

Supplementary dataset 1: Alignments of all newly found mitochondrial tRNAs. The alignments include all sequences of novel mt-tRNAs (“NEW”) in comparison to next related sequences. The structural alignments were initially calculated using the corresponding covariance models. Stem regions are colored according to the **RALEE** alignment editor (40), mispairings remain uncolored.

Alignment of mt-tRNA (**Ala**) genes

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NC_007933_A      GCUAUCUUAGUUU..AUAAAG.AACCCUAACUUGCACUUAGGAAGA.GGAAUUUA.....CCCCAGAAAGCA
NC_012571_A_NEW AAUUGAUAA-----.-GAUU-.---AAUUGAGUUGCAAUCAAUAUUG.AGGAGUAC.....aCCUUUAUCAGUUU
NC_011036_A     AUUAGAUAA-----.-AAAA-.---UUUUGAAUUGCACUCAAA---.AAAGUUUCC.....cACUUUAUCUAAUA
NC_012708_A     AGGAUAUUA---..----A-.-UUUUAAUUUGCAGUUAAAAUUA.AUUAAUUAuu...caUAAUAUAUCUUU
NC_008323_A_NEW GGGCAAGUAGUUAA..AAAAAUcACAUUUAAUUUGCAAUUAAAAAUU.AUUAUAAA.....-UAAUC-UGCCUA
NC_012688_A     AGGAUUUAUAAUUU..AUAUA.AAUAUUUGAAUUGCAAUCAAAAAUU.ACUAAUUA.....CUAGUUAAUCUUU
NC_002651_A     UGGGAUUUAGUUU.aUAAUAA.AAUAUUUAAAUUGCAAUUAAAAGAA.AAGAGAUU.....--UUAAUCCUUA
NC_009983_A_NEW GGAUUUGAUU-----.------.-AGCUCUUUUUGCACAGAGUGUAACGAAUGAAUcucuauuCAUUUGCAAUCUU
NC_007884_A     GGUUAAA-----U..AUUUAA..---AUUUCUUUUGCAAUGAAGUUUU.UGGCUUAUa....guGGCC...GACCU
NC_013612_A     AAGGACUUAACUU..AAUUAA.AGUACCUGACCUGCACUCAGGAAAU.GUAAGAUAga...auCUUGCAGACCUUA
NC_013612_A_NEW AAGGACUUAACUU..AAUUAA.AGUACCUGACCUGCCGCCAGGAAAU.GUAAGAUAga...auCUUGCAGACCUUA
NC_013622_A     AAGGCCUUAUCUU..AAUUAA.AGUAUUUGAGUUGCAUUUAAAUGAU.GUGGGAUAaa...gaCCCGCAGGUCUUA
NC_008127_A     AAGGCCUUAGCUU..AAUUAA.AGUGCUUGUUUUGCACACACGAGAU.GUGGGAUAga...guCCUGCAGGUCUUA
NC_008127_A_NEW GAGG-CUUAGCUU..AAUUAA.AGUGCUUGUUUUGCACACACGAGAU.GUCGGAUAga...guCCUGCA--CCUUA
NC_003189_A     AAGGCCUUAGCUU..AAUUAA.AGUAUCUGUUUUGCAUGCAGGAGAU.GUGGGUAau...auCCCGCAGGUCUUA
NC_001327_A     GGGGCUGUAUUUUaaGUUUAA.AAUAUGCGCUUUGCAAGCGGAUGAU.-----UC.....-----UGGCUCUA
NC_010690_A_NEW GGGGCUGUAUUUUaaAAUUAA.AAUACGUGUUUUGCAUGCACGAGAU.-----UU.....-----UGGCUCUA
NC_010773_A     GGGGUUAUAUUUUaaAAUUAA.AAUAUGUGCUUUGCAUGCACAAGAU.-----UGU.....G----GGGCUCUA
NC_012821_A     UCUUUAGUACUUU..AUAAAA.AAGUUUUGAUUUGCAUUUAAAAAAA.AGGAUAAUuu...aaUCCUCUAAAAGAA
NC_009082_A_NEW GUUUUAUAUUUUA..AAUUAA.ACAUUUAAUUUGCAUUUAAAAGUU.GAAU-GAU.....--AUUUGUAGGCA
NC_010961_A     AUUCUUAUAUUUA..AAUUAA.AAAUUUAAAUUGCAAUUAAAAAUU.AUUGGGGA.....uCCAAUUAU--UA
#=GC SS_cons    (((((( (, <<<< . _____ > .>>> , <<<< _____ >>>> , , , , <<<< _____ >>>> ))))))) :

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Alignment of mt-tRNA(Cys) genes

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NC_013184_C      ACUUCUUAAGUUU.....-UAUAAUACAUUAGGUUGCAAAACCUAAAAUU.-----...--CA-----UAGAA.GUA
NC_012218_C_NEW AUCUCUUUAAAGUUU.....UAAAAUACAUUAGAUGCAAAUCUAAAAUU.-----...--UU-----AAGAG.GUU
NC_010526_C      GA-----UAGAGG.....AAAAACUUUUUUUGUUGCAACACAAAUAUA.-----...--AU-----UCU
NC_003979_C      GGUUUUUUAAGUAU.....AAUAUAUUAUAAAAUUGCAAAUUUUGAGGU.-----...--CA-----AAAAA.CCU
NC_007215_C_NEW AGCUAAUAA-----.....AA-----AGGGAUUUGCAAAACCCUAAUU.CCU--...-CAC--AGGGUUAG.CUU
NC_005934_C      GGUCUUUUGGUGU.....A--GAGCAUGUGGAAUUGCAAGUUCGUGGA.-----...-GUA-----UAAGA.CUU
NC_010967_C      UUUAAUAUAGUUU.....aAAAAAAAUUUUAAAUUGCAAAUUUAAAGAU.UAAGA...AAAA-UUUUAUUA.AAU
NC_004529_C_NEW AUAAUUAUAGUUU.....AUUAAAAACAUUAAAUUGCAAAUUUAAAGAA.AUAAU...AAAA--AAUUAUU.AAU
NC_011520_C      AAUCUUUAUAGUUU.....AAUAAAAAUUCAAAUUGCAAGUUUGAAGAU.AAAU-...-AAU-AUUUUAAAGA.UUU
NC_010197_C      AACUUGAAC-----.....---CAA---AUUAGAUGCAAAUCUAAUAAA.GUACA...aUAUAAUACUCAAG.UUU
NC_006386_C_NEW GGACGAACGUCCa.....uAAUUAGUGCAUUUUUGUGCAAAUAAAGAAAAA.-----...--GU-----UUUUU.CCU
NC_004537_C      GGCUUUACCA---.....---AAA---UUUUGGUUGCAACC-----AAAAGc..uUUAGCUUUUAAAAG.CCU
NC_013612_C      GGUUUUGUAGUGU.....U--CAACACAUUAGAUGCAAGUCUUAAGC.GCGGGg..uAACACCAGCCAAAA.UCU
NC_013612_C_NEW GGU-UUGUAGUGU.....U--CAACACAUUAGAUGCAAGUCUUAAGC.GCGGGg..uAACACCAGCCAAAA.UCU
NC_013622_C      AGUCCCAUGGUGU.....---UUACAUUUCAGAUUGCAAACUGAAGUU.GCAGGg..gCAACUCUGCUGGGG.CUU
NC_003159_C      AGCCUGAGGUGU.....----GACACGUCAGAUUGCAAAUCUGAAGAA.GCAGGu.uuCCAGCCUGCCGGGG.CUU
NC_003159_C_NEW AGCCUGAGGUGU.....----GACACGUCAGAUUGCAAAUCUGAAGAA.GCAGGu.uuCCAGCCUGCCGGGGaCUU
NC_003159_C_NEW AGCCUGAGGUGU.....----GACACGUCAGAUUGCAAAUCUGAAGAA.GCAGGu.uuCCAGCCUGCCGGGGaCUU
NC_003159_C_NEW AGCCUGAGGUGU.....----GACACGUCAGAUUGCAAAUCUGAAGAA.GCAGGu.uuCCAGCCUGCCGGGGaCUU
NC_013564_C      AGCCCCGUGGUGA.....A--GACCACGUCAGAUUGCAAAUCUGAAGAU.GCCGGc.uaAUAGCCUGCCGGGG.CUU
NC_012138_C      AGCCUGUAGUUG.....AAAAUCAACGGUGAGUUGCAGCCUCACAAAU.GGAGGauuuUAGUUC-----CAGGG.UUU
NC_011608_C_NEW GGCCUUGUAGUUG.....AAUAAACAACAAUUAGUUGCAGCCUUUUGGU.GGGGA...AAUUUCCUUGAGG.UCU
NC_009081_C      AGCUCUGUAGUUG.....AAGAAACAACAGUAAGCUGCAGUCUUGCUAGU.GGÜGGauuaUGAACCCCCAGAG.CUU
NC_008640_C      AUUUAAGA-----.....-AGAAA---CUUCAUUGCAAAAUGAAAAAA.AAUC-...-UCU--UUUGUUGA.AUU
NC_008693_C_NEW AAAUUAAAA-----.....-CCUAA---UUAAGUUGGCAAAACUUAAAAU.-----...-AUUUG---GGAU.UUU
NC_002681_C      GAAGGAUUAUAU.....aAUUAAUUAUAAGAUGCAAGUCUUAAGAU.-----...--UG-----AUUCU.UCU
NC_010212_C      GGUGCUAUAAGCAAa...auGGUCAUUGCAUAUAGUUGCAAAACUAUUGAGuAUAGGu.ucaAGUCCUGUAGCG.CCU
NC_010215_C_NEW GCCUAUAUAAUGUuuauauGAAGAACGCUUUCUAUUGCAAAUAGACUAAA.-----...-GUU-----UAUAG.UUU
NC_006894_C      UGAUGUGUAGCUUa...aUGGCAAGCAAAAGGUUGCAAAACCUAUUGGUuGUUGGu.ucAACUCCAGUCGCAU.CAU
NC_008557_C      AGCUUUUAUAGUAA.....AAAAAAUACAUUAGACUGCAAUUCUAAAAAU.GCAU-...-UAU--UGCUAGAG.CUU
NC_013568_C_NEW AGCUUUGAG-----.....-----U---GUACAAUUGCAAAUUGCAAGGA.UUAUU...AUUAAGAGAUAAAG.UUA
NC_010472_C_NEW GGUGAGGUAC---.....-CGAAA---CCUAGGUGGCAAGCCUAGGGAA.-----...AGUCUC---UCUCA.CCU
NC_010484_C      AGGUUAGUAGUUU.....AUUUAAAACAGUUUAUUGCAAGUAAACAGAU.GGU--...-CUA--UCCUAAC.CUU
#GC SS_cons      (((((( (, <<<<.....>>>>, <<<<.....>>>>, , , , <<<<.....>>>>))))))):

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Alignment of mt-tRNA (**Asp**) genes

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NC_010534_D      AAAAAAUUAGUUA...AG--AAUAAUAUAAUUUUGUCAGAAUUUA.AGUCAUCA-...-UAA--GAUAUUUUUUA
NC_010534_D_NEW AAGAGUUUAAAUUA...AAUUAAUAAUAUAGAAUGUCAAUUCUA.AUUUAUCC-...-CAG..GAUAGUUUUUU
NC_010533_D      UAAAAAUUAGUUA...AUACA-UAACAUAGUUUUGUCAAAAACUA.AAUAAACUU-...-AUUAAAAGUAUUUUUUU
NC_011715_D      AAGACACUAGUAAa.gcUGAGUAUUACCCCGCCUUGUCAAGGGGU.AUUCGUGGGuucgAACCCCCACGUGUCUUA
NC_008449_D_NEW AAGACACUAGUAAaaagCGCGAACUACAUUGCUUUGUCAAGGCCAA.AAUUGUGGGU.....UCUUC
NC_008449_D      AAGACACUAGUAAaaagCGCGAACUACAUUGCUUUGUCAAGGCCAA.AAUUGUGGGU.ugAAAUCCCACGUGUCUUA
NC_011009_D      AGAACCCUAGUAAa..aAUCACAUUACACUGCCUUGUCGAGACAG.AUUUGUGGGU.uaAAACCCCGCGGGUCCUG
NC_011009_D_NEW AGAACCCUAGUUAa..aAUCACAUUACACUGCCUUAUCGAGACAG.AUUUGUGGGU.uaAAACCCCGCGGGUCCUG
NC_004597_D      AGAACCCUAGUAAa.auAGCACAUUACACUGCCUUGUCGAGGCAG.AGUUGUAGGu.uaGAACCCUGCGGGUCCUG
NC_008679_D      AAGACAUUAGUAAa.ccCGUAAAUUACAUCACUUGUCAAGGUGA.AAUAGUAGGu.uaAACCUCGCAUGUCUUA
NC_008680_D_NEW AAGACAUUAGUAAa.cuCGUAAAUUACAUCACUUGUCAAGGUGA.AAUAGUAGGu.uaAACCUCGCAUGUCUUA
NC_005257_D      AAGACAUUAGUAAaauuUGUAAAUUACAUCACUUGUCAAGGUGA.AAUUGUAGGu.uaAAUCCUGCAUGUCUUA
NC_006666_D      AAAGAAUUAUUA...AAAAA-UAACGGCGGAUUGUCAGACCGC.AAUUAUUAGuaacCAACUAUAUUUUUA
NC_006664_D_NEW AAAGAACUAGUUA...AAAAA-UAACUUCGGACUGUCAGACCGA.CAUUACCAAuaacCAACUUGGUGUUUUUA
NC_007789_D      AAAGAGCUAGUUA...AACCGAUAACACCAGAAUGUCAGACUGG.AAUUGCUGGcugaUAACCCAGCGCUCUUUG
NC_011608_D      AGAGUGGUGGUGA...AAUAA-UCAUAAGCGGUUGUCGUCCGU.AGUUGCUGa.guAAUCCAUGCCCAUUCU
NC_009081_D_NEW GGGAGGGUAGUGA...AAAAA-UCAUGGGUGGUUGUCUUCGCU.UGUUGCUG...GUGAAACGCCCCUCCC
NC_009081_D_NEW GAAAGGGUAGUGA...AAGAA-UCAUGGGCAGUUGUCGUCGCU.CGUUGCUG...GCUGGGCGCCCUUUU
NC_007234_D      CGGGGGGUGGUGG...AAGAA-UCACAGGCAGUUGUCACUUGCC.AAUUGGUGC...gUUGAGUGCCCCUCCGU
NC_012821_D      AAGAAUCUAGUUA...AUUAA-UAAUAUAAUUUUGUCAUACUUA.UGUAACUC-...-UUUAGAGUUUUUU
NC_009082_D_NEW AAAUGUAUAAUU...AU--AAAAUAUAAAUUGUCAAAUUUA.AAAUGAAU...cCACAAUAUAUCCUUUA
NC_008151_D      GAGGUUGUAGUUUa..aUUGGAAAGCUACGGCUUGUCGAGCCGUaCGGUAGGAGu.ucAACUCUCCUCAUUCUG
#=GC SS_cons    ((((((, <<<<.....>>>>, <<<<<.....>>>>, ., ., ., <<<<.....>>>>))))))):

