



## Reduced Use of Restricted and Danger-Labeled Pesticides in Florida Bell Pepper Production (1992-2004)<sup>1</sup>

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- Restricted and “Danger”-labeled pesticides used in Florida bell pepper production include the insecticides endosulfan, methomyl, oxamyl, and permethrin, the herbicide paraquat, as well as the fumigants chloropicrin and methyl bromide. No fungicides used in Florida bell pepper production are classified as restricted use. These seven active ingredients account for over 95% of the restricted or exclusively labeled “Danger” pesticides employed in Florida bell pepper production (1-7).
- Pesticide use values for 2004 compared to peak usage data for the period 1992 through 2004 demonstrate a 56% reduction in the application of restricted or “Danger”-labeled insecticides in bell pepper. Paraquat use was reduced by 89%. Fumigant use (35% reduction) was mainly influenced by rate reduction, rather than reduction of use (1-7).
- The reduction in use of the restricted use and “Danger”-labeled pesticides is believed to be due to strong adoption of integrated pest management (IPM) principles by Florida pepper

growers, working in conjunction with Extension agents and professionals.

- Increased IPM adoption and reduced spraying of these ingredients is reflected in an 83% decrease in methomyl residues (from 0.040 PPM to 0.007 PPM) in Florida bell pepper from the period 1999 to 2003 (8). These values are far below the tolerance in bell pepper for methomyl (0.2 PPM).

The General Accounting Office (GAO) audit of the U.S. Department of Agriculture (USDA) IPM program during 2000-2001 was conducted to determine whether USDA appropriately met the stated goal of the 1994 IPM Initiative, which was to foster adoption of IPM practices on 75% of U.S. planted crop land by the year 2000 (9). Indeed, from 1994 through 2000, adoption of IPM practices increased from around 40% to nearly 70%, yet pesticide use (in terms of weight per unit of area) increased slightly. The GAO concluded that USDA's IPM program had not yet developed the methods for measuring IPM's environmental and economic results, among other things.

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Contrary to the GAO findings, this analysis will demonstrate that Florida bell pepper growers are committed to IPM principles and practices. Lack of adherence to these principles often leads to resistance, which in turn leads to crop loss or failure. The USDA has collected and published pesticide use data on select Florida crops every other year from 1992 through 2004. Bell peppers have been enumerated each of these years, for a total of seven data sets. Data for all seven active ingredients examined in this analysis are available for even-numbered years. The total pounds of each active ingredient used in Florida bell pepper were divided by the amount of Florida pepper acreage (between 17,600 and 22,100 acres) each year. The values from 2004 were compared to peak years of use.

From Table 1, it is apparent that use reductions of between 51 and 67% (in comparison to the peak year of 1992) have occurred since 1998, with the last year of data (2004) reflecting a 56% reduction in restricted or "Danger"-labeled insecticide use in Florida bell pepper production.

A similar but less dramatic reduction has occurred in fumigant use in Florida bell pepper production (Table 2). In this case, the impetus for reduction in use has come mainly from the methyl bromide phaseout that is occurring under the Montreal Protocol on Substances that Deplete the Ozone Layer. This trend is mainly due to the reduction in rate, rather than a reduction in use (i.e., the majority of bell pepper acreage is fumigated).

A use reduction of 35% has occurred since 2002. The use of methyl bromide will continue to decline, until it is completely phased out as an agricultural pesticide. However, its use may well be supplanted by methyl iodide or other fumigants, which would likely carry the restricted use status and "Danger" labeling.

Use of the only restricted herbicide (paraquat) in Florida-grown bell peppers has also decreased from historic highs (Table 3). In this case, use reduction is cost and IPM related. Glyphosate pricing was easing (and use increasing) during the decade of the 90's, and paraquat-resistant weeds (such as American

black nightshade and goosegrass) were noted in several areas of the state.

Since the peak year of 1998, use reductions of paraquat have ranged between 83 and 98% in Florida bell pepper production. Based on the 2004 value, the use reduction was 89%.

This reduction in use of restricted and "Danger"-labeled pesticides decreases potential hazards for mixer/loader and application personnel, as well as harvest crews. It also reduces potential hazards for associated wildlife and watersheds. Unfortunately, data that would document these trends do not exist. However, data are available for pesticide residues in vegetables, including bell pepper. The USDA's Pesticide Data Program has reported residues of pesticides in bell pepper yearly from 1999. Reduced spraying of restricted pesticides is reflected in an 83% decrease in methomyl residues (from 0.040 PPM to 0.007 PPM) in Florida bell pepper from the period 1999 to 2003 (8). These values are far below the 0.2 PPM tolerance in bell pepper for methomyl, demonstrating proper use of the insecticide when employed for pest control.

