

## Supplementary Information

**Table S1.** The composite multifasta file used for the group V1 MultiGeneBLAST search. This list contains one member of each group of orthologous genes in all group V1 clusters.

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<b>&gt;gi 514825998 gb AGO59040.1  PtaA (<i>Pestalotiopsis fici</i>)</b>
MSDNSGSGTSPWGS LNTPV GPPKVTLAYFSNEFPDDLNFIVRKLFDRTSKGPFCSIDGVLLCAIQFAN LIGHYETDHLFFPGSSIASVAGLGIGLVAAA AVSVTPSLADLPVAGAEAVRIAFRLGVLVDGVSQNL QPRDRSTTGT PDSWAYVIPDVSPEVVQKELDEIHSREKTPIPSKIFVSALSRTSVTISGPPARLRSFLRSL DFFRDRKFVALPVYGG LCHAGHIYEQRHVQEVEKSVLDETHVRYSPSVRLFSTSTGKPFLLSTSVTN LFEQVVGEILTQKIQWDKVVKGVLERIQELSA TEVEVLVFRDSLPHVHVKALKSADSGLQTTTEDL LQWLHQSRERLQGRGSLQSKIAIVGMSCRMPSGATDTEKFWELLEKGLDVHRKIPADRFVETHH DPTGKRVNTSITPYGCFIDEPLFDAGFFNMSPREAQQTDPMQRLALVTAYEALERAGYVANRTSAT NLHRIGTFYGGASDDYREVNTAQEISTYFIPGGCRAFGPGRINYYFFKFSGPSYSIDTACSSSLATIQAAC TSLWNGD TDTVVAGGMNVL TNSDAFAGLNGHFLSKTPNACKTWDCEADGYCRADGIGSIVMKR LEDAEADNDNILGVILGAGTNHSADAISITHPHAPSQAFLYRQILRDAALDPFDVSVFVEMHGTGTQAG DSEEMQSVTEVFAPIANKRRTSKQPLHIGAVKSNVGHGEAVAGVTALIKVLLMFQKEAIPPHAGIKN SINPGFPKDL DKRNINIPYQKTAWPRSTDRKRIAVVNNFSAAGGNTTIAIEEGPLRQTIGHDPRTTHLIP ISAKSKVSLKGNIQRLIDYLEVSPDVSLADLSYSLTARRYHSHRVAITTSVVAHLKKQLRSQ LDSAD SHKPIVAAAGPPPVAFAFTGQASYGTM DLELYHESKYFRDQILQLDSFAQQGQGFPSFVPAIDGSFPK EHTHRPVVTQLALLCTEIALAKYWASLGVKPDVVIGHSLGEYAALHVAGVLSASDAIFLVGQRALM LEKKCQAGSHKMLAVRASLAQVQEAAGELPYEVACINGQKDTVLSAAKDDIDKLASVLESAGYKC FSLDVAF AFHSAQTDPI LDDFESVSRTGVLFQAPNLPVISPLL GKVVFN DKTINANYVRRATRESVDF LSALEAAQKISHIDESTTWIEIGHPVCMGFIRSAVPSIKVASPSIRRGENNWQTLVQTLGALHLAGIPV DWNEYHRPFEQALRLLDLPTYSWNDKTYWIQYNGDWALTKGNTFYDAEKAAPRVGGDLPPSPI STSTVHRVIGETFDGTAGTVDIQSDLMQQDFHDAAYGHKMNNCGVVTSSIHADIVYTIGRYLHTKLK PGVKDIHMNISNLEVVKGLVAQKNRDVPQLIQVSISTEDISSGTAQVTWFNVLPDGG LDEPFATATLF YGKANDWLQSWIPTTHLVLGRVHELERLAEQGVANRFSRNMAYGLFARNLVDYADKYRGMQSVV LHGLEAFADVELTKEKGGTWTVPFFIDSVAHLAGFIMNVSDAVDTANNFCVTPGWESMRFARPLL AGARYRSYVKMIPT EEDAGVFLGDVYIFQDNKIIGQVRGIKFRRYPRLLLDRFFSAPDAAKHGGKHA PAVKA AIPPALEKKS AVVVAQVPVVDKPPPTKENAVAAPAAKSPEPVAAA AVNEDSITVKAMALVA AEAALDVSELEDDVQFANIGVDSLMSLVIAEKFRETLGVTISGSLFLEYP AVGDLRAWLLEYG
<b>&gt;gi 514825999 gb AGO59041.1  PtaB (<i>Pestalotiopsis fici</i>)</b>
MVGKGGYRQINKALNICA FEDYLDGQQKSLPPLNDVEQISPNVLRVLGQNP GKFTLQGTNTYIIGTG EKRLIDTGQGIPEWADLISSTLANSSIRLSAVLLSHWHGDHTGGVPDLLRLYPHLSDSIYKHS PSKGQ QPIEDGQVFEVEGATVRAVHAPGHSHDHMCFVIEEENAMFTGDNVLGHGTA AVELLSTWMATLRL MQSHNCGRGPAPHGEVIPNLNAKISGELASKERRERQVLQHLNRIRKEEQGGKGSATVQRLV VEMY GDTDQQMREQALEPFIDEVLRKLAEDEKVAFQLRAGEKTWFAIALE
<b>&gt;gi 514826001 gb AGO59043.1  PtaC (<i>Pestalotiopsis fici</i>)</b>
MMGLPLMAVPMLLDTGADPVYLARQWARMYYYGVRTMPPLAITTFILYVWTIIRRRSQHQAWYIL AVAAVVTMG MIPFTWYVLAPTNNALFRLAEGPEAASGTTAGSLEEVTELLVRWNKLHIARSLFPLT GVVIALSDAM
<b>&gt;gi 514826002 gb AGO59044.1  PtaD (<i>Pestalotiopsis fici</i>)</b>
MAEMSKNPASTLKP SRYLCLTICGYRKPGMSEEDYRYHMTQVSAPMTKDLMAKYGVKRWTMNY MIRRWPCPTLTASAKLCLRTLEDYKRMKQDPWYKEHLIGDHEKFADTKRSKMTIGWIEEWISDGK PVDGLEFKS

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Table S1. Cont.

<p><b>&gt;gi 514826000 gb AGO59042.1  PtaE (<i>Pestalotiopsis fici</i>)</b></p> <p>MVIRTPFSIRLYESRPGMMFAMFQSI LFLAFYGRP VFGSAAARDYACVNTAESRDCWKDGF  NIETDYYGKEEAPEGKLV EESTVKNNFTENYNGTAVHWHGIRQKETNWLDGVPVGTQCPI  TPGDSQVYEFRTQYGT SWYHSHYSLQLMELMLMQSQGPVIHGPSSANWDVDLGPWLLS  DWYHDDAFALDHV GITTNR AAIPKSSLINGKGY YECDPTNDAKCTGTRDY YE VVLKQGTK  YKFGIINTSTILYTFWIDGHNFTIIAIDFVPIEPLTVDTLNVGIGQRYEIIIETNPDFDDDSSFW  MHAQYCFINQTDIVDDKVGIVRYESAGSSDPPYINKSDYHLNFGCADPKPESLVPILKQQVG  AQANPLAAEDYFRVGLGNFTWPDATNSTGSVFLWFLQKLPLYVNWSEPSVKKLTIDETADF  PPNSRPIELDYETGQWVYFVIESDWD PAGAVDQY GQEIRVEPSVHPFHLHGHDFLILAQGLG  KFTSDIQPNLDNPPRRDTVDVEPLGYVWIAFQIDNPGAWLFHCHIAFHSSDGAIAQFLEQPSK  LKPIMEEAGVLGDFADRCNKWDDWYQAVNIPHNATQADSGV</p>
<p><b>&gt;gi 514825993 gb AGO59035.1  PtaF (<i>Pestalotiopsis fici</i>)</b></p> <p>MSRYAILGSTGNCGTALIENVLDSSMTEVHAF CRNQEKLERLVPRVISDARVKV FVGGIGDT  ETLAACLHGCNAVFLCIT TNDNVP GCRVAQDTALGVVKV LERSRADGFLPMPKLVLLSSAT  IDDVLSRNTPWVLR SILLKSASHVYEDLRKTEILLRAEQDWLTTIFIKPGALSVDIQRGHALS  LTDEDSPVSYLDLAAAMIEAVNDPQGRYDMRNVGVVNT HGRANFPGTPLCIAVGLLSHF  APFLHPYLPSGTGPR</p>
<p><b>&gt;gi 514826003 gb AGO59045.1  PtaG (<i>Pestalotiopsis fici</i>)</b></p> <p>MASTGSAQKETLNKFISGWKNANA EMLAVASDDYTQQTLPFSLGH DVRPKQVAEVMLP  KLYSILENYELKIHQV VHDVENQKAAVYAISKADTPFGFPWLNEFSAFITFNNAGDKVVNV  QEMVDTEFFQKFFPAYQSFLSQNK</p>
<p><b>&gt;gi 514825994 gb AGO59036.1  PtaH (<i>Pestalotiopsis fici</i>)</b></p> <p>MSTNDEVFAKDNEFWKTYLRGRAQPPE SFFERIFRYHEDHGGHFGTVHDCGAGNGPYSQK  LRSRFKHVIVSDVAPGNVELAKERLGN DGF SFRVARVEDFDDIPTGSVDL VFATNMHWVE  PSRGAKAIVSQLKSGGT FIAAGFGPARFEDQKVQDIWTRISQSGGRRIMKADDPTKILKVA  VRSSRYDYDVAPTDTS LFPVGTQRIHLNMNNGGLTDIVYPEDYVAAA EPSYTGPDDEIFESE  DGWSFETDLEGVKDHFATFPFSKEDPEVFAELWAELEKYVADGRPIRGCWPAKIILATRV</p>
<p><b>&gt;gi 514826008 gb AGO59050.1  PtaR1 (<i>Pestalotiopsis fici</i>)</b></p> <p>MSSVPIDSVQAAQQV VSTKIKDKSWIMPTDPAEFLQQIAYQS QLLACLHWLGEFQILACVPL  SGSVPIKDVADLAGVPVSQLAHVIRFMATAGFMKEPRRGEVAHTPQSAAFVTDPSFLDAGIF  LAQVSARSARKMAQNSAISTLMGGD GANNNGSDFDNGELLKSTSESPRVQREV TAYLHYVV  NEVSDTANLLAQLDWRKLGSSSVVEIRADRIYPASLVLTELHSTPRFTVQTFQEDSVEQGT  VTTTATTSSSFISKSSEEPSPKRIKPGITYQKRSLGSPQVVTDA TMYVMRLERPHSTSVQRSIL  DEGQIVSELRAHLGVLKHNSNATLILIGPLLPEAG AIDAKAEMVVRFRDL SLNQLT SEREME  VGELVDIIGDVQDESGCLVVVNKLYSRTSSTVALEVRYELYNRYK G</p>
<p><b>&gt;gi 514825995 gb AGO59037.1  PtaR2 (<i>Pestalotiopsis fici</i>)</b></p> <p>MEAADPNNNL TITSPSTLLSNPTQPPA QPLKLRDSCHACASSKVKCHKEKPTCSRCKRGIT  CEYFAHRRPGRKQENRAKDTTNHVERQENTTAVEMLDL NWPAPDFSTQTSIANDNLDVFH  DIFVPPDQLNNGLTDF TIDFDDFDIQSDPAEIASLPDTSSLES MFVTSPTAPTDTITPNVITPNV  GLSVLEGLPDTTHHTQAINLASYIQTPPTEKTPDSRIKHLEENKDPCMTRALSFLTQLSESTSR  ICKTSETGCSGTNKKSLPESLDGIIAENRRLLEAMSNILQCRCSEDDDLLCIQAI VASKILNLY  ASAIEIKPSPARVGSVSTHTTAGQYEPQVEQQLSTRTHPQLASGRDPIRMAAQSVL GELHR  VQRLLSQMLQKSKDNETMRRKGS ENGLRAVADKVPLTSGV SFGSIEADLRYKLGKLSIEIIT  LLRGA</p>

