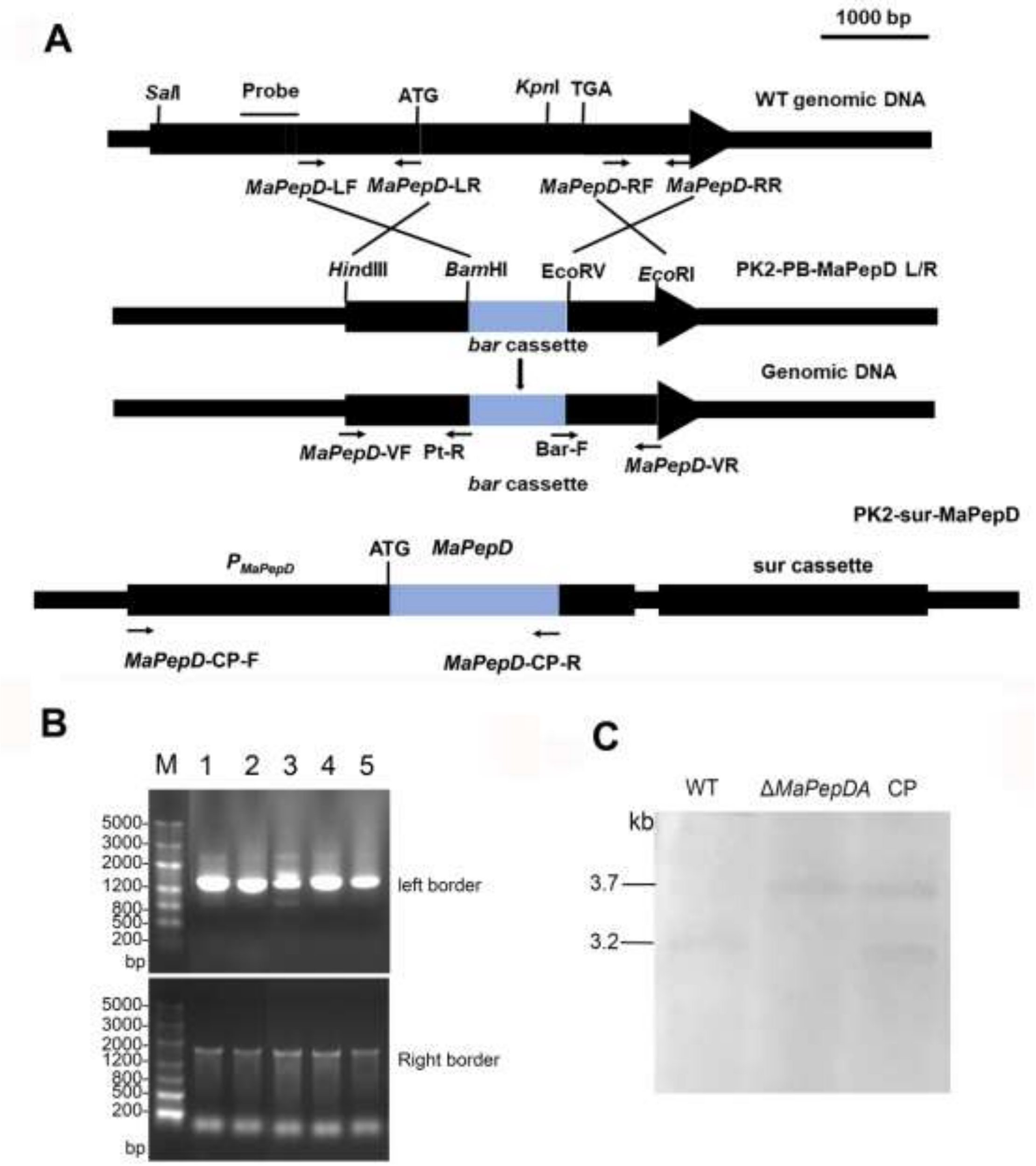

FIGURE S1 Disruption and complementation of *MaPepDA* in *M. acridum*. (A) The *MaPepDA* was disrupted by homologous recombination method. The plasmid pK2-PB-MaPepDA contains a Bar cassette. Complementing vector of *MaPepDA* carried a *MaPepDA* gene and upstream regulation sequence. (B) Verification of mutant by PCR. (C) Verification of mutant by Southern blotting. The genomic DNAs were cut with *Sal*I and *Kpn*I. The probe was amplified from genomic DNAs by PCR using the primers in Table S1.

