

Chemical controls for the management of *Meloidogyne enterolobii* in flue-cured tobacco

Nematode control treatments were assessed on-farm in Johnston County, NC in the growing seasons of 2017, 2018, and 2019. Field sites were chosen based on high populations of *Meloidogyne enterolobii*. Treatments were applied to 50-ft long by four row paired plots with 15-ft alleys. Fumigant treatments were applied 21 days prior to planting. Pre-plant Nimitz applications (both broadcast and 15 in. band) were applied 14 days prior to planting. Flue-cured tobacco (K326) was transplanted on 1 May 2017, 20 Apr 2018, and 30 Apr 2019. Velum Prime treatments were applied at planting. Nimitz applications and the second Velum Prime application were applied over the center of plant beds using a CO₂-pressurized backpack sprayer equipped with four XR110025 nozzles at 20 gal/A at 20 psi, then mechanically incorporated two to three hours later during cultivation. Percent of roots affected by galls was assessed at mid-season and at harvesting. Nematode soil populations were assessed on at planting, mid-season, and at harvest. Yield was harvested from the center two rows of each plot by hand (kg/plot) on 13 Sep 2017 and 3 Sep 2019. Yield data could not be collected in 2018 due to the impact of Hurricane Florence. Uncured, green foliage yield was used for statistical comparisons.

No phytotoxicity was observed in any treatment plot caused by the treatments; however, phytotoxicity from thrips management was observed. There were no differences between plant vigor of treated plots prior to harvest (data not shown). Telone II treatments reduced root colonization compared to the non-treated controls. Yield protection was observed with Telone II + Chlorpicrin, Velum Prime (TPW +LB), Nimitz (5 pt, broadcast), and Nimitz (3.5 pt banded) treatments.

Table 1. Untransformed averages and standard errors around means for percent root galling, green yield, and nematode soil counts evaluated during the 2017, 2018, 2019 chemical management of *Meloidogyne enterolobii* trials.

Treatments	Rate Per Acre	Application ¹	Percent Root Galling	Green Yield (kg/plot)	Nematode Soil Counts per 500 cc Soil		
					Pre-Plant	Mid-Season	Harvest
Telone II	6 gal	21PP	31.33±5.96	19.66±4.12	121.67±36.20	1910.42±961.56	1497.00±677.57
Chloropicrin	3 gal	21PP	43.79±3.30	19.01±3.77	128.83±26.63	423.83±205.05	1493.50±338.90
Telone II Chloropicrin	6 gal 2 gal	21PP	23.67±3.75	20.94±3.95	66.08±36.67	721.66±343.13	782.17±247.62
Velum Prime	6.5 floz	TPW	33.88±4.56	16.60±5.62	142.67±49.92	3025.33±1356.18	1544.75±555.67
Velum Prime	6.5 floz	TPW	31.59±3.60	21.07±4.22	86.42±34.88	1253.5±422.53	1090.00±282.08
Velum Prime	6.5 floz	LB					
Telone II	6 gal	21PP	27.25±5.17	19.76±4.75	111.00±44.84	828.58±454.03	1169.91±425.96
Velum Prime	6.5 floz	TPW					
Nimitz Broadcast	5 pt	14PP	40.63±4.31	18.68±3.85	118.33±41.79	2297.46±1458.68	1515.67±377.08
Nimitz 12 in. Band	3.5 pt	14PP	41.68±5.37	18.42±2.42	212.42±75.72	1522.67±565.78	1129.67±308.89
Nimitz 12 in. Band	5 pt	14PP	39.43±7.55	17.07±3.34	101±34.03	490.42±180.88	1087.25±278.66
Non-treated Control	--	--	45.81±2.15	16.45±1.70	105.58±18.44	1604.40±584.48	1308.32±187.43

¹21 day pre-plant application= 21PP, 14 day pre-plant application= 14PP, transplant water application= TPW, layby application= LB

