

The complete chloroplast genome sequence of American elm (*Ulmus americana*) and comparative genomics of related species

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ABSTRACT

American elm, *Ulmus americana* L., was cultivated widely in USA and Canada as a landscape tree, but the genome of this important species is poorly characterized. For the first time, we describe the sequencing and assembly of the chloroplast genomes of two American elm genotypes (RV16 and Am57845). The complete chloroplast genome of *U. americana* ranged from 158,935-158,993 bp. The genome contains 127 genes, including 85 protein-coding genes, 34 tRNA genes and 8 rRNA genes. Between the two American elm chloroplasts we sequenced, we identified 240 sequence variants (SNPs and indels). To evaluate the phylogeny of American elm, we compared the chloroplast genomes of two American elms along with seven Asian elm species and twelve other chloroplast genomes available through the NCBI database. As expected, *Ulmus* was closely related to *Morus* and *Cannabis*, as all three genera are assigned to the Urticales. Comparison of American elm with Asian elms revealed that *trnH* was absent from the chloroplast of American elm but not most Asian elms; conversely, *petB*, *petD*, *psbL*, *trnK*, and *rps16* are present in the American elm but absent from all Asian elms. The complete chloroplast genome of *U. americana* will provide useful genetic resources for characterizing the genetic diversity of *U. americana* and potentially help to conserve natural populations of American elm.

Key words: Phylogeny; whole chloroplast genome; conservation genetics; comparative genomics; American elm

INTRODUCTION

The American elm, *Ulmus americana* L. occurs as diploid ($2n = 2x = 28$), a tetraploid ($2n = 4x = 56$), and even as a triploid in its native range in the eastern United States and Canada (Bey, 1990;Whittemore and Xia, 2017). Of the six species of elm native to North America, *U. americana* has the largest historical range (NRCS, 2017), and it has been widely planted as an ornamental tree in many parts of the United States outside its native range. Exotic insects or pathogens have affected many American elm trees (Whittemore and Olsen, 2011). The most consequential is Dutch Elm Disease (DED), which, as described by Schwarz (1922) and Karnosky (1979), arose in the 20th century in USA and resulted in the death of a majority of mature elms across much of the northern hemisphere (Brasier and Buck, 2001). The remarkable expansion of DED led some to forecast the complete extirpation of elms in North America or, at best, its persistence as a scrub species (Brasier, 1983). Although the number of elms lost to DED since the epidemic began is uncertain, it is likely many millions of trees based on their former abundance (Bey, 1990). The changes in age structure associated with mortality of mature elms and the reduction in population sizes associated with DED could be expected to modify how genetic variation in elms is distributed over the landscape (Bouzat, 2010). Understanding these changes in the population genetics of elms may improve our ability to control the diseases of elm and to breed elms for the wide variety of uses for which they were once prized (Pinchot et al., 2017).

Chloroplast genomes can be used to understand evolution, genetic diversity and genetic structure because of their highly conserved structure, low rate of mutation, and uniparental inheritance (Setohigashi et al., 2011). Sequence data from chloroplast genomes have been used in phylogenetic analysis (Ruhfel et al., 2014), biotechnological applications (Sabir et al., 2014), species identification (Kane et al., 2012), identifying Single-nucleotide polymorphisms (SNPs), and studies of inter- and intraspecific variability (Alexander and Woeste, 2014). To date, seven complete chloroplast genomes in the genus *Ulmus* from Asia have been reported. These include:

U. pumila, *U. laciniata*, *U. davidiana*, *U. macrocarpa*, *U. davidiana* var. *japonica* (Zuo et al., 2017), *U. gaussenii* (Zhang et al., 2019a), and *U. chenmoui* (Zhang et al., 2019b). However, the genomes of North American elms, including the most important North American species, *U. americana*, are not yet published. Previous phylogenetic analyses of *Ulmus* were based on SSR markers (Brunet and Guries, 2016) or variation level of ploidy in elm species (Whittemore and Olsen, 2011). Here, we report the genome sequence of two American elms based on paired-end whole genome sequencing. The main aims of the present study were (1) assemble the whole chloroplast genome of American elm, (2) evaluate the phylogenetic position of American elm relative to Asian elms, and (3) Identify genic and intergenic regions of polymorphism within the American elm chloroplast genome.