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Alignment of mt-tRNA (Glu) genes

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NC_000875_E      AUUUUAUAUGUUU...AAUAA...AAACAUUACAUUUUCAAUGUAAAAAAUAAAA...UUUAUUUUUUUAUAAAUA
NC_010241_E_NEW AUUUUAUAUGUUU...AAAAA...AAACAUUACAUUUUCACUGUAAAAAAUAAAA...UUUAUUUUUUUAUAAAUA
NC_006817_E     AUUUUAUAUGUUU...AAAUAA...AAACAUUACAUUUUCACUGUAAAAAAUAAAA...UUUAUUUUUUUAUAAAUA
NC_011820_E     GUCAUUAUAGUUU...AACAA...AAACAUUUAU...UUUUCAGAUAAAAAUCCUU-...---UGAAGGUAUUGAU-
NC_010197_E_NEW GCUGUUAAA----...CAAACA...----UUUAGUUUUUCACGCUAAAAACUCUAC...gAUUGUUUAGAUAAACAGUA
NC_00819_2E     GUCACUAAA----...-----...----AGUCGUUUUUCAUUGACAUUCCC----...-CAG---GGUAGUGGUC
NC_013612_E     GUUUUUGUAGUUG...---AU...CGAUAGUGGCUUUUCACGUCACAGAUUCAGU.uaAAGCCUGGGCAUAAAACA
NC_013612_E_NEW GUUUUUGUAGUUG...AAU--...CAAUAGUGGCUUUUCACGUCACAGGUCUCAGU.uaAAGCCUGGGCAUAAAACA
NC_013622_E     GUUUUUUGUAGUUG...AAUUA...CAACGGUGGUUUUUCAUUACAUUGGUCUUAGU.ugAAAUCUAGGCAGAAAACU
NC_005318_E     GUUCUUGUAGUUG...AAUUA...CAACGGUGGUUUUUCAGCCAUUAGUCCUGGU.uaAAAUCCUGGCAGGAAU
NC_004530_E_NEW GUUCUUGUAGUUG...AAUUA...CAACGGUGGUUUUUCAGCCAUUAGUCCUGGU.uaAAAUCCUGGCAGGAAU
NC_005316_E_NEW GUUCUUGUAGUUG...AAUUA...CAACGGUGGUUUUUCAGCCAUUAGUCCUGGU.uaAAAUCCUGGCAGGAAU
NC_013485_E     GUUCUUGUAGUUG...AAUAA...CAACGGUGGUUUUUCAGCCAUUAGUCCUGGU.uaGAGUCCUGGCAGGAAU
NC_008109_E     GUUCUUGUAGUUG...AAUUA...CAACGGUGGUUUUUCAGCCAUUAGUCCUGGU.uaGAGUCCUGGCAGGAAU
NC_005317_E_NEW GUUCUUGUAGUUG...AAUUA...CAACGGUGGUUUUUCAGCCAUUAGUCCUGGU.uaAAAUCCUGGCAGGAAU
NC_008455_E     GUUCUUGUAGUUG...AAUUA...CAACGGUGGUUUUUCAGCCAUUAGUCCUGGU.uaAAAUCCUGGCAGGAAU
NC_003171_E     GUUCCUAUAGUUU...AAUAG...UAACGGCGGUUUUUCAGUCGUCAGUCCUGGU.uaGAGCCCGGGUGGGAAU
NC_003171_E_NEW GUUUCUAUAGUUU...AAUAG...UAACGACGGC...UUUUCAGUCGUCAGUCCUGGU.uaGAGUCCGGUAGGAAU
NC_012043_E     GUUCUUGUAGUUG...AAU-A...CAACGGUGGUUUUUCAGUCAUUGGUCUUGGU.uaAAAUCCAGGUAAGAAU
NC_008746_E     GUUCUUGUAGUUG...AAUAA...CAACGGUGGUUUUUCAGUCAUUGUUCUGGU.uaGAGUCCGAGCAGGAAU
NC_008747_E_NEW GUUCUUGUAGUUG...AAUAA...CAACGGUGGUUUUUCAGUCAUUGUUCUGGU.uaGAGUCCGAGCAGGAAU
NC_001717_E     GUUCUUGUAGUUG...AAUAA...CAACGGUGGUUUUUCAGUCAUUGUUCUGGU.uaGAGUCCGAGCAGGAAU
NC_013658_E     GCUAACUAGGUGU...UUA--...GCACAUUGACUUUUCACGUCAAAGAGGCAC-...--CCUGUCAUUUAGCU
NC_012716_E_NEW GCUAAUUAAGUGU...UCUUA...uGCACAUUGACUUUUCACGUCAAAGAGGCAC-...--ACCGUCAUUUAGCU
NC_013661_E     GCUAGUUAAGUGU...UUA-U...GCACAUUGACUUUUCACGUCAAAGAGGCAC-...-AUUAGUGCACUUAGCU
NC_007234_E     GCCGGGGUAAUAU...AAGAA...GUAUGGCCGUUUUUCGU GCGGCAUGUGGCUU...uUAAGUAGCCUCCCGGU
NC_007234_E_NEW GCCGGGGUAGAGC...AAUAA...GUAUGGUCGUUUUUCGU GCGGCAUUUGGUUU...uUAAGUAGCCUCCCGGU
NC_009690_E     GUUCUUAUAGUGU...aGUUUUaguaGCACAUUAGA...UUUUCAGUCU...UUUAGGAUAUAaaguAUUUAAUUAUUAAGAAUA
NC_010198_E     ACUUCUAUGGUUUaggGGUUA...AGACAUUAAGUUUUCAA...CUUAAAGACAGGAGU.ucAAUUCUCCUUAAGGUA
NC_010769_E_NEW AUAUUCAUAGUUU...AAAUa.aAAACUAAUAGUCUUCACCUAAUUCAAUAGA--...AAUC---CUUGAAUAUU
NC_008557_E     GCUCUUAUGGUGU...AAA--...ACACGUUAAGUUUUCAA...UUUAAAGAUUAUAU...AUUAAUUUAUUAAGAGUA
NC_013568_E_NEW UUUUUUAAGGUGU...UUC--...GCAUUAUUAUUUUCGUUAAUAAGGU-----...-UUAGA---UAAGGAUU
NC_010472_E     GCUUAUGUAGUAU...aCAACA...GUACUUGAUCUUUUCGC GAUCAAGAGUAAAG-...--UCUCUUUCUUAAGUU

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#=GC SS\_cons (((((((((,,<<<<...>>>>, <<<< <----->>>>, ,,, <<<< <----->>>>))))))):



Alignment of mt-tRNA(Gly) genes

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NC_008448_G      GUCUUUCUAGUAUuaaUAUUA.....GUAUAAAGUGACUUCCAAUCACGCAGUCUUGGUUAAa.ccCCAAGGAAAGACA
NC_008448_G_NEW GUCUUUCUAGUACuaaUAUUA.....GUAUAAAGUGACUUCCAAUCACGAAGUCUUGAUUAAg.ccCAAAG-AAGACA
NC_002734_G      AUCUUUCUAGUACu.aACCUA.....GUAUAUAGUGACUUCCAAUCACUCGGUCCUGGUGAAa.auCCGGGGAAAGAU
NC_007175_G      ACGUUUUUAGUAC...AAACA.....GUAUAUUUGUUUCCAAACAAAAGAUUUCUUUAUA...-AGAAAAAGCGUA
NC_009687_G_NEW UCAUUUCUGGUGU...AAAAA.....GCAUGC GCGCCUUCCAAAGUGUGAGGUCUUCUUGG-...GGAAGGGAGUG..
NC_012977_G      UCAUUUCUGGUGU...AAAAA.....GCAUGC GCGCCUUCCAAAGUGUGAGGUCUUCUUGG-...GGAAGGGAGUG..
NC_011121_G      AUGUUGUAGUAU..aAGUUUg...caUAUGUUUUUUUCCAAAAAAUGAUCUAGG----...UUUAGGCAAUGUA
NC_008075_G_NEW AUGUUACUAGUAU..aAAUUUcg..uaUAUGUUUUUUUCCAAAAAAUGAUCUAGAUU--...--UAGGUGACAU
NC_000928_G      AUGUUGCUGUAU...AAAUguuuguaUAUGUUUUUUUCCAAAAAAUGAUCUAGAGU--...--UAGGCGAUUA
#=GC SS_cons      ((((((, <<<<...<----->>>>, <<<<<----->>>>, , , , <<<<<----->>>>))))))):
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Alignment of mt-tRNA(Ile) genes

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NC_009631_I      GGUACAGCGCCGG...AUGA..ACGGAUAAUCUGAUGACGUUAAUUUAGGAA-UUU.....-CUUCC.CUGUGCCU
NC_010559_I_NEW GGUGUCACGCCGGg.aACGA..ACGGAUAGCUCUGAUAAACGCUAAAUACGGGAUUUA.....AAGCCC.UUUCACCU
NC_000931_I      GGUGUUGCGCCGG...ACGA..ACGGACAACUUUGAUGACGUUGAAUUAUGAGA-AUC.....-UUCUC.CAACACCU
NC_013474_I      AAUAAAAGUGCCUG...AUAA..AAGGGAUAUCUUGAUAGGAUAUAUAAUGU---UUU.....-AA-AC.CUUUAUUA
NC_009093_I_NEW GAUAAAAAA-CUA..aUAUU..UAGGCUUAUUUUGAUAGAAUAAAUUUAGCAA----.UUUUUGC.UUUUAUUA
NC_004454_I      AAUAAAAUGCCUG..aUAAA..AAGGAUUUUCUUGAUAGGAUAAAUAUUAUGAUUAA.....-AUCAU.UUUUAUUA
NC_010766_I      AAAAAAGUACCUUauaAAUAuaAAGGGUGGCUAUGAUAAAGCUA-ACAAAG---UUU.....-UA-CU.CUUUUUUA
NC_009985_I_NEW AGAAAGAUGCCCG..aAUCU..AAGGGUUAUUUUGAUGUAAUAAAUAUUU---UUU.....-AU-AC.UCUUUUUA
NC_010765_I      AGUAAGGUGCCUGaaaUUGA..AAGGGUAAUUUUGAUGGAAUUAUAUGUAA---GUA.....AAA-UU.UCUUACUA
NC_007102_I      AAUGAAUUGCCUG...AUAA..AAGGGCUAUCUUGAUAGGAUAGAUCAUGUAAUAAU.....-AUUAC.AUUCAUUA
NC_008755_I_NEW GAUGAAUCGCCUG...AUGA..AAGGAUUACCUUGAUAGGGUAAAUAUUAUGAACAU.....-GUCAU.AUUCAUUA
NC_002697_I      AAUGAAUUGCCUG..aUAAA..AAGGAUUACCUUGAUAGGGUAAAUCAUGUAAUAAU.....-AUUAC.AUUCAUUA
NC_013612_I      GGAAAUGUGCCCGa.uUAAA..AAGGAUUACUUGAUAGAGUAAAUAUUAAGAGUUAa...agUCUCUU.UGUUUCCU
NC_013612_I_NEW GGAAAUGUGCCCGa.uUAAA..AAGGAUUACUUGAUAGAGUAAAUAUUAAGAGUUAa...agUCUCUU.UGUUUCCU
NC_013622_I      GGAAAUGUGCCUG...AAUA..AAGGGCCGCUUGAUAGAGCGAAUCAUGAGAGCUAa...aaCCCCUC.CACUCCU
NC_012821_I      GAUGCUGCGCCGG..uAUGA..ACGGAUUACAUUGAUGUUGUAAAUAUUGAGA-AUA.....-UUCUU.CAGUAUUU
NC_009082_I_NEW AUUAUAGGGCCAG..gAUUA.uUUGGUUAACAUUGAUGAUGUAU-AUAUAU-----A.....U---AU.UUAUAAAA
NC_010961_I      ACUAA--UGUCUG...A-UA..AAGAAUACGUUGAUGAUGUAUUAUUAUGAAUUUauagaccAAUCUcUUUUGGUA
#=GC SS_cons    ((((((, <<<<...>>>>, <<<<<_____>>>>, ,,,, <<<<<_____>>>>.)))))):

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Alignment of mt-tRNA(Lys) genes

