



Effect of different nematicide applications per year on banana (*Musa AAA*) root nematode control and crop yield

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Original submitted in on 24th February 2016. Published online at www.m.elewa.org on 31st May 2016
<http://dx.doi.org/10.4314/jab.v10i1.4>

ABSTRACT

Objective: The objective of this study was to evaluate the effect of different nematicide applications per year on control of banana root nematode, root weight and crop yield in Belize. The relationship between cost and benefit of the nematicide applications was also estimated.

Methodology and results: A field experiment was conducted in a 40 years old commercial banana (*Musa AAA* cv. Grande Naine) plantation from November 2011 to February 2013. Four treatments were evaluated: (i). Three nematicides in rotation (Nemacur[®], Mocap[®], Vydate[®]) were applied per year with a 4-month interval, (ii). Two nematicides in rotation (Nemacur[®], Mocap[®]) were applied per year with a 6-month interval, (iii). Nematicides in rotation applied based on nematode threshold (100 nematodes per g of fresh root) which resulted in two applications; Nemacur[®] and Mocap[®] with a 7-month interval, and (iv). An untreated control. Averaging the 12 root nematode samplings, the lowest *R. similis* ($P= 0.0008$), *Helicotylenchus* spp. ($P< 0.0001$) and total nematode ($P< 0.0001$) population were observed in the plots treated with the three nematicide applications per year. Compared with the untreated control, the three nematicide applications reduced *R. similis* in 53%, *Helicotylenchus* spp. in 48% and the total nematode population in 53%. Even though the three nematicide applications per year resulted in higher *R. similis* control efficacy with 42.4%, no difference ($P= 0.6372$) was detected with two 32% (at 6-month interval) applications per year, and two 33% (at 7-month interval) applications per year, based on nematode population threshold. For *Helicotylenchus* spp. ($P= 0.0047$) and total nematodes ($P= 0.0018$), three applications were better than two at 6-month interval or two applications per year based on nematode population threshold, with 65.3 and 58.5% of efficacy on nematode control, respectively. No difference in total root weight ($P= 0.9812$) and functional root weight ($P= 0.7742$) was observed among treatments, varying from 88 to 90 and 73 to 79 g / plant, respectively. At harvest, 12 months after the nematicide applications, bunch weight was increased ($P= 0.0013$) in 7.2 (41%), 4.8 (27%) and 4.7 (27%) kg per bunch resulting in an extra gain of \$2468, \$1660 and \$1427 ha⁻¹ with three, two at 6-month interval and two applications per year based on nematode population density, respectively.

Conclusions and application of findings: The non-fumigant nematicide applications reduced banana root nematodes and improved crop yield. Rotation of the nematicides according to their physic-chemical properties and weather conditions is desirable in order to prevent their biodegradation.

Key words: chemical control, *Musa AAA*, nematode control, nematicides.