

Drosophila *rDNA* Map and Sequence



35S:

ETS.1 primer TATAGGTAGGCAGTGGTTGCC
ETS.2 rev-comp

ETS

TATAGGTAGGCAGTGGTTGCCGACCTCGCATTGTTTCGAAATATATATTTTCGTATAATGATTATATTTGGTTACTTATAATAAGTATATTATTATCCGTACAAATTTGTTTCTCAGTTCCTTTTTGAACACGG
 GACTTGGCTCCGCGGATAATAGGAATATACGCTATTTTAGATAATATCGTTGAAACAAAAGTCAAGTTTCTATTATACATAGAATAACAAATCGTTCCATATATATCGTTAATTTTGGTGGCAGGCAA
 ATATTAGTTTATTACCTGCCTGTAAAGTTGGATTATTATATCGTTACGGTATAATACAAAATGGATTCATATTATTATATGAAAGAAATATAAAATTTATATATAAATTTGGAAGAATTATCATGTGCGCT
 CGGTTTATGTTATATATTACCAGAGAGTTATATGAAAAGAGATAAATTTTAAATTTATCATCAAGATGCAAAATGATTTAACTTATATTTGGTTAAACAAAAATGTACAAGTGTGGATACAAAATTTATG
 TATGTTGAAAATAAAATGATATTTTAGAATGAAATATATGTATATATAAAGACAAAATTATAGAAAATATATTACAATAAATTTGTATGATCTTCTTGTATATTGGTAAAAACAAGTAGAATTTAAAAATGGA
 AATACGAATTACGAGTGCATATAAAAATGGCCGTATTCGAATGGATTTATTTTATAAATATATTTAAATTTTACCCAAAGGCAAAATATGAATTACATTCATAATATAAAAAAATGGAATTATAT
 ATAAAGTGGAAAATCTATAATATTTATATTGCTTATTTCAATTCAAAAATATGAATGAAATATGAAAAGAAAACATT

18S

1 **atctctggttg atcctgcccag tagttatatg** ctgtgtctcaa agattaagcc atgcatgtct
 61 aagtacacac gaattaaag tgaaccgca aaaggctcat tatatcagtt atggttcctt
 121 agatcgtaa cagttacttg gataactgtg gtaattctag agctaataca tgcaattaa
 181 acatgaacct tatgggacgt gtgcttttat taggctaaaa ccaagcgatc gcaagatcgt
 241 tatattgggt gaactctaga taacatgcag atcgtaggt cttgtaccga cgacagatct
 301 ttcaaatgtc tgccctatca acttttgatg gtagtatcta ggactaccat ggttgcaacg
 361 ggtaacgggg aatcagggtt cgattccgga gagggagcct **gagaaacggc taccacatct**
 421 aaggaaggca gcaggc**cggt aaattaccca ctcccagctc** ggggaggttag tgacgaaaa
 481 taacaataca ggactcatat ccgaggccct gtaattggaa tgagtacact ttaaatcctt

