GenBank Preview KY706202

Eutreptiella\_pomquetensis130561 bp DNA linear

DEFINITION Eutreptiella pomquetensis.

ACCESSION

VERSION

KEYWORDS .

SOURCE plastid Eutreptiella pomquetensis

 ORGANISM Eutreptiella pomquetensis

 Unclassified.

REFERENCE 1 (bases 1 to 130561)

 AUTHORS Dabbagh,N., Bennett,M.S., Triemer,R.E. and Preisfeld,A.

 TITLE Chloroplast genome expansion by intron multiplication in the basal

 psychrophilic euglenoid Eutreptiella pomquetensis

 JOURNAL Unpublished

REFERENCE 2 (bases 1 to 130561)

 AUTHORS Dabbagh,N., Bennett,M.S., Triemer,R.E. and Preisfeld,A.

 TITLE Direct Submission

 JOURNAL Fachbereich 4, Zoology and Didactics of

 Biology, Bergische University Wuppertal, Gaussstrasse 20, Wuppertal

 42119, Germany

FEATURES Location/Qualifiers

 source 1..130561

 /organism="Eutreptiella pomquetensis"

 /organelle="plastid"

 /mol\_type="genomic DNA"

 gene 1..1484

 /gene="rrn16"

 rRNA 1..1484

 /gene="rrn16"

 /product="16S ribosomal RNA"

 gene 1576..1649

 /gene="trnI"

 tRNA 1576..1649

 /gene="trnI"

 /product="tRNA-Ile"

 gene 1709..1781

 /gene="trnA"

 tRNA 1709..1781

 /gene="trnA"

 /product="tRNA-Ala"

 /anticodon=(pos:1742..1744,aa:Ala,seq:tgc)

 gene 1836..4706

 /gene="rrn23"

 rRNA 1836..4706

 /gene="rrn23"

 /product="23S ribosomal RNA"

 gene 4767..4882

 /gene="rrn5"

 rRNA 4767..4882

 /gene="rrn5"

 /product="5S ribosomal RNA"

 gene 5016..5977

 /gene="rpl32"

 CDS join(5016..5107,5899..5977)

 /gene="rpl32"

 /codon\_start=1

 /transl\_table=11

 /product="ribosomal protein L32"

 /translation="MAVPKKKMSKSKKNMRKSVWKQKASKQATLALSLAKSVLSGNSK

 GFLYLSSDSVEN"

 exon 5016..5107

 /gene="rpl32"

 /number=1

 intron 5108..5898

 /gene="rpl32"

 /number=1

 misc\_feature 5242..5266

 /gene="rpl32"

 /note="3' motif for potential twintron"

 misc\_feature 5332..5354

 /gene="rpl32"

 /note="3' motif for potential twintron"

 misc\_feature 5639..5658

 /gene="rpl32"

 /note="3' motif for potential twintron"

 exon 5899..5977

 /gene="rpl32"

 /number=2

 gene 6138..6209

 /gene="trnH"

 tRNA 6138..6209

 /gene="trnH"

 /product="tRNA-His"

 /anticodon=(pos:6170..6172,aa:His,seq:gtg)

 gene 6276..6347

 /gene="trnM"

 tRNA 6276..6347

 /gene="trnM"

 /product="tRNA-Met"

 /anticodon=(pos:6308..6310,aa:Met,seq:cat)

 gene 6398..6470

 /gene="trnW"

 tRNA 6398..6470

 /gene="trnW"

 /product="tRNA-Trp"

 /anticodon=(pos:6431..6433,aa:Trp,seq:cca)

 gene 6538..6610

 /gene="trnE"

 tRNA 6538..6610

 /gene="trnE"

 /product="tRNA-Glu"

 /anticodon=(pos:6572..6574,aa:Glu,seq:ttc)

 gene 6628..6700

 /gene="trnG"

 tRNA 6628..6700

 /gene="trnG"

 /product="tRNA-Gly"

 /anticodon=(pos:6661..6663,aa:Gly,seq:tcc)

 gene complement(7403..8458)

 /gene="chlI"

 CDS complement(7403..8458)

 /gene="chlI"

 /codon\_start=1

 /transl\_table=11

 /product="chlorophyll biosynthesis"

 /translation="MVEQTNERPVFPFTSIVGQEEMKLALILNVIDPKIGGVMIMGDR

 GTGKSTTVRALVDLLPQIEVATNDQFNSDPYDTELMSDAIRNMVRENKEIPVSKIKIP

 MVDLPLGATEDRVCGTIDIEKALTEGVKAFEPGLLAKANRGILYVDEVNLLDDHLVDV

 LLDSAASGWNTVEREGISICHPARFILVGSGNPEEGELRPQLLDRFGMHAQIGTVKEP

 DLRVKIVEQRALFDQNPHEFRAEYKNEQEALMSQIVEARERLIRVKIDYDLRLKISEI

 CSELNVDGLRGDMVTNRAAKALVAFEGRDEVTPRDIYTIITLCLRHRLRKDPLESIDS

 GSKVQDVFNKAFGFDEE"

 CDS join(8682..8873,9652..10150,12895..12929,15165..15285,

 16104..16126,16905..17093)

 /codon\_start=1

 /transl\_table=11

 /product="photosystem II core 34 kDa protein"

 /translation="MTIAIGKTEEKRGLFDAADDWLKRDRFVFVGWSGLLLFPCAYLA

 LGGWLTGITFVTSWYTHGLASSFLEGCNVLTAAVSTPPNSMAHSLLLLWGPEAQGEFT

 RWLQLGGLWPFVALHGAFALIGFMLRQFEIARAVQIRPYNAIAFSAPIAVFVSVFLIY

 PLGQSGWFFAPSFGVASIFRFILFFQGFHNWTLNPFHMMGVAGVLGAALLCAIHGATV

 ENTLFEDGDGSNTFRAFNPTQAEETYSMVTANRFWSQIFGVAFSNKRWLHFFMLFVPV

 TGLWMSAIGVVGLALNLRAYDFVSQEIRAAEDPEFETFYTKNILLNEGIRAWMAAQDQ

 PHEQLVFPEEVLPRGNAL"

 exon 8682..8873

 intron 8874..9651

 /gene="psbD"

 /number=1

 misc\_feature 9098..9120

 /note="3' motif for potential twintron"

 exon 9652..10150

 /gene="psbD"

 /number=2

 intron 10151..12894

 /gene="psbD"

 /number=2

 misc\_feature 10942..10961

 /note="3' motif for potential twintron"

 CDS 11034..12788

 /note="group II intron reverse transcriptase/maturase"

 /codon\_start=1

 /transl\_table=11

 /product="putative reverse transcriptase and intron

 maturase"

 /translation="MSIKTWLDVDWALCEQRVYRLQKRIFTASQAENKGKVHFLQRKI

 LCSLDAKLIAVRRITQINKGRKIPGIDKKRIKNNKEKLLLARNLRIKGKASTIRAVCI

 NKAGKDEKRSLGIPIIEDRVLQMLVKLALEPEWEAKFEPNSYGFRPGRNSHDAIRAVF

 NQSRHKSQFVLDADIRKCFETISHQKLLKKLKTFPLIENQMKAWLTAGIMEKYSLLGS

 DKSIPNPQGTPQGSVISPLLANIALHGMEDLTKEYYSKNFYKGPSKTTLKDRKSQIGL

 IRYADDFVVLHKDEQVVHAIKALLSTWLYKHMGLELSSAKTSIKSTDNGYEFLGFHIT

 SLNVKEKNKPKCQISVSKTSKKKFLDKTRRIMQNNRAIAAGHLIILLSPIIIGWSNYF

 KYAECSTSFGQVKYGLFGQVRAWVFRRKSLGLRSRTKLKEKYFPPNTTVKFNGKVHTG

 NWIFTGTVLGRRGNLKQVFLPYPSWVLAKRWVKVKQKSSPFDGQDIYWSHRNIQYCNW

 NKRTIRLVKLQNYNCPICQRIFMENDILEIDHIIPIALGGTDNIRNLQVVHDFCHVKK

 STTDKKFIVEIRSPSLKI"

 exon 12895..12929

 /gene="psbD"

 /number=3

 intron 12930..15164

 /gene="psbD"

 /number=3

 CDS 13482..15077

 /note="group II intron reverse transcriptase/maturase"

 /codon\_start=1

 /transl\_table=11

 /product="putative reverse transcriptase and intron

 maturase"

 /translation="MLYLEFLVFLIVYWKNYMRKYTLRFQSQEDILVAWQNFEILSLG

 TWVINWSDISWKSCNDIVIQIRRRIYIKTVELNNFTDSANLPKFLILQLQLRSLQRKL

 LFCQSNLLVSVRHVTQPLSCETITNINFYKSITLDCTESLRLLMFIKSCLNVLEWQRY

 HFLLNQSSRINNSNLRIQVTVDHIFQYIVKNALEPEHTNIELYMLDKYSFRSSYKTIK

 SVVQSCVTLQQPWVLSVNIKEFFEIISFDYINSKIFKFPFFSLVNYWLSCSFLDDGPL

 CFLLLDILLSGLGPEIKSQLFYFSYRHNSSLVNYLKDYIPSYTYVRYLDSVILLCETE

 LKIKICRQILRDILNSRGLKLLVTKKIQFSHLSFGFDYLGVTVRIYCHYNIKSFRYQL

 LIKPSSSSITKVKYKIRSLFIQYRSYHVSTLLKKMNPLIKEWGLYYSKFYSQETFSNL

 DFYLYVLQSRYGGRNHPKKSRTWIINKYFGCFNLNRTDKWVFGIYSHGKVSYMEKFIW

 IPGIQEEIGFFACSSLENKFCII"

 exon 15165..15285

 /gene="psbD"