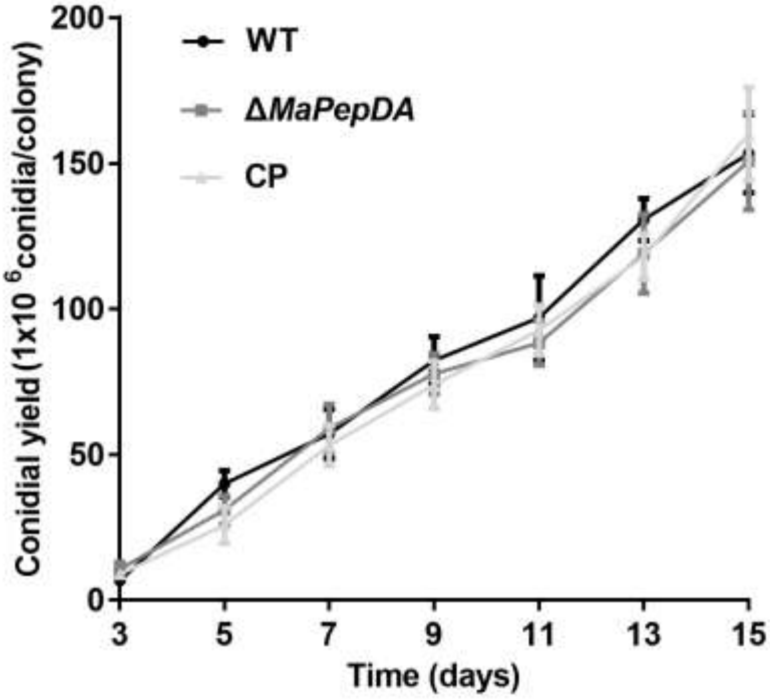

FIGURE S2 Time-course analysis of conidial yield. Aliquots of 5 μl of 1×10^7 conidia/ml of fungal strains were spotted on 1/4 SDAY. The colony were collected and suspended in 1 ml Tween 80, and then vortexed for 10 min. The suspensions were filtered with lens tissue. The concentration of conidia suspension was determined with a hemocytometer under microscope.

