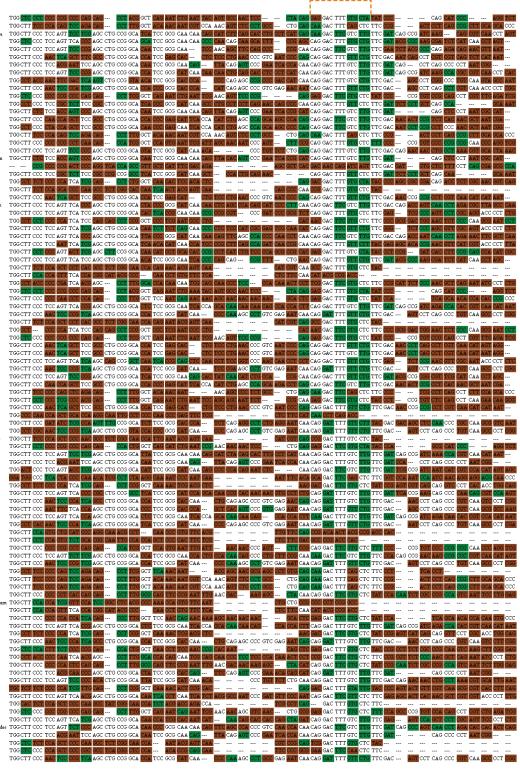
# In-frame with the mORF

Aspergillus oryzas Aspergillus\_oryzae Trichophyton\_tonsuran Myceliophthora\_therms Gaeumannomyces\_gram Daldinia\_eschscholzii Trichoderma\_atroviride ophila Fusarium\_oxysporum Thielavia\_terrestris Claviceps\_fluiformis Periglandula\_ipomoeae Neosartorya fischeri Ophiostoma\_piliferum Gibberella\_zeae Beauveria\_bassiana Beauveria\_bassiana Cordyceps\_militaris Arthroderma\_benhamiae Aspergillus\_niger Verticillium\_dakliae Fusarium\_pseudogramine. Tuber\_melanosporum Oshipatenus\_neum\_phui Ophiostoma\_novo-ulmi Ajellomyces\_dermatitidis Phaeosphaeria\_nodorum Hypocrea\_jecorina Colletotrichum higginsianum Colletotrichum\_higginsiar Amorphotheca\_resinae Coccidioides\_posadasii Marssonina\_brunnea Glomerella\_graminicola Botryotinia\_fuckeliana Cryphonectria\_parasitica Marsupathe\_poco Magnaporthe\_poae Pyrenophora\_teres Septoria\_passerinii Geomyces pannorum Aspengillus\_sojae Penicillium\_chrysogenum Penicillium\_chrysogenun Neurospora\_crassa Epichloe\_brachyslytri Pyrenophora\_trittici-repe Coccidioides\_immittis Aspergilhus\_fumigatus Hypocrea\_lixii Asperogrames\_surpoides Ascocoryne\_sarcoides Epichloe\_festucae Magnaporthe\_grisea Cordyceps\_bassiana Arthroderma gypseum Aspengillus\_nidulans Trichoderma\_reesei Mycosphaerella fijiensis Mycosphaerella\_fijiensis Claviceps\_paspali Epichloe\_glyceriae Cochliobohs\_heterostrophus Aspergilhs\_terreus Chaetomium\_globosum Gibberella\_moniliformis Podospora\_anserine Arthrobotrys\_oligospora Histoplasma\_capsulatum Grosmannia\_clavigera Grosmannia\_clavigera Metarhizium\_acridum Aciculosporium\_take Sordaria\_macrospore Neotyphodium\_ganuense Passalora\_fulva Myccophasrella\_populosum Aspergibus\_kawachii Chaotomium thermonbibum Chaetomium\_thermophikum Epichloe\_amarillans Microsporum\_canis Trichophyton versucosum Trichophyton\_rubrum Talaromyces\_stipitatus Cladosporium\_sphaeros Mycosphaerella\_gramin Penicillium\_digitatum Pencillann\_agriatum Neurospora\_tetrasperma Ajellomyces\_capzulatus Metarhizium\_anisopliae Thermomyces\_lanuginosus Geomyces\_destructarus Penicillium marneffei Nectria\_haematococca Verticillium\_albo-atrum Paracoccidioides brasiliensis Paracoccidioides\_brasiliens Sclerotinia\_homoeocarpa Leptosphaeria\_maculans daspergilbs\_clavatus Glarea\_lozoyensis Colletotrichum\_gloeospori Gibberella\_fujikuroi Alternois\_schemenen Alternaria\_arborescen Macrophomina\_phaseolina Epichloe\_typhina

Α

İ.



477 SYNONYMOUS (155 synonymous) 2261 non-synonymous (69 non-synonymous)

## In-frame with uORF2

Arpergillu oryzas Trichophyton, Ionszuas Myceliophtlora, thermophi Gaermannomyce, grannia Dahima, sochetobaii Tricholema, atrovitile Tusizion, ozytopoum Thialavia, tensetrio Calviceps, fusionnia Perglandha, joomosas Neosatorya, fischeri Ophiortona, giliferum Gbberdil, zose Beauveria, basiana Codyceps, militaris Arturolesma, benihanise Arpergillus juiger Verticillinum, dahlise Arpergillus juiger Verticillinum, dahlise Arpergillus juiger Verticillinum, dahlise Appengilus juiger Verticillinum, dahlise Appengilus juiger Verticillinum, dahlise Appengilus juiger Markoven, benihanise Appengilus juiger Markoven, benihanise Appengilus juiger Applicatoras, anodomn Hyporeas, jeoznin Hypocrea\_jecorina Colletotrichum\_higginsianu Collistotichum, haginisiana Amorphothesa, sevinas Coccidioides\_postatsii Marsonina\_hrannea Glomenilla\_pramitocha Bottyotina\_fickelaina Glomenilla\_praesitica Magnapootha\_pose Septora\_paserinai Geonyces\_pasanonum Geonyces\_pasanonum Geonyces\_pasanonum Aspergilla\_poje Neurospora\_crassa Epichloe\_brachyelytri Epsihos brachyslyti Pyranophora\_tritici-spenti Occidioidae, immitio Aspargilas\_famigatus Hypocraa\_triesus Hypocraa\_triesus Hypocraa\_triesus Hypocraa\_triesus Hypocraa\_triesus Hypocraa\_triesus Epsihos\_famia\_triesus Magnagorths\_grisea Confycesp\_Jassiana Arthrodenma\_tressi Trichodenma\_tressi Tricholerm\_seesei Mycorphasella\_fijansis Claricopp\_apali Epichica\_glyceniae Cochlicolou\_heteostropin Aspargila\_teneus Chastonnian\_globoum Gbberella\_monificmui Oologora\_meetine Arthrobotry\_oligospora Histoplasm\_capalatum Gromanui\_clarigiesa Metahisiam\_acidam Metahizizm, senidam Aciculosporium, take Sothati, marconpore Neotyphodium, gasuense Pasaloza, filva Mycospharella, populorum Aspezpikus, Jawachii Chaetonium, thermophihum Epichlos, amarillans Microsporum, canis Trichophytom, subsum Trichophytom, subsum Talaromyces\_stipitatus Talaconyces\_stipitatus Cladoposim\_spherrospem Mycorphaerolla\_graminicol Pensilium\_digitatum Neurojora\_steraspema Ajallonyces\_capatlatus Thermonyces\_langinous Pensilium\_maneffei Hertia\_lamaneffei Hertia\_lamaneffei Hertia\_lamaneffei Scientina\_dococca Verticilium\_abc-atrum Paneoccilioide\_basiliemu Paneoccilioide\_basiliemu Paneoccilioide\_basiliemu Paneoccilioide\_basiliemu Paneoccilioide\_basiliemu Leptophaena\_maculaus Aspengilhu\_clavatus Glarea\_lozoyensis Colletotriichum\_gloeosporio Gibberella\_fujikuroi Alternaria\_arborescens Macrophomina\_phaeolina Epichloe\_typhina

