

2020 Vegetable Fumigant Systems For Plasticulture in Georgia

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Vegetable growers continue to face a tremendous number of production challenges; fumigation is no exception. With the loss of methyl bromide and Paladin, current sustainable systems for producing multiple crops on a single mulch installation often include finding the optimum combination of 1,3-Dichloropropene (Telone II), chloropicrin, and/or metam sodium (Vapam, Sectagon, etc.). However, fumigant selection is only one part of the battle, as selecting the ideal mulch to accompany the fumigant system allows one to optimize pest management while managing plant back intervals. As if fumigant and mulch selection are not complex enough, it is likely that the most sustainable growers will also master the understanding of how soil texture, soil moisture, bed compaction, and soil temperature all influence the program's success.

STEP 1: REDUCING FUMIGANT COSTS OVER TIME

Fields heavily infested with nutsedge require higher fumigant rates, additional fumigants/herbicides, and more expensive mulches when compared to fields without nutsedge. Year round nutsedge management working to eliminate tuber production is the key to winning the battle. Consider the following:

- 1) Eliminate nutsedge in row middles, Sandea is labeled for most crops.
- 2) Terminate weeds as soon as harvest is complete.
- 3) Rotate a full rate of Roundup with disking on 3 week intervals when crops and mulch are not present (do not exceed 3 weeks in between intervals).
- 4) Rotate Roundup and Gramoxone when crop is not present but mulch is present; remember to wash mulch before planting.

STEP 2: PREPARE FIELDS FOR THE IDEAL FUMIGATION AND BED FORMATION

Fields should be free of debris and clods with moisture ideal for forming the perfect bed as noted in Fig 1. Deep turning land prior to fumigation will improve control of numerous pests, especially small seeded weeds. Bed compaction varies by soil type but for most fields a good rule of thumb is for a 150 lb person to sink about ½ inch when stepping on the bed thereby facilitating ideal fumigant, water, and fertilizer movement. *The most common mistakes include 1) fumigating when soils are too dry (shoulders fall apart) allowing the fumigant to escape and 2) applying Telone II when it is too wet, trapping the fumigant in the bed potentially damaging the crop at planting.*

STEP 3: FUMIGANT AND MULCH SELECTION (RATES PROVIDED AS BROADCAST)

Option 1: Telone II at 12+ gallon per acre (GPA), chloropicrin at 150 lb/A, and metam sodium at 75 GPA. Telone II is typically applied 14-18" deep followed by chloropicrin injected 8-10" deep with 3 knives in a typical 32" wide bed top. Place metam in the final bed with injection points 4" below the final bed top and 4" apart (Fig 2). Pic Chlor 60 can successfully replace Telone II and chloropicrin in fields with low nematode levels. *Selecting the ideal mulch for this system is critical. In areas with heavy nutsedge infestations, very sandy low organic soils, or during challenging conditions, a TIF mulch may prove beneficial (Fig 3 and 4).*

Option 2: Pic Chlor 60 applied under TIF at 28 GPA (340 lb/A) can be an effective option, especially when 1) producing only 1 or 2 crops prior to mulch removal, 2) applying in fields containing light nutsedge and nematode infestations, and 3) when growing crops that allow topical Sandea applications.

Fig 1. Finding the right fumigant & mulch system.



Fig 2. Knives mounted to second bed press to inject metam sodium followed by plastic layer.



Fig 3. Nutsedge response to Telone/Pic/Metam.

(Location included low nutsedge infestations with 1% organic matter soil and 89% sand in Tifton)

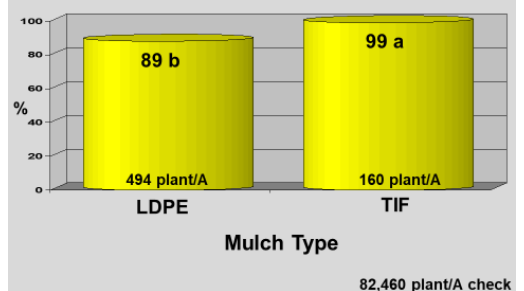
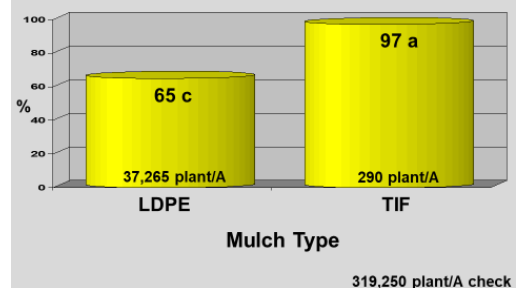


Fig 4. Nutsedge response to Telone/Pic/Metam.