 /number=4

 intron 15286..16103

 /gene="psbD"

 misc\_feature 15544..15897

 /note="potential group II twintron"

 exon 16104..16126

 /gene="psbD"

 /number=5

 intron 16127..16904

 /gene="psbD"

 /number=5

 misc\_feature 16351..16373

 /note="3' motif for potential twintron"

 exon 16905..17093

 /gene="psbD"

 /number=6

 gene 17041..24400

 /gene="psbC"

 CDS join(17041..17194,19775..19887,20732..21350,22139..22239,

 23269..23387,24175..24400)

 /gene="psbC"

 /codon\_start=1

 /transl\_table=11

 /product="photosystem II CP43 chlorophyll apoprotein"

 /translation="MNNLYSLRRFFHVETLFNGTLTVGGRDQESTGFAWWSGNARLIN

 LSGKLLGAHVAHAGLIVFWAGAMNLFEVAHFVPEKPMYEQGLILLISSAVLGFGGVYH

 SIVGPETLEESFPFFGYVWKDKNKMTTILGIHLCLLGFGAYLLVWKAMYLGGIYDTWA

 PGGGDVRVITNPTLSPFVIFGYILKSPFGGDGWIPSVDNMEDVIGGHIWIGTLEILGG

 IWHILTKPFAWARRAFVWSGEAYLSYSLAAVSLMGLIAVPMVWFNTTVYPSEFFGPTG

 PEASQSQAFTFLVRDQRLGANVASAQGPTGLGKYLMRSPTGEIIFGGETMRFWDFRGP

 WLEPLRGPNGLDLNKLRNDIQPWQERRAAEYMTHAPLGSLNSVGGVATEINAVNYVNP

 RSWLSTSHFVLGFFFFIGHLWHAGRARAAAAGFEKGLDRNFEAALFMRPLD"

 exon 17041..17194

 /gene="psbC"

 /number=1

 intron 17195..19774

 /gene="psbC"

 /number=1

 CDS 17797..19185

 /gene="psbC"

 /codon\_start=1

 /transl\_table=11

 /product="ycf13"

 /translation="MVKYNKKSLDLWKYLSWETCSYNLYRLQNRMFKSLVLGDIRTVL

 QVQKLIMRSNSARFLAIREVTQVNVDKKISGIDGKISLTFTERFELNEYLRLNANNWK

 PQVLKMIPNLRKDGTTKFLKVATIADRTWQCLIIFMLEPLYQAQVRPYICGVSSPYSY

 FELQKFLFINLNVKAHGIQKRVLEVNLTGCFHSINLGLLMHKAIAPRGVKLGLYRTLQ

 IGFTPEFSKDIFLSRLGLNSLLSDIALNGIESIHPCIRYADTVIFILKPLDSGKVIVE

 KLNSFLINIGLDISCKKVKFLSSLMGFNFLGWHFRVFSNGNFRCTPSVENYKTFKRKI

 KHIVNNSNYGSFIKATKLSPIVKNWRFYHKFCNMEGSRNSLFYMQRRAFKVFNKEAKQ

 DRYSSKKLLDKAFPTLRKFDEEIFKTILESSSYHGHLKLKINSTDGHFSQGRDKFLLR

 VQNHRCIHCGVM"

 exon 19775..19887

 /gene="psbC"

 /number=2

 intron 19888..20731

 /gene="psbC"

 /number=2

 misc\_feature 20146..20499

 /gene="psbC"

 /note="potential group II intron"

 exon 20732..21350

 /gene="psbC"

 /number=3

 intron 21351..22138

 /gene="psbC"

 /number=3

 misc\_feature 21575..21597

 /gene="psbC"

 /note="3' motif for potential twintron"

 exon 22139..22239

 /gene="psbC"

 /number=4

 intron 22240..23268

 /gene="psbC"

 /number=4

 misc\_feature 22385..22407

 /gene="psbC"

 /note="3' motif for potential twintron"

 misc\_feature 22406..22426

 /gene="psbC"

 /note="3' motif for potential twintron"

 exon 23269..23387

 /gene="psbC"

 /number=5

 intron 23388..24174

 /gene="psbC"

 /number=5

 misc\_feature 23612..23634

 /gene="psbC"

 /note="3' motif for potential twintron"

 exon 24175..24400

 /gene="psbC"

 /number=6

 gene 24506..24587

 /gene="trnL"

 tRNA 24506..24587

 /gene="trnL"

 /product="tRNA-Leu"

 /anticodon=(pos:24539..24541,aa:Leu,seq:taa)

 gene 25123..25467

 /gene="rpl20"

 CDS 25123..25467

 /gene="rpl20"

 /codon\_start=1

 /transl\_table=11

 /product="ribosomal protein L20"

 /translation="MSRVKRGSVARKHRKKVLKFNKGFVGAHSTLYRPANQQSMKAFR

 YSYIDRRKRKRDFRKLWIRRINAASRIYGFSYNEFINKLKKSKVVLNRKVLSQIAILD

 VKSFKYLVDAVA"

 gene 25511..26347

 /gene="rps12"

 CDS join(25511..25872,26317..26347)

 /gene="rps12"

 /codon\_start=1

 /transl\_table=11

 /product="ribosomal protein S12"

 /translation="MPTIQQLIRFQRKKLQKKTKSPALKLCPQRRGVCTRVYTTTPKK

 PNSALRKVARVRLSSGFEVTAYIPGIGHNLQEHSVVLIRGGRVKDLPGVRYHVVRGSL

 DAAGVKNRTQGRSKYGVKRRRKQTYKAA"

 exon 25511..25872

 /gene="rps12"

 /number=1

 intron 25873..26316

 /gene="rps12"

 /number=1

 exon 26317..26347

 /gene="rps12"

 /number=2

 gene 26787..28046

 /gene="rps7"

 CDS join(26787..27047,27837..28046)

 /gene="rps7"

 /codon\_start=1

 /transl\_table=11

 /product="ribosomal protein S7"

 /translation="MSRRRIAKKRQINPDPIYNSTLVTMLINRLLLKGKKTVAQQIFY

 QAMKKIEESTQQDPLEVLRQAIVNVTPLVEVKARRVGGSTYQVPLEVKAERGTSLALR

 WLIKSARTRSGREMVSKLSNEIIDAFNNTGAAVRKREETHRMAEANKAYAQFRF"

 exon 26787..27047

 /gene="rps7"

 /number=1

 intron 27048..27836

 /gene="rps7"

 /number=1

 misc\_feature 27272..27294

 /gene="rps7"

 /note="3' motif for potential twintron"

 exon 27837..28046

 /gene="rps7"

 /number=2

 gene 28132..31190

 /gene="tufA"

 CDS join(28132..28206,30036..31190)

 /gene="tufA"

 /codon\_start=1

 /transl\_table=11

 /product="translation elongation factor EF-Tu"

 /translation="MAREKFERTKPHVNIGTIGHVDHGKTTLTAAITMTLATQGNSSA

 KGYADIDSSPEEKARGITINTTHVEYETEARHYAHVDCPGHADYVKNMITGAAQMDGA

 ILVVSGADGPMPQTKEHILLAKQVGVPNIVVFLNKEDQVDDEELLELVELEVRETLSA

 YEFPGDDIPVIAGSALLSVEALTANPEIKKGENKWVDKIFNLMDKVDSYIPTPERDTD

 KDFLMAVEDVFSITGRGTVATGRVERGVVNVGETVELVGLKDTKQTTVTGLEMFQKSL

 DSALAGDNCGILLRGIQKADIERGMVIAKPGTINPHTKFDSQVYILTKEEGGRHTPFF

 EGYRPQFYVRTTDVTGKIESFLADDGSRVQMVMPGDRIKMEVELIQPIAIEKGMRFAI

 REGGRTVGAGVVLNIIA"

 exon 28132..28206

 /gene="tufA"

 /number=1

 intron 28207..30035

 /gene="tufA"

 /number=1

 misc\_feature 28329..28350

 /gene="tufA"

 /note="3' motif for potential twintron"

 misc\_feature 28398..28418

 /gene="tufA"

 /note="3' motif for potential twintron"

 misc\_feature 28986..29008

 /gene="tufA"

 /note="3' motif for potential twintron"

 misc\_feature 29275..29299

 /gene="tufA"

 /note="3' motif for potential twintron"

 exon 30036..31190

 /gene="tufA"

 /number=2

 gene 31270..31863

 /gene="ycf4"

 CDS 31270..31863

 /gene="ycf4"

 /codon\_start=1

 /transl\_table=11

 /product="photosystem I assembly protein ycf4"

 /translation="MINFLNLSQGDIFRDENTFREKIIGSRRISNYFWATVIFLAASG

 FFIVGLSSYLQFNLVFFLDAKEIVFFPQGIVMCFYGVAGILLSIYQWLVILWKVGEGF

 NEFDKNKGIMRLFRWGFPGKNREIDLVYSLEDVEAIRVEIKEGINPSRTIFIRIKGKP

 NIPLTQVGAPLPLSEIEKKASELASFLKVSIEGLVDK"

 gene 31977..32048

 /gene="trnQ"

 tRNA 31977..32048

 /gene="trnQ"

 /product="tRNA-Gln"

