Table S1. Primers used for TRFLP analysis and qPCR assays, with annealing temperatures and target regions.

Target Group	Primers	Primer Sequence	Amplicon Length (bp)	Annealing Temp (°C)	Reference	Target Regions
All Fungi (qPCR)	ITS1 5.8S	5′CTTGGTCATTTAGAGGAAGTAA3′ 5′CGC TGC GTT CTT CAT CG3′	300 bp	53°C	Fierer et al. 2005	ITS1
All bacteria (TRFLP)	63F 1087R	5′AGGCCTAACACATGCAAGTC3′ 5′CTCGTTGCGGGACTTACCCC3′	1000 bp		Singh et al., 2006	16S rRNA
All Fungi (TRFLP)	ITS1 ITS4	5′CTTGGTCATTTAGAGGAAGTAA3′ 5′TCCTCCGCTTATTGATAT GC3′	700 bp	55°C	Gardens and Brums 1993	ITS1

Table S2. Results of the two-way ANOVA analysis of the data on damaged plants.

Source of Variation	% of Total Variation	SS	F[#]
	Trial NW		
Treatment	19.66	2102	60.5**
Season	68.80	6823	131.3**
Interaction	9.42	1008	6.5**
	Trial BZ		
Treatment	4.40	375	4.6*
Season	80.65	6878	104.0**
Interaction	6.19	528	2.7

[#] F value is significant for * $p \leq 0.05$ or ** $p \leq 0.01$.

Table S3. Data used in the principal component analysis to determine the relationship between plant damage, entomopathogenic fungi abundance and climatic parameters at four time points in the two trials.

Trial	Year	Season	Timepoint	Treatment	*B. bassiana* (CFU)	*B. brongniartii* (CFU)	Damaged Plants [%]	Average Temperature [°C]	Air Humidity [%]	Total Monthly Precipitation
NW	2014	Autumn	September	Control	0.33	0.00	21.3	14.2	79.9	29.2
				BA	1.33	0.00	8.4	14.2	79.9	29.2
				BR	1.00	3.00	11.7	14.2	79.9	29.2
				BA + BR	1.67	0.33	9.6	14.2	79.9	29.2
	2015	Spring	June	Control	1.67	0.00	5.2	16.7	70.7	18.0
				BA	4.67	0.00	2.0	16.7	70.7	18.0
				BR	0.67	0.67	1.5	16.7	70.7	18.0
				BA + BR	2.67	0.00	1.2	16.7	70.7	18.0
		Autumn	October	Control	0.33	0.00	29.5	6.8	81.7	46.8
				BA	1.67	0.67	13.7	6.8	81.7	46.8
				BR	0.67	6.00	13.7	6.8	81.7	46.8
				BA + BR	0.33	1.00	14.0	6.8	81.7	46.8
	2016	Spring	July	Control	2.00	0.00	46.5	18.9	73.3	138.2
				BA	1.00	0.00	36.5	18.9	73.3	138.2
				BR	0.33	0.00	22.5	18.9	73.3	138.2
				BA + BR	0.33	0.00	19.2	18.9	73.3	138.2
BZ	2015	Spring	June	Control	0.67	0.00	0.0	16.7	70.7	18.0
				BA	1.00	0.00	0.0	16.7	70.7	18.0
				BR	0.33	1.33	0.0	16.7	70.7	18.0
				BA + BR	0.67	1.00	0.0	16.7	70.7	18.0
		Autumn	October	Control	0.67	0.00	14.3	6.8	81.7	46.8
				BA	1.00	0.00	12.3	6.8	81.7	46.8
				BR	0.00	1.00	11.7	6.8	81.7	46.8
				BA + BR	1.67	4.00	12.0	6.8	81.7	46.8
	2016	Spring	July	Control	0.33	0.00	47.3	18.9	73.3	138.2
				BA	1.00	0.00	33.7	18.9	73.3	138.2
				BR	0.00	0.00	28.3	18.9	73.3	138.2
				BA + BR	0.67	1.33	24.7	18.9	73.3	138.2

Table S4. Average values of optical density (wavelength 490 nm) of *Beauveria bassiana* (BA), *Beauveria brongniartii* (BR) and of a co-inoculum (BABR) cultured on 95 carbon sources + water. The values are the average well colour development of the whole Biolog FF plates (average of all substrates), after 72-hour and 92-hour incubation. One-way ANOVA, followed by Tukey's test, was run to evaluate statistical significance of the differences ($p < 0.001$) that are marked with different letters.

