

Proper Application of the 3-Way Fumigant System for the Post-Methyl-Bromide Era¹

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As the available supply of methyl bromide continues to diminish, Florida growers will have to look to methyl bromide alternative systems to control soilborne pests. While these alternatives are not as effective as high rates of methyl bromide, proper use of these alternatives can still result in a productive crop. One such system is known as the 3-Way system.

The 3-Way system is just that: a system. Certain fields with pest pressures may not seem to require an entire system for control. However, a total systems approach must be used to keep these fields relatively free of pests. While it may be possible to use a reduced system for one year, possibly two, a pest or several pests will eventually escape and cause significant yield loss. There is no true alternative to methyl bromide, and current alternatives are unlikely to achieve the level of control that was once achieved with 350–400 lbs of methyl bromide 98:2. However, the 3-Way system works very well in most locations.

Growers should not decide on a fumigant system based on the first year following methyl bromide use. Almost all fumigant systems will seem very effective following decades of methyl bromide use, but some won't be sustainable. Sustainability is the key to a

successful methyl bromide alternative. Ideally, all growers should try several systems on the same piece of land for several growing seasons to determine which one is right for them.

Economics plays a huge role in the choice of fumigant system because costs fluctuate regularly. Growers should not choose a fumigant program simply because it is cheap or easy to apply. Instead, growers should base their decisions on pest pressures and the types and number of crops involved. Eggplant, pepper, and strawberry crops require a systems approach, especially for weed control. There are no postemergence weed control options for broadleaf weeds and nutsedges for these crops, so any escaped weeds will have to be ignored or hand pulled. If the intent is to grow two or more crops on the same mulch, a systems 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, such as tomato, it may be possible to relax the systems approach for one year and then return to the full system the next year. However, as this option is currently being tested, all growers are encouraged to use a full fumigant system at this time.

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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 pests is 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, the most common being Telone[®] C17 (83% 1,3-D, 17% Pic), Telone[®] C35 (65% 1,3-D, 35% Pic), and PicClor 60[®] (40% 1,3-D, 60% Pic). Metam sodium is sold as Vapam[®], while metam potassium is sold as K-Pam[®].

The 3-Way system products are applied in separate passes. The 1,3-D and Pic can be applied together using combination products; however, there are restrictions on respirator use that must be taken into account. If applied together, a regular fumigation rig may be used with the knives set at 8–9 in. below the top of the bed. If applied separately, 1,3-D should be applied at 12–14 in. (usually done with a pass just prior to pulling the false bed) and the Pic at 8–9 in. below the bed top. If the 1,3-D is applied at 12–14 in., do not run seepage irrigation constantly from the time of fumigation until planting. Wet soil stops the movement of the 1,3-D, which seals it in and can stunt the crop even six weeks after fumigation. If seepage is run 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 4 in. apart and placing the fumigant 4 in. deep in the bed. So, 7 knives would work the best in a bed top that is 28 in. wide. The key with Metam is to place the fumigant near the top of the bed because the goal is weed control. Disking or rototilling the product into the bed will dilute the fumigant and result in less

effective weed control. Initial fumigation should not include an application via drip tape unless using a double tape system. A single drip tape cannot cover the width of a 28 in. or 24 in. bed top.

This system will require an investment on the part of the grower. If applying the 1,3-D deep into the soil, it will be necessary to build a fumigant system for dispensing the product on a false bedder (also called a hiller). The Yetter-Telone[®] rig developed by Mirruso Enterprises[™] would also do an excellent job of placing the product at the right depth. The Pic and combination products can be applied using a 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.

One last thing to consider is that in the post-methyl-bromide era, herbicides must be included with fumigant systems. There are several products labeled for different crops that can be placed under the plastic mulch. These are necessary especially if no postemergence herbicides are available for the crop. Some have restrictions for replanting the area with 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. Moving the soil drags the herbicide to the end of the rows.

Growers should take time to plan which system to use when their methyl bromide allotment runs out. Growers will continue to see their allotted methyl bromide for critical use exemption crops diminish. The most important thing to remember is that a sustainable system is needed—not one that appears cheap in the short term—so as to avoid having two good crops in a row and then a disaster on the third crop. Growers should develop and test systems for their crops and take care not to rely on one single fumigant regimen for the entire farm unless certain the results will be consistent for many years to come.