

CLUSTAL O(1.2.4) multiple sequence alignment - CRYPTOCHROME 1
 Conserved amino acids within conifers and within angiosperms are marked with the box.

P.abies	-----MSTNCSIVFRRDLRVEDNPALAAAGVRAGAVIVLYIWSPEEEGQYYPGRVSR	52
P.sylvestris	-----	0
A.thaliana	MSGSVSGCGSGGCSIVFRRDLRVEDNPALAAAVRAGPVIALFVWAPEEEGHYHPGRVSR	60
G.max	-----MSGGGGSIVFRRDLRIEDNPALTAGVRAGAVVAVFVWAPEEEGQYYPGRVSR	53
P.trichocarpa	-----MSGGGCSIVFRRDLRVEDNPALAAAGVRAGAVVAVFVWAPEEEGHYYPGRVSR	53
E.grandis	-----MSGCSIVFRRDLRVEDNPALAAAGVRSVLA VFIWAPEEEGAYYPGRVSR	51
P.abies	WWLKQSLAHL DSSLRNLGARLITKRSTNSISAILQVVQATGATQLFYNHLYDPLSLVRDH	112
P.sylvestris	-----	0
A.thaliana	WWLKNSLAQLDSSLRSLGTCLITKRSTDSVASLDDVVKSTGASQIFFNHLYDPLSLVRDH	120
G.max	WWLKNSLAHLHSSLRNLGTPLITKRSTDTLSSLLEVVKSTGATQLFFNHLYDPLSLVRDH	113
P.trichocarpa	WWLKQSLAHL DSSLRSLGTSLVTKRSTDSVSSLLEVVKSTGATQLLFNHLYDPLSLVRDH	113
E.grandis	WWLKHSLAHL DSSLRSLGTCLITRRSTDSVSSLLELVKSTGATQLFFNHLYDPLSLVRDH	111
P.abies	KLKQDLSSRGILVRSFNDDLLEPWEVNDDEEGHAFSTFQDYWNKCLNMPYDPLAPLLPPK	172
P.sylvestris	-----INDEEGHAFSTFQAYWNKCLNMPYDPSAPLLPPK	34
A.thaliana	RAKDVLTAQGI AVRSFNADLLLEPWEVTDELGRPFMFAAFWERCLSMYPDPESPLLPK	180
G.max	RAKEVLTAQGITVRSFNADLLLEPWEVNDAGHRPFTTFAAFWERCLSMYPDPESPLLPK	173
P.trichocarpa	RAKEILTAQGITVRSFNADLLLEPWDVNDAGQRPFTTFDTFWERCLSMFPDPEAPLLPPK	173
E.grandis	RAKEVLNAQGINVHSFNADLLLEPWEVNDQGHPTTFAGFWKCLSMYPDPESPLLPK	171
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P.abies	RIVAGEVSNCP SDDINLEDESEKASNALLARAWSPGWS SADKAL TAFINGPLIDMALNFQ	232
P.sylvestris	RIVAGEVSNCP SDDLKLEDESEKASNALLARAWSPGWS SADKAL TTFINGPLIDMALNFQ	94
A.thaliana	KIISGDVSKCVADPLVFEDESEKASNALLARAWSPGWSNGDKAL TTFINGPLIEMSKNFR	240
G.max	RIIPGDASRCPSDTLLFEDELEKASNALLARAWSPGWSNANKAL TTFINGPLIEMSKNFR	233
P.trichocarpa	RIISGDVSRCP SVTLVFEDESEKASNALLARAWSPGWSNADRAL TTFINGPLIEMSKNFR	233
E.grandis	RIISGDVSRCPSEALVFEDESEKASNALLARAWSPGWSNADKAL TTFVNGPLIEMSKNFR	231
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P.abies	KADSATTSLLSPHLHFGELSVKVFHLVRIROVLWANEGNTSGEQSVNLFKLSIGLREYS	292
P.sylvestris	KADSATTSLLSPHLHFGELSVRKVFHLVRIROVLWANEGNTSGEQSVNLFKLSIGLREYS	154
A.thaliana	KADSATTSLLSPHLHFGELSVRKVFHLVRIKOVANEGNEAGEE SVNLFKLSIGLREYS	300
G.max	KADSATTSLLSPHLHFGELSVKVFHLVRIKOVLANEGNKAGEE SVNLFKLSIGLREYS	293