Table S1. Cont.

**>gi|514825996|gb|AGO59038.1| PtaI (*Pestalotiopsis fici*)**

MPSPTNPAKVETPFTTAALGNGVDFWKAYVENRPHPSDSFFELISEYHHSHGDSAAQSAIAH  
 DVGTGPGNIAEKLLRHFHDHVVGSDVNEQALAAAPALLPADSIKRMTEVKSSAEDLASANIP  
 ESVGKGGQTDLILVSECIPLLDISKAFAAFRALLRPGGTLAIYFYSRPIFTGDNEAELNQLYDRI  
 ATRVCQFLLPFKGTGPFPIHYRAAEAMSSGLDSIPFDPEAWQDVVRYKWNADVPLTFNSKE  
 GYDFEVEPVDRRDHSTEITKEITDRDFWAEEDWIGRVASFLDSVFPNYRNKAGDKFEEVQS  
 LFTELETALGGPKATRKVSFPVLLLATRK

**>gi|514825997|gb|AGO59039.1| PtaJ (*Pestalotiopsis fici*)**

MAASTAAQVQLSEEALGLARIFENPKGSLEAASKLLQKNHDEFHVFWRDVGGHNHIPHSVL  
 SILALGGGPAELQRAWDDGVAIQRPPTPLDEDVVKLENPAEFRARIGSIPNYTNFLHFFRN  
 QMDKKGWQAVVSEYAFSRTPLAETIFAQLFEGAYHPFIHIGFGIEFNLPISIIAEGLAQAATHD  
 SAGIEGFFLEAERQAAQSKGPGKSLVQLLDEVRTTEKIKTAARLPDGPVVRDGVIGRAGAE  
 IAALASQFRVPADQLSRGAAESINISAYTAGAAQRAGKARKIDFFHMHNTTSSLFLTVFLNQ  
 PWISTEDKVRIVEWKGRLDLVWYAACSAPDLNVDHVIGYKPAQSAGWGWKELYEAINVA  
 HDDGHLAKIVRALKNGEEVSRPFESGEGAEAFPIKGD SWLKL AQMSYDTTLDLPDDDKWI  
 WGAGFLPLWNKVPSL

**>gi|514826010|gb|AGO59052.1| PtaK (*Pestalotiopsis fici*)**

MKSLFLTGLLSALTWASEFDYLYTTEPVTPLPQGYPWGSKTANDSHPEGKLVTVHNDLEEG  
 TALHWHAFLOKETPWQDGVPGITQCPIAPGACFTYTFVADSYGTSWYHSHYSAQYADGIL  
 GPIIVHGHPTVPYDIVLEHLFDEDFAVVVSFSFADSRNATNIRQTKPANNNLINGRNSWNCT  
 LKDLGDDTPCQSNAPLSEFRLTPGKKHRLRLNVGGSIAIQKFSLDGHKLQVIAHDFVPVLPY  
 EVEFLTGLVVGQRADVIVEALANGTGTYTMRATIPPAPCANSVDHDATALVHYGNTTSTFSN  
 SSSEAWPSFIEALGVCDGLPTEEITPWYAIPAPEAPATTQIINVTLAQNETGQYLFYMDNSSF  
 RVNYNHPVLLLSNLGNNSYPDDPEWNVYNFGSNNSIRIVMYNNAIRTHPIHLHGHNFFVEA  
 VGLGEWDGHVDHPENPVRRTAMLPQGGYMVISFNADNPGAWPLHCHVAWHVSSGFYV  
 TVLERPDEIAEYKIPSVVGQTCRDWWGYTNHTIVNQIDSGL

**>gi|514826005|gb|AGO59047.1| PtaL (*Pestalotiopsis fici*)**

MKHIVIIIGGFAGVSTAHRFLKNVKGKSTTAPYKVTLVSRDSHFFWNIAAPRGIIPGQIPEEKL  
 FQPIAEGFSQYGPDKFEFVLGTATDLVDVGGKTLVVDVDGKATRISYDYLIIGSGSRTKIPGPF  
 KSDGSTDGVKQTIHDFQERVKAAKTIVVVGAGPTGVETAGELAFEYGTSSKIIILISGGPTVL  
 ENRPASVTKTALKQLETLNVDVRVNTKAKDPVTLDPGKKELTLSGGEKLVVDLYIPTFGVL  
 PNSSFVPSQYLDSNGFVQVDQYFQVKGAEGVFAIGDVSDSEAPQFWFVEKQSVHIAKNLILS  
 LSGKAPTYPYKASATGMMGLQIGKNSGTGHFGNFKLPGLVKTIRKTLFVENLPKTVDGSM

**>gi|514826006|gb|AGO59048.1| PtaR3 (*Pestalotiopsis fici*)**

MATPKRMWPTDLKHIVRYTSRRTSSRYRVPPGQKANPKLAPKVHAAASTPSTNTSHSTETT  
 PPSDNGFYDTAESPLSPNGAQHLTIATIPAEDSILLMHFLDKVFPLQYPMYRPDILEGGRGWL  
 LALLLQTKSLYHAALALSSYHRRMLVFERISEQCRATAAVQQEKHLETCLNEVRQAMVILD  
 QRTRQRKSYDGMGTVTSIVQLVFFELFAGQDHAWRTHLNAIDVYDQNCRDKLEHLDLSE  
 ASKTILRNDQRLAVD GALVTQEVTFRFMGGSIIWLDILSSLAAGSVPRLLSYHQGVLD AAS  
 QVKLENIMGCKNWL MCQIGRI AALQGHRRQDGWTSQRHG IKLHSAADIKSEIESGMARE A  
 LESLNIQTS DSCGINNSSTNSVTLTTRMF AFMAIIHLHLVTHDFERLDNLRETIADAIRLLQSQ  
 VPCSMIPVIVAPLFIIGCVAAQGDEQSLFRASLASDTSQHRLYRHRKDVLSALEEIVSKRQTS  
 TDYTWNDVLDMGQHKYLLFL