 /anticodon=(pos:32009..32011,aa:Gln,seq:ttg)

 gene 32071..32157

 /gene="trnS"

 tRNA 32071..32157

 /gene="trnS"

 /product="tRNA-Ser"

 /anticodon=(pos:32105..32107,aa:Ser,seq:gct)

 gene complement(32424..32497)

 /gene="trnM"

 tRNA complement(32424..32497)

 /gene="trnM"

 /product="tRNA-Met"

 /anticodon=(pos:complement(32461..32463),aa:Met,seq:cat)

 gene complement(32517..32588)

 /gene="trnG"

 tRNA complement(32517..32588)

 /gene="trnG"

 /product="tRNA-Gly"

 /anticodon=(pos:complement(32554..32556),aa:Gly,seq:gcc)

 gene complement(32595..32667)

 /gene="trnT"

 tRNA complement(32595..32667)

 /gene="trnT"

 /product="tRNA-Thr"

 /anticodon=(pos:complement(32632..32634),aa:Thr,seq:tgt)

 gene 33935..35852

 /gene="psbK"

 CDS join(33935..33967,34472..34526,35782..35852)

 /gene="psbK"

 /codon\_start=1

 /transl\_table=11

 /product="photosystem II 3.9 kDa protein"

 /translation="MFNMNIEILFSLLLARLPEAYAPFDPIVDVLPIIPVLFFLLAFV

 WQASVSFR"

 exon 33935..33967

 /gene="psbK"

 /number=1

 intron 33968..34471

 /gene="psbK"

 /number=1

 exon 34472..34526

 /gene="psbK"

 /number=2

 intron 34527..35781

 /gene="psbK"

 /number=2

 misc\_feature 35589..35612

 /gene="psbK"

 /note="3' motif for potential twintron"

 exon 35782..35852

 /gene="psbK"

 /number=3

 gene 35933..36034

 /gene="psb30"

 CDS 35933..36034

 /gene="psb30"

 /codon\_start=1

 /transl\_table=11

 /product="photosystem II reaction center protein"

 /translation="MNFELIAQLGSLLLIVIAGPLVVVLLSARQGNL"

 gene 36815..36910

 /gene="psaM"

 CDS 36815..36910

 /gene="psaM"

 /codon\_start=1

 /transl\_table=11

 /product="photosystem I M-polypeptide"

 /translation="MGITSSQVFIALITALIPGFFTIRLVKELYK"

 gene 37176..37247

 /gene="trnR"

 tRNA 37176..37247

 /gene="trnR"

 /product="tRNA-Arg"

 /anticodon=(pos:37208..37210,aa:Arg,seq:tct)

 gene 37455..37568

 /gene="psbI"

 CDS 37455..37568

 /gene="psbI"

 /codon\_start=1

 /transl\_table=11

 /product="photosystem II I polypeptide"

 /translation="MLTLKIFVYTVVIFFISLFIFGFLSNDPGRNPNAKDM"

 gene 37641..37714

 /gene="trnD"

 tRNA 37641..37714

 /gene="trnD"

 /product="tRNA-Asp"

 /anticodon=(pos:37675..37677,aa:Asp,seq:gtc)

 gene 37815..39506

 /gene="petG"

 CDS join(37815..37859,39438..39506)

 /gene="petG"

 /codon\_start=1

 /transl\_table=11

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

 /translation="MVEPLLSGIVLGLIPSSIAGLFVTAYLQYRRGEQLTF"

 exon 37815..37859

 /gene="petG"

 /number=1

 intron 37860..39437

 /gene="petG"

 /number=1

 exon 39438..39506

 /gene="petG"

 /number=2

 gene 39571..39643

 /gene="trnK"

 tRNA 39571..39643

 /gene="trnK"

 /product="tRNA-Lys"

 /anticodon=(pos:39604..39606,aa:Lys,seq:ttt)

 gene 39689..39761

 /gene="trnF"

 tRNA 39689..39761

 /gene="trnF"

 /product="tRNA-Phe"

 /anticodon=(pos:39722..39724,aa:Phe,seq:gaa)

 gene 39816..47985

 /gene="psaA"

 CDS join(39816..40158,40986..41469,42244..42792,43616..43863,

 44673..44845,46754..46962,47736..47985)

 /gene="psaA"

 /codon\_start=1

 /transl\_table=11

 /product="photosystem I P700 apoprotein A1"

 /translation="MTISPPEREIKKVQVVVDRNPVETSFEKWAKPGHFSRTLSKGPA

 TTTWIWNLHADAHDFDSHTTDLEDISRKVFSAHFGQLAIIEIWISGMFFHGARFSNYE

 AWVMDPTHIKPSAQVVWPVVGQEILNGDVGGGFQGIQITSGFFQIWRASGITSELQLY

 STAIAGLIMAALLFFAGWFHYHKAAPKLEWFQNVESMLNHHLAGLLGLGCLSWAGHQI

 HISLPINKLLDAGVDAKEIPLPHEFMINRDLMAQLYPSFAKGLTPFFTLHWSEYSDFL

 TFRGGLNPVTGGLWLSDTAHHHLALAVLFIVAGHMYRTNWGIGHSMKEILETHKGPFT

 GQGHKGLYEIFTTSWHAQLSLNLATLGSLSIIVAQHMYAMPPYPYLATDYGTQLSIFT

 HHMWIGAFCIVGAAAHAAIFMVRDYDPTVNYNNLLDRVLRHRDSIISHLNWVCIFLGL

 HSFGLYIHNDTMSALGRPQDMFSDTAIQLQPVFAQWVQNTHYLAPNLTAPNADLATSA

 VWGGDIVTVGGKVAMMPIPLGTADFMVHHIHAFTIHVTVLILLKGVLFARSSRLIPDK

 ANLGFRFPCDGPGRGGTCQVSAWDHVFLGLFWMYNSISVVIFHFSWKMQSDVWGTVTA

 NGISHITGGNFAQSAITINGWLRDFLWAQASQVIQSYGSALSAYGLIFLGAHFIWAFS

 LMFLFSGRGYWQELIESIVWAHNKLKVAPAIQPRALSITQGRAVGVAHYLLGGIATTW

 SFFLARIIAVG"

 exon 39816..40158

 /gene="psaA"

 /number=1

 intron 40159..40985

 /gene="psaA"

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 exon 40986..41469

 /gene="psaA"

 intron 41470..42243

 /gene="psaA"

 /number=2

 exon 42244..42792

 /gene="psaA"

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 intron 42793..43615

 /gene="psaA"

 /number=3

 exon 43616..43863

 /gene="psaA"

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 intron 43864..44672

 /gene="psaA"

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 exon 44673..44845

 /gene="psaA"

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 intron 44846..46753

 /gene="psaA"

 /number=5

 misc\_feature 45046..45070

 /gene="psaA"

 /note="3' motif for potential twintron"

 CDS 45318..46634

 /gene="psaA"

 /note="group II intron reverse transcriptase/maturase"

 /codon\_start=1

 /transl\_table=11

 /product="putative reverse transcriptase and intron

 maturase"

 /translation="MVNVNWETVNWRLVQNRVSRIQYRIYEQKKRFKRYYLQHVLANS

 FETKFLALELTLQNYEVAVPLKSKRDIALQITFETTTNVVDTKVNVEFMTLLRFAIQR

 FLFYILVPYYYASSQFKTFIPFYRPIPHDIIKKIKKVLLKNNYQYAVQINLNFNYISN

 IVLLSVVQRLLVSPLLGSSIKPYLRYYQRHVSPRPKQYWKKISLPYYEPLKILFCDLL

 VYELLNQIQQLDNELNLILVPGRDKLVIFHLNLKVLKTILPSISKLSKKDICVYLHRK

 DLKIIKLSVGFSLYNFQIILLQTSNLTRKIHIFPGKKSQDSYLRKFSQICHKNRNVSA

 YILITKLRPLVLKWSMYFQYSNCIKVFIKVTYKSNQILRAWVFRRDNKNGRNVIKEKY

 FPSGNTYNFPRMSHKNNWVLCGEFNKNNLYKKKVFLPQLHWAPGLK"

 misc\_feature 46253..46277

 /gene="psaA"

 /note="3' motif for potential twintron"

 misc\_feature 46664..46686

 /gene="psaA"

 /note="3' motif for potential twintron"

 misc\_feature 46665..46685

 /gene="psaA"

 /note="3' motif for potential twintron"

 exon 46754..46962

 /gene="psaA"

 /number=6

 intron 46963..47735

 /gene="psaA"

 /number=6

 exon 47736..47985

 /gene="psaA"

 /number=7

 gene 48102..51873

 /gene="psaB"

 CDS join(48102..48770,49557..50873,51655..51873)

 /gene="psaB"

 /codon\_start=1

 /transl\_table=11

 /product="photosystem I P700 apoprotein A2"

