MEMORANDUM

SUBJECT: Comment on Metam Sodium Risk Assessments, EPA Docket OPP-2004-0159

FROM: Barbara Shew
Research Assistant Professor and Extension Specialist
Department of Plant Pathology
North Carolina State University

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The materials (narrative and two tables) below provide information on metam sodium usage patterns, application methods, and impacts on peanuts produced in North Carolina. Metam sodium currently is applied to approximately 45% of the 100,000 acres of peanut land in the state. Metam sodium is vital for the control of Cylindrocladium black rot caused by the soil borne fungus *Cylindrocladium parasiticum*. Our growers fumigate with low rates of metam sodium as a key part of in an integrated disease management approach that also includes moderate (partial) host resistance, rotation, and clean seed production. Without metam sodium for fumigation, North Carolina's peanut production, worth more than $67 million in 2003, would be severely threatened.

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1. Commodity: Peanuts

2. Target Pests:

Cylindrocladium parasiticum, cause of Cylindrocladium black rot (CBR)
Nematodes, including root-knot nematodes *Meloidogyne hapla* and *M. arenaria*

3. History of metam sodium use:

CBR was first described on peanut in Georgia in 1966. The disease quickly became established in North Carolina and Virginia and posed a severe threat to the industry by the late 1970's. Metam sodium was introduced for control of CBR in NC in the mid-1980's and has significantly reduced losses since that time.

4. Alternatives to metam sodium:

CBR

The control measures (fungicides, host resistance, rotation) described below currently are used in conjunction with metam sodium application. None of these methods is adequate to prevent severe losses in the absence of metam sodium application. No alternatives to metam sodium are currently under development for use against this disease.

Conventional fungicides (azoxystrobin, tebuconazole) have labels for CBR suppression. Little to no control has been demonstrated in the Virginia-Carolina production area.

Levels of partial host resistance in CBR resistant cultivars (NC 12C and Perry) are not adequate to control the disease in fields with a history of >15% disease. In addition, these cultivars are very susceptible to tomato spotted wilt (NC 12C and Perry) and Sclerotinia blight (NC 12C).

Currently, peanuts are grown three-year rotations (i.e., 1 year in 3). The most common rotation crops are corn and cotton. Soybean is a host of *C. parasiticum* and should not be used. Longer rotations are not economically practical for most growers.

Other fumigants (Telone C-17, Telone II, etc.) are too expensive and/or less effective.

Nematodes

Other fumigants (Telone C-17, Telone II) are registered to control nematodes. Use is very limited due to expense.

Nonfumigant insecticide- nematicides (aldicarb, fenamifos) applied in furrow can control nematodes if populations are low. However, these nematicides do not control more severe infestations. They also provide less suppression of tomato spotted wilt than the alternative in-furrow insecticide, phorate, which does not control nematodes. Phorate use is increasing because it gives some suppression of tomato spotted wilt.

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Nematode resistance is not available in cultivars suitable for production in the Virginia-Carolina region.

5. Application Practices:

Timing

Peanuts typically are grown in 3 year rotations with cotton and corn being the principal rotation crops. Metam sodium is not applied to rotation crops and its impacts these crops are unknown. Thus, metam sodium would be applied to a particular field only in the year peanuts are grown, or one time in three years.

Soil is usually fumigated in early to mid-April (Table 1), when soil becomes sufficiently warm and dry for effective treatment. We recommend that growers check weather forecasts to avoid fumigating before a cold spell or rain. A minimum of two weeks (longer if cool and/or wet conditions prevail) are then needed for fumigant dispersal before planting. Peanuts must be planted by mid-May to allow sufficient time for maturity.

Method

The fumigant is injected by chisel 8-12" deep directly under the row; row widths vary from 36 to 38 inches. Treatment is required under both rows in twin-row production, in which seeds are staggered in paired rows spaced 7 to 9 inches apart on 36 to 38 inch centers. In either case, only a small zone of soil directly under the row is treated. Therefore, there is minimal disturbance of the plant bed after fumigation.

Rates

The labeled rate on peanut is 7.5 to 11 gal/a rate. The most common reported rate is 10 gal/a; average rate is 9.5 gal/a (Table 2).

Sealing

Sealing is not necessary since metam sodium is injected 8-12” deep at low rates. The soil effectively seals behind the chisel and allows the fumigant to distribute appropriately through the profile.

Metam sodium can be injected with strip tillage equipment. Rollers and a series of baskets on strip tillage equipment seal the soil.

The method provides an adequate seal for the rates used and is compatible with equipment and production practices. Irrigation generally is not available in production fields and is not needed to seal the soil.

6. Percentage of crop treated in North Carolina:

Approximately 45% of the peanut acreage in the state is treated (Table 2).

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7. Incidents: (Via Patrick Jones, NCDA&CS)

North Carolina compiles information about pesticide incidents. No incidents pertaining to metam sodium use on peanuts have been reported.

