Chapter 13

Alternatives for Organic Soybean Production

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Organic Management of Soybean Rust

Although only 0.1 percent of the total current U.S. soybean acreage is organically produced, the demand for organic soybeans is gradually increasing due to a growing demand for soy-based food products, such as soy milk and tofu. Additionally, there is a growing consumer interest in organic livestock that has, in turn, increased the need for a greater supply of organically produced feed.

Managing disease on an organic farm can be challenging, especially when environmental conditions are favorable for disease, and there is little or no host resistance. Studies by the USDA have indicated that virtually all of the commercially grown soybean varieties are susceptible to soybean rust (SBR). Additionally, soybean plants are susceptible at any stage of growth, although first infections are typically observed on lower leaves of plants that are flowering or post-flowering. Several synthetic fungicides have been shown to be effective in managing SBR; however, these fungicides are not acceptable in organic production.

Studies were undertaken in 2005 and 2006 to identify organic-approved materials that may be effective in managing SBR. The research was conducted at the North Florida Research and Education Center (NFREC) in Quincy, Florida. A two-acre transitional organic field was used for the studies because its southern border was in close proximity to naturalized kudzu (Figure 13.1) with probable overwintered SBR infections.

Figure 13.1. The organic soybean rust management study at the North Florida Research and Education Center at Quincy, Florida. Note the blue color on some plots due to products containing copper. Photo by Jim Marois. Used with permission.

Organic fungicides were applied at flowering and included these products: Champion WP (NuFarm Americas, Inc.), Ballad (AgraQuest, Inc.), Electrified Water, Oxidate (Biosafe Systems, Inc.), Agricoat Natural II (Agricoat LLC), Basic Copper Sulfate (Old Bridge Chemicals, Inc.), MicroAF (TerraMax, Inc.), and Caprylic Acid.

During the course of the study, insect pests, namely the southern green stinkbug *(Nezara viridula),* became problematic. For this reason, in the second year of research, a trap cropping study was initiated outside the main study area to both limit the insect pests in the SBR study area and to develop a season-long insect trap cropping system for soybean that would be organic-approved.

Under heavy soybean rust pressure, organic-approved copper fungicides, such as Champion WP and Basic Copper Sulfate, controlled SBR significantly better than products that did not contain copper. Soybean plants treated with copper products had significantly less SBR on all rating dates and produced seed with significantly higher yield, size, and quality. Organic-approved non-copper fungicides did limit SBR when compared to the untreated check. However, soybean plants treated with non-copper products did not produce seed with characteristics that were significantly better than the untreated check. Untreated checks were moderately infected at the first rating, and rust progressed rapidly from October 7 to November 3, 2006.