	ITC CCT CCC TCC DCC CCC	GC A		TCA CAA TCT CA	A TTA CAG TOC CAA CTC	CCT ACA SC	GGA CTT TGT GCT		CACICTC
	ATGGCT TTC CCC ACA GTC CAG	ACA	GCC TTT GGC	TAC AAA CAA TO	G TCC AAA CAG TCT CCC	TGC CCT GCA GC	CA AGA CTT TCA GCT C	TT CCC GAC TCC TCA GCC GCT 1	GC AGC ACC
phila		gag cct	GCC GGC ATC	ATC CGC GCA AC	a <mark>aca</mark> gca tct tca gca	CCT GCC TCA TCA GC	CA AGA CTT CGT CTT G	IT CGA TCA GCC GAT CAA GCA GCG 1	CA ACC TAG
nis	ATGGCT CCC CTC CAG TTC ACC	CAG CCT	GCC GGC AGC		A ACC CCA ACA GCA AGO	ATT TCC GAG CC	A GGA CTT TGT GCT G	TT CGA TAC GCC CAA GOG ATC TCA TCA A	CC TAG
	ATGGCT TCC CTC CAG TTC CCC	GAG CCT	GCC GGC ACA	ATC CGC GCA	ATC CAA CAG CTT CCA		CA GGA CTT CGT CTT G	IT CGA ATC TAC GCC CCA GAG ACA GAA C TT CGA CAA TCA GCC TCG TCG TCA GTC 1	CA TAA
	ATGGCT TCC CTC CAC GAA TTC	CAG CCT	GCC GGC ACA	ATC CGC GCA AC				TT CGA TCA GCC TCA GCC CCC TAA	CG
	ATG GCT TCC CTC CAG TTC CCC	gag cct	GCC GGC ACC	ATC CGC GCA TO				IT CGA TCA GCC GAT CAA GCC ACG CCG 1	TCA ACC TCA
	ATG GCC TAC CAA CTT CGA CTC ATG GCT TCC CAA CTC CCC ATC	AAG TCT	GCC GGT AAC	ATC CGC GCA CC	C ACC CCA GAG CCC			TT CGA CAG CCC TCG GCC CTG TCA A TT CGA CAG CCC TCA GCC TCG TCA A	AGC CAA
	ATGGET TEC CAA CIC CCC ATC		GCC GGC ACC	TCA GAA TCT GA	C ACA TCA GAG CCC A TTC GAA CAG TTC CCC	GCA GA	CA GGA CTT TGT TCT G 3A GGA CTT CGT GCT C		TT GAG ATC
	ATG CCC TCC CTC CCG CTC TTC		GCC GGC ATC	ACC CGC GCA TO			CA GGA CTT TGT TCT C	TT CGA TTC TCC TGC TCA GCC	- AGC AAA
	ATGGCT TCT CTC CAC CAG TCC	CAG CCT	GCC GGC ACA	ATC CGC GCA AC	a <mark>aca</mark> gtt aca gag tco	CGA ATC ACC GCA TO	ca gga ctt tgt <mark>ctt</mark> g	FT CGA TCA GCT CCC TAA 1	CG CCA
	ATGGCT TCC CCA ACC AGC TTC	CGC CCT	GCC GGC ACC	ACC CGA GCA TT	CACC ACA TCT GAG CCC	AGC AAG CCC ACA GC		TT CGA CAA CAC TCC GTC TCA CAA CGC 1	TAA TCG
	ATG GCC TCC CCT ACC AGC TTC ATG GCT TTC CCC ACA GTC CAG	ACA	GCC GGC ACA	ACC CGA GCA AT	C ACC ACA TCT GAG CCC G TCC AAA CAG TCT CCC	TGC CCT GCA GC	CA GGA CTT CGT CTT G	IT CGA CAA TCC TCC GCC TCC CAA CGC 1	GC AGC ACC
	ATGGCT TCC CCC CCC GCC TCA	ACA	GCC ATC GGC	TCC AGT GAA TT	C GAT TAG CAA CAA TOO	CAG TCT TCC GC	A GGA CTT TGT GCT C	TT TCC CCC GTG TCC CCC GCC GCA A	CC CAG GTC
	ATGGCT TCC CTC CAG TTC CCC	CAG CCT	GCC GGC AGT	ATC CGC GCA TO	A AAC ACC	CTG TTC TCT GCA GO		IT CGA CCA GAA CAA CCT GCC TAA ACG 1	IGC ACT AAA
arum	ATGGCT TCT CTC CAC CAG TCC	CAG CCT	GCC GGC ACA	ATC CGC GCA AC	A ACA GTT ACA CAG TCC	CGA ATC ACC GCA TO	CA GGA CTT TGT CTT G	TT CGA TCA GCT CCC TAA	CG CCA
	ACC GCC CCC GAC TCC	CAG GTC	ACC AGC CGT	TGC TCA TTT CG		AAG CGC TCA CC	GA CAA CCA GAT CAG T	TT CGA CGA TGT GCT CTT TCC TCA C	ACC AAA
,	ATG CCC TTC TCC CCC ATC ATC	GCA	GCC TCT GGC	TCA ACA CTC CA	C ACT	CCA GO	JA CGA CTT TGT GCT A	TA CCC CAG CCG CCG ACA GAC CTC TCG C	CAA CGG TCA
	ATG GCT TTC TCC AGC ACC CCA	AGC CTC	TCG GCA CCA	ATC AAC TAC GA	G TCA	ACA GCC CCA AC	CC GGA CTT TGT GCT C	TA	
	ATGGCT TCC CAA CTC AGC TTC		GCC GGC ACC	ATC CGA GCA		CGT CAA TCC CCA GO		TT CGA CAA CCC GCC GCC TCG TCA ACA I	CA TAA
mum	ATG GCT TCC CTC CAG TTC ACC ATG GCT TCC CTC CAG TTC ATC		GCC GGC ACT	ACC CGC GCA TO	A ACA ACT CAG CCC ACA	GCA TCC CCT TCA AC	CA GGA CTT <mark>DGT CTT</mark> G DA GGA CTT TGT GCT <b>C</b>	TT CGA CCA GAC CAG TCA ACC TAG ACG C	AC CCC TCT
	ATG CCC TCC TCC CCC ATC ATC		GCC TCC GGC		C CCT	GCA CA	AA CGA CTT CGT GCT C	TT CCC CCC GGA CTG GAA CTC TCC CCA	GC GAA TCC
	ATG GCT TCC CTC CAG TTC ATC	GAG CCT	GCC GGC ACA	ATC TTC TCA GO	A ACC CCT CTC CCA TCC	CGA GTC GCA ACA TO	CA GGA CTT CGT TCT G	TT CGG GTC TCC CAG CGT TCG CAG T	AC CCC TCT
	ATGGCT TCC CTC CAG TTC ACC		GCC GGC ATT	ACC CGC GCA TO	A ACA ACA GTT CAG CCC			IT CGA CCA GAC CAA TCA ACC TAG AAA C	CTT CGC TCA
	ATG GCT TCC CTC CAA TTC ATC ATG GCT TCC TCC CAG TAC TTC	GAG CCT GAG CCT	GCC GGC ATC	AACACA TCA AC	C ATC CCC GCT TCA GCC	AGA TCA ACC GCA AC	CA GGA CTT TGT <b>TCT T</b> BA GGA CTT TGT <b>CCT A</b>	TA CGA GAG CAC ACC GAA CGT TCA <mark>TCG</mark> T TA CCC TCC	AC CCC TTT