P.trichocarpa	KADSATTSLLSPHLHFGELSVRKVFHLVRIKOVLANEGNRAGEE SVNLFKLSIGLREYS	293
E.grandis	KADSATTSLLSPHLHFGELSVRKVFHLVRIKOVLANEGNKAGEE SVNLFKLSIGLREYS	291
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P.abies	RYLSFNFPSSSHEKPLLSHLNYPWRVDSDFKSNRQGRGTGYPLVDAGMRELWATGWLHDR	352
P.sylvestris	RYLSFNFPSSSHERPLLSHLNYPWRVDRDYFKSNRQGRGTGYPLVDAGMRELWATGWLHDR	214
A.thaliana	RYISFNHPYSHERPLLGHLKFFPWAVDENYFKANRQGRGTGYPLVDAGMRELWATGWLHDR	360
G.max	RYISFNHPYSHERPLLGHLKFFPWVVEGYFKANRQGRGTGYPLVDAGMRELWATGWLHDR	353
P.trichocarpa	RYLSFNHPCTHERPLLGHLKFFPWVVEGYFKANRQGRGTGYPLVDAGMRELWATGWLHDR	353
E.grandis	RYMSFNHPYSHERPLLGHLKFFPWVVEGHFKANRQGRGTGYPLVDAGMRELWATGWLHDR	351
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P.abies	IRVVVSSFFVKVLQLPWRWGMKYFDWDTLLDADLECDALGWQYISGCLPDGREMDRIDNPQ	412
P.sylvestris	IRVVVSSFFVKVLQLPWRWGMKYFDWDTLLDADLECDALGWQYISGCLPDGREMDRIDNPQ	274
A.thaliana	IRVVVSSFFVKVLQLPWRWGMKYFDWDTLLDADLES DALGWQYITGTLPDSREFDRIDNPQ	420
G.max	IRVVVSSFFVKVLQLPWRWGMKYFDWDTLLDADLES DALGWQYISGSLPDGREIDRIDNPQ	413
P.trichocarpa	IRVVVSSFFVKVLQLPWRWGMKYFDWDTLLDADLES DALGWQYITGTLPDSREFDRIDNPQ	413
E.grandis	IRVVVSSFFVKVLQLPWRWGMKYFDWDTLLDADLES DALGWQYISGTIPDGREFDRIDNPQ	411
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P.abies	FEGYKFDFA GEYVRRWLP ELARLPTEWIHHPWDAPRAVLQAAGVELGSNYPLPIVEISTA	472
P.sylvestris	FEGYKFDFA GEYVRRWLP ELARLPQWIHHPWDAPQAVLQSAGVELGSNYPLPIVEISTA	334
A.thaliana	FEGYKFDENGEYVRRWLP ELSRLPTDWIHPWNAPESV/LQAAGIELGSNYPLPIVGLDEA	480
G.max	FEGYKFDENGEYVRRWLP ELARLPTEWIHHPWNAPESV/LQAAGIELGSNYPLPIVGLDAA	473
P.trichocarpa	FEGYKFDENGEYVRRWLP ELARLPTEWIHHPWNAPESV/LQAAGIELGSNYPLPIVGLDAA	473
E.grandis	FEGYKFDENGEYVRRWLP ELARLPTEWIHHPWNAPESV/LQAAGIELGSNYPLPIVGLDAA	471
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P.abies	KERLQEGLSMWWQREADARASLENGTEEGLGCSLENANA--SLPD--QMDVDREPVRRNT	528
P.sylvestris	KERLQDALSEMWWQREAAARASLENGTEEGLGCSLENANA--SLSE--NMDVDREPVRRNT	390
A.thaliana	KARLHEALSQMWQLEAASRAA IENGSEEGLD SAEVEEAPIEFPRDITMEETEPT----R	536
G.max	KTRLLEALSQMWQLEAASRAA IENGTEEGLGDSSE--SVPAAFPQDMQMEETHEPVRNRP	531
P.trichocarpa	KVRLEALSQMWQLEAASRAA IENGTEEGLGDSSE--SAPFAFPEDIHMEENHEPVRNRP	531
E.grandis	KVRLQDALSIMWQHEATSRAA IENGTEEGLGDSSE--SAPIAFPQDIQMEENHETMRNRP	529

