MANAGING CORN DISEASES IN CONTINUOUS NO TILL

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Introduction

Ethanol has dramatically increased the demand and the price of corn in 2006. This has resulted in an expected increased corn acres with fewer alternative crops in the rotation. In many cases the most profitable rotation is continuous corn. In addition, the increased fuel costs and improvements in machinery, seed, and seed treatments have encouraged a shift to reduced tillage, including no-till. Both continuous corn and no-till can have dramatic effect on plant diseases.

No-till soils tend to be cooler and wetter at planting and Pythium seedling decay and root rot can become a major factor. Pythium seedling decay and root rot is caused by an Oomycete (closely related to brown algae) and is considered a "killer" that can reduce plant populations substantially. Unlike soybeans that can compensate for missing plants, corn yields are dependant upon uniform populations. In continuous no-till corn, two other soil-borne diseases flourish. They are Fusarium root rot and Rhizoctonia root rot, which are considered "nibblers", because they generally reduce the root mass, especially the small fine roots. When plants are under moisture stress, they lack of these root hairs reduce the plants ability to extract water from the soil and can reduce yields without killing the plant.

In addition to soil-borne diseases, foliar diseases, e.g. gray leaf spot, northern leaf blight, southern leaf blight and eyespot increase in continuous no-till corn. The plant debris remaining from the previous crop provides a source of inoculum for the foliar diseases and the no-till environment keeps the debris cool and moist, favoring fungal sporulation. The main way to control these diseases has been through genetic resistance, crop rotation, and minimum tillage. However, under high disease pressure, many hybrids still suffer some yield loss due to foliar diseases. Foliar fungicides, Tilt and Quilt, have been used on hybrid corn seed production for many years, primarily due to the high value of the crop, but hybrid corn has had little use. With the increased price and demand, growers are asking if foliar fungicides, especially strobularins and triazoles, are profitable.

Results and Discussion

Foliar fungicides did increase yields in many cases, but not in all hybrids or at all locations. For hybrids that do not have a strong resistance package, they may be profitable. However, if hybrids with high yield and a high level of resistance are available, the yield increases many not be profitable. In addition, there are numerous claims that the strobularins group of fungicides promotes better health. They definitely affect some metabolic pathways and may affect yields in the absence of disease. However, there are few published reports detailing how this may work and under what specific conditions. As a plant pathologist, I prefer to focus on the control of plant diseases rather than a plant growth response. My only caution is to use only those adjavants recommended by the fungicide manufacturer and to apply the fungicide at the correct time, e.g. tassel emergence with the appropriate amount of water, pressure and droplet size.

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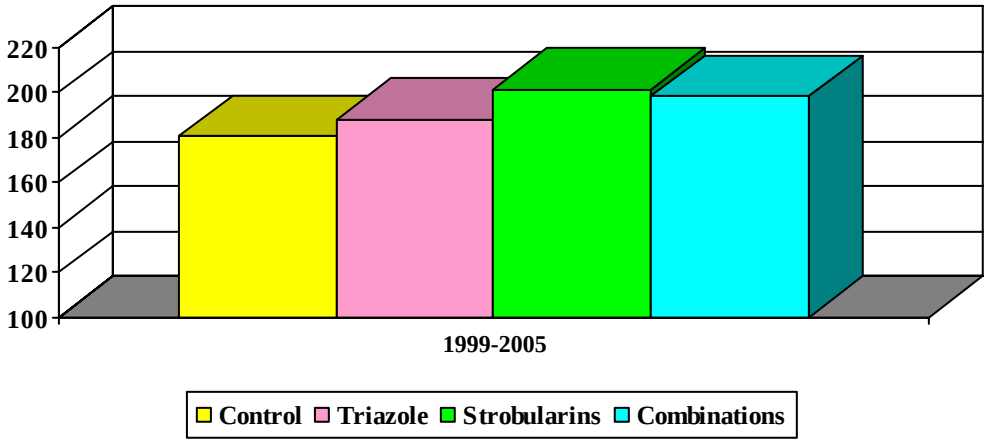

Figure 1. A summary of corn yields (bu/a) from plots treated with triazole, strobularins or combination fungicides at tassel emergence in Southern Illinois from 1999-2005.

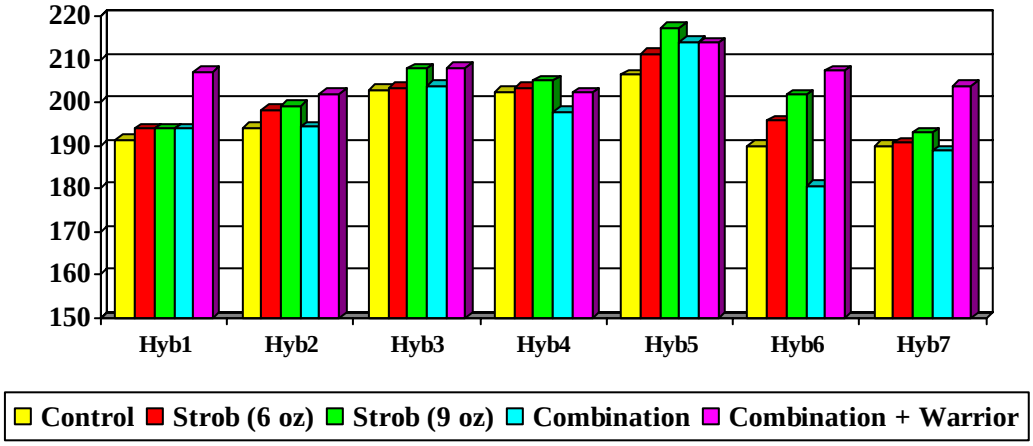

Figure 2. A summary of corn yields (bu/a) from ten hybrids treated with a strobularin fungicide, a combinations of strobularin and triazole, and the combination plus the insecticide Warrior in trials at University of Illinois South Farms, Urbana, IL in 2006