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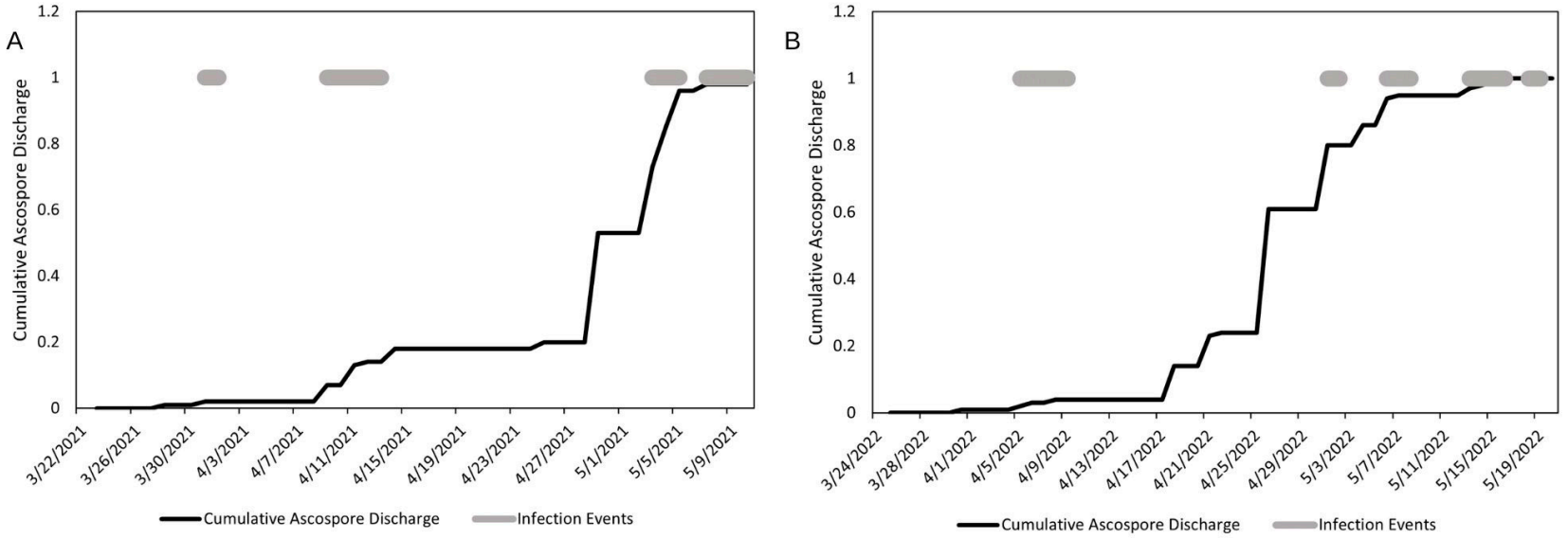
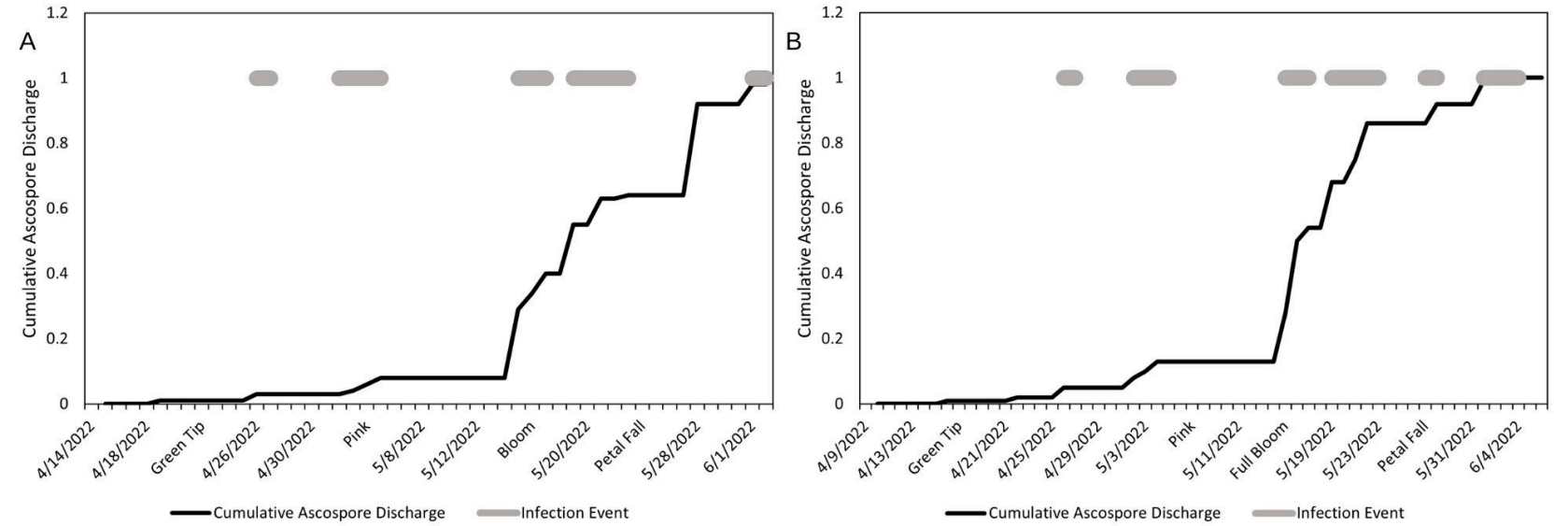
Supplementary Data

