

Title Resistance to thiabendazole and baseline sensitivity to fludioxonil and pyrimethanil in *Botrytis cinerea* populations from apple and pear in Washington State

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Abstract

Gray mold caused by *Botrytis cinerea* is a common postharvest disease of pome fruit. Thiabendazole was the most commonly used postharvest fungicide prior to the registration of fludioxonil and pyrimethanil in 2004 for postharvest use on pome fruit. In this study, 83 and 40 isolates of *B. cinerea* that had not been exposed to fludioxonil and pyrimethanil were obtained from apple and pear, respectively, screened for resistance to thiabendazole, and tested for sensitivity to fludioxonil and pyrimethanil. Three isolates from apple were highly resistant to thiabendazole, while all remaining isolates were sensitive to thiabendazole. EC_{50} values of fludioxonil ranged from 0.003 to 0.038 (mean = 0.005) mg/L for apple isolates and from 0.003 to 0.008 (mean = 0.005) mg/L for pear isolates. EC_{50} values of pyrimethanil ranged from 0.013 to 0.173 (mean = 0.060) mg/L and from 0.015 to 0.117 (mean = 0.048) mg/L for apple and pear isolates, respectively. One apple isolate exhibited reduced sensitivity to fludioxonil with EC_{50} of 0.038 mg/L, which was significantly higher than those of remaining isolates tested and was considered resistant to fludioxonil. After 20 successive generations on potato dextrose agar and four generations on apple fruit, the fludioxonil-resistant isolate retained the same level of resistance to fludioxonil as the initial generation. However, it showed a higher sensitivity to osmotic stress *in vitro*, was less pathogenic and virulent on apple fruit, and produced fewer conidia *in vivo* at 0 °C than fludioxonil-sensitive isolates. On apple fruit at 0 °C, the fludioxonil-resistant isolate was effectively controlled by thiabendazole and pyrimethanil but only partially controlled by fludioxonil. The results indicate that insensitivity to fludioxonil was present in a non-fludioxonil-exposed population of *B. cinerea* from pome fruit in the region but at a low frequency and that the vast majority of isolates in the baseline population of *B. cinerea* from pome fruit in the region were sensitive to and can be effectively controlled by the two newly registered postharvest fungicides.