

Evaluation of hairy vetch plus rye mulch and a health-promoting product on leaf mold in organically-produced tomato, 2005.

The objective of this study was to evaluate hairy vetch plus rye mulch used alone or combined with applications of AgriLife for control of foliar diseases of tomato by comparing these treatments to tomatoes grown in bare-ground. AgriLife, a citrus acid product that reportedly promotes plant health, was applied to the ground early in plant growth as well as to foliage throughout the growing season. The experiment was conducted at the Long Island Horticultural Research and Extension Center in Riverhead, NY, in a field of Haven loam soil that has been assigned to research on organic vegetable production. Hairy vetch and rye were seeded on 8 Oct 04 to the entire experiment area. Non-fungicide-treated tomato seed was hot-water treated at 50°C for 25 minutes to control seed-borne bacterial pathogens and then seeded in an organic soil-less mix on 2 May 05 in a greenhouse. On 28 May the field was flail chopped to form a mulch layer. On 3 Jun plots receiving the bare-ground treatment were prepared by raking away the vetch/rye mulch then using a hand-held rototiller to incorporate remaining crop debris and prepare the plant bed. Seedlings were put outside to harden on 31 May and were no-till transplanted on 7 Jun with Neptune's Harvest Benefits of Fish (2-4-1 N-P-K) as a starter fertilizer. A tractor equipped with a fluted coulter and an S-tine was used to cut 4 in. deep strips through the field. Seedlings were placed in these holes by hand. There were 10 plants spaced 2 ft. apart in each single-row plot. Plots were spaced five ft. apart. A randomized complete block design with four replications was used. Drip irrigation tube was laid on the soil surface next to the plants. Plants were irrigated as needed. Bare-ground plots were rototilled again on each side of the planted row on 27 Jun. Peanut meal was applied at 625 lb/A (equivalent to 50 lb/A of N) and straw was placed around the base of plants (1/2 bale/plot) in all plots on 27 Jun. In addition to the straw, weeds were managed throughout the growing season by mowing between plots and hand weeding in the planted rows. Plants were pruned, staked, and trellised. AgriLife was applied using a CO₂-pressurized backpack sprayer with a single flat-fan nozzle boom. Each side of the planted row was treated with the boom held sideways to obtain thorough coverage of foliage, then a second pass was made around the plot with the boom directed on the soil on each side of the plot. AgriLife was applied at 1:200 on 13, 21, 28 Jun, 5, 12 Jul, as well as on 1, 8, 16, 23, and 30 Sep. In the middle of the season AgriLife was applied at a higher rate of 1:100 on 19, 22, 27 Jul, and 1, 5, 8, and 16 Aug. Entrust was applied to help control Colorado potato beetle on 8 and 25 Aug. Leaf mold incidence (percentage of plants infected per plot) and severity (percentage of leaf tissue infected per plot) were rated on 15, 27 Sep, 3, and 17 Oct. Canopy condition including defoliation was assessed on 23 Sep. Red and pink fruit were harvested five times on a weekly basis from 10 Aug to 5 Oct. Fruit were graded by size, counted, and weighed. Average monthly high and low temperatures (°F) were 81/61 in Jun, 84/67 in Jul, 85/69 in Aug, 79/62 in Sep, and 63/51 in Oct. Rainfall (in.) was 1.20, 1.36, 1.48, 3.46, and 20.32 for these months, respectively.

Leaf mold developed naturally and was first observed in the field on 6 Sep. Neither leaf mold incidence nor severity were lower for tomato grown in hairy vetch mulch than tomato grown in bare-ground. Hairy vetch mulch has suppressed disease in other experiments and been shown to activate defense genes in tomato. In the current experiment there may not have been sufficient hairy vetch biomass since it was grown with rye. Vetch plus rye is a commonly used combination cover crop. Tomato plants treated with AgriLife had numerically lowest disease ratings at all assessments with incidence on 27 Sep being significantly lower than the other treatments. There were no significant differences in yield among treatments.

Treatment ^y	Leaf Mold Disease Ratings ^z					Yield (lbs)		
	Disease Incidence (%)			Disease severity (%)		2-3 inch fruit	>3 inch fruit	All fruit
	12-Sep	27-Sep	3-Oct	17-Sep	3-Oct			
AgriLife + Vetch Mulch...	43.1	51.9 b ^x	84.7	3.8	10.3	13.9	16.8	30.7
Rototilled.....	56.3	84.4 a	100.0	9.6	17.7	10.0	7.5	32.1
Vetch Mulch.....	67.5	77.5 a	100.0	15.7	22.9	10.8	22.1	18.3
Treatment <i>P</i> -value	0.2104	0.0020	0.1338	0.0573	0.0639	0.8577	0.0704	0.2417

^z Disease Incidence refers the percentage of plants in each plot that showed symptoms of leaf mold. A plant was considered infected if any part was showing symptoms (leaves, petioles, stems etc). Disease severity refers to the level of infection of each of these plants in the plot.

^y AgriLife 1:200 was applied on 13, 21, 28 Jun, 5, 12 Jul, 1, 8, 16, 23, and 30 Sep. In the middle of the season AgriLife was applied at a higher rate of 1:100 on 19, 22, 27 Jul, 1, 5, 8, and 16 Aug.

^x Numbers followed by the same letter are not statistically different from each other according to Fisher's protected LSD (*P*=0.05).