 /translation="MATKFPKFSKGLAQDPTTRRIWFGIATAHDFESHDGMTEENLYQ

 KIFASHFGQLAIIFLWTSGNLFHVAWQGNFEQWVTDPLHIRPIAHAIWDPHFGQPAIE

 AFTRSNATGPVNIAFSGVYHWWYTIGMRTNNDLYNGSIFLLFVSALALFAGWLHLQPN

 YKPKVSWFKNAESRLNHHLSGLIGVSSLAWTGHLIHVAIPESRGQHVRWDNFLSTSPH

 PAGLGPFFSGNWSVYAQNPDSQSHIFGTSEGAGTAILTFLGGFHPETKSLWLTDMSHH

 HLALAVLFIIAGHMYRTNFGIGHNMQEILEAHNPPSGKLGAGHKGLYDTVNESLHFQL

 GLALACVGVAASLTAQHMYSLPAYAFMSQDYTTMAALYTHHQYIAGFVMSGAFAHGAI

 FFIRDYDPEQNKGNVLARMLEHKEAIISHLSWVSLFLGFHTLGLYVHNDAMQAFGTPE

 KQILIEPIFAQWIQAAQGKALYGFDVILSANSNTAISASETIWLPGWLSAINDSTNTL

 FLPIGPGDFLVHHAIALGLHTTTLILVKGALDARGSKLMPDKKDFGYSFPCDGPGRGG

 TCDISAWDAFYLAVFWMLNTIGWTTFYWHWKHITLWQGNVSQFDESSTYIMGWLRDYL

 WLNSSQLINGYNPFGMNSLAVWGWMFLFGHLVWATGFMFLISWRGYWQELIETLAWAH

 ERTPFATAVQWKDKPVALSIVQARLVGLAHFCVGYVFTYAAFLIASTSGKFG"

 exon 48102..48770

 /gene="psaB"

 /number=1

 intron 48771..49556

 /gene="psaB"

 /number=1

 exon 49557..50873

 /gene="psaB"

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 intron 50874..51654

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 exon 51655..51873

 /gene="psaB"

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 gene 52072..52317

 /gene="psbE"

 CDS 52072..52317

 /gene="psbE"

 /codon\_start=1

 /transl\_table=11

 /product="photosystem II cytochrome b559 alpha subunit"

 /translation="MAGSTGERPFSDIITSIRYWVIHSVTIPSLFVAGWIFVSTGLAY

 DVFGTPRPNEYFTETRKETPLISDRFGALEQMDQLIK"

 gene 52327..52449

 /gene="psbF"

 CDS 52327..52449

 /gene="psbF"

 /codon\_start=1

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 /product="photosystem II cytochrome b559 beta subunit"

 /translation="MTTNKFTYPIFTFRWLTIHALAVPTVFFIGAISSMQFIQR"

 gene 52994..53110

 /gene="psbL"

 CDS 52994..53110

 /gene="psbL"

 /codon\_start=1

 /transl\_table=11

 /product="photosystem II L protein"

 /translation="MTQPNPNKQSVELNRTSLYWGLLLIFVLAVLFSSYIFN"

 gene 53186..53314

 /gene="psbJ"

 CDS 53186..53314

 /gene="psbJ"

 /codon\_start=1

 /transl\_table=11

 /product="photosystem II J protein"

 /translation="MSNSGTTGRIPLWFVGTIAGTAAIGILALFFYGSYSGLGSSL"

 gene 53422..53532

 /gene="psaI"

 CDS 53422..53532

 /gene="psaI"

 /codon\_start=1

 /transl\_table=11

 /product="photosystem I 4 kDa polypeptide subunit"

 /translation="MSASFLPSIFVPLIGLVLPVLFVTSFFIYVGKDQIN"

 gene complement(54072..54153)

 /gene="trnY"

 tRNA complement(54072..54153)

 /gene="trnY"

 /product="tRNA-Tyr"

 /anticodon=(pos:complement(54117..54119),aa:Tyr,seq:gta)

 gene 54377..54988

 /gene="rps4"

 CDS 54377..54988

 /gene="rps4"

 /codon\_start=1

 /transl\_table=11

 /product="ribosomal protein S4"

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 APTIVGARQLVSHGHILVNGKSVNIPSYQCQPRDILSVKNSKSSKGLVEKNLEALGNV

 VIPDHLSFNKDQLEGKVNNIIDRKSVALIINELLVVEYYSRKV"

 gene 55036..55428

 /gene="rps11"

 CDS 55036..55428

 /gene="rps11"

 /codon\_start=1

 /transl\_table=11

 /product="ribosomal protein S11"

 /translation="MARQQKKTGVRNIKRKVSKGVVHIKATFNNTIVSITDPKGEVIS

 WSSAGACGFKGARKGTPFAAQTAAENAAKKSLDQGMRQVEIIVTGPGAGRETAIRSIQ

 TAGLGISIIRDITPVPHNGCRPPKKRRV"

 gene 55633..56427

 /gene="rpoA"

 CDS 55633..56427

 /gene="rpoA"

 /codon\_start=1

 /transl\_table=11

 /product="RNA polymerase alpha subunit"

 /translation="MYQPKLSKLLTIECIEHKVSEANSRYGRFKIGPLNTGQGITVGN

 SLRRTLLSDITGLAITNAKINVENISGISELVESDSELIIPKFHEFSTIPGVRESVLE

 ILLNLKNIILSDNSTDFAEDQLGSLQCTGPCQITARDLILPETIKVVDPDQYIATMVS

 NQIFSIKVIIKHGRGVTEIPVQLDLKTQQKDCFDFLTIDATYIPIKKVNYTIEEKFLG

 DGIDSLKELITLEVWTNGSVKPQKAVSSAINTLVDLYLSIQNTMVV"

 gene 56940..57338

 /gene="rps9"

 CDS 56940..57338

 /gene="rps9"

 /codon\_start=1

 /transl\_table=11

 /product="ribosomal protein S9"

 /translation="MAPTTQYKSTGRRKSAVAQVILIPGSGKIIINGKDGTEYMQYNP

 RLVSTIQSPLNLLSLEEGYDVLVRSSGGGLSGQAEAIRLGIARALCKLDVTNRGPLKS

 EGFLTRNALCVERKKYGLKKARKAPQYSKR"

 CDS 57647..58042

 /codon\_start=1

 /transl\_table=11

 /product="ribosomal protein L12"

 /translation="MSIKTDEIIEQLKGITLLEASELVAQIEETFGVDASAPTGGMMV

 AAMPGLGGGAAEAVEEKTEFDVVIEEVPSAKRITVIKVVRNLTSLGLKEAKGLIESTP

 KAVREGVSKEEAEDAKKQLEEAGATVSIK"

 CDS 58960..59154

 /codon\_start=1

 /transl\_table=11

 /product="photosystem II protein Z"

 /translation="MDIILVFQFSLLALIAVSLLMVIAVPVVFATPDGWNGNKQYVLT

 GAAAWAGLVFVVGALNSVVV"

 gene complement(59252..59336)

 /gene="trnS"

 tRNA complement(59252..59336)

 /gene="trnS"

 /product="tRNA-Ser"

 /anticodon=(pos:complement(59300..59302),aa:Ser,seq:tga)

 gene complement(59368..59441)

 /gene="trnP"

 tRNA complement(59368..59441)

 /gene="trnP"

 /product="tRNA-Pro"

 /anticodon=(pos:complement(59405..59407),aa:Pro,seq:tgg)

 gene 59548..59673

 /gene="psaJ"

 CDS 59548..59673

 /gene="psaJ"

 /codon\_start=1

 /transl\_table=11

 /product="photosystem I 5kDa protein"

 /translation="MKDFTTYLSTAPVIATIWFGLLAGLLIEINRFFPDALTFAF"

 CDS complement(59877..61379)

 /note="group II intron reverse transcriptase/maturase"

 /codon\_start=1

 /transl\_table=11

 /product="putative reverse transcriptase and intron

 maturase"

 /translation="MLNIHMSKAITNNWSNVSWRFLRGKVFNIQCRIYQATKANKKRT

 TRNLQKVLLSSKSAKFVAMYRTTEIFSNDKSTNPNISNLIKLDNKMTENIISAVRNGS

 HSKHQLLLESTKQYLVRLVLEPEWESFFTNNEIASFGFRPGYCVHDAIQSILNQICSS

 HPYVFSTNIIRLDNKVNSTHLLQFLHLDDFPLLQAQIESWLNGGCLDKRDFLYCGNKN

 YSTLSFLLVNIILSRIPSVIKLAQLDFQNFNNGKTSANISIVQYGDSLVFSYPEINGL

 IHIKKSLDKFLLPIGLIMDQSEYGITHITNYRTHSKPGFNFLGVYIRKYRSITGRYKL

 VVTPKFSKVKEHLCHIRQVVRSNKSSPARRIIQLLNPIIQGWAYYYHYTNPTKIFNFC

 DFRIRIILRRWMVYRHPMKSWQWLRKKYFVYLSKDTHNIIKSDRFFDNNFRSNSLSYT

 FNSIILNRHTETYLSTWTNVDKRRSFFDGDFCYWRIKLQNFPELDHRKLI"

 gene complement(61586..61801)

 /gene="rps18"

 CDS complement(61586..61801)

 /gene="rps18"

 /codon\_start=1

 /transl\_table=11

 /product="ribosomal protein S18"

 /translation="MAISYNRTSSIKPSEVIDYKNIDLLRKFITVQGKILPRRITKLT

 AKQQRAVTSSIKQARTLGLLPFINKES"

 gene complement(62185..63696)

 /gene="atpA"

 CDS complement(62185..63696)

 /gene="atpA"

 /codon\_start=1

 /transl\_table=11

 /product="ATPase alpha subunit"

