

Supplementary Information

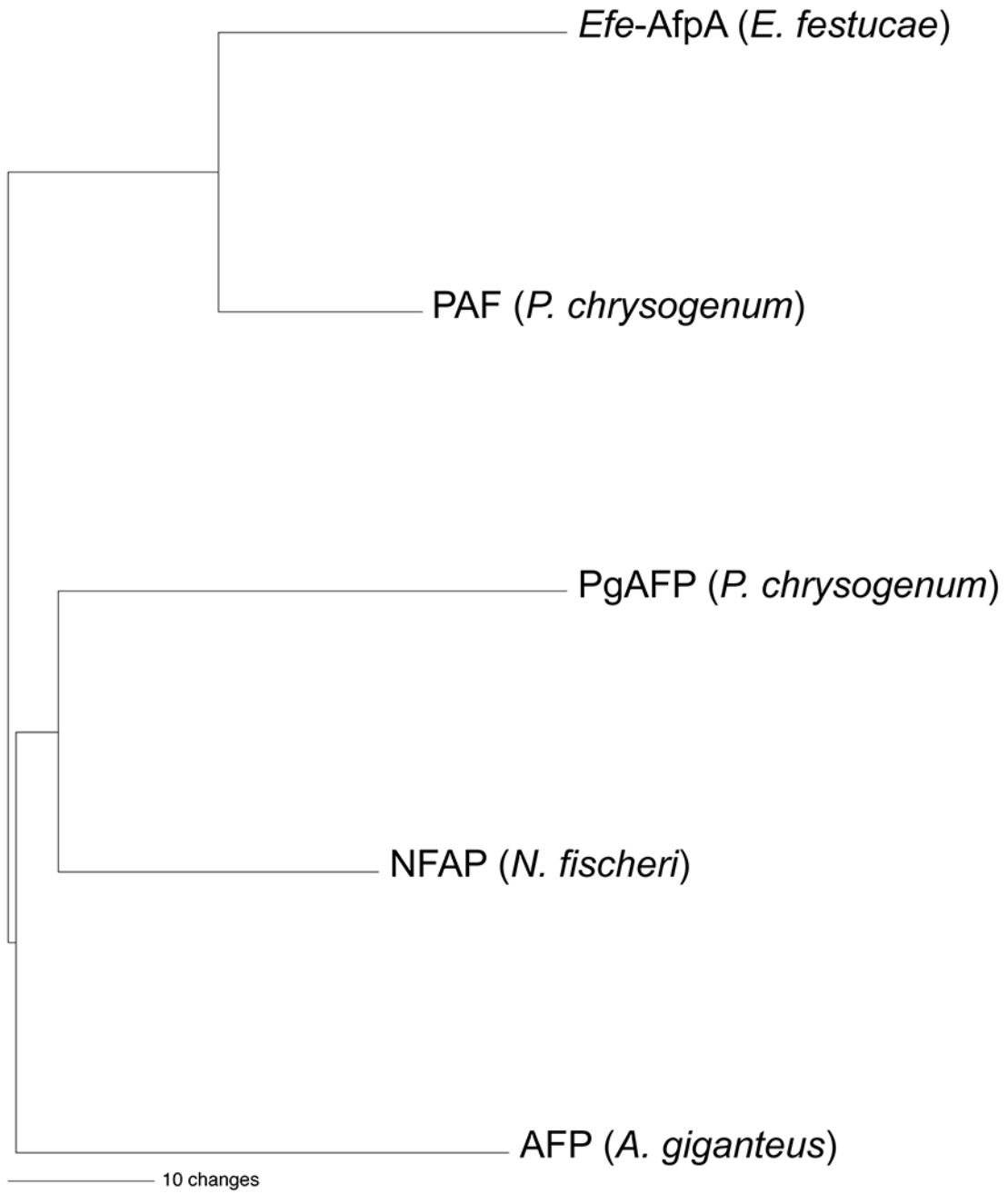
The *Epichloë festucae* antifungal protein has activity against the plant pathogen
Sclerotinia homoeocarpa, the causal agent of dollar spot disease

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Supplementary Fig. S1. The single most parsimonious phylogenetic tree from an exhaustive search of the antifungal protein amino acid sequences shown in Fig. 2. The tree is midpoint rooted. The tree was based upon 101 total characters, of which 26 were constant, 56 variable characters were parsimony uninformative, and 19 variable characters were parsimony informative. NCBI accession numbers for the sequences are *Efe-AfpA* from *E. festucae*, SRR493691.12929; PAF from *P. chrysogenum*, U22944.2; PgAFP from *P. chrysogenum*, D0EXD3.1; NFAP from *N. fischeri*, AM983570, and AFP from *A. giganteus*, accession X60771.