1	ATG GCT TCC TCC CAG TAC TTC ATG GCT TCC CTC CAG TTC ATC	_	GCC GGC AAC	ATC CGC GCA AT	CACC CCA GCA GCC	GTT TCT GAA CO		TT CGA TAC GCC CAA GCG ATC TCA TCA A	CC TAG
	ATGGCT TTC TCC AGC TCC TCA	CGC CTC	TCG GCA ACC	ACA GAA CAC GA	G TCA	ACA TCG TCA AC	GC CGA CTT TGT GCT C	TA	
	ATGGCT TCC ACC AGT TTC ACC	ACG GCA	TAC GCC	CCA ACC TGT GT	т стс	ACT CTT CCA AC	CA TAC GCC GAC		
	ATG GCC TAC CCC CCG ATC AAC	GAG	CCC TTT GGC	ACC ACA ACA AT	C GCA GCA ACC CTC	CCC ACA AAC TCC TT	TC GGA CTT CGT GCT C	TT CCC GCA TTC TCC CAA CGC TCA GAA T	AT CCC TCT
	ATGGCT CCC FCC CCC GCC CCA	ACA	GCC TAC GGC GCC CTT GGC	TCA GAA TCI GA	A ATA CAG TGC CAA CTC	CAA CCT ACA GO	JA GGA CIT IGI GCI A		CAG GTC
	ATGGCT TCC CTC CAG TTC ACC	GAG CCT		CTC CGC GCA AT	C ACC AGC ACA ACA ACA	ACA GCC ACC ACT TO		TT CGA TCA GCC GAT CAG ACC ACA CCG	CA ACA TAA
	ATGGCT TCC CAA CTC CCC GTC	AAG CCT		ATC CGC GCA TO	A ACC CCA AAG CCC	TGT CGA GAA TCA AG		TT CGA CAG TCC TCA GCC CTG TCA A	GC CCC TCG
entis	ATGGCT TTC TCC AGC TCC TCA	CGC CTC	TCG GCA ACC	ACAGAA TAC GA	G TCA	ACA TCG TCA GO	SC CGA CTT TGT GCT C	TA	
	ATG GCC TCC CCC ATC ATC ATG GCT CCC CCC CCC GCC CCA		GCC TCC GGC GCC TTC GGC		A TTC GAA CAG TTC CCC	GCA CA	AA CGA CTT CGT GCT C 3A GGA CTT CGT GCT C	TA TCC CCC GTG TCC GCA CTC TCC CCA A	GC GAA TOC
	ATGGCT TCC CAA CTC AGC TTC		GCC GGC ACC	ATC CGA GCA					AG TAG
	ATGGCT TCC CAA CTC AGC TTC	CGC CCT	GCC GGC ACC	ATC CGA GCA	CCT CTC CCT GAA CCC			FT CGA CAA CCC <mark>TCA</mark> GCC TCG TCA ACA 1	TAG
	ATGGET TEE CTE CAG TTE ATE	AAG CCA		ATC ACC GCA GC	T CCA ACC TTC CGG TCC			TT CGA GTC TCC GAA CGT TCG CAA T	TAC CCC TCT
	ATG GCT TCC CAA CTC CCC GTC ATG GCT TCC CTC CAG TTC CCC	AAG CCT GAG CCT		ATC CGC GCA TO ATC CGC GCA AC	A ATC CCG AAG CCC			TT CGA CAG TCC TCA GCC CTG TCA A TT CGA TAC GCC GCG GCG TTC GCA TCA A	GC CCC TCG
	ATGGET TEC CEA ACC AGE TTC		GCC GGC ACC	ACC CGA GCA T	CACC ACA TCT GAG CCC			TT CGA CAA CAC TCC GCC TCA CAA CGC 1	CAA TOG
	ATG GCT TTC CCC CCA GCT CAG		GCC TTT GGC	TAC AAA CAA	TAA CAG CCC CTC	TGC CCT GCA GO	CA AGA CTT CCA GCT C	TT CCC CTC GCC TCA GCC TCT	CC AGC ACC
	ATGGCT TCC TCC CTC GCC CAC		GCC TTT GGC		A TTC CAG CAG CAA TTC		ga gga ctt <mark>cgt</mark> gct <mark>c</mark>	TA CCC TCC GTG TCT CCA GCC TCA A	AGA ACA AGC
	ATGGCT TCC CAA CTC AGC TTC	CGC CCT	GCC GGC ACC	ATC CGA GCA	TCT GTC CCT GAA CCC	CGT CAA TCC CCA GO	CA GGA CTT TGT TCT G	TT CGA CAA CCC GCC GCC TCG TCA ACA 1	CA TAA
	ATGGCT TCC CGA TAT CTC GCC	AAG TTT	GCC GGC ATC	TTCCCC CCA CC	C ATC TCA GAG GCC	TCT GAG GAA TCA AG	CA GGA TTT TGT TCT T	TA CGA CGA CAG CCT CCA ACC CCG CCA A	GC GGT CAA
	ATG GCC TCG CAA CTC CCC GTC	AAG CCT	GCC GGT ACC	ACC CGC GCA TO	A ACC CCA GAG CCC	TGT CGA GAA TCA AG	ca gga <mark>ttt</mark> tgt <mark>tct</mark> g	TT CGA CAG TCC TCA GCC CTG TCA #	GC CCC TCG
phus	ATGGCT TTC CCC AGC TCC CAA	CGC CTC	TCG GCA ACC	<b>ATT</b> GAA TAC GA	G TCA	ACA TCG TCA GO	CC GGA CTT TGT CCT C	TA	
	ATGGCT TCC TCC GCC GCC CCA ATGGCT TCC CTC CAG TTC CTC	GCA	GCC ACT GGC	ATC CGC GCA AC	A TCC GAA CAA CAA CTC	CCT GCA GO	<b>3A</b> GGA CTT <b>DGT</b> GCT A CA GGA CTT TGT <b>CTT</b> G	TA CCC AGC GCA TCC TT CGA TCA GCC GAT CAA ACC ACG TCA A	CAG GTC
	ATGGET TEC CTC CAG TTC	CAGICCT	GCC GGC ACA	ATC CGC GCA AC	A GTT ACA GAG TCC			TT CGA TCC ACC TCA GCC CCC TAA	CG
		GAG CCT	GCC GGC ACA	TTC CGC GCA TO				TT CGA TTC GCC GAT CAA TCA TCG TCC	CA TAG TAG
L.	AGG ATG GCC CTC ACT ACC CCA	AAC ATC	GCC TCT AAC	GCA AAA TCC CA	A TCA	AAA TTT CAC AC	<mark>ge aga</mark> ett <mark>ega</mark> get e	TT <mark>CGG</mark> TCC AAA TCC AAT CAA CAG GAG C	GCA ACC
	ATG GCC TTC TCC CCC ATC ATC ATG GCT TCC CTC CAG TTC ACC	GCA	GCC GCC GGC		C GCT	CAA GO	GA CGA CTT CGT GCT C CA GGA TTT TGT CTT C	TA TCC GAG TCG <mark>TCA</mark> GCA GGT CCC TCA ( TT CGA TTC ACC GAA GCA GCC CCA ACA (	CAC CTG GCA
	ATGGCT TCC CAA CTC CCC ATC	AGC CCT	GCC GGC ACC	ATC CGC GCA TC	A ACT GCA GAG CCC	CGT CGA GAA CCA GO		TT CGA TTC ACC GAA GCA GCC CCA ACA C TT CGA CAA CCC TCA GCC CCG TCA A	GT CCC TCG
	ATGGCT TCC CAA CTT CTC ACC	AAGCCT	GCC GGC ACC	CTC CGC GCA CC	C AGC TCA CAG TCC		CA GGA TTT TGT TCT G	TT CGA CAG CCC TCA GCC CCG TCA A	GC GGC CAA
