

Table S3. The CDPKs amino acid sequences used to construct the phylogenetic tree.

>VvCDPK1

MGNCNGLPSGDTQFQINAGRDGGVRPSSHAHSSNGLNVRPPSPSPPPPPRTAAPVVHRPLA
GNRVLGRPMEDVRQTYIFGRELGRGQFGVTYLVTHKETKEQFACKSIATRKLVNRRDIE
DVRREVQIMHHLTGHRNIVELKGAYEDRHSVNLVMELCAGGELFDRIIAKGHYSERAAA
ALCRQIVTVVHNCHTMGVMHRDLKPENFLFLSTAEDSPLKATDFGLSVFFKPGDVFKDLV
GSAYYVAPEVLRRSYGAEADIWSAGVILFILLSGVPPFWGENEQSIFDTILRGHIDFSSDPW
PSISNSAKDLVKKMLRADPKERLTAIDVLNHPWMKEDGASDKPIDIAVLTRVKQFRAMNK
LKKVALKVIAENLSEEEIIGLKEMFKSMDTDNSGTITYEELKNGLPKLGTKLSESEVRQLM
EAADV DNGTIDYIEFISATMHMNRMEREDHLYRAFEYFDKDKSGYITMEELEHALKRY
NMGDEKTIKEIIAEVDTDHDGRINYEEFAAMMRKGNPDLITNRRRK

>VvCDPK2

MGNTCRGSFRGKYFQGYGQPEEQSTS KRNSDRSNSDYSPSSLNSQQLVSQEFAKENPKKE
TRVSILSPTNKDGTMRRGVDNQSYVVLGHKTANIRDLYSLGRKLGQGQFGTTYLCTDMA
TGIEYACKSISKRLISREDVEDVRREIQIMHHLAGHKNI VTIKGAYEDPLYVHIVMELCAG
GELFDRIIQRGHYSERKAAELTKIIVGVVEACHSLGVMHRDLKPENFLLVNKDDDFSLKAI
DFGLSVFFKPGQVFTDVVGSPYYVAPEVLCKHYGPEADVWTAGVILYILLSGVPPFWAET
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AGLRRYGSTLKESEIRDLMDAADVDNSGTIDYGEFIAATVHLNKL EREEHLVAAFQYFDK
DGSYITVDELQQACAEHNMTDVFLEDIIKEVDQDNDGRIDYSEFVAMMQKGNAGIGRR
TMRNSLNM SMRDAPGAF

>VvCDPK3

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DRVAVKRIEKNKMILPIAVEDVKREVKILEALTGHENVVQFHNAFEDDSYVYIVMELCEGG
ELLDRI LAKKDSRYSEKDAAKVVRQMLKVAAECHLHGLVHRDMKPENFLFKSTKEDSPL
KATDFGLSDFIKPGKKFQDIVGSAYYVAPEVLRRKSGPESDVWSIGVITYILLCGKRP FWD
KTEDGIFKEVLKNKPDFRRKPWPTISNGAKDFVKKLLVKDPRARLTAAQALSHPWVREG
GDASEIPIDISVLSNMREFVKYSHLKQFALRALASTLDDEELADLRDQFDAIDVDKNGSISL
EEMRQALAKDLPWKMKESRVLEILQAIDSNTDGLVDFTEFVAATLHVHQLEEHDSKWR
QRSQA AFDKFDVDRDGFITPEELKLHTGLRGSIDPLLEEADIDKDGRI SLAEFRLLRTASIS
SRQVPSSSGFRNPRKI

>VvCDPK4

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EDKDNVHLMELCEGGELFDRI VARGHYTERAAADVTRSIVEILQICHQHGMHRDLKPE
NFLFADASEASPLKAIDFGLSIFFKPGQRFNEIVGSPYYMAPEVLRRHYGPEVDVWSAGVI
LYILLCGVPPFWAETEEGIAQAIVKS VVDFERDPWPHVSEDAKDLVRSMLDPNPYNRLTVE
EVL AHPWIKNATSIPNVSLGENVRTRIKQFSLMNKFKKRVLRV VADNLPNEQRDGIRQIFH
MMDTDKNGNLSFEELKDGLHKIGHPVADPDVKMLIEAADMDGTGTLNCDEFVTISVHLR

KISSDENLSEAFRAFDKND SGYIEFEELREALREDNLGPNNEQVIQDIIFDVLDDKDGRISY
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RSMRLQNQVFV

>VvCDPK5

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AVHIVMELCEGGELFDRIVSRGHYTERAAAGVMRTIVEVVQICHKHGVMHRDLKPENFLF
ANKKEAAPLKIIDFGLSVD FKHGERFSEIVGSPYYMAPEVLKHNYGPEIDIWSAGVILYILL
CGIPFVAETE QGVAQAIIRAVVDFKRDPWPKVSDKAKELVKKMLDPDPKKRLTAQEVLD
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MDINN RGQINLDELRSGLQKL GQPIPDSDLQILMEAADLDGDGTLNYAEFVAVSIHIKKITN
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AMMKAGTDWRKASRQYSRERFNTLSLKLTRDGKDGQ