Supplementary Fig. S2. DNA sequence alignment of the antifungal protein gene sequences used for the phylogentic analysis presented in Figure 8. The coding sequences are in upper case and the intron sequences are in lower case. Asterisks indicate regions of identity.

<i>E. festucae</i>	ATGCAAATCACCGTGGTGC	GGTTTTTCCTCCTCTCTGCAATGGGCGGAGT
<i>E. baconii</i>	ATGCAAATCACCGTAGTC	GGTTTTTCCTCCTCTCTGCAATAGGCGGAGC
<i>E. aotearoae</i>	ATGCAAATCACCGTAGTC	GGTTTTTCCTCCTCTCTGCAATAGGCGGAGC
<i>E. inebrians</i>	ATGCAGATCACCGCAGTT	GGCCTTTTTCTCTCGCTGCAATGGGCGTGGT
<i>Po. chlamydosporia</i>	ATGCAGATCA---	TAATTGGCCTTTTTCTTTGCGCTGCGATGGGCGTGGT
<i>Pe. chrysogenum</i>	ATGCAAATCACACAGTT	GCCCTTTTTCTCTCGCTGCAATGGGCGGGGT
<i>B. bassiana</i>	ATGCAGATTATTTCCAT	CGCACTCTCTCTCCTCGCTGCGACCGGCGCCGT
<i>C. brongniartii</i>	ATGCAAATTATTTCCAT	CGCCCTCTTTCTCCTCACTGCGACCGGCGCCGT
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<i>E. festucae</i>	AGCCACACC---	CATCAACTCCAGAATCAATCCTGTTGATGCCAGGGCGG
<i>E. baconii</i>	AGCCACACC---	CATTAACTCCAGAATCAATCATGTTGATGCCAAAGCGG
<i>E. aotearoae</i>	AGCCACACC---	CATTAACTCCGGAATCAATCATGTTGATGCCAAAGCGG
<i>E. inebrians</i>	AGCCACCCCAATTATT	GAGTCCGAATCCAACGGCCTCGATGCTAGAGATG
<i>Po. chlamydosporia</i>	AGCCACCCC---	TATTAATTTCCAGTCCAACGGCCTCGATGCTAGAGATG
<i>Pe. chrysogenum</i>	AGCCACCCC---	CATTGAGTCTGTATCAAACGACCTCGATGCCAGGGCTG
<i>B. bassiana</i>	CGCCGCCGC-----	-----CACCCCTGAGCAGTTTGAGGCCAGAGATG
<i>C. brongniartii</i>	CGCCGCCGC-----	-----CACCCCTGAGCAGTTTGAGGCCAGAGATG
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<i>E. festucae</i>	AGACTGGCATTCTGATC	ACGTATGAAGGA gtgagttgat-tttgtgtcac
<i>E. baconii</i>	AGACTGGCGTTCTGATC	ACGTATACAGGA gtgagtcaat-tttgtgttac
<i>E. aotearoae</i>	AGACTGGCGTTCTGATC	ACGTATATAGGA gtgagtcaat-tttgtgttac
<i>E. inebrians</i>	AGGCTGGCATCCTTATC	ACTTACTGGGGA gtgagtaaacatcaacattcc
<i>Po. chlamydosporia</i>	AGGCTGGCATCCTTATC	ACTTACTGGGGA gtgagtaaacataaacattcc
<i>Pe. chrysogenum</i>	AGGCCGGTGTCTGGCC	AAATACACCGGA gtgagtaaacatcaatatccc
<i>B. bassiana</i>	GGGCCGGCGCCATGAT	CAAGTACCACGGA gtaagcaag-----ataccgc
<i>C. brongniartii</i>	GGGCCAGCGCCATGAT	CAAGTACCACGGA gtgagcaag-----aaaccgc
	* * *	* * * * * * * * *
<i>E. festucae</i>	aatacc-----	cgattactctgagtattcaa-taacca-cggagtcccctc
<i>E. baconii</i>	aatacc-----	ctattactctaattcttcaa-taacca-cggaatcccctc
<i>E. aotearoae</i>	aatacc-----	ctattactctaattactcaa-taacca-cggaatcccctc
<i>E. inebrians</i>	-atacc	ttgggtactcacttgggaattaccgctaaccacttggaaacctc
<i>Po. chlamydosporia</i>	-gtacc	taggtgtcacttaggagttacagctaaccacttggaaacctc
<i>Pe. chrysogenum</i>	-atacc	ttaagtactcacttgggaatcgcgactaacggttcgggaccacaa
<i>B. bassiana</i>	-caatcc---	atgttcactacggag-caaagctaacca-tccactcaactt
<i>C. brongniartii</i>	-caatcc---	atgttcactacggag-caaagctaacca-tcgaatcacgtt
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<i>E. festucae</i>	tataaag	ACATGTTCTAGAGCCAAAAACGAATGCAAGTACAAAAATCAGA
<i>E. baconii</i>	tataaag	ACATGTACTAGAGACAAAAACGAATGCAAGTACAAAAATCAGA
<i>E. aotearoae</i>	tataaag	ACATGTACTAGAGCCAAAAACGAATGCAAGTACAAAAATCAGA
<i>E. inebrians</i>	tccttag	ACATGTACCCAAAAGACGAATGTATGCAAATACAAAAACCAA
<i>Po. chlamydosporia</i>	--cttag	ACATGTACCCAAAACAAAAATGAATGCAAATACAAAAACCAA
<i>Pe. chrysogenum</i>	--ctcag	AAATGCACCAAAATCTAAGAACGAATGTAAATACAAGAACGATG
<i>B. bassiana</i>	--caaag	ATTTGCACCAAGGCCAAGAACGAATGCAAGTTCAAGGGCCAGA
<i>C. brongniartii</i>	--caaag	ATTTGCACCAAGGCTAAGAACGAATGCAAGTTCAAGGGCCAGA
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<i>E. festucae</i>	ACAACAAGGACACGTT	CGTCAAGTGCCCGTCGTTGCAAAACAAGAAG gta
<i>E. baconii</i>	ACAATAAGAACACGTT	CGTCAAGTGCCCGTCGTTGCAAAACAAGAAG gta
<i>E. aotearoae</i>	ACAATAAGGATACGTT	CGTCAAGTGCCCTTCGTTTGCAAACAAGAAG gta
<i>E. inebrians</i>	ACAACAAGACACTTTT	TGTCAGTGCCCTTTTTTCAATAATAAGAGG gta

