

BLUEBERRY (*Vaccinium corymbosum* 'Blueray')
Botrytis blossom blight; *Botrytis cinerea*
Anthracnose fruit rot; *Colletotrichum fioriniae*
Alternaria fruit rot; *Alternaria spp.*

K. A. Neugebauer, R. W. Sysak, R. L. Smith, and T. D. Miles
Department of Plant, Soil and Microbial Sciences
Michigan State University, East Lansing, MI

Evaluating fungicides for control Botrytis blossom blight and anthracnose fruit rot in blueberries, 2022.

The experiment was conducted in a mature blueberry planting at the Trevor Nichols Research Center (TNRC) in Fennville, MI. Bushes were spaced at 5 x 10 ft. Treatments were applied to 3-bush plots and were replicated four times in a randomized complete block design. Sprays were applied using a research sprayer equipped with six 5-gal tanks, a 12-volt 3.8-gpm diaphragm pump set at 55 psi, and an XR TeeJet 8002VS nozzle on a 5-ft spray boom. Spray volume was 40 gpa. Spray dates and phenological stages were as follows: 6 May (early green tip), 14 May (late green tip), 20 May (pink bud), 27 May (bloom), 2 June (petal fall), 14 June (green fruit), 22 June (green fruit), 29 June (green fruit), and 6 July (green/blue fruit). Total rainfall between sprays was 0.36, 0.34, 0.95, 0.03, 1.85, 0.25, 0.12, and 0.68 in, respectively. Bushes were sprayed with *Colletotrichum fioriniae* conidia at a concentration of 1×10^6 spores/ml in each plot until runoff on 13 June and 20 June. The number of botrytis blossom blight infected shoots were assessed on the middle bush of each plot on 29 May. The number of Anthracnose fruit rot infected fruit was assessed on the middle bush in each plot on 21 July. On 14 July, fifty ripe berries per plot were harvested, placed equidistantly on metal screens in aluminum trays and incubated at room temperature and 100% relative humidity. Fourteen days later, the berries were rated for post-harvest diseases. This rating is denoted as 'post-harvest rating' below. All bushes were scouted for phytotoxicity throughout the season.

Blossom blight pressure was high in this trial as the untreated control had 81.5 blighted shoots per bush. Pristine applied starting at pink bud resulted in 79% control compared to the untreated, while Abound + Aprovia, Switch, or Abound applied starting at pink bud resulted in 87-89% control.

Anthracnose fruit rot pressure was very high as the untreated control had 97 infected fruit per bush at the time of rating. Lifegard or Elatus applied starting at pink bud resulted in 83% control compared to the untreated control, while Switch, Pristine, or Abound applied starting at pink bud resulted in 99-100% control.

Treatment, rate/A	Application timing ^z	Number of <i>Botrytis cinerea</i> blighted shoots per bush, 29 May	Control [%] ^x
Untreated		81.5 a	
Echo 720 4 pt Pristine 23 oz	1, 2, 3, 4, 5, 6, 7, 8, 9	16.8 b	[79]
Echo 720 4 pt Stargus 2 qt	1, 2, 3, 4, 5, 6, 7, 8, 9	15.5 bc	[81]
Echo 720 4 pt Lifegard 4.5oz/100gal	1, 2, 3, 4, 5, 6, 7, 8, 9	15.3 bcd	[81]
Echo 720 4 pt Trivapro 20.7 floz	1, 2, 3, 4, 5, 6, 7	13.3 bcde	[83]
Echo 720 4 pt Elatus 7.3 oz	1, 2, 3, 4, 5, 6, 7, 8, 9	12.0 cdef	[85]
Echo 720 4 pt Aprovia 10.5 floz	1, 2, 3, 4, 5, 6, 7, 8, 9	11.8 def	[86]
Echo 720 4 pt Omega 500F	1, 2, 3, 4, 5, 6, 7, 8, 9	11.8 def	[86]
Echo 720 4 pt Abound 15.5 floz + Aprovia 10.5 floz	1, 2, 3, 4, 5, 6, 7, 8, 9	11.0 ef	[87]
Echo 720 4 pt Switch 62.5WG 11 oz	1, 2, 3, 4, 5, 6, 7, 8, 9	10.3 ef	[87]
Echo 720 4 pt Abound 15.5 floz	1, 2, 3, 4, 5, 6, 7, 8, 9	8.5 f	[89]

^zSpray dates: 1 = 6 May (early green tip), 2 = 14 May (late green tip), 3 = 20 May (pink bud), 4 = 27 May (bloom), 5 = 2 June (petal fall), 6 = 14 June (green fruit), 7 = 22 June (green fruit), 8 = 29 June (green fruit), 9 = 6 July (blue fruit). Note only sprays 1 – 4 were applied before the blossom blight rating on 29 May.

^xBracketed values denote percent control relative to the untreated check.

Note: Trivapro and Elatus and not labeled in blueberry.