 /translation="MVKIRPDEISSIIRQQIEQYNQEVKVVNVGTVLQVGDGIARIYG

 LEKVMAGELVEFDEGTVGIALNLEADNVGAVLMGDGFKIQEGSSVKATGKIAQIAVGE

 NYLGRIVDALARPIDGKGEIASSETRLIESPAPGIIARRSVYEPLQTGLVAIDAMIPI

 GRGQRELIIGDRQTGKTAVATDTILNQQGQGVICVYVAIGQKASSVAQIVNTLEERGA

 MDYTIVVAENADAPATLQYLAPYTGAALAEFFMYTGRHTLVIYDDLSKQAQAYRQMSL

 LLRRPPGREAYPGDVFYLHSRLLERAAKLSDELGEGSMTALPIVETQAGDVSAYIPTN

 VISITDGQIFLSSDIFNSGIRPAINVGISVSRVGSAAQIKAMKQVAGKLKLELAQFAE

 LEAFAQFSSDLDATTQAQLARGQRLRELLKQSQSSPLVVADQVATIFTGVNGFLDDIA

 VEDVPAFLTGLREYINTNKPNYAEIINSTKAFTSEAEGIVKSAISEYKAVFSK"

 gene complement(63796..65155)

 /gene="atpF"

 CDS complement(join(63796..64320,65135..65155))

 /gene="atpF"

 /codon\_start=1

 /transl\_table=11

 /product="ATPase subunit I"

 /translation="MIVSNINNTFASVAESEGFGINTDLFETNILNLAVVVGVLVYFG

 KDILSDTLKTRKEAILKSLQDADNKFQEATDKLNDAKKQFDFAKIRAEEITAQGLVTA

 EKSSNKLLARVEDDIKRLEDGKVATLRFEEEKAVTEVCEKVSRLALDQAVDNLNKRLN

 PALQQRIIQLNLALLRNLVTK"

 exon complement(63796..64320)

 /gene="atpF"

 /number=2

 intron complement(64321..65134)

 /gene="atpF"

 /number=1

 misc\_feature complement(64928..64950)

 /gene="atpF"

 /note="3' motif for potential twintron"

 exon complement(65135..65155)

 /gene="atpF"

 /number=1

 gene complement(65239..66262)

 /gene="atpH"

 CDS complement(join(65239..65399,66175..66262))

 /gene="atpH"

 /codon\_start=1

 /transl\_table=11

 /product="ATPase subunit III"

 /translation="MNPIICGASVIGAGLAIGLGAIGPGIGQGTAAGAAVEGIARQPA

 QEGKIRGTLLLSLAFMEALTIYGLVVALAIIFANPFVG"

 exon complement(65239..65399)

 /gene="atpH"

 /number=2

 intron complement(65400..66174)

 /gene="atpH"

 /number=1

 exon complement(66175..66262)

 /gene="atpH"

 /number=1

 gene complement(66547..67275)

 /gene="atpI"

 CDS complement(66547..67275)

 /gene="atpI"

 /codon\_start=1

 /transl\_table=11

 /product="ATPase subunit IV"

 /translation="MDAIVFNSIYEIASVEVGQHFYWSLGDYEVHGQVLINSWIVIGV

 IILGGTLTTRELKTIPESGQNFAEILTEFIRDIAKTQIGEKEYKKWVPYLGTLFLFIF

 VANWSGALIPWKIIELPNGELGAPTNDINTTAGLALLTSAAYFYAGLGKRGLEFFTKY

 IEPTPVLLPINVLEDFTKPLSLAFRLFGNILADELVVGVLVSLVPLIVPIPLIFLGLF

 TSGIQALIFATLSGAYIGEAMEGH"

 gene complement(67341..69433)

 /gene="rps2"

 CDS complement(join(67341..67600,68522..68758,69250..69433))

 /gene="rps2"

 /codon\_start=1

 /transl\_table=11

 /product="ribosomal protein S2"

 /translation="MITVKQMVDSGVHLGHQVRRWNPKMASYIYGERNGIHIIDILQT

 LICLSDTTDYLVKAGKENKTILFVGTKRQFASIIESCAEKSNSHYVNQRWLGGMLTNW

 STMKVCIENLQILNQQEEDGTLSRLTKKEAAILNKRKDKLEKYFGGVKEMGSLPDVVI

 LVGQPRELIAVKECIKLGIKTITITDTNCDPTLTDFAIPGNDDSIRSVELILNELTDS

 IVKGQNTK"

 exon complement(67341..67600)

 /gene="rps2"

 /number=3

 intron complement(67601..68521)

 /gene="rps2"

 /number=2

 misc\_feature complement(67786..68297)

 /gene="rps2"

 /note="potential group II twintron"

 exon complement(68522..68758)

 /gene="rps2"

 /number=2

 intron complement(68759..69249)

 /gene="rps2"

 /number=1

 exon complement(69250..69433)

 /gene="rps2"

 /number=1

 gene complement(69699..69770)

 /gene="trnC"

 tRNA complement(69699..69770)

 /gene="trnC"

 /product="tRNA-Cys"

 /anticodon=(pos:complement(69736..69738),aa:Cys,seq:gca)

 gene 70830..77040

 /gene="rpoB"

 CDS join(70830..71384,72251..73379,74492..75352,76127..77040)

 /gene="rpoB"

 /codon\_start=1

 /transl\_table=11

 /product="RNA polymerase beta subunit"

 /translation="MIKNFVLPDLIEIQRASFISFLEKGLSEELENISSIKTEDGKLE

 LILHTSKLKFKRPKFSPQDAIKKAQTYSAALYVPAQINYNNRFKSKLQNICFGEIPLM

 TERGTFIINGSPRVIVNQIVRSPGIYYKAEFNKENQKTFTGTIISNRGSWFRIETDKD

 GYVWAKIDKVKKIPIFILLQAFGLPQKKIFYAVRHPEFLVKSLEKGNPTTTFEALILL

 HSLLRPDKQATVKDARNLIYSNFMDPKRYDLGEVGRLKLNKKLKISTSPKCRSLRPED

 ILAAIDYLINLDFGIGSIDDIDDLKNRRIRSSGELIQNQIRIGISRVERITHEKLEKF

 QKKENITNSQLLNKNSKLKTQLDNVHTPATLISSKPLISSLREFFGSSQLSQFMDETN

 SLSEITHKRRITSFGPGGLNRERAGLAVREIHPSHYGRICPIETPEGPNAGLVGSITT

 YARINKHGFIESPFYKVRDKIVNRNVSPFFLSAEQEENAALAPGDLLISSNGELQIRD

 KLIPIRYKQEFTTALPENVNYMAISPIQMISVATALIPFLEHDDANRALMGSNMQRQA

 VPVINSQRPVVGTGLELQTARDCGSTIIAKKSGFVQDVSAEKIIIDSSPTYLRNFTDH

 TNKYKNFSKSLRFQSLITEPIKRHKKFIKFKDLSNLFLDKKISIDDHLLKLIANTKKD

 KIKKRVNEKNLDIYKLQKYQRSNQDTCINQKPLVHQGEWVKKGDILADGASTSKGELA

 LGQNILIAYMPWEGYNFEDAILISERLVQDNVYTSIHIEKYEVQIQQTKLGPEETTKN

 IPNISNLATRYLDKNGIIIPGTWVESGDILVGKVTPKGESDQTPEGRLLRAIFGEKGR

 DVKNTSLKVPNGVKGRVIDIQIFQKTSIHVYLAQKRKIQVGDKIAGRHGNKGIISNIL

 PCQDMPYLQDGTPVDMVLNPLGVPSRMNVGQVLECLLGLAGKNLDENYKIVPFDEMHG

 NETSRNLVYNKLYEARKKTGHKWLFDPNSPGKSRLFDGRTGESFEQPITVGYAYMLKL

 VHLVDDKIHARSTGPYSLVTQQPLGGRAKNGGQRLGEMEVWALEGFGAAYTLQELLTV

 KSDDIKGRNDALNAIIKGKTIPNPGTPESFKVLIRELQSLCLDIGLYNIDKFNNTKEI

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 exon 70830..71384

 /gene="rpoB"

 /number=1

 intron 71385..72250

 /gene="rpoB"

 /number=1

 misc\_feature 71645..72000

 /gene="rpoB"

 /note="potential group II twintron"

 exon 72251..73379

 /gene="rpoB"

 /number=2

 intron 73380..74491

 /gene="rpoB"

 /number=2

 misc\_feature 73826..73849

 /gene="rpoB"

 /note="3' motif for potential twintron"

 exon 74492..75352

 /gene="rpoB"

 /number=3

 intron 75353..76126

 /gene="rpoB"

 /number=3

 misc\_feature 75560..75584

 /gene="rpoB"

 /note="3' motif for potential twintron"

 exon 76127..77040

 /gene="rpoB"

 /number=4

 gene 77235..80176

 /gene="rpoC1"

 CDS join(77235..77246,77603..79479,80134..80176)

 /gene="rpoC1"

 /codon\_start=1

 /transl\_table=11

 /product="RNA polymerase beta' subunit"

 /translation="MIEYEYIRIHLASPERVRQWSERLLPNGTKIGEVTKSETINYRT

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 LGYIQLASPVTHVWYLKSIPSYIAILLDKPIKEIEKIVYFTGYLAINPDSINYTIPPG

 NDWNYYRWYYSKSFFNGNKKPQENLKTAQGTLLDNIIGAQAIQNLLSEINLEYTAQNI

 REDLKSIQKTDALTEIELGKIFRKKKKHVRRLRLINYFIQTKSKPEWMVLSCLPVLPP

 DLRPMVQLDGGRFATSDLNDLYRRVINRNNRLLRLTKMLAPEILIRNEKRLLQESVDA

 LIDNGKRGKAVAGTNNRPLKSLSDIIEGKQGRFRQNLLGKRVDYSGRSVIVVGPKLKL

 HECGLPKEMAIELFQPFVIHKLIQLRLANNIRGAKIKIQQNEPVIWEILEKVIKGHPV

 LLNRAPTLHRLGIQAFQPKLVRGRAIQLHPLVCPAFNADFDGDQMAVHVPLSLEAQAE

 ARILMLASNNWTSPATGHPILVPSQDMILGCYFLTIENLSLYNLLQEIKYFTGLNDAL

 LAYEQKKIGLHSFIWIRSNLKEYTKNSIEIKIENNSIILKKEHENITIEGNKKQNLVQ

 YIRTTTGRLLFNQVIKEFL"

 exon 77235..77246

 /gene="rpoC1"

