LOCUS Cinnamomum 152570 bp DNA circular 16-MAY-2017

DEFINITION Cinnamomum camphora chloroplast, complete genome.

ACCESSION

VERSION

KEYWORDS .

SOURCE chloroplast Cinnamomum camphora

ORGANISM Cinnamomum camphora

Eukaryota; Viridiplantae; Streptophyta; Embryophyta;

Tracheophyta;Spermatophyta; Magnoliophyta; Magnoliidae; Laurales;

Lauraceae;Cinnamomum.

REFERENCE 1 (bases 1 to 152570)

AUTHORS Chen,C.

TITLE direct submission

JOURNAL Unpublished

REFERENCE 2 (bases 1 to 152570)

AUTHORS Chen,C.

TITLE Direct Submission

JOURNAL Submitted (16-MAY-2017) Nanjing Forestry University, Co-Innovation

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FEATURES Location/Qualifiers

source 1..152570

/organism="Cinnamomum camphora"

/organelle="plastid:chloroplast"

/mol\_type="genomic DNA"

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73307..73420))

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misc\_feature 1..93705

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gene complement(30..104)

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tRNA complement(30..104)

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gene complement(499..1560)

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CDS complement(499..1560)

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DEWLYNGGPYELIVLHFLLGVACYMGREWELSFRLGMRPWIAVAYSAPVAAATAVFLI

YPIGQGSFSDGMPLGISGTFNFMIVFQAEHNILMHPFHMLGVAGVFGGSLFSAMHGSL

VTSSLIRETTENESANAGYRFGQEEETYNIVAAHGYFGRLIFQYASFNNSRSLHFFLA

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gene 8615..8794

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LLRRPPGREAYPGDVFYLHSRLLERAAKSSSRLGEGSMTALPIVETQSGDVSAYIPTN

VISITDGQIFLSADLFNAGIRPAINVGISVSRVGSAAQIKAMKQVAGKSKLELAQFAE

LEAFAQFASDLDKATQNQLARGQRLRELLKQSQSAPLTVEEQIVTIYTGANGYLDPLE

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gene complement(13055..14335)

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/translation="MRDVTDSFVSFGHWPSAGSFGFNTDILATNLINLSVVLGVLIFF

GKGVLSDLLDNRKQRILSTIRNSEELREGAIEQLEEARARLRKVEIEADEFRVNGYSE

IEREKWNLINATYENLERLENYKNETIHFEQQRAINQVRQRVFQQALQGALGTLNSCS

NSELHLRTIGANIGMLGAMKEVTD"

exon complement(13055..13465)

/gene="atpF"

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exon complement(14192..14335)

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gene complement(14788..15033)

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gene complement(15698..16441)

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CDS complement(15698..16441)

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/product="ATP synthaseCF0 subunit IV"

/translation="MNVLPCSINSLKALYDISDVEVGQHFYWQIGGFQVHAQVLITSW

VVIAILLGSATIAVRNPQTIPTDGQNFFEYVLEFIRDLSKTQIGEEYGPWVPFIGTMF

LFIFVSNWSGALLPRKIIQLPHGELAAPTNDINTTVALALPTSVAYFYAGLTKKGLGY

FGKYIQPTPILLPINILEDFTKPLSLSFRLFGNILADELVVVVLVSLVPSVVPIPVMF

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CDS complement(16658..17368)

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GMLTNWSTTEMRLHRFRNLRSEQNTGKLNCLPKRDVAMLKRQLSHLQTYLGGIKYMTG

LPDIVIIVGQQEEYTALRECLTLRIPTICLIDTNCDPDLANIPIPANDDAMASIRWIL

NKLVSAICEGSSSYIRNC"

gene complement(17541..21707)

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CDS complement(17541..21698)

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FRTQPIYIRTPFLCRSISWICRLCYGQSPTHGDLVELGEAVGIIAGQSIGEPGTQLTL

RTFHTGGVFTGGTAEHVRAPFKGKIKFNEDLVHPTRTRHGHPAFLCYIDLYVTIESHD

ILHNVNIPPKSFLLVQNDQYVESEQVIAEIRAGTSTFNFNKVKEKVRKHIYSDSEGEM

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ARSIDSISMNLEKRVEGWNERITRILGIPWGFLIGAELTIAQSRISLVNKIQKVYRSQ

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gene complement(21860..24630)

/gene="rpoC1"

CDS complement(join(21860..23479,24199..24630))

/gene="rpoC1"

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WKELGEEGFTGNEWEDRKIGRRKDFLVRRMELAKHFIRTNVEPERMVLCLLPVLPPEL

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LLDNGIRGQPMRDGHNKVYKSFSDVIEGKEGRFRETLLGKRVDYSGRSVIVVGPSLSL

HRCGLPREIAIELFQTFVIRGLIRRHIASNIGIAKSQIREKEPIVWEILQEVMQGHPV

LLNRAPTLHRLGIQAFQPILGGGRAICLHPLVRKGFNADFDGDQMAVHVPLSLEAQAE

ARLLMFSHMNLFSPAIGDPISVPTQDMLIGLYVLTIGNRRGICANRYNPWNRINYQNE

TVNDYKYKYTTKEKEPYFCSSYDVLIVYQQKRINLDSPLWLRWRLDQRVIASREVPVE

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exon complement(21860..23488)

