STRAWBERRY: FUNGICIDE EFFICACY - CONVENTIONAL

Fungicide[1]	Resistance risk (FRAC)[2]	Gray mold	Powdery mildew	Anthrac - nose	Rhizopus/ Mucor rot	Phytophthora diseases[3]	Common leaf spot	Angular leaf spot
Miravis Prime	medium (7/12)	5	5	3	NL (4)	NL	NL	NL
Merivon	medium (7/11)	5[R]	5[R]	ND	NL (4)	NL	0	NL
Kenja, Zenby	high (7)	5	3	ND	NL (2)	NL	ND	NL
Pristine	medium (7/11)	5[R]	4[R]	ND	NL	NL	0	NL
Switch[5]	medium (9/12)	5[R]	2	4	4	NL	NL	NL
Cannonball[5]	high (12)	5[R]	NL	4	4	NL	NL	NL
Elevate	high (17)	5[RR]	NL (0)	NL (0)	NL	NL	NL (0)	NL
Inspire Super	medium (3/9)	5[R]	5	4	5	NL	ND	NL
Protocol	medium (1/3)	4[R]	4[R]	3	NL	NL	4	NL
Captevate**	medium (M4/17)	4[R]	NL	4	NL	NL	NL	NL
Rovral, Iprodione, Nevado, etc.[7]	high (2)	4[R]	NL (0)	0	NL	NL	0	NL
Thiram	low (M3)	4	NL (0)	3	NL	NL	0	NL
Captan	low (M4)	4	NL (0)	NL (2)	NL (2)	NL	NL (0)	NL
PH-D, Oso	high (19)	3	4	3	NL	NL	NL	NL
Regev	medium (3/BM 01)	3	5	4	5	NL	ND	NL
Scala	high (9)	3	NL (2)	NL	NL	NL	NL	NL
Fontelis	high (7)	2[R]	4[R]	NL	NL	NL	NL	NL
Luna Sensation	medium (7/11)	1[R]	5	3[R]	2	NL	ND	NL
Luna Privilege **(foliar)/ Velum One (soil)[4]	high (7)	1/NL	5/3	NL	ND	ND	ND	NL
Luna Tranquility	medium (7/9)	1	5	NL	1	NL	ND	NL
Tesaris	high (7)	1	ND	NL	NL	NL	NL	NL
Topsin-M, T-Methyl, Incognito, etc.[6]	high (1)	1[RR]	4	0	NL	NL	NL (3)	NL
Intuity	high (11)	1[RR]	2[R]	NL	NL	NL	NL (0)	NL
Quadris, Abound, Acadia LFC, Arius, etc.	high (11)	1[RR]	3[R]	4[R]	NL (2)	NL	NL	NL
Evito*	high (11)	1[RR]	3[R]	2[R]	NL	NL	NL	NL
Flint Extra	high (11)	1[RR]	4[R]	2[R]	NL	NL	NL	NL
Cabrio	high (11)	1[RR]	2[R]	3[R]	NL (2)	NL	0	NL
Quilt Xcel, Avaris 2XS, etc.	medium (3/11)	NL (3)[R]	5[R]	0[R]	NL (0)	NL	NL	NL
Quintec	high (13)	NL (3)	5[R]	NL (4[R])	NL (0)	NL	NL (0)	NL
Quadris Top, Acadia ESQ*,[8], etc.	medium (3/11)	NL (2)[R]	5[R]	4[R]	NL	NL	3	NL
Bumper, Tilt, etc.	high (3)	NL (0)	5[R]	NL (3)	NL (0)	NL	4	NL
Mettle, Perissim, etc.	high (3)	NL	5[R]	NL	NL	NL	ND	NL
Procure	high (3)	NL	5[R]	NL (2)	NL	NL	NL (0)	NL
Rally	high (3)	NL (0)	5[R]	NL (3)	NL	NL	4	NL
Rhyme[9]	high (3)	NL (0)	5[R]	NL	NL	NL	NL	NL
Torino	high (U6)	NL	5[R]	NL	NL	NL	NL	NL
Gatten*	high (U13)	NL	5	NL	NL	NL	NL	NL
Prolivo, Hoshi	High (50)	NL	4	NL	NL	NL	NL	NL
Sulfur	low (M2)	NL	4	NL	NL	NL	NL	NL
Cevya	high (3)	NL	3[R]	NL	NL	NL	NL	NL
Zivion S[5]	low (48)	NL (0)	NL	4	NL	NL	NL	NL
Fungi-Phite, K-Phite, ProPhyt, etc.	high (P07,33)	NL	0	0	NL	4	NL	NL (2)
Orondis Gold	high (4/49)	NL	NL	NL	NL	4	NL	NL
Aliette[3,9], Legion**	high (P07,33)	NL	NL	NL	NL	4	NL	NL
Ridomil Gold SL, Ultra Flourish, etc.[9]	high (4)	NL	NL	NL	NL	4	NL	NL
Copper, etc.[10]	low (M1)	0	0	0	0	0	0	4[10]
Actigard	high (P01)	NL	NL	NL	NL	NL	NL	3

Rating: 5 = excellent and consistent, 4 = good and reliable, 3 = moderate and variable, 2 = limited and/or erratic, 1 = minimal and often ineffective, 0 = ineffective, NL = not on label, ND = no data. [R] =Resistance in this pathogen has been documented but performance is not fully compromised. [RR] =High level of resistance documented in this pathogen and performance is significantly compromised.

Footnotes continued on next page…

* Registration pending in California.
** Not registered, label withdrawn or inactive in California.