 /number=1

 intron 77247..77602

 /gene="rpoC1"

 /number=1

 misc\_feature 77448..77467

 /gene="rpoC1"

 /note="3' motif for potential twintron"

 exon 77603..79479

 /gene="rpoC1"

 /number=2

 intron 79480..80133

 /gene="rpoC1"

 exon 80134..80176

 /gene="rpoC1"

 /number=3

 gene 80269..83235

 /gene="rpoC2"

 CDS 80269..83235

 /gene="rpoC2"

 /codon\_start=1

 /transl\_table=11

 /product="RNA polymerase beta'' subunit"

 /translation="MESFFCNRTFDKGEMRKLIQWFLVNYGTARTAKLVDRLKTVGFH

 YATKAGISLGIDDLKIPPIKTRLLMNAETKIEENEKHFLSGKITAVERLQKVIDVWNT

 TNELLKNEVIIHFRQTDLLNPVYMMAFSGARGNISQVRQLVGMRGLMADSRGEIIDLP

 IKSNFREGLNVTEYLISCYGARKGLVDTALRTANSGYLTRRLVDVAQSVIINKTDCGT

 YHGILVNPLIKDKKTYISIEKRLIGRVLAKDVFDIQNKKLIASRGQDICSYLAPKILK

 NTTQRLYVRSPLTCESNRGICQLCYGWSLAHGRLAQIGEAVGIIAAQSIGEPGTQLTM

 RTFHTGGVFAGNVADRIYAPHDGILEYFSDSGGKKIRTRYGEDVFFTFTEKRLFIKET

 ELNTSTLTLPRYTIIFIKPGQKIFARQIIAEMSSITEIVPSSDKNDWVEASKEVKTNI

 GGQIYFDNLITVQQHNASEKIQQINKNQNVTKAKENGLVWVLNGNLFSFLTIFKKLSI

 ESKQRYTLSEMKISKNRKFQIFIDNVCNKSIYKKNQNIKHRILQPCSPTFTNLETYNY

 RNKQIHDKNYENPYRYQFYTKNLNIKINLSKVQQLKKQVKIDFHQNKVKAIRKNRLGK

 DYKTYKKPIPHCETSYLEKYDNINFCSQDIKRYPKELSFDYQNLNKQKHCQYEEITVL

 TSNKQCLIHNTENQVIFDTQLRTLKVNIGDLICKGNEIADSLRSTQSGQIISIQHNQI

 ILRKGIPNLASENTLVGVNNRDLIAKNNLLFHLVYKKPKTGDIVQGLPKIEELLEARR

 TKDLQTIVDNPHEKLRQQFNFYKQKYDNAIATRKSAEKIQQFLVNGIQLVYQSQGIEI

 SDKHIEIIVKQMTSKVLIEEGGETSLLSGEVIEINRIEKINKNIIKKAEYQPILLGIT

 KASLNTESFISAASFQETTRVLIQAAVEGKTDWLYGLKENVILGRLIPAGTGFQTKEK

 STTKLLQTPTANKFDN"

 gene 83453..83525

 /gene="trnV"

 tRNA 83453..83525

 /gene="trnV"

 /product="tRNA-Val"

 /anticodon=(pos:83486..83488,aa:Val,seq:tac)

 CDS 84175..84516

 /codon\_start=1

 /transl\_table=11

 /product="hypothetical protein"

 /translation="MKKIQRRFTGGDNPFKQPSLKKFGFRDIGVPFNFTLVKDIHATI

 ECCLDIRKRFVNQEFLNFCYTNVDRVLTQEILNQTVVMRGEDIPSWLKPIEKRCLVCT

 LLCLLNRPHRN"

 gene complement(85824..85939)

 /gene="rrn5"

 rRNA complement(85824..85939)

 /gene="rrn5"

 /product="5S ribosomal RNA"

 gene complement(86000..88870)

 /gene="rrn23"

 rRNA complement(86000..88870)

 /gene="rrn23"

 /product="23S ribosomal RNA"

 gene complement(88925..88997)

 /gene="trnA"

 tRNA complement(88925..88997)

 /gene="trnA"

 /product="tRNA-Ala"

 /anticodon=(pos:complement(88962..88964),aa:Ala,seq:tgc)

 gene complement(89057..89130)

 /gene="trnI"

 tRNA complement(89057..89130)

 /gene="trnI"

 /product="tRNA-Ile"

 /anticodon=(pos:complement(89094..89096),aa:Ile,seq:gat)

 gene complement(89222..90705)

 /gene="rrn16"

 rRNA complement(89222..90705)

 /gene="rrn16"

 /product="16S ribosomal RNA"

 gene complement(91544..92605)

 /gene="psbA"

 CDS complement(91544..92605)

 /gene="psbA"

 /codon\_start=1

 /transl\_table=11

 /product="photosystem II core 32 kDa protein"

 /translation="MTATLERRESTSLWARFCSWITSTENRLYIGWFGVLMIPTLLTA

 TSVFIIAFIAAPPVDIDGIREPVSGSLLYGNNIISGAVIPTSNAIGLHFYPVWEAASL

 DEWLYNGGPYQLIVTHFFIGICCYMGREWELSFRLGMRPWIAVAYSAPVAAATAVFII

 YPLGQGSFSDGMPLGISGTFNFMIVFQAEHNILMHPFHMLGVAGVFGGSLFSAMHGSL

 VTSSLIRETTENESANAGYKFGQEEETYNIVAAHGYFGRLIFQYASFNNSRSLHFFLA

 AWPVVGIWFTALGVSTMAFNLNGLNFNQSVVDSQGRVINTWADIINRANLGMEVMHER

 NAHNFPLDLAAIEAPSVNG"

 gene 92854..93159

 /gene="ycf65"

 CDS 92854..93159

 /gene="ycf65"

 /codon\_start=1

 /transl\_table=11

 /product="putative ribosomal protein 3"

 /translation="MNKYVLKFLWLEKSIAVALDQQIGENTSPITEYFFWPRKDAWEE

 LKTELEKKPWISQNEAIVLLNQTTEVINYWQEENGTNRRDLQKAKSKFPECLFIGHD"

 gene complement(93219..94483)

 /gene="rps14"

 CDS complement(join(93219..93344,94307..94483))

 /gene="rps14"

 /codon\_start=1

 /transl\_table=11

 /product="ribosomal protein S14"

 /translation="MAKKSMVEREAKRQKLVAKHNASREILKAKIKEADSFEAKLNYH

 RQLQALPRNSAPSRLHNRCMVTGRPKGYYRFFGLSRHVLREMAHEGILPGVKKASW"

 exon complement(93219..93344)

 /gene="rps14"

 /number=2

 intron complement(93345..94306)

 /gene="rps14"

 /number=1

 exon complement(94307..94483)

 /gene="rps14"

 /number=1

 gene complement(94517..94600)

 /gene="trnM"

 tRNA complement(94517..94600)

 /gene="trnM"

 /product="tRNA-Met"

 /anticodon=(pos:complement(94564..94566),aa:Met,seq:cat)

 gene complement(94713..94826)

 /gene="rpl36"

 CDS complement(94713..94826)

 /gene="rpl36"

 /codon\_start=1

 /transl\_table=11

 /product="ribosomal protein L36"

 /translation="MKVRASVRKICEKCRLIRRKTRVMVICSNPKHKQRQG"

 gene complement(94993..95409)

 /gene="rps8"

 CDS complement(94993..95409)

 /gene="rps8"

 /codon\_start=1

 /transl\_table=11

 /product="ribosomal protein S8"

 /translation="MVNDIVSDMLTRIRNANLVKAQIVLVPRTKMTVSVSDILKQEGF

 IQSFEELDIPTKGQKYVNKFLVLCLKYKGPKQKPYITALKRISKPGLRVYVNQTHIPR

 VLGGIGMAILSTSKGLMTDRQARINKLGGEVLCYIW"

 gene complement(95487..96026)

 /gene="rpl5"

 CDS complement(95487..96026)

 /gene="rpl5"

 /codon\_start=1

 /transl\_table=11

 /product="ribosomal protein L5"

 /translation="MQRLKKIYLKDVIPQLKEQFNYINLQQVPQLKKIVINRGFGENY

 QNVKVLESSLDELTNISGQRGIITKSKKAIASFKVREGMPVGMTVTLRGDKMYGFLDR

 LINLSLPRIRDFQGVSSKSFDSRGNYSIGFDDQLMFPEVDFDKVNQTQGMDITIVTSA

 KTDPEGVALLKALGMPFKS"

 gene complement(96085..96450)

 /gene="rpl14"

 CDS complement(96085..96450)

 /gene="rpl14"

 /codon\_start=1

 /transl\_table=11

 /product="ribosomal protein L14"

 /translation="MIQPQTYLNVADNSGARKIMCIQVLGSNRQYASIGDVIVAVVKD

 ATPNMPLKKSDVVKAVIVRTCKALRRESGMTIRFDDNAAVVVSAEGAPKGTRVFGPVA

 RELRDKNFIKIVSLAPEVL"

 gene complement(96521..96928)