Another manner to measure IPM adoption is use of "reduced risk" pesticides, which are generally more selective than restricted or "Danger"-labeled pesticides. Insecticides such as spinosad and imidacloprid have been adopted by Florida bell pepper growers as early as the mid to late 90's. Neither of these insecticides are restricted or "Danger"-labeled when purchased individually in Florida. It is important to note that these "reduced risk" products are always more expensive than older, off-patent materials. Extension agents and professionals have been essential in educating Florida pepper growers, so that costs using "reduced risk" materials are commensurate with previous costs.

## References

1. U.S. Dept. of Agriculture/National Agricultural Statistics Service. (2005). Agricultural Chemical Usage, Vegetables, 2004 Summary. Agricultural Statistics Board, National Agricultural Statistics Service, U.S. Department of Agriculture.

2. U.S. Dept. of Agriculture/National Agricultural Statistics Service. (2003). Agricultural Chemical Usage, Vegetables, 2002 Summary. Agricultural Statistics Board, National Agricultural Statistics Service, U.S. Department of Agriculture.
3. U.S. Dept. of Agriculture/National Agricultural Statistics Service. (2001). Agricultural Chemical Usage, Vegetables, 2000 Summary. Agricultural Statistics Board, National Agricultural Statistics Service, U.S. Department of Agriculture.
4. U.S. Dept. of Agriculture/National Agricultural Statistics Service. (1999). Agricultural Chemical Usage, Vegetables, 1998 Summary. Agricultural Statistics Board, National Agricultural Statistics Service, U.S. Department of Agriculture.
5. U.S. Dept. of Agriculture/National Agricultural Statistics Service. (1997). Agricultural Chemical Usage, Vegetable Crop Summary 1996. Agricultural Statistics Board, National Agricultural Statistics Service, U.S. Department of Agriculture.
6. U.S. Dept. of Agriculture/National Agricultural Statistics Service. (1995). Agricultural Chemical Usage, Vegetable Crop Summary 1994. Agricultural Statistics Board, National Agricultural Statistics Service, U.S. Department of Agriculture.
7. U.S. Dept. of Agriculture/National Agricultural Statistics Service. (1993). Agricultural Chemical Usage 1992 Vegetables Summary. Economic Research Service, Washington, D.C.
8. U.S. Dept. of Agriculture/Agricultural Marketing Service. Florida specific bell pepper analyses obtained from USDA's Pesticide Data Program.
9. Agricultural Pesticides - Management Improvements Needed to Further Promote Integrated Pest Management. GAO-01-815. August 2001. U.S. General Accounting Office, Washington, D.C.

**Table 1.** Total Insecticide Use in Florida Bell Pepper Production

Year	Total Insecticide Use (Pounds)*	Pepper Acreage	Pounds/Acre
1992	84,700	19,900	4.3
1994	80,800	22,100	3.7
1996	59,000	21,300	2.8
1998	35,400	19,400	1.8
2000	26,400	18,600	1.4
2002	37,600	17,600	2.1
2004	35,800	18,500	1.9

\*Pounds of endosulfan, methomyl, oxamyl, and permethrin combined

**Table 2.** Fumigant Use in Florida Bell Pepper Production

Year	Total Fumigant Use (Pounds)*	Pepper Acreage	Pounds/Acre
1992	3,100,300	19,900	156
1994	4,012,500	22,100	182
1996	3,794,900	21,300	178
1998	3,782,300	19,400	195
2000	3,389,700	18,600	182
2002	3,623,400	17,600	206
2004	2,455,000	18,500	133

\*Pounds of methyl bromide and chloropicrin combined.

**Table 3.** Use of the only Restricted Herbicide (Paraquat) in Florida-grown Bell Peppers

Year	Total Paraquat Use (Pounds)	Pepper Acreage	Pounds/Acre
1992	9,200	19,900	0.46
1994	3,200	22,100	0.14
1996	8,500	21,300	0.40
1998	10,500	19,400	0.54
2000	1,700	18,600	0.09
2002	200	17,600	0.01
2004	1,200	18,500	0.06