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P.abies	HLAARSQDDQLVPSISNAVQRAYVGYTLSSQAAS-SSPSEQAEVPSNTDSGIASAASSQQF	587
P.sylvestris	GFAARSQDDQLVPSISNMVHRADVITYTLSSQAAS-SARSEQAEVPSNRDSGTASAASSQQF	449
A.thaliana	LNPNRRYEDQMVPISITSSLRPEEDEFSSSLNLRNSVGDSSRAEVPRNMVNTNQAQQ---R-	592
G.max	LPVARRYQDQMVPISITSSLLRVEEETSSDLRHSAESSRAEVPTANAQQNV-G---V-	586
P.trichocarpa	PATNRRYEDQMVPISITSSFLRIEDEETS-DVRNST-GDGRAEVPRDVNVNQEP RR---D-	585
E.grandis	PGPVERRYEDQMVPISITSLVRADEEETS-GIQNSI-GDTRA EVPANVNLNEEPRR---D-	583

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P.abies	LGQSTWSMTRGLIEDL--PNVTNDYPMQVLDQNESEHSTADSSSILRGRDDMS\$GGIVP	645
P.sylvestris	LGQSTWSMTRGLIEDL--PNVISHYPMQALDEQSEHSTADSSSILRVRDDTSSGGIVP	507
A.thaliana	-----RAEPAS---NQVTAMIPEFNIR-IVAESTE-DSTAESSSS---GRRERSGGIVP	638
G.max	-----TLNERMLQ-TTNRNAQTQYNTTMELRNVAE-DSAVESSSG---TRRERDGGVVP	635
P.trichocarpa	-----ALNQGQFVQTVRNNTALSPFNISRGLTN-VE-DSTAESSSS---GRRERDGGIVP	634
E.grandis	-----TLNEGQVFQQLRPNTQPMYNFSPGLHNDAE-DSTAESSST---GRRERDGGVVP	633

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P.abies	VWSQSLSQSC-----	655
P.sylvestris	VWSQSLSGHSQQFP EEGTVPGTAESSLQQQLHNHSMGTWRHGHNQGAVQMSKPVCFEFNF	567
A.thaliana	EWSP---GYSEQFPSEENGIGGGSTSSYLQNHHEILNWRRLSQTG-----	681
G.max	VWSPPASSYSEQFVGEENGITNSSSFLQRHPQSHQMLNWRQLPQTG-----	681
P.trichocarpa	VWSPPTSSYSEQFVGGDNGIGATSSYLQRHPQSHQIINWRRLSQTG-----	680
E.grandis	VWSPPTSSYSYDQIAGDENGIGNGSAFLQRHPQSHQIINWRRLSQTG-----	679

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P.abies	-----	655
P.sylvestris	KYAVL	572
A.thaliana	-----	681
G.max	-----	681
P.trichocarpa	-----	680
E.grandis	-----	679

Sequence details

P.abies	MA_10428291p0010 (http://congenie.org/)
P.sylvestris	AFV79203.1 (https://www.ncbi.nlm.nih.gov/)
A.thaliana	AT4G08920.1 (https://www.arabidopsis.org)
G.max	Glyma.04G101500.1 (https://phytozome.jgi.doe.gov/)
P.trichocarpa	Potri.005G164700.2 (https://phytozome.jgi.doe.gov/)
E.grandis	Eucgr.F00326.1 (https://phytozome.jgi.doe.gov/)