>VvCDPK6

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EDVRREVQIMHHLTGQPNIVELKGAYEDKQSVHLMELCAGGELFDRIISKGHYTERGAA
SLLRTIVQIVHTCHSMGVVHRDLKPENFLLLNKDENAPLKATDFGLSVFFKQGEVFRDIVG
SAYYIAPEVLKRRYGPEVDIWSVGVMLYILLCGVPPFWAESEHGIFNAILRGHIDFTSDPWP
TISSGAKDLVRKMLTSDPKQRITAFQVLNHPWIKEDGEAPDTPLDNAVERFKQFRAMNK
FKKVALRVIA GCLSEEEIMGLKQMFKGMDTDNSGTITLEELKQGLSKQGTKLSEYEVKQL
MEAADADGNGTIDYDEFITATMHLNRMKD EDHLYTAFQYFDKDNSGYITTEELEQALHEF
GMHDGRDIKEILNEVDGDNDGRINYDEFVTMMRKG NPEPNPKKRRDVFV

>VvCDPK7

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QIMHHLSEHPNVVRIRGTYEDPVFVHLMELCEGGELFDRIVQRGHYSEREA AKLIKTIVG
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ELLRKMLDRNPKRLTAHEVL SHPWVVD DRMAPDKPLDSAVLSRLKQFSAMNKLKKMA
LRVIAEGLSEEEIGGLRELFKMIDTDNSGTITFDELKDGLKRVGSELMESEIRDLMNAADID
NSGTIDYGEFLAATVHLNKL EREENLVSAFSFFDKDKSGYITIDELQQACKEFGLSEAHLD
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>VvCDPK8

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YSLGRKLGQGQFGTTYLCVEKANGKEFACKSIAKRKLTTREDVEDVRREIQIMHHLAGHP
NVISIVGAFEDAVAVHVMELCVGGELFDRIIQRGHYTERKAADLARVIVGVVEACHSLG
VMHRDLKPENFLFINQDEDSPLKTIDFGLSMFFRPGEIFTEVVGSPYYVAPEVLRKHYGPE
CDVWSAGVIIYILLSGVPPFWDETEQGIFEQVLKGDLD FVSEPWPSISDSAKDLVRKMLVR
DPKKRLTAHEVLCHPWVQVNGVAPDKPLDSAVLTRLKQFSAMNKLKKIAIRVIAESLSEEE
IAGLKEMFKMIDVDNSGNITLEELKTGLERVGADLDSEIIRLMQAADIDNSGTIDYGEFV
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DGRIDYSEFVAMMQDRDFGKKGYKIT

>VvCDPK9

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KLGHGQFGTTFLCVEKETGKEYACKSIAKRKLLTRDDIEDVRREIQIMHHLAGHSNIISIKG
AYEDAVAVHVLVMELECTGGELFDRIAKRGHYTERKAAQLARTIIGVVEACHSLGVMHRDL
KPENFLFVNEQESLLKTIDFGLSVFFKPGEIFTDVVGSPYYVAPEVLRKCYGPEADVWSV
GVIIYILLSGVPPFWAESEQEIFQEV LHGDLNFSSDPWPHISESAKDLIRRLVRDPKKRLTA
HEVLCHPWIQVDGVAPDKTLD SAVISRLKQFSAMNKLKKMALRVIAENLSEEEIAGLKEM
FKIIDTDNSGQITFEELKAGLKRFGANLNEAEIYDLMQAADVNDNSGTIDYGEFIAATFHLN
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EFVAMMQQGNNDGFGKKGLQNGISFGFRQPLPVY

>VvCDPK10

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LGRGEFGVTYL CIDRDTRELLACKSISKRLRTAVDVEDVRREVAIMKHLPKNSSIVSLKE
ACEDENAVHVLVMELECTGGELFDRIVARGHYTERAAAAVTRTIVEVVQLCHKHGVHRDLK
PENFLFANKKENSPLKAIDFGLSIFFKPGERFSEIVGSPYYMAPEVLKRNYGPEIDIWSAGVI
LYILLCGVPPFWAESEQGV AQAILRGLIDFKRDPWPNISESAKSLVRQMLEPDPKLRLTAKQ
VLEHSWLQNAKKAPNVPLGDVVKARLKQFSMMNRFKRKALRVIADHLSTEEVEDIKESF
KKMDTDNDGIVSIEELKSGLRKFGSQLAEAEVQMLIETVDTNGKGTLDYGEFVAVSLHLQ
RMANDEHLRKAFSYFDRDNGYIERDEL RDALMEDGADDCTDVANDIFQEVDTDKDGKI
SYDEFAAMMKTGTDWRKASRHYSRGRFNSLSIKLMKDGSNLNGNE

>VvCDPK11

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YEDDNAVHVLVMELECTGGELFDRIVARGHYTERAAAAVTKTIVEVVQMCHKHGVHRDL
KPENFLFANKKETAPLKAIDFGLSVFFKPGERFTEIVGSPYYMAPEVLKRNYGPEVDVWS
AGVILYILLCGVPPFWAETE QGVAQAIIRSVLDFKRDPWPVKVSENAKDLVKKMLDPDPKR
RLSAQEVLDHPWLQNAKKAPNVSLGETVRARLKQFSMMNKLKKRALRVIAEHLVVEEV
AGIKEGFQLMDTGNGKGINMDELRVGLQKLGHQIPEQDLQILMEAGDVDGDGHLDYGEF
VAISVHLRKMGNDDHLLKAFEFFDQNNSGYIEIEELRDALAGELESNSEEVINAIHVDVTD
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>VvCDPK12