Table S1. *Cont.*

<p><b>&gt;gi 514826004 gb AGO59046.1  PtaM (<i>Pestalotiopsis fici</i>)</b></p> <p>MSVPAQTSVLIVGGGPAGSYAATVLAAREGVDVVLLEAEKFPYHIGESMLASIRFFLRFVEL        EEEFDRHGFEEKYGFATFKITEKNPAYTDFAAASLGEGGYSWNVVRSESEIIFRYAGKCGAK        TFDGTKVESLTFEPYPHEGFDES VHLANPGRPV SANWSRKGSSGVKFDYIIDGSGRNLIS        TKYLKNRSFNQGLKNIANWTYWKGAKRFNVGEKNENSPLFEALKDGS GWVWAIPLHNDTI        SVGVVARQDAFFEKKKESGLSGEAFYKEYLKLAPQIKNELLRDATIVSDIKQATDWSYSAS        AYAGPNFRLIGDAGCFVDPYFSSGCHLAMTSALSASVSIQAVRRGQCDEL TGAKWHTTKV        AEGYTRFLLL VMTVQRQLRMKDKNIISTDEEEGFDMAFKKIQPVIQGVADTRTEDEQTQRR        AAEAVDFSLESFEITPEKQAAVISKIERSQAPELLEKL TPEEVHILGNIVNRTFEREKDELNL        THFTGDMIDGYS AKLEHGNIGLYKREKALLNGTASRAAAVLKSIHQVA</p>
<p><b>&gt;Afu4g14580 COORDS:Chr4_A_fumigatus_Af293:3847775-3849411W,        translated using codon table 1 (482 amino acids)</b></p> <p>MERQPKSLCDATQLLETANIISDTVQTIIEWSAEAKAPQGS GKQNA PMLPSRELFDAQRTIL        AAVGKLT ELVSDPSARILEVATQFQESRSLYIAAERRIPDLLAAGDEGGVHIDQISQKAKIEP        RKLARILRYLCSIGIFKQTGPDTFANNRISAALVSNEPLRAYVQLVNSEGFTASDRLPHTLLH        PDTGPSYDVAKTAWQNAVCTKKTRWEWLEERVAPEQLLES GGHYPGIPSLVMGLPPREDD        GLVARPELEIMGLSMVGGGRVFGTAHVYDFPWASLG DALVVDVGGGVGGFPLQLSKVYP        QLRFIVQDRGPVVKQGLEK VWPRENPEALHQGRVQFVEHSFFDTNPTEGADIYFLRYVLHD        WSDDYCVRILAAIRSSMAAHSRLICDQVMNTTIGDPDLDSAPSPLPANYGYHTRFSHRDI        TMMSCINGIERTPAEFKGLLQAAGLKLKKIWD CR SQVSLIEAVLPEMNGFR</p>
<p><b>&gt;Afu4g14530 gstC COORDS:Chr4_A_fumigatus_Af293:3835440-3836117W,        translated using codon table 1 (225 amino acids)</b></p> <p>MPDIQPITVYGKGGPNPPRVAILAELDLPHKVIEVPLSKVKEPDYVAINPNGRIPAIYDPNTD        LTLWESGAIVEYLVSHYDPDRISFPAGSNLAALATQWLFFQASGQGPYYGQASWFKKFHH        EKVPSAIERVYVKEINRVTVGLVLEGLSRQKVAADGDGPWL VGGKCSFADLA WIPWQVIVTAI        IQPEDGYTVEDYPHVKNWLD RMMARPGVQKGMADIFPST</p>
<p><b>&gt;Afu4g14510 COORDS:Chr4_A_fumigatus_Af293:3833644-3832621C,        translated using codon table 1 (282 amino acids)</b></p> <p>MLEKVFHEKSFADQYTYGAKISELYAETLITESGIAKSHQRPLIILDNACGTGSISSTLQRTLD        ERNKRSLKLTCDLSEGMVDYTKQRMQAEGWNNAEAKIVNAQDTGLPSDHYTHVYTAF        FNMFPDYKAALRECLRILQPGGTLATSTWKTANWCTIMKPVIATMPGQLSYPTMDEINTML        NKGWDRESDVRAEFEQAGFDHVNITTEKQCLLPVQEFGEACKILLPYILSKFWTQEQRDQ        YEADVPSYLMRYLERYGKDGLAPMKGVAIIASGRKP</p>
<p><b>&gt;ATEG_08460 (conserved hypothetical protein)</b></p> <p>MLASMRFFLRFIDLEEQFDAYGFQKKYGATFKINSKREAYTDFASASLGPGGYAWN VIRSEA        DDLIFRYAGEQGAHIFDGTKVDDIEFLSYDGADGANFTPA AFLVNPGRPVAATWSRKGTR        GRIKFDYLIDASGRAGIISTKYLKNRTVNEGLRNIANWSYWKGAKVYGEQSDQGGSPFFEA        LTDGSGWCWAIPLHNGT LSVGVVMRQDLFFGKKKAAGSPGSLEMYKLCLQSVPGISGLLE        DAEIVSDVKMASDWSYSASAYAGPHFRVAGDAGCFIDPYFSSGVHLALVGGLSAATTIQAV        RRGETSEFSAKWHSSKVTEGYTRFLLVMAVLRQLRKQNAAVITDDKEEGFDTAFLGIQP        VIQQQADTGESEQQRMVAGVQFSLERFGQATPEAQRALLDKVQFAGQNAEELEKLTADEL        AVLHNIIGRQLKMTKVEKNLDNFTRDVIDGWAPRVERGKLG LQRADTSIMTAEMKDLFQL        NRSLDSTKAGIQLPA</p>

Table S1. *Cont.*


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**>AN10049|mdpB COORDS:ChrVIII\_A\_nidulans\_FGSC\_A4:4457666-4458357W,  
translated using codon table 1 (214 amino acids)**

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MTLQPTFEGRTPEQCLNVHTDHPDITGCQAALFEWAESYDSKDWDRLKQCIAPFLRIDYR  
AFLDKLWEKMPAEFVAMVSHPHFLGNPLLKTQHFGVGMKWEKVDDSKIVGYHQMRVA  
HQQHLDSQMKEVVAKGHGHGSATVTYRKINGEWFAGIEPNIRWTEFGGEGIFGPPEKEEN  
GVAADDQVMNSNGSSEVEERNGHVVNKAVEVRSV

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**>AN0146|mdpC COORDS:ChrVIII\_A\_nidulans\_FGSC\_A4:4456446-4457370W,  
translated using codon table 1 (289 amino acids)**

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MSPAQRSLVSSHLNSNVSALPKMTATTHAPYRLEGKVALVTGSGRGIGAAMALELGRLG  
AKVVVNYANSREPAEKLVEIKELGTDALQANIRNVSEIVRVMDDAVAHFGGLDIVCSN  
AGVVSFGHLGEVTEEFDRVFLNTRAQFFVAREAYRHLNTHGRIILMSSNTAKEFSVPRHS  
VYSGSKGAIESFVRVMAKDCGDKQITVNAVAPGGTVTDMFYDVAQHYIPNGEKHSAEELQ  
KMAATVSPLKRNGFPVDIAKVVGFLASREAEWVNGKIITVDGGAA

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**>AN0147|mdpD COORDS:ChrVIII\_A\_nidulans\_FGSC\_A4:4454244-4455887W,  
translated using codon table 1 (521 amino acids)**

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MTHFPVNIASDKQEFDPERWAKTPTTESSVNGENGTAPTSGLPSRHPSTGISVLIVGAGMGG  
LMTALECWRKGHVAGILERSEGPVYSGDIIVMQPSAVSIIRHWPDMMLHDMKAEQVHAVV  
SYETHDGRHIYGPTVPSFNDPEHLETRKGPVAPAQVRRKFYRMLLRQVARCGLRVEYGKT  
VKSYPFEDEKDGKGGVIIATTGEAEVRVADIVVAADGLKSPSEILIAQGHVPPRSSGLSIYRTA  
FPKDLAMQNELVRKRWSDSPPIWEYWLGPGLMYLGVFVGGDDIISFGFTPRDDIVEGTATESW  
EPDTPETVAQAMLSGAGDWDPAVLALIRSAPKGAIVHWPLLWRDLRREWTSAPGRVVQ  
VGDSAHSFIPTSGNGGSQALEDAITLATCLQLAGSSQRAYLGTKIYNLLRYERVSCAQKMSF  
VNSQLKTGTDWDIAWKDPAKIRTRFPKWIFQHDPEAYA YEKFGAEFAHLLDGREFVNTNY  
PPGHEFRAWTVEEVWRNIADGKRVEDLLDGDWS

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**>AN10035|mdpI COORDS:ChrVIII\_A\_nidulans\_FGSC\_A4:4441618-4439762C,  
translated using codon table 1 (592 amino acids)**

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MSVSRSCFRPFLPAEIDGGHLPVDPSVFTHIERGLHQNPQGFAIQSTHQQPCHFSALVQTGSG  
TENGGAPNYDAVEREPGTCLAWTYTQLHHAALRIAAGLLARNAQPSTRMLLLIPNGAEFCL  
LLWTA VVLRVTIVCLDEELLNVEQHDELRRMLKTINPRVIVVQDVKGADVIDVALRNLPLD  
PDILKITLSELAGSQPDSAWRSLLSLSLTPALSASETESLLSSARWDSSNAARTYSILYTSGTS  
GVPKGCPLHISGMSYVLQSQSWLVNAENCTRALQQAHPCRGIAIAQTLQTWREGGTVVMT  
GNGFNAGDLVHAVKRHAVSFVVLTPAMVHPVADELKGRNGAADSVRTVQIGGDAVTRGA  
LEICTRLFPKARVVVNHGMTEGGGAFVWPFNRPRDIPFYGEMSPVGSVARGAAVRIRGANA  
TVARGELGELHVSCPSIIPGYLGGVSAQSFHDEDGRRWFKTGDVGLMDKQGVVFILGRMK  
DMINGKVMPIESCLEKYTSVQTCVVNAGGPFVAVLARYTGKKEAQIRRHVVRAALGKSNA  
LNGVIYLHQLGLERFPVNGTHKIARGDVEGAMLAYLQTEPTSR

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**Table S2.** The composite multifasta file used for the group V2 MultiGeneBLAST search. This list contains one member of each group of orthologous genes in all group V2 clusters.