CLUSTAL O(1.2.4) multiple sequence alignment - PIF3

A.thaliana	MPLFELFRLTKAKLESAQDRNPSPVDEVVELVWENGQISTQSQSSRSRNIPPPQANSSR	60
P.taeda	-----	0
P.abies	-----	0
P.sylvestris	-----	0
A.thaliana	AREIGNGSKTTMVDEI PMSVPSLMTGLSQDDDFVPWLNHHPSLDGYCSDFLRDVS PVTV	120
P.taeda	-----MSHYRPSLTSFIPK----AS-----	16
P.abies	-----	0
P.sylvestris	-----	0
A.thaliana	NEQESDMAVNQ--TAFPLFQRRK----DGNESAPAASSSQYNGFQSHSLYGS DRARDLPS	174
P.taeda	-----LQVKTYIFSFYTLIHCYGFAGPRRGASTSRLIQTGFPPSR-----QKHK	62
P.abies	-----	0
P.sylvestris	-----	0
A.thaliana	QQTNPDRFT-----QTQEPLITSNKPSLVNFSHFLRPATFAKTNNN-LHDTKEKSPQS	227
P.taeda	DQKTP-HFALRIMAQKCEPGFLVNNNSALWDDDED-----ALNRNYNYNYTDLWGGLPLS	116
P.abies	-----MAHKCLEPSFLVHNPLVWDDDED-----ALNRNYNYNYTDLWGGLPLS	43
P.sylvestris	-----MAQKCSEPGFLVNNNSALWDDDED-----ALNRNYNYNYTDLWGGLPFS	43
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A.thaliana	PPNVFQTRVLGAKDSEDKVLNESVASATPKDNQKACLISEDSCRKQSEKAVVCS---S	284
P.taeda	SS-AP--ARTSAEDSRPKVVAASEAVE--SDYG--RVNK--N-NNTVSADTQLSCETAAT	166
P.abies	SS-VATTARTSAEDSRPEVAVSEALE--SDYG--RLNN--NNNNNVSADTQLSCETAAT	96
P.sylvestris	SS-APATARTSAENSRPKVVAASEAVE--SDYG--RVNN--K-NNNVSADTQLSCETAAT	95
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A.thaliana	VGSGNSLDGPSESPSL---SLKRKHSNIQDIDCHSEDEVVEESGDGRKEAGPSRTGLGSKR	341
P.taeda	SSSGGSMSSPSKSNKVIKSSKNKVLMTGTDIECQSQ-----	202
P.abies	SSSGGSMSSPSNGKVIKSSKKKVLMTGTDIECQSQAQEDSGENFKQCST--GTSSSKR	154
P.sylvestris	SSSGGSMSSPSKSNKVIKSSKNKVLMTGTDIECQSQAQEDSGENFKQCST--GTS-SKR	152
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A.thaliana	SRSAEVHNLSERRRRDRINEKMRALQELIPNCNKVDKASMLDEAIEYLKSLQLQVQIMSM	401
P.taeda	-----RRRNRINEKMKALQNLIPNSNKTDKASMLDEAIEYLKSLQLQVQIMSM	250
P.abies	SRAAEVHNLSEKRRRRNRINEKMKALQNLIPNSNKTDKASMLDEAIEYLKSLQLQVQIMSM	214
P.sylvestris	SRAAEVHNLSEKRRRRNRINEKMKALQNLIPNSNKTDKASMLDEAIEYLKSLQLQVQIMSM	212
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A.thaliana	ASGYLPPAVMFPP---GMGHYPAAAAAMA---MGMGMPYAMGLPDL SRGGSSVNH--	451
P.taeda	RSGIDLSSMRWLAQMPHLQIQQMPKACMAIDQHAGVPI SMPVGSGLINTNQGSEKRPLPL	310
P.abies	RSGIDISSMRWLAQMPHLQIQQMPKACMTTDQHAGVSI SMPVGSGLMNTNQGSEKRPLPL	274
P.sylvestris	RSGIDLSSMRWLAQMPHLQIQQMPKARMAIDQHAGVPI SMPVGSGLINTNQGSEKRPLPL	272
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A.thaliana	GPQFQVSGMQQPVMAGIPR--VSGGGIFAGSSTINGSTRDLSGSKDQTTNNNSNLKP	509
P.taeda	HDLYKSGALCNTAIPINLSSVRIDDHHSCKMDHPQGHFTLPQLPT----TTQEVHSAL-S	365
P.abies	HDLYISGALGNTAIPINLPSARIDDHQSKMDRPPQGHFTLPQLPT----TTQEVHSAL-S	329
P.sylvestris	HDLYNSGALGNTAIPINLSSVRIDDHHSCKMDHPQGHFTLPQLPT----TTQEVHSAL-S	327
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A.thaliana	IKRKQGSSDQFCGSS 524	
P.taeda	LQEK----- 369	
P.abies	LQEK----- 333	
P.sylvestris	LQEK----- 331	
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Sequence details