 /gene="rpl16"

 CDS complement(96521..96928)

 /gene="rpl16"

 /codon\_start=1

 /transl\_table=11

 /product="ribosomal protein L16"

 /translation="MLSPKRTKYRKYHRGNMRGKALRGNKLSFGEIGLQATEAGWITS

 RQIEAARRVITRTARRGGKLWIRIFPDKPVTFRAAETRMGSGKGNVEYWVAVVKPGKV

 LYEIKGVAELVARSAMKTASYKMPVKTRIISKL"

 CDS complement(96992..97300)

 /codon\_start=1

 /transl\_table=11

 /product="putative reverse transcriptase and intron

 maturase"

 /translation="MRLELDANKFACSVLRENAFLVLLNIIDWTNFYKDSDYFYVVCL

 EVDIYLFRLLWKWVHKRHPSRSSIWLLKRYWCKKYGKFIFYNFAPTISRSYTLVFHCQ

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 CDS complement(98473..98985)

 /codon\_start=1

 /transl\_table=11

 /product="putative reverse transcriptase and intron

 maturase"

 /translation="MSRIQRDLLVRIFGRFFKNLPSTFSGLDNFVKEKFRIQSRSIEL

 LFPIFVRYFNTILLTGQNPVQLYMFRYIFSEFISIRGLRITVSTIPVYFCEGFTFLSW

 YFYQTYNGVFFCTLSKSTLRFHKRLLKSIVKNSLALPVNVLIRQLNNQVRQAHYFVLP

 VPNSGGFIST"

 CDS complement(101296..101958)

 /note="putative reverse transcriptase and intron maturase"

 /codon\_start=1

 /transl\_table=11

 /product="hypothetical protein"

 /translation="MLVRSLFSSIRNKNWLTIKWVIVERRVLRVQHLIVRATQKIDRR

 TLRVFQKLLVRSFFSRLKSIRYVTQEDTKRFIPGGDGEIVVSNESKFSLALNFAINSN

 VTKLRLIYFFTKECLYRSILVPTLRERVFQVLWNLALVPVVESTRDSLVYTFPRSQVT

 DDYSKSVKNYFEFPYSLSWISTVSIEPIQESFKSIWLLCNAPMDRQVCKGWQRDNFLV

 QI"

 gene complement(102050..102694)

 /gene="rps3"

 CDS complement(102050..102694)

 /gene="rps3"

 /codon\_start=1

 /transl\_table=11

 /product="ribosomal protein S3"

 /translation="MGQKVNPLGFRIGITQDHRSHWYAKPSDYSSLLMEDNFIRSYVN

 SKLSEAGISLVKIQRKSDHLQIDIHAERPSIIIGRNNSGLDTFRQDLNNQLSRKFTLR

 DIQLNIIEVTNPDSHSKLLAEFISQQLESRVPFRRVVRNATQRAQKAGVKGIKIQIAG

 RLNGAEIARSEWVREGQVPLQTLRANIDYCSHKAHTIYGILGIKVWIYAPNVSS"

 gene complement(102865..103218)

 /gene="rpl22"

 CDS complement(102865..103218)

 /gene="rpl22"

 /codon\_start=1

 /transl\_table=11

 /product="ribosomal protein L22"

 /translation="MSAIKSLEAKAFSRYVRMSPFKVRRILDQIRGRSYEEALMILEF

 MPYSGCKPVLKVLCSAASNAKHRFGTPKSSLFVCEARADKGPIMKRFRPRAQGRGFPI

 QKPTCHIVITVSESS"

 gene complement(103275..103553)

 /gene="rps19"

 CDS complement(103275..103553)

 /gene="rps19"

 /codon\_start=1

 /transl\_table=11

 /product="ribosomal protein S19"

 /translation="MSRSIKKGPFVADHLLKKIEKMDSGGKRSVIITWSRASTVLPVM

 IGHTIAVYNGQEHIPVLISDQMVGHKLGEFSPTRTYRGHVKSDKKSKR"

 gene complement(103639..104472)

 /gene="rpl2"

 CDS complement(103639..104472)

 /gene="rpl2"

 /codon\_start=1

 /transl\_table=11

 /product="ribosomal protein L2"

 /translation="MGIRFYKARTSGTRNRSVSDFSEITKSKPEKSLTYYKHRARGRN

 NRGVITSRHRGGGHKRLYRQIDFKRNKLGVLAKVYSVEYDPNRNARIALLHYEDGEKR

 YILQPNGLSVGDKVISNFDVPIQIGNAAPLKNIPLGTEVHNIELQPGKGGQLARAAGS

 LAQIVAKEGNYVTLRIPSGEVRLIEKNCWATIGQIGNIEASNIVIGKAGRKRWLGKTP

 KVRGVVMNPCDHAHGGGEGRSPIGRARPVTPWGRPALGQKTRKAKRYSNAFVIRSRKS

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 CDS complement(104715..104993)

 /codon\_start=1

 /transl\_table=11

 /product="ribosomal protein L23"

 /translation="MIDLLKYPVLTEKATRLLERNQYTFDVDLRLNKTVIKSTIEELF

 KVKVIAVNTYIPPRKKRRLGRFAGFKPAYKRVILTLKSDDSIPLFPES"

 gene complement(105141..107342)

 /gene="rbcL"

 CDS complement(join(105141..106278,107053..107342))

 /gene="rbcL"

 /codon\_start=1

 /transl\_table=11

 /product="RuBisC/O large subunit"

 /translation="MSPQTETKTGAGFKAGVKDYRLTYYTPEYQIAETDILAAFRMTP

 QPGVPAEECGAAVAAESSTGTWTTVWTDGLTQLDRYKGRCYDLEPVPGEENQYIAYIA

 YPIDLFEEGSVTNLLTSIVGNVFGFKALRSLRLEDLRIPPAYSKTFAGPPHGIQAERD

 RLNKYGRAMLGCTIKPKLGLSAKNYGRAVYECLRGGLDFTKDDENVNSQSFMRWRDRF

 MFCAEAIYKAQTETGEVKGHYLNVTAGTCEEMYKRAEYAAEIGVPIIMHDYITGGFTS

 NTSLALYCRDNGLLLHIHRAMHAVIDRQRNHGIHFRVLAKTLRMSGGDHLHSGTVVGK

 LEGEREVTLGFVDLMRDPYVEKDRSRGIYFTQDWCGMGGTMPVASGGIHVWHMPALVE

 IFGDDACLQFGGGTLGHPWGNAPGAVANRVALEACVQARNEGRDLAREGGDVIRAACK

 WSPELASACEVWKEIKFEFETIDKL"

 exon complement(105141..106278)

 /gene="rbcL"

 /number=2

 intron complement(106279..107052)

 /gene="rbcL"

 /number=1

 misc\_feature complement(106844..106864)

 /gene="rbcL"

 /note="3' motif for potential twintron"

 exon complement(107053..107342)

 /gene="rbcL"

 /number=1

 gene complement(107587..109996)

 /gene="atpE"

 CDS complement(join(107587..107820,108650..108687,

 109861..109996))

 /gene="atpE"

 /codon\_start=1

 /transl\_table=11

 /product="ATPase epsilon subunit"

 /translation="MSLEVSIIVPDRVFWKNDAQEIIFPTLTGQMGVLENHIPLLTGL

 DTGVMKVRQGENWIAVAVMGGFALVNENKVTILVNEAVVSSDIDAQEAEAMYLQTKSV

 FEKAAEGSKEKSEANVQYKKALARFEVTKELVI"

 exon complement(107587..107820)

 /gene="atpE"

 /number=3

 intron complement(107821..108649)

 /gene="atpE"

 /number=2

 exon complement(108650..108687)

 /gene="atpE"

 /number=2

 intron complement(108688..109860)

 /gene="atpE"

 /number=1

 misc\_feature complement(109056..109075)

 /gene="atpE"

 /note="3' motif for potential twintron"

 misc\_feature complement(109102..109124)

 /gene="atpE"

 /note="3' motif for potential twintron"

 exon complement(109861..109996)

 /gene="atpE"

 /number=1

 gene complement(110042..114641)

 /gene="atpB"

 CDS complement(join(110042..110641,111433..111545,

 112333..112804,113581..113768,114572..114641))

 /gene="atpB"

 /codon\_start=1

 /transl\_table=11

 /product="ATPase beta subunit"

 /translation="MAATVNTSAGVITQIIGPVMDIAFPPGSMPSIYNSLIIEGKIES

 GENVKVVCEVQQLLGDNLVRAISMSATDGLQRGMSVVDTGSALSVPVGETTLGRIFNV

 LGEPVDEMGDIDLSNKLPIHRSAPSFVDLDTQLAIFETGIKVVDLLAPYRRGGKIGLF

 GGAGVGKTVLIMELINNIAKAHGGVSVFGGVGERTREGNDLYQEMKESGVINASNFKE

 SKVALVYGQMNEPPGARMRVGLTALTMAEYFRDVNNQDVLLFIDNIFRFVQAGSEVSA

 LLGRMPSAVGYQPTLATEMGGLQERITSTKEGSITSIQAVYVPADDLTDPAPATTFAH

 LDATTVLSRNLAAKGIYPAVDPLDSTSTMLQPWIVGEEHYDIAQAVKRTLQRYKELQD

 IIAILGLDELSEEDRLLVARARKVERFLSQPFFVAEVFTGSPGKYVSLAETIEGFKMI

 LAGELDTLPEQAFYLVGALEEAVTKAASLS"

 exon complement(110042..110641)