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NC_011328_K      CAUUAGAUGACUGAAAGC..-AAGUAAUGGU CUCUUAAAACCAAcAAAU. AGUAAa..guAGCGACUACUUCUAAUG-
NC_012144_K_NEW CAUUAGAUGACUGAAAGC..-AAGUAAUGGU CUCUUAAAACCAGuUUAU. AGUAAu..uuGGCGAAUACUUCUAAUG-
NC_011322_K      CAUUAGAUGACUGAAAGU..-AAGUACUGGU CUCUUAAAACCAUaUUAU. AGUAUa..uuAACGAAUACUUCUAAUGA
NC_006279_K      CAUUAAAAAGCUUAAAAGU..-AAGUGUUGAU CUUUUAAAUCAA. UUUAU. GGUAa...uGUCGUCUAUCUUUAAUGG
NC_006159_K_NEW CAUCAAAAAGCUUAAAGU.gUAAGCAUCGAAUUUUUAAAUCGA. GGAUuAUUGU...--AUA--AAUUUUGAUGG
NC_006292_K      CAUUAAAAAGCUUAAAGU..-AAGCUCUGAU CUCUUAAAUCAG. CUAU. GACAAGu.ugGGCGUCUGUCUUUAUUGA
NC_004610_K      CUUUGAUAAAGCUUAAAUggcAAGCAUUAAA CUCUUAAUUUAAaUCA. AGUGAUc.ucACCGCCACUAUCAAGA
NC_006666_K_NEW CCCUGAUAAAGCUUAAAG..GAAGCUCAAA CUCUUAAUUUGA. AAAA. AGCGGac.ucACCAACCGCUAUUUGGGA
NC_006664_K      CUUAGAUAAAGCUAAUACG..GAAGCAUUAGA CUCUUAAUCUAA. AUAUaAGUGUauagaCCCAAACACUAUCUGAGA
NC_001276_K      GGAAUUGUAGCUUAAAGGAugAGAGCGUUGAG CUUUUAAUCUCA. AUGU. GAAAC...-UAGUGUUUUCGAUUCUA
NC_001276_K_NEW AGCUUCAAAAGCCUAGUUU..UUGGCAGCAUU AUUUUAAAAGC. UAUG. AGUAA...UCAAUUUACUUGAAGUUU
NC_011518_K      GGAAUUGUAGCUUAAAGUacaAGAGCGUUGAG CUUUUAAUCUAA. AUGU. GAAAC...-AAUGGUUUUCGAUUCUA
NC_012138_K      GGGUUGGUAGCUUAAAGU..AGGGCGGCGGA CUUUUAAUCCGU. AGGU. GAAGUa...uAAAAAGCUUCUCAACCCU
NC_011608_K_NEW AGGUUGAUAGCUUAAAUU..AGAGCGACGGAC UUUUUGAUUCGU. AGGU. GAAGU...aUAGAUCUCCUCAACCCU
NC_009081_K      GGGUUGGUAGCCUAAUAGC..AGGGCGGCGGA CUUUUAAUUCGU. AGGU. GUAGUg...uAAAAAGCUUCUCAACCCU
NC_009689_K      UAUUAAGUGGCCGAUUU-..-AAGCAUAGA CUUUUAAUCUAGaAAAU. GAUU-...AAUUUUAAUCCUUAUGG
NC_007782_K_NEW UGUUGAGUGGCCGAGUUU.aUAGGCAGUAGG CUUUUAAACCUAAcUAAC. GGCC-...AAUAGUGGCCUCAGCAU
NC_013073_K      UCCUAAAUGACUGAGAAU..-AAGUGUUAGA CUUUUAAUUUAA. UUAC. GGUAUu...uCAUUUUUACCUUUAGGAA
NC_005305_K      UAAAGGAUUUUUUAUUUuuA GAUUUUUUGA CUCUUAAUCAAA. AGGUu-----...--UAU-----UUCUUUAG
NC_001861_K_NEW UAAAGGAUUUUUUAAGUuuA GAUUUUUUGA CUCUUAAUCAAA. AGGUu-----...--UGU-----UUCUUUUAU
NC_013253_K      UUAGUUUUUUUUCUUUU..-GAAUAAUAGU UUUUUACACUAA. AGGU. UA-----...--UAUGACUAAA
NC_008693_K      CUUAGACUUUUUUUU--..AGAAUAAUGAA UUUUUAAUUCAU. AGGG.-----...--CUA-----AUCUAAAA
NC_008692_K_NEW AAGGUUUAAAUGCUGAG-..-GCAUGUAAAG AUUUUUUUCUUUA. AAUU.-----...--UUA-----AUACCUUA
NC_008047_K      UACUAACCAGUGUUUGA-..-GCACUUUUAA UUUUUAAUUAAA. AAGUa-----...--AAAA-----UAGUUUA
NC_010202_K      UGGUGUGUAACUCAGGUGguAGAGUGAUAGG CUUUUAAACCUAU. AAGUaGUUGGu...uCAAACCCAAUCACACCAA
NC_010171_K_NEW AGGUACAUAGCUCAUUUUGgaAGAGCAAUAGG CUUUUAAACCUAG. UGGUgAUUGGu...uCAAGUCCAAUUGUACUUA
NC_010210_K      UGAUAUGUAACUUUAUUUGguAAAGUAAUAGG CUUUUAAACUUA GaGUAA. AUUGGu...uCGAAUCCAAUCAUAUCA
#=GC SS_cons      ((((((, <<<<_____.._>>>>, <<<<_____>>>>.,,.,., <<<<....._____>>>>))))))):

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Alignment of mt-tRNA(**Leu1**) genes

```

NC_012218_L1      AUUGUAAAAGCAGAU----UU.....UUGCAUAAAUUUAGAAUUUUAAGGA.-----U.AUU.....----UUACAAUA
NC_011574_L1_NEW CCAAAAAUA-----C.....AUUUUUUGAUUUUAGGAUUGAAUUU.-----G.AGU.....----AUUUUUUGGU
NC_012571_L1      UUCAUUUAAGUAUAUUA---A.....AUACAUAUAAAGUUUAGAACUUAAAAAU.-----GA.AAA.....----AAAUGAAA
NC_002074_L1      UUCAGCUUGGCAGAU---A.....AUGCAAUAAAUUUAGAAUUUAUUUA.-----GAGUA.AAC.....UC---AGUUGAUA
NC_013474_L1_NEW AAUU---UGACA---GAUUUA.....AUGUAUCAAUUUAGAAUUUGAUUUU.-----GGUGA.-UA.....CC-----AA-UU
NC_013474_L1      AAUU---UGACA---GAUUUA.....AUGUAUCAAUUUAGAAUUUGAUUUU.-----GGUGA.-UA.....CC-----AA-UU
NC_005925_L1      UG-----GCAGAUU---A.....UUGCAAUAGAUAUUAGAAUCUAUCAAC.U-----CCU.....-----UAU
NC_010766_L1_NEW UCCAUUUUGUCAGAUU---GA.....UUGAGUUAAAUUUAGAAUUUAAUUAG.---GGGUGAA.AUUuauaaaagCCC---AAAUGGGA
NC_009985_L1      UUCAAUUCUGGCAGAAUAGAAA.....AUGUGAUGAAUUUAGGCUUCAUAGUU.---GGGUAU.AUU.....CC---GGUUGAAA
NC_008234_L1      ACUAAUUUGGCAGAU---A.....AUGUAUUGAAUUUAGAAUUCAACAAU.---GUGAG.AAC.....-----AAUUAGUA
NC_007214_L1_NEW AUUAUCUUGGCAGAAU---A.....GUGUUUAGAUUUUAGGAGCUAAUAAU.---GUAGUA.AAU.....AC---AGAUAUA
NC_011717_L1      ACUAAUUUGGCAGAU---A.....GUGCAUCAGAUUUAGAAUCUUAUAU.-GUA--AUA.AAU.....--UACAAUUAGUA
NC_012893_L1      ACUAAUUUGGCAGAU---A.....AUGUGAUGAUUUUAGAAUUAUAAU.-AUUAGUA.AAU.....UAUUAUAGAUAGUA
NC_011128_L1_NEW ACUAAUUUGGCAGAAA---A.....UUGUGUUGGUUUUAGAAAUCAUUAU.-AUUAUUUAuAUU.....UAUUAUAGGUAGUA
NC_007976_L1      ACUAAUUUGACAGAAA---A.....AUGUGUUGAUUUUAGAAAUCAUUAUaUAUAAUUUA.AAU.....UAUUAUUAUAGUA
NC_005299_L1      GCCUCUAAAAGGAAUUAGCCU.....AUCCGUUGGUUUUAGGAAACCAAAAAC.CCUUGGUGCA.AAU.....CCAAGUAGUGGCU
NC_013601_L1_NEW GCCCCUAAAAGAAUAAUAGU-.....AUCCAUUGGUUUUAGGAAACCAAAAAC.UCUUGGUGCA.ACU.....CCAAGUAGCGGCU
NC_013612_L1      GCCCCUAAAAGAAUAAUAGU-.....AUCCAUUGGUUUUAGGAAACCAAAAAC.UCUUGGUGCA.ACC.....CCAAGUAGAGGCU
NC_010636_L1      ACAGAGUUGGCAGAAA---U.....AUGUGAAUAAUUUAGGUUUUUUUU.-AAGAUUU-A.UUA.....AUCUUACUUUGUA
NC_006354_L1_NEW ACAGAGUUGGCAGAAU---U.....AUGUGAAUAAUUUAGGUUUUUUUU.-AAGAUUU-A.UUA.....AUCUUACUUUGUA
NC_007896_L1      AUAGAGUUGGCAGAAU---U.....AUGUGAGUAAUUUAGGUUUUUUUU.-AAAAGUUUG.A--.....CUUUUACUUUAU-
NC_011121_L1      GUAAAAGAUGCCAGAAAAUUUuuauauAUGGGGUUAAUUUAGGUUUAAUUUAU.---GAUUAG.UUG.....UC---UCUUUACU
NC_008075_L1_NEW GUAAAAGAUGCCAGAAAAUUUuuauauAUGGGGUUAAUUUAGGUUUAAUUUAU.---GAUUAG.UUG.....UC---UCUUUACU
NC_000928_L1      GUAAAAGAUCCA GaaaAAAAUUUAuaauAUGGGGUUAAUUUAGGUUUAAUUUAU.---GAUUAG.UUG.....UC---UCUUUACU
#=GC SS_cons      ((((((, ,<<<<----->>>>, <<<<----->>>>,,,,, <<<<----->>>>))))):

```

Alignment of mt-tRNA (**Leu2**) genes

```

NC_012218_L2      UUUAAUUUAGCAUAACAU..aAUGCGAAGAGUUUAAGCCUCUCUAGAU-----...-CUU-----AAUUAAAA
NC_011574_L2_NEW UUAAAAUUAAACUG--GCA...GAGUUUACUUCUUAAGG.AAGUAAACAUUU--...UGUG--AAAAUUUAUC
NC_012571_L2      UUCAAAAAAGCAAAAU--...UUGCAUAAAAUUUAAAA.UUUUAUUUAGUGAAa.uAAUUUUCACUUUUUGAAA
NC_013474_L2      UUUAAAGUGACAGAUUU-...AUGUGAUGGAUUUAAGA.UCCUUUUUAGC---...UAUU---GCCUUUAAAA
NC_009093_L2_NEW UAUUAAAGUGGCAGACAA-...AUGUAAAGAAUUUAAAA.UUCUUAAAUGUAA-...---UUUUACCUUAAUGA
NC_004454_L2      AUUAAAAUGGCAGAACA-...AUGCAUAGGAUUUAAGC.UCCUUUUUAUCU-...UUUACAGAUUUUUAAUA
NC_012893_L2      UCUAUUUAGGCAGAUUU..AUGUAAUGGAUUUAAAC.CCCAUUCAUAAAAGG..aUUUCCUUUUUUUAGAA
NC_011128_L2_NEW UCUAUUUAGACAGAUUU..AUGUAAUGGAUUUAAAGC.CCCAUUUUAAAAGGu.uUUUCCUUUUUUUAGAA
NC_007976_L2      UCUAUUUAGACAGAUUU..AUGUAAUGGAUUUAAAA.CUCAUUUUAAAAGG..aUUUCCUUUUUUUAGAA
NC_011121_L2      GUAGCUAUGUCAGAAGGUuaAUGAGUUAGUUUUAAGC.AUUAAUUUAGGAU-...-GUU--UCCUAGCUAUU
NC_008075_L2_NEW GUAGCUAUGUCAGAAGUGa.uAUGAGUUAGUUUUAAGC.AUUAAUUUAGGAU-...-GUU--UCCUAGCUAUU
NC_000928_L2      GUAGCUAUGUCAGAAGUa.uAUGAGUUAGUUUUAAGC.AUUAAUUUAGGAU-...-GUU--UCCUAGCUAUU
NC_008557_L2      AUUAAUUAUGGCAGAUAA-...GUGCAUGAAUUUAAGC.UUCAUUUAUAGGGGuggAAGCCCCUUUUUAAUA
NC_013568_L2_NEW UUUAGUAUGGCAGAGUA-...AUGUGUUAAAUUCAAGU.CUUAAUUU-----...--UU-----UACUGAGA
NC_010484_L2      GAUAAUUUGGCAGAAUA..uAUGCAUUGAUUUUAAGC.UCAUAUAUACUA-...-UAU-UAGUAAUUUUCU
#=GC SS_cons      ((((((, <<<<-----...>>>>, <<<<----->>>>, , , , <<<<...>>>>))))))):

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Alignment of mt-tRNA (**Met**) genes