Treatment, rate/A	Application timing ^z	Number of <i>Collectotrichum acutatum</i> infected fruit per bush, 21 July ^y	Control [%] ^x
Untreated		97.0 a	
Echo 720 4 pt Lifegard 4.5oz/100gal	1, 2, 3, 4, 5, 6, 7, 8, 9	16.3 b	[83]
Echo 720 4 pt Elatus 7.3 oz	1, 2, 3, 4, 5, 6, 7, 8, 9	16.3 b	[83]
Echo 720 4 pt Stargus 2 qt	1, 2, 3, 4, 5, 6, 7, 8, 9	14.8 bc	[85]
Echo 720 4 pt Trivapro 20.7 floz	1, 2, 3, 4, 5, 6, 7	11.8 bc	[87]
Echo 720 4 pt Omega 500F 20 floz	1, 2, 3, 4, 5, 6, 7, 8, 9	9.5 c	[90]
Echo 720 4 pt Abound 15.5 floz + Aprovia 10.5 floz	1, 2, 3, 4, 5, 6, 7, 8, 9	5 d	[95]
Echo 720 4 pt Aprovia 10.5 floz	1, 2, 3, 4, 5, 6, 7, 8, 9	4.3 d	[95]
Echo 720 4 pt Switch 62.5WG 11 oz	1, 2, 3, 4, 5, 6, 7, 8, 9	0.05 e	[99]
Echo 720 4 pt Pristine 23 oz	1, 2, 3, 4, 5, 6, 7, 8, 9	0.0 e	[100]
Echo 720 4 pt Abound 15.5 floz	1, 2, 3, 4, 5, 6, 7, 8, 9	0.0 e	[100]

^z Spray dates: 1 = 6 May (early green tip), 2 = 14 May (late green tip), 3 = 20 May (pink bud), 4 = 27 May (bloom), 5 = 2 June (petal fall), 6 = 14 June (green fruit), 7 = 22 June (green fruit), 8 = 29 June (green fruit), 9 = 6 July (blue fruit).

^x Bracketed values denote percent control relative to the untreated check.

^y Values shown are actual means; statistical analysis was performed on square-root(x) transformed data.

Note: Trivapro and Elatus and not labeled in blueberry.

Treatment, rate/A	Application timing ^z	Post-harvest rating of Anthracnose fruit rot	Post-harvest rating of Alternaria fruit rot	Post-harvest rating of Botrytis fruit rot	Percent Marketable ^w
		Incidence (%) ^x	Incidence (%) ^y	Incidence (%) ^y	
Untreated		91.0 a ^x	1.0 d ^y	1.5 a ^y	6.5
Echo 720 4 pt Aprovia 10.5 floz	1, 2, 3, 4, 5, 6, 7, 8, 9	1.5 b	15.0 a	0.5 a	82
Echo 720 4pt Abound 15.5 floz + Aprovia 10.5 floz	1, 2, 3, 4, 5, 6, 7, 8, 9	0.0 c	13.0 ab	0.5 a	86
Echo 720 4pt Switch 62.5WG 11oz	1, 2, 3, 4, 5, 6, 7, 8, 9	0.5 bc	10.5 ab	1.0 a	87
Echo 720 4pt Elatus 7.3 oz	1, 2, 3, 4, 5, 6, 7, 8, 9	2.5 b	8.5 abc	0.0 a	88
Echo 720 4pt Stargus 2 qt	1, 2, 3, 4, 5, 6, 7, 8, 9	0.0 c	10.5 abc	1.5 a	88
Echo 720 4pt Omega 500F 20 floz	1, 2, 3, 4, 5, 6, 7, 8, 9	0.5 bc	10.5 ab	0.0 a	88.5
Echo 720 4pt Abound 15.5 floz	1, 2, 3, 4, 5, 6, 7, 8, 9	0.0 c	9.0 abc	2 a	89
Echo 720 4pt Pristine 23oz	1, 2, 3, 4, 5, 6, 7, 8, 9	1.0 bc	6.5 abc	2 a	89.5
Echo 720 4pt Trivapro 20.7 floz	1, 2, 3, 4, 5, 6, 7	0.5 bc	5.0 bc	0.5 a	93.5
Echo 720 4pt Lifegard 4.5 oz/100gal	1, 2, 3, 4, 5, 6, 7, 8, 9	0.5 bc	5.5 bc	0.5 a	93.5

^z Spray dates: 1 = 6 May (early green tip), 2 = 14 May (late green tip), 3 = 20 May (pink bud), 4 = 27 May (bloom), 5 = 2 June (petal fall), 6 = 14 June (green fruit), 7 = 22 June (green fruit), 8 = 29 June (green fruit), 9 = 6 July (blue fruit).

^y Column means followed by the same letter are not significantly different according to Fisher's Protected LSD test ($P \leq 0.05$).

^x Values shown are actual means; statistical analysis was performed on square-root(x) transformed data

^w Other fruit rot fungi were observed and not reported

Note: Trivapro and Elatus and not labeled in blueberry.