 /gene="atpB"

 /number=5

 intron complement(110642..111432)

 /gene="atpB"

 /number=4

 exon complement(111433..111545)

 /gene="atpB"

 /number=4

 intron complement(111546..112332)

 /gene="atpB"

 /number=3

 misc\_feature complement(112174..112198)

 /gene="atpB"

 /note="3' motif for potential twintron"

 exon complement(112333..112804)

 /gene="atpB"

 /number=3

 intron complement(112805..113580)

 /gene="atpB"

 /number=2

 misc\_feature complement(113334..113356)

 /gene="atpB"

 /note="3' motif for potential twintron"

 exon complement(113581..113768)

 /gene="atpB"

 /number=2

 intron complement(113769..114571)

 /gene="atpB"

 /number=1

 misc\_feature complement(113978..114001)

 /gene="atpB"

 /note="3' motif for potential twintron"

 exon complement(114572..114641)

 /gene="atpB"

 /number=1

 CDS complement(join(114729..115214,119343..119481,

 121218..121240))

 /codon\_start=1

 /transl\_table=11

 /product="cytochrome b6/7 complex subunit V"

 /translation="MSKVYDWFEERLEIQSIADDISSKYVPPHVNIFYCLGGLTFTCF

 IIQVATGFAMTFYYRPTVTEAFASVQYIMNDVNFGWLIRSIHRWSASMMVLMMILHVC

 RVYLTGGFKKPRELTWVTGVALASLTVSFGVTGYSLPWDQVGYWAVKIVTGVPDAIPV

 IGSFVVELLRGSVSVGQSTLTRFYSLHTFVLPLLTATFMLAHFLMIRKQGISGPL"

 exon complement(114729..115214)

 /gene="petB"

 /number=3

 intron complement(115215..119342)

 /gene="petB"

 /number=2

 misc\_feature complement(115601..115620)

 /note="3' motif for potential twintron"

 misc\_feature complement(116489..116513)

 /note="3' motif for potential twintron"

 CDS complement(116501..117430)

 /note="group II intron reverse transcriptase/maturase K"

 /codon\_start=1

 /transl\_table=11

 /product="putative reverse transcriptase and intron

 maturase"

 /translation="MFKYKDKSSSFFRFFKKNSLLYLLYDIYYFEFDKFLVQIFSSYD

 PEFLENSTIVDHREFSTLRFLHYLYLRNWDQSFKTRISAVKYIKPLRNVNSMLSRNLL

 SSIKFFYCRYLTHWIVLFPASVDISKIKSWILEYMISNINANTVSRTCKEISVLTGFS

 FLGYSVKFSKTMAFNTPYILTSLKIYPDKFCILRSLLTKSVISRENFFPIAKRSWVNF

 SDYDIVLNFRRIILDLVYYYKYSYSLKSLHFVLYLLKFSCAKTLACKNRITLTQVFNK

 YGSVLTTEKRIYMGDYHRVYSISFPLLSEFKKI"

 misc\_feature complement(116874..116895)

 /note="3' motif for potential twintron"

 CDS complement(117286..118011)

 /codon\_start=1

 /transl\_table=11

 /product="hypothetical protein"

 /translation="MCKKTCSYSSLGANKLATHLCSPYFFLEVLSSFSKISQNEMSLY

 SHYNTRLKFISHLHAESLSQQFRSYNYVFYTSGKKRKLGSVNLALTDSFSKHREFIVN

 ESLYLILKFIFEPKFESWKQMDSSSHILTSCGYSIQEIIPNFCSHIYRRSTNYLGING

 ELPFIDPAICLLLLRRYIKDHKFLTLINNFLISSCSNIRINQVPFLDSSKKIVCCIYC

 TIFIILNLINFLFRFLVVMILNF"

 misc\_feature complement(118299..118321)

 /note="3' motif for potential twintron"

 exon complement(119343..119481)

 /gene="petB"

 /number=2

 intron complement(119482..121217)

 /gene="petB"

 /number=1

 exon complement(121218..121240)

 /gene="petB"

 /number=1

 gene 121520..121654

 /gene="psbN"

 CDS 121520..121654

 /gene="psbN"

 /codon\_start=1

 /transl\_table=11

 /product="photosystem II N protein"

 /translation="METPAFFSAIFLGCLLLSITGYSIYIGFGPASKELRDPFEEHED

 "

 gene 121715..121951

 /gene="psbH"

 CDS 121715..121951

 /gene="psbH"

 /codon\_start=1

 /transl\_table=11

 /product="photosystem II 10 kDa protein"

 /translation="MATTSKTKTPITQGKVTALGSALKPLNSEYGKVAPGWGTTVVMA

 VFMALFAVFLVIILEIYNSSVILDNVGMSWKSLG"

 gene complement(122158..122750)

 /gene="psbT"

 CDS complement(join(122158..122228,122726..122750))

 /gene="psbT"

 /codon\_start=1

 /transl\_table=11

 /product="photosystem II T protein"

 /translation="MEALVYTFLLIATLGIIFFAIFFREPPRIVK"

 exon complement(122158..122228)

 /gene="psbT"

 /number=2

 intron complement(122229..122725)

 /gene="psbT"

 /number=1

 misc\_feature complement(122415..122434)

 /gene="psbT"

 /note="3' motif for potential twintron"

 misc\_feature complement(122526..122547)

 /gene="psbT"

 /note="3' motif for potential twintron"

 exon complement(122726..122750)

 /gene="psbT"

 /number=1

 gene complement(122872..126010)

 /gene="psbB"

 CDS complement(join(122872..123386,124162..125153,

 125991..126010))

 /gene="psbB"

 /codon\_start=1

 /transl\_table=11

 /product="photosystem II CP47 chlorophyll apoprotein"

 /translation="MGLPWYRVHTVVLNDPGRLIAVHLMHTALVSGWAGSMALYEIAI

 FDPSDPVLNPMWRQGMFVLPFMTRLGVTKSWGAWSIDGGNAANPGFWSYEGVALAHIV

 LSGLLFLAAIWHWVYWDLQLFRDPRTGDSALDLPKIFGIHLFLSGLLCFGFGAFHVTG

 LFGPGIWVSDPYGITGSIQPVTPAWGAEGFDPYNPGGIASHHIAAGILGIIAGLFHLT

 VRPPQRLYKVLRMGNIETVLSSSIAAVFWSAFVVAGTMWYGSAATPIELFGPTRYQWD

 QSFFQEETQRRVQKSLEEGSTLSQAWAKIPEKLAFYDYIGNNPAKGGLFRSGPMDNGD

 GIAAGWLGHAVFTDKSGRELTVRRMPTFFETFPVLLLDQDGIVRADVPFRRAESKYSI

 EQVGVSVSFYGGELDGVSFNDPATVKKYARRSQLGEIFEFDRATLQSDGVFRSSPRGW

 FTFGHLCFALLFFFGHIWHGARTIFRDVFAGIDPDLEEQIEFGAFQKLGDVTTRKQAV

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 exon complement(122872..123386)

 /gene="psbB"

 /number=3

 intron complement(123387..124161)

 /gene="psbB"

 /number=2

 misc\_feature complement(124003..124027)

 /gene="psbB"

 /note="3' motif for potential twintron"

 exon complement(124162..125153)

 /gene="psbB"

 /number=2

 intron complement(125154..125990)

 /gene="psbB"

 /number=1

 misc\_feature complement(125725..125749)

 /gene="psbB"

 /note="3' motif for potential twintron"

 misc\_feature complement(125726..125748)

 /gene="psbB"

 /note="3' motif for potential twintron"

 exon complement(125991..126010)

 /gene="psbB"

 /number=1

 gene 126168..126239

 /gene="trnN"

 tRNA 126168..126239

 /gene="trnN"

 /product="tRNA-Asn"

 /anticodon=(pos:126200..126202,aa:Asn,seq:gtt)

 gene 126261..126334

 /gene="trnR"

 tRNA 126261..126334

 /gene="trnR"

 /product="tRNA-Arg"

 /anticodon=(pos:126295..126297,aa:Arg,seq:acg)

 gene complement(126565..126646)

 /gene="trnL"

 tRNA complement(126565..126646)

 /gene="trnL"

 /product="tRNA-Leu"

 /anticodon=(pos:complement(126610..126612),aa:Leu,seq:tag)

 gene complement(126969..130530)

 /gene="psaC"

 CDS complement(join(126969..127102,127722..127746,

 128574..128587,129882..129912,130489..130530))

 /gene="psaC"

 /codon\_start=1

 /transl\_table=11

 /product="photosystem I subunit VII"

 /translation="MSHSVKIYDTCIGCTQCVRACPTDVLEMVPWDGCKAGQIASAPR

 TEDCVGCKRCESACPTDFLSVRVYLGSETTRSMGLAY"

 exon complement(126969..127102)

 /gene="psaC"

 /number=5

 intron complement(127103..127721)

 /gene="psaC"

 /number=4

 exon complement(127722..127746)

 /gene="psaC"

 /number=4

 intron complement(127747..128573)

 /gene="psaC"

 /number=3

 exon complement(128574..128587)

 /gene="psaC"

 /number=3

 intron complement(128588..129881)

 /gene="psaC"

 /number=2

 exon complement(129882..129912)

 /gene="psaC"

 /number=2

 intron complement(129913..130488)

 /gene="psaC"

 /number=1

 exon complement(130489..130530)

 /gene="psaC"

 /number=1