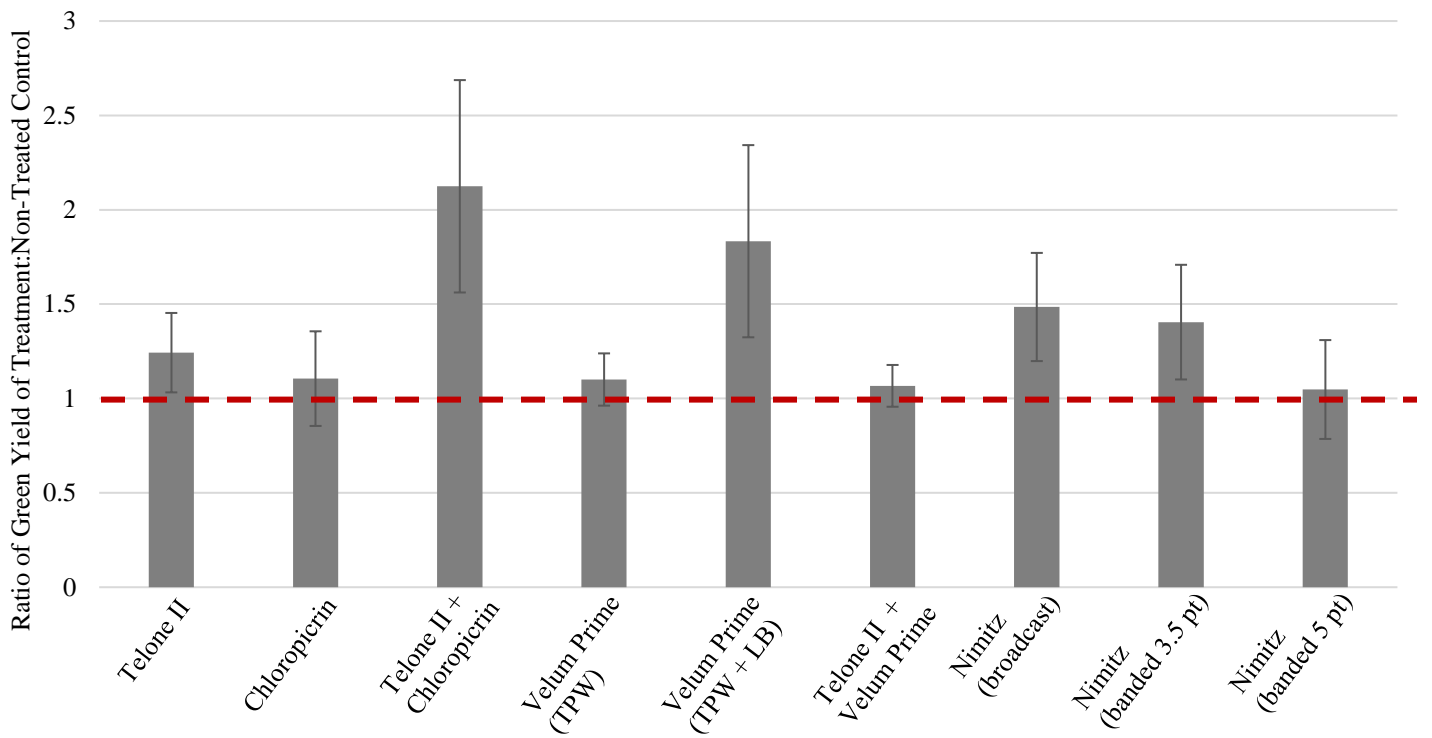


Figure 1. Green yield (kg/plot) ratio of treatments:paired, non-treated control plots. Non-treated control plots are represented by the red dashed line ($y = 1$), in which treatments with means above the line have greater yield than the non-treated control. Error bars that cross the red-dashed line indicate that a treatment is not significantly different from the non-treated control.

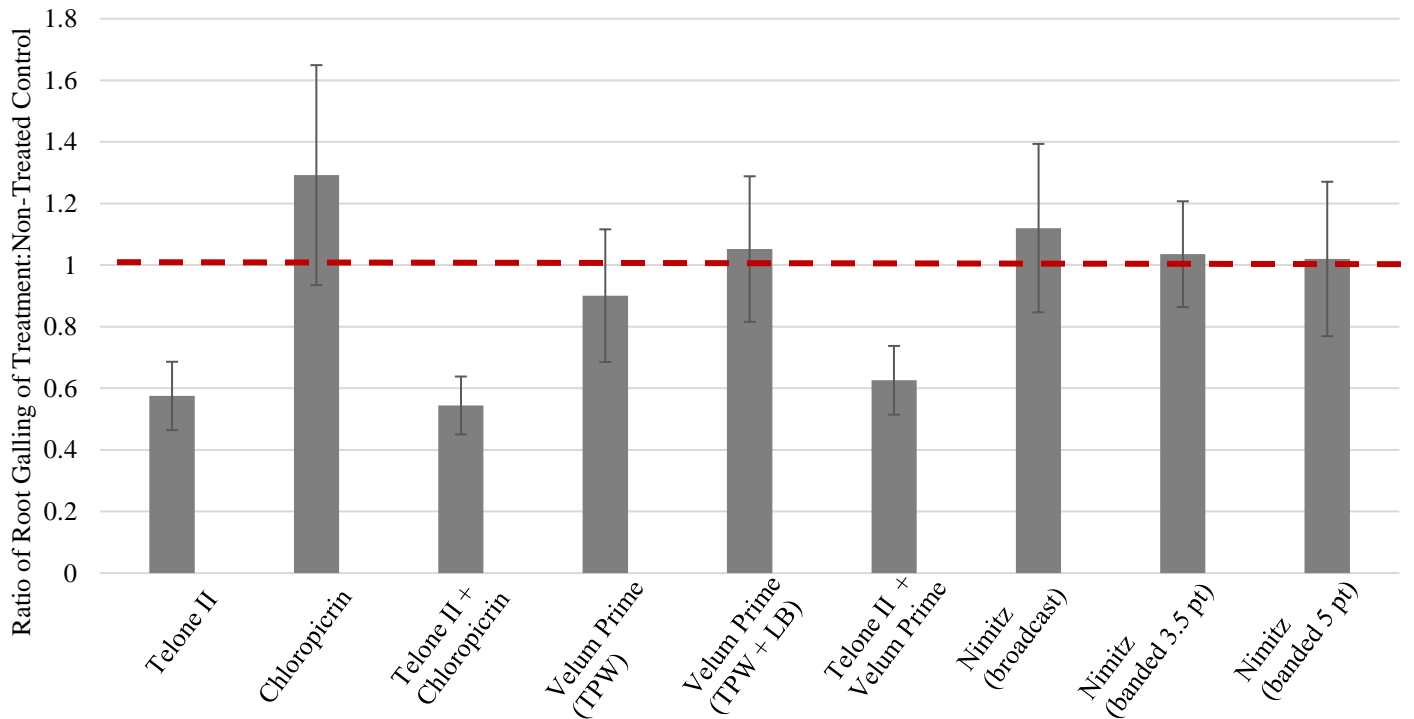


Figure 2. Root galling (% of root affected) ratio of treatments:paired, non-treated control plots. Non-treated control plots are represented by the red dashed line ($y = 1$), in which treatments with means above the line have greater root colonization than the non-treated control and, conversely, means below the dashed line have lower root colonization than the non-treated control. Error bars that cross the red-dashed line indicate that a treatment is not significantly different from the non-treated control.