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GELFDRIISQGHYSERAAAAICRAIVNVVHICFMGMVHRDLKPENFLLSSKDEAAMLKA
TDFGLSVFIEEGKVYRDIVGSAYYVAPEVLRNRYGKEIDIWSAGVILYILLSGVPPFWAETE
KGIFDAILQGEIDFESQPWPAISNGAKDLVRKMLTQDRNKRITSAQVLEHPWIREDGEASD
KPIDSAVLSRMKQFRAMNKLKKLALKVIAENLSEEEIKGLKAMFTNMDDTKSGTITYEEL
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LF

>VvCDPK13

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FLCVQKATRKEYACKSIAKRKLLTDEDVEDVRREIQIMHHLAGHPNVISIEGAYEDAVAVH
VVMELCKGGELFDRIIQHGHYTERKAAELTRTIVGVVEACHSLGVMHRDLKPENFLLVNE
EEDSLLKTIDFGLSVFFKPGEKFTDVVGSPYYVAPEVLRKRYGPEADVWSAGVILYILLSG
VPPFWAETEQQIFEQVLHGDLDFSSDPWPSISESAKDLVRRMLVRDPRRRLTAHEVLCHPW
VQVDGVAPDKPLDSAVLSRLKQFSAMNKLKKMALIVIAENLSEEEIAGLKEMFKMIDTDN
SGQITFEELKAGLRKRVGANLKESEIYDLMHAADVNDNGTIDYGEFIAATLHLNKVEREDH
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KGNPGIGKKGLQTSFSMGFREALKH

>VvCDPK14

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SSLPDHPNIVKLKATYEDSEAVHLMELCEGGELFDRIVARGHYSERAAAGVARTIAEVVR
MCHENGVIHRDLKPENFLFANKRESSPLKAIDFGLSVFFRPGERFSEIVGSPYYMAPEVLK
RNYGPEVDIWSAGVILYILLCGVPPFWAETEQGVAILRGVIDFKREPWPQISDNAKSLVR
QMLEQDPRKRLTAQQVLEHSWLQNAKKAPNVPLGDIVRTRLKQFSCMNRFKKKAMRVI
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NGVLDYGEFVAVTIHLQRMENDEHFQRAFMFFDKDGNFIDLIELQEALADESGETDADV
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EDRITGQSIIV

>VvCDPK15

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PLCEITSIYDIGKELGRGQFGITYLCTEKSTGLKYACKSISKRKLKSGKDIEDVKREILILEHL
TGQPNIVEFKGAYEDKQNLHLMELCSGGELFDRI TAKGSYSEREAADICRQIVTVVHVC
HFMGVMHRDLKPENFLMVSREENSPLKATDFGLSVFIEDNEVYKDVVGSAYYVAPEVLR
RSYGKEIDVWSAGVILYILLSGVPPFWGENEKSIFDAVLQGYVDFDSAPWPSISSSAKDLIK
KMLMKDPKRRITASDALNHPWLREDGEASDKPIDS AVLVRMKQFRAMNKLKKLALKVIA
ENLSEEDIKGLKQMFNNMDTDRSGTITFEELKTGLSRLGSKLSELEIKQLMDAVDVDQNG
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>VvCDPK16

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GLKLLKRQLRKGRKKVEKMRKEASKPRAVL PNATPRLREEYQIGRKLGGQYGITYLCT
HKSSGTHFACKSIPKRKLVCKEDYDDVLREIQIMHHLSEHPHVQIKATYEDSVFVHLVME
LCAGGELFDRIIQRGHYSERQAAHLIKIIVGVVEACHSLGVMHRDLKPENFLFESTDEDAK
LKATDFGLSVFYKPGEVFFE VVGSPYYVAPEVLRKHYGHEVDVWSAGVILYILLSGVPPF
WAENDTGIFKEILKGKLDKSDPWPSISESAKDLIKKMLEMDPKKRISAHEVLCHPWIVDD
RVAPDKPLDSAVLSRLKQFSAMNKLKKMALRVIAERLSEEEIGGLKELFKMIDTDNSGTIT
FEELKEGLRKVGSELMESEIKTLMDAADIDNSGTIDYGEFLAATLHLNKMEREENLIAAFS
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GSRTMRNNLNFNLADAFGINDTT

>VvCDPK17

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HYSERAAASICRAIVNVVHICHFMGVMHRDLKPENFLSSKGENALLKATDFGLSVFIEEG
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QFRAMNKLKKLALKVIAENLSEEEIQGLKAMFTNMDTDKSGTITYEELKSGLARLGSKLT
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AAMKEHGMGDDDTIAEIISEVDTDNDKINYGECFSMMRGGTQQGLKV

>VvCDPK18

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QGVVHRDLKPENFLFISKEENSPLKAIDFGLSDYVKPDERLNDIVGSAYYVAPEVLHRSYG
TEADMWSVGVIAYILLCGSRPFWARTESGIFKAVLKADPSFDEAPWPSLSSDAIDFVKRLL
NKDYRKRLTAAQALSHPWLANHYHDVKIPLDMIVYKLVKAYIFSSSLRKSALAALAKTSLI
AQLAYFREQFTLLGPNKSGFVSLQNFKTAVTKNSTDAIKDSRVLEYVSMVGSCLKYRKLDF
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>VvCDPK19

