

# INTEGRATED NEMATODE MANAGEMENT ON FLUE-CURED TOBACCO

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## 2013 Evaluation of Tobacco Cultivars for Tolerance and/or Resistance to Nematodes

### Greenhouse and Field Treatments

On 12 March pre-plant fumigant Telone II were applied to Treatment 8 trial plots. Telone II was injected into soil approximately 12"-14" using a subsoil bedder with two shanks spaced 12" apart. Beds were immediately tilled and sealed using concrete drag. Tobacco transplants were treated in the greenhouse on 01 April with Admire Pro at 1fl.oz/1000 plants. Plants were pre-wet with material being washed in after spraying. Tobacco varieties XHN52, XHN55, PVH2340, CC33, CC35, CC65, and NC71 were transplanted on 03 March on 44" wide rows with an 18" plant spacing.

### Field Trial Data

A stand count was conducted on 11 April to establish a base count. Stand counts were conducted thereafter every two weeks beginning 12 May and ending 06 July to monitor any loss of plants.

Vigor ratings were conducted on the 11 April (approx. 2 wks. post plant), 01 May (4 wks. post plant), 16 May (6 wks. post plant), and 29 May (8 wks. post-plant). Plant vigor was rated on a scale of 1-10, with 10 representing live and healthy plants and 1 representing dead plants.

Height measurements were conducted on 24 May. Plants were measured individually from the soil level to the tip of the longest leaf and recorded in centimeters.

Three harvests were conducted on 25 June, 11 and 25 July. Harvests were one by collecting 1/3 of the plants leaves at one time and weighing each plot in pounds.

A mid-season root gall rating was conducted on 11 June on three plants per plot using the Zeck's scale of 0-10. A second root gall rating was conducted following the final harvest on 01 August rating ten plants per plot utilizing the same scale.

Nematode soil samples were pulled from plots on 07 March (prior to planting and soil treatment), on 19 June (mid-season), and again on 05 August (at final harvest). Eight to ten cores of soil, 2.5-cm-diamx 25-cm-deep, were collected from each plot randomly. Nematodes were extracted from 100-cm<sup>3</sup> soil sub-sample using a centrifugal sugar flotation technique.



### Introduction

Many crops in Georgia that are rotated with tobacco are susceptible to root knot nematode. Cotton is susceptible to *M. incognita*, peanuts are susceptible to *M. arenaria*, and *M. javanica*. Tobacco and vegetables in general are susceptible to all root knot species with a few exceptions. Several species of root knot nematodes are found in Georgia. All species are capable of infecting tobacco. Most commercial tobacco cultivars have resistance to Race 1 and Race 3 of *M. incognita* (Southern RKN), but have no resistance to Race 2 and Race 4 of *M. javanica* (Javanese RKN), or *M. arenaria* (Peanut RKN). Without resistance to these pests the use of rotation, crop destruction, and nematicides are the only means to manage the problem. As the price of nematicides increase, their availability declines and regulations on application increase, nematode tolerant cultivars for management of tobacco root knot nematode will increase in popularity.

Several tobacco cultivars were evaluated for tolerance to *M. arenaria* (Peanut RKN) in 2011 and 2012 with very favorable results. NC71, the standard, was out performed by several tobacco cultivars (see 2011 and 2012 reports) by up to 600 pounds per acre. The use of Telone II is recommended for management of root knot nematode in Georgia. However, Telone II has become expensive (\$17 per gallon+) and at times is difficult to obtain. In addition, special precautions are required for the use of fumigants. Several new contact nematicides are being evaluated by chemical companies and a few of them show promise on tobacco. The data here represents two separate trials; one comparing tobacco cultivars with reported tolerance/resistance to nematodes and one comparing the use of the product MCW-2 (MANA) to standard industry nematicides and applied in combination with a susceptible (NC71) and tolerant/resistant (CC35) variety of tobacco.

### Methods and Materials

Both trials were conducted at the Bowen Farm-CPES, Tifton, Georgia in a field with a history of corn, peanuts, tobacco and soybean production. The trial was set up in a field with a strong population of *Meloidogyne arenaria* nematodes. The 2013 Evaluation of Tobacco Cultivars trial was set up in a single row, randomized complete block design (RCBD) with six replications. Each plot was 32 feet long, 44" wide beds with ten foot alleys.

The 2013 MANA Evaluation of MCW-2 for Control of nematodes on Susceptible Cultivars of Tobacco was set up in a randomized complete block design (RCBD) split plots, with six replications. Each plot was 32 feet long, 44" wide beds with ten foot alleys. Two cultivars of tobacco were tested; NC71 used as the industry standard and CC35 as a tolerant/resistant cultivar.

