MOVENTO, A POST-PLANT NEMATICIDE

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ABSTRACT

We have now achieved 50% control of the *Pratylenchus vulnus* populations in 25 yr old Black walnut treated November when measured over a six month period. We have achieved 50%nematode control in 10 year old Paradox trees treated with three applications of 7 ounces Movento each during spring summer and fall, the growing period for the walnuts and the nematodes. Black walnuts in our latter trial were difficult to sample but we suspect the control we have engendered to them is as useful as it was in an earlier experiment using older trees. Poor growing trees result in huge variation in nematode counts but generally it is the poor trees that support fewer nematodes and interfere with our data sets because poor trees also support fewer nematodes present in the untreated check. We are ahead of schedule with these studies and suspect only one more year of walnut data will be necessary. We have attached a Guideline for application of Movento to grapes and walnuts as well as other perennials. This Guideline will be improved upon next year as necessary. For walnuts estimate that 2 weeks of non irrigation after a treatment will be the best strategy for 50 % nematode control.

OBJECTIVES

Objective 1 Evaluate nematicidal activity in various field trials sprayed with Movento and Penetrator or DYNE-AMIC with applications made in early May, mid summer and or early November. Nematicidal value determined monthly on Paradox or NCB rootstocks.

PROCEDURES

Site 1. A 25-year-old orchard on NCB sprayed Nov 17, 2008 and sampled for nematodes monthly through winter months. Seven ounces Movento + DYNA-MIC adjuvant in 300 gpa water

Site 2. A mixed planting of various scions on Paradox and NCB aged 7 to 11 years of age (McGranahan Block at Kearney) sprayed in early May, July and early November with 7 ounces Movento each time using Penetrator in spring and summer with DYNE-AMIC in October and then monitored for nematodes monthly.

Site 3 A planting near Ripon broken into large blocks either treated or not with a spring an fall application of 7 oz with yield data to be collected in 2010 only.

Treatments for each of these objectives will be replicated at least 4 times but our limitation will likely be the availability of adequate walnut selections. All nematode counts will be log-transformed and subjected to ANOVA.
RESULTS AND DISCUSSION

Experiment 1
Our studies for this project began at KAC on November 17, 2008 as we made a fall treatment of Movento in 300 gallons per acre with DYNE-AMIC as the adjuvant applied to 25 year old walnut on Northern California Black in a micro sprinkler irrigated orchard. The roots in this orchard seldom reach below three feet deep but spread all across the 22 foot by 11 foot tree spacing. Monthly samples with 12 reps collected primarily from the rhizosphere of treated and untreated trees provided 6 months of 50% control of Pratylenchus vulnus attributable to the spray treatment. Nematode control achieved 11 feet away from the tree trunk was not as striking as when samples were collected within several feet of the trunk. Half the treated trees were sawn to the ground at 6 days after the spray treatment and 30 days later the nematode control was similar to that obtained where tree tops had not been removed. However, over the remainder of the sampling periods nematode control approximated half that achieved when tops were left alone, ~25% nematode control for 6 months. Essentially, walnuts can be effectively treated with Movento as late as November 17 if irrigations or rainfall do not occur within several weeks thereafter. It appears that not all of the Movento reached beneath ground level at 6 days after a Movento spray to 25 foot tall trees.

\[ P. vulnus /250 \, \text{cc in surface 18” of walnut rhizosphere soil} \]

\[ = 50\% \text{ control for 6 mo.} \]
Experiment 2

Our second trial began May 5, 2009 at the McGranahan field trial. This 4.5 acres consists of trees on NCB and Paradox rootstocks ranging in age from 7 to 10 to 12 years. We began by collecting soil rhizosphere samples from each of these different ages and treating the acreage as a single block. Basically, the Movento treated provided minimal value because the youngest trees were not doing well and ended up with more nematodes on the healthiest trees down each row compared to the poorer trees that couldn’t support the nematodes and might be present in the untreated block. This huge variability was overcome by discarding data unless it came from trees that were 10 years of age, 13 rows in the middle of the 26 row field. The top label rate for Movento on walnuts is 21 ounces per acre per year. We chose 7 ounces because it enabled flexibility of being able to treat three times per year and where growers use flood or furrow irrigation it enabled summertime applications. The results are depicted in Table 2 where we achieved 51 % nematode reduction over a period of 6 months of growing period if Paradox was the rootstock. In this furrow irrigated site the roots of NCB are deep and typically NCB has 1/5 the number of root tips as compared to Paradox. Fewer root tips is always more difficult to sample but in this irrigation approach we had great difficulty due to deep roots. We do not suggest here that Movento does not perform well on Black walnut roots but with only 6 reps and a lack of concentrated root system we have difficulty showing the value of Movento on the NCB,~ 13% population reduction over 6 months.
P. vulnus / 250 cc Paradox walnut rhizosphere soil, flood irrigated but not till 14 days after each treatment

![Bar chart showing the effect of Movento application on P. vulnus population over time]

P = 0.05

P. vulnus / 250 cc Black Walnut rhizosphere soil flood irrigated but not till 14 days after each treatment

![Bar chart showing the effect of Movento application on P. vulnus population over time]

P = 0.05 ns
Guidelines for Improved Performance of Movento as a Nematicide
Michael McKenry
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Nematicidal performance of Movento can be influenced by numerous factors. After three full years of study with Movento on perennial crops the following factors need consideration as Movento registration expands to nematode control and growers strive for maximum efficacy against nematodes as well as insects.