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CDS complement(24657..27839)

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WARVSRKQKISILVPSSAMGSNLREILDNVCYPEIFLSFPNHKEKKKIGSRENAILEF

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FPFQYFSIGASLIPFIEHNDANRALMSSNMQRQAVPLSRSEKCIVGTGLECQAALDSG

VSAIAEHEGKIIYTDTDKIVLSGNGDTISIPLVMYQRSNKNTCMHQKPQAPRGKCIKK

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QRVGEMEVWALEGFGVAHISQEMLTYKSDHIRARQEVLGTTIIGGTILKPEDAPESFR

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gene 28984..29064

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tRNA 28984..29064

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/product="tRNA-Cys"

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gene 30111..30200

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CDS 30111..30200

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/product="cytochrome b6/f complex subunit VIII"

/translation="MDIVSLAWAALMVVFTFSLSLVVWGRSGL"

gene complement(31265..31369)

/gene="psbM"

CDS complement(31265..31369)

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gene complement(32329..32402)

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tRNA complement(32329..32402)

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/product="tRNA-Asp"

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gene complement(32716..32799)

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tRNA complement(32716..32799)

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/note="anticodon:GUA"

gene complement(32854..32926)

/gene="trnE-UUC"

tRNA complement(32854..32926)

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/note="anticodon:UUC"

gene 33650..33721

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tRNA 33650..33721

/gene="trnT-GGU"

/product="tRNA-Thr"

/note="anticodon:GGU"

gene 35168..36229

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CDS 35168..36229

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VTGLWMSAIGVVGLALNLRAYDFVSQEIRAAEDPEFETFYTKNILLNEGIRAWMAAQD

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gene 36177..37598

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CDS 36177..37598

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LGIHLILLGIGAFLLVLKALYFGGVYDTWAPGGGDVRKISNLTLSPSVIFGYLLKSPF

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GALSVFGFIACCFVWFNNTAYPSEFYGPTGPEASQAQAFTFLVRDQRLGANVGSAQGP

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gene complement(37813..37905)

/gene="trnS-UGA"

tRNA complement(37813..37905)

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gene 38227..38415

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CDS 38227..38415

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/translation="MTIAFQLAVFALIATSSILLISVPVVFASSDGWSSNKNVVFSGT

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gene 38691..38761

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tRNA 38691..38761

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gene complement(38921..38994)

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tRNA complement(38921..38994)

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gene complement(39149..39451)

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CDS complement(39149..39451)

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WLNSSQLINGYNPFGMNSLSVWAWMFLFGHLVWAIGFMFLISWRGYWQELIETLAWAH

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gene complement(41812..44064)

/gene="psaA"

CDS complement(41812..44064)

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IGALVFAALMLFAGWFHYHKAAPKLAWFQDVESMLNHHLAGLLGLGSLSWAGHQVHVS

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WIGGFLIVGAAAHAAIFMVRDYDPTTRYNDLLDRVLRHRDAIISHLNWVCIFLGFHSF

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FFLARIIAVG"

gene complement(44705..46677)

/gene="ycf3"

CDS complement(join(44705..44857,45589..45816,46552..46677))

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/product="photosystem I assembly protein ycf3"

/translation="MPRSRINGNFIDKTSSIVANILLRIIPTTSGEKEAFTYYRDGMS

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LKIARRFE"

exon complement(44708..44857)

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exon complement(45589..45816)

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/number=2

exon complement(46552..46677)

/gene="ycf3"

/number=1

gene 47488..47574

/gene="trnS-GGA"

tRNA 47488..47574

/gene="trnS-GGA"

/product="tRNA-Ser"

/note="anticodon:GGA"

gene complement(47854..48459)

/gene="rps4"

CDS complement(47854..48459)

/gene="rps4"

/codon\_start=1

/transl\_table=11

/product="ribosomal protein S4"

/translation="MSRYRGPRFKKIRCLGALPGLTSKRPRSGSDLRNQSRFGKRSQY

RIRLEEKQKLRFHYGLTERQLLRYVRIAGKAKGSTGQVLLQLLEMRLDNILFRLGMAS

TIPGARQLVNHRHILVNGRVVDIPSYRCKPRDIITARDEQRSRALIQNYLDSSPREDL

AKHLTFDSSQYKGLVNQIIDIKWIGLKINEFLVVEYYSRQT"

gene complement(48799..48871)

/gene="trnT-UGU"

tRNA complement(48799..48871)

/gene="trnT-UGU"

/product="tRNA-Thr"