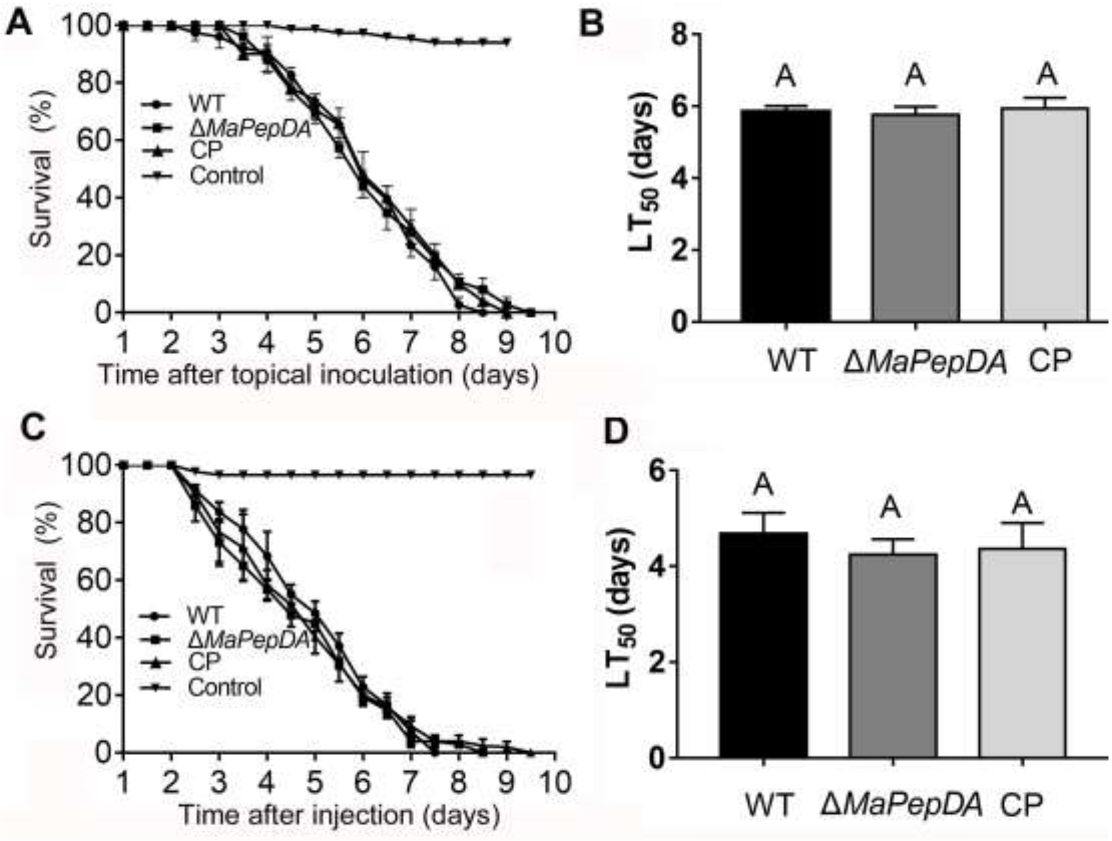

FIGURE S3 Insect bioassays. (A) Insect survival after topical application of conidia of WT, Δ*MaPepDA*, or complemented strain. Liquid paraffin oil was the blank control. (B) LT_{50} for topical inoculation assay. (C) Insect survival after injection of conidia directly into the insect hemocoel. Sterile water was the blank control. (D) LT_{50} for injection assay. Error bars are standard deviations of three trials. Same letters above the columns indicate no significant difference.

TABLE S1 Primers used in this study

Primer	Sequence (5′-3′)*	Remarks
cDNA-F	ATGAAGCCTCATCTCGCGGCC	Clone the cDNA of *MaPepDA*
cDNA-R	TCAAGACAGATCCTGGACAACA	
MaPepD-LF	GACGGCCAGTGCCAAGCT TACCACCCAGTCGGAGCA	Disruption transformants
MaPepD-LR	CGGATCCCTCGAGTCTAG AGGGTCTGCGGAACAAGC	
MaPepD-RF	GCTGGCCGCCCATGGGATAAGCGACGACAGCAAAGACA	Disruption transformants
MaPepD-RR	ATGACATGATTACGAATTCGAAGCATACGGAGCAGAAG	
MaPepD-VF	GACGAGTGAGATTAGGGCTTTC	Screening the *MaPepDA*
LB-PT-R	CAGCCAAGCCCAAAAAGTG	
RB-Bar-F	GCTCTACACCCACCTGCT	Screening the *MaPepDA*
MaPepD-VR	GCCCCTGTAATGAAGACGAG	
MaPepD-PF	TTTGTTCCCATATTACGCAGTT	Clone the probe
MaPepD-PR	AAGCCCTAATCTCACTCGTCT	
MaPepD-CP-F	GACGGCCAGTGCCAAGCTCGACCGAGCTTCTCAACAGGG	Clone complementation of *MaPepDA*
MaPepD-CP-R	CCTTGCTCACCATGGATCCAGACAGATCCTGGACAACAA	
MaPepD-CP-VF	CTACGGCGGAAACACGCACCT	Verify the vector of CP
EGFP-VR	CGATGCGGTTCACCAGGGTGT	
EX-F	ATTTCCCCTAAGTACTTCTAGAATGAAGCCTCATCTC	Clone the overexpression
EX-R	TTGCTCACCATGGATCCAGACAGATCCTGGACAACAA	
Eo-F	TTAAGAAGGAGATATACCATGAAGCCTCATCTCGCGG	Clone the cDNA of prokaryotic expression in *E. coil*
Eo-R	GTGGTGGTGGTGGTGGTGCTCGAGAGACAGATCCTGGACAAC	