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IAQSNRQKQQMIIAGDFSFYEKTWKNISSAKQLISSLLTVPERRPTAHQLLQHPWVMGD
SAKQDQMDAEIVSRLQSFNARRKFRAAAIASVWSSTVFLRTKKLKTLVGSHDLTQELEN
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>AtCPK1

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KHKMRVSSAGLRTESVLQRKTENFEKFYSLGRKLGGQFGTTFLCVEKTTGKEFACKSIA
KRKLLTDEDVEDVRREIQIMHHLAGHPNVISIKGAYEDVVAVHLMVMECCAGGELFDRIIQR
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VGANLKESEILDLMQAADVNDSTIDYKEFIAATLHLNKKIEREDHLFAAFTYFDKDGSGYI
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SFSIALKL

>AtCPK2

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GPESDVWSAGVIVYILLSGVPPFWAETEQQGIFEQVLHGDLDFFSSDPWPSISESAKD LVRKM
LVRDPKRRLTAHQVLCHPWVQIDGVAPDKPLDSAVLSRMKQFSAMNKFKKMALRVIAES
LSEEEIAGLKQMFKMIDADNSGQITFEELKAGLKRVGANLKESEILDLMQAADV DNSGTI
DYKEFIAATLHLN KIEREDHLFAAFSYFDKDESGFITPDELQQACEEFGVEDARIEEMMRD
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>AtCPK3

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>AtCPK4

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SEREAAKLIKILGVVEACHSLGVMHRDLKPENFLFDSPSDDAKLKATDFGLSVFYKPGQ
YLYDVVGSPYYVAPEVLKKCYGPEIDVWSAGVILYILLSGVPPFWAETESGIFRQILQGKID
FKSDPWPTISEGAKDLIYKMLDRSPKKRISAHEALCHPWIVDEHAAPDKPLDPAVLSRLKQ
FSQMNKIKKMALRVIAERLSEEEIGGLKELFKMIDTDNSGTITFEELKAGLKRVGSELMES
EIKSLMDAADIDNSGTIDYGEFLAATLHINKMEREENLVVAFSYFDKDGSGYITIDELQQA
CTEFGLCDTPLDDMIKEIDLNDGKIDFSEFTAMMKKGDGVGRSRTMRNNLNFNIAEAFG
VEDTSSTAKSDDSPK

>AtCPK5

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DYACKSISKRKLISKEDVEDVRREIQIMHHLAGHGSIVTIKGAYEDSLYVHIVMELCAGGE
LFDRIIQRGHYSERKAAELTKIIVGVVEACHSLGVMHRDLKPENFLLVNKDDDFSLKAIDF
GLSVFFKPGQIFTDVVVGSPYYVAPEVLLKRYGPEADVWTAGVILYILLSGVPPFWAETQQG
IFDAVLKGYIDFESDPWPVISDSAKDLIRRM LSSKPAERLTAHEVLRHPWICENG VAPDRAL
DPAVLSRLKQFSAMNKLKKMALKVIAESLSEEEIAGLREMFQAMDTDNSGAITFDELKAG
LRKYGSTLKDTEIHDLMDAADV DNSGTIDYSEFIAATIHLNKL EEEHLVAAFQYFDKDGSG
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NSLNISM RDA

>AtCPK6

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ISKEDVEDVRREIQIMHHLAGHKNIVTIKGAYEDPLYVHIVMELCAGGELFDRIIHRGHYSE

RKAAELTKIIVGVVEACHSLGVMHRDLKPENFLLVNKDDDFSLKAIDFGLSVFFKPGQIFK
DVVGSPYYVAPEVLLKHYGPEADVWTAGVILYILLSGVPPFWAETQQGIFDAVLKGYIDFD
TDPWPVISDSAKDLIRKMLCSPSERLTAHEVLRHPWICENG VAPDRALDPAVLSRLKQFS
AMNKLKMKALKVIAESLSEEEIAGLRAMFEAMDTDNSGAITFDELKAGLRRYGSTLKDT
EIRDLMEAADV DNSGTIDYSEFIAATIHLNKL EREEHLVSAFQYFDKDGSGYITIDELQQSC
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>AtCPK7

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VMHRDLKPENFLFANKKETSALK AIDFGLSVFFKPGEQFNEIVGSPYYMAPEVLRNRYGP
EIDVWSAGVILYILLCGVPPFWAETE QGVAQAIIRSVIDFKRDPWPRVSDSAKDLVRKM LEP
DPKKRLTAAQVLEHTWILNAKKAPNVSLGETVKARLKQFSVMNKLKKRALRVIAEHL SV
EEAAGIKEAFEMMDV NKRGINLEELKYGLQKAGQQIADTDLQILMEATDVDGDGTLNY
SEFVAVSVHLKKMANDEHLHKAFFDQNNQSGYIEIDELREALNDEL DNTSSEE VIAAIMQ
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>AtCPK8