	ATGGCT TCC CTC CAG TTC ACC	AAG CCT	GCC GGC ACT	CTC CGC GCA AT	C ACC AGC ACA ACA ACA	GCC ACC ACT TO	ca aga ctt tgt ctt g	TT CGA TCA GCC GAT CAG ACA ACA CCG	TAA TAA
e	ATG GCC TCA CAA CTC CCC ATC	AAG CCT	GCC GGC ATC	ATC CGC GCA TO	A ACC CCA GAG CCC	CGT CGA GAA TCA AG	CA GGA TTT TGT TCT G	TT CGA CAA TCC TCA GCC CTG TCA A	GC CCC TCG
11111	ATGGCT TCC AGT GCT GCA TCC ATGGCT TCC TCC AGT GTC TGC	ACG GCA	ATTGCC ACC	TCA ACC CGT GI	T CAC	GIT GIT CCA GO	C GAC AAC TAC GCC G	AU UCA	
	ATGGCT TCC CCC CCC GCC TCA	GCA	GCC ATC GGC	TCC AGT GAA TT	TGAT TAA CAA CCC	CAG TCT TCC GO	CA GGA CTT CGT GCT C	TT TCC CCC GTG TCC CCC GCA	CC CAG GTC
lum	ATGGCT TCC CTC CAG TTC TTC	GAG CCT	GCC GGC ACC	ATC CGC GCA AC	C <mark>ACT</mark> GCC ACA ACA GCC			TT CCC ACA GCC GAA CAA GCC GCC CCG 1	ICA ACA TAG
	ATGGCT TCC CAA CTC CCC GTC	GAG CCT	GCC GGC ACC	ATC CGC GCA TO	A ACC CCA AAG CCC	TGT CGA GAA TCA AG		TT CGA CAG TCC TCA GCC CTG TCA A	AGC CCC TCG
	ATG GCC TTC CCC CCA GTC CAG	ACA	GCC TTC GGC	TICAAA CAA	G TCC AAA CAG TCT CCC	TGC CCT GCA GC	CA AGA CTT TCA GCT C	TT CCC TTC ACC TT	
In	ATGGCT TTC CCC CCA GTC CAG	ACA	GCC TTT GGC	TAC AAA CAA TO	G TCC AAA CAG TCT CCC		CA AGA CTT TCA GCT	TT CCC GAC TCC TCA GCC GCT T	TGC AGC ACC
	ATGGCT TCC CCC CCC TCA CCA	GCA	GCC TTT GGC	GCA GTT CCC GA	A TTT GAA CGA CAA	GAG CCT ACA AC	ca gga ctt <mark>cgt</mark> gct c	TA TCC ACA ATC TCG CCC GCC AGT CAA 1	TTC CTT GGA
emun	ATGGCT TCC ACC ATC GGT TCC	ATC CGG	CCT CAC GCC	CAA ACC AGT GI	T CAA	TCT GCT GCC GC	CC CCC TCC GGC		
cola	ATGGET TEC ACC AGT TTE ACC ATGGET TEE CCC CCC ACC ATE	ACG GCA	TAC GCC	TTOCAA CCA CA	A CAN AND CAN CAN CAN	ACT CTT CCA AC	CA TAC GCC GAC	TA TCC ATC AGC AAC ACC	CA ACT CCC
	ATGGCT TCC CTC CAG TTC ACC	GAG CCT	GCC GGC ACT	CTC CGC GCA AT	C ACC AGC ACA ACA ACA	GCC ACC ACT TO	CA GGA CTT TGT CTT G	TT CGA TCA GCC GAT CAG ACC ACA CCG	CA ACA TAA
	ATG GCC TTC TCC CCC ATC ATC	GCA	GCC TCC GGC	TCA AAA CTC GA	C GCT	CAA GO	GA CGA CTT CGT GCT	TA TCC GAG TCA TCA GCA GGT TCC TCG TT CGA CAA GCC TCA GCC CGG TCA Z	
	ATGGCT TCC CAA CTC CCC ATC	AGC CCT	GCC GGC ACC	ATC CGC GCA CC	A ACT GCA GAG CCC	CGT CGA GAA TCA GO	CA GGA TTT TGT CTT G	TT CGA CAA CCC TCA GCC CCG TCA	GT CCT TCG
715	ATGGCT CCC ACT TTC TCC CCC	GCA	GCC ACT GGC	ACC ACC TTC CA	A CCC GCA CAA	CCC ACA AND TOT TO	GGA CTT TGT GCT	ta ccc gcc ttc <mark>tcg</mark> ccc <mark>gca</mark> agt caa c tt ccc gcg ttc tcc caa cgc tca gaa t	AT CCC TCT
	ATGGCT TCC CCC CCC ACT CCA	GCA	GCC TTT GGC	GCA GTT CCC GA	A TTT GAA CGA CAA CAA	GAG CCT ACA TO	CA GGA CTT CGT GCT	TA TCC GCA ATC TCG CCC GCC AGT CAA 1	TTC TTG GGA
	ATGGCT TCC CTC CAC GCA ACC	CAG CCT	GCC GGC ACT	ATC CGC GCA CC	A GTT CCA GAG TCC	CGA AAC ACA GCA TO	CA GGA TTT TGT CTT G	TT CGA TCA GCC CCC TAA	CG
	ATG GCT TCC CTC CAG TTC CCC	CAC ACT	GCC GGC ATT	ATC CGC GCA TO	A AAC ACC	CTG TTC TCT GCA AG	CA GGA CTT TGT <mark>CTT</mark> G	TT CGA <mark>CCA GAA CAA CCT</mark> GCC TAA ACG 1	IGC ATT GAA
nsis	ATG CTC TTC TCC CCC ATC GTT ATG GCT TCC CTC CAG TTC AAC	GCA	GCC TCC GGC				GA CGA CTT TGT ATT		TCA CCT TCA
a								TT CGA <mark>gag cac  <u>tca</u> caa cgc  tcg  tcg  t</mark> TT	AC CCC TTT
	ATGGCT CCC CCC CCC CCA	GCA	GCC TTT GGC	TCA GAA TCA GA	a ttc gaa <mark>caa</mark> cag cgt	CAA CCT GCC GC	SA GGA CTT TGT GCT C	TT TCC AGC CCC GTG TCC ACA GCC TCG 1	CT GAG ATC
	ATGGCT TCC CTC CAG TTC ATC	GAG CCT	GCC GGC ACA	ACC ATC GCA CA	A TCA TCA ACA GCA	CCA CCA GCT AGA TO	CA GGA CTT TGT CTT G	TT CGA GAG TCC AGC TCC TCG CAG 1	TC CCC TCT
orioides								TT CGA TCA GCC CAG TCA ACC TAG ACA	
	ATGGCT TCC CTC CAC GAA TTC	LGC CCT	GUU GGC ACA	ATC UGC GCA AC	G TCA	ACC ACC ACA AC	la gga citi tgt <b>citi</b> g Igga citi tgt gct	TT CGA TCA GCC CCC TAA	
ina	ATGGCT CCC CCC AGC TCC CCG	CGC CTC	ACG GCT CCC	AAC ACC GC	A GCA	ATT CCC CGC GC	GA AGA CTT CCA ACT C	TA	
	ATGGCT TCC CAA CTC CCC GTC	AAG CCT	GCC GGC ACC	ATC CGC GCA TO	A ACC CCA AAG CCC	TGC CGA GAA TCA AG	CA GGA TTT TGT TCT G	TT CGA CAG TCC TCA GCC CCG TCA A	GC CCC TCG

