

REVIEW OF THE NON-FUMIGANT NEMATOCIDES OXAMYL AND FOSTHIAZATE

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Oxamyl (Vydate®, DuPont Agricultural Products, Wilmington, DE), a carbamate, and fosthiazate (Nemathorin™, Syngenta International AG, Basel Switzerland), an organophosphate, are two non-fumigant nematicides which have been evaluated as partial methyl bromide alternatives since the early 1970's and 1990's, respectively. Both compounds function as cholinesterase inhibitors, giving them some insecticidal as well as nematicidal activity.

Plant parasitic nematode control with oxamyl varies with crop, application method, and targeted nematode pest. Much of the research for nematode control with oxamyl has been conducted on cotton. Oxamyl is considered both a systemic and contact nematicide which, in addition to soil applications, can be applied directly to foliage for control of foliar nematodes and systemic control of soilborne parasitic nematodes. Soil application methods include surface, in furrow, root dip, and drip irrigation. Oxamyl has also been applied as a seed treatment, but resulted in reduced germination and plant growth in cucumber. The ability to apply oxamyl with minimal risk of phytotoxicity allows its use as a post-plant nematicide. Foliar application of oxamyl in combination with a soil fumigant has been reported to enhance soilborne nematode control compared to the fumigant alone. Nematode control was also improved when oxamyl was combined with other carbamate nematicides including aldicarb. Although oxamyl can provide some control of a number of nematode species, it does not control *Meloidogyne javanica*.

Much of the research for nematode control with fosthiazate has been conducted on cotton, tomato, potato, and tobacco. Fosthiazate does not appear to have any systemic activity. Fosthiazate does control *M. javanica* but not as effectively as 1,3-D or fenamiphos. Integrated approaches of fosthiazate and 1,3-D, or metam sodium provided control of root-knot and cyst nematodes similar to methyl bromide on some crops. Fosthiazate increased ratoon yields in pineapple following fumigation with Telone but was not effective itself as a preplant soil treatment. Yield increases have been reported in tobacco, banana, pineapple, tomato, and peanut following application of fosthiazate but were not always linked with nematode control. Yield increases were higher when banded applications were used rather than broadcast applications. Control of *Meloidogyne incognita* on sweet potatoes was not accompanied by an increase in yield due to phytotoxicity. The level of nematode pressure also determines the amount of control achieved with this compound. While fosthiazate effectively

controlled root-knot nematodes on spring tomatoes in Florida, it failed to provide similar control in the fall under higher nematode pressure.

The usefulness of oxamyl and fosthiazate for soilborne nematode control in vegetable and strawberry production in the Southeastern U.S. may be limited. These products could prove useful in some areas as a supplemental nematode control or where post-plant applications are needed to enhance fumigant performance. Also, should a label become available, oxamyl could be useful in field grown ornamentals for control of foliar nematodes, or where risks of phytotoxicity to adjacent plantings restrict use of fumigants such as chloropicrin. However, according to the oxamyl label, the compound should not be used where the water table is close to the surface, where large volumes of water are applied (as irrigation or precipitation), or where there are sandy soils low in organic matter, due to groundwater contamination risks. Fosthiazate is not currently labeled for use in the U.S., although a label for use on tomatoes is expected soon. Although results of fosthiazate trials for nematode control in vegetable production in the Southeastern U.S. are limited, it has been reported to perform fairly well under low nematode pressure. Under high nematode pressure, the efficacy of fosthiazate for parasitic nematode control is reduced. It remains unclear if application methods and rates for use on vegetables will be adequate for root-knot nematode control in Florida. There are also indications that phytotoxicity can be a problem with fosthiazate. More research is needed to determine consistency, efficacy, and phytotoxicity of fosthiazate before it can be recommended as a nematicide component in IPM systems for vegetable and strawberry production in the Southeastern U.S.