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DAFEDDDAVHIVMELCEGGELFDRIVARGHYTERAAAAMKTILEVVQICHKHGVMHRD
LKPENFLFANKKETSALK AIDFGLSVFFKPGEGFNEIVGSPYYMAPEVLRNRYGPEVDIWS
AGVILYILLCGVPPFWAETE QGVAQAIIRSVIDFKRDPWPRVSETAKDLVRKM LEPDPKKRL
SAAQVLEHSWIQNAKKAPNVSLGETVKARLKQFSVMNKLKKRALRVIAEHL SVEEVAGI
KEAFEMMDSKKTGKINLEELKFGLHKL GQQIPDTDLQILMEAADV DGDGTLNYGEFVA
VSVHLKKMANDEHLHKAFFDQNNQSDYIEIEELREALNDEVD TNSEEVVAAIMQDVDT
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>AtCPK9

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KSISKKKLVTKADKDDMRREIQIMQHLSGQPNIVEFKGAYEDEKAVNLVMELCAGGELFD
RIIAKGHYTERAAA SVCRQIVNVVKICHFMGVLHRDLKPENFLLSSKDEKALIKATDFGLS
VFIEEGKVYRDIVGSAYYVAPEVLR RRYGKEVDIWSAGIILYILLSGVPPFWAETEKGIFDAI
LEGHIDFESQPWPSISSAKDLVRRMLTADPKRRISAADVLQHPWLREGGEASDKPIDSAV
LSRMKQFRAMNKLKKLALKVIAENIDTEEIQGLKAMFANIDTDNSGTITYEELKEGLAKL
GSKLTEAEVKQLMDAADVDGNGSIDYIEFITATMHRHRLESNENLYKAFQHFDKDSSGYI
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>AtCPK10

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VVKLKASYEDNENVHLMELCEGGELFDRIVARGHYTERAAA AVARTIAEVMMCHSNG
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GVDVWSAGVIILYILLCGVPPFWAETE QGVALAILRGVLD FKRPWPQISESAKSLVKQML
DPDPTKRLTAQQVLAHPWIQNAKKAPNVPLGDIVRSRLKQFSMMNRFKKKVLRVIAEHL S
IQEVEVIKNMFSLMDDDKDGKITYPELKAGLQKVGSQ LGEPEIKMLMEVADVDGNGFLD

YGEFVAVIIHLQKIENDELFKLAFMFFDKDGSTYIELDELREALADELGEPDASVLSDIMRE
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TVPV

>AtCPK11

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GQYLYDVVGSPYYVAPEVLKKCYGPEIDVWSAGVILYILLSGVPPFWAETESGIFRQILQG
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LKQFSQMNKIKKMALRVIAERLSEEEIGGLKELFKMIDTDNSGTITFEELKAGLKRVGSEL
MESEIKSLMDAADIDNSGTIDYGEFLAATLHMNMEREENLVAAFSYFDKDGSGYITIDEL
QSACTEFGLCDTPLDDMIKEIDLNDNGKIDFSEFTAMMRKGDGVGRSRTMMKNLNFNIA
DAFGVDGEKSDD

>AtCPK12

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EREAALKTIKIVGVVEACHSLGVVHRDLKPENFLFSSSDEEDASLKSTDFGLSVFCTPGEAF
SELVGSAYYVAPEVLHKHYGPECDVWSAGVILYILLCGFPPFWAESEIGFRKILQGKLEFEI
NPWPSISESAKDLIKMLESNPKKRLTAHQVLCHPWIVDDKVAPDKPLDCAVVSRLKKFS
AMNKLKKMALRVIAERLSEEEIGGLKELFKMIDTDKSGTITFEELKDSMRRVGSSELMESI
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ESMNV

>AtCPK13

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CEDDNAVHLMELCEGGELFDRIVARGHYTERAAAGVTKTIVEVVQLCHKHGVHHRDLK
PENFLFANKKENSPLKAIDFGLSIFFKPGEKFSEIVGSPYYMAPEVLKRNYGPEIDIWSAGVI
LYILLCGVPPFWAESEQGVQAAILRGVIDFKREPWPNISETAKNLVRQMLEDPKRRLTAK
QVLEHPWIQNAKKAPNVPLGDVVKSRLLKQFSVMNRFKRKALRVIAEFLSTEEVEDIKVMF
NKMDTDNDGIVSIEELKAGLRDFSTQLAESEVQMLIEAVDTKGKGTLDYGEFVAVSLHLQ
KVANDEHLRKAFSYFDKDGNGYILPQELCDALKEDGGDDCVDVANDIFQEVDTDKDGRI
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>AtCPK14

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DDKAVHLMELCEGGELFDRIVARGHYTERAAASVIKTIIEVVQMCHKHGMHRDLKPE
NFLFANKKETASLKAIDFGLSVFFKPGERFNEIVGSPYYMAPEVLRRSYGQEIDIWSAGVIL
YILLCGVPPFWAETEHGVAKAILKSVIDFKRDPWPKVSDNAKDLIKMLHPDPRRRLTAQ
QVLDHPWIQNGKNASNVSLGETVRARLKQFSVMNKLKRALRVIAEHLVSEETSCIKERF
QVMDTSNRGKITITELGIGLQKLGIIVPQDDIQLMDAGVDKDGYLVDNEFVAISVHIRK
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>AtCPK15

