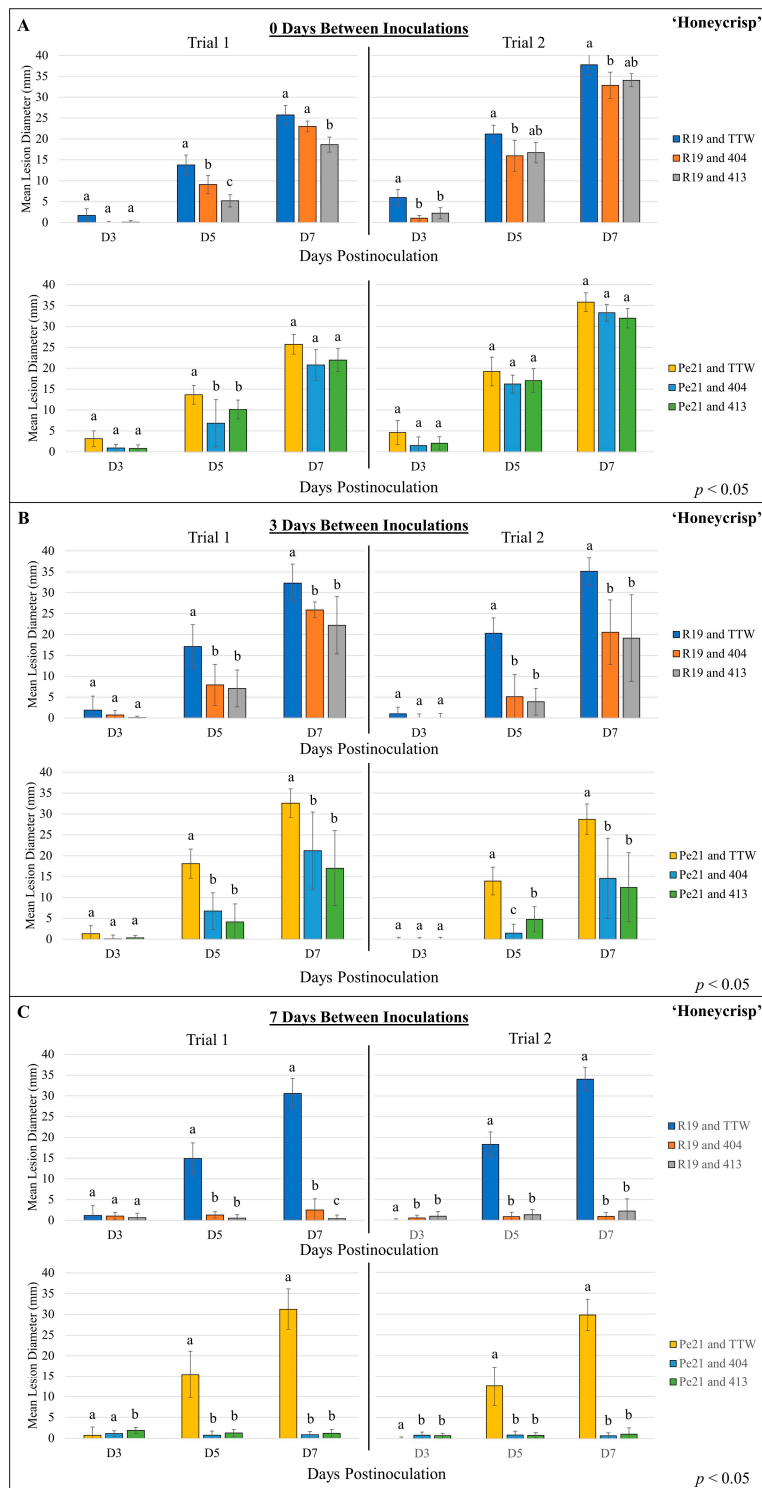
