ADVANCES IN PRECISION PLACEMENT OF TELONE® II SOIL FUMIGANT FOR MANAGEMENT OF NEMATODES

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Abstract

The precision application of Telone® II Soil Fumigant may provide an economical method of nematode management in cotton. Root-knot and reniform nematodes are major problems throughout much of the cotton producing areas of the U.S. Since soil texture has been closely linked with nematode incidence and damage, areas with varying levels of soil texture are good candidates for precision application of a fumigant. Studies were conducted in Lubbock, Texas and St. Joseph, LA to evaluate the precision application of Telone II fumigant in fields with root-knot nematode and reniform nematode. Fields were divided into zones based on electrical conductivity (EC_a) which is negatively correlated with soil sand content. Telone II treated and untreated strips were arranged within each of the zones. Both locations showed a significant yield response in soil zones that had the lowest EC_a values which relate to higher sand content. High rates of Telone II were effective across all zones at the Lubbock, TX site compared with the low rate being effective in only the first and second zones. The response to the fumigant declined at the St. Joseph, LA site as the EC_a values and zone numbers increased.

Introduction

Root-knot (*Meloidogyne incognita*) and reniform (*Rotylenchulus reniformis*) nematodes continue to be common and difficult to control pests in cotton. Root-knot resistant varieties are becoming more available and provide an excellent means to reduce damage in regions where they are adapted. New seed treatment and soil applied products with nematicidal activity are being introduced as well. Significant advances have been made in precision placement of Telone II Soil Fumigant for management of nematodes. Research results show that the use of soil maps and electrical conductivity (EC_a) data can be used to identify low and high risk or "responsive" zones. When Telone II fumigant is applied only in the responsive soil management zones, input costs can often be reduced by 30 to 40%. A combination of management practices is often required to optimize return on investment as determined by nematode species present, soil types, nematicide efficacy, economics, and other variables. Growers need to be prudent in sampling as nematode population shifts can occur, for example from root-knot to reniform.

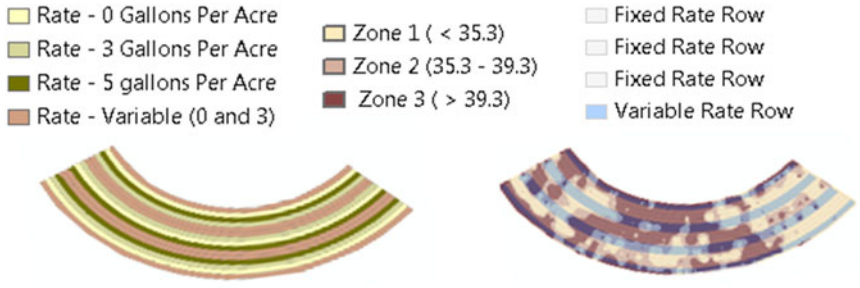
Materials and Methods

Lubbock, TX. EC_a readings, collected using a Veris cart, were used along with soil analyses and nematode assays to define three management zones in a root-knot nematode infested field (Fig. 1, 2). Telone II was applied 12-14" deep in 8 row strips to all zones at the rate of 3 or 5 gpa , or only to zones 1 and 2 at the rate of 3 gpa.

St. Joseph, LA. Small plot trials with 6 replicates were established in 2013 and 2014 in a reniform infested field in which the EC_a ranged from 1 – 45. The field was divided into 6 zones with zone 1 having the lowest EC_a. Nematode assays were conducted in the spring, mid-season and fall. Telone II was applied at 3 gpa.

Results and Discussion

Application of Telone II increased yields in the root-knot and reniform nematode infested fields from 69 – 267 lbs lint/A (Table 1, Figure 3). Higher yield increases and returns on investment occurred in areas of fields with higher sand content compared to where the soil texture was characterized by a lower sand and higher silt content. At the Lubbock, TX location the application of Telone II at 5 gpa resulted in lint yield increases of over 200 lbs per acre in all 3 zones compared to the untreated checks (Table 1). The relationship between injury potential and soil texture appears to be consistent across years and different environments for both root-knot and reniform nematodes.



Figures 1 (left) and 2 (right)**.** Fifteen 8-row strips were treated which included all 3 (EC_a) zones. Fixed rate strips were treated as shown in Figure 1, whereas, variable rate strips were treated at a rate of 3 gpa in areas where the variable rate strips overlapped the EC_a management zones 1 or 2, but non-treated for areas overlapping zone 3 (Figure 1).

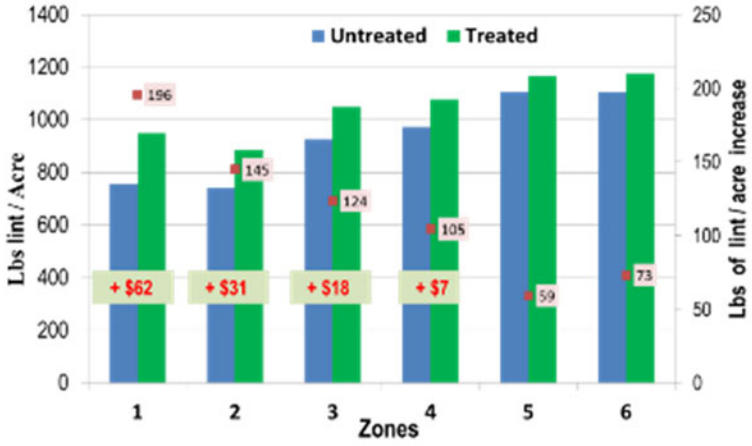


Figure 3**.** Based on $0.60 / lb cotton and cost of Telone II at $56 / acre, the return on investment per acre would be ~ $62 for Zone 1, $31 for Zone 2, $18 for Zone 3 and $7 for Zone 4 at St. Joseph, LA during 2013-2014.

Table 1. Lint yield results in the three EC_a zones in the Lubbock, TX trial showing lint yield per acre and net gain by zone. Variable rate row treatment strips were treated at a rate of 3 gpa in areas where the variable rate strips overlapped the EC_a zones 1 or 2, but non-treated for areas overlapping zone 3.

Telone II Rate / A	Zone 1	Zone 2	Zone 3
Non-treated	758	794	799
All zones at 3 gpa	946 / 188	898 / 104	868 / 69
All zones at 5 gpa	1025 / 267	994 / 200	1020 / 221
Variable at 3 gpa*	927 / 151		na

Summary

Precision application of the fumigant Telone II is practical in soils that can be divided into various zones based on soil texture as defined by EC_a. The greatest response to the fumigant is in zones that have the highest levels of sand and are most likely to suffer the greatest damage from nematodes.