Po. chlamydosporia ACAACGGGAACCTCTTTTGTCAAGTGCCCTTTGTTTCGATAACAAGAAG gta
Pe. chrysogenum CTGGAAAGGACACTTTTATCAAGTGCCCCAAGTTTGATAACAAGAAG gta
B. bassiana ATGGCAGGGATACCTTTGTCAAGTGCCCCAAGTTTGCCAACAAGAGG gta
C. brongniartii ACGGCAAGGATACCTTTGTCAAGTGCCCCAAGTTTGCCAACAAGAGG gta

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E. festucae aaggttcttttttgcccccttttgaggct--gcctattttccaagcttacg
E. baconii aaggttcttttttaccctcttttcaggct--gcttattttccaagcttacg
E. aotearoae aaggttcttttttaccctcttttcaggct--gcttattttccaagcttacg
E. inebrians aagttccatttaaccccccaagtagccaccaggttgccaccgtgctaac
Po. chlamydosporia aaatctcatt-agtccctaagtagccacctgggttgactcgtgtaatg
Pe. chrysogenum gaatatcaat-cattcgggaagtagccatctgaatcgatttcgtgctaac
B. bassiana cg----tatttctccctcgacaagccgct--aattgtgtagatgctgact
C. brongniartii cg----tatttctccctcgacaagctgct--aattgtttagatgctgact

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E. festucae2368 tctgattaatccaccgttacag TGCACCAAAGACAACGCCAAGTGTAGCT
E. baconii tctgtttaatccaccgttacag TGCACCAAAGACAAGCCAAGTGTACCT
E. aotearoae cgttttttaatcatcgttacag TGCACCAGAGACGGCGCAAGTGTACCT
E. inebrians tcgctctgttc---ttttccag TGCACCGGGGATGGCAAGTCGTGTAAAT
Po. chlamydosporia tcgctctgttt---tttgtccag TGCACCGGGGATGGCAAGTCGTGTAAAT
Pe. chrysogenum tcgctct-----ttttccag TGCACCAAGGATAATAACAAATGTACCG
B. bassiana gc-----tttcttttag TGCACCAAGGACTACAACGAATGTTTCAT
C. brongniartii gc-----tttcttttag TGCACCAAGGACCACAACGAATGTTTCGT

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E. festucae TTGACAGTTATCTCGAGCTGTCACGTGTCATTAG
E. baconii TTGACAGTGTACTCGAGGTGTCACGTGTGATTAG
E. aotearoae TTGACAGTGTCTCGAGGTGTCACGTGTGATTAG
E. inebrians TCGACAGCTACGACCGAGCAGTTACGTGTTACTAG
Po. chlamydosporia TCGACAGCGTCAACCGAGCAGTTACGTGTTACTAG
Pe. chrysogenum TCGACACCTACAACAACGCTGTCGATTGTGACTAG
B. bassiana ATGACAGCGTCAGCCGAGCTGTCGTGTGCCACTAG
C. brongniartii ACGACAGCGTCAACCGAGCTGTCGTGTGCCACTAG

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