<p><b>&gt;gi 297242539 gb ADI24939.1  VrtR2 (<i>Penicillium aethiopicum</i>)</b></p> <p>MPSLSSTSTMQRSCRPMQMSACPNQQKDRPVPQLSCVLCRDRKCLKCDKLDPCSNCTSSGV  ACTPIYRPRLPGRHARTVQTKASTPPDTRRRGSSNESTTAPAPDDGGLGTHIDQLDNLVQD  REVSKLGLSGEGNGLQELISLVSEDEMPATAWSTHCFGTISRILSSRIRLLESLVQETARIQTP  KRARKPMPVQWYSAPLAGCNWNRMVVQTPQGLEVQQFPAPPTSYSARRSPELSGNDI  WADLMDHDMHDPQYNALELPPDLTNEGVDNMGSSGRDDPINNGFNALRLLGINNSLSP  SFISLPRDRLSASKLCQVYLQNVDPHIKILHRPSLSRWMVDGAPTYLGSSSEDDYAVKALESA  VCYTAANTMTEHQCAAFQKTKSSIMAVRRKMCEDALENAGLLTTRDMTVLQAFILYLV  PTDSLKIGRSEDKDTAVWALVALAIRLIKAMGLNQEPSEGARKGESFFQQQLRLRLWLTA  CLIDLQASFAQATDPLITHRDAACAVPYVANINDSDFDVTDAHPVASHEELTDTTFALVTYR  VQVAGRLFNFGPGCSTAAERHKLAEVQQQVFTLLHYCDPESSSYAWFTWHSTQSIIFAVR  LSELLPFRCGQPGGHVPPSPRAEGDTLLWRALQNLEKAQLIRADPRGDGFRWYITTPWL  ALSTAISECNSCTDVALVCRAWPVIEISYRQHEELQISDECQLPQGPLVHLMNKTREKLAPLL  QEGGARLSDSQTVDRASADSLQPPVPVGSIPIDPLLNGSLGADTAMSEASSIGSLPPFEQQC  WKQMTMPTDGAPVRDGVVFTSELYNPLQSDFLNSHG</p>
<p><b>&gt;gi 297242538 gb ADI24938.1  VrtL (<i>Penicillium aethiopicum</i>)</b></p> <p>MSKLSDNHSSASEGEKEAGDLESGPTAISSEPSFDDADRDPNLITWDGPKDPENPKNWPKGL  RWKNTWTVSLFVFISPVSSSMIAPAMSDLAKSLGMHAEIEIYLSLSIFILAYSIGPIFFGPASEL  YGRVRLQISNVWYLAWNLGCGFATTKGQLFAFRFLAGIGGSAPLAIGGGAISDMWTAER  GKAMGVYTLGPLLGPVVGPIAGGFIAEYSTWRWVFWSTSAALAVQVVGFFWLQECHPGT  LLRKRDRDLAKETGNENLHTAEKVETLGYKLLHAFERPVKMFTTQPIVFCMAIYMAYLFGI  SYLMFATFPEIWTVVYHESPGIGGLNYLSIAIGSFIGLFFNLKLVDRYRSLKARNNGVVGKPE  YRMPSLAVGSVISTIGLFWYGWSIGNTHWIMPNIGALIFAMGTISCLOGMQTYIVDSYQTYA  ASAMAACAVLRSLCGFGFPLFAPYMYNSLGYGWGTSLLAFITMVVGGWGAPFAFWHFGPRL  RAMSKYASG</p>
<p><b>&gt;gi 297242537 gb ADI24937.1  VrtK (<i>Penicillium aethiopicum</i>)</b></p> <p>MAFSTYLGSSLESSLVKGLAGVWLWYIYGRVFNIFLHPLANVPGPLLCKFSKIPWDYWQ  WTGRLPQNTAKVHAKYGEIVRIGPNELSFTNNAAWNDIFAKVPGRAQWPRHPKRVPOGKN  GPQSIMNTAGTYHARFRLLNHAFASEKGLQEQQDLITKYIDIFVSKVDGFARTGQSLDVTK  WFVMVGFDFVISDLGWSEPFNCVENGEVHEWMKTF AETAFTDQLKFLFRERGLMFLAPYLV  PMKLQLARLNNFKYARARVEERIKTGGTRGDFWDKISVKSAGDNASGEGLTKEEMVVA  VTLVGTGSHTISTLLTGLAYFLGTNPHTMKKLVDEIRTSFNSPPEIDLVSVHKLKYLTA  CLNE TMRLYPPVINMLWRTPPQGGGHASGIFIPEGTGCNMSFFGIAQNPDYFTRPLDFC  PERFLPDP PAEFRDDNHEAYHPFSLGAYNCLGQNLANAESRLIMTKLLWYFDFELDGT  VDKDWLDQKS YGVFIKKELPVKFHPGPNAVVRHVANGNGVATNGHANGHANGHARINTK</p>
<p><b>&gt;gi 297242536 gb ADI24936.1  VrtJ (<i>Penicillium aethiopicum</i>)</b></p> <p>MTNSPIADLVHHPERVQSPSLVNSKMNGDAKAVTEWTEPGPAAFDFRSDTVTRPTEQMLA  AIAATTLQDDDFRQDPTTLGLEAWMAELTGKAAGLFVVS GMTGNQLGVRAHLQSPPHSVL  CDARSHLVTHEAGGVASLSGAMVSCVTPVNGRYMTQADLEAHVNRGTLITDCPTRLV  VLE IPLGGVILPLDKCRRISEWARAQGIALHLDGARLWEAVAAGAGSLRDYCACFDSVSLCFSK  GLGAPIGSVLVGSETLRERARWIRKSIGGGMRQAGVVC AAARVAVEATFLGGLLKRSHAR  ARDIATFWEIHGGRLTYPTETNMVWLDLEAVGWTPERLIRGAELGLRFMGARLVVHYQI  GDEAIGRLQDLMLEILVSGLVLDHPRDS</p>

Table S2. Cont.

**>gi|297242535|gb|AD124935.1| VrtI (*Penicillium aethiopicum*)**

MGARSKEARHRWFSRLPPDASSSFLPCKRPKSVAFVLWIRPSCFLRESLPAELSGLPGLPLPP  
 QAPTNTMNCGLPEAALSVIDWGRLLKSGDVNEGARLLSACDDQGGFFYLDSSEPSFLHDHKS  
 VLHFMDQYFHQGLADKMKDDRQSDTHGYEPVATSTGALNTLPDYYESLKASRDELHGDG  
 RNLAPAVCDRQDLFLRFSDMMHQMVIAILQELDCQLGFGGDRASFQDFHRKDAESLTTLS  
 MFRYPKQETLDLGVGHNKHTDIGTLTFLLCDQWGLQVLSKDPAGWRFVAPREGHAVINVG  
 DTLRFLSGNRFSAVHRVIPTQRLQHEDRYSIAYFLRAANDTQFTDSAGRQVSAKQWHDEK  
 FDFVRETHEEQEKMPILTGGMERLENLPGIWCGVRLTDGICHRLGAEDC

**>gi|297242526|gb|AD124926.1| VrtA (*Penicillium aethiopicum*)**

MLHPTEVEKFPPTLLYFGNEFPNDDVNELEFRRLQQHSKDRRFLLNAYLEESILVLQDEVAK  
 LPHHIKSRVPYFDNIVTLSEHGYLRLDLGLGAAMESAFLLILQLGLFIGNHEAVDRELNLPHN  
 VTTVAGLSVGLFSAAAIALSASLAEVVRNGAECLRVSFRLGVYAGDFSSSLEAPQPEGMLAS  
 WAHVVTGMTEESVQSELTRVNEDLGNPETSKEVFISAADKSSVSVSGPPSRIKAAFLQSSDLR  
 YSKSLPLPVYDGLCHATHIYSQDDVNTVLEISESLIPATRPFQLSVISSRTGVPFTATTASDLL  
 SEIATELVMGTIYLDNIIIEGIVRHIGAFPGAQSCRIDSFRTSIIFKGILEAIAIDHPDLTIEKNDL  
 VDWWHQDFGTRRRNDPANSKLAIVGMACRMPGGANNVEEFWQLLEQGRDACTTVPPDRF  
 DLETHYDPTGKTENAAQTPYGNFIDRPGYFDAFFAMSPKEAEQTDPMQRLAIVTAYEAME  
 MAGLVIGRTQSTRDRIGSYYGQASDDWRELNASQNIGTYAVPGGVRGFTVGRINYFFKLS  
 GPCLCIDTACSSSMAAVHAACALWAGDVDVALAGGVNIITDPDNYAGLGNNAHFLSPTGQ  
 CKVWDKGADGYCRAEGIGSVVIKREDAEADNDNILAVVLSAATNHCADAISITHPHAGH  
 QKDNCRRLRKAGVSPMQVSYVEMHGTGTQAGDAIESESVLDFVAPLKPLRRPDQRLHLG  
 AVKSNIGHGEEAAGISSLIKMLLMFQKNAIPPHIGIRTEMNPQLPKDLGRRNAGLVFETTPW  
 LRPEGKKRISVVNSFGAHGGNTLLLEDAPERHRQRISPESTDGRSVYAISVSAKSKKSLQG  
 NLSSLLGYLEQHPDLDLADLSYTTTCARRTHHNLRVATVVSSVSALQKFLRSAIDSNIAATTVQ  
 SVPSNIPSVVFTFTGQGASDRGVRQELFDDFPAFRTOVLQDLQVQRLGFPSVVPALRGSTD  
 EEVLSPPVVSQLSIVVLEIALSRFWRLGIRPSAVIGHSLGEYAALEVAGVLSAADVLYLVGRR  
 AQITEQRCTPYGHSMLSVLATPDEIDRVVRRVPETSNEVEYVSCQNTHEDTVLGGAADIE  
 AIRKVLETTSYKCVPLAIPFAYHTSQMDVVVDELEEIAKNIPFKAPSIPVLSTMLGTVVFDGK  
 TINPTYLRRQTRGTVKFVA AVETARDLGLIDEKTVWVDLGHVPVCVGFIRKLSPEARIAASC  
 RRNEENLSTITKSLVTLHLAGATPLWNEFFRPNEQVYRLLNLPKYSWNETNYWIPYLGTTWA  
 LDKALLKYGITPVGAKAPATLPAAGLRTSTIHQTTLTIDSMATLHVLSDMQAPEFRAAVY  
 GHTMNNCGVATSSIWTDMALAVGEYLYRKLVPQAKEVHMNVCDLEVLHAQVISKVKGCS  
 QPLALEAHLDDLDMQYMSLKWYNTNAATGERAPEWFASAAVRFENPDAWTAEWNRTGHL  
 VLGRIETLRLAADGVANRISKRLAYTLFKNVVDYSDWYRGIDDVIMNDYEAVANVTLPD  
 RHGTWHTPPHWIDSVCHLAGLIMNGSDASNTQDFFYVTPGSDSFRLKPLAPGAKYISYVR  
 MFPLSAEAGNMYAGDVYILKDDVIVGVLCQIRFRRVPRLLMDRFFSPPTADNAGVHGTGPGS  
 QRSQAPPAATHAATKSPQKTLQVPSGHVFNKASIVDTNHVQASHPSAVPVRHDQSNGVSG  
 VSDSDSSTSITSSNSTADTSTPTPESEDADSGLVGQCIIISRETNLDMSELTPDATFAQLGVD  
 SLMSLVLSEKFRNELGIDVKSSLFLECPTIGEVKEWIDQNC

Table S2. Cont.

**>gi|297242527|gb|ADI24927.1| VrtB (*Penicillium aethiopicum*)**

MAPYLQHFIAWFGKDSILSKLIQIFNPPSHSDSAKIIISDDDDGRSPEPPGGEEILWRHSAPKSTQ  
 MWAFLQKVNKKYGYSLRTYQDLHHWSITHRGQFWGEAWDYCGIRHSRQYDEVVDEAAA  
 MWPRPAWFRGARLNFAENLLFPKVPQAVSDEAIAVISVDEGGKRDFITWQDLRERVRCQS  
 GMRALKIQPSDRVAGYVANHSNALVAMLATASLGAIWTAVSPDTGVIGAVDRLVQIEPRLL  
 FTDNAVVIYNGRIHPVLTKTQEIITALPSLEAVVVMRTVAGVQEDLPSSPRSPAKRLTYNSFLA  
 QGPETQKLEFVHMPAEHPLYILYSSGTTGPPKCIHVHGAIGTLMQHKKEHMLQSDIQPGDRLC  
 FVTTCMWMWHWLVSGLASGATVVLVYNGSPFYYPSSHGTSKDDLAMPKLVDELGITQ  
 FGASATYFMSLERRKHLPRSLTQGRLSLETLKAVYSTGSPLAPSTFRYIYQAFGSQVNLGSIS  
 GGTDIADFGVPSPLQAVVAGEIQVIALGMAVQAWGPTGMDLSVTGEPGELVQFWGPGSGAS  
 KYESSYFAKYPGVWAHGDHIQINPRTGGLIMLGRSDGTLNPKGVRFGSAEIYHVLQYHFAA  
 QVEDALCVGRRRRQDTDEMVLVFKMRQDQLWSLALAEAIRRTVREELSPRHVPELIIIECP  
 EIPVTANGKKVEVLVKRIVSGVEVPAAGSGTVNADCLQWFQEWATQN

