7	4.9	4.3	4.3	6.3
Bahiagrass						
Argentine						
Control	0	11.2	14.7	14.0	7.6	10.7
Inoculated	1	8.5*	12.0	13.2	7.4	10.9
Tall Fescue						
Kentucky 45-50						
Control	0	4.1	5.2	5.2	3.6	9.8
Inoculated	10	3.0*	4.1	4.2	3.1	9.4
Browntop Millet						
Common						
Control	1	6.3	11.4	8.7	3.0	9.4
Inoculated	1	6.9	11.9	10.1	2.3	5.0
Forage Sorghum						
Lindsey 101 F						
Control	1	9.4	13.9	9.5	9.1	21.0
Inoculated	2	8.6	13.8	11.1	8.5	14.9*
Yieldmaker						
Control	2	9.8	13.5	10.7	9.3	18.9
Inoculated	1	7.6*	12.5	10.6	8.7	14.1*

*Differences from control significant at 5% level as determined by Duncan's multiple range test.

less at the first and last harvests. Yields of inoculated bahiagrass and tall fescue were less than controls at only the first harvest. Reduction in forage yields was not statistically significant for inoculated browntop millet and alfalfa at any harvest.

Clovers and fescue supported large populations of P. scribneri. High numbers were associated with reduced forage yields for the three clovers. Although the number of nematodes recovered from the roots of tall fescue at the termination of the experiment was five-fold greater than the number applied to the soil at the beginning, statistically significant reductions of forage yields occurred on only one harvest date. Relatively low numbers of nematodes were recovered from alfalfa, forage sorghum, bahiagrass, and browntop millet. Reduced forage yields occurred for these crops on only one or two harvest dates or not at all.

The presence of P. scribneri in the roots of all crops tested indicated a wide host range for this nematode. Both grasses and legumes were attacked, but greatest nematode reproduction and plant damage occurred on the three varieties of white clover and tall fescue. Although the number of nematodes recovered from alfalfa, forage sorghum, bahiagrass, and millet was calculated to be about the same as or less than the original inoculum, the possibility of the occurrence of reproduction was not eliminated, since maximum recovery was not achieved.

Literature Cited

1. ANONYMOUS. 1960. Distribution of plant parasitic nematodes in the south. Southern Cooperative Series Bull. 74. 72 pp.
2. CHRISTIE, J. R., and WRAY BIRCHFIELD. 1958. Scribner's lesion nematode, a destructive parasite of amaryllis. Plant Disease Reptr. 42: 873-875.
3. NONG, LIMHUOT, and GEORGE F. WEBER. 1965. Pathological effects of Pratylenchus scribneri and Scutellonema brachyurum on amaryllis. Phytopathology 55: 228-230.
4. OTEIFA, BAKIR A. 1962. Species of root-lesion nematodes commonly associated with economic crops in the delta of the U. A. R. Plant Disease Reptr. 46: 572-575.
5. SCRIBNER, F. L. 1819. Diseases of the Irish potato. Tennessee Agr. Exp. Sta. Bull. 2: 27-43.

AGRICULTURAL RESEARCH SERVICE, UNITED STATES DEPARTMENT OF AGRICULTURE AND AGRICULTURAL EXPERIMENT STATION, AUBURN UNIVERSITY, AUBURN, ALABAMA

OCCURRENCE OF PEACH TREE DECLINE IN GEORGIA IN 1965[1]

J. H. Owen, W. M. Powell, and Floyd F. Hendrix, Jr.[2]

INTRODUCTION

A disease called peach decline has caused the loss of young bearing peach trees in Georgia for many years. Chandler, et al. (1) reported that 200,000 trees were killed in 1962. This disease has continued to be a serious problem, and in the spring of 1965 major losses occurred in some sections of the State. To determine the extent of these losses, a survey was conducted in May in Peach, Houston, Taylor, Macon, Bleckley, Jones, Spaulding and Jasper counties, which contain approximately 40% of the peaches grown in Georgia (2).

Ford and Elrod (2) reported the greatest concentration of peaches in Georgia in the Fort Valley area (Crawford, Peach, Houston, Macon and Taylor counties) which is in central Georgia. In 1961, 2,194,000 of the 3,967,000 trees in Georgia were found in these counties. Because of the importance of this section, 35 of the 42 orchards surveyed were in the Fort Valley area. Orchards in Peach County were selected by driving 1.5 miles from the preceding orchard, then surveying the first orchard of bearing age. In the remaining counties, the method of selection was identical except that orchards were selected at least 3 miles apart. Each orchard was surveyed by walking through it at four randomly selected locations and taking data from two rows of trees as to condition, that is, healthy, diseased or dead. To be classified as diseased, at least one major limb on a tree was dead or declining. Forty-two orchards were surveyed and 15,481 trees or spaces were tallied.

RESULTS

The condition of the orchards, summarized by county, is presented in Table 1. In the 6-county area, 13,900 trees or spaces were counted. Thirty-five percent, or 4889, were dead or missing and an additional 2309 (17%) were diseased. The peach disease situation observed in the orchards in Peach County is shown in Table 2. The percentage of dead trees per orchard ranged from 12 to 62; diseased trees accounted for another 7 to 53% of the trees. In a later examination of some of these same orchards, many of the trees classified as diseased had died, while some listed apparently healthy had since become diseased.

---

[1]The University of Georgia College of Agriculture Experiment Stations, Athens.
[2]Plant Pathologists, Department of Plant Pathology and Plant Genetics, University of Georgia.