TABLE S2 Differential expressed genes between WT and Δ*MaPepDA* strains

Gene ID	Product name	Log_2^{ratio} (Δ*MaPePDA*/WT)	References
Amino acid metabolism			
MAC_06861	Aldehyde dehydrogenase	2.42917446	(Asiimwe et al., 2012)
MAC_08739	Carboxypeptidase	1.48806815	(St Leger et al., 1994)
MAC_04079	Amino-acid permease inda1	1.15615597	(Sauer, 1984)
MAC_02956	Tyrosinase	1.14412774	(Yang et al., 2011)
MAC_04483	Proline oxidase Put1, putative	1.12026531	(Wang and Brandriss, 1986)
MAC_08901	Aspartate aminotransferase, putative	1.42247981	(Wang et al., 2016)
MAC_06811	Alkaline serine protease AorO, putative	1.08846785	(Hui et al., 2004)
MAC_07959	Hydantoinase/oxoprolinase, putative	1.01141874	(Ye et al., 1996)
MAC_06980	Peptide synthetase 3	-1.18111933	(McErlean et al., 2019)
MAC_08095	Amidohydrolase family protein	1.42917446	(Sadowsky et al., 1998)
DNA replication and repair			
MAC_07294	Cysteine rich protein	1.69000796	(Szczypka and Thiele, 1989)
MAC_07387	4-coumarate-CoA ligase 2	1.37364152	(Kuhn et al., 1984)
MAC_01848	Indole-diterpene biosynthesis protein PaxU, putative	1.16614006	(Young et al., 2005)
MAC_09373	A/G-specific adenine glycosylase	1.008382995	(Eberle et al., 2015)
Growth and development			
MAC_06859	MFS multidrug transporter, putative	1.199079001	(Crespo-Sempere et al., 2014)
MAC_05794	3,2-trans-enoyl-CoA isomerase precursor, putative	1.050895513	(Gurvitz et al., 1998)
MAC_07845	Cytochrome P450	1.10473951	(Shin et al., 2017)
MAC_05691	Major facilitator superfamily domain containing protein 5	1.64216819	(Berger et al., 2012)
MAC_08428	NDT80 / PhoG like DNA-binding family protein	-2.22687114	(Doyle et al., 2016)
MAC_07120	Cytochrome P450 52A11	1.38502736	(Breskvar et al., 1995)
MAC_07320	Sugar transporter, putative	-2.187496898	(Zhang et al., 2011)
MAC_01730	Sugar transporter, putative	1.16902257	(Zhang et al., 2011)
MAC_00175	Glucose dehydrogenase, putative	1.26502096	(Maleki et al., 2015)
MAC_08696	Endo-N-acetyl-beta-D-glucosaminidase precursor	1.45259881	(Pusztahelyi and Pócsi, 2014)
MAC_06293	Type I phosphodiesterase/nucleotide pyrophosphatase	-1.05944417	(Yang et al., 2017)
MAC_06812	C-3 sterol dehydrogenase/C-4 decarboxylase	1.277171369	(Aaron et al., 2001)
MAC_02181	Monooxygenase, putative	1.0769198	(Deng et al., 2018)
MAC_00080	C2H2 finger domain protein, putative	1.24360822	(Huang et al., 2005)
MAC_00167	Extracellular dioxygenase, putative	1.19700102	(Boissel et al., 2009)
MAC_06584	Glucose repressible protein Grg1	1.31893306	(Lee and Moss, 1993)
MAC_06154	Transcriptional regulatory protein pro-1	1.29531872	(Ryder et al., 2004)
MAC_04470	Catalase	-1.148102901	(Hansberg et al., 2012)
MAC_05139	C6 zinc finger domain protein	1.04299183	(Masloff et al., 2002)
MAC_09507	Hydrophobin	-1.49487668	(Wessels et al., 1991)
Sporulation			