Crop maintenance was achieved by using University of Georgia Cooperative Extension Service recommendations for the control of weeds, suckers, and insects. Chemicals used for maintenance of the crop were Orthene 97 at 0.5lbs/A for insect control, Prowl 3.3EC at 2pts/A for weed control, and Royal MH-30 Extra at 1.5 gal/A for sucker control. Total rainfall recorded at the Bowen Farm during this period (March thru August 2013) was 29.94 inches. Environmental data requested from Georgia Automated Environmental monitoring Network. Field trial was supplemented with additional irrigation as required.

## 2013 Evaluation of MCW-2 for Control of nematodes on Susceptible Cultivars of Tobacco

### Greenhouse and Field Treatments

On 12 March pre-plant fumigant Telone II were applied to Treatment 8 trial plots. Telone II was injected into soil approximately 12"-14" using a subsoil bedder with two shanks spaced 12" apart. Beds were immediately tilled and sealed using concrete drag. Tobacco transplants were treated in the greenhouse on 01 April with Admire Pro at 1fl.oz/1000 plants. Plants were pre-wet with material being washed in after spraying. Tobacco varieties CC35 and NC71 were transplanted on 03 March on 44" wide rows with an 18" plant spacing.

### Field Trial Data

A stand count was conducted on 10 April to establish a base count. Stand counts were conducted thereafter every two weeks beginning 12 May and ending 06 July to monitor any loss of plants.

Vigor ratings were conducted on the 11 April, 17 April, 24 April, 01 May, 08 May, and 22 May. Plant vigor was rated on a scale of 1-10, with 10 representing live and healthy plants and 1 representing dead plants.

Height measurements were conducted on 24 May. Plants were measured individually from the soil level to the tip of the longest leaf and recorded in centimeters.

Three harvests were conducted on 25 June, 11 and 25 July. Harvests were one by collecting 1/3 of the plants leaves at one time and weighing each plot in pounds.

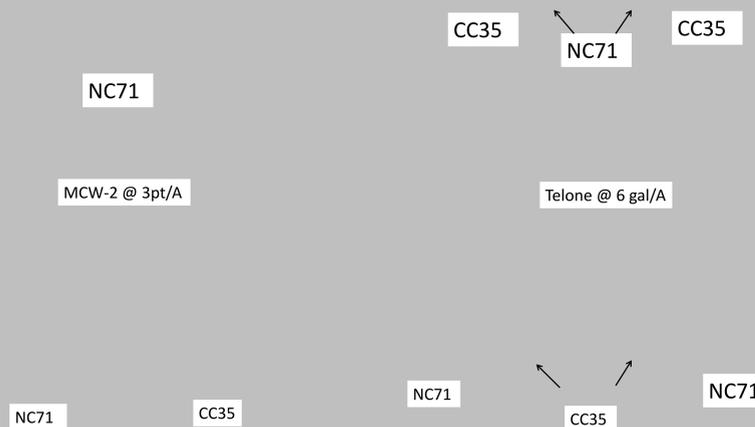
A mid-season root gall rating was conducted on 11 June on three plants per plot using the Zeck's scale. A second root gall rating was conducted following the final harvest on 31 July rating ten plants per plot utilizing the same scale.

Nematode soil samples were pulled from plots on 26 March (prior to planting and soil treatment), on 19 June (mid-season), and again on 06 August (at final harvest). Eight to ten cores of soil, 2.5-cm-diamx 25-cm-deep, were collected from each plot randomly. Nematodes were extracted from 100-cm<sup>3</sup> soil sub-sample using a centrifugal sugar flotation technique.

MCW-2 @ 5 pt/A

MCW-2 @ 7 pt/A

MCW-2 @ 4 pt/A



### Summary- 2013 Evaluation of Tobacco Cultivars for Tolerance and/or Resistance to Nematodes

Yield of cultivars ranged from a low of 1,568 lb./A (NC71) to a high of 2,092 lb./A for CC35. Tobacco cultivars CC33, CC35, and CC65 all had yields that were significantly better than the standard NC71, but were not significantly different from NC71 treated with Telone II. Root gall ratings by mid-season were high on NC71 at 6.8 RGI while all other treatments were significantly less including the NC71 treated with Telone. By final harvest RGI's were generally high across all the treatments, ranging from 3.9 for CC35 and a high of 7.8 for NC71. Nematode populations were moderate to low ranging from 10 at plant, but building to 105 to 823 by harvest. All tobacco cultivars had lower nematode numbers than NC71 and were not different from NC71 treated with Telone II. Several tobacco cultivars, notably CC35 and CC65 had higher yields, reduced RGI and reduced populations of root knot nematode when compared to NC71, There were no significant differences (P<0.05) among those cultivars and NC71 treated with Telone II.

### Summary- 2013 Evaluation of MCW-2 for Control of nematodes on Susceptible Cultivars of Tobacco

MCW-2 decreased RGI and nematode populations on the NC71 cultivar, but not yields. Combined with the CC35 cultivar yields were 50% higher above NC71, however there were no significant differences (P .05) that occurred for RGI or nematode population.

**Acknowledgments** The authors would like to thank the Georgia Agricultural Commodity Commission for Tobacco for financial support.