18S.3 primer catataactactggcaggatcaaccagaat
--

ue18S.1 primer aacctgggtgatcctgccagt

18S.1 primer agcctgagaaacggctacca

18S.2 primer agctgggagtggttaatttacg
--

541 taacaaggac caattggagg gcaagtctgg tgccagcagc cgcggttaatt ccagctccaa
 601 tagcgtatat taaagttggt gcggttaaaa cgttcgtagt tgaacttggc cttcatcagc
 661 gtagtacaac ttacaattgt ggttagtact atacctttat gtatgtaagc gtattaccgg
 721 tggagtctct atagtgtgatt aaatacttgt attttttcat atgttcctcc tatttaaaaa
 781 cctgcattag tgctcttaaa cgagtgttat tgtggggcgg tactattact ttgaacaaat
 841 tagagtgctt aaagcaggct tcaaatgcct gaatattctg tgcattggat aatgaaataa
 901 gacctctggt ctgctttcat tggttttcag atcaagaggt aatgattaat agaagcagtt
 961 tggggggcatt agtattacga cgcgagaggt gaaattcttg gaccgtcgta agactaactt
 1021 aagcgaagc atttgccaaa gatgttttca ttaatcaaga acgaaagtta gaggttcgaa
 1081 ggcgatcaga taccgcocta gttctaacca taaacgatgc cagctagcaa ttgggtgtag
 1141 ctacttttat ggctctctca gtcgcttccg ggaacccaaa gctttttggg ctccggggga
 1201 agtatggttg caaagctgaa acttaaagga attgacggaa gggcaccacc aggagtggag
 1261 cctgcggctt aatttgactc aacacgggaa aacttaccag gtcgaacata agtgtgtaag
 1321 acagattgat agctctttct cgaatctatg gttgggtggc catggccggtt cttagttcgt
 1381 ggagtgattt gtctggttaa ttccgataac gaacgagact caaatatatt aaatagatat
 1441 cttcaggatt atggtgctga agcttatgta gccttcattc atggtggcag taaaatgctt
 1501 attgtgtttg aatgtgttta tgtaagtgga gccgtacctg ttggtttgtc ccattataag
 1561 gacactagct tcttaaatgg acaaatgctg tctagcaata atgagattga gcaataacag
 1621 gtctgtgatg cccttagatg tcctgggctg cacgcgcgct acaatgaaag tatcaacgtg
 1681 tatttcctag accgagaggt ccgggtaaac cgctgaacca ctttcatgct tgggattgtg
 1741 aactgaaact gttcacgatg aacttggact tcccagtaag tgtgagtcac taactcgcat
 1801 tgattacgtc cctgcccctt gtacacaccg cccgtcgcta ctaccgattg aattatttag
 1861 tgaggctctc ggacgtgatc actgtgacgc cttgctgtgt acggttgttt cgcaaaagt
 1921 gaccgaactt gattatttag aggaagtaaa agtcgtaaca aggtttccgt aggtgaacct
 1981 gcggaaggat catta

ue18S.2 primer GGCACCAGACTTGCCCTC

V4-V5	18Suni572F primer gccagcagccgcggtaat
	18Suni1354R primer gaacggccatgcaccacc

V7-V8	18Suni1354F primer ggtggtgcatggccgttc
	18Suni1821R primer acgggcggtgtgtac

ITS1

ttgta taatatoctt accgttaata aatatttcta attatacaaa
 2041 taaaaacaat ttaccaaaat aaaaatataa caaatgatt ccatggaatc aaaagttaa
 2101 atcaaaaataa aacgaagatg ggttttattt atatagttag tgtggggcctt ggcaacctca
 2161 taaaaagatt ttaacatttc taatgtatgt tgtgcgtatt tgtggcagat acttacaaca
 2221 acggcgtttc ctataaaaat aatgtttcga acatgaaaat cgaagaaaca aaattcgaaa
 2281 gtggaagtcg aatcaaaaata aaataatttc gaatgtgtgg taatcatcga aataagtgtt
 2341 aatataattg gtagatatta actaattttt aaaatttctg tgtatttatt actatacacg
 2401 cgttgcgaat atgtattggt catcttagtt atgggcatac gttggctaata gcaacaacct
 2461 gaaataaaca atgttgatc tggcatccat caggttaatg ttttatataa attgcagtat
 2521 gtgtcaccga aatatgcaaa cccataacc aaccagatta ttatgataca taatgcttat
 2581 atgaaactaa gacatttcgc aacatttatt ttaggtatat aaatacattt attgaaggaa
 2641 ttgatatatg ccagtaaaaat ggtgtatttt taatttcttt caataaaaac ataattgaca
 2701 ttatataaaa atgaattata a

5.8S

aactctaag cgggtgatca ctcggtcat gggctgatga
 2761 agaacgcagc aaactgtgct tcactgtgtg aactgcagga cacatgaaca tcgacatttt
 2821 gaacgcatac cgcagtcact gctg