	72 h	**96 h**
BA	0.38 a	0.76 a
BABR	0.38 a	0.75 a
BR	0.30 b	0.49 b
Pr > F (Model)	<0.0001	<0.0001
Significant	Yes	Yes

Table S5a Average values of mitochondrial activity of *Beauveria bassiana* (BA), *Beauveria brongniartii* (BR) and of the co-inoculum (BABR) cultured on 95 carbon sources + water. The optical density values obtained at 490 nm wavelength of 4 biological replicates, after subtraction of the blank, were compared with One-way ANOVA, followed by Tukey's test. Only the Biolog FF substrates that triggered a significantly different chitinases activity (see Table S6.1) are listed in this table.

	BA	**BABR**	**BR**	**Pr > F**	**Significant**
A3 N-Acetyl-D-Galactosamine	0.23 a	0.22 a	0.15 a	0.2513	No
A2 Tween 80	0.47 b	0.45 b	0.55 a	<0.0001	Yes
A1 Water	0.04 a	0.07 a	0.09 a	0.2513	No
G5 Succinic Acid Mono-Methyl Ester	0.31 a	0.14 ab	0.02 b	0.0398	Yes
H9 Putrescine	0.42 a	0.33 b	0.35 b	0.0291	Yes
H8 2-Amino Ethanol	0.21 a	0.12 ab	0.06 b	0.0933	Yes
D10 D-Psicose	0.17 a	0.08 b	0.16 a	0.0289	Yes
F3 Fumaric Acid	1.24 a	1.27 a	0.72 b	<0.0001	Yes
F12 Quinic Acid	0.07 a	0.07 a	0.06 a	0.1908	No
E11 Xylitol	0.22 ab	0.18 b	0.34 a	0.0263	Yes
C7 2-Keto-D-Gluconic Acid	0.55 b	0.59 b	0.76 a	0.0164	Yes
C3 D-Glucuronic Acid	0.11 a	0.08 a	0.09 a	0.6227	No
B1 a- Cyclodextrin	0.07 a	0.06 a	0.05 a	0.5552	No
C8 a-D-Lactose	0.17 a	0.06 b	0.12 ab	0.0105	Yes
B2 b-Cyclodextrin	0.02 a	0.02 a	0.01 a	0.3735	No
F4 b-Hydroxy-butyric Acid	0.09 a	0.05 a	0.10 a	0.1804	No
B6 L-Fucose	0.06 b	0.01 c	0.11 a	<0.0001	Yes
A12 D-Cellobiose	1.49 a	1.46 a	0.65 b	0.0006	Yes
E5 L-Sorbose	0.20 a	0.15 a	0.08 a	0.3880	No
D5 a-Methyl-D-Galactoside	0.05 a	0.05 a	0.07 a	0.5061	No
B3 Dextrin	0.97 a	0.72 b	0.24 c	<0.0001	Yes
C9 Lactulose	0.10 a	0.09 a	0.09 a	0.9783	No
C10 Maltilol	0.08 ab	0.04 b	0.09 a	0.0477	Yes
G6 N-Acetyly-L-Glutamic Acid	0.11 c	0.17 b	0.30 a	0.0002	Yes
D8 b-Methyl-D-Glucoside	0.99 a	0.80 b	0.51 c	0.0005	Yes
B4 i-Erythritol	0.56 a	0.26 b	0.28 b	0.0011	Yes
D12 L-Rhamnose	0.07 b	0.10 a	0.10 a	0.0002	Yes
C4 Glycerol	1.47 a	1.20 b	0.86 c	<0.0001	Yes
E3 Sedoheptulosan	0.05 a	0.07 a	0.07 a	0.6758	No
G1 D-Saccharin Acid	0.05 a	0.06 a	0.06 a	0.9051	No
A8 D-Arabinose	0.09 a	0.10 a	0.08 a	0.5930	No
F9 L-Lactic Acid	0.10 a	0.02 b	0.09 a	0.0001	Yes
D4 D-Melibiose	0.23 a	0.24 a	0.06 b	0.0006	Yes
A6 Adonitol	1.16 a	1.15 a	0.41 b	<0.0001	Yes
B7 D-Galactose	0.92 a	0.88 a	0.40 b	<0.0001	Yes
G11 L-Aspartic Acid	1.07 b	1.19 a	0.72 c	<0.0001	Yes
E8 D-Tagatose	0.05 ab	0.04 b	0.09 a	0.0331	Yes
F8 D-Lactic Acid Methyl Ester	0.07 a	0.02 b	0.10 a	0.0004	Yes

