

MAPPING YOUR ROUTE TO THE FUTURE

Great Lakes Fruit, Vegetable & Farm Market EXPO

DeVos Place Convention Center
Grand Rapids, MI
December 7-9, 2004



Onion

Wednesday morning 9:00 am

Where: Gallery Overlook Room C-D (upper level)

Recertification credits: 1 (Private, 1B)

CCA Credits: IPM(1.5) CM(0.5)

Moderator: Amy Irish-Brown, MSU Extension Fruit & Vegetable

- 9:00 a.m. New Products for Onion Disease Management
- Mary Hausbeck, Plant Pathology Dept., MSU
- 9:30 a.m. Weed Management in Onion
- Bernard Zandstra, Horticulture Dept., MSU
- 10:00 a.m. Onion Thrips - Insecticide Resistance and Management
- Brian A. Nault, Entomology Dept., Cornell Univ.
- 10:30 a.m. Michigan Onion Variety Trials: A Cooperative Program
- Darryl Warncke, Crop & Soil Sciences Dept., MSU

New Products for Onion Disease Management

Dr. M.K. Hausbeck (517-355-4534; hausbec1@msu.edu) and R.S. Bounds (Graduate Student)
Michigan State University, Department of Plant Pathology

Downy Mildew

Downy mildew is an especially devastating disease because it spreads rapidly and is not readily controlled. Downy mildew of onion is caused by the pathogen, *Peronospora destructor*, and first infects older leaves, occurring as pale, elongated patches that may have a grayish-violet fuzzy growth. Symptoms of the disease are best recognized when dew is present in the morning. Infected leaves become pale green then yellow and can fold over and collapse. Premature death of onion leaves reduces bulb size. The downy mildew pathogen initiates infection during cool temperatures (< 72 °F) and wet conditions. Multiple infection cycles can occur in a season. Spores are produced at night and are easily blown long distances in moist air. They can germinate on onion tissue in 1½ -7 hours when temperatures are 50-54 °F. High daytime temperatures and short or interrupted periods of humidity at night can prevent sporulation. Overwintering spores, called oospores, can form in dying plant tissue and can be found in volunteer onions, onion cull piles, and in stored infected bulbs. Oospores have thick walls and a built-in food supply so they can withstand unfavorable winter temperatures and survive in the soil for up to 5 years.

Research studies have shown that weekly applications of mancozeb (Manzate 75DF) protect against downy mildew when spray coverage is good and sprays are begun before disease appears. Some growers choose to include Ridomil Gold MZ 68WP in alternation with Manzate 75DF although this program is more costly. This year's test included a new product, Pristine 38WG, in rotation with Ridomil Gold MZ 68WP for downy mildew control. The program with Pristine 38WG and Ridomil Gold MZ 68WP in alternation was effective for downy mildew. It is likely that Pristine 38WG alternated with Manzate 75DF would also be effective but needs to be tested. In addition to downy mildew, Pristine 38WG has activity against the leaf blights including purple blotch and Stemphylium. In a field test for purple blotch and Stemphylium leaf blight, Pristine 38WG alternated with Bravo Weather Stik 6SC was a stand-out treatment.

Purple Blotch and Stemphylium Leaf Blight

Purple blotch first appears as small water-soaked lesions that quickly develop white centers. As they age, the lesions turn brown to purple, surrounded by a zone of yellow. Lesions can coalesce, girdle the leaf, and cause tip dieback. Occasionally, bulbs are infected through the neck or wounds on the scales. Spores of *Alternaria porri* can form repeatedly on lesions with cycles of low and high relative humidity. When free water is available, spores can germinate in 45-60 minutes at 82-97 °F. Spores can form after 15 hours of high relative humidity (greater than 90%) and can be spread by wind, rainfall, and irrigation. Fungal growth is favored by temperatures of 43-93 °F, with an optimum temperature of 77 °F. Old and young leaves injured by onion thrips are more susceptible to infection. Symptoms can appear 1-4 days after infection, and new spores can appear by the 5th day. The pathogen can overwinter in onion debris.

Stemphylium leaf blight is an occasional foliar problem in Michigan. Symptoms begin as small, light yellow to brown, water-soaked lesions that develop into elongated spots that turn dark olive brown to black with spore development. Coalescing spots can blight leaves but rarely affect the bulb. The pathogen normally invades dead and dying tissue. Disease development is favored by long warm periods with leaf wetness. Fungicides effective against purple blotch are also effective against Stemphylium leaf blight.

New Product Testing

Fungicides were tested for control of purple blotch at a grower cooperator's farm in 2004 (Table 1). 'Hamlet' onion seeds were planted on 20 April at a seed spacing of 2.75 in. to rows 10 in. apart on two-row beds centered 36 in. apart. Treatment plots consisted of one bed 20 ft long with 5 ft of unsprayed buffer between plots in the same bed. Eight treatments were replicated four times in a randomized complete block design. Fertilizer, herbicide, and insecticide applications were made according to commercial production practices. No irrigation was applied. Fungicides were applied with a CO₂ backpack sprayer equipped with two XR8003 flat fan nozzles spaced 19.5 in. apart and calibrated to deliver 50 gal/A at a nozzle pressure of 53 psi. Eleven weekly applications were made on 23 and 30 June; 7, 14, 21, and 28 July; 5, 12, 19, and 25 August; and 1 September. Disease assessments were recorded from plants in the center 10 ft of each plot on 20 August and 8 September. Onions in the center 10 ft of each plot were hand-harvested on 8 Sep, the foliage was removed using a mechanical topper, and bulbs were graded by size and weighed on 5 October.