ITS1.5

ttatgt actttaatta attttatagt gct

2S

2881 ctacatatgg ttgagggttg ta

gcttggga

ITS2

2941 catatggtat attattggat aaatataata atttttattc ataataattaa aaaataaatg
3001 aaaaacatta tctcacattt gaatgtgaaa aacgaagaga aatattttct ttttcaatca
3061 aataaactg agaaatgtct agcataaaaa attgaaatat ttttcatcta gaattgtctc
3121 ttattaatga ttcggaaata gaaaaatcct gtttatgtta ttattcttcg ttggttcgtt
3181 aaaaatggat aaataaaaac tttgcataca agaattaata aaaatgttat aacgaattta
3241 attaaatggt ttatcattat atataaagaa tttatggcaa gataaagtta tatacaacct
3301 caactcatat gggactacct cctgaattta agcatattaa ttagggggagg aaaagaaact
3361 aacaaggatt ttcttagtag cggcgagcga aaagaaaaca gttcagcact aagtcacttt
3421 gtctatatgg caaatgtgag atgcagtgtg tggagcgtca atattctagt atgagaaatt
3481 aacgatt

28S exon 1

3541 tccaaagagt cgtgttgctt gatagtcag cactaagtgg gtggtaaact ccatctaaaa
3601 ctaaatataa ccatgagacc gatagtaaac aagtaccgtg agggaaaagt gaaaagaact
3661 ctgaatagag agttaaacag tacgtgaaac tgcttagagg ttaagcccga tgaacctgaa
3721 tatccgttat ggaaaattca tcattaaaat tgtaaatatt aaataatatt atgagaatag
3781 tgtgcatttt ttccatataa ggacattgta atctattagc atataccaaa tttatcataa
3841 aatataactt atagtattt ccaattaaat tgcttgcat ttaacacaga ataaatgta
3901 ttaattgat aaagtgtga tagatttata tgattacagt gcgttaattt ttcggaatta
3961 tataatggca taattatcat tgatttttgt gtttattata tgcacttgta tgattaacaa
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4081 tatgtgcaag ttattgggat ataaacctaa tagcgttaatt aacttgacta ataatgggat
4141 tagtttttta gctatttata gctaattaa acaatcccgg ggcgttctat atagtattgt
4201 ataatgtata tttatattat ttatgctct aactggaacg taccttgagc atatatgctg
4261 tgaccgaaa gatggtgaac tatacttgat caggttgaag tcaggggaaa ccctgatgga
4321 agaccgaaac agttctgacg tgcaaatcga ttgtcagaat tgagtatagg ggcgaaagac
4381 caatcgaacc atctagtagc tggttccttc cgaagtttcc ctcaggatag ctgggtgcatt
4441 ttaatattat ataaaataat cttatctggt aaagcgaatg attagaggcc ttagggtcga
4501 aacgatctta acctattctc aaactttaaa tgggtaagaa ccttaacttt cttgatatga
4561 agatcaagggt tatgatataa atgtcccagt gggccacttt tggtaaagcag aactggcgct
4621 gtgggatgaa ccaaacgtaa tgttacgtgc ccaaattaa aactcatgca gataccatga
4681 aaggcgttg ttgcttaaaa cagcaggacg gtgatcatgg aagtcgaaat ccgctaagga
4741 gtgtgtaaca actcacctgc cgaagcaact agcccttaaa atggatggcg ctttaagttgt
4801 atacctatac attaccgcta aagtagatga tttatattac ttgtgatata aattttgaaa
4861 ctttagtgag taggaaggta caatggtatg cgtagaagtg tttggcgtaa gcctgcatgg
4921 agctgccatt ggtacagatc ttggtggata gtagcaaata atcgaatgag agccttgag
4981 gactgaagtg gagaagggtt tcgtgtgaac agtggttgat caccagttag tcggctctaa
5041 gttcaaggcg aaagcgaaaa tttcaagta aaaca