MAC_08744	SpoC1-C1C	2.59909946	(Stephens et al., 1999)
MAC_08903	MFS transporter, putative	1.0006327	(Khaokhajorn et al., 2015)
MAC_02934	Glucose-methanol-choline oxidoreductase	-1.30595991	(Etxebeste et al., 2012)
Cell wall components			
MAC_06615	Putative cyclic nucleotide gated channel beta 1	1.5166373	(Thomas et al., 2001)
MAC_05133	Cell wall protein	1.3514112	(Kirkham et al., 2017)
MAC_02205	Chitinase 18-15	1.32533865	(Katarina et al., 2010)
MAC_09698	Oxidoreductase, 2OG-Fe (II) oxygenase family	1.18014692	(Fang et al., 2012)
MAC_02204	Cell wall protein	1.4692519	(Ouyang et al., 2019)
MAC_04535	Inositol monophosphatase	1.87211796	(Goswami et al., 2018)
MAC_08097	Putative chitosanase CSN1	1.03220854	(Liu et al., 2010)
MAC_06312	Gram-positive signal peptide, ysirk family	1.48992252	(DeDent et al., 2008)
MAC_08916	Cell surface protein	-1.64882805	(Wong et al., 2007)
MAC_05852	Antigenic cell wall galactomanno protein	1.26129729	(Chan et al., 2002)
MAC_05145	Glycosyl hydrolase, family 18, putative	-1.14709034	(Wu et al., 2001)
Stress resistance			
MAC_01566	MFS monosaccharide transporter, putative	1.35528704	(Lopez-Moya et al., 2016)
MAC_08131	RING-1 like protein	1.23510731	(Daumke et al., 2010)
MAC_06860	Nonribosomal peptide synthase, putative	1.17919621	(Oide et al., 2006)
MAC_05717	ThiJ/PfpI domain-containing protein	1.16770735	(Bankapalli et al., 2015)
MAC_01513	RTA1 domain protein, putative	-1.51455732	(Mulcahey et al., 2009）
MAC_01732	Benzoate 4-monooxygenase	1.12105217	(Shinji et al., 1998)
MAC_04555	Benzoate 4-monooxygenase cytochrome P450, putative	2.1644095	(Shinji et al., 1998)
MAC_05903	Cysteine desulfurase	1.00531311	(Sandrine et al., 2003)
MAC_08307	Myo-inositol oxygenase	1.08355836	(Zhan et al., 2015)
MAC_09501	MFS quinate transporter, putative	-6.365860188	(Hoffmann et al. 2003)
MAC_09183	Dihydrofolate reductase	-1.49776208	(Gorelova et al., 2017)
MAC_04778	Nicotinamide riboside kinase	2.12961418	(Belenky et al., 2009)
Carbohydrate metabolism			
MAC_06644	(S)-2-hydroxy-acid oxidase, putative	1.16941519	(Zhang et al., 2019)
MAC_05415	2,6-dihydropseudooxynicotine hydrolase	-3.53335083	(Sachelaru et al.,2005)
MAC_02142	Endo alpha-1,4 polygalactosaminidase precusor	1.0416177	(Naumov and tepushchenko, 2011)
MAC_00989	Sugar transporter (hexose transporter)	1.1963403	(Ozcan and Johnston, 1995)
MAC_07957	Lactate dehydrogenase	1.31791771	(Gleason and Nolan, 1966)
Energy metabolism			
MAC_07816	Inorganic pyrophosphatase	-1.10428353	(de Meis, 1985)
MAC_03493	Nitrite reductase	-1.20801882	(Wijma et al., 2007)
MAC_08624	Nitrate reductase	-1.72398696	(Wijma et al., 2007)
MAC_08430	Oxidoreductase, 2-nitropropane dioxygenase family	1.00681628	(Kido and Soda, 1978)
MAC_08721	Flavin-binding monooxygenase	1.18361288	(Xiao et al., 2012)
MAC_00200	Pfs, NACHT and WD domain protein	1.00119791	(Espagne et al., 1997)