178 synonymous 2561 non-synonymous

# Aspergillus

Asperzillus orvzas Trichophyton tonsurans Myceliophthora\_thermophila es graminis Daldinia eschscholzii Trichoderma\_atroviride Fusarium\_oxysporum Thielavia\_terrestris \_\_\_\_\_\_ Claviceps\_fusiformis Periglandula ipomoeae Neosartorya\_fischeri Ophiostoma\_piliferum Gibberella zeae Beauveria\_bassiana Cordyceps\_militaris Arthroderma benhamiae Aspergillus\_niger Verticillium\_dahliae Fusarium pseudograminearum Tuber\_melanosporum Ophiostoma\_novo-ulmi Ajellomyces\_dermatitidis Phaeosphaeria\_nodorum Hypocrea\_jecorina Colletotrichum\_higginsianum Amorphotheca\_resinae Coccidioides\_posadasii Marssonina\_brunnea Glomerella\_graminicola Botrvotinia fuckeliana Cryphonectria\_parasitica Magnaporthe\_poae Pyrenophora\_teres Septoria\_passerinii Geomyces\_pannorum Aspergillus\_sojae Penicillium\_chrysogenum Neurospora\_crassa Epichloe brachvelvtri Pyrenophora\_tritici-repentis Coccidioides\_immitis Aspergillus\_fumigatus Hypocrea\_virens – Hypocrea\_lixii Ascocorvne sarcoides Epichloe festucae Magnaporthe\_grisea Cordyceps\_bassiana Arthroderma gypseum Aspergillus\_nidulans Trichoderma\_reesei Mycosphaerella fijiensis Claviceps\_paspali Epichloe\_glyceriae Cochliobolus heterostrophus Aspergillus\_terreus Chaetomium\_globosum Gibberella moniliformis Podospora\_anserine Arthrobotrys\_oligospora Grosmannia clavizera Metarhizium\_acridum Aciculosporium\_take Sordaria macrospore Neotyphodium\_gansuense Passalora\_fulva Mycosphaerella populorum Aspergillus\_kawachi Chaetomium\_thermophilum Epichloe\_amarillans Microsporum\_canis Trichophyton\_verrucos Trichophyton\_rubrum Talaromyces\_stipitatus Cladosporium sphaerospermu Mycosphaerella\_graminicola Penicillium\_digitatum Neurospora tetrasperma Metarhizium\_anisopliae Geomyces\_destructans Penicillium marneffei Nectria\_haematococca Verticillium\_albo-atrum Paracoccidioides brasiliensis Leptosphaeria\_maculans Aspergillus\_clavatus Glarea lozovensis Colletotrichum\_gloeosporioide Gibberella\_fujikuroi Alternaria arborescen Macrophomina\_phaseolina Epichloe\_typhina

		F١	ra	m	e	1	
	CGC CGT	CCG CCT	CCC CCT	GTT GTA		CTA TTG	TTC TTC
	CGC			GTT	CCT CCC	CTT	TTC
	CGC		сст	GTA	CCA	CTT TTG	TTC
	AGG AGG	CCT	CCA CCA	GTT	CCT	CTC	TTT TTT
	CGC CGT		CCC CCT	GTT GTG	CCT CCC	CTG TTA	TTT TTC
	CGA CGT	CCT CCC	CCC CCT	GTA GTT	CCC CCA	TTG TTG	TTC TTT
	CGT CGA	CCT		GTC GT▲	CCG	TTG	TTT
	CGC	CCC	CCC	GTC	CCT	СТС	TTC
	CGC CGT	CCC CCT	CCC CCT	GTT GTA	CCC	CTC TTG	TTC TTC
	CGC CGC	CCA CCA	CCC CCA	GTC GTT	CCC CCA	CTA CTA	TTT TTC
	CGA CAG	CCC	CCC	<mark>GTA</mark> CAG	CCT CCT	CTA ATT	TTC CTT
	CGT CGT	CCG	CCC	GTC	CCG	CTG TTG	TTC TTT
	TAC		CCG	GTT GTA	CCA	CTG	TTC
	CGG CGC	CCA CCA	CCA CCC	GTA GTA	CCC CCG	TTG TTG	TTT TTT
	CGC CGT	CCT CCT	CAA CCA	GTC GTT	CCC CCC	CTG CTC	TTC TTT
	CGT		CAA CCT	GTC GTC	CCC CCG	CTG TTG	ТТТ ТТТ
	CGT	CCT	CAA		ССС	TTG	TTT
	CGT CGT	CCA CCG	ССТ	GTT GTG	CCC	CTT CTT	TTC TTC
	CGT CGC	CCC CCT		GTT GTT		CTG CTC	TTT TTT
	CGA CGC	CCG CCG	CAA		CCC	CTG CTA	TTC TTC
	CGC	CCA	ccc	ATC GTT	CCG	CTT TTG	TTT TTT
	CGT			GTT	CCC	TTG	TTT
	CGT CGT		CCA	GTT GTT	CCC	CTG CTC	TTT TTT
	CGT CGG	CCC CCA	CCT	GTT GTA	CCA CCC	TTG CTG	TTT TTT
	CGG CGT	CCA	CCA		ccc	TTG TTG	TTT TTT
	CGT		CCT CCT	GTA	CCC	TTG	TTT
	CGT	ccc	CCC	GTC	CCT	СТС	TTC
	CGT CGT		CCA CCT	GTA GTC	CCT CCG	TTG CTC	TTT TTC
	CGG CGC	CCA CCA	CCA CCT	GTA GTG	CCC CCT	TTG TTA	TTT TTT
	TGT CGT	CGC CCC	TTC CCT	CTC GTA	CCA CCC	TTG TTG	GTC TTT
	CGT	CCC	CCA	GTC	ccc	CTG	TTT
	CGA	CCA	CCT CCT		CCC	CTA CTC	TTC
	AGG CGC	CCT CCA	CCA CCC	GTC GTT	CCT CCC	CTC CTG	TTT TTT
	ATT CGG	CCC CCG	ATT CCC	ATT GTC	CCC	ATT	ATT TTC
	AGG CGT	CCT	CCT CCT	GTA	CCA CCT	TTG TTG	TTC
	CGC	CCT	CCT		CCC	TTG	TTT TTT
	CGT CGA	CCC CCA	CCT CCT	GTA GTG	CCC CCT	TTG CTA	TTT TTT
	CGT	CCA CCA	CCT	GTA GTC	CCA CCT	CTC CTA	TTC TTC
	CGC CGT	ATT	TCC CCT	GTC GTA	сст ссс	CTG TTG	TTC TTT
	CGT		CCA	GTA	ccc	CTG	TTT
	CGT CGT	CCT	CCT CCT	GTA GTA	CCC CCC	TTG TTG	TTC
m	CGT CGA	CCT CCA	CCG CCA	GTT GTG	CCT CCT	TTG CTA	TTT TTC
		CCT CCT	CCA CCT	GTT ATC	CCA CCG	CTC CTT	TTC TTC
	CGC	CCT		GTT		TTG TTG	TTT TTC
	CGT	CCC	CAC	GTC	CCG	CTG	TTC
	_	сст		GTT GTT		TTG CTT	TTT TTT
	CGC CGT		CCA CCA	GTC GTT	CCG CCA	CTA TTG	TTT TTC
	CGC CGT	ccc	CCG CCC	GTT GTC	CCC	CTG TTG	ТТТ ТТТ
	CGA	CCG	CCT	GTC	CCA	CTG	TTC
es		CCT	CCA	GTC GTT		CTC	TTC TTT
	CGT CGT	CCA	CCG CCC	GTT GTA		CTG CTC	TTC TTC
	CGC		ССТ	GTA	ccc	TTG	TTT