28S intron

5101 cgaattataa tacacttgaa
aaaaat gcctaactat ataaacaaag

28S exon 2

5161 ctgttgagta tccgtttggt attaaatatg ggctcgtgc tcatcctggc aacaggaacg
5221 accataaaga agccgtogag agatatcgga agagttttct tttctgtttt atagccgtac
5281 taccatgga gtccttcgca gagagatatg gtagatgggc tagaagagca tgacatatac
5341 tgttggtcgc atatcttctc ctccgacctt gaaaatttat ggtggggaca cgcaaacttc
5401 tcaacaggcc gtaccaatat ccgagctgg tctccaaggt gaagagtctc tagtcgatag
5461 aataatgtag gtaagggaag tcggcaaat agatccgtaa ctccgggata aggattggct
5521 ctgaagattg agatagtcgg ccttgattgg gaaacaataa catggtttat gtgctcgttc
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5641 gtagccaatt gtggaacttt cttgctaaaa tttttaagaa tactatttgg gttaaaccac
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5821 caatgtgatt tctgcccagt gctctgaatg tcaaagtga gaaattcaag taagcgcggg
5881 tcaacggcgg gagtaactat gactctctta **aggtagccaa atgcctcgtc atctaattag**
5941 **tgacgcgcat gaatggatta acgagattcc** tactgtccct atctactatc tagcgaacc
6001 acagccaagg **gaacgggctt ggaataatta** gcgggaaag aagacccttt tgagcttgac
6061 tctaactctg cagtgtagg agacataaga ggtgtagaat aagtgggaga tattagacct
6121 cggtttggtg tctcaatga aataccacta ctcttattgt ttccttactt acttgattaa
6181 atggaacgtg tatcatttcc tagccattat acggatataat ttattatatac ttatggtatt
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6481 atagagcaaa agggcaaatg ctgacttgat ctccgtgttc agtacacaca gggacagcaa
6541 aagctcggcc tatcgtacct ttgggtttaa agagttttta acaagagggtg tcagaaaagt
6601 taccataggg ataactggct tgtggcggcc aagcgttcat agcagcgtcg ctttttgatc
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6721 cccatgcaag ggaacgtgag ctgggtttag accgtcgtga gacaggttag ttttacccta
6781 ctaatgacaa aacgttggtg cgacagcatt cctgcgtagt acgagaggaa cccgcaggta
6841 cggaccaatg gcacaactact tgttcgagcg aacagtggta tgacgctacg tccgttgat
6901 tatgcctgaa cgcctctaag gtcgtatccg tgctggactg caatgataaa taaggggcaa
6961 tttgcattgt atggcttcta aaccatttaa agtttataat ttactttata aacgacaatg
7021 gatgtgatgc caatgtaatt tgtaacatag taaattggga ggatcttoga tcacctgatg
7081 ccgcgctagt tacatataaa agcattattt aatacaatga caaagcctag aatcaattgt
7141 aaacgacttt tgtaacaggc aaggtgttgc aagtgttga gcagctgcca tactgcgatc
7201 **cactgaagct tctccttgc ttgatgattc ga**

R2 insertion site:
5913g--R2--t5914

NoR2F primer
cccagtgctctgaatgtcaa

NoR2R primer
cgaggcatttgctaccta

YesR2R primer
tagatgacgaggcatttggc

R1 insertion site:
5987t--R1--a5988

NoR1F primer
acgcgcatgaatggattaac

YesNoR1R primer
aattattccaagcccgttcc

28S.3
cactgaagcttctccttggcttgatgattcga

28S.4
rev comp of 28S.3

R1:

CGGACGTGTTTTCTGTCGCTCGTGGACATAGTGCAGAAGAACTTTGTTCCTCGTATTTGGAAGTATACGG
AATAAATAAATTTAGTGTTCGGTGGAAAGTGGTGCAGAAATTTTCGCGAATTAATAAACAAGCGGTTTGGAAAG
TAATTGACAATAAATTTATGGAATTTTCCACTCCGCACGTGTTGAGCGCGGAGCTTGGCGGTGAGCTT
TTCGAACAGCTGAGAGAAGCTTATTGGTGGTAGTCACCGCTAAGGATGTGTCTTGGGACAGCTTAGTGC
ACTCTACCAATAGGTGGAGCTATCACCATAGCAACTAGCCCGTGTGAGCGAGCATACGATTGCTGGACTC
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TCTCACACAGATTATGGCGTATGCTGGTTCGTTAAAGGGAGTTTGGCTCAATCTTCTTTGCGCCGCA
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CCCGGTTGGACGGCATCAATGGCACTATCTGCAAGGAGCTGCGCGCCATACCCGAGCACCTAGCAT
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ACCGCGAACAAGTAGCTGCCAGAGGCGACTAGCCTCCTGCCAGAGGCTAATCTGCTTGGATGCCCTT
CGGTATGCCGAACAGTATCCACAGTGGCACTGCAGGTACTTGGTGGAGCTCCCGGCTTGTGCTGGCTG
TAAGTTATTAGCGATCAAATACAAGCTAAAACGTGGATTCCCGCTGGAGGAGAACGACTGGCTTTACGGC
GAGGACATTCGCTGTCTTAGCTGGAGCAGAGGAAGACTCGCTAGAGGAGTGTAAATCCAGAGTTGGC
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GAGATTTTAGGTAGATCTGCTCCTCAGCAAGGGGAGTGTTCGCCCGCAAGCAAGTACTCGAATGCT
ACCGGGTGGTCTGATGTACATAGCTATAGCTTCTAGTCCGGGACGCTGTGCTGGCGTATCCAGACACA
TGACCATATGCTCACTTGTGGCGTATAGGGTGGCGTGGTTGTAATCCCTTCAAGTGTGGAACACGCCAC
GTAAAATAAGTTTCGGAGGGATCCGAAAAGCATAACAT

YesR1F primer
atagggtgccgtgggtgtaa

R2:

TTGGGGATCATGGGGTATTTGAGAGCAGAGGGGGAGTATTCCTCTGTAAATTCGTAAGTCATATCATATGA
TGTGCGGAAGGGGAATTTTACTCTGTAACCTACAAGTCTCTCCTTTACTCAAGTCGACTCAAAACCTCCT
CGTGGTGGTCCCGTAATGCTAAACTCGTTTAGCAGCTAATTTGAGCGGAAAACTTTTCCGATGGGCTG
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ATCTGATGACGACCCGACCTCCGTGGATATCTTCCCGGAGGACCAATATGAACCAAACGACGCGGTAC
TCTATCTAGGGTTCCTGACAGTATGTGGCCGGTCTTTAACAGCAAGAGAGGACTCGGTGTTACATG
CGATCTCGGCACCAGACGAAC TTGATGAAGAAGTGCAGCTGTCGATATAAAGGCAAGATGGAGTGATG
AAGAGAAGTGGATGATGGCGAGAAAGGAGGTTGAGCTCACAGCAAATGGATGTAAACACATAAAACAAGCA
ACTAGCGGTGTATTTGCAAACCGCAGCGTCGAAGCCATCAAAAAGCTAAGACAGAGGGGCGATTATAAG
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GTCGAACAGGGAAATTTTGGGACACTACGCGGGTATAGCCCCGTAGAATGCCATTCCAAATGGAGAGCC
CAAGAGTTGCAAAC TATCATTTGATAGGGCACATCTCGAGGGAAAGGAAACCACTCTCCAATGCTTATCGC
TATATCTCTGGGAATTTTCCGGCACAGGGTGTACGACACACACTGACGAGACCTCTCCGGAGACCTCG
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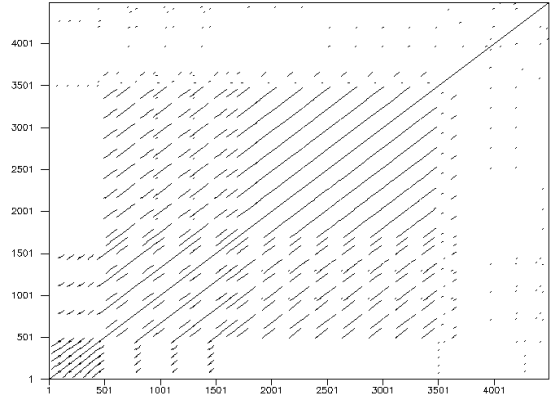
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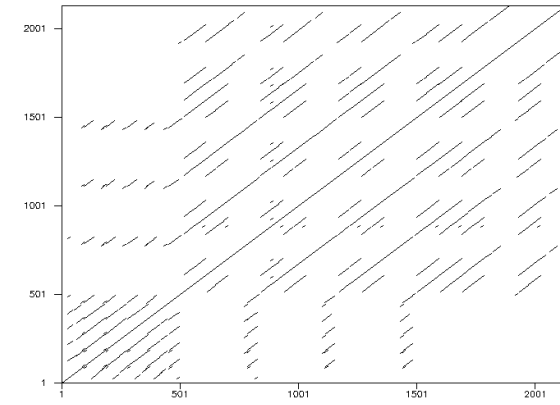
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another