P.abies	MA_26114p0010 (http://congenie.org/)
P.sylvestris	PSY00020194 (https://bioinformatics.psb.ugent.be/plaza/)
A.thaliana	AT1G09530.2 (https://www.arabidopsis.org)
P.taeda	PITA_000009665 (http://congenie.org/)

CLUSTAL O(1.2.4) multiple sequence alignment - HY5

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P.abies      MQAIAPDFSG----SATGDKLITSSSGDPHEEAMNECVNESDDDIRRVPEMGVQTGFVM-      55
P.taeda      MQGTAPDLSG----SATGDKFFTSSSGDLHEEARNECVNESDDDIRRVPEMGVQTGVVV-      55
A.thaliana   MQEQATSSLAASSLPSSSERS---SSSAPHLE--IKEGIESDEEIRRVPFEGGEAVGKET      55
P.sylvestris MQDTAASTST--QHQSTSEKSSSSAAPAQFRQ--AKDAIESDDDIRRVPEMGGMQAGPST      56
            ** * .      ::::      :      :      :      :      *****:

P.abies      --HSDLAVKTESERASASGGSQRRRGRTPADKEHKRLKRLLRNRVSAQQARERKKAYLNE      113
P.taeda      --NSDLVVKTESERGLSGSGSQRRRGRTPADKEHKRLKRLLRNRVSAQQARERKKAYLNE      113
A.thaliana   SGREGSATGQERTQATVGVESQRKRGRTPAEKENKRLKRLLRNRVSAQQARERKKAYLSE      115
P.sylvestris CVPMLRD---NPQPSTGVVAHRKRGRAPADKEHKRLKRLLRNRVSAQQARERKKAYLND      112
            .      :      :*****:*****:*****:*****:*****:

P.abies      LETKANELQQKNSELEERVSTLQENFMRLRQVLKNMTAKNKGGFVEAEG---      163
P.taeda      LETKAKELQQRNSELEERVSTLQENYMLRQVLKNMTAKNKGGVGEVEG---      163
A.thaliana   LENRVKDLENKNSELEERLSTLQENQMLRHILKNTTGNKRGGGGGSNADASL      168
P.sylvestris LETRVKEIEHKNSELEERLSTLQENHMLRQILKNTTMMKKKSGNSGAET---      162
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Sequence details

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P.abies      MA_41006p0010 (http://congenie.org/)
P.sylvestris PSY00021926 (https://bioinformatics.psb.ugent.be/plaza/)
A.thaliana   AT5G11260.1 (https://www.arabidopsis.org)
P.taeda      PITA_000075685 (http://congenie.org/)
    
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