363 synonymous 30 non-synonymous

## iv.

Aspergillus\_oryzae Trichophyton\_tonsurans Myceliophthora\_thermophila Gaeumannomyces\_graminis Daldinia\_eschscholzii Trichoderma\_atroviride Fusarium\_oxysporum Thielavia\_terrestris Claviceps fusiformis Periglandula\_ipomoeae Neosartorya\_fischeri Ophiostoma piliferum Gibberella\_zeae Beauveria\_bassiana Cordyceps\_militaris Arthroderma\_benhamia Aspergillus\_niger Verticillium dahliae Fusarium\_pseudograminearum Tuber\_melanosporum Ophiostoma novo-ulmi Ajellomyces\_dermatitidis Phaeosphaeria\_nodorum Hypocrea jecorina Colletotrichum\_higginsianum Amorphotheca\_resinae Coccidioides posadasii Marssonina\_brunnea Glomerella graminicola Botryotinia\_fuckeliana Cryphonectria\_parasitics Magnaporthe\_poae Pyrenophora\_teres Septoria\_passerinii Geomyces\_pannorum Aspergillus\_sojae Penicillium\_chrysoa Neurospora crassa Epichloe\_brachyelytri Pyrenophora\_tritici-repentis Coccidioides\_immitis Aspergillus\_fumigatus Hypocrea\_virens Hypocrea\_lixii Ascocoryne\_sarcoides Enichloe festucae Magnaporthe\_grisea Cordyceps\_bassiana Arthroderma gypseum Aspergillus\_nidulans Trichoderma\_reesei Mycosphaerella fijiensi Claviceps\_paspali Epichloe\_glyceriae Cochliobolus heterostrophus Aspergillus\_terreus Chaetomium\_globosum Gibberella moniliformis Podospora\_anserine Arthrobotrys\_oligospora Grosmannia clavizera Metarhizium\_acridum Aciculosporium\_take Sordaria macrospore Neotyphodium\_gansuense Passalora\_fulva Mycosphaerella populorum Aspergillus\_kawachii Chaetomium\_thermophilum Epichloe\_amarillans Microsporum\_canis Trichophyton\_venue Trichophyton\_rubrum Talaromyces\_stipitatus Cladosporium\_sphaerospermun Mycosphaerella\_graminicola Penicillium\_digitatum Neurospora\_tetrasperma Metarhizium\_anisopliae Geomyces\_destructans Penicillium\_marneffei Nectria\_haematococca Verticillium albo-atrum Paracoccidioides\_brasiliensis - \_ Sclerotinia\_homoeocarpa Lentosphaeria, magulans Aspergillus\_clavatus Glarea\_lozoyensis Colletotrichum zloeosporioide: Gibberella fujikuroi Alternaria\_arborescen: Macrophomina phaseolina Epichloe typhina

Frame 2											
GCC CGC CCG TTO											
GTC CTC CTG TAC GCC CGC CTG TTC											
GCC CGC CTG TGC GCC CAC CTG TAC	CCC TAT TCT CAC TTT TCA										
GAC CAC CAG TCC GGC CTC CAG TTC	CTT TGT TTC CTC TCT TTT										
GCC CGC CCG TTC											
GAC CTC CCG TAC	CCT TGT TCA										
GTC CCC CTG TTC GTC CTC CTG TCC	CAT TGT TTT CGT TGT TTC										
GAC CCC CAG TAC GCC CCC CCG TCC	CTC TTT TCT CTC TCT TCA										
GCC CCC CCG TTC GTC CTC CTG TAC	CCC TCT TCA CCT TGT TCG										
GCC CAC CCG TCC GCC CAC CAG TTC	CCC TAT TTA CAC TAT TCG										
GAC CCC CCG TAC	CTC TAT TCT CTA TTC TTG										
GTC CGC CCG TCC	CGC TGT TCT										
GTC CCC CAG TTC	CAC TGT TCT										
GGC CAC CAG TAC GCC CAC CCG TAC	CCT TGT TTC CGT TGT TTC										
GCC CTC AAG TCC	CCC TGT TCG										
GTC CTC AAG TCC GCC CGC CTG TCC	CCC TGT TTT CGT TGT TTT										
GTC CTC AAG TAC	CCT TGT TTT										
GTC CGC CTG TGC	CCC TTT TCT										
GTC CCC CTG TTC GCC CTC CAG TTC											
GAC CGC AAG TCC GCC CGC CCG TTC	CCC TGT TCT										
GCC CAC CCA TCC	CGC TTT TTA										
GTC CCC CTG TTC GTC CTC CGG TTC	CCT TGT TTA										
GTC CTC CAG TTC	CCC TCT TTC										
GTC CCC CTG TTC GGC CAC CAG TAC	CCC TGT TTA										
GGC CAC CAG TAC GTC CCC AAG TCC	CCT TGT TTA CAT TGT TTT										
GTC CCC CTG TAC	CCT TGT TTA										
GTC CCC CCG TCC GTC CTC CAG TAC	CTC TCT TCA CTT TGT TTA										
GTC CAC CTG TCC	CGC TCT TCA										
GCC CAC CAG TAC	CTT TAT TTC										
GTC GCT TCC TCC GTC CCC CTG TAC	CAT TGG TCA CCT TGT TTA										
GTC CCC CAG TCC GCC CGC CTG TTC	CCC TGT TTT CTC TAT TCA										
GAC CAC CTG TGC	CCC TCT TCC CTC TCT TTT										
GCC CAC CCG TTO TTC CCA TTA TTC	CCC TGT TTC										
GGC CGC CCG TCC	CGC CGT TCC										
GGC CTC CTG TAC GTC CTC CTG TTC	CTT TGT TTA										
GCC CTC CTG TCC GTC CCC CTG TAC	CCT TGT TTA										
GAC CAC CTG TGC GTC CAC CTG TAC											
GCC CAC CCG TCC GCA TTT CCG TCC	CTC TAT TCA										
GTC CCC CTG TAC GTC CCC CAG TAC	CCT TGT TTA										
GTC CTC CTG TAC	CCT TGT TCG										
GTC CTC CTG TAC GTC CTC CGG TTC	CTT TGT TTA										
GAC CAC CAG TGC	CAC TCT TCC										
GCC CTC CTA TCC GCC CTC CTG TTC											
GGC CCC CTG TAC GTC CCC ACG TCC	CAT TGT TCA										
GTC CTC CGG TTC											
GCC CAC CAG TCC	CGC TAT TTG										
GTC CCC CAG TTC GTC CTC AAG TGC	CTT TGT TTT										
GCC CCC CGG TTC GTC CTC CCG TCC	CAT TGT TTT										
GAC CGC CTG TCC TGC CCC CGG TCC	CAC TGT TCT										
GGC CTC CAG TTC GTC CTC CGG TTC	CTC TCT TTT										
GTC CAC CCG TAC	CGC TCT TCT										
200 000 010 TAU	SOL TOT TTA										

45 synonymous 378 non-synonymous

## V.

Aspergillus oryzae Trichophyton\_tonsuran Myceliophthora\_thermophila Gaeumannomyces graminis Daldinia\_eschscholzii Trichoderma\_atroviride Fusarium oxysporum Thielavia\_terrestris Claviceps\_fusiformis Periglandula ipomoeae Neosartorya\_fischeri Ophiostoma\_piliferum Gibberella zeae Beauveria\_bassiana Cordyceps\_militaris Arthroderma benhamiae Verticillium\_dahliae Fusarium pseudograminearum Tuber\_melanosporum Ophiostoma\_novo-ulmi Ajellomyces\_dermatitidis Phaeosphaeria\_nodorum Hypocrea\_jecorina Colletotrichum\_higginsianum Amorphotheca\_resinae Concidioides nosadasii Marssonina\_brunnea Glomerella\_graminicola Botryotinia fuckeliana Cryphonectria\_parasitica Magnaporthe\_poae Pyrenophora teres Septoria\_passerinii Geomyces\_pannorun Aspergillus sojae Penicillium\_chrysogenum Neurospora\_crassa Epichloe brachvelvtri Pyrenophora\_tritici-repentis Coccidioides immitis Aspergillus\_fumigatus Hypocrea\_viren Hypocrea\_lixii Ascocoryne\_sarcoide Epichloe\_festucae Magnaporthe grisea Cordyceps\_bassiana Arthroderma\_gypseum Aspenzillus nidulans Trichoderma\_reesei Mycosphaerella\_fijiensis Claviceps paspali Epichloe\_glyceriae Cochliobolus\_heterostrophu Asperzillus terreus Chaetomium\_globosum Gibberella moniliformis Podospora\_anserine Arthrobotrys\_oligospora Grosmannia\_clavigera Metarhizium\_acridum Aciculosporium take Sordaria macrospore Neotyphodium\_gansuens Passalora\_fulva Mycosphaerella, populorur Aspergillus\_kawachii Chaetomium\_thermophikum Epichloe amarillans Microsporum\_canis Trichophyton\_veru Trichophyton rubrum Talaromyces\_stipitatus Cladosporium\_sphaerosp Mycosphaerella graminicola Penicillium\_digitatum Neurospora\_tetrasperma Metarhizium anisopliae Geomyces\_destructans Penicillium marneffei Nectria\_haematococca Verticillium\_albo-atrum Paracoccidioides brasiliensis Sclerotinia\_homoeocarpa Leptosphaeria\_maculans Asperzillus clavatus Glarea\_lozoyensis Colletotrichum\_glo Gibberella fujikuroj Alternaria\_arborescens Macrophomina\_phaseolina