```

NC_011381_M      AGUAAAAGUCAGCU..AAAUA-...AGCUUUUGGGCCCAUACCCCAA.ACAU.GUUGGuu...aaAAUCCUCCUUUACUA
NC_011381_M_NEW AGUAAAAGUCAGCU..AAAUA-...AGCUUUUGGGCCCAUACCCUAA.ACAU.GUUGGuu...aaAAUCCUCCUUUACUA
NC_011814_M      AGUAGAGUCAGCU..AAUAUA...AGCUUUUGGGCCCAUACCCCGA.ACAC.GUUGGuu...aaAGUCCUCCUCUACUA
NC_011707_M      AGUAAAUAAGCU..AAUCUGuaaaAGCUUCGGGCCCAUACCCGG.ACAC.GUGGGuu...agAAUCCCAGUAUUACUA
NC_011707_M_NEW AGUAAAUAAGCU..AAUCUaUuaAGCUUCGGGCCCAUACCCGGA.AUAAU.GUGGGuu...aaAAUCCCAGUAUUACUA
NC_002812_M      AGCAAGGUCAGCU..AAAUA-...AGCUUUUGGGCCCAUACCCUA.ACAU.GUUGGuu...aaAAUCCUCCUUUGCUA
NC_012977_M      AAGCAAGUAGUUA..AUUUUU...aGUACACGGGCUCAUGC CCCGA.UGGA.GGGAAa.....uUUUUCCCCUUGGCUUA
NC_012138_M_NEW GGUGGAGUAAUUA..AAUAA-...GUUUGGUGGUUCAUGC CCCAU.UUGC.GGGAGguuuuaUUCUUUCCUCUGCCU
NC_012138_M      AGCAGAGUAGUUA..AAAGA-...GUACAGCGGGUCAUACCCUGC.GGGU.GGGAGu.....uUGUGCCCCCUUUGCUU
NC_009081_M      GGUGGGGUAAUUA..AAAAA-...GUUAUUGGGUCAUGC CCCAA.UCGC.GGAAGgcu.gcgUUCUUUCCUCUGCCU
NC_009081_M_NEW GGCAGAGUAGUUA..AAUAA-...GUUUGGUGGUUCAUACCCUGA.AGGU.GGGAG.....uGUGCCCCCUUGCUU
NC_007234_M      AGUGAGGUAGUUU..AAUAA-...GAACAUGGGUCAUGC CCUGA.AAGU.GGGGAua...uagAUCUCUCCUCUCGCUU
NC_007234_M      GGUGAGGUAGUGU..AGUAA-...GAACGUUAGGCUUAUAG CCUGA.AAGU.GGGGA.....uUAUCCCCCUCGCGU
NC_007234_M_NEW GGUGAGGUAGUGU..AGUAA-...GAACGUUAGGCUUAUAG CCUGA.AAGU.GGGGA.....uUAUCCCCCUCGCGU
NC_007234_M      GGCAGGUAGUUU..AAUAA-...GAACAGUGGGCUUAUGA CCCAA.AAGU.GGGGAua...uagAUUCCCCCUCGCUU
NC_007782_M      GCUAAGAUAAGUU..AAUUA...AACCCGAGACUCAUAACCUUG.AAAU.GCCUG.....AAUCAGGCUCUAGUA
NC_007782_M_NEW AUUGCAGUAUGUU..AAAGUA..aAACUAUGGGUCAUGC CCUCC.CAAU.GGUCCgu...caCAAGGGCCUCAAUU
NC_013073_M      UGUAAAUAAGCU..AAAUAUu..aAGCUUGGGUCAUAC CCCAA.AAAU.GAGGU.....--UUACUCUUUUACAA
NC_008151_M      GGCAGGUAGACU..AAUGGC..aAGUUACUGGGUCAUGU CCCAU.UGAU.UUAGGuu...cgAUUCCUAACUCUGCUA
NC_008832_M_NEW CGGGUUGUAGUUU..AGUCGGc..aAAACAUAAGUCAUAACUUGAaUGAU.AGAAGuu...caAUUCUUCUCUACCCGA
NC_008832_M      GGCUGGUAGACU..AAUGGU..aAGUUACUGGGUCAUGU CCCAU.UGAU.UUAGGuu...cgAUUCCUAACUCAGCCA
NC_008834_M_NEW CGGGUUGUAGUUUagAAGGUA...AAACAUAAGUCAUAACUUGAaAGAU.AGAAGuu...caACUCUUCUCAACCCGA
NC_008834_M      GGCAGGUAGACU..AAUGGC..aAGUUACUGGGUCAUGU CCCAU.UGAU.UUAGGuu...cgAUUCCUAACUCUGCUA
NC_008833_M_NEW CGGGUUGUAGUUU..AGUAGGc..aAAACAUAAGUCAUAACUUGAaGGAU.AGAAGuu...caAUUCUUCUCAACCCGA
NC_008833_M      GGCAGGUAGACU..AAUGGC..aAGUUACUGGGUCAUGU CCCAU.UGAU.UUAGGuu...cgAUUCCUAACUCAGCUA
NC_010213_M      GGCGAUUAUAGUUU.uAAAGAA...AAACAUAUAUCUCAUACGUAAC.UAAU.AAAGGuu...caAGUCCUUUUGUCGCC
NC_010213_M_NEW GGUUAGUAUAGCUU..AUCGGU..aAAGCAUGUCGCUAUAACUACAuAGAA.GUUGGuu...caACCCCAUCUCAACCCA
NC_010213_M      GGUAAAAGUCAACU..AAAGGU..uAGUUCCAGACUCAUUAUCUGG.CAAU.GUCGGuu...cgAGUCCUACCUUUGCCU
NC_010212_M      AGUAGGGUCGACU..AACGGG..aAGUCCAGGCUCAUUAUCUGA.GUAU.GCAGGuu...caAGUCCUCCCUUAUUA
NC_010212_M_NEW AGGCUGAUAGCUU..AUUUGGu..aAAGCAUGUUCUCAUUAACAACAaGGUA.GUUGGuu...caACCCCAUCUCAGCCUA
NC_010212_M      GGUGAUUAUAGUUU..AAUGGUu..aaAAACAUAUAUCUCAUACGUAU.AAAU.AGAGGuu...caAUUCCUUUUUCACCC
NC_010215_M      AUUAGAAUAGACU..AAGGGG..aGGUCGUCAGGAUCAUUGUUUGA.AGGU.AUAGGuu...cgAGUCCUAUUUCUAAA
NC_006894_M_NEW GGCUGAUAGCUU..AUAGGU..aAAGCAUGUUCUCAUUAACAUA.AAGA.AAUUGgu...ucgACUCCAUUUCAGCCCA
NC_006894_M      GGUUGGGUUGACU..AAGGGU..uAGUACCAGAUUCAUGAUCUGA.GGAU.GUGGGuu...cgAGUCCCACCCGACCC
NC_010209_M_NEW AGACUGAUAGCUU..AUUAGGu..aAAGCAUUGCUCAUUAACAUAaGGAA.GUUGGuu...caACUCCAUUCAGUCUA
NC_010209_M      UGUAGAAUAGACU..AAAGGA..aAGUCGACAGUCAUUAUUUGG.AAAU.GUGGGuu...caAAUCCGGCUUCUAUAU
NC_010209_M      GGUAUAUAUUUU..AAAGGU..cAAAUUAUUUAUCUAUUAUAAG.AUAU.AAAGGuu...caACCCCUUUUAUUACCU
NC_010204_M_NEW AGACUGAUAGCUU..AUUAGGu..aAAGCUUUGUUCUCAUUAACAUAaGAA.GUUGGuu...caACUCCGCUUCAGUCUA
NC_010204_M      UGUAAAAGUUGACU..AAAGGU..uAGUACCAGACUCAUUAUCUGG.GGAU.GUGGGuu...cgAGUCCUCCUUUACAU
NC_010204_M      GGUAUAUAUUUU..AAGGGA..AAACAUAUAUCUCAUACGUAUaAGAU.AGAGGuu...caAAUCCUUCUUUACCCU
NC_010206_M_NEW GGUUAGUAUAGCUU..AAAAGGu..aAAGCAUUGCUCAUUAACAUAaAGU.AUUUGgu...ucgAUCCCAACUCAACCUA
NC_010206_M      UGUAGAGUAGACU..AAAGGU..uAGUUACAGACUCAUUAUCUGG.GGAU.GUGGGuu...cgAGUCCUCCUACCU
NC_010201_M_NEW CGGUUGAUAGCUUauAAGGUA...AAGCAUGUGGCUCAUUAACAUAaAGUA.GUUGGuu...caAGCCCAUCUCAACCGA
NC_010201_M      UGUAGGGUAGAUU..AAAGGU..aAAUCAUCAGACUCAUUAUUUGG.GAAU.GUAGGuu...cgAGUCCUGCCUCUACAG
NC_008944_M      AGCAGAGUGGACG..AAGGGU..aCGUACCGGGUCAUGAUCGGG.GGGA.GCAGGuu...cgAAUCUUGCCUAUGUUA
NC_010211_M_NEW AAGCUGAUAGCUU..AUGUGGu..aAAGCAUGUGGCUCAUUAACAUAaAGGUA.AUUUGgu...caAUUCCAAUUCAGCUUA
NC_010211_M      UGUAGAGUAAACU..AAAGGU..uAGUUACUAGACUCAUUAUCUGG.GGAU.GUAGGuu...cgAGUCCUCCUUAUAU
NC_010211_M      GGUGAUUAUAGUUU..AAAGGU..aAAACAUAUAUCUCAUACGUAUaAGAU.AGAGGuu...caACUCCUUAUUUCACCA
NC_010202_M_NEW AGGCUGAUAGCUU..AUUAGGu..aAAGCAUGUUCUCAUUAACAUAaAGUA.GUUGGuu...caACUCCAAUCUAGUCUA
NC_010202_M      AGUAGAGUUGACU..AAAGGU..uAGUUACAGACUCAUUAUCUGGgGAU.GUAGGuu...cgAGUCCUGCCUCUACAU

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NC_010202_M      GGUGAUAUAGUUU..AAGGGU...aAAACAAAUUAUCUCAUACGUAAUaAGAU. AGAGGuu...caACUCCUCUUUUCACCU
NC_010171_M_NEW AGACUGGUAGCUU..AAAGGU...aAAGCAUGUUGCUCAUAACAAUAgAGAA. GUUGGuu...cgAUUCCAUCCUCAGUCUA
NC_010171_M      GGUAGAGUAGACU. uAAGGUA...GGUUAUUGGGUUCAUAGUCCAA.GUGA. AUAGGuu...caAUUCCUGUCUUUACCA
NC_010210_M_NEW AGACUGAUAGCUU..AUUAGGa..aAAGCAUGUUGCUCAUAACAAUG.AGGA. AGAUGgu...ucgACUCCAUUUGAGUCUA
NC_010210_M      AGUAGAAUAGACU..AAAGGA...aAGUUGCCAGACCUCAUUAUCUGG.AGAU. GUAGGuu...cgAAUCCGAUUUCUAUUAU
NC_010210_M      AGUAAUAUAAUUU..AAGGGG...aAAAUUGUUAUUUCAUAUGUAAG.AUAU. AAAGGuu...cgAAUCCUUUUAUUACUU
NC_010207_M_NEW AAACUGAUAGCUU..AAAGG...aAAGCAUAUUGCUCAUAACAAUAaAGAU. GUAGGuu...caAUUCCUUCCUCGGUUUA
NC_010207_M      GGUAGAGUAGACC. uAAGGAA...GGUUAUUGGGUUCAUGGUUCAA.GGUA. GUAGGuu...cgAUUCCAUCUUUUACCA
NC_010203_M_NEW AGGUUGAUAGCUU..AUUUGGc..aAAGCAUGUUGCUCAUAACAACAgGAUA. GUUGGuu...caAUUCCAUCCAACCUA
NC_010203_M      UGUAGAGUAAACU..AAUGGC...uAGUUACCAGACUCAUUAUCUGG.GUAU. AUGGGuu...cgACUCCUAUCUCUACUU
NC_010203_M      GGUGAUAUAGUUU..AAAAGGu..aAAACAAAUUAUCUCAUACGUAAUaAGAU. AGAGGuu...caAUNCCUCUUUUCACCU
NC_009090_M_NEW AGGCUGGUAGCUU..AUUUGGu..aAAGCAUAUUGCUCAUAACAAUAgGGAA. GUUGGuu...caAGUCCAACUCAGUCUA
NC_009090_M      UGUAGAGUAGACU..AACGGU...uGGUCACUAGACUCAUGAUCUAG.GAU. GUAGGuu...cgAUUCCUACCCUCUCUU
NC_009090_M      GGUGUAUAGUUU..AGUUGGu..aAAACAAAUAGUCUCAUAUGCUAG.AUUC. AGAGGuu...caACUCCUCUUUACACUU
NC_010217_M_NEW AGGCUGGUAAACUU..AUAGGU...aAAGUGUGUUGCUCAUAACAACAgAGAA. GUUGGuu...cgAUUCCAUCCAACCUU
NC_010217_M      UGUAGGGUAGACU..AAAGGA...aGGUCAUCAGGCUCAUCAUCUGG.UAGU. GUGGGuu...caAUUCCCGCCCCUCUCUU
NC_006990_M_NEW AGGCUGAUAGCUU..ACUAGGu..aAAGCACGUUGCUCAUAACACAGgUGUC. GGUGGuu...cgAUUCCACUUUCAGCUUA
NC_006990_M      UAUAGAGAAGACU..AAGGGU...uAGUCGCCAGGCUCAUGAUUUGG.AAAU. GUAGGuu...cgAGUCCUACCCUCUAUUU
NC_010208_M      AGUAGGGUAGACU..AAGGGU...aAGUCAUCAGGCUCAUUAUCUGG.GUAU. GUAGGuu...caAGUCCUACCCUUAUUA
NC_010208_M_NEW AGGCUGAUAGCUU..AUUUGGu..aAAGCAUGUUGCUCAUAACAACA.AGGUaGUUGGuu...caAGCCCAUCCAGCUUA
NC_010208_M      GGUGAUAUAGUUU..AAUGGUu.aaAAACAAAUUAUCUCAUACGUAAU.AAAU. AGAGGuu...caAUUCCUUUUUUCACCC
NC_010496_M_NEW AGGCUGGUAGCUU..AAUAGGu..aAAGCAUGUUGCUCAUAACGUCAaAGAA. GUAGGuu...caAGCCCGUCUCAGCCUA
NC_010496_M      UGUAAAGGUAGACU..AAGGGU...uAGUCACUAGCUCAUUAUCUGG.GGAU. GUAGGuu...cgAGUCCUACCUUUACAC
NC_010496_M      AAUGAUAUAGUUU..AAGGGU...aAAACAAAUUAUCUCAUGUGUAAUaAGAU. AGAGGuu...caAAUCCUCUUUUCAUUU
NC_006991_M_NEW GGAUUGAUAGCUU..AAAGGU...aAAGCAUGUUGCUCAUAACAACAaAGAA. GUUGGuu...caAUUCCACCCUCAAUCUA
NC_006991_M      UGUAAAGGUAGACU..AAUGGU...uAGUUAUCAGGCUCAUGAUCUGG.GGGU. GUGGGuu...cgAGUCCACCCUUACUU
NC_006991_M      GGCGAUAUAGUUU..AAAGGG...aAAACAAAUUAUUUCAUAUGUAAUaAGAU. AGGGGuu...caAUUCCUUUUUUCGCUU
NC_010198_M_NEW AGGCGGAUAGCUU..ACUGGGu..aAAGCACGUUGCUCAUAACGACGgGGUC. GGUGGuu...cgAUUCCACUUCCGCUUA
NC_010198_M      UAUAGAGAAGACU..AAGGGU...uAGUUGCCAGGCUCAUGAUUUGG.AGAU. GUAGGuu...cgAGUCCUGCCCUCUAUUU
#=GC SS_cons    ((((((, <<<<.._____...>>>>, <<<<<_____>>>>.,,,,, <<<<<.....____>>>>))))))):

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Alignment of mt-tRNA(**Asn**) genes

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NC_012708_N      UUAAUUGAAACCA.....AAUAGAGGUUAAUUAUUGUUAAUAAUU.AAAUuGAAU-UAU...-A-UUCCAAUUAAA
NC_008323_N_NEW UUAAUUGAAACCA.....-AAAAGAGGUAAAUUAUUGUUAAUAAUU.CUAUuGAUUAUA...---AUCCAAUUAAA
NC_008323_N_NEW UUAAUUGAAACCA.....-AAAAGAGGUAAAUUAUUGUUAAUAAUU.CUAUuGAUUAUA...---AUCCAAUUAAA
NC_008323_N      UUAAUUGAAACCA.....-AAAAGAGGUAAAUAUUGUUAAUAAUU.CUAUuGAUUAUA...---AUCCAAUUAAA
NC_006279_N      UUAGUUAAAACCA.....AAAAGAGGUAAAUUAUUGUUAAUAAUAgAAU.GAAA-UUU...--UUUCUAAAUAAA
NC_006292_N_NEW UUAGUUAAAACCA.....AAUAGAGGUUACUAUUGUUAAUAGUA.UAAUuGAAAUA...---UUCUAAAUAAA
NC_006280_N      UUAAUUAAAGCCA.....-AAGAGCGGCCUACUGUUGUUAAUAGUA.UAAUuGAUUUUC-...-UAGUCUAGUUAAA
NC_008192_N      GGUUUUUAAGCAG.....-----AAUGCGUUUGAUUGUUAAUCAA.AGGU.-----UUA...-----AAACCG
NC_006386_N_NEW AAAUUUCUAGCAUg.....gCUCUAAAUGCCUUUUUCGUUGGAAAA.AUGA.-----UAA...-----UAAUUUU
NC_004537_N      UAAAUAGUAGCUUauauauuCUUUUAAAGCAUUGGACUGUUAAUCCAA.AGAU.GCAA-GUA...--UUGCCUAAUUAG
NC_013612_N      UAGGUGGAUGCUCu.....cUGGUUCGGGACUUAGCUGUUAAUUAAG.AUUUuGGGGGAUCgagGCCCCUACCUAU
NC_013612_N_NEW UAGGUGGAUGCUCu.....cUGGUUCGGGACUUAGCUGUUAAUUAAG.AUUU.UGGGGGAUCgagGCCCCUACCUAU
NC_013622_N      UAGAUAGAUGCUCu.....cUGGUUUAGCGCUUAGCUGUUAAUUAAG.AAUUuGGGGGAUCgagGCCCCUACCUAU
NC_008127_N      UAGAUGAAUGCCCg.....cUGGCUUGGGGCUUAGCUGUUAAUUAAG.AGUUuGUAGGACCgagGCCUUCUCAUCUAG
NC_008127_N_NEW UAGAUGAAUGCCCg.....cUGGCUUGGGGCUUAGCUGUUAAUUAAG.UGUuGUAGGACCgagGCCUUCUCAUCUAG
NC_003189_N      UAGAUGAAUGCUCg.....cUGGCUUGGGGCUUAGCUGUUAAUUAAG.AUUUuGUAGGACCgagGCCUUCUCAUCUAG
NC_010122_N      UAGAUGAAUGCUCg.....cUGGCUUGGGGCUUAGCUGUUAAUUAAG.AGUUuAAAGGAUCgagGCCUUCUGUCUAG
NC_010121_N_NEW UAGACAGAUGCUCg.....cUGGUUUAGUGCUUAGCUGUUAAUUAAG.AGUUuAAAGGAUCgagGCCUUCUGUCUAG
NC_010121_N      UAGACAGAUGCUCg.....cUGGUUUAGUGCUUAGCUGUUAAUUAAG.AGUUuAAAGGAUCgagGCCUUCUGUCUAG
#=GC SS_cons    ((((((, <<<<.....>>>>,<<<<.....>>>>,,,,,<<<<.....>>>>))))):