/note="anticodon:UGU"

gene 49420..49454

/gene="trnL-UAA"

tRNA 49420..49454

/gene="trnL-UAA"

/product="tRNA-Leu"

/note="anticodon:UAA"

gene 49934..49983

/gene="trnL-UAA"

tRNA 49934..49983

/gene="trnL-UAA"

/product="tRNA-Leu"

/note="anticodon:UAA"

gene 50331..50403

/gene="trnF-GAA"

tRNA 50331..50403

/gene="trnF-GAA"

/product="tRNA-Phe"

/note="anticodon:GAA"

gene complement(50935..51411)

/gene="ndhJ"

CDS complement(50935..51411)

/gene="ndhJ"

/codon\_start=1

/transl\_table=11

/product="NADH-plastoquinone oxidoreductase subunit J"

/translation="MQGRSSAWLVKHELVHRSLGFDYQGRETLQIKPEDWYSIAVISY

VYGYNYLRFQCAYDVAPGGFLASVYHLTRIQYGVDQPEEVCIKVFVPRRNPRIPSVFW

IWKSADFQERESYDMLGISYENHPRLKRILMPESWVGWPLRKDYIAPNFYEIQDAH"

gene 51511..52368

/gene="ndhK"

CDS complement(51511..52368)

/codon\_start=1

/transl\_table=11

/product="NADH-plastoquinone oxidoreductase subunit K"

/translation="MGNEFRCIGCICVYRSFNFRAYPNCWFSLCMAKRSIGMVLAPEY

SDNQNQKEGKDYIETVMNSIEFPLLDRTAQNSVISTTSNDLSNWSRLSSLWPLLYGTS

CCFIEFASLIGSRFDFDRYGLVPRSSPRQADLILTAGTVTMKMAPSLVRLYEQMPEPK

YVIAMGACTITGGMFSTDSYSTVRGVDKLIPVDVYLPGCPPKPEAVIDAITKLRKKVS

REIYEDRIGSQQENRYFTTNHKFHVGHSTHTGNYDQGLLYQSPSTSEIPSETFFKYKS

SVSSPKLMN"

gene complement(52248..52610)

/gene="ndhC"

CDS complement(52248..52610)

/gene="ndhC"

/codon\_start=1

/transl\_table=11

/product="NADH-plastoquinone oxidoreductase subunit 3"

/translation="MFLLHEYDIFWAFLIISSVIPILAFLISGVLAPISEGPEKLSSY

ESGIEPMGDAWLQFRIRYYMFALVFVVFDVETVFLYPWAMSFDVLGVSVFIEALIFVL

IPIVGSVYAWRKGALEWS"

gene complement(52256..52257)

CDS complement(52261..52275)

/gene="ndhC"

/pseudo

/codon\_start=1

/transl\_table=11

/product="noproductstringinfile"

gene complement(54463..54499)

/gene="trnV-UAC"

tRNA complement(54463..54499)

/gene="trnV-UAC"

/product="tRNA-Val"

/note="anticodon:UAC"

gene complement(55087..55125)

/gene="trnV-UAC"

tRNA complement(55087..55125)

/gene="trnV-UAC"

/product="tRNA-Val"

/note="anticodon:UAC"

gene 55305..55376

/gene="trnM-CAU"

tRNA 55305..55376

/gene="trnM-CAU"

/product="tRNA-Met"

/note="anticodon:CAU; tRNA-Met2"

gene complement(55605..56009)

/gene="atpE"

CDS complement(55605..56009)

/gene="atpE"

/codon\_start=1

/transl\_table=11

/product="ATP synthase CF1 epsilon subunit"

/translation="MTLNLCVLTPNRIIWDSEVKEIILSTNSGQIGVLPNHAPIATAV

DIGILRIRLNDQWLTMAVMGGFARIGNNEITILVNDAEKGSDIDPQEAQRTLEIAEAN

LSRAEGKRQAIEANLALRRARTRVEAINVISY"

gene complement(56006..57502)

/gene="atpB"

CDS complement(56006..57502)

/gene="atpB"

/codon\_start=1

/transl\_table=11

/product="ATP synthase CF1 beta subunit"

/translation="MRINPTNSGPGVSTLEEKNLGRIAQIIGPVLDVAFPPGKMPNIY

NALVVKGRDTVGQQINVTCEVQQLLGNNRVRAVAMSATDGLMRGMEVIDTGAPLSVPV

GGATLGRIFNVLGEPVDNLGPVDTRTTSPIHRSAPAFIQLDTKLSIFETGIKVVDLLA

PYRRGGKIGLFGGAGVGKTVLIMELINNIAKAHGGVSVFGGVGERTREGNDLYMEMKE

SGVINEQNIAESKVALVHGQMNEPPGARMRVGLTALTMAEYFRDVNEQDVLLFIDNIF

RFVQAGSEVSALLGRMPSAVGYQPTLSTEMGSLQERITSTKEGSITSIQAVYVPADDL

TDPAPATTFAHLDATTVLSRGLAAKGIYPAVDPLDSTSTMLQPRIVGEEHYETAQRVK

QTSQRYKELQDIIAILGLDELSEEDRLTVARARKIERFLSQPFFVAEVFTGSPGKYVG

LTETIRGFQLILSGELDGLPEQAFYLVGNIDEATAKAMNLEVESKLKK"

gene 58257..59684

/gene="rbcL"