**>gi|297242528|gb|ADI24928.1| VrtC (*Penicillium aethiopicum*)**

MGDATA TEVFPVMSIAVAMGDVESQLRVFHNVSRLFPTDDANQVFWWRRTTGRHFAIMM  
 HEARYSEARQVELLLFYRFVIAPRLGPRPTSATPWFHSRVAPGIGDGSPIGYSWRWGTGPDT  
 KPLIRHYIEAIGPLTGTTADPLNEFAAKEMLYQLGQLVPGVELPLAWKFAAHIRPSLTDEPTR  
 AVAGSSILIGLQCAPESAGIEVMAGLMTRSPAQVPELLHSIFPRAMRDAYGPDASLDGLNMV  
 RDFVCHDPQGQYL TILGTTAIDCCAAASSRFKVVYVTTTNTSFAHLAAVMTLGGRKPEAPES  
 LTQLQELWYALKGLDPEFPVTAEPLSSVCGAANGTASGNPNANVSGVTFYFDIHPKYPPPHI  
 KLQVDISKHTISDLGAINAVTEFLARRGQAADAQAYLNVVRAMVPDEELRTRRGLQAFFAF  
 AFKNGAVDITSYFLPQIYRRYA EVQAELEPRKDCQGRSELSSKLQRRSRFDSY

**>gi|297242529|gb|ADI24929.1| VrtD (*Penicillium aethiopicum*)**

MATSTTTSLKEFLSVFPQLVADLRALCLEEYQLPACVWDRFESTLNHNLTGGKCNRGLSVI  
 DSVRLLRDGLELSPA EYFDAAVLGLVELLQATMLVLDDIMDGSPTRRGKPSWYRVPGVG  
 MAAVNDATMLES AIYMLLK KYFAGRAIYLPVVDLFHETALQIELGQAFDMLIANEGTPDLT  
 TFVPATYSQIVTYKTAFYSFYLPVALALHAVDAATPTNLAAARAILVPMGEYFQVQDDYLD  
 CFADPTVLGKVGTDIIEGKCSWL VVQALQRASTDQAQLLAENYGSASGESSVKALYSELDL  
 ESVYRTFEEQRVAELRTLITGLDESQGLRKS VFEELLGKIYQRRK

**>gi|297242530|gb|ADI24930.1| VrtE (*Penicillium aethiopicum*)**

MFIAAVTHNWMERLAALSLLHYVLGAIFLLLLFHMLSNFFHPGLVDVPGPFAAKFTDLWRL  
 FKVWQRRFKEDLPLGHASHRSTLIRIGPRMVSCSDPRAVELIYGFHTEFSKSDMVKAMAPIY  
 KGKKQPTMFAAADNKTHARIRKPVAGAYAMTSIMQRMDELFI RPKRACDIHNWVQYFAFD  
 MVLEMTMSRNLGFMKAGGDVDGV LKQLQKDLDYRGIALAMPIIDRIWRLNPVSKFFKPKQ  
 SGHFAMRCKRILED RMAYEKSLDSRTQQQQDQKPHDFAHRFLEAQRKDPSISDGQLIGYMQ  
 ANLIAGSDTTAVVMRTAIYYTLKQPWILQRLVTELDQYHGPLPVPFRIARFEMPF CGAIVRE  
 ALRRHF AFIGMMERQTPPCGVVMPDGRRLPGGVVIGMHGDLIGRDRAIFGEDADEFNPLR  
 WLARPGEPEAKYQERLRAMNAHDLAFGHGPRGCIGKHVAEME IYKFIPTFFALIQRFRMRP  
 EQSWTVRQLFVFKQSGMDMMLDWRQGKGLQ SMA

**>gi|297242531|gb|ADI24931.1| VrtF (*Penicillium aethiopicum*)**

MTTTTTTDDDTQKLDPSASDEV IYKSWDLLIYEI WVLGIVSTWAWGCSTTEYLLPQFRANVG  
 TNHLDVSGSGTY YLRKGGIPASTRL TLLDLERPALDLGLQRCGRSDARGLQADILQPLPVID  
 KFDSVSMYYLLHCIPASVEDKCAIFKHIKHNMTPDGVIHGANVLGKGVRNDGHFAAYVRR  
 GVLKAGIFHNLD DNAYDFEHALRMNFEEVETR VVGSVFIFRASRPKLDEGDLET



Table S2. Cont.

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**>gi|297242532|gb|ADI24932.1| VrtG (*Penicillium aethiopicum*)**


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MATRIPFDESYWEEYLSGQEASLPALPAVTQLSPRVTRLLAGNPGIMQLQGTNTYLVGTGP  
 ARILIDTGEGRPVWHATLAEHLRTHHLTLEYILLTHWHGDHTGGIPDLIAHDPTLQSRIYKH  
 HPDRGQRPIRDGQRFTVTGATVRAVFTPGHAIDHMCFLIEEEKALLTGDNVLGHGFAIVQDL  
 AEYMASLARMAALGCERGYPAHGAVIENLPAKMQLYIHHNEVRVQQVITALASVVKLP GK  
 RVGMTVPEIGRAIYGEVPREIVENAIVPFLSQVLWKLAE DRKVGFEPEANKRRWFGLVTQQ

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**>gi|297242534|gb|ADI24934.1| VrtH (*Penicillium aethiopicum*)**


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MQRANHTRPVLIIAGLSGLAIGRLLTNNGIANIVFEASPPERSQGF AISLHDWGYSLLEAL  
 GGLSLRAMTKAVAPDRFIGGTGWVDLIMRDNTTGKVLVEPDVDARPAVIRANRNSLRAW  
 MADCGDDEL DVRYGHRLKSISGSVGNVQAVFENGAEYRGSIVIAADGVHSAVRSQVLPHIV  
 PEVLPVVVYHGEFQVSHDEYDRCVRPVIGTANILAGVGDGFNT PITVCNITKTQVHLDWSY  
 SRPARGENDPLFSTKTPEDQTRDLPQALLEELASRQLAEPWAKYINPETIQQHSVFRWISRCV  
 YMPTADALHAAQAGVVFIGDAWHAMPIFGGEGGNHALVDSVELAAAMVKEANVERAVA  
 VYYEGAARRCQEAVRRRSRFRVYLHRPMAEWRDIAEKRRAKAALEQKH

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**>gi|297242533|gb|ADI24933.1| VrtR1 (*Penicillium aethiopicum*)**


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MEDTTETTETDTTAVSRLVPLAPAPARAPSM DAVNGSFDSELTTARRFNCQSCVRKKIKC  
 NRAVPTCASCSKAKLHCYVYQSRPPRKRKR SRGEEDVYERLAQYERILHDHNLQAAA ASTP  
 SGRDTETSAISTRAPTPVLPDAQHTKAGK VLLSTDGRSRYIDNVLLLDAGEGDLCELP ESE  
 QEDYNHDETS PDESTPTGLLGALAAHTISGAIIGN TQSLTNLHPTYEQAAKLWQAYVKNVE  
 PLCKILHVPTVAKMFDTVSKQPAAVSKNDECLMFVIYYFAVFSMSDDECLHEFNYPRAQLL  
 SRYQTTVIQALVNASWLKTTAMPVLQAYTLFLIALRTQIDSHTFWILTGIAVRLAQRMG LHR  
 DGESLGLPPFEVQMRRLFWQLPLDSYAGQTS GTGISISPSSWDTKQPLNINDDQIFPGMTQ  
 PPCEQRGASEMIFCLSRMELSNFYIRTGVKLKEHGDTIQFRDAEDIERLIDEVEDLIETKFLRY  
 CDILNPLHFLT TGIVRSAIDAVRLRARMPLLKQQTITDAQRRRLCALAEKVLD TNSTIFSNPS  
 TQNFRWQMQAFFLWDALLCILRNIAEVGFYSPSELAAA WSKVANVYANHDELVKARRTLY  
 VTIKAVTLKAWLANPPRDSSPQAFITALLTQHEPKGINQQNSVLSDDKAADGASL FDEFF  
 DNMMNGTDLDINNAFNLDSSSDWLFWDQICRGTSLS

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**>Afu7g00180|nscE COORDS:Chr7\_A\_fumigatus\_Af293:44976-44029C,  
 translated using codon table 1 (315 amino acids)**


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MHIFITGATGFIGRVVSELAIQQGHTVHGLSRSPQGDEILTSIGAIPIRGDLATHNILREQSAKA  
 DAVFHAFDHDGFKSYDQIIKLDTEAVDALAAPLVGTSKPLIAASGILTVRPDQGD CVVNES  
 APYTKNTRVRRHVCEENALSWAERGVRVNVVRLPPYVYGRANETGFAARMV RMAVDNG  
 VSGYIASVKDRCVTSVYVDDAAALFLLL ASDKTVKAGEIFHGTADWDTTYGMLAKAIGRA  
 VGVVPRQFEREEAEERWGAFSSFFGLIIRASNGKAVEKLGWKPSGPSLVEELETGSYRQVA  
 ERFKQMKN

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**Table S3.** The composite multifasta file used for the group V3 MultiGeneBLAST search. This list contains one member of each group of orthologous genes in all group V3 clusters.