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Alignment of mt-tRNA(**Pro**) genes

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NC_006081_P      CAAGGGGUAUUUU..aAAAAAAAUAUUAGUUUUGGGGAUUAAUGAU.AGGAA...GAAAUUCUUUCCCUUGA
NC_013032_P_NEW CAGAAAAUAGUUUU...-UAUAAAAAAAUAAUUUUGGAGAUUAUAGAU.GAUUU...-GAAAGAUUUUUUCUGA
NC_008412_P      CAAAGAGUAGUUUU...AUUUAAAAUACUAGUUUUGGAUACUAGAGAA.AGU--...CCUU--ACUCUCCUUGA
NC_008192_P      UCAGAUUAGUUUU..AAAAAAAACAUGAACUUUGGAAGUUCAAAGAU.GCUUC...UGAGAGAGUAAGCUUGU
NC_006083_P_NEW UAAUAAUUAGUUC...-----CAUAUAAACUUUGGAAGUUAAAGAA.-----...AAUUCA---UUUGUUAA
NC_004537_P      CAGAAAAUAGUUUU..aAGCUAAAACCUAAACUUUGGGAGUUUAAAAAU.GAUAA...--UUUAUCUUUUUCUGA
NC_011933_P      CAAAGAAUAGUUUUa.gUUUCAGAAUACUAGCUUUGGGAGCUAGUGGU.GAGGGuuuGAAUCCCUUUUCUUUGA
NC_011924_P_NEW CAAAGAAUAGUUUUa.gUGUUAGAACUUAGCUUUGGGGGCUAGAGGU.GGGGAuuuAAGUCCCUUCUUUUUGA
NC_011926_P      CAAAGAGUAGUUUUa.gUUUUAGAAUACUAGCUUUGGGAGUUAGCGGU.GGGGGuuuAAAUCCCUUCUUUUUGA
NC_006328_P      CAGACUACAGUUUU..aAACCAGAAUUUUGGCUUUGGGUGUCAAGGGU.GGGAGuuuAAGUCUUCCUUGUCUGA
NC_006328_P_NEW CAGACUACAGUUUU..aAACCAGAAUUUUGGCUUUA-GUGCCGAGAGU.GGAAGuuuAAGUCUUCCUUGUCUGA
NC_006328_P_NEW CAGACUACAGUUUU..aAACCAGAAUUUUGGCUUUA-GUGCCGAGAGU.GGAAGuuuAAGUCUUCCUUGUCUGA
NC_006328_P_NEW CAGACUACAGUUUU..aAACCAGAAUUUUGGCUUUA-GUGCCGAGAGU.GGAAGuuuAAGUCUUCCUUGUCUGA
NC_006345_P      CAAGCGAUAAUUUUagaCCUCAGAAUUUUGGCCUUGGGUGUCAAGAGU.GAAAGugaAAAUCUUUUCUUUUUGA
NC_006343_P      CGAGCGAUAGUUUUaguUUCUAGAAUUUUGGCCUUGGGUGUCAGAGAC.AAAAGugaAAAUCUUUUUUGCUUGA
NC_006343_P_NEW CGAGCGAUAGUUUUaguUUCUAGAAUUUUGGCCUUGGGUGUCAGAGAC.AAGUG..aAAAUC-UUUUUGCUUAA
NC_006335_P      UAAGCGGUAGUUUA..aUUUAGAAUUUUGGCCUUGGGUGUCAAAUGGU.GAAGGuuAAAUCCUCCUGCUUAA
NC_007970_P      CAAAAGAUAGUUUU..aUAAAAAGAUUUCGGUUUUGGGGGCCGGGAU.GGAGGuuuAAGUCCUUCUCUUUGA
NC_007970_P_NEW CAAAUAUAGUUUU..aUAAAAAGAUUUCGAUUUUGGGGGCCGGGAU.GGAGGuuuAAGUCCUUCUCUUUGA
NC_002073_P      CAAGAGGUAGUUUU..aUAAAAAGAUCUCAGCUUUGGGAGCUGGGGAU.GAAGGuuuAAGUCCUUCUCUUUGA
NC_007698_P      CAGAAGAUAGUUUU...AAUAAAAAUCCGGCUUUGGGGGUCGGGAU.GAGGUu.uGAGUCUUUCUCUUUGA
NC_007698_P_NEW CAGAAGAUAGUUUU...AAUAAAAAUCCGGCUUUGGGGGUCGGGAU.GAGGUu.uGAGUCUUUCUCUUUGA
NC_002780_P      CAAAAGAUAGUUUU...AUUUAGAAUUCCGGUUUUGGGUAUCGGGGGAUgAAGGU..uUGAAUCCUUUUUUUUGA
NC_011608_P      CGAGGGAAAGUAU..aAAGUUGUACAGUGGGUUUGGGACUCAUAGU.CCCUG...GUGGCAGGGUCUCUGU
NC_009081_P_NEW CGGGAAAUAGUAAUaagAAGAUGUACGUGGGUUUGGGACUCACGAGU.CCUUG...-GUUCAAGGUUUCCUGU
NC_007234_P_NEW CGGGGGAGAGUAU...GACAAGUAUUCUGGGUUUGGAACUUGGAGGU.CCCCU..gACUUUGGGGUCCUCUGU
NC_009690_P      CAAGAAGUAGUUUU...AAUAAAAAUUAACAUUGGAAGUUAGGGAU.UAAAA...UUGUAUUUACUUUUUUGA
NC_008557_P      CAAGGAGUAGUUUU..uAAUUAAAUAUAAACUUUGGGAGUUAAAGAA.AAGAG...-UUUUUCUUUCCUUGA
NC_013568_P_NEW GAGAAUAAAGUUUU...--UUAGAAUAAAGAUUCUGGGUAUCUUAGGA.-----...-U-----UAUUUUUA
NC_010472_P      AGAGGUAUAGUAU...ACAUAUUAUAUUUGGUUUGGGGCCAAAAGAA.AUUAC...GUAAGUAGUACUUCUA
#=GC SS_cons    (((((( (, , <<<<...>>>> , <<<< <----->>>> , , , , . <<<< <...>>>> ) ) ) ) ) :

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Alignment of mt-tRNA (Gln) genes

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NC_007177_Q      UUUCAAAUGGUGU...--AAAGCACAUUCUCUUUUGAUAGAGAAAGA-----A-AA-...-----AUUGAUAA
NC_010595_Q_NEW UUACUAUUGGUGU...--UUGGCAUAUUUUUUUUUGAUAAUAAAGGU-----UUA-----...-----UUAGUAAU
NC_005291_Q      UAACUUUUGGUGU...--AUGGCACGUUAAAUUUUGAUUUUAAAAGAAAUAUUUCAUU-...UUUUAAAAGUUAA
NC_005820_Q      -AGUUUUUGGUGU...--ACGGCACAUUAAAUUUUGAGUUUAAAAGAAAUGAAUCACUU...UCAUUAAAAUU--
NC_005963_Q_NEW UAACUUUUGGUGU...--AAAAGCACGAAAAUUUUGAUUUUUUAGGAAAUAUUUACU-...UUUUAAAAGUUAA
NC_005292_Q      UAAUCUUUGGUGU...--AAGGCACGAAAAUUUUGAUUUUUUAGGAAAUAUU-UAAUU...UUUUAGGAUUAA
NC_000875_Q      UAUUUUUUGGUGU...AUGACGCACAAAAGAUUUUGAUUCUUUUGAAGAAUAGUUUUUU...CUUUAAAUAUAA
NC_010241_Q_NEW UAUUUUUUGGUGU...ACGAUGCACAAAAGUUUUGAAGCUUUUGGAAAUAGUUUUUU...CUUUAAAUAUAA
NC_006817_Q      UAUUUUUUGGUGU...AUGAUGCACAAAAGUUUUGAAGCUUUUGAAGAAUAGUUUUUU...CUUUAAAUAUAA
NC_006899_Q      UGUAAAUUGGUGU...AUGAUGCACUAAAUUUUGAUUUUUAAAGA-UAAGUUUUUU...CUUUAAAUAUAA
NC_005939_Q_NEW UUAUUUUAA---U...cAUUUUAAACAUUAAUUUUGAUUUUUUAGGAAAUAUUUUUU---...UUUUAAAUAUAA
NC_006160_Q      UUAUUUUAAAGUGA...-UAAUUCACUUUUUUUUUUGAUUUUUUAGGAAAUAUUUUUU---...UUUUAAAUAUAA
NC_002629_Q      UUACAUUUGAUGU...--UUAGCAUAUUUUUUUUUGGUGUUUUUGAAGCAGU--GAGU...CUGUUAAUGUGAA
NC_010221_Q_NEW UAUAGUUUGGUGU...-AGUGGCACGCCGGCCUUUUGAUUCCUCAGGACUAAUUGCAGC-...AAUAGAACUAAUU
NC_003343_Q      UAUUUGGUGGUGU...-AAGGGCACAAGGAGUUUUGGGUCUCCUAGGACUCUU--UAACC..gGGGAGGCGUAUU
NC_013612_Q      UAGAAUUUGGUGUg.gUGGAAGCACUUGGGAGUUUUGAGUCCCUAGGGUGGGUUCAAAU...UCCAUUUUUUAA
NC_013612_Q_NEW UAGAAUUUGGUGUa.gUGGAAGCACUUGGGAGUUUUGAGUCCCUAGGGUGGGUUCGAAU...CCCAU-UUUUUAA
NC_013622_Q      UAGGAAAUGGUGUa.gAGGGAGCACCGGAGUUUUGAUGCUCUGGGGAUGGGUUCAAAU...CCCAUUUUCUAA
NC_010268_Q      UAGUAAGUAGUGUa.gUGGAAGCACCAAGAGUUUUGAUCUCUUGAGGUAGGGUUCAAAC...CCCUUCUUUCUAA
NC_010269_Q_NEW UAGGAAGUAGUGUa.gUAGAAGCAGUAAAGAGUUUUGAUUUUUUUGGAGGGGUGCGAGG...CCCUGUUUUUGUGG
NC_010269_Q      UAGGAAGUAGUGUa.gUAGAAGCACUAAAGAGUUUUGAUCUCUUGAGGAGGGGUGCGAGG...CCCCUCUUUCUAG
NC_005825_Q      UAGAAUGUGGUGUa.aAGGAAACACGUUAGUUUUGAGCUUUAAAUGUAGGUUCAACU...CCUGCUGUUCUAG
NC_008145_Q_NEW UAGAAUGUGGUGUa.aAGGAAACACAGAGGAUUUUGGGUUCUUUGGAUUGGGUUCGAGU...CCUAAUGUUCUAG
NC_008136_Q      UAGAAUGUGGUGUa.aAGGAAACACAGAGAAUUUUGAGUUCUCUAAUUAUGGGUUCGAAU...CCUAAUGUUCUAG
NC_011608_Q      UGCGAGGCGGUGA...-UUGGGCAUGUAGGGUUUUGGACCUUUAGGAGGGAAUUAGUUUUuuuUCCCCCUCGUAG
NC_009081_Q_NEW UACGGGGUGGUGU...AUUGAGCACGUGGGUUUUUGGAGCCUGAAGGGAAAGAGUAAGA..gUUUUCCUCGUAU
NC_007234_Q      UGUAGAGUGGUGU..aAAUGAGCACAGGGGACUUUGGCUCUCCAAAGAGUGAGUUUGUAG..uCUUGCCUCUGCAU
NC_009082_Q      -----GUGU...--UUGACACUAAAACUUUUGAAGUUUAUUUAUAGUUCAUAAUA...AGCUA-----
NC_010961_Q_NEW UCAAUAUUAGUGU...----GACACUAAAUUUUUGAAGUUUUAAAUAUUUAUUUAUUUAUUUAUUUAUUUAUUUA
NC_008151_Q      GAGGGGUAUUUAAaAcUGGAAAACUUAGA AUUUUGGCUCUAAAGUUUGGGUUCGAGC...CCCACUCCCCUAG
#=GC SS_cons      ((((((, , <<<<...>>>>, <<<<----->>>>, , , , <<<<-----...>>>>))))))):

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Alignment of mt-tRNA(**Arg**) genes