CDS 58257..59684

/gene="rbcL"

/codon\_start=1

/transl\_table=11

/product="ribulose-15-bisphosphate carboxylase/oxygenase

large subunit"

/translation="MSPKTETKASVGFKAGVKDYKLTYYTPDYETKDTDILAAFRVTP

QPGVPPEEAGAAVAAESSTGTWTTVWTDGLTSLDRYKGRCYHIEPVPGEETQFIAYVA

YPLDLFEEGSVTNMFTSIVGNVFGFKALRALRLEDLRIPPAYSKTFQGPPHGIQVERD

KLNKYGRPLLGCTIKPKLGLSAKNYGRAVYECLRGGLDFTKDDENVNSQPFMRWRDRF

VFCAEAIYKAQAETGEIKGHYLNATAGTCEEMIKRAVFARELGVPIVMHDYLTGGFTA

NTTLAHYCRDNGLLLHIHRAMHAVIDRQKNHGMHFRVLAKALRMSGGDHVHAGTVVGK

LEGERDITLGFVDLLRDDFIEKDRSRGIYFTQDWVSMPGVLPVASGGIHVWHMPALTE

IFGDDSVLQFGGGTLGHPWGNAPGAVANRVAVEACVQARNEGRDLAREGNEIIREAAK

WSPELAAACEVWKEIKFEFAAMDTL"

gene 60368..61879

/gene="accD"

CDS 60368..61879

/gene="accD"

/codon\_start=1

/transl\_table=11

/product="Acetyl-CoA carboxylase carboxyltransferase beta

subunit"

/translation="MGKWWFNSMLSNEELEHRCGLGKSMDSLGRPVGNTSGSEDPILN

DTNKNNHNHGWRESNSCSNVDHFFGVRDIWSFISDDTFLVRDSNGNSYSVYFDIENRV

FEIDNDSSFLSELETAFSSYLNSGSKSDNRYYDHYMYDTTYSWNNHINSCIDSYLRSE

ISINKYISSGSDNPIYSYIYSYICSGESVSDSDRGSSSIRTGGNGSDFNIRGRSNDFD

GNKKYRHLWVQCENCYGLNYKKFFRSKMNICEQCGYHLKMGSSDRIELSVDSGTWDPM

DEDMVSIDPIEFHSEEEPYRDRINSYQRKTGLTEAVQTGIGQLNGIPIAIGVMDFQFM

GGSMGSVVGEKITRLIEYAANRSLPVIMVCASGGARMQEGSLSLMQMAKISSALYDYQ

FNKKLFYVSILTSPTTGGVTASFGMLGDIIIAEPNAYIAFAGKRVIEQTLNKTVPDGS

QAAEYLFHKGLFDPIVPRNPLKGVLSELFQLHGFFPLNQNSSRALGSVICSEL"

gene 62465..62575

/gene="psaI"

CDS 62465..62575

/gene="psaI"

/codon\_start=1

/transl\_table=11

/product="photosystem I subunit VIII"

/translation="MTDFNLPSIFVPLVGLVFPAIAMASLSLHVQKNKIV"

gene 63013..63567

/gene="ycf4"

CDS 63013..63567

/gene="ycf4"

/codon\_start=1

/transl\_table=11

/product="photosystem I assembly protein ycf4"

/translation="MNYRSERIWIELITGSRKTSNFCWACILFLGSLGFLLVGTSSYL

GRNLISLFPSQQIIFFPQGIVMSFYGIAGLFISSYLWCTISWNVGSGYDRFDRKEGIV

CIFRWGFPGINRRIFLRFLMREIQSIRMEVKEGLYPRRVLYMEIRGQGAIPLTRTDEN

LTPREIEQKAAELAYFLRVPIEVF"

gene 64478..65167

/gene="cemA"

CDS 64478..65167

/gene="cemA"

/codon\_start=1

/transl\_table=11

/product="chloroplast envelope membrane protein"

/translation="MSKKKALTPLPYLASIVFLPWWISLSFNKSLEPWVTNWWNTGQS

ETFLNDIQEKNVLERFVELEQLFLLDEMIKEYPETQIQKLRIGIHKETMQLVKMHNED

HIHIILDFSTNIICFAILSGYSILGNEELVILNSWVQEFLYNLSDTIKAFSILLLTDL

CIGFHSPRGWELMIGSVYKDFGFAHNDQIISGLVSTFPVILDTILKYWIFHYLNRVSP

SLVVIYHSMNE"

gene 65390..66352

/gene="petA"