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**>gi|297242553|gb|ADI24952.1| GsfR2 (*Penicillium aethiopicum*)**

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MPPLYRRSCITCVQSKRKCDQGLPKCQRCLAKNIHCEYNPRYPNRRRQTTERNVDENVSLVEPIAEE  
 PSRGCQLQRSPARPTSPHSPHANDIFFNFANDPFNLESIPQDNFLNSTIFEDVVTQQAPNDTERITSDT  
 TAQARVEFAAKKLSVIPKIFSQQGQTMFIHRQLFQDRAPPALQDALSACALYCLKSTENQTLVFRNLE  
 HKRKQLISSIDPLLASKLDLLEALQALVLYQIISLFDGDIRLRAQAEADEPVLLMWAQTLRTPQFQ  
 PPLGLSNPQSLAGSASMDWGRWLIEESSRRTLITASMLKGVYSFVKLGYDTPDMRMSFTAQAVLW  
 NSQSEISWRRAYKEKERLEIQVTHWDETIAKAKANDLEELGVLIMVMLKGTGATGEWLGHSNIRY  
 GLEEAYYGSV

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**>gi|297242552|gb|ADI24951.1| GsfK (*Penicillium aethiopicum*)**

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MPATVLITGGNRGLGKGLVATYLPDTPVIATVRDPSKCESLSALPKALGSNLLLKLEVTSKDSIT  
 TAIGTLDTHNIGSIDVVIANAGISGPTSSLAEPVSELQRYIDVNA YGPFELFKAVLPLLRSSNSGKA  
 KFVCISSAGGSLAAMYNFMPISAYGASKALANFLVKWLALDNKDIIIWAQNPQSVDTDMARDGLDL  
 AKSLGFDLSSLSFTSPEESACAIIKLIDGATTEMSGKFLDHDGSELAW

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**>gi|297242551|gb|ADI24950.1| GsfR1 (*Penicillium aethiopicum*)**

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MSDGPETAEGDITDDAVQDAAVNSRVASESSARSQPRATVVGCLPPTPFAIHTTPAPSEHSKEKNVSR  
 RLPTEKTPSRLATPQFPPTPVSSRGSIAEPSAYPSITQALRSLPPQKDIEILLSNLSSMSIFCYKSSFKLC  
 SSWPSEMTEEQIPIANLLYSETHPVLLARHMLLFAVGLQHLSPKAIPLTRHHRAIMEQLADSAIKL  
 VNTDDVLLGTLEGLLENLILESFYHIDGGNIRRAWITMRAVMTAQLLGLHRPGHYRFKTVNKQNDL  
 DPAVMWACIVSTEQFLCLLLGLPTSTSGASFTIPRATSACVESGNLPVLIPDVVRKIIERNQTHVPQEA  
 LDMTQKIDHELLGVVKQWPPAFWRPLQLSGLEVDSADAFWETRRAWDHIFYYSLVNQLHLPYMLN  
 PSHVSQKVYSRIACASASREILIRQIAIRTFNPVTAGCRMGDVVALIAGMTLMLAHILSHCSKGTENLL  
 VHQRVGDRAIVERALECMESMSEQHEDILAKCAALLKNLLDIEAGPAEARSDDGQKDDQNVLVV  
 KVPHVGAIKIARDGISITPFDETEQEQVSHDGVITIGGFGSIHVSTPHDSDRDGDHQAADVTPNDTASQA  
 TTQVVRPASARKQWRPVSQRSSGDVFTLPEETFPDASAGMEEWLFQGLDTAFFDVLISGAGEQPLNS  
 TDTEGWNFVMSP

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**>gi|297242550|gb|ADI24949.1| GsfJ (*Penicillium aethiopicum*)**

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MDKQNTDSEKRATAEAPPQSLCTLVSSSEQGMDITNHNKAGAADEYPHGVRLLAAVVFSLMLGM  
 FLVALDNTILGTAIPKITDEFHDLNKVSWYGSAYLMTFGCGFQSTWGKFYKYFPIKVWFLVAVFIFE  
 VGSLICAVAQNPTTLIVGRAIAGFGGSGVGVGIFTIIGFAAPPENRPQLLGFTGATYGIAAVLGPLIGGA  
 FTDKCFYINLPIGGVAAGTIFLLFKPPTSASPAKATPKEKFLQMDLVGATLMMGLIVSYILALQYGGQ  
 THSWKSSEVIGLLVGGFFLVAFVTWEIYQKERAMIVPRLFMRRYISVGSIMFFFSGAYFIILYYLPIY  
 FQSVYNSSPIGSGVKMLALIPLTLAAIVQGWALSKIRIVPLFWIIGGALGTVGCGLFYTFDTETSVGK  
 WVGYYQIIVGFSTGWTFQIAMSNAQVHAPPEDMSQATAIVNFFMTVGGAFFISAAQCAFSNQLIKTITK  
 NLPELDPTVAISTGATQIREAFTASQVPIVVDA YMVGLKAVFAITIAAFGVATVIGFFGSWKLLADE  
 LEKATGGVA

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Table S3. Cont.

**>gi|297242549|gb|AD124948.1| GsfI (*Penicillium aethiopicum*)**

MAIPQSCTVLVAGGGPGGSYTAALAREGVDVVLLEADCHPRYHIGESLLPSMRYLLRFID  
 LEDTFEQHGFQKKLGAFFKLNAKSAGYTD FIRANGPNGYSWNVVRSEDEILFRHATKSGA  
 KTFENVSLKSVNFEPYENDKFTSQDKLTNPGRPVS AEWKTKDGCSGTISFDYLV DATGRVGI  
 LSTKY LKNRKFNESFRNIAMWGYFKGNIPSPGTDRENQPISEGMRD GSGVWVWMLPLHNG  
 TVSIGAVVRKDIFQAKKALPEGTTEAQT LASLVALCPTISSYLEPAELASGIRQAADYSYSA  
 NAYAGPNFRIVGDAGCFIDPFFSSGHLALSSALAAATSINACIRGDCNEFDASRWF AKKVD  
 EGYTLFLVVVMAALKQIRMQEQPILSDLDEEGFDRAFTILRPVIQGAADKETAPKAKGESIT  
 ETIDLCLTALNDLHDTTELQRKLT SIVEAKGTPEQEQLLGKLS PDETAALHRMRAMHSILPMG  
 ELEDFENS NIDGFKARLEKGS LGLRRERALCRDHAGDLQM

**>gi|297242554|gb|AD124953.1| GsfA (*Penicillium aethiopicum*)**

MTSAK VLYFSGEIPQGDPEGDQRTLFRKHLHLLSKERD HVVLASLLEC VTTLTKDECSKLS PQ  
 YRDLLPPFESVLDLTDHV VQLRKTPLGGAIERVL VLVFQLGSLVAYHEAHPLEYNFT PASTV  
 IIGRGSGLLSAAAIGLSPSIVMVPSIAKEIARISFRFGLVVDKVCRSLEVSSDEINSDGAWVYC  
 VHGIGEKEARDAVNQFNEIKAYPSTNGASVFNVD DAGNSV SIGGPPKTLEALFSES NIFKKT  
 KNVAMRKIQGMWHTDRVYGPEHVEQIVPKIESARELHVPLISPVS GDFRETEAGPLLEQIM  
 EEILMERVRWDMIIETVSKQLKQLMPKSVQLVSIQPSHYNQNMLERWKSEL PDAAVSGLTM  
 MPAILELAL EQSPK DTRSSKIAVVGMS CRFP GS DTTEEFWERLMLGEDMHRHIP PDRFDVE  
 THVDPTGKRHN TSKTSY GCFVDN PGLFDAMFFGMSPREAEQT DPMQRLALVTAYE ALEKA  
 GYVDGRGVIHRKRVGTFY GQASDDYREVNSGQEVGTYFIPGGCRAF GPGRINYFLNFWGPS  
 FSVDTACSSSLAAIQAACSSLWSGDIDMAITGGMNILSNSDVYAGLSQGHFLSPTGGCKTW  
 DEGADGYCRSDGVGSVVLKRLEDAEADNDNILAVVLSAATSHSAEAVSITHPHDAAQALL  
 YNQIVRRAGIDPLEVGYVEMHGTGTQAGDPTEMRSVTSV FAPPHIQGSRPIPLHVGSVKAN  
 MGHGEAAAGIMAFVKTMLVFQNGIIPPHIGVKTGLNPALPDLKAGVVIPFRAANWRPTGT  
 KKRLAMVNNFGAAGGNTAMIIIEAKARPLCEDIREAHAITISAKTAVSLSLNKRLVEYIES  
 AQDLSLADVAYTVSARRRH YEYRKS VVVRSLAEAIKHLQPHIETAKSQTPTLVKRPPVAF A  
 FAGQGT FYV GIAAQIYRDS PFFRAQIDQFDNLARRQNFPSFLPAINKTCAHEDLPASSIHLAIV  
 CVEVALARMCMTFGIKPCAVIGHSLGEYAALAVA EVLSDSDTVFLVGTRATILESNCSPYTH  
 GMISVRASVDDISREADGLPFEVSCINGPNETVIGGTVENLEAVADRLSKVGYR KTRLDVPH  
 AYHTAQMDNVVNELIRQSQGIAYNTPKIPIMSPRDSSVIETGANIDSSYLPTSLKKAVDFAGA  
 LNA AWEAGV VSKSTVWLEL SHHPVCSGFINRTL PNTSLTCSTLHRDS DNWTSLLKTLSSLYE  
 VGLNIDWNEYHRPF EHALRLVSAPTYAWNNKDYWIQYRGDWNLT KGQVLPEAELPAVSG  
 FRTSSIHRLYSENYDSSTAHL LGECNMTDL SLKGVIEGHAMNGYGVASSFLHAEMAFTLAR  
 RIQEKASLSTFTGMGINVTNFEYHDPVVKDASSLDPYPIVVDAEANLEMGEVQIKWFNPAIE  
 KWYCHAIAYYEDPSTWLSNWSRTTRLVTSRIDALVAMSNKGMANKLTTSLAYTLFGKLV D  
 YSSMYHTMQWVILNEDEAVAEVFPADTQGDWAVPPHFIDGVVSLSGFILNGGTHFDNVN  
 NFFITPSWKS MRFAKPLAPGGRYLTYVRMIPEGVDDKGR LGSYVGDVYILQDGEIVGVVEA  
 ILFRQWPRIMLNRFFQPVGMAPPAPRVEKKRDAGRGTL PSSSSLQEKT TATAVTAKITARFPG  
 SVITPSRSAPISKSGSSPKIVPQLDYSLLTPRTSPNSDERIEKTDSDSGFEEADGANDVTSRAVEI  
 LAEELAVDKGLLTDECEIADIGVDSLMSLVISQKLREDLGIEVRDAFYLEVTTIGDLKKLLS

Table S3. Cont.