MATERIALS AND METHODS

Plant samples and sequencing

Fresh leaf samples of two genotypes (RV16 and Am. 57845) of *U. americana* were collected at the U.S.D.A. Forest Service, Northern Research Station work unit in Delaware, Ohio, USA. Genomic DNA was extracted using the methods of Zhao and Woeste (2011). Paired-end libraries were prepared by the Purdue Genomics Core Facility using the Truseq DNA PCR-Free Sample Preparation Kit (Illumina). Whole-genome sequencing was performed using Illumina short-read technology (2x100bp) on the HiSeq2500 sequencing platform in two single-lane reactions. Raw reads were processed using Trimmomatic (Bolger et al., 2014) to remove Illumina adapters and for quality control: bases of less than Phred-20 were clipped from the 5' and 3' ends, and subsequently reads below a minimum length of 30bp were discarded.

Chloroplast genome assembly and annotation

The chloroplast genomes were assembled with BWA (Burrows Wheeler-aligner), Picard-tools and GATK (Genome Analysis Toolkit) software (Langmead et al., 2009; McKenna et al., 2010; Wysoker et al., 2019). The *U. davidiana* (NC_032718.1) genome (Zuo et al., 2017) was used as a preliminary reference to guide assembly of the RV16 genotype, and subsequently the RV16 assembly was used to fill gaps of the Am. 57845 genotype.

The RV16 assembly was annotated in stages; first by predicting genes using Mfannot (Beck and Lang, 2010), an integration of tools including BLAST (Altschul et al., 1990), Exonerate (Slater and Birney, 2005), RNAweasel (Lang et al., 2007) and collections of reference proteins, RNA models, and group I and II splice junction profiles. These predictions were used as references for annotation within the program GeSeq (Tillich et al., 2017), along with six publicly available chloroplast genomes in genus *Ulmus*: *U. chenmoui* (NC_037758.1), *U. davidiana* (NC_032718.1), *U. gaussenii* (NC_037840.1), *U. laciniata* (NC_032719.1), *U. macrocarpa* (NC_032720.1), and *U. pumila* (NC_032721.1), and GeSeq's manually curated chloroplast rRNA and CDS reference sequences. The BLAT (Kent, 2002) search identity was set at 55% for protein and 85% for rRNA, tRNA, and DNA. The tRNA annotator ARAGORN (v. 1.2.38) was additionally used (Laslett and Canback, 2004). The annotations were validated in Sequin (v. 16.0), in which errors and warnings were flagged and resolved (NCBI, 2016). Subsequently the annotations were manually inspected to resolve discrepancies. As the strand directionality of some of the tRNAs and rRNAs in the *Ulmus* (Asian elm) chloroplast references were determined to be incorrect during annotation, the chloroplast genome of *Vitis vinifera* (NC_007957.1) was used as a reference to correct these issues. Subsequently the Am. 57845

assembly was annotated in a similar manner using the RV16 genome as an additional reference. The annotated American elm chloroplast genomes were deposited in the NCBI database (Genotype RV16 as MN043961 and Am. 57845 as MH324448).

Analysis of U. americana chloroplast genomes

For both American elm genotypes a circular chloroplast genome map was drawn with OGDRAW (v. 1.3.1) (Greiner et al., 2019). A global pairwise sequence alignment of the two chloroplast genome sequences was produced using EMBOSS Stretcher (v. 6.6.0) with default parameters (Madeira et al., 2019). The alignment was visualized with the Sequence Manipulation Suite (Stothard, 2000).

Comparison of American elm and Asian elms

The RV16 genotype was used as the representative *Ulmus americana* chloroplast genome, and compared to the chloroplasts of the seven Asian elm species publicly available (*U. pumila*., *U. laciniata*, *U. davidiana*, *U. macrocarpa*, *U. davidiana* var. *japonica*, *U. gaussenii*, and *U. chenmoui*). A global multiple sequence alignment of the eight species' chloroplast genomes was produced using the LAGAN algorithm with translated anchoring (Brudno et al., 2003). The alignment, annotated according to the RV16 reference, was visualized with the mVISTA server (Frazer et al., 2004). The sizes and junction sites of the two inverted repeat (IR) regions, the short single-copy (SSC) region, and long single-copy (LSC) region were compared and visually represented with IRscope (Amiryousefi et al., 2018).

Variant identification within the American elm chloroplast

To identify variants (i.e., SNPs and indels) within the *U. americana* chloroplast, chloroplast-specific reads were extracted from each genotype's whole-genome paired-end reads using BBSplit in BBMap (v. 37.93) (Bushnell, 2014). These chloroplast reads from each genotype were separately mapped to the RV16 genotype's chloroplast assembly using BWA (v. 0.7.15) (Langmead et al., 2009). Picardtools (v. 2.18.2) was used to sort and validate .sam and .bam files and to mark duplicates (Wysoker et al., 2019).