D3 D-Melezitose	0.86 a	0.67 b	0.13 c	<0.0001	Yes
E1 D-Ribose	0.34 a	0.32 b	0.23 c	<0.0001	Yes
F1 g-Amino-butyric Acid	1.19 a	0.86 b	0.12 c	<0.0001	Yes
B9 Gentibiose	1.35 a	1.25 b	0.71 c	<0.0001	Yes
D1 D-Mannitol	1.05 b	1.15 a	0.60 c	<0.0001	Yes
G10 L-Asparagine	1.24 a	1.21 a	0.27 b	<0.0001	Yes
E9 D-Trehalose	1.56 a	1.33 b	0.74 c	<0.0001	Yes
E12 D-Xylose	0.25 b	0.23 c	0.27 a	0.0002	Yes
E4 D-Sorbitol	0.91 a	0.76 a	0.35 b	<0.0001	Yes
A7 Amygdalin	0.67 a	0.61 b	0.38 c	<0.0001	Yes
C6 m-Inositol	0.55 a	0.48 b	0.21 c	<0.0001	Yes
E10 Turanose	1.47 a	1.32 b	0.27 c	<0.0001	Yes
A10 D-Arabitol	0.37 a	0.34 a	0.34 a	0.5874	No
G8 L-Alanine	1.22 b	1.33 a	0.95 c	<0.0001	Yes
G9 L-Alanyl-Glycine	1.30 a	1.35 a	1.12 b	0.0059	Yes
H4 L-Proline	0.90 a	0.89 a	0.31 b	<0.0001	Yes
C2 Glucuronamide	0.03 a	0.02 a	0.04 a	0.3711	No
B8 D-Galacturonic Acid	0.05 a	0.02 b	0.00 b	0.0005	Yes
F7 a-Keto-glutaric Acid	0.83 a	0.79 a	0.62 b	0.0126	Yes
B11 D-Glucosamine	0.34 a	0.24 a	0.25 a	0.0943	No
A4 N-Acetyl-D-Glucosamine	2.02 a	1.90 a	0.73 b	<0.0001	Yes

Table S5b Mitochondrial activity (optical density values in FF Biolog plates after 96-hour incubation, measured at 490 nm wavelength) of *Beauveria bassiana* (BA), *Beauveria brongniartii* (BR) and of the co-inoculum (BABR). The 96 substrates, including water, were classified into the fifteen functional groups listed in the table. The average absorbance for all wells in each group were calculated. Statistically significant differences ($p < 0.01$) between inocula are marked with different letters.

	BA	**BABR**	**BR**	***p***	**Significant**
Water	0.04 a	0.07 a	0.09 a	0.2513	No
Heptoses	0.05 a	0.07 a	0.07 a	0.6758	No
Hexoses	0.64 a	0.58 b	0.31 c	<0.0001	Yes
Pentoses	0.22 a	0.20 ab	0.17 b	0.0387	Yes
Sugar acids	0.17 a	0.15 a	0.19 a	0.1633	No
Hexosamines	0.66 a	0.61 b	0.29 c	<0.0001	Yes
Polyols	0.79 a	0.69 b	0.42 c	<0.0001	Yes
Polysaccharides	0.32 a	0.24 a	0.12 b	0.0015	Yes
Oligosaccharides	0.77 a	0.67 a	0.25 b	<0.0001	Yes
Glucosides	0.76 a	0.63 b	0.35 c	<0.0001	Yes
Peptides	1.27 b	1.36 a	1.05 c	<0.0001	Yes
L-amino acids	0.90 a	0.93 a	0.44 b	<0.0001	Yes
Biogenic and heterocyclic amines	0.20 a	0.14 a	0.15 a	0.2170	No
TCA-cycle intermediates	0.99 a	0.89 b	0.51 c	<0.0001	Yes
Aliphatic organic acids	0.15 a	0.07 b	0.14 ab	0.0687	Yes
Other compounds	0.19 a	0.15 b	0.16 b	0.0020	Yes

Table S6a NAGase activity of *Beauveria bassiana* (BA), *Beauveria brongniartii* (BR) and of the co-inoculum (BABR). The values are reported as Relative Fluorescence Units (RFU). One-way ANOVA, followed by Tukey's HSD test, was run on RFU subtracted by blank values. Only the Biolog FF substrates that triggered a statistically significant difference (within three biological replicates) between the treatments are listed. However, the average values of two substrates that gave no significant differences, but have a biological meaning (B11 D-Glucosamine and A4 N-Acetyl-D-Glucosamine), are shown at the end of the table. Statistically significant differences (p <0.01) in NAGase activity between inocula are marked with different letters.