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GNTYACKSILKRKLTRKQDIDDDVKREIQIMQYLSGQENIVEIKGAYEDRQSIHLVMELCGG
SELFDRIIAQGHYSEKAAAGVIRSVLNVVQICHFMGVIHRDLKPENFLLASTDENAMLKAT
DFGLSVFIEEGKVYRDIVGSAYYVAPEVLRRSYGKEIDIWSAGIILYILLCGVPPFWSETEKG
IFNEIIKGEIDFDSQPWPSISESAKDLVRKLLTKDPKQRISAAQALEHPWIRGGEAPDKPIDS
AVLSRMKQFRAMNKLKLLALKVIAESLSEEEIKGLKTMFANMDTDKSGTITYEELKNGLA
KLGSKLTEAEVKQLMEAADVDGNGTIDYIEFISATMHRYRFDRDEHVFKAQFYFDKDNSG
FITMDELESAMKEYGMGDEASIKEVIAEVDTDNDGRINYEEFCAMMRSGITLPQQGKILP
VQ

>AtCPK16

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TYVATDKKTGDRVAVKKIDKAKMTIPIAVEDVKREVKILQALTGHENVVRFYNAFEDKNS
VYIVMELCEGGELLDRI LARKDSRYSERDAAVVVRQMLKVAAEHLRGLVHRDMKPENF
LFKSTEEDSPLKATDFGLSDFIKPGKKFHDIVGSAYYVAPEVLKRRSGPESDVWSIGVISYIL
LCGRRPFWDKTEDGIFKEVLKNKPDFRRKPWPTISNSAKDFVKLLVKDPRARLTAAQAL
SHPWVREGGDASEIPIDISVLNNMRQFVKFSRLKQFALRALATTLEEEELADLRDQFDAID
VDKNGVISLEEMRQALAKDHPWKLKDARVAEILQAIDSNTDGFVDFGEFVAAALHVNQL
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>AtCPK17

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REVQIMHHLTGQPNIVELKGAYEDKHSVHLVMELCAGGELFDRIIAKGHYSERAAASLLR
TIVQIVHTCHSMGVIHRDLKPENFLLLNKDENSPLKATDFGLSVFYKPGEVFKDIVGSAYYI
APEVLKRKYGPEADIWSIGVMLYILLCGVPPFWAESENGIFNAILRGHVDFSSDPWPSISPQ
AKDLVKKMLNSDPKQRLTAAQVLNHPWIKEDGEAPDVPLDNAVMSRLKQFKAMNNFKK
VALRVIAGCLSEEEIMGLKEMFKGMDTDSSGTITLEELRQGLAKQGTRLSEYEVQQLMEA
ADADGNGTIDYGEFIAATMHINRLDREEHLYSAFQHFDKDNSGYITMEELEQALREFGMN
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>AtCPK18

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KILQALGGHENVVGFHNAFEDKTYIYIVMELCDGGELLDRI LAKKDSRYTEKDAAVVVR
QMLKVAAEHLRGLVHRDMKPENFLFKSTEEGSSLKATDFGLSDFIKPGVKFQDIVGSAY
YVAPEVLKRRSGPESDVWSIGVITYILLCGRRPFWDKTQDGIFNEVMRKKPDFREVPWPTI
SNGAKDFVKLLVKEPRARLTAAQALSHSWVKEGGEASEVPIDISVLNNMRQFVKFSRLK
QIALRALAKTINEDELDDL RDQFDAIDIDKNGSISLEEMRQALAKDVPWKLKDARVAEILQ
ANDSNTDGLVDFTEFVVAALHVNQLEEHDSEKWQQRSRAAFDKFDIDGDGFITPEELRLQ
TGLKGSIEPLLEEADVDEDGRISINEFRLLRSASLKSKNVKSPPGTEHIICHNLLDGICIEDT
EERTSAVRFEYVSQVL

>AtCPK19

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ACKSILKRKLIRTKDREDVRREIQIMHYLSGQPNIVEIKGAYEDRQSVHLMELCEGGELF
DKITKRGHYSEKAAAEIIRSVVKVVQICHFMGVIHRDLKPENFLLSSKDEASSMLKATDFG
VSVFIEEGKVYEDIVGSAYYVAPEVLKRNYGKAIDIWSAGVILYILLCGNPPFWAETDKGIF
EEILRGEIDFESEPWPSISESAKDLVRNMLKYDPKKRFTAAQVLEHPWIREGGEASDKPIDS
AVLSRMKQLRAMNKLKLAFAKFIQNKEEELKGLKTMFANMDTDKSGTITYDELKSGL
EKLGSRLTETEVKQLLEDADVDGNGTIDYIEFISATMNRFRVEREDNLFKAFQHFDKDNSG
FISRQELETAMKEYNMGDDIMIKEIISEVDADNDGSINYQEFNMMKSCSQSHQSKLVQP
N