8. Implications of cancellation or restriction:

Approximately 100,000 acres of peanuts were planted in North Carolina in 2003. Average yield was 3,200 lb/a and estimated farmgate value was $67.8 million.

Impact on CBR management (Table 2)

County agents from the affected counties report that approximately 60% of peanut acres are infested with *C. parasiticum* and about 45% of peanut acres are fumigated.

Estimates by county agents of likely CBR losses in the event that metam sodium was not available ranged from 5 to 50% and averaged 26%. This may underestimate the potential for CBR losses since repeated metam sodium use over the past 20 years has resulted in lowering inoculum levels throughout the production area. Without metam sodium, CBR problems could be expected to become more severe over time since inoculum would build up from current levels with successive peanut crops. Also, since *C. parasiticum* is seedborne, the pathogen can be continually introduced into fields on seed.

Moving production to uninfested land is not feasible due to the limited availability of soil types suitable for peanut production and overlap in these areas with soybean production.

Impact on nematode management (Dr. Jack Imbriani, NCDA&CS)

According to the Nematode Assay Section of the North Carolina Department of Agriculture and Consumer Services, 69% of soil samples assayed from peanut fields in 2003 were infested with root knot nematodes. Nematode hazard was rated as moderate in 23% of all samples and as high in 18% of all samples. In addition, 58% of samples were infested with lesion nematodes and 60% of samples were infested with ring nematodes.

It is difficult to proportionally ascribe yield increases from metam treatment to nematode and CBR control since the pathogens occur together. However, metam sodium has been shown to dramatically reduce galling indices in treated compared to untreated peanut cultivars grown in North Carolina (P.M. Phipps, VPI&SU).

Effects on jobs

The inability to control CBR, for which fumigation with metam sodium is essential, would result in elimination of a high percentage of peanut production in many growing areas. Peanut production requires significantly more personnel and labor than crops like cotton, corn, soybean, or small grains. This labor is not only on the farm but also at buying points, shelling facilities, and dealerships. Reductions in acres will impact not only income for the peanut farmer but will also

reduce jobs and consequently will impact local economies.

Impacts of possible buffer zones and pre-application notification schemes

Median field size in NC is 15 acres (Table 2) and fields are widely dispersed in production areas. Ditches, waterways, ponds and residences are prevalent throughout the production area. Therefore, any requirement for large buffer zones would severely impair growers' ability to use metam sodium and produce peanuts.

Pre-application notification would cause great difficulties because the window of time available for fumigation is small. Growers must wait until soils are sufficiently warm and dry before they can fumigate. This usually occurs by mid-April. Another two weeks (longer if cool and/or wet conditions prevail) must then be allowed for fumigant dispersal before planting. Peanuts must be planted by mid-May to allow sufficient time for maturity. This tight schedule allows little room for delays that would arise if a pre-application notification period were necessary, especially in the event that fumigations would need to be rescheduled due to rain. Fall fumigations are not possible because only a small zone directly under the plant row is treated before peanuts are planted into fumigated soil. Therefore, peanuts must be planted shortly after fumigation to minimize disturbance of the treated soil.

Table 1. Methods for metam sodium application in North Carolina peanut production areas*

County reporting	Application method	Number of mixers	Does mixer apply?	worker protection	days per year applied	hours per day handled	total hours	area treated per day	max treated per day	Frequency of treatment per year	frequency field treated (years)	date of tmt	days to planting	usual soil temp	usual air temp day	usual air temp night	
Bertie	chisel at bedding	2	yes	gloves, mask, tyvek suit	5	6	30	40	75	1	1 in 3	April	14 to 21				
Edgecomb	chisel at bedding	1	yes	gloves, mask, tyvek suit	5	10	50	20	20	1	1 in 3	April	14 to 21	60	78		
Hertford	chisel at bedding	2	yes	gloves, mask, tyvek suit	3	6	18	50	100	1	1 in 3	April	14-20	55	60	40	
Martin	chisel at bedding	2	yes	gloves, mask, tyvek suit	5	6	30	40	75	1	1 in 3	April	14 to 21				
Perquimans	chisel at bedding	1	yes	gloves, mask, tyvek suit	2	6	12	40	60	1	1 in 3	April	21 to 28	55	65	50	
Pitt	chisel at bedding	1	yes	gloves, mask, tyvek suit	5	8	40	45	55	1	1 in 3	April	14	55	75	50	
Washington	chisel at bedding	1	yes	gloves, mask, tyvek suit	2	8	16	40	60	1	1 in 3	April	14	63	73	53	
Summary	chisel at bedding				3.8571	7.143	28	39.29	63.6	1	1 in 3	April	14 to 28	58	70	48	

* As reported by County Agents in reprsentative peanut production counties

Table 2. Metam sodium use in North Carolina peanut production areas as reported by County Agents in peanut production counties*