**>gi|297242555|gb|AD124954.1| GsfB (*Penicillium aethiopicum*)**

MASNTSRSAHLAQIITENTANIETYRREQGLPPLSLGPDAPLDVKYPPNVEKCRRAVIDATLE  
 LGELATGPVELRLVPGWAIMTMFGVTQFICDFDIARQIPLAGDISYEDLSKAINVAVPVLRQ  
 VLRAGMPYHMFYESRPGHVAHTATTKVMASESLISDWTSLYTDVLFPASAGLSKALREEPT  
 ASDPSKTGFMVTKGDGESGMYMYFEKHPEEARFAGVMEAFQKDEAYAVRHLTDSWPSD  
 SQTGKLVDLGGSTGAVAFALAEKFPGLEIVVQDLPGALEAAHVREGKNVSMFPHDFFNEQP  
 VKDADVYMFWRWILHNWPDGHVQRILRALVPSLKPGAKVIVFDEIMPPAGTLPLSIERYQRNI  
 DFGMLTLFNSKIRDIVEWKEIITQSDQRFNVTGVRYPENSRSLSLIEIVWQP

**>gi|297242556|gb|AD124955.1| GsfC (*Penicillium aethiopicum*)**

MTLDQISRIQALVAEIADLSQTFEGPSEFMVDGLPFLRKSEELVTLVQSPAEHATSLIIKTME  
 TAVIRTLNLSLNLVQTIPTTGSITLQSLAVATETQESLLERLLRVVTKTGFIIRENGGYSHSHTSL  
 AYAGPLGALFAPCYDEGIRALVRLPEYLSVKDKEEAKNARYSLFTWNEGQEGKATFEILST  
 MPARTEGIHTLAMNVQHLRPYTGFFDYSKLVSEDRERPVFVDVGGGNGHVIKEILQAFPQIR  
 PEQCVLEDRAETLELARTTGLLPAGVQLLEHDYLTRQPVSNAKAYHLRAVAYNLGDAELV  
 QLLKQIVPVMGADSKVLAENILFDDNSTVFSTVSDMIMLGIGGKERTEQNFREVLYEAGLTI  
 EGIHRAPGLEYGIMEASLATS

**>gi|297242557|gb|AD124956.1| GsfD (*Penicillium aethiopicum*)**

MSTPEQWIQEFALCSRASILFSPGIEDENIRIRALRIA EKAVHQLHTPMTFAEAQTWAPLELF  
 GAGVACEMGIFDVLSSVPLSPVDIATELNTDPALVARIMRLDDAHYMVDQVTLGQYAA  
 NAITRDYVQPYRKGNVMTQVALMPSYFALPAWLRDNDYKVRPDANHC AWQVGANTTKT  
 FWEMPRTTQEDDFVTFYPFEAVFSTSNVDDILFVDIGGGLGHQAMRVRSAFPRSRGRIIVQD  
 LPQVTNKITTASLPDVEIMDHDMDADPQPVK GARVYYLRGVLHNHADHISIKYLSQFAAAMS  
 PESRLLIHEALATDLNPTKNITRFDLSMLASCGGAQRSEAEQKALLEKVGLEVSGVWSTPRD  
 WSIMEARLKRE

**>gi|297242558|gb|AD124957.1| GsfE (*Penicillium aethiopicum*)**

MPKTAFITGANGLSGSAIVEYLCNTTSSDDWGSIIVTSRSPFKSTVMDPRIKFIALDFVNDVSS  
 LVETMKEVCGAVTHAYFCSYLHKDDFAESYTVNKALFENFIAAIDKAAPKLENTLQTGG  
 KYYNLHVPEVPSPARENDPRRYGPFENFYFTQEDTLAEMQRGKTWSWNVIRPEAIIGANSQ  
 PYGLNVALTIAMYFLICRELGSASPMPTNQRYWEGTDDVSYAPLIADLTIFVSTRKSCANEA  
 FNVTNGDYFTWRYMWPRLAASLGAKADSQQCFEKPMPEGELQLDWSLAEWCKDKRKV  
 WEDLCDRQGLPGAKATFDLAGWAVGDFLYQRTWSATLSVNKARRFGWTGHMDSYQSFV  
 DTFDKFRQLGLIPK

**>gi|689554835|gb|AD124958.2| GsfF (*Penicillium aethiopicum*)**

MTVLFILSAGLVAVFGYLVSWFIYCRTLHPLSKVPGPFWPSVTRLWLTYAVSRGELDVVQR  
 DLHRRYGPLVRIAPDEIACADPEAIRKIYSTTSPLNKSDFYHIWDVGAFSKYPNFAIVDENM  
 HFERRRIVSSVYSMSTVL TLEPYIDNCSRLFVKRM TERTVPHEAIDLGDWFLWYAYDVIGEL  
 FFGHSLGFIENRGDEGGFLASLEVMLPVL TIAAASSPLVRGLIMGLFTLSSTARKGLKGMNHI  
 IETARASVDKRAVAEPEGKGERKDLLHNLLNIVSSKGDKLDGIEDVKNEAFAALTAGAD  
 ATMIELQAIFYLVKDRSVYEELRKEVDQAVETGKLSEFPSYSEVVQLPLLKATIKEALRLH  
 PAVGFTMPRVVGQAGIELLGMYPGWKVG MNAAVVGRDEGVYGT DANTFRPERWIERT  
 DSDMDRCNNLVFGAGTRTCIGKQIALSEIYKMVPLLIRKFDALVDPSKSWTTHDYFFNKQS  
 GVQVKVTVRGL

Table S3. Cont.

<p><b>&gt;gi 297242560 gb ADI24959.1  GsfG (<i>Penicillium aethiopicum</i>)</b></p> <p>MLCSSCGVPTSTQDPSSPRAKAAAADRRREQNRRRAQKRFRQKHREQKATPEQDQSQPQKR  ASDAMDTVGPPTSKESTPLTPPSCYEERQADSVVDYDCLLDPSDRVCVMNKWTDDFWTSTL  EETAPFAATALVLPSEKDSQEILTMRDFDSDVDKNQNGRVPAGPTVLHRAVQTGNSKVV  GLLEHNANCNTKDNTGLTPLLCAVIGGHEEVLELLLSHGASIGHVDDAHWSALHWAVFH  KRHRILERLLRCCSGDSSLLNIRNKDGETPLSVAVSAGSEVAVKLLLEFGATVNIEQSS</p>
<p><b>&gt;gi 297242561 gb ADI24960.1  GsfH (<i>Penicillium aethiopicum</i>)</b></p> <p>MFISIGIKAVLLLVASIPAQAWNRLDKDNAALLIIDHQVGLAQVVRDYNTNDFRNNILGHAA  LGNVFNLPVLTSSDAGPNGLMLKEITDMHPNATFVRRQGEVNAWDNADFRAAVEATGK  KQLIAGIVTEVCTSFLALSLVDAGYEVFANTDASGTFDARLAEDANRRMEKAGVTLMGLF  GIVCDLMRDWRKTPGLPEVLPFLDKYQFGYGLVARHHAGAIQNGTFFPVEGALI</p>
<p><b>&gt;gi 111055548 gb EAT76668.1  hypothetical protein SNOG_15830 (<i>Phaeosphaeria nodorum</i> SN15)</b></p> <p>MAYTPMEQPLQFSVTRIGQDLKIFEILTNAGPQSLQELQILTHAHPITLALS LTGRLLRYMSS  VGLIHETGVNQFEASKKSQNLATPEAEKIVTHFFENCGPLFQEMPAFLRSKKYQDITDGGQNT  VFQPAYNTDLDTNEWFSQNPLHMGARIKYMAMEQAVRGRWLNVPYIQSQLKGWNPPELPA  FVDVGGSVGHYCTMFKNFPDVPGRVILQDLPDLSHALKTPGVELMGHDFFPQPIKGAK  FYHLGWILNNWNDDSKQILRQIRSAMNAESVVLINDVILPEAGVPSFAASLDLVMLGACG  SRERMRKEWDEILADVGLIVKDCIVYHHELCHGIIGAKLA</p>
<p><b>&gt;gi 111055549 gb EAT76669.1  hypothetical protein SNOG_15831 (<i>Phaeosphaeria nodorum</i> SN15)</b></p> <p>MAETIKLEVKDSAHRRRSVPLLSSGERQPPAKTRNGDCIVLPSKTPTSLASTIVDDVLVDCN  GPSCTLMGKETRERLAIGQSDALLVMFYLDNLFPLFPFYRPSLLEGGRTWILEMMICSPVV  KQALLCQSSCFMSMAQGMANWEMVLEQTRDAFKVLRLSLQVISDAGVTEHIHGTVRILASI  VQVQRFEVAVLSFDNCQAHLNVALSLSFQLESTDDTNTACPSSSFNAVLNQLKPKTWSAS  TGVPVPIAEQAARFSSALLILDDIIAATILQEQRPLYNYHRSLLCTPNSSGAVVNLEETVGC  QNWALLYIGEIATLDAWKQYQHTGSLDLMELVRRATDIEALVEGHVLQLESELLGASSEG  ASLLDMFDSRSRQTKTSASQITLVTRVWAHAALIYLSVVVSGWQPANLDVRYHVSQTFELL  TQQIVPPALLRSMVWPFCVAGCMAAPEQEAQLRTMVQVLQPPSMFGTVRKALEIMEDVWS  KRGMGDAGKRDLATCFKNQGDVLLV</p>
<p><b>&gt;gi 160705606 gb EAT76670.2  hypothetical protein SNOG_15832 (<i>Phaeosphaeria nodorum</i> SN15)</b></p> <p>MLPISSYISRLSCFGTKPKPKPKPIKSRISKLSTQTCFTITKDTNMATVVILGSGPRVGASVA  QTFKESGYSVALASRKGSNSVTDDGYFSIKADLASPASILGVFSTIKSKFGAAPSVVIYNAAA  LTPPSDPSSVLSVSTEAVTKDLNINVVSPYVAAQQAIAAWETLPQDAKKTFIYTGNVNLNELI  VPIPMFLTLGIGKAASAYWVGLADTLYKARGYRFFHADERHPDGKNKGMALDGPAGHEY  YHELAQHPDGPVWQATFVKGGQYRSFK</p>
<p><b>&gt;AN7070 pkgB COORDS:ChrIV_A_nidulans_FGSC_A4:1131258-1129968C, translated using codon table 1 (340 amino acids)</b></p> <p>MSGGFYSSPFWAGYLETQRSRLPVLPEIDDGLSHCVVRFLGYNPGSMQLQGTNTYLVTGTS  TRILIDTGEAPQWAVSVTRYLEDHDISISHVLLTHWHKDHTGGVADLLAHDPSIIYKHAP  DPGQQAIANGQTFKTQGATLRAVLTPGHAVDHMCFLLEEENALFTGDNVLGHGYSVAEDL  ETYTASRLMAGLKCSVGYPGHGDAILNLPQTIARYISQRVAREKKIYAILALHACSCSSRN  GGSTSSIGSVSESGDSDEEDNNMKTSRPAMQGLSTAEIGGLVYGESVKNSPTFDSA VGPLLN  QVLYMLLEQKCCDHVSILVIFQKPGFFSIPVI</p>

