Effects of Number and Timing of Chlorothalonil Applications on Onion Yield

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ABSTRACT

Chlorothalonil at 1.75 kg a.i./ha and mancozeb at 2.69 kg a.i./ha were applied to New Mexico Yellow Grano onions to determine the number of the timing of chlorothalonil treatments on bulb yield. Bulb yields decreased linearly (Y = 31.45 - 0.77X, P = 0.05) as the number of chlorothalonil applications increased. Yields of onions treated with 10 mancozeb applications and those of untreated controls did not differ significantly. No significant difference in yield was observed among treatments with equivalent numbers of chlorothalonil applications, indicating that the total number and not the timing of applications affects bulb yield.

MATERIALS AND METHODS
Chlorothalonil (Bravo 500) and mancozeb (Manzate 200 80WP) were evaluated on New Mexico Yellow Grano onions at 1.75 and 2.69 kg a.i./ha, respectively. Each onion plot, except the controls, received 10 fungicide applications on a 7-10-day schedule. These treatments consisted of combinations of 0, 2, 4, 6, 8, or 10 consecutive chlorothalonil applications either preceding or following 10, 8, 6, 4, 2, or 0 consecutive mancozeb applications. Thus, plots receiving two consecutive early-season chlorothalonil applications would then receive eight consecutive mancozeb applications; and conversely, plots receiving two consecutive early-season mancozeb applications would then receive eight consecutive chlorothalonil applications. Fungicides were dispersed in water and applied at the rate of 560 L/ha through five hollow-cone nozzles (25 core and D-2 tip) per bed at 31.8 × 10^5 Pa at the pump. Initial fungicide applications were made when the bulbs were 2-2.5 cm in diameter.

RESULTS AND DISCUSSION
Purple blotch levels were low, with disease ratings ranging from 3 to 4, and not significantly different (P = 0.05) among fungicide treatments and the control. Leaf damage levels of less than 25% within 2–3 wk of harvest have been observed to have no significant effect on yield (4); therefore, yield losses reported in this experiment are attributed to fungicide treatments and not to damage caused by purple blotch.

There was an inverse relationship (Y = 31.45 - 0.77X, P = 0.05) between the number of chlorothalonil applications and yield of New Mexico Yellow Grano bulbs (Fig. 1). Onions treated with 2, 4, 6, 8, and 10 applications of chlorothalonil yielded 25.0, 29.3, 25.1, 26.6, and 23.6 t/ha, respectively. Onions receiving 6, 8, or 10 applications of chlorothalonil yielded significantly less than onions receiving equivalent mancozeb applications and the control.

Onions initially treated with mancozeb had reduced yields if subsequently treated with chlorothalonil (Fig. 2). As the number of chlorothalonil applications increased after the mancozeb treatments, yield losses became greater. For example, onions treated with two mancozeb applications followed by eight chlorothalonil applications yielded 25.9 t/ha, whereas onions treated with eight mancozeb applications followed by two chlorothalonil applications yielded 29.8 t/ha. Conversely, the yields in plots initially treated with chlorothalonil increased (Y = 25.2 ± 0.76X, P = 0.05) as the number of mancozeb applications increased. This confirms the previous findings on Granex 33 and Texas Early Grano 502 that chlorothalonil suppresses onion yield (1.6).

No significant difference in yield was observed among treatments with equal numbers of chlorothalonil applications (Table 1), indicating the total number and not the timing of applications affected bulb yield.
affects bulb yield. For example, onions treated with either two early or two late chlorothalonil applications had yields of 30.0 and 29.8 t/ha, respectively; however, onions treated with either eight early or eight late applications of chlorothalonil had yields of only 26.6 and 25.9 t/ha, respectively.

Even though six to 10 chlorothalonil applications reduced yield under low purple blotch levels, it is still a valuable fungicide to use in purple blotch management programs. Numerous examples demonstrating its efficacy in controlling onion foliage diseases have been reported (2,3). Judicious use of this fungicide coupled with the use of other fungicides in disease management programs should maintain adequate purple blotch control while minimizing the yield-suppressing effects of chlorothalonil.

**LITERATURE CITED**