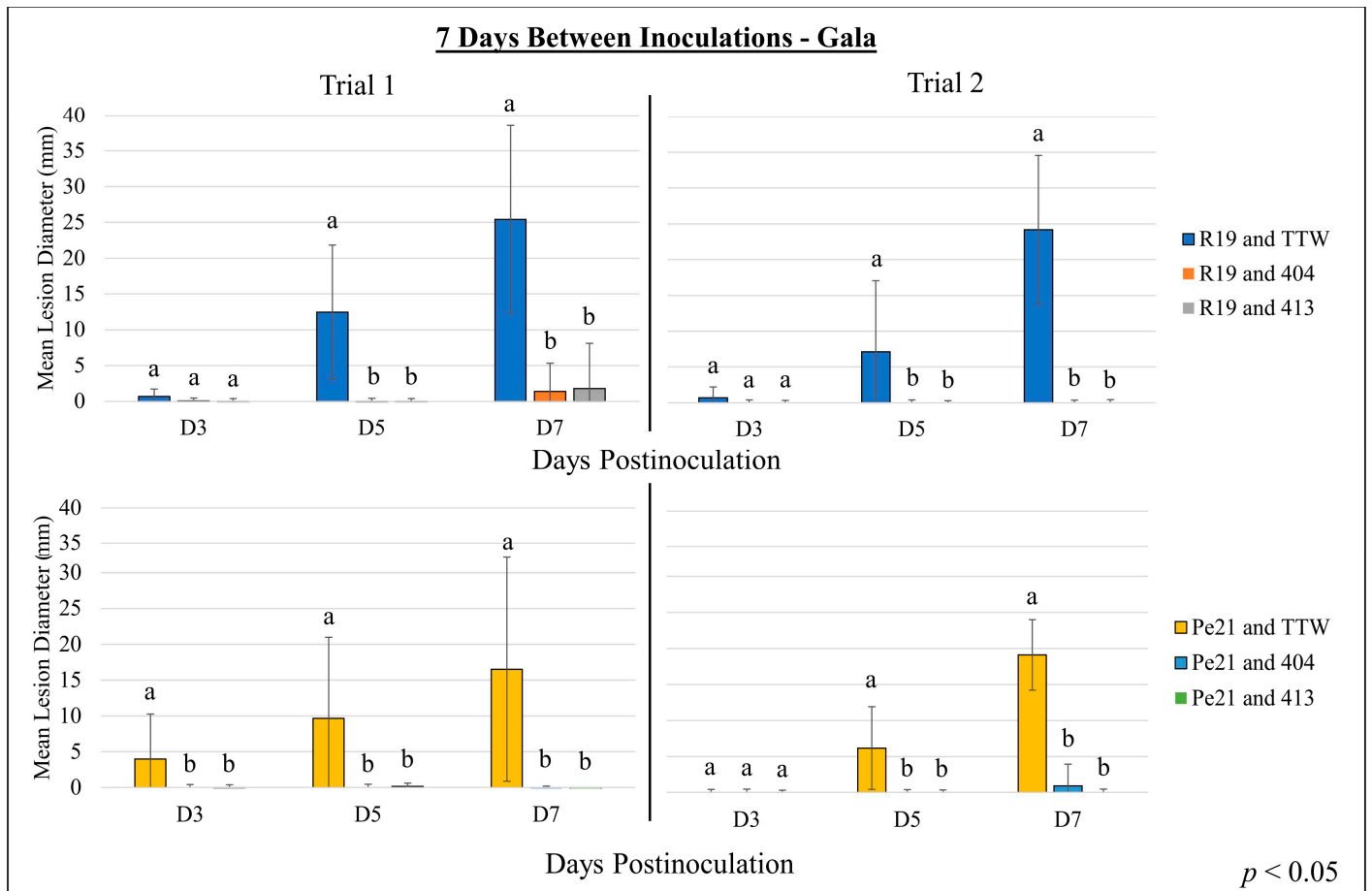