Lipid metabolism			
MAC_09442	Putative long-chain-fatty-acid--CoA ligase FAA2	1.19668707	(Murphy and Spence, 1980)
MAC_05853	Hydrophobic surface binding protein	1.734451317	(Saharine and Keski-Oja, 2000)
MAC_01452	Pfs, NACHT and Ankyrin domain protein	1.09075825	(Zhou et al., 2000)
MAC_09815	Fatty acid-binding protein FABP, putative	1.01413696	(Niot et al., 1997)
MAC_06816	Putative cholesterol oxidase precursor	1.10082508	(Ghosh et al., 2018)
MAC_00274	Enoyl-CoA hydratase/carnithine racemase	1.10528485	(Liu et al., 2016)
MAC_08994	Esterase/lipase	-1.66704085	(Valek et al., 2019)
MAC_08900	phytanoyl-CoA dioxygenase family protein	1.13343589	(Masuda et al., 1967)
MAC_06273	Arrestin domain-containing protein	1.01047065	(Ogawa et al., 2019)
MAC_09347	3-ketoacyl-acyl carrier protein reductase, putative	1.16614006	(Cheng et al., 2012)
Virulence			
MAC_06641	Allergen	2.1644095	(Coleman et al., 1975)
MAC_03516	Toxin biosynthesis protein, putative	1.19793414	(Aranda et al., 2018)
Hypothetical protein			
MAC_08031	Hypothetical protein	1.05895547	
MAC_08454	Hypothetical protein	1.43699397	
MAC_04777	Hypothetical protein	1.36206027	
MAC_02043	Hypothetical protein	-1.30875906	
MAC_05633	Hypothetical protein	1.09008582	
MAC_09701	Hypothetical protein	1.11174776	
MAC_07196	Hypothetical protein	-1.59314012	
MAC_06795	Hypothetical protein	2.59909946	
MAC_08697	Hypothetical protein	1.70340213	
MAC_08698	Hypothetical protein	1.47569712	
MAC_09032	hypothetical protein	1.36777392	
MAC_01405	Hypothetical protein	1.34171162	
MAC_05692	Hypothetical protein	1.33147779	
MAC_07530	Hypothetical protein	1.31129715	
MAC_07870	Hypothetical protein	1.28952247	
MAC_08745	Hypothetical protein	1.2809235	
MAC_04545	Hypothetical protein	1.21117381	
MAC_02851	Hypothetical protein	1.25950272	
MAC_09514	Hypothetical protein	1.25514506	
MAC_02850	Hypothetical protein	1.25067357	
MAC_09149	Hypothetical protein	1.24762709	
MAC_09700	Hypothetical protein	1.22644057	
MAC_06079	Hypothetical protein	1.21676613	
MAC_03322	Hypothetical protein	1.17389578	
MAC_00321	Hypothetical protein	1.12734757	
MAC_02603	Hypothetical protein	1.112765	
MAC_08016	Hypothetical protein	1.099908	
MAC_06965	Hypothetical protein	1.08843753	

MAC_08010	Hypothetical protein	1.07726494	
MAC_01234	Hypothetical protein	1.07687272	
MAC_02044	Hypothetical protein	1.04110401	
MAC_09469	Hypothetical protein	1.02830878	
MAC_06538	Hypothetical protein	1.01413696	
MAC_00261	Hypothetical protein	1.01413696	
MAC_04559	Hypothetical protein	-3.79321796	
MAC_06978	Hypothetical protein	-3.30779113	
MAC_05095	Hypothetical protein	-2.86447664	
MAC_05396	Hypothetical protein	-2.83830585	
MAC_03274	Hypothetical protein	-1.56255444	
MAC_09326	Hypothetical protein	-1.41235916	
MAC_01218	Hypothetical protein	-1.40967075	
MAC_08896	Hypothetical protein	-1.40090054	
MAC_05392	Hypothetical protein	-1.32466495	
MAC_02230	Hypothetical protein	-1.2374018	
MAC_02290	Hypothetical protein	-1.20045709	
MAC_04973	Hypothetical protein	-1.08562447	
MAC_01193	Hypothetical protein	-2.148224744	
MAC_06307	Hypothetical protein	-1.03255627	
MAC_09561	Hypothetical protein	-1.01782895	