CDS 65390..66352

/gene="petA"

/codon\_start=1

/transl\_table=11

/product="cytochrome f"

/translation="MQNRNTFSWVKKEMTRFISVLIMIYVITRTSISNAYPIFAQQGY

ENPREATGRIVCANCHLANKPVDIEVPQAVLPDTVFEAVVRIPYDMQMKQVLANGKKG

ALNVGAVLILPEGFELAPPDRISPELKEKMGNLSFQSYRPTKRNILVVGPVPGQKYSE

IVFPILSPDPSTKKDVHFLKYPIYVGGNRGRGQIYPDGSKSNNTVYNATAAGIVSRIV

RKEKGGYEISIADASDGHQVVDIIPPGPELLVSEGESIKLDQPLTSNPNVGGFGQGDA

EIVLQDPLRVQGLLFFLASVILAQIFLVLKKKQFEKVQLSEMNF"

gene complement(67516..67638)

/gene="psbJ"

CDS complement(67516..67638)

/gene="psbJ"

/codon\_start=1

/transl\_table=11

/product="photosystem II protein J"

/translation="MADTTGRIPLWLIGTVTGIPVIGSIGIFFYGSYSGLGSSL"

gene complement(67765..67881)

/gene="psbL"

CDS complement(67765..67881)

/gene="psbL"

/exception="RNA editing"

/codon\_start=1

/transl\_except=(pos:complement(67879..67881),aa:Met)

/transl\_table=11

/product="photosystem II protein L"

/translation="MTQSNPNEQNVELNRTSLYWGLLLIFVLAVLFSNYFFN"

gene complement(67904..68023)

/gene="psbF"

CDS complement(67904..68023)

/gene="psbF"

/codon\_start=1

/transl\_table=11

/product="photosystem II cytochrome b559 beta subunit"

/translation="MTIDRTYPIFTVRWLAVHGLAVPTVSFLGSISAMQFIQR"

gene complement(68033..68284)

/gene="psbE"

CDS complement(68033..68284)

/gene="psbE"

/codon\_start=1

/transl\_table=11

/product="photosystem II cytochrome b559 alpha subunit"

/translation="MSGSTGERSFADIITSIRYWVIHSITIPSLFIAGWLFVSTGLAY

DVFGSPRPNEYFTESRQGIPLITGRFDPLAQLDEFSRSF"

gene 69552..69647

/gene="petL"

CDS 69552..69647

/gene="petL"

/codon\_start=1

/transl\_table=11

/product="cytochrome b6/f complex subunit VI"

/translation="MTTITSYFGFLLAASTITPALLISLSKIRLI"

gene 69822..69935

/gene="petG"

CDS 69822..69935

/gene="petG"

/codon\_start=1

/transl\_table=11

/product="cytochrome b6/f complex subunit V"

/translation="MIEVFLFGIVLGLIPITLAGLFVTAYLQYRRGDQLDL"

gene complement(70055..70128)

/gene="trnW-CCA"

tRNA complement(70055..70128)

/gene="trnW-CCA"

/product="tRNA-Trp"

/note="anticodon:CCA"

gene complement(70282..70355)

/gene="trnP-UGG"

tRNA complement(70282..70355)

/gene="trnP-UGG"

/product="tRNA-Pro"

/note="anticodon:UGG"

gene complement(70284..70354)

/gene="trnP-GGG"

tRNA complement(70284..70354)

/gene="trnP-GGG"

/product="tRNA-Pro"

/note="anticodon:GGG"

gene 70731..70865

/gene="psaJ"

CDS 70731..70865

/gene="psaJ"

/codon\_start=1

/transl\_table=11

/product="photosystem I subunit IX"

/translation="MRDIKTYLSTAPVLTTLWFGSLAGLLIEINRLFPDALTFPFFSF

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gene 71292..71492

/gene="rpl33"

CDS 71292..71492

/gene="rpl33"

/codon\_start=1

/transl\_table=11

/product="ribosomal protein L33"

/translation="MAKGKDVRVVVILECTSCVRNGLNKESRGISRYITQKNRHNTPS

QLDLKKFCPYCYKHTIHGEIKK"

gene 71633..71938

/gene="rps18"

CDS 71633..71938

/gene="rps18"

/codon\_start=1

/transl\_table=11

/product="ribosomal protein S18"

/translation="MDKSKRPFHKSKRSFHRRLPPIGSGDRIDYRNMSLINQFISEQG

KILSRRVNRLTLKQQRLITIAIKQARILSSLPFLNNEKQFERTGSIPRTTGPRTRNK"

gene complement(72196..72549)

/gene="rpl20"

CDS complement(72196..72549)

/gene="rpl20"

/codon\_start=1

/transl\_table=11

/product="ribosomal protein L20"