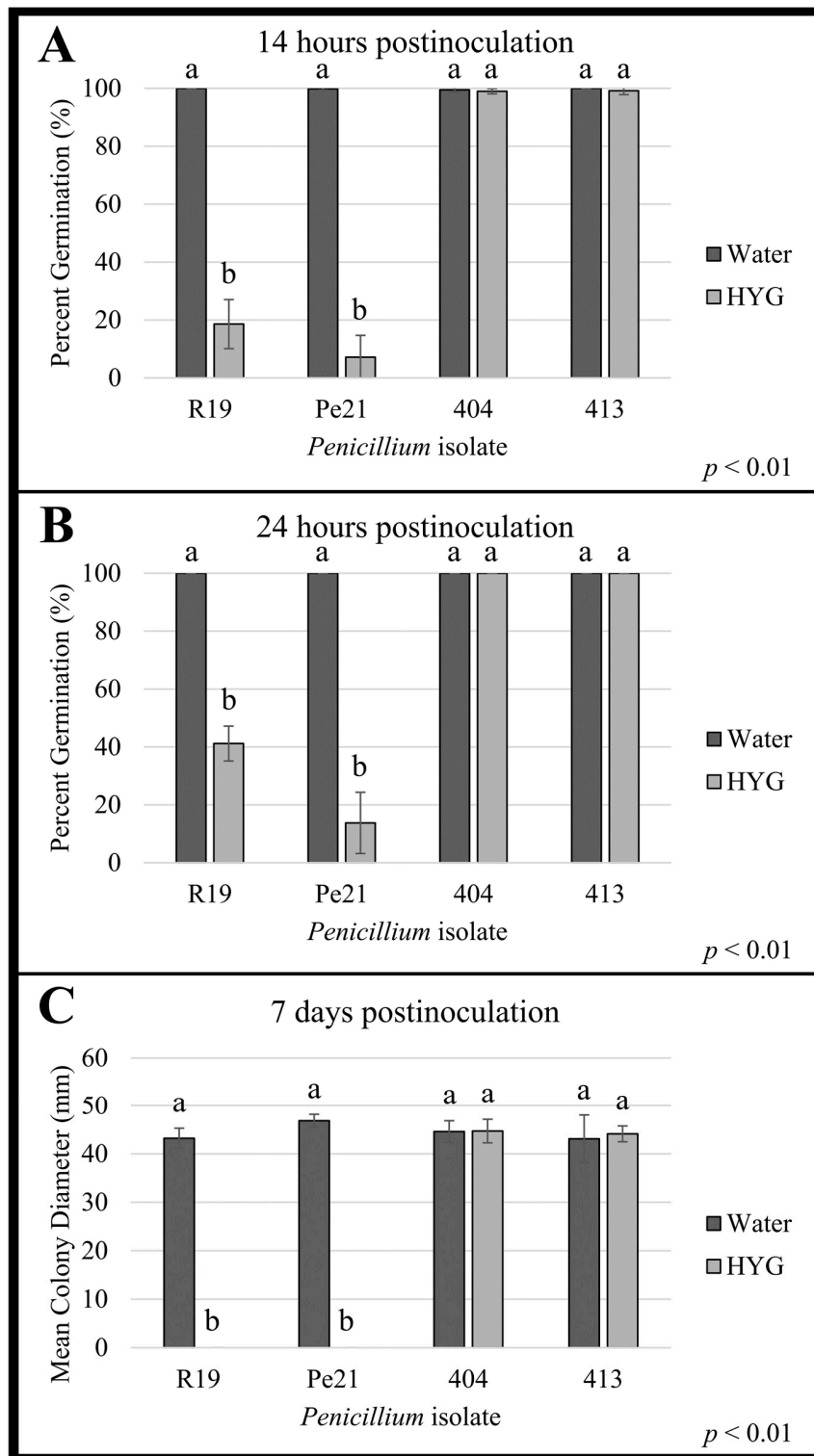
## Supplementary Materials



**Figure S1.** 'Honeycrisp' apples co-inoculated with *P. chrysogenum* and *P. expansum* isolates at different times. Mean lesion diameter of wounds inoculated with *P. expansum* R19 and Pe21 at A) 0, B) 3, and C) 7 days after *P. chrysogenum* 404 and 413 inoculation into wounded 'Honeycrisp' apples (0, 3, and 7 DBI). All measurements were collected at 3, 5, and 7 days (D3, D5, and D7) postinoculation of the *P. expansum* inoculum, with the mean wound diameter of TTW-inoculated fruit subtracted from each strain. Error bars represent standard deviation. An ANOVA with Tukey's HSD post hoc test ( $p < 0.05$ ), or a Kruskal-Wallis test with Wilcoxon post hoc test ( $p < 0.05$ ,  $n = 5$ ) was performed to determine significance between inoculum at each timepoint. Values with the same letter are not significantly different. DBI = days between inoculations.



**Figure S2.** ‘Gala’ apples co-inoculated with *P. chrysogenum* and *P. expansum* isolates at different times. Mean lesion diameter from wounds inoculated with *P. expansum* R19 and Pe21 at 7 days after *P. chrysogenum* 404 and 413 inoculation into wounded ‘Gala’ apples (7 DBI). All measurements collected at 3, 5, and 7 days (D3, D5, and D7) postinoculation of the *P. expansum* inoculum, with the mean wound diameter of TTW-only inoculated fruit subtracted from each strain. Error bars represent the standard deviation. A Kruskal-Wallis test was performed with Wilcoxon post hoc test ( $p < 0.05$ ,  $n = 5$ ) to determine significance between strains at each timepoint. Values with the same letter are not significantly different. DBI = days between inoculations.