Table S3. *Cont.*


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**>AN7073 COORDS:ChrIV\_A\_nidulans\_FGSC\_A4:1120517-1119359C,  
translated using codon table 1 (321 amino acids)**

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MEAYKTQPPVRKLKDCDVCASAKLRCDKQKPTCARCANLNRPCITYSPARRGGRPHRVRR  
DRSKSQSQSQSSRQFFGMPDANTSSSPFAEPTRVPSQTDRGMSCSNDWFLRTQSRVHDHIQD  
SQPSAQSAKVSPSPCKNPMNTRLAAETAETDMDCTRVALSIVEQLERSQEQRPRSTAPTYTH  
GGLTATEACQRLLTILMPCSDQAEVALLVASGCISLMDVIHSSAGFASESLGHDGVSVSSCN  
SPPISSEQDPLIRSWSQPQSISRSCSLASDSRSQVGDLSKIAKVIVQFTERYCQDAKVAAEPPRA  
HWVTRYESLSR

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**>AN7072 COORDS:ChrIV\_A\_nidulans\_FGSC\_A4:1121945-1122955W,  
translated using codon table 1 (336 amino acids)**

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MELPAESELQYAGECLSLPGTFLEPPIEDPPSSVLNLLNLSQVDFNSYDFSSLGSREFSSKWQ  
TNTPLCTDSLSDSAPGLLTEDMGISPIPMPAEATCPQESDRLCRNPQGRICISLATGILGSM  
HAGNSCILQVATSDQGGASDRQPQQSRAADAILSMNQSALRTVRSILNCSCYESPQVLLLV  
TVMCSRITAWYWRIADIYSYSHGNPTAGSPRAALPTSVGSRAETRRRDFFIGNHRLDREVET  
VVIRHVLLGMLQELQLVIRDFAGQAGQSPAGTVDTDDPTSTSDLMLSGMRARVVAFLRKQ  
LHSLTSALDHTDSGFMTMGPVSHY

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**>AN10884 COORDS:ChrIV\_A\_nidulans\_FGSC\_A4:1131717-1134001W,  
translated using codon table 1 (647 amino acids)**

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MMNVPEKCKVLVVGGGPAGSYAASALAREGIDVVLLEAEKFPYRHIGESMLPSMRHFLKFI  
DAYDKWDAHGFNIKKGGAFRLNWSRPETYTDFIAAGGPGGYAWNVRSEADELLFKHAAE  
CGVKTFDETKVASIEFSSPDLSSGGTHPFGRPVSATWTRKDGTSMTISMDYIVDASGRNGLIS  
TKYLKNRSYNKGLKNVASWGYWRGGGVHGVGTHKEGAPYFEALKDASGWVWFIPLHNG  
THSVGVVQNQEMATEKKRMAEPSSKGFYLESLEFVPGIKELLANAELISEVKSASDWSYS  
ASSYAFPGVRIAGDAGSFIDPFFSSGVHLALSGGLSAATTIAAAIRGDCDENVAASWHDKKT  
SESYTRFLLVSSALKQIRSQDEPVISDFDEGSFERAFDLFRPIIQGQADADAKGKLTQAEISK  
TVEFCFRAFAHVSFEQKEALVQKLKSLGHDGDAYDENNRKALEEIEKQLTPEEQTILKTLKG  
RRMVRPEDSLNIDNFTLDSIDGLAPRLEKGLGLSAAKKAELKFTAHDPLSFLNGEAMAAQ  
KTSPNGNLEINGHTQTNGNHLANGHGEVNGHSNAGASSAKSCMADLIAAENDSSQPSFDEA  
TRHRLISSLQQSAEELETPYDTVLRVNAVVSQIN

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**>AN10889 COORDS:ChrIV\_A\_nidulans\_FGSC\_A4:1134037-1135110W,  
translated using codon table 1 (337 amino acids)**

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MLTALSKQGRQTALVCIGDGLGIFKSLAESKAPLSSKQLAEATMADPLLVSRIMRYLVASRL  
VGETAPDQYVATKKTIVFADPRFEPIRFHFAVSNRAFQALPEFLKETGYQNETQRSQAFQK  
GLGTELQLYPWLKQHPDVLKNFQAAMRLTKDANGVGVMPDSSVSSGHEGVMFVDIGGN  
TGHQAAEVLSQHPELAGRVTVQDRGEVIKSAPEMKGIQWMEHDFDVQPVKGAKYYYYLR  
AILHNWDDDHAVQILANIVPAMSADSLVAIDEVVVPDRDAHLWPAGLDLQMYTIFGTRER  
TAAQWDAILDRAGLRAVAVKRYAPVMQSSVIFAAAK

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Figure S1

**Figure S1.** A maximum likelihood phylogenetic tree constructed with FastTree [1] from the KS domains of the 908 PKSs used in this study. Bootstrap values are shown next to the internal nodes of the tree. The clade corresponding to the 188 group V PKSs is highlighted in green. The leaves of the tree are labeled with the accession number of the PKS and its corresponding species.

Figure S2

**Figure S2.** A maximum likelihood phylogenetic tree constructed with FastTree [1] from the KS domains of the 188 group V PKSs extracted from the larger set used above. The bootstrap values are presented next to their corresponding nodes and the leaves are labeled with the accession number of the PKS and the corresponding species. The characterized PKSs belonging to groups V1, V2, and V3 are shaded in blue, green, and yellow, respectively [2–15]. These shaded boxes include closely related PKSs from the same species in which the characterized cluster was originally described. Next to the tree are the gene clusters corresponding to the PKSs that were identifiable through MultiGeneBLAST analysis. Gene cluster diagrams next to brackets depict the cluster corresponding to the PKS with its accession number highlighted in red, but all of the bracketed PKSs belong to clusters which are identical in terms of the presence and synteny of their group V-cluster homologs. Genes are represented as arrows with a color corresponding to the proteins they encode which are detailed in the color key to the right of the cluster diagrams. These color keys are subgroup-specific, and black lines extending from the tree to the color keys delimit the subgroups. Genes with no color were not identified as homologous to any group V1 cluster gene. Colorless genes that were noted as occurring frequently in related clusters are labeled adjacently. The products of the characterized clusters are shown at right. Group V1: PKS = Polyketide synthase, M $\beta$ L = Metallo- $\beta$ -lactamase-type thioesterase, AO = Anthrone oxidase, OGO = 2-oxoglutarate-Fe(II)-type oxidoreductase, EthD = EthD domain-containing protein, a putative decarboxylase [3,7], MCO = multicopper oxidase, P450 = cytochrome P450, SMT = S-adenosylmethionine-dependent methyltransferase, BVO = Baeyer-Villiger oxidase, DOR = Pyridine nucleotide-disulfide oxidoreductase, FDH = Flavin-dependent halogenase, AfIS = Transcriptional co-regulator of the aflatoxin biosynthetic gene cluster [16], AfIR = Transcriptional regulator of the aflatoxin biosynthetic gene cluster, C6TF = GAL4-like Zn(II)<sub>2</sub>Cys<sub>6</sub>-domain and fungal-specific transcription factor domain-containing protein, NOR = NADH-dependent oxidoreductase, OMT = *O*-methyltransferase, GST = Glutathione *S*-transferase, MT = Methyltransferase, SD = Scytalone dehydratase, KR = Ver-1-like ketoreductase [4,17], FMO = Flavin-dependent monooxygenase, ACS = Acyl-CoA synthase, Kelch = Kelch domain-containing protein, SDR = Short-chain dehydrogenase, GA4D = GA4 desaturase family protein, MFS = Major Facilitator Superfamily transporter, GMCOR = Glucose-methanol-choline oxidoreductase, *vbs*-like, MFS = Major Facilitator Superfamily transporter, PPT = Polycyclic prenyltransferase, AKOR = Aldo/keto

oxidoreductase, SH = Salicylate hydroxylase. Group V2: C6TF = GAL4-like Zn(II)<sub>2</sub>Cys<sub>6</sub>-domain and fungal-specific transcription factor domain-containing protein, VrtR1-like, MFS = Major Facilitator Superfamily transporter, P450 = Cytochrome P450, TA = Threonine aldolase, OGO = 2-oxoglutarate-Fe(II)-type oxidoreductase, PKS = Polyketide synthase, ACS = Acetoacetyl-CoA synthase, PPT = Polycyclic prenyltransferase, IDS = Isoprenyl diphosphate synthase, MT = Methyltransferase, MβL = Metallo-β-lactamase-type thioesterase, FMO = Flavin-dependent monooxygenase, TF = GAL4-like Zn(II)<sub>2</sub>Cys<sub>6</sub>-domain and fungal-specific transcription factor domain-containing protein, VrtR2-like, NDH = NAD-dependent dehydratase, LIP = Secretory lipase, ART = Arrestin, CNR = Copper-containing nitrite reductase, MGT = Magnesium transporter, ABCT = ABC transporter, Abr2 = Conidial pigment laccase, OMT = *O*-methyltransferase, EthD = EthD domain-containing protein, putative decarboxylase [3,7], PksP = Conidial pigment polyketide synthase. Group V3: C6TF = GAL4-like Zn(II)<sub>2</sub>Cys<sub>6</sub>-domain and fungal-specific transcription factor domain-containing protein, GsfR2-like, SDH = Short chain dehydrogenase, TF = GAL4-like Zn(II)<sub>2</sub>Cys<sub>6</sub>-domain and fungal-specific transcription factor domain-containing protein, GsfR1-like, DRT = Drug resistance transporter, EmrB subfamily, FDH = Flavin-dependent halogenase, PKS = Polyketide synthase, OMT = *O*-methyltransferase, NSD = Nucleoside-diphosphate-sugar dehydratase, P450 = Cytochrome P450, ANK = Ankyrin repeat-containing protein, AHD = YcaC-related amidohydrolase, FDH/OMT = Flavin-dependent halogenase and *O*-methyltransferase bifunctional protein, MβL = Metallo-β-lactamase-type thioesterase.

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