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NC_001673_R      AAACAAUAAGCAUuaAAAAAA.. AUGCGcGCCGAUUUCGACUCGGCGAGA. GC----ACAAA.. ---GCAUUG. UUUU
NC_009631_R_NEW AAACAAUAAGCAU..UUU----. AUGCC.AUCGGUUUCGGCCCGGUGAGA. GCGGC-----.. AACGCAUUG. UUUU
NC_010559_R_NEW GAGUGAG--UGCA.aUAC----. UGCAA.CCUGGUUUCGGCCCAGCUUUA. AAGAGUGUAAU.. uCUCUUCUCA. CUUU
NC_000931_R      AAGUG--UA-----..-AA-----..-UA.UACGGUUUCGGCCCGUAUAA. GGUAU-UCCUA.. AUACC--CA. CUUU
NC_012218_R      UCCUGGGUAUCUA..-GCUUU.. UAUA.AUUAGUUUCGACCCUAAUUUAU. UG----U--GU.. ---CAGCUA. GUAU
NC_011574_R_NEW AAUUAAACAUCU..--UGGU.. AAUA.AGUAGUUUCGGCCUUCUAAACcA-----CAAU.. ---UUUA. AGCU
NC_010526_R      AUUUGAUAA-----..---AUA.. AAAGU.UUUGAUUUCGAAUCAAAAGUA. UA----C-----.. ---UAAUCA. -AUA
NC_005924_R      AGUAAAGAAGUGU..-UU----. UCACA.UCCAGUUUCGACCUGGCCCCA. GG---UU--UU.. ---CCCUUU. ACUU
NC_005925_R_NEW CAAAGUAUAAAAU..GUUUUA.. GAUCU.CUUCUUUUCGGAAGGGUUGA-. --A--UGAACA.. --UAAUUUU. UUGA
NC_010766_R      UUAUAAAAGUGA..-AAUUA.. UCACA.UUCAGUUUCGACCUGAAAAUU. UG---AACUA.. ---CAUUCU. UAUU
NC_003290_R      AGGCAAUUAGUUU..-AAAGA.. AAACC.UUUGAUUUCGGCUCAAAAACU. UAUGGUUAAAAG.. uCCUAAAUCG. CCUA
NC_003194_R_NEW AGGCGAUUAGUCU..-AAUUA.. AAACA.UUUGAUUUCGGCUCAAAAACU. UGUGGUUAAAAG.. uCCAUAAUCG. CCCA
NC_004402_R      AGGCGAUUAGUCU..-AAUUA.. AAACA.UUUGAUUUCGGCUCAAAAACU. UGUGGUUAAAAG.. uCCAUAAUCG. CCCA
NC_008448_R      AGGUGGUUAGUCU..AAAACA.. AGACC.UCUGAUUUCGACUCAGAAAAU. UAUGGUUAAAAG.. uCCAUAAUCG. CCCU
NC_008448_R_NEW AGGUGGUUAAUCC..AAAACA.. AGACC.UCUGAUUUCGACUCAGAAAAU. UAUGGUUAAAAG.. uCCAUAAUCG. CCCU
NC_002734_R      AGGCGGUUAGUCU..AAAAGA.. AGACC.UUUGAUUUCGGCUCAAAAACU. UGUGGUUAAAAG.. uCCGCAACUG. CCUU
NC_008671_R      AGGUGGUUAGUCU..AAACUA.. AGACC.UCUGAUUUCGGCUCAGAAAAU. CGUGGUUAAAAG.. uCCACGACCC. CCUU
NC_008677_R_NEW AGGGAGUUAGUCU..AAAACA.. AGACC.UCUGAUUUCGGCUCAGAAAAU. CGUGGUUAAAAG.. uCCACGACCC. CCUU
NC_008669_R      AGGGAGUUAGUCU..AAAACA.. AGACC.UCUGAUUUCGGCUCAGAAGAU. CAUGGUUAAAAG.. uCCAUGACCC. CCUU
NC_011608_R      AGAUGGGUC--CAug--AAAU.. GGGAA.AAAGGUUUCGGCCCUUUUUUU. AGGAG-UAGAU.. UCCUCUCA. UCUG
NC_009081_R_NEW AGGUAAGUC--CA..UAAAUG..-GGAA.GAAGGUUUCGGCCCUUCUUGU. UGGAG--AAGC.. cCUCCUCUUA. CCUG
NC_007234_R_NEW GGGUGGGUC-----..UAGGUGcuAGCAA.GGGGGUUUCGGCCCUCCUGA. AGGGAGAGACAuguUCCUCCCA. CCUU
NC_009690_R      UUACAAGAAUUGA..u---UAA.. UCAUA.UAUGAUUUCGACUCAUACUUA. GGUGC---AAU.. GCACCCUUG. UAGU
NC_005928_R      AAAAGUUUAGUGG..--GUUA.. CUACG.CUUGGCUUCGAAUCAAGAAA-. -----AAAU.. ---GACU. UUUA
NC_008231_R_NEW GUUUUAUAA-----..-CAUUA.. AUAAA.UUAUAUUUCGGCUAUACUAGA. AU----UAAAA.. ---AUAUAA. GAUU
NC_008828_R      AGCUCUAAA-----..-A----..-U.. AAAGAUUUCGACUCUUUGAAU. -----AU.. ---CAGA. GCUU
NC_011121_R      AGACAUUAUA-----..-AG----..UUGGC. UUAUGUUACGGCCAUAAGAGC. GGUAUUUUAUG.. UAUCGUAG. UUUG
NC_008075_R_NEW GACAUUAUA-----..-G----..UUGGC. UUAUGUUACGGCCAUAAGAGC. GAUAUUG--AU.. GUAUCGUAU. GUUU
NC_000928_R      GACAUUAUA-----..-GUUGA..-C.. UUAUGUUACGGCCAUAAGAGC. GAUAC--UAAU.. GUAUCGUAU. GUUU
NC_009090_R      ACACUCUUAGCUCagUUGGUA.. GAGCA.UUUACCUUCUAAGUAAAUGGUuGUGGGUUCAA.. uCCUACUGAG. UGUU
NC_010217_R_NEW AGUGUAGAC-----..-----UA..-C.. CAGGGUAUCUAAUCCUGUUU-. -----GCU-----.. cC----CUAC. ACUU
NC_006990_R      CUACCCAUUAGCUCaaUUGGGG.. GAGCA.UUUACCUUCUAAGUAAGAGGUuGUAGGUUCAAG.. uCCUAAUUGGG. UAAU
NC_010484_R      GUACAUUAUA--AAcuAAG---.. UUUAA.UUUAGCUACGGCCAAAAUAGG. UGUGGUGUAAU.. uCCAUUAUAG. UAUA
NC_012618_R_NEW GGUUAAGCG--CC..-UUCUA.. GGCAU.UCUGGUUUCGGCCCAGAAAAU. GAAGA---AAC.. UCUCCUUAuACCU
NC_011826_R      GAUCAAG--CGCA..uAAUGU.. UGCC.UAUGGUUUCGGCCCAUAGUAU. GGAGACUCCG.. aGCUCCCUUG. CUCC
NC_008556_R      ACUAGUGUAGUUU..--ACUA.. AAACA.CUUGAUUUCGACUCAAGAAAC. CUGAAU---AA.. AUCAGCAU. AGUU
#=GC SS_cons    ((((((, , <<<<..<<<<..>>>>, <<<<----->>>>, , , , <<<<-----..>>>>))))))):

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Alignment of mt-tRNA (**Ser1**) genes

NC\_006892\_s1\_NEW GGGAAUGUG---.....--U---UUAAAGACUACUAAUC.U.UU....GUAAU--CAAUUUACUU-UG.AAACAUUUUCA  
 NC\_013569\_s1 AAGGAGUAAA---.....UU----GUJGGGCUUCUAACC.C.GA....UAUAGAU--GUUUGUUC---.AUUGCUCUUCUU  
 NC\_012218\_s1 AAGAUGUAAA---.....--A---AAAGGACUUCUAAUC.C.UG....CUAAUCA-----CAU---UGAACAUUCUU  
 NC\_011574\_s1\_NEW UAGAGUGAU---.....--U---AAAGAACUUCUAAUC.C.UU....GAAA-----GAUUCUA.UCACACUCUU  
 NC\_012571\_s1 AAAAAGAAU---.....--U---AUAAACUGUCUAAUC.U.UA....AAAU-----UUAAAUC---.UUUUUUUU  
 NC\_013474\_s1 AAAACUACU---.....ACU---UGAAAGCUGCUAACU.U.UC....UUAAAAUUAU-----UUUAU.AUUUAGUUUUU  
 NC\_009093\_s1\_NEW AAAGAUCAA---.....-A---AAAAAGCUUCUAAUC.U.UU....UAACAAGCA-----AACG.CUUAAUCUUUU  
 NC\_009093\_s1\_NEW AAAGAUCAA---.....-A---AAAAAGCUUCUAAUC.U.UU....UAACAAGCA-----AACG.CUUAAUCUUUU  
 NC\_004454\_s1 AAGAUUAU---.....AAA---UAUAAGCUGCUAACU.U.AU....AAAAAUGA-----AUAGUUC.AUUUAAUCUUU  
 NC\_006992\_s1 GGGUAUUAUGC.....uAAAAGCAGAAAGCUUCUAAUC.U.UU....UACUAAGCGGUUAAAUUCGG.UUUUAUUCUU  
 NC\_013480\_s1\_NEW GGGUUAUAUGA.....cAA-GAUAAUAAGCUUCUAAUC.U.UU....UUUCAAGCGGUUAAAUUCGG.UUUUAUUCUU  
 NC\_006281\_s1 GGAAUAUAUGA.....cAA-AAUAAGAAGCUUCUAAUC.U.UU....UUUUAAAGCGGUUAAAUUCGG.UUUUAUUCUU  
 NC\_010532\_s1 GAAAACUGAGUA.....uUUCUAUUAAGCUGCUAACU.U.UA....aUUUAUAGCGGUUAAAACUCGG.UUAAGUAUUCU  
 NC\_006895\_s1\_NEW GGAAUCUGG---.....-----UGAAAGCCGCUAACU.UgUC....ACCACAGCGGUUAAAACUCGG.UUGAGAUUUUCU  
 NC\_011329\_s1 GAAUAUUAUGA.....UC-AAGAUAAAGCUGCUAACU.U.UU....uUCUUUAGCGGUUAAAUUCGG.UUUUAUUCUU  
 NC\_010967\_s1 GAAUAUAAU---.....UA----AUAAAGCUUCUAAUC.U.UA....AUUUAGUA-CUUAAC--UA.UCAUUAUUUCU  
 NC\_004529\_s1\_NEW GAAUAUAAA---.....AU----AUAAAGCUUCUAAUC.U.UA....UUUAAGUAU---UAAUAU.UCUUAUUCUU  
 NC\_011520\_s1 GGAAUAAA---.....uAA---AUAAAGCUUCUAAUC.U.UA....UAACUAAUAAUUUAAAUA.UUAUUUUCGG  
 NC\_012708\_s1 AAAUAAGUAUG.....AA-CUAAAGAAUUUCUAAUC.U.CU....AAAAUUAUGGUUAAAACUCA.UUUUUUUUUU  
 NC\_008323\_s1\_NEW AAGAUAAGUUA.....AACANAUUUGAAUUUCUAAUC.U.UU....aUUUUAAAUGGUUAAAACUCA.UUUUUUUCUU  
 NC\_012688\_s1 GAAUAAGAUUUuu..uac-UCAAAUUUAAAUCUUCUAAUC.U.AA....aUUUUUUAUGGAUAAAUC-CA.UUUUUUUCUU  
 NC\_012893\_s1 GAAUAUAUAUU.....UU-AAAAUUAAGCUGCUAACU.U.AA....UUUUUAGUGGUUAAAACUCA.UUAUAUUUCU  
 NC\_011128\_s1\_NEW GAAUAUAAA---.....UU-AAAAUUAAGCUGCUAACU.U.AA....UUUUUAGUGGUUAAAACUCA.UUAUAUUUCU  
 NC\_007976\_s1 GAAUAUAU---u.....uAUA---AUUAAAUCUUCUAAUC.U.AA....UUUUUAGUG-AAUAAU-CA.UUAGUUAUUUCU  
 NC\_006899\_s1 AAGAGGUUAAGU.....UA-AAGAAUAGCUGCUAACU.AaUU....UCUUAAGCGGUUCAAUUCGG.UUUACCUCUUA  
 NC\_005939\_s1\_NEW AAGAUUAU---.....AU----UUAUAGCUUCUAAUC.A.UA....UAAAAUAA--UUAUU-UU.AUUUAGUCUUU  
 NC\_006160\_s1 AACUCUUUA---u.....uAAA---AUUAACUUCUAAUC.A.UA....UUAAAGUAU---AAU-AU.ACUAAGAGUUU  
 NC\_006280\_s1 AAAACUUUA---.....UU---UCGUAGCUUCUAAUC.A.UG....AUAAAGUG--CUUAUUUU-C.ACUAAGUUUU  
 NC\_006158\_s1\_NEW AAAGAUUA---a.....aAAA---AAGAGCUGCUAACUa.U.CU....UUUAAAGCA-UUAUAAA-UG.UUUAAUCUUUA  
 NC\_011594\_s1\_NEW AAAGAUUU---a....aaAAA---AAGAAGCUGCUAACUa.U.CU....UUUAAAGCA-UUUUAAA-UG.UUUAAUCUUUU  
 NC\_006157\_s1 GGAGUCUUG---.....--A---AGAAAGCUGCUAACU.A.UC....UCAAGCAA-AUAAUUUUU.GUUAGGCCCC  
 NC\_006627\_s1 AGAGUGGUU---.....ACG---UGAUUUUCUGCUAAA.U.UC....ACUUACUUA-----UAGUUA.AGUGCACUCG  
 NC\_008158\_s1\_NEW UAGGGUAG---.....cCA---UUUAGGUUGCUUAA.U.A.UC....GAAUAAGAGGAACAAUACUU.CUUAAAGUCUUU  
 NC\_008167\_s1\_NEW AAAAUGGU---.....gAA---CUGAAACUACUAAU.U.AAu..uAUUAUCAUA---GGUUCUA.UCACUGUUUA  
 NC\_008446\_s1\_NEW AGAAAUGGA---a.....ccUA---UCCAAGCUCUAAUC.U.GG....GAAU--GUUGUUAUUAUCAG.UGACAUUUUA  
 NC\_006665\_s1\_NEW GAAACUUAUAGG.....UUUAUUUAGUCUGCUAAGU.C.UU....aAAAUUGUGGUUCAAAUCA.UAGAAGUUUCG  
 NC\_004610\_s1 GAAACUUAUUGG.....uUUUAUUUAGUCUGCUAAGU.C.UU....aAAAUUGUGGUUCAAAUCA.UAGAAGUUUCG  
 NC\_006666\_s1\_NEW GAAAUUUUAGGG.....UU-AUCUAAGUCUGCUAAGU.C.UU....aGAUCUGUAGUUCACUCUA.UGGAAAUUCG  
 NC\_006664\_s1\_NEW GAAACCAUAGG.....UUUGUUUAGUCUGCUAAGU.C.UC....uAAACUGUAGUUCACUCUA.UAGGGGUUCG  
 NC\_007789\_s1 GAAACUUAUUGG.....cUU-AUUCUAGUCUGCUAAGU.C.CA....aGAAUCUGUAGUUCACUCUA.UAGAAGUUUCG  
 NC\_005929\_s1 AAGAUUUUAAGA.....UU-GAUUCUGGUUGCUAAAAC.C.AU....gAAGCCUGUGGUUUGACUCA.UAGAAAUCUUG  
 NC\_010692\_s1\_NEW GAAAUUUUAAAGG.....UUUAACAGAAGUCUUCUAAUC.U.UG....uUGUUUUGUGGUUCAAAUCA.UUAAAAUUUCG  
 NC\_010692\_s1 GAGAUUAUAGG.....UUUAUAAGAGUUUCUAAUC.U.UU....uUAUUUUGCGGUUCAAUUCGG.UUGUAUUCUCG  
 NC\_013275\_s1 GAGAAAGGUGGU.....AUCGAAAAAGGACUUCUAAUC.C.UA....uAUUCAGGCAGUUCGACUCUG.UCUAUUUUCUU  
 NC\_011075\_s1\_NEW GAGGGAAAGCUGG.....GC-AUGAAAGAGCUUCUAAUC.UgUU....UCAUAGGGGUUCAAUUCU.UCUUCCUUCU  
 NC\_013188\_s1\_NEW GAAAAGUGUAGG.....UC-GUAAAAAGAUUUCUAAUC.U.UU....uAUACAAGCAGUUCACUCUG.UUUACUUUUU  
 NC\_012767\_s1\_NEW GAAAAGUGUAGG.....UC-GUAAAAAGAUUUCUAAUC.U.UU....uAUACAAGCAGUUCACUCUG.UUUACUUUUU  
 NC\_003354\_s1\_NEW GAGAAAAAGCGGG.....GC-AUGGCUAGACUUCUAAUC.UuUG....CUAUAAGCAGUUCACUCUG.UUUUUUUCUCU  
 NC\_013658\_s1 GAGAAAUAGCUG.....aGCUAAUACAUGGCUUCUAAUC.A.CG....UAAAGAGAGGUUUAACUCU.UUCAUUUCUCU  
 NC\_009687\_s1 GCGGGAAGUUG.....ACUUAAGCAUUGACUUCUAAUC.U.GU....uGCUAGAGAGGGUAUCGAACU.UUCUCCCGUCU

