Fungicides Protect South African Grapes from Rot and Mildew

International Pesticide Benefits Case Study No. 55, May 2012

Leonard Gianessi and Ashley Williams

South Africa ranks eleventh in the world for grape production. Wine is South Africa’s biggest agricultural export, earning R2.2 billion in foreign exchange annually. South African farmers also produce about 1.8 million tons of table and dry grapes annually. The industry is primarily export oriented with up to 90% of the total production being exported with a value of R1.5 billion per year. The majority of South African table grapes are available in northern hemisphere countries during their winter and spring seasons.

Fungicide spray programs are commonly applied in commercial vineyards to control two diseases: powdery mildew and Botrytis bunch rot.

The powdery mildew fungus overwinters inside dormant buds of the grapevine. Wind borne spores are released in the spring, spreading the disease to neighboring vines. The fungus penetrates the epidermal cells sending tubular suckers into them to absorb nutrients. Fruit infection lowers wine quality both as a result of increased acid concentration and as a direct result of the fungus itself producing off-flavors [1]. Wineries in South Africa specify that the fruit may not contain more than 5% powdery mildew infected berries [1]. Grape powdery mildew has become the most important disease of grapevine in the country, with growers applying 5-7 fungicide sprays to control it [1]. In one South African experiment, fungicide treatment reduced the proportion of infected bunches from 62% to 4% [2]. The results indicated that the wine made from treated grapes was significantly higher in quality than the wine made from untreated grapes [2].

Berries infected with Botrytis left in the vineyard at harvest dry and become mummified. The fungus survives in the mummified tissue and in the spring releases masses of spores. Inside a grape, the fungus exudes enzymes that degrade and soften grape tissue cell walls. Bunch rot begins when individually infected berries crack and spores are released that spread gray mold to other berries in the cluster. In wine grape production the fungus causes a serious decrease in quality of juice and wine. Wines produced from infected grapes have off-flavors and are sensitive to oxidation and bacterial contamination, making them unsuitable for aging [3].

Chemical control remains the most effective strategy to reduce the incidence of bunch rot on grapevines in South Africa [4]. Three fungicide applications are recommended. Studies have shown that when fungicides are properly applied, infection and symptom expression are prevented at all growth stages [4].

References