Subsequently, variants were called using GATK (v. 4.1.1.0) (McKenna et al., 2010). First, the tool HaplotypeCaller (with the flags --pcr-indel-model NONE and -ploidy 1) was used on each genotype in GVCF mode. Joint genotypes were then produced using the tools CombineGVCFs followed by GenotypeCaller. The raw variants were separated into SNPs and indels and hard-filtered separately according to GATK best practices parameters for quality control; those variants not passing all filters were removed using the SelectVariants tool. The high-quality SNPs and indels were sorted, merged together, and validated using Picardtools (v. 2.18.2) (Wysoker et al., 2019). The variants were functionally annotated using SnpEff (v. 4.3t) (Cingolani et al., 2012) using sequence ontology and a custom reference library built from the annotated RV16 genotype chloroplast genome. The cutoff to label a variant as upstream or downstream from a gene was set at 200bp.

Phylogenomic analyses of elms and related genomes

For phylogenetic analyses, the two American elm chloroplast genomes were compared to the genomes of the seven Asian elm species listed above and 12 other related species available from Genbank (Table 1). A multiple sequence alignment (MSA) was produced with MAFFT (v. 7.452) using the FFT-NS-i method (Katoh et al., 2002; Katoh and Standley, 2013). Subsequently all gaps created by the alignment were removed by TrimAI in Phylemon 2.0 (Sanchez et al.,

2011). To create the phylogeny, the curated MSA was provided to IQ-TREE (v.1.6.11) (Nguyen et al., 2015). First, we used ModelFinder within IQ-TREE to choose the appropriate model of sequence evolution (Kalyaanamoorthy et al., 2017), as assessed by Bayesian Information Criterion (BIC) support measures among 286 DNA models. The best nucleotide substitution model was deemed to be TVM+F+R2. In this nomenclature, TVM represents the base substitution rates of the Transversion model, in which A-G=C-T, with unequal base frequencies. Because the base frequencies were unequal, they were determined empirically from the data. The rate type R represents “free rate” heterogeneity, which relaxes the assumption of Gamma distributed rates and thus is more accurate for large data sets (Yang, 1995; Soubrier et al., 2012). The two categories of rates, in the format of (proportion of sites, relative rate), were determined to be (0.8045, 0.258) and (0.1955, 4.053).

The best substitution model was then used to infer the best phylogeny using a maximum-likelihood (ML) approach. For branch support analysis, we performed 1,000 replicates for a non-parametric Shimodaira–Hasegawa-like approximate likelihood ratio test (SH-aLRT) (Shimodaira and Hasegawa, 1999; Guindon et al., 2010) as well as 1,000 alignments of ultrafast bootstrapping (Hoang et al., 2018). A 50% majority-rule consensus tree was constructed based on 1,000 bootstrap trees. Graphical representation of gene trees was performed with FigTree v. 1.4.3 (<http://tree.bio.ed.ac.uk/software/figtree/>).

Intergenic variability in the American elm chloroplast

Intergenic regions of RV16 and Am. 57845 were aligned with Genious software (Grant and Stothard, 2008). Seven intergenic regions were identified as potentially polymorphic between the two American elm genotypes, and these were used to design primers with Primer3 in batch mode (You et al., 2008). Six additional genotypes maintained in the breeding collection were used to evaluate polymorphism in the intergenic spacers (Table 6). For each individual, all genotype- primer combinations were amplified in separate PCR reactions and their amplification tested on 2% agarose gels. The amplicons for each genotype were pooled and submitted for WideSeq analysis at the genomics core facility at Purdue University. WideSeq involves the construction of an NGS library which then is sequenced in its entirety. Raw data were trimmed with trimmomatic software (Bolger et al., 2014). The clean reads were mapped to the reference with BMap (Bushnell, 2014). GATK HaplotypeCaller (McKenna et al., 2010) was used to identify SNPs and to obtain a depth of coverage file. BCFtools (Narasimhan et al., 2016) was used to generate a consensus sequence, and ClustalW (Larkin et al., 2007) was used to generate an alignment for verifying polymorphic regions.