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NC_012977_S1_NEW GGCGGGAAGUUG.....ACUUAGCAUUGACUUCUAAUC.U.GU....uGCUAGAGAGGGUAUCGAACU.UUCUCCCGUCU
NC_012138_S1 GGCGGGUAGUUG.....UCUUGGCCUAGACUUCUAAUC.U.GU....gGCCAGGGAGGGUGACGACCU.UCCGCUCGCUG
NC_011608_S1_NEW GGCGAGUAGUUG.....UCUUAUCAGGACUUCUAAUC.CgUG....GUUAGGGGGGGUGACGACCU.UCCAUUCGCUU
NC_009081_S1_NEW GGUGGGUAGUUG.....UCUUGGUCUAGACUUCUAAUC.U.GU....gGCCAGGGAGGGUGACGACCU.UCCGCUCACUU
NC_007234_S1_NEW GGCGGGGAGUUG.....UCUUAGCUUUGACUUCUAAUC.U.AU....gGCUAGAGAGGGUAACGACCU.UUCCUCGCUU
NC_009690_S1 AAAGGUAAUAGG.....AUUAAAAUAAAGCUGCUAACU.U.UA....UUUUGAGCAACUCAUAU-UG.UUCUACCUUUU
NC_007980_S1 UAAGAAUGAUUGa....gAAUGAAUGGGGCUGCUAACC.U.UA....CUUCGGAUGGUUCAAAACCA.UCCUUCUUUA
NC_007782_S1_NEW UAGGGAGAUUGAa....uAAUGAGGCCGGGCUUCUAACC.U.AG....CUUCGGGCGG-UAGUA--CG.UCCUCCUAA
NC_013073_S1 AGAAAAAACUUG.....gAGUGGAGCAGGGCUGCUAACU.U.UG....UUUCGGCAAUUCGAUUUUG.UCCUUUUUCUU
NC_008047_S1 AACUUCUA---.....AUU---AAUGAAUUUCUAAUU.C.AU....AUUUGGG-----CAC---.CCCGGAAGUUU
NC_008046_S1_NEW AAGUUGUAA---.....AU----UUUAAACUUCUGAUU.U.AGacucuAUAACUGGU--ACAGAUCGC.CCGUCACCUUG
NC_002681_S1 AGAGAAGAC---.....AU----UUUAAGCUUCUAAUC.U.AA....aGUACUGG-----AAUACAACCACUUCUCUC
NC_012821_S1 AAGGCAAUUAGG....uAA-AAAUAAAGCUGCUAACU.U.UA....AUUUGAGUGAUUCAUUUCA.UUCUUGUUUUU
NC_009082_S1_NEW AUAUUUUUGUAAuuuagaaUAAUUAUUAAGAUUCUAAUC.U.GA....UGGGGAGAA----AAAU-UU.UUCAGGUUAGG
NC_008151_S1 GAUAGCUAAGUUug..guuUAAAGCAGCCGCUUGCUAAGC.G.GA....UGGUGGUC-----GG.ACUCGAUUUCG
#=GC SS_cons ((((((, , <<<<.....>>>>, <<<<<----->>.>.>....., , , , <<<<<----->>.>>>>))))))):
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Alignment of mt-tRNA (**Ser2**) genes

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NC_012218_S2      GUCUUUAAA----.....-AAUA..----.UUAACUUUGAAAGUUAUU..GUGCUU--....-----UUAGCUAAAGACU
NC_011574_S2_NEW GAAGAUUUG---G.....AAUUA..CUU-.UAGUAACUUGAUCUUAC-CG..AUCUUUU-....-----GGAAAAGAUUCUUA
NC_010526_S2_NEW AAAAUACUA----.....-----U---.ACUUUUUUUGAAAAGAGUU..GUUUUU-....-----UAAUUUGUAUCUUU
NC_011036_S2     ACUUUCUUU----.....-----U..U---.ACUUUUCUUGAAAUAAGUU..UUAGA---....-AAAA--UCUAGAAAGUU
NC_006081_S2     AAUUUUUGGCCG.....aGGCUC..AGGC.AGAUUUUGAAAUAUCUU..ACAAGGGU...UUAAGUCCCUAAUAAUUU
NC_013032_S2_NEW --CUUCUUA----.....-----A---.CAGUUUUGAAAUAACUAA..UUAGACU-....-----AAGUCUAGAAGUUU
NC_008412_S2     AGUCUUUAGCUA.....-UAGU..AAGU.GAAUUUGAAAGCAUUAG..AAAAG---...UAAAAU--CUAAAAGGCUU
NC_012893_S2     AAUUAAUAGGCUU.....--GUA..AAGC.AUUUUUGAAAACUUAG..AAAGAAUa...aUAAAAUUUCUAUUAAUUU
NC_011128_S2_NEW AAUUAAUAGGCUU.....aUAUAA..AAGC.AUUUUUGAAAACUUAG..AAAGAAU-....ACUAAUUUCUAUUAAUUU
NC_007976_S2     AAUUAAUAGGCUU.....--GUU..AAGC.AUUUUUGAAAACUUAG..AAAGAAU-....-UUUUUUCUAUUAAUUU
NC_006279_S2     AGAUCAAU----.....--GUU..U---.UAAUUUGAAAGCAUUAG..CUAGACU-....--GGUGAGUCUUUGAUCUU
NC_006159_S2_NEW AAGUUAAU----.....-----U..U---.AAAUUUGAAAACUUUU..UUAGAUU-....--AAGCAAUCUUAAUUU
NC_006292_S2     AAUUGAUU----.....-----U---.AAUUGGUUUGAAACCAUUU..UCAGACU-....-GUAAAAGUCUUCAGUUU
NC_010197_S2     GGCUUUUUA----.....-AUUU..A---.CUCAGAUUUAACUCUGAAA..AAGGGG-....UACUAACCCCAAAGCCU
NC_006083_S2_NEW AAUGAGCAUCUUA.....-AGUA..UAAU.UAUUGCUUGAAAGUAUUC..GCAUAAAUacuuGCAAUUUUUUUUUU
NC_006386_S2_NEW GUUUUUUUUAGA.....--GGA..UCUA.AUUACCUUGAAAGUAUCC..CU-----...--UAG-----AAAUUCU
NC_004537_S2     GGAAAUAGGCAG.....AGUAU..AUGC.GAUUGGCUUGAAACCAAUAG..ACAAAGGGa..uAAAUUACCUUUUUUUUUU
NC_011007_S2     AAGAAAGUGGCAGa...gCGGUU..AUGC.GGCUGCUUGAAACCAGCAU..AUGGGGG...UCAACUCCUCCUUUCCG
NC_011009_S2_NEW AAGAAAGUGGCAGa...gCGGCU..AUGC.GGCUGACUUGAAACCAGCAU..AUGGGGG...UCAACUCCUCCUUUCCG
NC_011009_S2     AAGAAAGUGGCAGa...gCGGUU..AUGC.GGCUGCUUGAAACCAGCAU..AUGGGGG...UCAACUCCUCCUUUCCG
NC_007175_S2     AGAAAGCAU-CUUg...cUACAA..GAGU.UAGUUCUUGAAAACACUAA..AUCAAGAGg..gGAGGGCUCUUGGCUUUUCU
NC_012977_S2_NEW GUCCAGGUG----.....CGGA..A---.GAUUGUUUGAACCUAUCU..UAGGGGG...gCAGCAACCUCCUUGCGU
NC_012138_S2_NEW GGUGCGGCUAAUC.....-----A..GAU.GGUGGUUGAACCCUUCU..cAUGGGGG...uGGAGUUCUCCCGCACU
NC_011608_S2     GGCAUGGCCAAUC.....-----G..GGUG.GGAGGGUUUGAACCCUUCUUucACGGGGAU..uUAGAGCUCUCCCAUGUUU
NC_007234_S2_NEW GACGUAGCC----.....UAUCG.g-GU-gUAGGGUUUGAACCCUUCUUucAUGGGGAGU...UAGAGGUUUCGUGCGUU
NC_009690_S2     AGUCUAUU----.....AGGUUgU---.AAAAUUUGAAAUUUUUA..AGAAGUGU...UCGAUUCACUUAGGGCUU
NC_005940_S2     AGCUGCUGGCCUG.....--GGG..CAGG.UUUUGCUUGAAAUGAAAC..AGAAGUGU...UCGAUUCACUUAGUAGCUU
NC_013708_S2_NEW AGCUACUGGCCUG.....--GGG..CAGG.UUUUGCUUGAAAUGAAAC..AGAAGUGU...UCGAUUCACUUAGUAGCUU
NC_005439_S2     UUUUUUU----.....-AUUA..----.UUUGAUUUUGAAAUCUAA..AAGGAU--...-UUGAUCAUCCGCAAAAA
NC_001861_S2     GAGUUAAU----.....-----U..U---.UUAAGUUUGAAAACUUUA..UUAGAUU-....--UUUGGCUUUUAACUUG
NC_005928_S2_NEW CAUGACUUA----.....-----U..U---.GAUAAUUUGAAAUUAUCU..UU-GGC---...-----UUGCCUAGUCAUA
NC_008231_S2_NEW GGAAAAUAA----.....-----..----.AAUAGUUUGAAACUAAUUA..U-----GA...UUACUCAU----AUUUUCCU
NC_008828_S2_NEW AAGGAAAAA----.....-----..----.UUUUGUUUGAAACCAA-UG..UUGAAAA-....-----UAUUCAUCCUUA
NC_008640_S2     GAAUUUUU----.....-AAAA..UAA-.GAUAAUUUGAAAUAAUUG..GAUGGA--...-CCUGUUUCUAAUAAUUU
NC_012821_S2     AGUUUUAAAGCUU.....-AGGA..GCAU.GUUUGUUUGAAACAAAAG..GAAAGUGU...UCGAUCACUUGGACU
NC_009082_S2_NEW AUUGAAUUA-CUAuaaaucUAAAG..AAGA.AUUUGUUUGAAACAAAU..AU-----...-ACAU-----GUUCAUU
NC_010961_S2     UAUUUUAAAACUA.....-AUGA..UAGU.AUUUGCUUGAAACAAAAA..AU-----...-UAAUA---CCCAAAUAU
NC_011121_S2     ACCUGUGUA----.....--UAU..----.AUUGAUUUUGAAGUCAUUUU..GGUUGUU---...UUUGCUGACAAGACAGGUU
NC_008075_S2_NEW ACCUGUGUG----.....--UAU..----.GUUGAUUUUGAAAUCAUUUU..GGUUGUU---...UUUUAACAAGACAGGUU
NC_000928_S2     ACCCGUUU----.....--UAU..----.AUUGAUUUUGAAAUCAUUUC..GGUUGUU---...UUAGUUAACAAGUAGGGU
# =GC SS_cons    (((((( (, <<<<.....>>>>, <<<<.....>>>>, , <<<<.....>>>>))))))):

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Alignment of mt-tRNA(Thr) genes