Table 1. Fungicides tested on onion, 2004.

Product	Active ingredient(s)	Manufacturer	Registered
Bravo Weather Stik 6SC	chlorothalonil	Syngenta	yes
Cabrio 20WG	pyraclastrobin	BASF	yes
Captevate 68WDG	captan + fenhexamid	Arvesta	no
Dithane 75DF	mancozeb	Dow AgroSciences	yes
ManKocide 61.1DF	mancozeb + copper hydroxide	Griffin	yes
Manzate 75DF	mancozeb	Griffin	yes
Omega 4.17SC	fluazinam	Syngenta	no
Pristine 38WG	boscalid + pyraclostrobin	BASF	yes
Ranman 3.3SC	cyazofamid	ISK Biosciences	no
Reason 4.16SC	fenamidone	Bayer	no
Ridomil Gold MZ 68WP	mefenoxam + mancozeb	Syngenta	yes
Rovral 50WG	iprodione	Bayer	yes
Tanos 50WG	famoxadone + cymoxanil	DuPont	no

Purple blotch and Stemphylium leaf blight symptoms were detected at low levels on 12 August. Purple blotch was the primary disease and advanced nearly 5-fold in untreated plots during a 19-day period between 20 August and 8 September as temperatures increased to above normal levels (Table 2). Treatment programs that included Pristine 38WG or Tanos 50DF + Manzate 75DF were effective in limiting purple blotch to $\leq 26\%$, while the remaining treatments did not significantly reduce disease when compared to the untreated at the time of the final evaluation. Pristine 38WG alternated with Bravo

Weather Stik 6SC was the only treatment to significantly reduce *Stemphylium* leaf blight when compared to the untreated. All fungicide programs, except those containing ManKocide 61.1DF, reduced the percentage of necrotic leaf tissue when compared to the untreated. Percentages of small (< 2 in.), medium (2-3 in.), and large (> 3 in.) bulbs did not differ among treatments. Total bulb yields differed among treatments; however, yield differences did not correspond to foliar disease levels. Slight phytotoxicity affecting < 1% of the foliage occurred on leaf tips after 7 weekly applications of ManKocide 61.1DF, applied alone or mixed with Tanos 50DF.

Table 2. Efficacy of fungicides against purple blotch and *Stemphylium* leaf blight of onion.

Treatment and rate/A	Purple blotch (%) ^y		Stemphylium (%) ^x	Necrotic tissue (%) ^w	Bulb yield per 10-ft bed (lb)
	20 Aug	8 Sep			
Untreated.....	9.8 bcd ^v	46.8 c	11.3 b	56.3 d	36.2 ab
Tanos 50DF 8 oz + Manzate 75DF 3 lb alt. Manzate 75DF 3 lb.....	3.5 a	24.4 ab	7.5 ab	33.8 ab	37.6 ab
Tanos 50DF 8 oz + Manzate 75DF 3 lb alt. Manzate 75DF 3 lb + Rovral 50WG 1 lb.....	3.0 a	25.7 ab	5.0 ab	31.3 ab	38.1 ab
Tanos 50DF 8 oz + ManKocide 61.1DF 2 lb alt. ManKocide 61.1DF 3 lb.....	11.8 d	41.5 bc	7.5 ab	51.3 cd	40.9 a
Manzate 75DF 3 lb alt. Manzate 75DF 3 lb + Rovral 50WG 1 lb.....	3.9 a	28.1 abc	5.0 ab	37.5 abc	31.0 b
ManKocide 61.1DF 3 lb.....	11.2 cd	36.1 bc	7.5 ab	43.8 bcd	39.0 a
Pristine 38WG 18.5 oz alt. Bravo Weather Stik 6SC 1.5 pt..	4.9 ab	17.0 a	1.3 a	22.5 a	33.6 ab
Captevate 68WDG 5 lb.....	5.5 abc	32.4 bc	6.3 ab	40.0 bc	30.4 b

^z Application sequence: 1 = 23 Jun; 2 = 30 Jun; 3 = 7 Jul; 4 = 14 Jul; 5 = 21 Jul; 6 = 28 Jul; 7 = 5 Aug; 8 = 12 Aug; 9 = 19 Aug; 10 = 25 Aug; 11 = 1 Sep.

^y Leaf area with purple blotch symptoms.

^x Leaf area with *Stemphylium* leaf blight symptoms on 8 Sep.

^w Leaf area with necrotic tissue on 8 Sep.

^v Means within a column followed by the same letter are not significantly different according to the Waller-Duncan Bayesian k-ratio t-test (k-ratio = 100).