	BABR	BA	BR	p	Significant
A3 N-Acetyl-D-Galactosamine	38973.83 a	30164.10 b	7657.23 c	<0.0001	Yes
A2 Tween 80	8099.08 a	318.03 b	2201.43 b	0.00024	Yes
A1 Water	5285.63 a	7240.15 a	1237.63 b	0.00169	Yes
G5 Succinic Acid Mono-Methyl Ester	4938.63 a	989.94 b	748.55 b	<0.0001	Yes
H9 Putrescine	4517.13 a	3644.76 a	1550.39 b	0.01127	Yes
H8 2-Amino Ethanol	3857.01 a	2850.70 b	2342.60 b	0.00911	Yes
D10 D-Psicose	3652.97 a	2494.84 b	1212.21 c	<0.0001	Yes
F3 Fumaric Acid	3560.05 a	2381.12 b	1202.73 c	0.00699	Yes
F12 Quinic Acid	3513.47 a	3724.78 a	992.91 b	0.02497	Yes
E11 Xylitol	3476.47 a	2150.39 b	1488.98 c	<0.0001	Yes
C7 2-Keto-D-Gluconic Acid	3106.24 a	3081.86 a	1234.45 b	0.00082	Yes
C3 D-Glucuronic Acid	3039.83 a	1377.94 b	1083.87 b	<0.0001	Yes
B1 a- Cyclodextrin	2968.93 b	3653.38 a	865.37 c	<0.0001	Yes
C8 a-D-Lactose	2836.76 a	1148.71 b	1459.78 b	0.00881	Yes
B2 b-Cyclodextrin	2697.16 a	309.73 b	739.28 b	0.0001	Yes
F5 g-Hydroxy-butyric Acid	2674.79 a	1283.67 b	1314.19 b	0.00579	Yes
B6 L-Fucose	2599.36 a	1258.59 b	1346.91 b	<0.0001	Yes
A12 D-Cellobiose	2594.99 b	2823.62 b	6585.87 a	0.02484	Yes
E5 L-Sorbose	2594.17 a	1103.22 a	1352.57 a	0.04775	Yes
D5 a-Methyl-D-Galactoside	2339.04 a	1716.34 ab	1123.98 b	0.01646	Yes
B3 Dextrin	2335.29 b	1327.88 c	3281.67 a	0.00016	Yes
C9 Lactulose	2301.62 a	1224.54 b	889.98 b	0.00018	Yes
C10 Maltilol	2281.81 a	1445.29 b	556.54 c	0.00069	Yes
G6 N-Acetyly-L-Glutamic Acid	2207.02 b	3232.20 a	2551.94 b	0.01043	Yes
D8 b-Methyl-D-Glucoside	2163.32 a	2507.93 a	905.93 b	0.00021	Yes
B4 i-Erythritol	2102.57 a	949.29 b	2133.36 a	<0.0001	Yes
D12 L-Rhamnose	2052.14 a	2061.98 a	728.12 b	0.01566	Yes
C4 Glycerol	2024.52 a	2388.27 a	1609.63 b	0.00894	Yes
E3 Sedoheptulosan	1974.46 a	862.99 b	684.57 c	<0.0001	Yes
G1 D-Saccharin Acid	1905.42 a	915.64 b	1202.77 b	0.00398	Yes
A8 D-Arabinose	1887.48 a	1689.88 ab	1386.32 b	0.03753	Yes
F9 L-Lactic Acid	1832.58 a	1056.54 b	892.29 b	0.01149	Yes
D4 D-Melibiose	1766.54 ab	2979.96 a	882.67 b	0.03593	Yes
A6 Adonitol	1654.44 b	592.59 c	2496.35 a	0.00132	Yes
B7 D-Galactose	1587.43 a	1543.29 a	733.28 b	0.01243	Yes
G11 L-Aspartic Acid	1486.39 b	1056.79 b	2397.61 a	0.00551	Yes
E8 D-Tagatose	1319.66 a	667.20 b	868.74 b	0.00144	Yes
F8 D-Lactic Acid Methyl Ester	1293.46 a	839.14 b	875.95 b	0.02778	Yes
D3 D-Melezitose	1252.92 a	593.54 b	1291.60 a	0.00248	Yes
E1 D-Ribose	1209.79 b	1262.34 b	1755.11 a	0.02063	Yes
F1 g-Amino-butyric Acid	1201.95 b	3219.10 a	841.19 b	<0.0001	Yes
B9 Gentibiose	1170.61 c	2102.09 b	3703.12 a	<0.0001	Yes
D1 D-Mannitol	1169.76 b	5238.52 a	2063.18 b	0.00025	Yes
G10 L-Asparagine	1155.01 b	898.67 b	1866.82 a	0.00068	Yes
E9 D-Trehalose	1133.19 b	2019.31 a	1795.83 a	0.00343	Yes
E12 D-Xylose	1103.67 b	749.73 b	2977.18 a	<0.0001	Yes
E4 D-Sorbitol	1092.78 c	1332.66 b	2909.99 a	<0.0001	Yes
A7 Amygdalin	995.82 b	657.03 b	5083.26 a	<0.0001	Yes
C6 m-Inositol	964.53 a	436.34 b	309.46 b	0.0023	Yes
E10 Turanose	898.92 b	2377.42 a	1132.85 b	0.02927	Yes
A10 D-Arabitol	752.93 b	849.79 b	3938.66 a	<0.0001	Yes
G8 L-Alanine	711.28 b	801.37 b	2100.08 a	0.00013	Yes
G9 L-Alanyl-Glycine	711.28 b	801.37 b	2100.08 a	0.00013	Yes
H4 L-Proline	655.44 b	741.14 b	3283.95 a	<0.0001	Yes