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repeat_region 74..116 /note="direct repeat b (1)"
repeat_region 117..134 /note="direct repeat c (1)"
repeat_region 135..167 /note="direct repeat a (2)"
repeat_region 168..208 /note="direct repeat b (2)"
repeat_region 209..226 /note="direct repeat c (2)"
repeat_region 227..259 /note="direct repeat a (3)"
repeat_region 260..300 /note="direct repeat b (3)"
repeat_region 301..318 /note="direct repeat c (3)"
repeat_region 319..351 /note="direct repeat a (4)"
repeat_region 352..383 /note="direct repeat b (4)"
repeat_region 384..400 /note="direct repeat c (4)"
repeat_region 401..433 /note="direct repeat a (5)"
repeat_region 434..477 /note="direct repeat b (5)"
misc_feature 478..1889 /note="truncated copies of 240 bp repeat and 100 bp module"
repeat_region 496..532 /note="direct repeat a"
misc_feature 533..588 /note="imperfect sequence homologous to rRNA (18S and 28S) transcription initiation region"
repeat_region 589..613 /note="direct repeat 2"
misc_feature 614..609 /note="site corresponding to transcription initiation site"
repeat_region 610..704 /note="direct repeat 3"
misc_feature 705..628 /note="sequence homologous to transcription initiation region"
repeat_region 629..706 /note="imp. inverted repeat A"
repeat_region 707..773 /note="direct repeat 4B"
repeat_region 774..807 /note="imp. inverted repeat A'"
repeat_region 808..825 /note="direct repeat C"
misc_feature 826..860 /note="imp. sequence homologous to transcription initiation region"
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repeat_region 1102..1056 /note="direct repeat 4"
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repeat_region 1136..1153 /note="direct repeat c"
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repeat_region 1465..1482 /note="direct repeat a"
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repeat_region 1596..1690 /note="direct repeat 3"
misc_feature 1691..1614 /note="sequence homologous transcription initiation region"
repeat_region 1615..1784 /note="direct repeat 3"
misc_feature 1785..1709 /note="sequence homologous transcription initiation region"
repeat_region 1710..1786 /note="imp. inverted repeat D"
repeat_region 1787..1852 /note="direct repeat 4"
repeat_region 1853..1808 /note="imp. inverted repeat D'"
repeat_region 1809..1889 /note="direct repeat 5"
misc_feature 1890..2132 /note="240 bp repeat (1-5)"
repeat_region 1891..1915 /note="direct repeat 1"
misc_feature 1916..1948 /note="imp. sequence homologous transcription initiation region"
repeat_region 1949..1929 /note="direct repeat 2"
misc_feature 1930..1925 /note="site corresponding transcription initiation site"
repeat_region 1926..2024 /note="direct repeat 3"
repeat_region 2025..2026 /note="imp. inverted repeat E"
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repeat_region 2093..2047 /note="imp. inverted repeat E'"
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