Crop- Springtime sprays to grape can be made after May 1 while sprays to walnut should not be made until late May. Fall sprays to grape should be halted after mid October while sprays to walnut could be made as late as mid November. What about other crops?

One way to assess crop differences (if endoparasitic nematodes are present) is to collect root samples at 100 days post treatment and determine if populations are unchanged or controlled (30 to 60% population reductions) when compared to the untreated.

Application Rates- For most nematode species (including root-knot, root-lesion, citrus, and dagger nematodes) optimal nematode control on grapes is achieved at 4 oz/acre which can provide 50% population reductions for 5 to 6 months. These same nematode species treated at 6.25 oz/acre may provide only 10% nematode control when measured monthly over a five to six month period. However, ring nematode is an exception. The application rate for ring nematode on grapes needs to be 6.25 oz/acre to achieve 50% population reductions over a 5 to 6 month period. The nematicidal value of the 4 oz rate against ring nematode can be nil when measured over that same five to six month period. At the present time 4 oz is the optimal treatment rate for nematode control (except ring nematode) but over the years ahead there may be situations and settings where some nematode species appear to increase after several years of treatment at 4 oz. For example, if root-lesion and ring nematode are together in a field and both appear to be responsible for similar damage there may be reason to apply 4 oz in spring and 6.25 oz in fall, or vice versa depending on crop and other timed events that impact the grower. Keep the options open here because insect management must also be taken into account as nematicidal application rates are being considered.

Repeated Applications- We have repeatedly observed the lack of nematicide longevity when re-treatments are too close together. It is as though 4 oz on May 5 cannot be followed by 4 oz on June 5 if nematode control is the purpose of the treatments. We have recently demonstrated that 7 oz to walnut on May 5 followed by 7 oz on July 29 tended to erase our progress with nematode control. More on this next year as experiments continue.

Impact of other Systemics- Presence of other systemic products already within the plant can impact the performance of Movento. In 2006 and 2007 we observed when 14 oz Admire Pro was applied 2-4 weeks ahead of Movento on citrus that there were negative impacts on eventual nematode control. However, our treatment rates in those days were often as high as 24 oz/acre of Movento. More recently we applied Admire to grapes 7 days ahead of Movento and it appeared to enhance the nematicidal performance of Movento.
Movento. Likewise, we noted that a natural plant material, NatureCur, developed from walnut hulls and having some systemic qualities could interfere with performance of Movento. More recently we observed that NatureCur applied in November could destroy the nematicidal value of Movento applied 7 days later but 5 ½ mo later treatments in those same locations enhanced the nematicidal value of 4 oz of Movento compared to 4 oz without NatureCur. The point of this commentary is to advise that there are extraneous factors that can directly impact negatively or positively the nematicidal performance of Movento. Studies continue but as this product reaches the hands of growers keep these incidents in mind until these and others are better understood.

Irrigations too soon after Movento spray- In 2008 our recommendation was to not apply water for 2 weeks after Movento or we would not be interested in conducting nematicidal studies in that field. This has been a useful advisory as Movento performance has improved. This strategy has also allowed us to see a bit more clearly how other factors can impact nematicidal properties of Movento. The eventual goal is to fine-tune this recommendation and this year we have made some headway in that direction. The impacts of irrigating too soon, use of an Admire application 7 days ahead of Movento and the impact of Movento on root-knot compared to ring nematodes are presented in the attached power point. This single presentation provides quantification as these three factors are taken into account when Movento becomes available for commercial settings. This data set also leads this author to alter slightly the recommendation of 2 weeks of non irrigation after a Movento treatment. During 2010 our new strategy will be: Irrigate well at least 4 days ahead of the Movento spray and do not irrigate for 9 days after the Movento spray. The main determinant that leads this direction is yield data as shown in the power point. Consider both of these strategies as a work in progress.

Movento can enhance fruit quality and hasten maturity- Does this actually happen? Yes, it has now been observed in a Delano trial for each of the last three years. Where does this physiological change originate. Is it tied to damage caused by nematodes or is it a general phenomenon? Is it always of benefit? Consider assessments of fruit quality when conducting experiments with Movento.

In Summary- Some of the factors influencing efficacy of this new nematicide have been identified. Additional factors will become apparent in the future but as of today growers of perennial crops can achieve a 50% reduction in nematode population levels over a five to six month period after a single Movento application. Five to ten soil samples from a treated row compared to five to ten samples from a nearby untreated row at 100 days after treatment can provide an answer as to the level of population reduction achieved in a given field setting. If at least 30% nematode control was not achieved; consider carefully the prevailing factors during the time of Movento application.