Fungicides Can Increase Asian Maize Production

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Traditionally, maize has been grown in Asia primarily as a subsistence food crop. In recent years, the per capita consumption of maize as a food crop has declined while the use of maize as a feed crop for livestock has increased. Maize yields are especially low in India, Indonesia and the Philippines – approximately one-half of the yield of maize in China, Thailand and Vietnam.

The downy mildew diseases have been a major limiting factor in production of maize in Asia throughout this century. Java downy mildew is of great importance in Indonesia, where depending on the year, 20-80% of the total maize harvests are being lost as a result of downy mildew damage [1]. Philippine downy mildew is the most serious downy mildew disease in the Philippines, where the damage usually affects 40-60% of the total maize yield [1]. Brown stripe downy mildew incidence is greatest in regions of high rainfall in India and has been reported from most maize-growing regions of that country with yield losses ranging from 20-90% [2].

Downy mildew infections occur both as a result of soil borne overwintering spores which infect young plants and from spores produced by nearby infected hosts such as sugarcane or other grasses. Once inside maize plants, the fungus moves systemically throughout the plant. Infected leaves show discolored streaks and have a mildew growth which becomes a source of spores that spread the disease to other plants. Most of early infected plants usually die within a month. When cobs are formed, they are small and poorly-filled. Infected plants have weak and thin stems and poor root growth.

Research has demonstrated that systemic fungicides applied as seed treatments and/or foliar sprays provide excellent control of downy mildew [3]. Yield increases of 8-10% are possible through seed treatment alone [4]. Research has shown that seed treatment combined with one foliar spray to control brown stripe downy mildew increased maize yield by 34% [5]. Seed treatments protect young seedlings from soil-borne spores; as the fungus is taken up systemically in the developing seedling, young plants are protected from spores moving into the crop [6].

Fungicides are widely-used on maize crops in China, Thailand and Vietnam, but are used on less than 5% of the maize hectares in India, Indonesia and the Philippines [7] [8]. Recently, as a result of higher maize prices in India, seed treatments to control downy mildew are being recommended to farmers [9].

References
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