Supplementary Figure S1. Cumulative *Venturia inaequalis* ascospore discharge and primary scab infection events (of more than one day) data from Network for Environment and Weather Application's apple scab models based on data collected from the weather station located at Penn State University Fruit Research and Extension Center: (A) experiment 1 and (B) experiment 2.



Supplementary Figure S2. Cumulative *Venturia inaequalis* ascospore discharge and primary scab infection events (of more than one day) data from Network for Environment and Weather Application's apple scab models based on data collected from the weather station located at New Hampshire sites: (A) experiment 3 and (B) experiment 4.



Supplementary Table S1. Apple scab infection events and rainfall collected from Network for Environment and Weather Application's apple scab models based on data collected from the weather station located at each site (NEWA 2023; https://newa.cornell.edu/).

	Primary Scab Infection Events	Secondary Scab Infection Events	Rain (in) (April – Oct)
Experiment 1: FREC 2021	5	25	25.22
Experiment 2: FREC 2022	8	21	24.62
Experiment 3: NH On-Farm #1	6	13	15.91
Experiment 4: NH On-Farm #2	7	17	21.34

Supplemental Table S2. Mean disease incidence ± standard error on 'Rome' leaves from the 2021 Penn State University Fruit Research and Extension Center research trial (Experiment 1).[1, 2]

	Water Control	**GS**	**C**	**RR**	**RR+C**
Powdery Mildew Incidence (%)	31.8±1.8	17.4±1.5	25.7±1.8	21.9±1.9	22.7±2.1
Rust Incidence (%)	0.3±0.1	0.2±0.2	1.3±0.4	1.0±0.3	1.3±0.4

[1] Treatments evaluated were water control, grower standard (GS), chitosan (C), reduced risk (RR), and a reduced risk and chitosan mixture (RR+C).

[2] Within a disease measurement, treatment means followed by different letters are significantly different (α=0.05) as determined by the Tukey HSD Post-hoc test.

Supplemental Table S3. Mean disease incidence or russet severity (score 0-6) ± standard error on 'Dabinett' and 'Wickson' harvested apples from the 2022 New Hampshire on-farm site #2 (Experiment 4).[1, 2]

		Dabinett			Wickson		
		GS	**GS+C**	**GS+B+C**	**GS**	**GS+C**	**GS+B+C**
Harvested Fruit	Powdery Mildew Incidence (%)	18.7±8.1	8.0±3.7	24.0±6.7	85.3±6.7	73.0±10.1	76.0±2.3
	Russet Score (0-6)	0.2±0.1	0.2±0.05	0.3±0.1	1.6±0.1	1.4±0.1	1.3±0.1
	Flyspeck Incidence (%)	5.3±2.7	2.0±2.0	6.0±3.5	2.7±1.3	1.0±1.0	0.0±0.0

[1] Treatments evaluated were grower standard control (GS), grower standard + chitosan (GS+C), and grower standard + biopesticide + chitosan combination (GS+B+C).

[2] Within a disease measurement and within a cultivar (Dabinett, Wickson), treatment means followed by different letters are significantly different (α=0.05) as determined by the Tukey HSD Post-hoc test.