Frame 3	3
---------	---

		F	ra	m	ne	3
					CCT	
		GCC	TGT	TCC	тст	GTT CGC TTT CTC
	000 000	GCC	TGT TGT		CCT ACT	ATT CTC
	ACC	ACC	AGT	ccc		GTT TCA
	GCC CCC	TCC GCC	AGT CGT	TCC TCC	TCT TCT	CTT TTC GTT TCT
		TCC	TGT	GCC	CTT	ATT CGA
	TCC	_	CGT TGT			GTT CAA GTT <mark>TTC</mark>
			TGT AGT		GTT TCT	
	CCC	CCC	CGT	CCC	тст	CTT CAA
			CGT TGT			CTT CAA GTT CGT
	CCC CCC	ACC	CGT	CCC TCC		ATT TAA ATT CGC
	ACC	CCC	CGT		TCT	
	GCA TCC	ACA GCC	ACA CGT			TCT TGA GTT CTC
	TCC		AGT	TCC	ATT	GTT TAG
	GCC	ACC	AGT		CTT	GTT TCC
	ccc ccc		CGT AGT	ACC CCC		GTT TCC GTT CGC
		TCC	AGT	TCC	ССТ	стт тсс
	TCC CCC		AGT TGT			GTT TTC GTT TTC
	TCC		AGT TGT			GTT TTC
	TCC	GCC	TGT	GCC	ССТ	TTT CTC
		CCC TCC	TGT AGT		ACT ACT	GTT TTC CTT TCA
		GCA	AGT	CCC	ССТ	GTT CTC
	ccc	ACC	CGT CAT	CCC	GCT	ATT CAA TTT TAA
		TCC CCC			CTT CTT	GTT TCC GTT TAA
	TCC	TCC	GGT	TCC	ACT	GTT TTC
		тсс ССС	TGT		CCT ATT	GTT TTC
			AGT AGT			GTT TAA GTT TAA
	TCC	CCA	AGT	CCC	ATT	GTT TTC
	TCC ACC		TGT TGT			GTT TAA GTT CTC
	TCC TCC		CGT			CTT CAA GTT TAC
	тсс	ACC	TGT	ccc	GCT	CTT CAA
	GCC CCC	ACC ACC	AGT TGT	ACC GCC	CTT TTT	GTT TCC
	TCG	CTT	CCT	000	ATT CTT	GGT CAA GTT TAA
	TCC TCC	000 000	TGT AGT	CCC	ССТ	GTT TTC
	CCC ACC	GCC ACC	TGT TGT			ATT CAA
	GCC	тсс	AGT	ccc	тст	CTT TTC
	CCC TCC	ACC CAT	TAT	TCC TCC		GTT TCC TAT TCC
	GCC GCC	GCC TCC	CGT TGT		GCC ≜TT	GTT <mark>CCC</mark> GTT CAA
	TCC			TCC		GTT TAA GTT TCC
	TCC	CCC	TGT	ACC	CTT	GTT TAA
	ACC TCC	ACC	TGT TGT	GCC ACC	TCT ACT	ATT TCA CTT CAA ATT CAA
	CCC	ACC	CGT	ccc	TCT	ATT CAA
	CAT TCC	TTC CCC	CGT TGT	CCC ACC	TCT CTT	GTT CAA GTT TAA
	TCC	ccc	A CT	100	COT	CTT TCC
	TCC	TCC	TGT	ACC	CTT	GTT CGC
m	TCC	TCC	GGT	TCC	TTT	GTT TAA
	ccc	тсс	AGT	TCC	ACT	CTT CCA
	CCC	TCC	TAT TGT	TCC	CTT	TTT CAA GTT TCC GTT CAA
	GCC TCC	CCC CCA	TGT CGT	ACC CCC	ATT GCT	GTT CAA GTT <mark>CTC</mark>
	TCC	TCC	GGT	TCC	ттт	GTT TAA
	CCC	ACC	AGT	ccc	GCT	TTT TTC ATT TGC
		CCC	AGT	TCC	ATT	GTT CAA GTT <mark>TTC</mark>
	CCC	CCC	GGT	TCC	CCT	GTT TTC
	TCC ACC	TCC GCC	CGT TGT	ccc ccc	ATT ACT	GTT TTC GTT CTC
es	GCC	CCC	GGT	CCC	GCT	TTT CTC
	TCC	TCC	GGT	TCC	TCT ACT	GTT CCC
	TCC	ACC	CGT	ACC	GCT	CTT CTC GTT TAA
	_	_				

5 synonymous 437 non-synonymous

Epichloe typhina

Serpula\_lacrymans Heterobasidion\_irregulare Lentinula\_edodes Coprinopsis\_cinerea Dichomitus\_squalens Ganoderma\_lucidum Piriformospora\_indica Ceriporiopsis\_subvermispora Schizophyllum\_commune Phanerochaete chrvsosporium Fibroporia radiculosa Omphalotus olearius Stereum\_hirsutum Coniophora puteana Pleurotus ostreatus Gloeophyllum\_trabeum Fomitiporia\_mediterranea Heterobasidion\_annosum Phanerochaete\_carnosa Laccaria bicolor Postia\_placenta Rhizoctonia\_solani Antrodia\_cinnamomea Punctularia\_strigosozonata Trametes versicolor Agaricus bisporus Pinus\_taeda\_cont

CTT	GCT	GCC	CAC	TAT	GGC	ATA	ccc	CAG	TCT	CTG	CCT	CCA	GCA	CCT	CGT	ACA	ACT
TTA	GCT	GCC	CAT	CAT	GGG	ATA	ccc	CAA	CAA	CTG	CCC	CCA	CCA	CCT	CGT	ACA	ACT
CTA	GCT	GCC	CAC	TAT	GGC	TTA	CCA	CAA	GCA	CTG	CCT	CGG	CCG	CCA	CGT	ACA	TCA
CTT	GCA	GCC	CAC	TAT	GGC	ATC	CCA	CAA	CTT	TTG	CCG	CCA	GCG	CCT	CGC	ACA	ACA
TTA	GCT	GCC	CAT	CAT	GGA	ATC	CCC	CAA	TCG	CTT	CCC	CCG	GTT	CCT	CGA	ACA	ACC
TTG	GCT	GCT	CAT	CAT	GGA	ATC	CCC	CAA	TCG	CTT	CCT	CCA	GTT	CCT	CGA	ACA	TCC
CTC	CCC						CCG								CTT	TCC	GCC
CTA	GCT						CCT				ccc				CGT		
TTG							CCG										
							CCT										
TTA							CCC							CCT			
CTT							CCT					AGA			CGT		
CTC							CCG								CGC		
CTC							CCT							CCT			
				_			ccc					CCT			CGT		
CTC							CCC							CCT			
CTG							CCT										
							CCC										
							CCT										ACT
							CCA				_				CGA		GTA
TTA	GCT						CCC							CCT		ACA	
ACT							CCC							CCC		ACT	ACC
TIA ama	GCT						CCT								CGT		ACT
CTC							CCG					CCG				ACA ACA	_
CIA OTA	GCT						ccc ccc							CCT	AAA		ACC
CIA TTLA	GCA						CCG				_						atta
TTA	GCL	GCL	CAT	CAC	GGL	AIC	CCG	AIG	TCC.	ALL	000	CCA	ACA	eec.	CGT	ACA	GIG

#### 193 synonymous 85 non-synonymous

#### uORF (long) AUG

Serpula\_lacrymans Heterobasidion irregulare Lentinula\_edodes Coprinopsis cinerea Dichomitus squalens Ganoderma lucidum Piriformospora\_indica Ceriporiopsis\_subvermispora Schizophyllum\_commune Phanerochaete chrysosporium Fibroporia radiculosa Omphalotus olearius Stereum\_hirsutum Coniophora\_puteana Pleurotus\_ostreatus Gloeophyllum trabeum Fomitiporia mediterranea Heterobasidion\_annosum Phanerochaete\_carnosa Laccaria\_bicolor Postia placenta Rhizoctonia solani Antrodia cinnamomea Punctularia\_strigosozonata Trametes\_versicolor Agaricus\_bisporus Pinus taeda cont