[1] To reduce the risk of resistance development, start fungicide treatment with a multi-site mode of action; rotate or mix fungicides with different mode of action FRAC numbers for subsequent applications, use labeled rates (preferably the upper range), and limit the total number of applications per season.'

[2] Code numbers are assigned by the Fungicide Resistance Action Committee (FRAC) according to different modes of actions (for more information, see http://www.frac.info/). To minimize resistance, make no more than one application of a fungicide with a "high" or "medium" resistance risk of the same FRAC code before rotating to a fungicide with a different FRAC code. Resistance risk determined based on single-site = high risk; premix = medium risk; multi-site = low risk.

[3] Efficacy rating for soil applied control of Phytophthora crown rot and leather rot of fruit.

[4] Velum One is a fluopyram formulation for chemigation. Soil applications are designed for nematode management but may also suppress powdery mildew.

[5] Apply as a transplant dip after digging/harvesting and prior to cold storage (nursery use) or prior to planting (field use).

[6] Generic products may not be all listed and "etc." indicates that other products may be available that have the same active ingredient.

[7] Apply as preplant dip or foliar spray; do not apply after first fruiting flower.

[8] Not for use in nurseries, on nursery transplants, or greenhouses (check label for details).

[9] Foliar applications provide systemic treatment.

[10] Apply at low rates since phytotoxicity (reddening of older leaves, slow growth and yield reduction) has been documented with repeated sprays.

STRAWBERRY - FUNGICIDE EFFICACY - BIOCONTROLS AND NATURAL PRODUCTS

Fungicide trade names	Active ingredient	Resistance risk (FRAC)[1]	Gray mold	Powdery mildew	Anthrac - nose	Rhizopus/ Mucor rot	Phytophthora diseases[2]	Common leaf spot	Angular leaf spot
Oso	Polyoxin D zinc salt	medium (19)	3	4	3	NL	NL	ND	NL
Microthiol Disperss, etc. [3]	sulfur	low/ (M2)	NL	4	NL	NL	NL	NL	NL
All Phase	*potassium sorbate; sodium lauryl sulfate*	low (NC)	ND	4	ND	NL	NL	ND	ND
Serenade ASO, etc.[3]	*Bacillus subtilis* QST 713	low (BM 02)	0	3	0	NL (0)	NL (0)	NL (0)	NL
Sonata	*Bacillus pumilis* QST 2808	low (BM 02)	NL (0)	3	0	NL	NL	NL	NL
Timorex Act	tea tree oil	low (BM 01)	0	3	ND	0	ND	NL	ND
ProBlad Verde, Fracture[3]	Banda de *Lupinus albus* doce	low/(NC)	0	3	ND	ND	NL	ND	NL
Aviv, BACIX, etc.	*Bacillus subtilis* IAB/BS03	low (BM 02)	0	3	ND	NL	ND	ND	NL
Kaligreen, MilStop, etc.	potassium bicarbonate	low (/NC)	0	3	NL	NL	NL	NL	NL
M-Pede, Des-X, etc.[3]	potassium salts of fatty acids	medium (28)	NL	2	NL	NL	NL	NL	NL
Double Nickel	*Bacillus amylo-liquefaciens* D747	low (BM 02)	0	2	0	NL	0	NL	1
Actinovate	*Streptomyces lydicus* WYEC 108	low (BM 02)	0	2	NL	NL	0	NL	1
Serifel	*Bacillus amylo-liquefaciens* MBI 600	low (BM 02)	0	2	0	NL	0	ND	2
Taegro	*Bacillus amylo-liquefaciens* FZB24	low (BM 02)	0	2	0	NL	ND	NL	NL (2)
Theia	*Bacillus subtilis* AFS032321	low (BM 02)	0	2	0	NL	0	NL	ND
Regalia	*Reynoutria sachalinensis* extract	low (P5)	0	2	ND	NL	ND	NL	NL

Table continued on next page…

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Stargus	*Bacillus amylo-liquefaciens* F727	low (BM 02)	0	1	ND	NL	NL (1)	NL (1)	NL (1)
Copper, etc.[4]	Copper	low (M 01)	0	0	0	0	0	0	4[5]
Cinnerate	cinnamon oil	low (BM 01)	0	ND	NL	ND	NL	NL	NL
Lalstop G46	*Clonostachys rosea* J1446	low (BM 02)	2	0	NL	NL	ND	ND	ND
Oxidate, Jet-Ag, etc.	Hydrogen peroxide; peroxyacetic acid	low (NC)	0	0	NL	NL	NL	NL	2
Julietta	*Saccharomyces cerevisiae* LAS02	low (BM 02)	0	NL	NL	NL	NL	NL	NL
Procidic, etc.	citric acid	low (NC)	0	NL	NL	NL	0	NL	NL
Rango	cold pressed neem oil	low (NC)	2	ND	ND	NL	0	0	NL
BotryStop	*Ulocladium oudemansii* U3	low (BM 02)	0	NL	NL	NL	NL	NL	NL
Botector	*Aureobasidium pullulans* DSM 14940; DSM 14941	low (BM 02)	0	NL	ND	NL (1)	NL	NL	NL
Howler	*Pseudomonas chlororaphis* AFS009	low (BM 02)	0	NL (2)	NL	NL	ND	ND	0
Veg'Lys	garlic oil	Unknown/ (NC)	0	NL	0	NL	0	0	ND
Vacciplant	Laminarin	Low (P04)	0	ND	ND	ND	ND	ND	ND

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