>AtCPK20

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SVLGRKTENLKDIIYSVGRKLGGQGFQTFLCVDKKTGKEFACKTIAKRKLTPPEDVEDVR
REIQIMHHLSGHPNVIQIVGAYEDAVAVHVMEICAGGELFDRIIQRGHYTEKKAELARII
VGVIEACHSLGVMHRDLKPENFLFVSGDEEAALKTIDFGLSVFFKPGETFTDVGSPYYV
APEVLRKHYSHECDVWSAGVIIYILLSGVPPFWDETEQGIFEQVLKGDLDIFSEPWPSVSES
AKDLVRRMLIRDPPKKRMTTHEVLCHPWARVDGVALDKPLDSAVLSRLQQFSAMNKLKKI
AIKVIAESLSEEEIAGLKEMFKMIDTDNSGHITLLEELKKGLDRVGADLKDSEILGLMQAAD
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LDDILREVDKDNDGRIDYSEFVDMMQDTGFGKMGLKVS

>AtCPK21

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VKREIQIMQYLSGQPNIVEIKGAYEDRQSIHLMELCAGGELFDRIIAQGHYSERAAAGIIR
SIVNVVQICHFMGVVHRDLKPENFLLSSKEENAMLKATDFGLSVFIEEGKVYRDIVGSAY
YVAPEVLRRSYGKEIDIWSAGVILYILLSGVPPFWAENEGIFDEVIKGEIDFVSEPWPSISES
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LKVIAESLSEEEIKGLKTMFANIDTDKSGTITYEELKTGLTRLGSRLSETEVKQLMEAADV
DGNGTIDYIEFISATMHRYKLDRDEHVYKAFQHFDKDNSGHITRDELESAMKEYGMGDE
ASIKEVISEVDTNDNDRINFEEFCAMMRSGSTQPQGKLLPFH

>AtCPK22

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EKDAAGIFRSIVNAVKICHSLDVVHRDLKPENFLFSSKDENAMLKAIDFGCSVYIKEGKTF
ERVVGSKYIIAPEVLEGSYGKEIDIWSAGVILYILLSGVPPFQTGIESIIVSTLCIVDAEIKEC
RLDFESQPWPLISFKAKHLIGKMLTKKPKERISAADVLEHPWMKSEAPDKPIDNVVLSRM
KQFRAMNKLKLAALKVIAEGLSEEEIKGLKTMFENMDMDKSGSITYEELKMGLNRHGSK
LSETEVKQLMEAVSADVDGNGTIDYIEFISATMHRHRLERDEHLYKAFQYFDKDGSGHIT
KEEVEIAMKEHGMGDEANAKDLISEFDKNNDGKIDYEEFCTMMRNILQPQGKLLKRLY
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>AtCPK23

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QPNVVEIKGSYEDRHSVHLVMELCAGGELFDRIIAQGHYSERAAAGTIKSIVDVVQICHLN
GVIHRDLKPENFLFSSKEENAMLKVTDFGLSAFIEEGKIYKDVVGSPYYVAPEVLRQSYGK
EIDIWSAGVILYILLCGVPPFWADNEEGVFVEILCKIDFVREPWPSISDSAKDLVEKMLTE
DPKRRITAAQVLEHPWIKGGEAPEKPIDSTVLSRMKQFRAMNKLKKLALKVSAVSLSEEEI
KGLKTLFANMDTNRSGTITYEQLQTGLSRLRSRLSETEVQQLVEASDVDGNGTIDYYEFIS
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DNDGKINFEEFRAMMRCGTTQPKGKQYPFH

>AtCPK24

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NIVSFKEAFEDKDAVYLVMEICEGGELFDRIVSRGHYTERAAASVAKTILEVVKVCHEHG
VIHRDLKPENFLFSNGTETAQLKAIDFGLSIFFKPAQRFNEIVGSPYYMAPEVLRNRYGPEI
DVWSAGVILYILLCGVPPFWAETEEGIAHAIVRGNIDFERDPWPKVSHEAKELVKNMLDA
NPYSRLTVQEVLEHPWIRNAERAPNVNLDGNVRTKIQQFLLMNRFKKKVLRIVADNLPNE
EIAAIVQMFQTMDDTKNGHLTFEELRDGLKKIGQVVPDGDVKMLMDAADTDGNGMLSC
DEFVTLSTHLKRMGCDEHLQEAIFYFDKNGNGFIELDKVALCDDKLGHANGNDQWIK
DIFFDVDLNKDGRISEDEFKAMMKSGETDWKMASRQYSRALLNALSIMFKEDFGDNGPK
SHSMEFPIARKRAKLLDAPKNKSMELQISKTYKPSGLRN

>AtCPK25

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EDVRREIEIMKHLLGQPNVISIKGAYEDSVAVHVMELCRGGELFDRIVERGHYSERKAA
HLAKVILGVVQTCHSLGVMHRDLKPENFLFVNDDDEDSPLKAIDFGLSMFLKPGENFTDVV
GSPYYIAPEVLNKNYGPEADIWSAGVMIYVLLSGSAPFWGETEEEIFNEVLEGELDLTSDP
WPQVSESAKDLIRKMLERNPIQRLTAQQVLCHPWIRDEGNAPDTPLDTTVLSRLKKFSATD
KLKKMALRVIAERLSEEEIHELRETFKTIDSGKSGRVTYKELKNGLERFNTNLDNSDINSL
MQIPTDVHLEDTVDYNEFIEAIVRLRQIQEEEANDRLESSTKV

