Table S1. Active ingredients, modes of action, and characteristics of fungicides used in this study.

Fungicide	Active Ingredient	Target Site and Mode of Action	Resistance Risk	Fungicide Type	Key Characteristics	References
Azoxystrobin	Azoxystrobin	C3: Complex III, cytochrome bc1 Qo-site ubiquinol oxidase (cytochrome b)	High	Methoxyacrylate (QoI)	Broad-spectrum, high efficiency, strong endosmosis and penetration, long duration	[1, 2]
Triadimefon	Triadimefon	G1: Sterol biosynthesis (C14-demethylation, erg11/cyp51)	Moderate	Triazole (DMI)	High efficiency, long persistence, endosmosis	[3-5]
Myclobutanil	Myclobutanil	G1: Sterol biosynthesis (C14-demethylation, erg11/cyp51)	Moderate	Triazole (DMI)	High efficiency, long persistence, endosmosis	[6, 7]
Polyoxin B	Polyoxin B	H4: Glucan synthesis (chitin synthase / gibberellin synthase)	Moderate	Antibiotic fungicide	Protective, therapeutic, strong endosmosis conductivity	[8, 9]
Bacillus subtilis	*Bacillus subtilis*	F6: Disruption of fungal membranes via microbial action	Low	Microbial-derived fungicide	Strong endosmosis, stability, biological control mechanism	[10-12]
Physcion	Physcion	H4: Glucan synthesis	Low	Plant-derived	Protective,	[13, 14]

	(Emodin derivative)	(chitin synthase inhibition)		fungicide	endosmosis conductivity	
Carvacrol	Carvacrol (from oregano)	Multi-site: membrane disruption and metabolic interference	Low	Plant-derived fungicide	Broad-spectrum, high efficiency, endosmosis	[15, 16]
Matrine	Matrine (from Sophora)	Multi-site contact activity	Low	Plant-derived fungicide	Touch-activated, endosynthetic, systemic	[17, 18]
Osthole	Osthole (from Cnidium)	Multi-site contact activity	Low	Plant-derived fungicide	Touch-activated, endosynthetic, systemic	[19]

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