Serpula\_lacrymans

 Heterobasidion\_irregulare Lentinula\_edodes Coprinopsis\_cinerea Dichomitus\_squalens Ganoderma lucidum Piriformospora indica Ceriporiopsis\_subvermispora Schizophyllum\_commune Phanerochaete\_chrysosporium Fibroporia\_radiculosa Omphalotus\_olearius Stereum hirsutum Coniophora puteana Pleurotus ostreatus Gloeophyllum\_trabeum Fornitiporia\_mediterranea Heterobasidion\_annosum Phanerochaete carnosa Laccaria\_bicolor Postia placenta Rhizoctonia solani Antrodia cinnamomea Punctularia\_strigosozonata Trametes\_versicolor Agaricus\_bisporus Pinus\_taeda\_cont

AGC AGC

AGC TGC

tg ctg ccc act atg gca tac ccc agt ctc tgc ctd cag cac ctc gta caa ctc TAG CTG CCC ATC ATG GGA C CCC <mark>AAC AAC</mark> TGC CCC <mark>CAC</mark> CAC CTC GTA CAA CTC TAG CTG CCC ACT ATG GCA TTC CAC GC CAC GTA TGC CTC GGC CAG CCC ACT ATG GCA TCC CAC TGC GC CAG CTC CAA TAG CTG CCC ATC ATG GAA TCC CCC CTC CAA CTG CTC ATC ATG A TCC CCC TC CAG CTC CCG CCC ATT TCG C CTA C AT CCC CTT CAC TAG CTG CTC ATC ATG GCA TC AGT CTC TGC CCC CAG C CTC GTA CAA CTC CG CGC AAC ATG TC TGC C A TGA CCC TC CAC CTC CG CTG CCC CC ATG GAA TCC CTC AGT CTC CTC JAA CTA CTC TAG CTG CTC ATG GCA TCC CCC AGT TTT TGC CTC GTA CAA CTC GATTC CTC AGT CTC ccc T ATG ac gta caa CTC ATC ATG AA TCC TT TGC CAC CAC GCA CAA ATG GCA TCC CCC AGT CTC TGC CAC CTC GTA ATG GCA TCC G CAC CAC GTA ATG GCA TCC CCC CTC GTA CAA TGC CAG AC TCC CTA ATG CAC CTC GTA CAA CTC TAG CTG CCC ATC ATG GA TAC CCC TGC CCC CG CTG CTC ACC ATG AA TCC CTC C CTC TTC CCC CT ATG GTA TCC TAG CGG CCC CAC TGC CAC CAG TTC ATC ATG GCA TCC CCC AGT TGC CCC TAG CTG CTC CAA CTC GTA TAA ATA TCC TC AAT TGC TAG CTG ATC ATG GCA TCC AGT GTA ccc CG CCG ACC ATG GCA TAC GC AGT TAG CTG TC ATC ATG GAA TCC CCC AGT CAG CTC TAG CAG CTC ATC ATG GCA TTC C TAG CTG CTC ATC ACG GTA TCC GTA CCC CAC

ACG TAC AT

TCG TAC AAC

TCG TAC AAC TCG <mark>acg</mark> tac aac

ACG CAC AAC

CG TAC

C CCG TGT CAA

TAC

TCG

C AAC

CAAC

TCG

AAC TCG

CAAC

TCG

TCG

TCG

TCG

TCG

TCG

TGC TGC CCA CTA TGG CAT ACC CCA GTC TCT GCC TCC AGC ACC TCG TAC AAC AGC TGC CCA TCA TGG GAT C CCA ACA ACT GCC CCC A CC ACC TCG TAC AAC agc tgc cca <mark>cta</mark> tgg cat **t**g GCC TGC AGC CCA CTA TGG CAT CCC ACA GCC GCC AGC AGC TGC CCA TCA TGG AAT CCC CCA IGC TGC TCA TCA TGG T CCC CCA CGC CCA TIT CGG laad ACC AGC TGC 'CA TCA TGG CAI GTC TCT GCC CCC AGC GAC CCT TCC ACC G CA TGC GC CGC GCA TCT acc TGC CCA TGG T CCC GTC TCT AGC TGC TCA CA TGG CAT CCC CCA 🕻 TGG GAT TCC TCA GTC TCT C CCA C TCA TCA TGG AAT CCC ACC ATC TTT GCC GTC TCT GCC CCA TGG CAT CCC ACC TCG TAC TGG CAT CCC TCT ACC TGG CAT CCC CCA CC TCG TAC AAC TAG GCC CA TGG ACT CCC TAC TAA GC CA CCC G AGC TGC CCA TCA TGG AT ACC CCA GCC CCC ACC TCG TAC AAC CGC TGC <mark>A</mark> TGG CCCT TTCC CCC IA TGG TAT CCC ACA AGC GGC CCA TCT GCC ACC AGC TCA TGG CAT CCC CCA GCC CCC AGC TGC ACC TCG ATA ATA TAT AAA TAT CCC CAC GCC TCC AGC TGC TCA TGG CAT CCC lccc CGC CGC CCA TGG CAT ACC AGC TGC A TCA TGG AAT CCC CCA GTC ACC TCG TCA TGG CAT TCC CAC

ICA TCA CGG TAT CCC

AT GTC

co aca

## 15 synonymous 275 non-synonymous

### 13 synonymous 270 non-synonymous

Supplementary Figure 3. Regions upstream of mAUG show coding conservation in-frame with the mORF. (A) Conservation in the N-terminal extension of N. crassa cpc-1. Nucleotide and codon alignments of the region corresponding to uORF2 of cpc-1 in N. crassa is shown in: (i) in-frame with the main ORF (frame 1 in Figure 1B); (ii) in frame with uORF2 (frame 3 in Figure 1B). (iii-v) A proline-rich region (residues 218-224, red dashed bracket in Figure 1K) upstream of the cpc-1 mAUG shows high conservation in the mORF reading frame. Nucleotide and codon alignments of this region are shown for: (iii) frame 1 (in-frame with the mORF); (iv) frame 2; and (v) frame 3. In these alignments consensus codons (and gaps) are highlighted in white, synonymous codons in green, non-synonymous codons in brown and stop codons in magenta. Species identifiers of the sequences used are indicated on the left. The numbers of synonymous and non-synonymous substitutions are summed below each panel. The additional numbers in parentheses below panel "i" indicate the number of synonymous and non-synonymous substitutions in-frame with the mORF in the small patch of sequence marked a dashed orange bracket above the aligned sequences. This patch represents the conserved peptide region indicated by the corresponding dashed orange bracket in Figure 1K. The alignments were generated by a custom script that conceptually translated the main ORF frame into peptide sequence, then performed ClustalX alignment of peptide sequence, then converted this alignment back to nucleotides. The most common codon in each column was then designated as the consensus codon; synonymous and non-synonymous substitutions were determined relative to it. (C) The region corresponding to the beginning of uORF3 of Coprinus cinerea *cpc-1* is conserved at the amino acid level in-frame with the mORF in Agaricomycetes homologs. Nucleotide and codon alignments of the region including the beginning of uORF3 of C. cinerea cpc-1 (indicated by red dashed lines in Supplementary Figure 5F) are shown for: (vi) frame 1 (in-frame with the main ORF); (vii) frame 2 (in-frame with uORF3); and (viii) frame 3. Species identifiers of the sequences used are indicated on the left. "Pinus taeda cont" indicates a sequence coming from an unknown Agaricomycetes species contaminating the Pinus taeda EST library. The numbers of synonymous and nonsynonymous substitutions are indicated on the right of each panel. The position of the AUG start codon of uORF3 is indicated by an inverted red triangle. Coloring scheme, alignment generation and display are the same as in other panels.