>AtCPK26

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RPSERLTAHQVLRHPWICENGVA PDRA LDPAVLSRLKQFSAMNKLKQMALRVIAESLSEEE
IAGLKEMFKAMDTDNSGAITFDELKAGLRRYGSTLKDTEIRDLMEAADIDKSGTIDYGEFI
AATIHNLKLEREEHLLSAFRYFDKDGSGYITIDELQHACAEQGMSDVFLEDVIKEVDQDN
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>AtCPK27

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DVGKSYSEKEAAGIIRSIVNVVKNCHYMGVMHRDLKPENFLLTSNDDNATVKVIDFGCSV
FIEEGKVYQDLAGSDYYIAPEVLQGNYGKEADIWSAGIILYILLCGKSPFVKEPEGQMFNEI
KSLEIDYSEEPWPLRDSRAIHLVKRMLDRNPKERISAAEVLGHPWMKEGEASDKPIDGVV
LSRLKRFRDANKFKKVVLKFIAANLSEEEIKGLKTLFTNIDTDKSGNITLEELKTGLTRLGS
NLSKTEVEQLMEAADMDGNGTIDIDEFISATMHRYKLDRDEHVYKAFQHFDKDNNGHIT
KEELEMAMKEDGAGDEGSIKQIADADTDNDGKINFEEFRTMMRTESSLQPEGELLPIIN

>AtCPK28

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VVQFHNAFEDDDYVYIVMELCEGGELLDRLSKKGNRYSEKDAAVVVRQMLKVAGECH
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GPESDVWSIGVITYILLCGRRPFWDRTEDGIFKEVLRNKPDFSRRKPWATISDSAKDFVKKLL
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EAEISDLRDQFDAIDVDKNGVISLEEMRQALAKDLPWKLKDSRVAEILEAIDSNTDGLVDF
TEFVAAALHVHQLEEHDSEKWQLRSRAAFEKFDLDDKGYITPEELRMHTGLRGSIDPLLD
EADIDRDGKISLHEFRLLRTASISSQRAPSPAGHRNLR

>AtCPK29

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EAEHPWMTDTKISDKPINS AVLVRMKQFRAMNKLKKLALKVIAENLSEEEIKGLKQTFK
NMDTDES GTITFDELNRGLHRLGSKLTESEIKQLMEAADVDKSGTIDYIEFVTATMHRHRL
EKEENLIEAFKYFDKDRSGFITRDELKHSMT EYGMGDDATIDEVINDVDTDNDGRINYE EF
VAMMRKGT TDSDPKLIR

>AtCPK30

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KLKATYEDNENVHVLVMECEGGELFDRIVARGHYTERAAATVARTIAEVVRMCHVNGVM
HRDLKPENFLFANKKENSALK AIDFGLSVLFKPGERFTEIVGSPYYMAPEVLKRNYGPEV
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VEVIRNMFTLMDDDNDGKISYLELRAGLRKVGSQLGEPEIKLLMEVADVNGNGCLDYGE
FVAVIIHLQKMENDEHFRQA FMFFDKDGSYIESEELREALTDELGEPDNSVIIDIMREVD T
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V

>AtCPK31

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KDGKSYSEKEAVEIIRPIVNVVKNCHYMGVMLRDLKPENFLSSTDKNATVKAIDFGCSV
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>AtCPK32

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>AtCPK33

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>AtCPK34

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>OsCPK1

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>OsCPK2

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>OsCPK3

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>OsCPK4

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>OsCPK5

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>OsCPK6

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>OsCPK7

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>OsCPK8

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>OsCPK9

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>OsCPK10

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>OsCPK11

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>OsCPK12

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>OsCPK13

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>OsCPK14

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>OsCPK15

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>OsCPK16

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SVKLGNE

>OsCPK17

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>OsCPK18

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>OsCPK19

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>OsCPK20

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>OsCPK21

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>OsCPK22

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>OsCPK24

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>ZmCPK16

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>ZmCPK17

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>ZmCPK18

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>ZmCPK19

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>ZmCPK20

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>ZmCPK21

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>ZmCPK22

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>ZmCPK23

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>ZmCPK24

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>ZmCPK25

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>ZmCPK27

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>ZmCPK28

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>ZmCPK29

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>ZmCPK31

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>ZmCPK32

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>ZmCPK33

>ZmCPK34

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>ZmCPK35

>ZmCPK36

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>ZmCPK37

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>ZmCPK38

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>ZmCPK39

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>ZmCPK40

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>PtCPK1

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>PtCPK2

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>PtCPK3

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>PtCPK4

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>PtCPK5

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>PtCPK6

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>PtCPK7

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>PtCPK8

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>PtCPK9

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>PtCPK10

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HLKKMGND EHLRQAFKFFDQNSGYIEIDELRGALADEVDGSNEEVINAIINDVDTDKDG
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>PtCPK11

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>PtCPK12

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>PtCPK13

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>PtCPK14

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>PtCPK15

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>PtCPK16

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GEFVAISVHIKKMGNDLHKAFAFFDRNQSGYIEIEELRESLNDDVDVTNNEDVINAIMHD
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>PtCPK17

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>PtCPK18

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>PtCPK19

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>PtCPK20

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>PtCPK21

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>PtCPK22

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>PtCPK23

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NIKDSELAGLMQAADVNDNSGTIDYGEFIAAMLHLNKIVKEDHLYSAFSYFDKDGSGYITQ
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>PtCPK24

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REALSVY

>PtCPK25

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