County	Peanut acres	Proportion treated	Treated acres	Field size	Rate gal/a	Rate lb/a	Proportion affected	Projected loss (proportion of yield)
Bertie	12700	0.8	10160	30	9	38.34	0.5	0.35
Bladen	6000	0.75	4500	25	9	38.34	1	0.25
Chowan	6000	0.5	3000	20	10	42.6	0.5	0.35
Duplin	1100	0	0	15			0	0
Edgecomb	11800	0.2	2360	14	10	42.6	0.6	0.05
Gates	6800	0.65	4420	8	10	42.6	0.75	0.4
Halifax	9000	0.125	1125	13	8	34.08	0.3	0.4
Martin	12500	0.9	11250	5	9	38.34	0.9	0.35
Nash**	3200	0.5	1600		10	42.6	*0.5*	
Northampton	5000	0.15	750	15	9	38.34	0.85	
Perquimans	4000	0.6	2400	10	10	42.6	0.7	0.2
Pitt	4800	0.75	3600	30	10	42.6	0.95	0.5
Sampson	1500	0	0	22			0	0
Washington	2800	0.3	840	15	8	34.08	0.45	0.25
sum	87200		46005					
average***		0.445		17.077	9.455	40.276	0.571	0.258

* 14 of 15 County Agents responding

** % acres affected estimated as equal to % acres treated

*** average rates include only counties reporting use

METAM SODIUM (OR POTASSIUM) USE DATA

THE INFORMATION WILL BE USED TO REFINE AND REVISE EPA'S RISK ASSESSMENT

ARE YOU A GROWER? _no_____ ARE YOU A CUSTOM/COMMERCIAL APPLICATOR? __no_____

Please fill out the following questionnaire as completely as possible for a **TYPICAL** season or application.

CROP ____peanut_____ APPLICATION METHOD __inject by chisel at bedding_____ IRRIGATION METHOD ____none_____
(Please use a separate sheet for each crop or application method)

For a typical application, how many people are involved in mixing, loading, and application? ___1 or 2_____

Are mixing, loading, and application usually done by the same individual? ____yes_____

What worker protection equipment is commonly used? _____gloves, mask, tyvek suit, boots_____

How many **days per year** are the individuals doing the mixing, loading, and application handling Metam? __Range 2 to 5 days; mean 3.9 days__

How many **hours per day** are these individuals handling Metam? _ range 6 to10; mean 7hrs, 9 min_____

Typical area (acres) treated per day __range 20 to 50; mean 39_____ Maximum acres treated per day _range 20 to 100; mean 64

Typical application rate (lbs. of Active Ingredient/acre)__40 lb/a (9.45 gal/a)_____Maximum application rate__42.6 lb/a_(10 gal/a)_____

Method of soil surface sealing_____none_____

For a typical field, what is the frequency of treatment? ___1 year in 3_____

For a typical application, how many hours or days are required for Metam treatment? _____28 hours_____

What is the typical date of treatment? (Late October, early June, etc) ____early April_____

How many days are there between Metam application and soil tillage or planting? _____14 to 28 days_____

At application, what is the typical soil temperature? __58_F_____ What is the typical air temperature? Day___70_F__ Night__50_F___

What are the primary pests you are controlling with Metam? _Cylindrocladium parasiticum; nematodes_____

Other than Metam, what other pest management strategies do you use? __rotation, host resistance_____
_____

(PLEASE TURN TO OTHER SIDE)

Please give a detailed description of the Metam application scenarios that may take place on your operation or under your supervision. Include approximate dates and times, number of people involved, types of equipment used. Give a detailed representation of where the people involved are during the operation and for how long. Give this scenario on a representative time line. i.e. applicators arrive at 7:00 AM with two tractors six workers and an applicator supervisor; irrigation equipment on sight was _____; and continue until the application is completed.

This description was provided by a NC County Agent

Although I am not a farmer or and applicator, the normal sequence of events would be to have the peanut land prepared for fumigation some days in advance of fumigation. On the day of fumigation, the rig used for peanut disease control would be prepared for use. It normally is a tractor that has an injection rig and a bedder. The land will have been prepared by disking to aerate the soil and to make the injectors easier to pull through the soil 8-12 inches below the soil surface. A truck driver with the metam-sodium will accompany the tractor and application rig to the field. The chemical will be pumped through a sealed system into a mini-bulk tank on the fumigation rig. The tractor driver will not have to leave the cab of the tractor in order to fill the mini-bulk tank on the fumigation rig from the bulk tank on the truck. Once the mini-bulk tank is filled, the applicator can detach the vacuum pump hoses and inject the material into the ground. In the area of Pitt County NC, the applicator is typically an eight row rig and it can fumigate up to 55 acres in a typical day. The length of the day would depend upon field access and distance between fields, breakdowns in the field, etc.

Once the application is complete, two weeks must elapse before planting can occur.

Contact information:

NAME ___Barbara Shew, Research Assistant Professor, Extension Specialist

PHONE__919-515-6984_____

E-MAIL__barbara_shew@ncsu.edu_____