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TABLE S3 Verification of DGE results by qRT-PCR analysis

Gene ID	Gene product description	Primers (5′-3′)
MAC_08744	SpoC1-C1C	TCTTCCTGGACTTGTGAT GAGCGGTAATGGTAATGG
MAC_07294	Cysteine rich protein	GATTCAACGATATGGCAAAT ATAGGTATCACGGATGTAGA
MAC_05691	Major facilitator superfamily domain containing protein 5	GCTTGCCGATATTATTCCT GCCTGTAAACCTCTTTCAT
MAC_06615	Putative cyclic nucleotide gated channel beta 1	AATACCCGTCGCATTATAC ACTCATCTGTAGCAAGGA
MAC_02204	Cell wall protein	TACGGCTTTCTTGATACA TTGCTGAGTAATCTTGTTG
MAC_08696	Endo-N-acetyl-beta-D-glucosaminidase precursor	CCATCTCAATGCTACCAT AGGAGGATAGTCGTTCAA
MAC_08095	Amidohydrolase family protein	CCTTGTTTGCCAGTTATG GAGTCCTTGTGATTGATG
MAC_07120	Cytochrome P450 52A11	CGGTTGAAGGTCGTATTG TCGGTTGTGAAGATGCTA
MAC_07387	4-coumarate-CoA ligase 2	CCCGTTATTGACATTTGG TCGTTGAAGGTGTATGAG
MAC_01566	MFS monosaccharide transporter, putative	GCTTGATTACTCCTCCTAT CTTGAACAGATCGTCCAT
MAC_05133	Cell wall protein	TATACGACAACATTGACGAAT CGATGGGAGGTGTAATCT
MAC_02205	Chitinase 18-15	CCTATCTTCCCATCATCAA TGAATCTCCTGAACATCC
MAC_07957	Lactate dehydrogenase	TATACCGCAATGTGTCCAT CAGAGTCGTAGCCAAGTC
MAC_04483	Proline oxidase Put1, putative	AAGTGCGATTGTTAATAGATG TTCAGGTAGGCTTGGTAT
MAC_05794	3,2-trans-enoyl-CoA isomerase precursor, putative	CCAAGTTCTACTCCAACGG TACGACTTGCGTCAGGAG
MAC_08428	NDT80 / PhoG like DNA-binding family protein	ATATAGACGAGTATCAGATC TGTGTAACCTGTCAATGG
MAC_01513	RTA1 domain protein, putative	ATCTCACTTCTTGCCATATAC CGCTACCACCATCAATAC
MAC_09183	Dihydrofolate reductase	GACACATTCTTTCCTCTG GCAATTCCATCCTCAATC

MAC_09507	Hydrophobin	TCTTGTTCTCGGTGTTAT TTATGGTGGTGTCAGTAC
MAC_03493	Nitrite reductase	AAGGGCGTATTTGTCTAT CTCTCAAGGTCCATCATT
MAC_04470	Catalase	TTCTACCTCGCTCACTGA TATGCTATGAAGGAGTTGTT
MAC_01848	Indole-diterpene biosynthesis protein PaxU	ACGACAAGTCCACATATC GGAATACGACATGAGTGA
MAC_07816	Inorganic pyrophosphatase	TAACTTCGTGGTTGAGAT CTTCTTCTTTGAGGTATCG
MAC_09373	A/G-specific adenine glycosylase	GTGAATCTCCTAAGCATAT ATCTCCTATTCCACACTC