/translation="MTRVRRRYIARRRRTKIRLFAATFRGAHSRLTRTTTQQKMRALV

STHRDRGRRKRSFRRLWITRINAVTRENRGSHSYSRLILDLYKRQLLLNRKIPAQIAI

SNRNCLDTISNAIIK"

CDS join(complement(73307..73420),144824..145035,

145534..145564)

/trans\_splicing

/codon\_start=1

/transl\_table=11

/product="ribosomal protein S12"

/translation="MPTIKQLIRNTRQPIRNVTKSPALRGCPQRRGTCTRVYTITPKK

PNSALRKVARVRLTSGFEITAYIPGIGHNSQEHSVVLVRGGRVKDLPGVRYHIVRGTL

DAVGVKDNMGSKSQNK"

misc\_feature join(complement(73307..73420),144824..145035,

145534..145564)

/note="trans-splicing"

gene complement(73307..145560)

/gene="rps12"

gene complement(73557..75592)

/gene="clpP"

CDS complement(join(73557..73802,74458..74748,75524..75592))

/gene="clpP"

/codon\_start=1

/transl\_table=11

/product="clp protease proteolytic subunit"

/translation="MPIGVPKVPFRSPGEEDAVWVDVNRLHRERLLFLGQEVDSEISN

QLVGLMVYLSIEDDTRDLYLFINSPGGWVIPGIAIYDTMQFVPPDVHTICMGLAASMG

SFILVGGEITKRLAFPHARVMIHQPASSFYEAPTGEFILEAEELLKLRETLTRVYVQR

TGNPLWVVSEDMERDVFMSATEAQDYGIVDLVAIENTGDFA"

exon complement(73557..73802)

/gene="clpP"

/number=3

exon complement(74458..74748)

/gene="clpP"

/number=2

exon complement(75524..75592)

/gene="clpP"

/number=1

gene 76021..77547

/gene="psbB"

CDS 76021..77547

/gene="psbB"

/codon\_start=1

/transl\_table=11

/product="photosystem II CP47 chlorophyll apoprotein"

/translation="MGLPWYRVHTVVLNDPGRLLSVHIMHTALVSGWAGSMALYELAV

FDPSDPVLDPMWRQGMFVIPFMTRLGINNSWGGWSITGGTITNPGIWSYEGVAGAHIV

FSGLCFLAAIWHWVYWDLEIFCDERTGKPSLDLPKIFGIHLFLSGVACFGFGAFHVTG

LYGPGIWVSDPYGLTGKVQSVNPAWGAEGFDPFVPGGIASHHIAAGTLGILAGLFHLS

VRPPQRLYKGLRMGNIETVLSSSIAAVFFAAFVVAGTMWYGSATTPIELFGPTRYQWD

QGYFQQEIYRRVGASLAENLSLSEAWSKIPEKLAFYDYIGNNPAKGGLFRAGSMDNGD

GIAVGWLGHPIFRDKEGHELFVRRMPTFFETFPVVLVDGDGIVRADVPFRRAESKYSV

EQVGVTVEFYGGELNGVSYSDPATVKKYARRAQLGEIFELDRATLKSDGVFRSSPRGW

FTFGHATFALLFFFGHIWHGARTLFRDVFAGIDPDLDAQVEFGAFQKLGDPTTRRQVV

"

gene 77725..77832

/gene="psbT"

CDS 77725..77832

/gene="psbT"

/codon\_start=1

/transl\_table=11

/product="photosystem II protein T"

/translation="MEALVYTFLLVSTLGIIFFAIFFRDPPKVPTKKTK"

gene complement(77891..78022)

/gene="psbN"

CDS complement(77891..78022)

/gene="psbN"

/codon\_start=1

/transl\_table=11

/product="photosystem II protein N"

/translation="METATLVAISISGSLVSFTGYALYTAFGQPSQQLRDPFEEHGD"

gene 78130..78351

/gene="psbH"

CDS 78130..78351

/gene="psbH"

/codon\_start=1

/transl\_table=11

/product="photosystemIIphosphoprotein"

/translation="MATQTVEGSARSGPRRTITGDLLKPLNSEYGKVAPGWGTTPFMG

VAMALFAIFLSIILEIYNSSVLLDGISMN"

gene 79257..79904

/gene="petB"

CDS 79257..79904

/gene="petB"

/codon\_start=1

/transl\_table=11

/product="cytochrome b6"

/translation="MSKVYDWFEERLEIQAIADDITSKYVPPHVNIFYCLGGITLTCF

LVQVATGFAMTFYYRPTVTEAFASVQYIMTEANFGWLIRSVHRWSASMMVLMMILHVF

RVYLTGGFKKPRELTWVTGVVLAVLTASFGVTGYSLPRDQIGYWAVKIVTGVPEAIPV

IGSPLVELLRGSASVGQSTLTRFYSLHTFVLPLLTAVFMLMHFPMIRKQGISGPL"

gene 80102..81300

/gene="petD"

CDS join(80102..80108,80819..81300)