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NC_013612_T      GCCCUAGUAGCUUAAAUA-...AAGCAUUGGUUUUGUAAUCCAAaGACUGGAAGUUAa...agUCCCCCUAGUGC
NC_013612_T_NEW GCCCUAGUAGCUUAAAUA-...AAGCAUUGGUUUUGUAAUCCAAaGACUGGAAGUUAaa...guCCCCCGGUGC
NC_013622_T      GCCCUAGUAGCUUAAACACUccaAAGCACCGGUCUUGUAAUCCGGaGAUUGAAGACUAa...gaCCCUUCCUAGCGCU
NC_011933_T      GCACUAGUAGCUCAGCCUC..aGAGCGCCGGUCUUGUAAACCGaGGCCGAGGGUUAa...auCCCUCCUACUGC
NC_011924_T_NEW GCAAUAGUAGCUCAGGUUA..aGAGCGCCGAUUUUGUAAAGCCGGaGGCCGAGGGUUAa...aaACCCUCGUUGC
NC_011926_T      GCAUUAGUAGCUCAGUUC..aGAGCGCCGGUCUUGUAAACCGaGGCCGAGGGUUAa...auUCCCUCCUACUGC
NC_004926_T      GUCGCAAUAGCUUAAUUA-...AAGCGUGGGUCUUGUAAACCCAaGAUUGAAAGUAAa...aaGCUUUCUGCGGC
NC_004926_T_NEW GUCGCAAUAGCUUAAUUA-...AAGCGUGGGUCUUGUAAACCCAaGAUUGAAAGUAAa...aaGCUUUCAGCAGC
NC_007446_T      GUCGCAGUAGCUUAAUUA-...AAGCACGGGUCUUGUAAACCCAaGAUUGAAAGUAAa...aaGCUUUCUGCGGU
NC_006343_T      GCUAUUGUAGUUUAAUU--...AAACAUUGGUUUUGUAAACCAAaAUUGGGGGCUAau...uaGCCCCCCUAGCC
NC_006343_T_NEW GCUAUUGUAGUUUAAUU--...AAACAUUGGUUUUGUAAACCAAaAUUGGGGGCUAau...uaGCCCCCCCAACCU
NC_006343_T_NEW GAUGCUAUAGUUUAAUU--...AAACAUUGGUUUUGUAAACCAAaAUUGGGGGCUAau...agCCCCC---CACC
NC_006335_T      ACUACCGCAGUUUAAGA--...AAACAUCAGCUUGUAAAGCUGaGAAUGGGGAUUUa...aaAUCUCCCGAUAGC
NC_006335_T_NEW ACUACCGCAGUUUAAGA--...AAACAUCAGCUUGUAAAGCUGaGAAUGGGGAUUUa...aaAUCUCCCGAUAGC
NC_006334_T      GCUACUGUAGUUUAAA---...AAACAUUGGCUUGUAAAGCCAAaAUUGGGGGCCAg...caGCCCCUCCAGC
NC_007698_T      AUUCUAGUAGCUUAAUUA..AAGCAUUGGUUUUGUAAACCAAaGAUUGAAAACCAc...aUUUUCUAGAGUA
NC_007698_T_NEW GUUAAUUCUAGCUUAAUUA..AAGCAUUGGUUUUGUAAACCAAaGAUUGAAAACCAcacaauUCCUAGAGUAUC
NC_002780_T      ACUCAAGUAGCUUAAACAG..cAAGCAUUGGUUUUGUAAACCAAaGAUUGAGGUCACu...aACCCUCCUGGAGUA
NC_013561_T      GGGAUUUUAGUUUAAAUA..AAAUUAUUCUUUGUAAAGGUUAaAGUUGUUAAGGU...-UUUGCAAGUCCA
NC_013561_T_NEW GUGUUAGUAGUUAAACUUA..AAACUACGUUUUGUAAUACGUAaAAGUGCAGAGAG...uUCUUGCUUAUCAU
NC_013752_T      GAUUUUUAGUUUAAGAGA..aAAAUAAUAAUUUGUAAAGUUGUaAGAUAAU-GUA...G--UUUAAUAAUCU
NC_010198_T      GUCUUUGUAGCUCAAUUGGgggAAGCAUUUACCUUGUAAAGUAAGaGGUUGUAGGUUCa...agUCCUACUAGAGACA
NC_010769_T_NEW ACUUGUCUAGUUUAAAUAgaAAACACUAAUUUGUAAUACGAAAUUGCACAACAc...acAAUCGCGACACGUA
NC_008557_T      GUCUUCUAGUUUAAUUA-...AAACACUAGCUUGUAAACUAAaACUGCAAAACU-...-UUUGCUGAUGACU
NC_013568_T_NEW AUUUAGAUGUUUAAAUA-...UAAUGUUUCUUUGUAAAGCUUAaAGUU-----...U-----CCCAAGUA
NC_010472_T      GUUAAAUAAGUUAAAGGUA-...UAACAUCUAAUUUGUAAUAGGAAUCGACUAU--...-CAGUCAUUUAACU
#=GC SS_cons    ((((((, <<<<_____...>>>>, <<<<_____>>>>.,,,, <<<<_____.>>>>))))))):

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Alignment of mt-tRNA (Val) genes

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NC_013474_V      AAAAAUAAAUUCAAAGUU-...UGAAGUUUCU AUUACAAAGAAUUUA.GU.CUA.--.----AGGACUAUUUUUA
NC_009093_V_NEW UAAAAUAUUAUCUAC-AAA...AGA UUUAGUU CUUACAAAACUAAAA.GA.CAA.--.----CUGUCUAUUUUAA
NC_004454_V      AAAGAAAUAUCU AUUUUA-...AGAUCUUUCA CUUACAAUGAAAAA.GU.UU--.----UUUACUUUCUUUU
NC_003058_V      UGAAGUAAAGCUAAGAAAA..gAAGCAUUCGG CUUACACGGAAAGAA.UG.UUG..UG.aAAUUCAACGUACUUUA
NC_011243_V_NEW CAAAUAAGCUAAAUC-...UAGCAUUUCA CUUACGUUGAGAAAGGUuUG.UCA.--.CAGUUGACUUGUUUUA
NC_013713_V      UAAAGUAUAGCUAAAUAgu.aUAGCAUUUCA CUUACGUUGAAAGGGAuUA.UCG..UG.cAAGUCGGUUUACUUUA
NC_013032_V      GAAGGUGUUUCUAAAAAUG..aUAUAUAUUA CUUACAAUAAUAAUUA.CC.UU--.----AAAGGCAUUUUUA
NC_008412_V_NEW UAAAGAGAAGCAC---UC-...GUGCGCCUUAUUUACAUUAAGGAGGA.GG.CCC.--.----AUGCCCUCUUUAA
NC_005935_V      CAAGAUUAGCUUAUAAAA...GAGCAUUUG CUUACAAUAAUAGGA.GU.AA--.----UUUACUAUCUUGA
NC_000941_V      CAGAGUAAAGCAUAAAA-...AUGCCCUC CCUACACCGAGAAGAU.CU.UCC.--.----CCAAAGUACUCUGU
NC_006386_V_NEW UAAAUCAAAAAAUUGAUAA...AUUUAAAGUAUUCUACACAUACUAAAG.AA.AAA..UA.gAAAUUUUUU---UUUAA
NC_004537_V      CGAACUAGAGCUUGACAU-...AAGCGUUUCU UUUACACGGAAAGAU.AU.UUG..UG..AA-UCAAAUUAGUUUGA
NC_004409_V      CAGAGCGUAGCCAAGCUAGa.aGGGCGUCUC CCUCACACUGAGAAGGU.AU.CCG..UG.cAAGUCGGGUCGCCUGA
NC_004409_V_NEW CAGAGCGUAGCCAAGCUAGa.aGGGCGUCUC CCUACACUGAGAAGGU.AUaCCG..UG.cAAGUCGGAUCGCCUGA
NC_002386_V      CAGGGUGUAGCUAAGCCAGaccCAGCACUC ACUACACCGAGAAGAC.AU.CCG..UG.cAAGUCGGAUCGCCUGA
NC_012138_V      GCUGAGCUAGUAU AUGCA-...GUACGGGUGG AUUACACCCACU UAGA.GG.CCG..UG.--GUCGGUCGCUCGGU
NC_011608_V_NEW GCCGGACUAGUAU AUUUA-...GUUAAGUGG AUUACACCCACUAGGG.GG.UUA..CG..AUUUGGACCGUUUGGU
NC_009081_V_NEW GCCGAGCUAGUAU ACAUA-...GUACGGGUGG AUUACGCCCUU UAGA.AG.CCA..UA.--GUCGGUUGCUUGGU
NC_007234_V_NEW GCUAGGCUAGUAU A-UAGA...GUACGGGUGG CUUACAUUCACC CAGA.GG.UCG..GAgCAGUUGGCCGCCUGGU
NC_009690_V      CAAAUAUUAACAUACUA-...AUGUAUCUC CUUACACUGAGAAUAU.GA.UUAaaUU.aAAUAUAAUCAGUUUUGA
NC_001816_V      CUAAGUAUAGUAU UAAAA-...AUACAUAUUG UUUACAACAUUACAAU.CG.GU--.----AACGUGCUUAGU
NC_001816_V_NEW CUAAGUAUAGUAU UAAAA-...AUACAUAUUG UUUACAACAUUACAAU.CG.G--.-G..AA-----CGUGCUUAGU
NC_012376_V      UGGGUAAGAUU---ACU...GUACAUCUUA GUUACAUUGAGAAAGGG.CC.UAU.--.AA--CAAGGUAUCCAU
#=GC SS_cons      (((((((((,,<<<<_____...>>>>, <<<<_____>>>>,,,,, <<.<<<..____>>>>))))))):

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Alignment of mt-tRNA(**Tyr**) genes

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NC_002735_Y      AAUAAAAGUGGCU... AUU---. .AGGUGUAAAACUGUAAAUUUAA..... AGAUGAAGA---..... --AUUCCUUUAUA
NC_006075_Y_NEW AAUAAGGUGUCUG... AAU---. .AGGUAUAAAACUGUAAAUUUAA..... UUAUGAAAAUUGu..... uuUAUUUUCUCUUAUA
NC_010536_Y      AAUAAGGUGUCUG... AUUA---. .AGGUAUAAAACUGUAAAUUUAA..... UUAUGAAUA--A..... cAAUAUUCUCUUGUA
NC_003344_Y      GAUGAUGUGGCU... ACUA---. .AGGCGCGGAUUGUAAAUCUGU..... UUAUAUUU--A..... AU-UAUUCGCAUA
NC_011572_Y_NEW GGUAGAUUAGUCU... AAUUUA. .GGAUAAUAGAUGUAAAUUUAA..... UGGUGU---G..... UUAU-UCUUCUGUUU
NC_008453_Y_NEW -----GGCUG... AUU---. .AAGCGUAAAUGUAAAUUUAA..... UUAAGAUUA---. --AAAUC-----
NC_002322_Y      GGUAGAGUAGUUU... AAUAGA. .AAACGGGAGACUGUAAAUCUUC..... AAAUGAG----- --UUCUUCUACCA
NC_011820_Y      UGCGUGGGGA----- .----- .--CCAUAAGGUCUGUAAAACCUAA..... AUUAGUAUA---. AUUAUACCCACGUUG
NC_010197_Y_NEW GCGUGGGAA----- .--AUA. .----UUAUGGUCUGUAAAACCAUA..... AAAAGGGUACUU..... AACACCCCAACGUA
NC_004537_Y      AGUAAAAGGCG... AUCAA-. .AAGCGAUAGAUGUAGCUCUAU..... UUAUGGGAUUA-. --UUCUCUUUAUA
NC_013612_Y      GAUAAGAUGGUC... AUUAU-. .AGGCGUGGUCUGUAAACUCAC..... ACAUAGAGGUUa..... aCUCUCUUUUUAUA
NC_013612_Y_NEW GAUAAGAUGGUC... AUUAU-. .AGGCGUGGUCUGUAAACUCAC..... ACAUAGAGGUUa..... aCUCUCUUUUUAUA
NC_013622_Y      GGUAAGAUGGCU... AGUGUU. cAAGCGUGGUGUAGC----- GUAGAUAGGUUa..... aUUCUUUUUUAUA
NC_008127_Y      GGUAGGGUGGCU... AGUU--. .AAGCGUGGUGUAGC----- AGACGGAGGUUg..... aUCCUCUCCUGUA
NC_008127_Y_NEW GGUAGGGUGGCU... AGUU--. .AAGCGUGGUGUAGC----- AGACGGAGGUUg..... aUCCUCUCCUGUA
NC_003189_Y      GGUAAGAUGGCU... AGUU--. .AGGCGUGGUAUGUAGCCCCAC..... AUACAGAGGUUg..... aGCCUCUUUUUAUA
NC_007782_Y      UAGAAGGUGGCG... AGUGGC. .AUGCAUUCGGUCUGUAAACCGAA..... UAACGGGC--Ag..... gcAGAGCCCUUUUAUA
NC_007782_Y_NEW UAGAAGGUGGCG... AGUGGC. .AUGCAUUCGGUCUGUAAACCGAA..... UAACGGGC--Ag..... gcAGAGCCCUUUUAUA
NC_013073_Y      UGUUAGGUGGCU... AGCUA-. .AGGCAGUAGACUGUAGAUUAU..... UAACGGAGUUA-. AUUCUCCCC--AACAA
NC_005928_Y      AUGACUAUA----- .-AAAA. .----ACUUGUCUGUAAAACAAG..... GUUC--AGCC--. UAGCUAAUAGUCGAG
NC_008046_Y_NEW UUAACCUG----- .---CAU. .----AUUAAGUUGUAAACCUAA..... AAGU-----A..... GUAU---GGUUUAUU
NC_002681_Y      GAU-----AAUA. .ACUUUA. .GAUUUCAAAACUGUAAAUUUGA..... aUAUAAAAGGUA-. --AUUU-----GUCG
NC_012821_Y      CGCAAGGUGGCU... AAACUU. .AGGUGAAGGAUUGUAGCUCUUU..... UUAUAGGGA--A..... aUUCUUUUUUUAUA
NC_010961_Y_NEW GAA--AAUGGCU... AUU---. .AAGCAGUAAAUGUAAAUUUAC..... AAAUAUUU---. AUAAUUU-----CA
NC_008151_Y      AGAUUGAUGGCG... AAUGGCuuAUGCGGCUCCUGUAAAAGGAGUguu..... uuuaCAAUGUAGGUUCa..... aUCCUACUCAAUA
NC_011121_Y      ACUGAUUUAGCAU... AUUUUU. aAUGUGGUGGUGUAAAACCCUU..... UGAAAUCUGG--. --GAAGUUGAUCAGGA
NC_008075_Y_NEW GCUGGUUUAGCAU... AUUUUU. aAUGUGGUGGUGUAAAACCCUU..... UGAAAUCUGG--. --AAGUUAUUCAGGA
NC_000928_Y      ACUGAUUUAGCAU... AUUUUU. aAUGUGGUGGUGUAAAACCCUU..... UGAAAUCUGG--. --UAGUUAUUCAGGA
NC_010202_Y      GUGGAGAUUGGCG... AGCGGU. aAUGCAUUCGUGUAAAACGGAGuaagggauaccGAUCGAGAGUUCa..... aACCUCUCUCACUA
NC_010171_Y_NEW AAUAGGAUGGCG... AGGGGU. .AUGUAGUCCGUGUAAAACGGAA..... aUAAGAAGAGUUCg..... aGUCUCUUUCCUGUA
NC_010171_Y      UGCCUUUAUGUUU... aAUUGGU. aAAAUUAUUAUUUAUUAAUAGAA..... aAGUAUAGGUUCa..... aUCCUUUUUAGGUUCU
NC_010208_Y      AGUGAGAUGGCG... AGUGGUuaAUGCGCUUCGUGUAAAACGGAG..... UUGGGAGACUUUaucgagaguuaaAUCUCUCUCACUA
NC_010496_Y_NEW AGUAAGAUGACAG... AAUGGC. aAUGUGUCCCGUGUAAAACGGUA..... uUUUUAGAGGUUCa..... aUUCUCUCUCUUAUA
NC_006991_Y      AGGGGUAUGACAG... AAUGGU. aAUGUAUGCCAUGUAAAUGGUA..... uUAAUAAGAGUUCa..... aUUCUCUUUAUUCUA
NC_010472_Y      GAUUGUUUAGUAU... AAACCA. .UUACUCAGACUGUAAAUCUGA..... AGAUGACAU---. --UGUCAACAAUA
NC_010484_Y_NEW UUUAGAUUAUCGGaagAUUGUAuaCCGUGUAUGACUGUAAAUC-UA..... UAAUGA-----u..... cgGA---GUAUCUAGAC
NC_012618_Y      GAUAAGAUGGCUgagaACUUUAuuAAGCGAAAGACUGUAAAUCUUU..... UAACGGUCUA-. AAUUCCUCUUUAUCU
#=GC SS_cons    ((((((, <<<<...>>>>, <<<<_____>>>>.....,,, <<<<____>>>>))))))):

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