



Benefits of an Insecticide Seed Treatment for Pumpkin Production in Virginia

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In recent years cucurbit growers in the Mid-Atlantic U.S. could purchase their seeds pre-treated with the neonicotinoid insecticide thiamethoxam. The insecticide seed treatment is currently packaged as FarMore F1400, which also includes three proven and complementary fungicides that provide the first line of defense against several key seed and seedling diseases including *Rhizoctonia*, *Fusarium*, *Pythium*, general damping-off and seedling blight. The seed treatment is relatively cheap (less than \$1 per acre), and has become widely used by growers. However, as the use of neonicotinoids have become controversial, particularly as it relates to pollinator protection issues, some growers have asked whether the thiamethoxam is really needed. In this bulletin, we hope to provide some information that might be helpful to answering that question.

Prior to the registration of FarMore DI-400 (now F1400) seed treatment in the late 2000s, researchers from Cornell University, University of Delaware, University of Maryland, Ohio State University, and Virginia Tech evaluated the efficacy of neonicotinoid seed treatments on cucurbits and showed that thiamethoxam seed treatments provided effective control of cucumber beetles (the primary target pest) for up to 3 weeks following planting. Compared with the typical control strategies that were used for cucumber beetles in the early 2000s, such as in-furrow applications of Furadan 4F, neonicotinoid transplant drenches, or weekly foliar sprays of pyrethroids, the thiamethoxam seed treatment provided a similar level of protection against excessive foliage damage in young plants, but at a tiny fraction of the amount of insecticide applied to the environment. Additional research also recently showed that, when applied as a seed treatment, the insecticide is almost undetectable in the reproductive structures of the plant, and would consequently not have deleterious effects on pollinators. Most of the insecticides applied as a foliar spray such as pyrethroids, neonicotinoids, or Sevin; however, are potentially harmful to bees.

Cucumber beetles are not always pests of pumpkins as that crop can quickly outgrow beetle feeding injury and pumpkins are not preferred by the beetles compared to other cucurbits like blue hubbard squash, cucumbers or various muskmelons. Beginning in 2013, we conducted a three-year on-farm study on the benefits of FarMore F1400 seed treatment compared with fungicides alone on pumpkins in the absence of significant cucumber beetle pest pressure. Basically, we were hoping to answer the question, “If you take cucumber beetle out of the equation, then are there any other benefits of that seed treatment?”

Experiments were conducted at five locations from 2013 to 2015 in Washington and Montgomery counties. Treated plots were isolated by 10 foot alleways and *Gladiator* pumpkin seeds were planted 2 feet apart on 6 foot centered rows. Plots contained three rows of ten plants each with four plots of F1400 treated and four fungicide only plots per block in a completely

randomized design. Pumpkins were harvested and yield was extrapolated out to a per acre basis as shown in Figure 1.

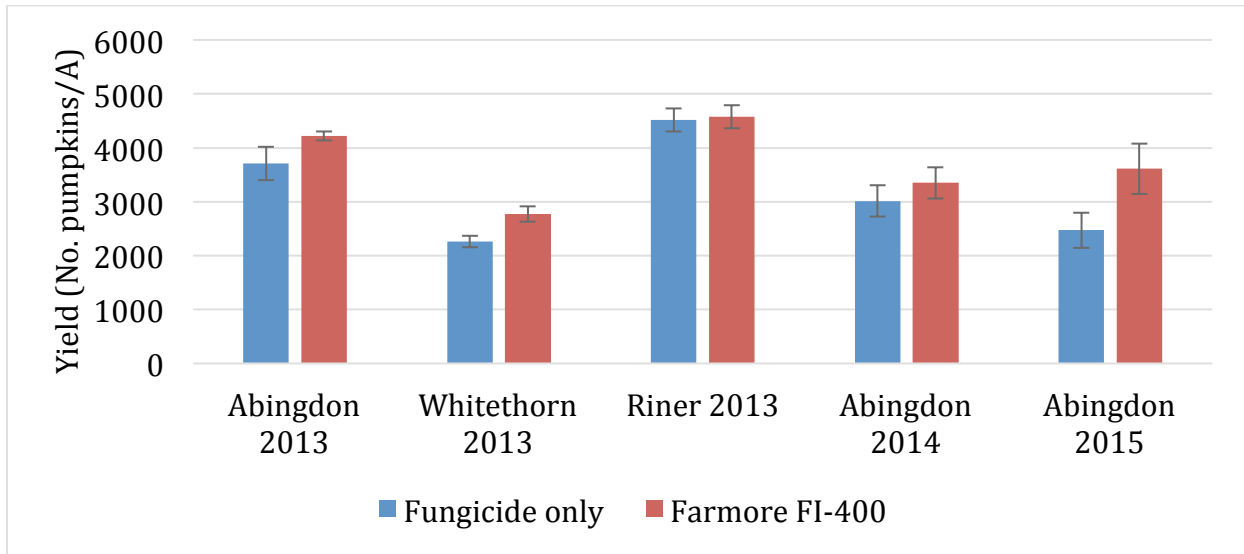


Figure 1. Pumpkin yields on a per acre basis for fungicide treated only seed treatment and Farmore F1400 seed treatment from 2013 to 2015 field seasons in Washington and Montgomery counties, Virginia.

Without significant cucumber beetle pressure, plots that were planted in the Farmore D1400 seed treatment had similar if not greater yield year after year, regardless of the site, than the fungicide only seed treated seeds. Past trials have shown a reduction in cucumber beetle presence and damage in plots treated with the F1400 seed treatment. Removing early season sprays for cucumber beetle by using a seed treatment instead could eliminate multiple costly sprays. Additionally any of the traditional insecticides used during these early sprays are broad spectrum and may cause injury to beneficial insects in the field. Reducing early pyrethroid sprays may reduce the risk of flaring melon aphids, which can be expensive to control with aphicides after they have developed resistance to broad-spectrum insecticides. Other cucurbit pests like the squash bug, arise later on in the season. In our study there was no pest pressure that justified any treatment beyond at planting seed treatment with D1400. The reduction of insecticide sprays in favor of a seed treatment can have significant cost savings on a per acre basis without having to sacrifice yields.