C2 Glucuronamide	621.47 a	313.36 b	495.84 ab	0.02185	Yes
B8 D-Galacturonic Acid	486.25 b	343.17 c	568.45 a	0.00025	Yes
F7 a-Keto-glutaric Acid	313.35 c	6324.80 a	2033.20 b	<0.0001	Yes
B11 D-Glucosamine	17913.97 a	10810.75 a	6008.89 a	0.12	No
A4 N-Acetyl-D-Glucosamine	6665.80 a	6839.85 a	4835.83 a	0.85	No

Table S6b NAGase activity of *Beauveria bassiana* (BA), *Beauveria brongnartii* (BR) and of the co-inoculum (BABR). The 96 substrates were classified into the fifteen functional groups listed in the table. NAGase activity for all wells in each group were calculated. The values are reported as Relative Fluorescence Units (RFU). The fluorescence values were compared with One-way ANOVA, followed by Tukey's test. Statistically significant differences ($p < 0.01$) in NAGase activity between the inocula are marked with different letters.

	BA	**BABR**	**BR**	***p***	**Significant**
Water	7240.15 a	5285.63 a	1237.63 b	0.0017	Yes
Heptoses	862.99 b	1974.46 a	684.57 c	<0.0001	Yes
Hexoses	1722.84 a	1798.74 a	1159.99 a	0.1613	No
Pentoses	1584.60 b	1926.65 a	1815.73 a	0.0147	Yes
Sugar acids	1222.34 b	1742.16 a	1066.84 b	0.0048	Yes
Hexosamines	12164.24 b	16312.28 a	5040.47 c	0.0008	Yes
Polyols	1742.23 b	1654.75 b	2118.70 a	0.0053	Yes
Polysaccharides	1885.11 b	2873.27 a	1665.21 b	0.0003	Yes
Oligosaccharides	2013.68 a	2231.57 a	1862.79 a	0.5638	No
Glucosides	1353.80 a	1302.81 a	1661.80 a	0.1130	No
Peptides	1477.16 b	1691.30 b	2164.24 a	0.0082	Yes
L-amino acids	1553.05 b	1542.81 b	2079.00 a	0.0047	Yes
Biogenic and heterocyclic amines	2433.37 a	2893.09 a	1461.13 b	0.0059	Yes
TCA-cycle intermediates	2751.69 a	2249.88 a	1589.54 b	0.0037	Yes
Aliphatic organic acids	987.14 c	1642.57 a	1133.71 b	<0.0001	Yes
Other compounds	1354.59 b	2781.51 a	1567.34 b	0.0012	Yes

Table S7. Fungal genes copies number in the soil of the two trials (NW and BR). Data followed by the same letter are not significantly different at $p \leq 0.05$ (Tukey's HSD post-hoc test).

Treatment	**Trial NW**		**Trial BZ**	
	October 2015	**July 2016**	**October 2015**	**July 2016**
Control	2907421 a	6182248 a	1351806 ab	5516163 a
B, bassiana	973790 b	5688618 a	1829224 a	3051788 b
B, brongniartii	2366551 ab	5939836 a	984140 ab	1501112 c
BA + BR	1300206 ab	5936636 a	875966 b	5934904 a