(Location included high nutsedge infestations with <0.5% organic matter soil and >95% sand in Echols Co.)



STEP 4: DO I NEED AN HERBICIDE?

1) **Under mulch:** If metam and chloropicrin are applied in a system then an herbicide is usually not needed; herbicides would likely benefit programs without the two fumigants (Table 1). Herbicides applied under mulch must consist of the spray being applied after the final bed is formed, including laying the drip tape. When laying the mulch, the treated bed must not be disturbed. *Residual herbicides do not perform as well under mulch as in bareground systems and herbicide carryover can be greatly enhanced.*

2) **Row middle:** An herbicide program is needed for nearly every field (Table 1). Most weeds build up populations as a result of row middle weed escapes, especially purslane, grass and pigweed.

3) **Topical applications:** Applications are encouraged where herbicides are available (without injury risks) as a means to mitigate weed competition and seed production (Table 1).

Table 1. Potential herbicide options for fruiting vegetables. Herbicide rates are provided as broadcast. *If using herbicides for the first time, limit use. Follow all labeled guidelines and restrictions.*

BELL PEPPER				
Preplant Under Mulch Options	Typically 7-14 d after transplant	POST 14 d after transplant but before bloom	Typically when grasses are < 3 inches in height	Row Middles (herbicides may damage or kill cover crops)
Devrinol 50 DF (2-4 lb/A) + Command ² 3ME (1-2.5 pt/A) + Devrinol 50 DF (2-4 lb/A) + Reflex ² 2 SL (12 oz/A) + Devrinol 50 DF (2-4 lb/A) + Reflex ² 2 SL (12 oz/A) + Command ² 3ME (1-2.5 pt/A)	Dual Magnum ¹ (8-10 oz/A)		Select Max (9 oz/A) (no adjuvant; treat goosegrass < 1.5")	<p>Prior to planting: <i>Chateau 4 oz/A + Dual Magnum 1 pt/A</i> (include Treflan if rain expected within 24 hr; Prowl is not labeled). Avoid contact with mulch top, must get rain before planting.</p> <p>After transplanting: <i>Sandea + Surfactant</i> will control emerged nutsedge and provide residual nutsedge control but avoid drift on crop; Dual Magnum can also be included as long as one does not exceed 1 pt/A broadcast rate for the crop. Roundup, Gramoxone, and/or Aim are also labeled for row middle applications; avoid all crop contact.</p>
TOMATO				
Devrinol 50 DF (2-4 lb/A) + Dual Magnum ¹ (8-12 oz/A) + Devrinol 50 DF (2-4 lb/A) + Reflex ² 2 SL (12 oz/A) + Dual Magnum ¹ (8-12 oz/A) + Reflex ² 2 SL (12 oz/A) + Dual Magnum ¹ (8-12 oz/A) + Metribuzin ² 75 DF (0.5 lb/A)	Dual Magnum (8 oz/A)	Sandea (0.75 oz/A) + NIS (0.25% V/V)	Select Max (9 oz/A) (no adjuvant; treat goosegrass < 1.5")	<p>Prior to planting: <i>Chateau 4 oz/A + Dual Magnum 1.3 pt/A</i> (include Treflan if rain expected within 24 hr; Prowl not labeled). Avoid contact with mulch top, must get rain before planting.</p> <p>After transplanting: <i>Metribuzin + adjuvant</i> is effective on numerous broadleaf weeds; Dual Magnum can also be included as long as one does not exceed 1.33 pt/A broadcast rate for the crop. Envoke² can also be used for improved morningglory and nutsedge control. Roundup, Gramoxone, and Aim are also labeled for row middle applications; avoid all crop contact.</p>
EGGPLANT				
Devrinol 50 DF (2-4 lb/A)			Select Max (9 oz/A) (no adjuvant; treat goosegrass < 1.5")	Row middle applications are identical to pepper above <u>EXCEPT Dual CANNOT be used in eggplant.</u>
<p>¹Dual Magnum can be applied under mulch for pepper but stunting is often observed; thus it is not included as a preplant option. Stunting of pepper and tomato occurs more in the fall with Dual when drip irrigation is run more frequently. Do not exceed 1 pt/A of Dual Magnum for all uses in pepper and tomato; don't use in eggplant.</p> <p>²Carryover from Reflex, Command, metribuzin and Envoke can be significant, check rotational intervals closely.</p>				

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