/gene="petD"

/codon\_start=1

/transl\_table=11

/product="cytochromeb 6/f complex subunit IV"

/translation="MGVPITKKPDLNDPVLRAKLAKGMGHNYYGEPAWPNDLLYIFPV

VILGTIACNVGLAVLEPSMIGEPADPFATPLEILPEWYFFPVFQILRTVPNKLLGVLL

MVLVPTGLLTVPFLENVNKFQNPFRRPVATTVFLIGTAAALWLGIGATLPIDKSLTLG

LF"

exon 80102..80108

/gene="petD"

/number=1

exon 80819..81300

/gene="petD"

/number=2

gene complement(81488..82507)

/gene="rpoA"

CDS complement(81488..82507)

/gene="rpoA"

/codon\_start=1

/transl\_table=11

/product="RNA polymerase alpha subunit"

/translation="MVREEVAVSTRTLQWKCVESRTDSKRLYYGRFVLSPLMKGQADT

IGIAMRKALLGEIEGTCITRAKSEKVSHEYSTIVGIEESVHEILMNLKEIVLRSNLYG

TRDASICVRGPKYVTAQDIISPPSVELVDTTQHIANLTEPIHLCIEFKIERDRGYRMK

SPNNYQDGSYPIDAVSMPVRNANHSIHSYGSENEKQEILFLEIWTNGSLTPKEALREA

SRTLIDLFIPFLHAEEEDIHFYLEDNQNRFTVSFFTFHDRLANIRKNKKGIALKCIFI

DQSELPSRTYNCLKRSNIHTLLDLLNNSQEDLMRIEHLRIEDVKQILDILQKHFAIYL

PKNKF"

gene complement(82576..82968)

/gene="rps11"

CDS complement(82576..82968)

/gene="rps11"

/codon\_start=1

/transl\_table=11

/product="ribosomal protein S11"

/translation="MTKAIPRIGSRKNGRRIQKGVIHVQASFNNTIVTVTDVIGRVVS

WSSAGTCGFRGTRRGTPFAAQTAAGNAIRKAVDQGLQRAEVMIKGPGLGRDAALRAIR

RSGILLSFVRDVTPMPHNGCRPPKKRRV"

gene complement(83081..83194)

/gene="rpl36"

CDS complement(83081..83194)

/gene="rpl36"

/codon\_start=1

/transl\_table=11

/product="ribosomal protein L36"

/translation="MKIRASIRKICEKCRLIRRRGRIIVICSNPKHKQRQG"

gene complement(83310..83543)

/gene="infA"

CDS complement(83310..83543)

/gene="infA"

/codon\_start=1

/transl\_table=11

/product="translational initiation factor 1"

/translation="MKEQKLIHEGLITESLPNGMFRVRLDNEDLILGYVSGRIRRSFI

RILPGDRVKIEVSRYDSTRGRIIYRLRNKESND"

gene complement(83660..84058)

/gene="rps8"

CDS complement(83660..84058)

/gene="rps8"

/codon\_start=1

/transl\_table=11

/product="ribosomal protein S8"

/translation="MGRDTIADIITSIRNANMDKKGTVRVASTNIAENIVKILLQEGF

IENVRKHRENNKYFLVSTLRHRRNRKGTYRNILKRISRPGLRIYSNHQRIPRILGGMG

VVILSTSRGIMTDREARLERIGGEILYYIW"

gene complement(84238..84606)

/gene="rpl14"

CDS complement(84238..84606)

/gene="rpl14"

/codon\_start=1

/transl\_table=11

/product="ribosomal protein L14"

/translation="MIQPQTHLNVADNSGARELMCIRIIGASNQRYAHIGDVIVAVIK

EAVPNMPLERSEVIRAVIVRTCKELKRDNGMIIRYDDNAAVVIDQEGNPKGTRVFGAI

ARELRQLNFTKIVSLAPEVL"

gene complement(84736..85140)

/gene="rpl16"

CDS complement(84736..85140)

/gene="rpl16"

/codon\_start=1

/transl\_table=11

/product="ribosomal protein L16"

/translation="MLSPKRTRFRKQHRGRMKGISYRGNHICFGRYALQALEPAWITS

RQIEAGRRAMTRYARRGGKIWVRIFPDKPVTVRPTETRMGSGKGSPEYWVSVVKPGRI

LYEMGGVSETVARAAISIAACKMPIRTQFIIA"

gene complement(86264..86926)

/gene="rps3"

CDS complement(86264..86926)

/gene="rps3"

/codon\_start=1

/transl\_table=11

/product="ribosomal protein S3"

/translation="MGQKINPLGFRLGENQSHRSLWFAQPKSYYIGLQEDEKIRDWIK

IYVQKNIRVSSSFEGIGIAHIEIQKKMDLIQVIIYIGFPNLLIEGQTRGIEELQINVQ

KGLHSVNRRLNIAITRVAKPYGQPNILAEYIALQLKNRVSFRKAMKKAIELTEQADTK

GIQVEIAGRIDGKEIARVEWIREGRVPLQTIRAKIDHCSYTVRTAYGALGIKIWIFVD

EQ"

gene complement(86817..87380)

