Proper Application of the 3-Way Fumigant System for the Post Methyl Bromide Era

By: Andrew W. MacRae, Assistant Professor, Weed Science, Gulf Coast Research and Education Center - Balm, University of Florida/IFAS

Before I start, I need to say that the system to be mentioned below is just that, a system. There will be certain fields with certain pest pressures that will not require an entire system for control. However, these fields will not stay relatively clean of pests if a total systems approach is not used. This means you may get away with using a reduced system for one year, if you’re lucky two years, but a pest or several pests will eventually escape causing significant yield loss. There is no true alternative to methyl bromide, don’t believe anyone who tells you there is. We cannot provide the level of control we used to receive with 350-400 lbs of methyl bromide 98:2, but we can do very well with the 3-Way system in most locations.

Almost all fumigant systems will look great following decades of methyl bromide use, but there will be some that are not sustainable. Do not make a decision on a fumigant system based on this first year following methyl bromide use. I would encourage all growers to try several systems on the same piece of land, for several growing seasons, to determine which one is right for you. Sustainability is the key to a successful methyl bromide alternative.

Economics plays a huge factor in the decision for which system a grower may choose. I will not give costs for systems as they fluctuate regularly. What I must emphasize is that growers do not choose a fumigant program simply because it is cheap or it is easy to apply. Instead, make your decision based on your pest pressures and the type of crop and number of crops being placed on the mulch. If you are growing a crop such as eggplant or pepper you need to use a system approach, especially for weed control. We do not have postemergence weed control options on broadleaf weeds and nutseedes for these crops, so any escapes will have to be ignored or hand pulled. If you intend to grow two or more crops on the same mulch, a system approach is necessary to reduce initial nematode and weed populations that can cause problems in future cropping systems. If growing a single short season crop with postemergence herbicide options, it
may be possible to cheat on the systems approach for one year and then return to the full system the next year.

The 3-Way system uses a combination of three fumigants to achieve control of nematodes, diseases, and weeds. When any one of the products mentioned below is removed from the system, the level of control on one or two of the areas of pests will be reduced. The 3-Way system is composed of three active ingredients: 1,3 Dichloropropene (1,3-D), chloropicrin (Pic), and either metam sodium or metam potassium (Metam). 1,3 Dichloropropene and chloropicrin can be found alone in products (Telone II and Chloropicrin, respectively) or in combinations: Telone C17 (83% 1,3-D, 17% Pic), Telone C35 (65% 1,3-D, 35% Pic), and PicChlor 60 (40% 1,3-D, 60% Pic) are the most common of these. Metam sodium is sold as Vapam while Metam potassium is sold as KPam.

The 3-Way system products are put out in separate passes. The 1,3-D and Pic can be put out together using the combination products, however there are restrictions on respirator use that must be taken into account. If they are put out together you can use your regular fumigation rig with the knives set at 8-9 inches below the top of the bed. If put out separately, place the 1,3-D at 12-14 inches (usually done with a pass just prior to pulling the false bed) and the Pic at 8-9 inches below the bed top. If you place the 1,3-D at 12-14 inches, do not run your seepage irrigation constantly from the time of fumigation until planting. You will seal in the 1,3-D which can stunt the crop even six weeks after fumigation. Wet soil will stop the movement of 1,3-D. If you do happen to run the seepage from the time of fumigation until planting, do not stop the seepage immediately after planting. This will cause a flush of 1,3-D to move into the root zone and may cause severe damage to the crop. Continue running the seepage for a few weeks to allow only a little of the 1,3-D to escape at one time. The best plan is to have the soil moist but not wet at the point of fumigant placement for 14 days to allow the escape of the fumigant, even if this requires shutting off the seepage prior to planting.

Metam is best applied using coulters or knives set four inches apart and placing the fumigant four inches deep in the bed. So if you have a 28 inch wide bed top, seven knives would work the best. The key with Metam is to place the fumigant near the top of the bed since we are aiming for weed control with this product. Disking or rototilling the product in will dilute the fumigant resulting in less than expected weed control. Initial fumigation should not include an application via drip tape, unless you are using a double tape system. A single drip tape cannot cover the width of a 28 or 24 inch bed top.

This system will require an investment on the part of the grower. If putting the 1,3-D deep, it will be necessary to build on your false bedder (also called a hiller) a fumigant system for putting out the product. You could also use the Yetter-Telone rig developed by John Mirruso which does an excellent job at placing the product at the right depth. The chloropicrin and the combination products can be put out using your regular fumigation rig so very little adjustment is needed. The Metam application will require the creation of a new fumigation rig to properly place the fumigant. This is often done on the press bedder which many growers use on the second pass after the fumigation rig.
So it seems we’re done, except for one thing. In the post methyl bromide era, you must include herbicides with your fumigant systems. There are several products labeled for different crops that can be placed under the plastic mulch. These are necessary especially if no post emergence herbicides are available for the crop you are growing. Take note of the restrictions on some for replanting of a second crop. All applications under mulch should be made to a finished bed top. This means that the soil on the top of the bed cannot be disturbed after the herbicides have been applied. If you are moving the soil you are dragging the herbicide to the end of the rows and it will not be where you desire it to be.

Take time to plan what system you are to use when your methyl bromide allotment runs out. If you have not started working on a system it is never too late, but it is getting close. We will continue to see our allotted methyl bromide for CUE crops to diminish. The most important thing to remember is not what the cheapest system is, but rather what system will be sustainable. Having two good crops in a row and then a disaster on the third crop due to short cuts is not a viable option. Develop and test systems for your crop and do not rely on one single fumigant regiment for the entire farm unless you are sure the results you see will be consistent for many years to come. I hope you do well in the years to come and feel free to contact your local extension agent and myself if there are any questions that you have on fumigant and herbicide selection.