**Figure S3.** Conidial germination and radial growth of *Penicillium* spp. isolates following hygromycin treatment. Germination of *Penicillium expansum* R19 and Pe21, and *P. chrysogenum* 404 and 413 after A) 14 hours and B) 24 hours after exposure to water or hygromycin (HYG; 100 ppm), and C) Radial growth of the four fungal isolates 7 days postinoculation. A Student's *t*-test or Mann-Whitney U test was performed to determine significance between treatments for each individual isolate ( $p < 0.01$ ,  $n = 6$ ), and error bars represent standard deviation. Values with the same letter are not significantly different.

**Table S1.** Re-isolation and growth of *Penicillium* spp. strains on selective media, containing hygromycin B, recovered from apple fruit cultivars ‘Fuji’, ‘Gala’, ‘Golden Delicious’, and ‘Honeycrisp’ 7 days postinoculation<sup>a</sup>

Strain	Apple Cultivar	PDA	PDA + hygromycin B (100 ppm)
<i>Penicillium expansum</i> R19	‘Fuji’	+	-
	‘Gala’	+	-
	‘Golden Delicious’	+	-
	‘Honeycrisp’	+	-
<i>Penicillium expansum</i> Pe21	‘Fuji’	+	-
	‘Gala’	+	-
	‘Golden Delicious’	+	-
	‘Honeycrisp’	+	-
<i>Penicillium chrysogenum</i> 404	‘Fuji’	+	+
	‘Gala’	+	+
	‘Golden Delicious’	+	+
	‘Honeycrisp’	+	+
<i>Penicillium chrysogenum</i> 413	‘Fuji’	+	+
	‘Gala’	+	+
	‘Golden Delicious’	+	+
	‘Honeycrisp’	+	+
TTW	‘Fuji’	-	-
	‘Gala’	-	-
	‘Golden Delicious’	-	-
	‘Honeycrisp’	-	-

<sup>a</sup>Growth on agar medium indicated with ‘+’, no growth indicated with ‘-’. TTW = Tween-Treated Water control. PDA = Potato Dextrose Agar.

**Table S2.** Wound sizes (expressed as mean lesion diameter in mm) caused by *P. chrysogenum* and *P. rubens* spore suspensions inoculated in wounded apple fruit 14 days postinoculation.

Isolate	‘Golden Delicious’	‘Honeycrisp’	‘Fuji’
<i>P. chrysogenum</i> DTO 275-D7	3.5 ± 0.72	0	0.76 ± 0.44
<i>P. chrysogenum</i> DTO 431-E3	3.34 ± 1.51	0	0
<i>P. chrysogenum</i> DTO 402-A9	3.82 ± 1.29	0	0
<i>P. chrysogenum</i> DTO 382-H5	3.4 ± 1.10	0 ± 1.97	0
<i>P. rubens</i> DTO 405-A6	3.7 ± 0.85	0	0
<i>P. rubens</i> DTO 397-13	3.7 ± 0.63	0	0
<i>P. rubens</i> DTO 346-D4	5.82 ± 0.33	0.48 ± 5.46	0.72 ± 4.34
<i>P. chrysogenum</i> 404	2.82 ± 1.63	0	0.692 ± 0.42
<i>P. chrysogenum</i> 413	2.54 ± 1.50	0.98 ± 0.71	1.24 ± 0.28
<i>P. expansum</i> R19	52.02 ± 8.87	61.3 ± 2.92	54.76 ± 3.27

<sup>a</sup>Type-specimens of *P. chrysogenum* and *P. rubens* were inoculated into apple fruits and compared to isolates 404, 413, and *P. expansum* R19. Lesion diameters were recorded 14 days postinoculation. Table provides representative data for one trial. All data represented with subtracted TTW-inoculated control wound. Standard deviation presented after “±”.

**Table S3.** Growth of *Penicillium* spp. strains on selective media, containing different antimicrobial compounds at specific discriminatory doses, after 7 days<sup>a</sup>

Fungicide (medium)	<i>Penicillium</i> spp. isolate			
	R19	Pe21	404	413
TBZ (PDA)	-	-	-	-
FLU (PDA)	-	-	-	-
PYR (SA)	-	-	-	-
DIF (MEA)	-	-	-	-
HYG (PDA)	-	-	+	+
PAT (PDA)	+	+	+	+
PDA control	+	+	+	+
SA control	+	+	+	+
MEA control	+	+	+	+

<sup>a</sup>Growth on agar indicated with '+', no growth indicated with '-'. PDA = Potato Dextrose Agar; SA = Sugar Agar; MEA = Malt Extract Agar; TBZ = thiabendazole (10 ppm); PYR = pyrimethanil (0.5 ppm); DIF = difenoconazole (2.5 ppm); FLU = fludioxonil (0.5 ppm); HYG = hygromycin (100 ppm)