/gene="rpl22"

CDS complement(86817..87380)

/gene="rpl22"

/codon\_start=1

/transl\_table=11

/product="ribosomal protein L22"

/translation="MKRSSSTQVQALAQRICMSAHKARRVIDQIRGHSYEKTLMLLEL

MPYRAFYPIFKLVYSAAANASHNKSFNEADSVISKAEVNGGTIVKKLKPRARGRSYPI

ERPACHIIIVLKDSSKKKTDQDIFLETKNVWRDPIIERYIEKEREREKKDGSKNKSTW

FPPWRKPKSSFPLVRTTKKLLHRSPGR"

gene complement(87482..87760)

/gene="rps19"

CDS complement(87482..87760)

/gene="rps19"

/codon\_start=1

/transl\_table=11

/product="ribosomal protein S19"

/translation="MTRSLKKNPFVANHLLEKIKKLNMREEKEIIVTWSRASTIIPTM

IGNTIAIHNGKAHLPIYITDRMVGQKLGEFAPTLTFQGHARNDTRSLR"

gene complement(87835..89329)

/gene="rpl2"

CDS complement(join(87835..88266,88940..89329))

/gene="rpl2"

/exception="RNA editing"

/codon\_start=1

/transl\_except=(pos:complement(89327..89329),aa:Met)

/transl\_table=11

/product="ribosomal protein L2"

/translation="MIHLYKTSTPSIRKGSIDSQAKSNPRNNLIYGQHRCGKGRNSRG

IITAGHRGGGHKRLYRKIDFRRNEKDISARIVTIEYDPNRNAYICLIHYGDGEKRYIL

HPRGAIIGDTIVSGTEVPISMGNALPLSTHMPLGTAVHNIEITLGKGGQLTRAAGAVA

KLIAKEGKSVTLRFPSGEVRLISKNCSATVGQVGNVGANQKSLGRAGSKCWLGRRPVV

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CDS 89895..96866

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QSIDPFNSISNEGSEYHTLINQTEIQQLKKRSILLDTSFLQTERTEIKSDRFSKYLSG

YSSMARLFPEREKQMNNHLLPEEIEEFLGNPTRSIRSFFSDRWSELHLGLNPTERSTI

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gene complement(97847..100078)

/gene="ndhB"

CDS complement(join(97847..98602,99305..100078))

/gene="ndhB"

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exon complement(97847..98602)

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exon complement(99305..100078)

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gene complement(100405..100872)

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CDS complement(100405..100872)

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gene complement(100927..100956)

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gene complement(101482..101724)

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gene 105599..105640

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tRNA 105599..105640

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FMLFPRRSGESSNQ"

exon 105740..105781

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/number=1

exon 105810..106118

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gene 106580..106614

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gene 107702..110505

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gene 110624..110726

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rRNA 110947..111067

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NNKMLFVTSSFVGWLIGHIFFMKWVGLVLFWIRQNHSIRSNVLIRSNKYLVSELRNSM

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QVNEDREIPYNYNTPKIEPFYVLGDICISDYLGEESIIGTGKSTDRKYLEWKIFDLFL

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QALEGIPGGPYENLEVRRFDRASDSEWNGFEYRFISKKPSPTFELSKQELYVRVEAPK

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gene 119919..122137

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GLRAAAQSISYEIPLTPCVLSISLRVIRLSNSSSTVDIVEAQSKYGFWGWNLWRQPIG

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VLYLGGWNFSIPYIFISEPFGINKTGGVFGMTIGILITLAKAYLFLFIPITTRWTLPR

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gene 123090..123620

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IILLVALIGAIAMARQ"

gene 123868..124173

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CDS 123868..124173

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/product="NADH-plastoquinone oxidoreductase subunit 4L"

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LVTFSDLFDSRQLKGDIFSIFVIAIAAAEAAIGPAIVSSIHRNRKSTRINQSNLLNK"

gene 124441..124686

/gene="psaC"

CDS 124441..124686

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gene 124807..126312

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RLYSATKFILYTAGGSIFLLMGVPGMGLYGSNEPTLNFETLANQSYPLGLEIIFYIGF

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LVITFRKNLDIPRKSNHLLIGSFSFVNEKRSVLQNTSFLSFRNYHRYQLTQQLDQCSY

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gene complement(127573..127652)

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tRNA complement(127573..127652)

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CDS complement(129044..129217)

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gene 130423..132657

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CDS 130423..132657

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NNKMLFVTSSFVGWLIGHIFFMKWVGLVLFWIRQNHSIRSNVLIRSNKYLVSELRNSM

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tRNA 134628..134699

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gene complement(135596..135716)

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CDS complement(140479..140787)

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