RESULTS

Chloroplast genome organization of American elm

The complete chloroplast genome maps of the American elm genotypes were produced for RV16 (Figure 1) and Am. 57845 (Supplementary Figure 1). The global pairwise nucleotide sequence alignment between the full chloroplast genomes of the RV16 and Am. 57845 genotypes contained 159,106 positions (Supplementary Figure 2). The sequences showed 99.8% identity (158,778/159,106) and 99.8% similarity (158,777/159,106). There were 284/159,106 gap positions (0.2%). The chloroplast genome and region sizes of *U. americana* were similar to those of the seven Asian elm species and closest in size to *U. laciniata* (Table 2). The *U. Americana* complete chloroplast genome assemblies ranged from 158,935bp (Am. 57845) to

158,993bp (RV16). The IR length ranged from 25,563bp (Am. 57845) to 26,072bp (RV16). The SSC ranged from 88,112bp (RV16) to 89,113bp (Am. 57845), and the LLC ranged from 18,696bp (Am. 57845) to 18,737 (RV16) (Table 2, Figure 2). The two genotypes exhibited the same GC content of 35.6%, and the same gene content: 127 genes, including 85 protein-coding genes, 34 tRNA genes and 8 rRNA genes, and were intermediate in the number of genes when compared to the Asian elms (which ranged from 121 in *U. chenmouii* to 145 in *U. davidiana* var. *japonica*) (Table 2, Table 3). American elm had 16 genes with introns, while the number of genes with introns varied from 8-18 in Asian elms (Table 2).

Variant identification within the American elm chloroplast

We found *U. americana* chloroplast genome variants in the form of SNPs and indels, which are available in vcf format as Supplementary Table 1. We retained 240 high-quality variants: 67 SNPs, 85 insertions, and 88 deletions (Table 5). Variants occurred at a rate of one per 662bp, and were scattered throughout the chloroplast genome, with the highest number (22) occurring at the 9,000-10,000bp and 124,000-125,000bp ranges of the RV16 genome assembly (Figure 3). These peaks are due to intragenic variants in *trnL*-TAA and intron variants in *ndhA*, respectively (Supplementary Table 1). Upon annotation, we found 328 effects among the 240 variants (as individual variants can exhibit more than one effect) (Table 5). While most variants did not occur in coding regions, variant effects were found acting on 47 different protein coding genes (Supplementary Table 2). Variants deemed high impact occurred in four genes: frame-shift variants in *rpl2* and *ycf1* and stop-gained variants in *ndhF* and *ycf4*. Additionally, missense variants (causing amino acid substitutions) were found in *ndhC*, *ndhK*, *rbcL*, *rpl2*, *rpoC2*, and *rps3* (Supplementary Table 2).

Gene loss-gain based on the whole chloroplast genome

We evaluated the chloroplast genomes of the eight *Ulmus* species, two species closely related to *Ulmus* (*M. mongolica* and *C. sativa*), and *A. thaliana* for the presence and absence of particular genes (Table 4). Five genes (*petB*, *petD*, *psbL*, *rps16*, and *trnK*) were present in American elm but absent from all Asian elms (Zuo et al., 2017; Zhang et al., 2019a; Zhang et al., 2019b). The gene *ycf15* was present in all elms but absent from the related species *Morus mongolica*, *Cannibis sativa*, and *Arabidopsis thaliana*. The gene *trnH* was present in most Asian elms and the other related species but not in *U. americana*. The gene *trnfM* was present in *U. americana* and the other related species, but absent from over half of the Asian elms (Table 4). Additionally, *U. americana* exhibited only one copy of *ycf1* (at the junction of SSC and IRb) while all the Asian elms exhibited two, with another copy at the junction of SSC and IRa (Figure 2). However, *U. americana* contained two copies of *rpl2*, one at the junction of LSC and IRa and one at the junction of LSC and IRb, while all Asian elms except *U. davidiana* contained just the copy between the junction of LSC and IRb (Figure 2).

We generated a global multiple sequence alignment of the eight elm species using RV16 (American elm) as the reference sequence for alignment and annotation (Figure 4 and Supplementary Figure 3). These identity plots show that Asian elms, while similar among themselves, differ from American elm, with non-coding regions less conserved within the genus than exons.

Phylogenomic analyses

We prepared a phylogeny based on the chloroplast genomes of 21 species that ranged from 153,854-160,094bp, and produced an initial MSA of 198,896 positions. Upon gap removal, 119,518 nucleotide positions remained, of which 17,831 were parsimony-informative and 76.2% were constant.

Using the MSA and best model of nucleotide substitution, the best maximum likelihood tree had a total tree length (sum of branch lengths) of 0.4272. The sum of internal branch lengths was 0.1936 (45.3% of the total tree length). The majority rule consensus tree based on 1000 ML bootstrap trees had the same topology as the best ML tree. The consensus tree represents the phylogeny for the 21 species, pictured as both a rectangular phylogram (in which branch lengths represent inferred evolutionary change as the number of nucleotide substitutions per site) and as a cladogram (with equal branch lengths) (Fig. 5). The American elms clustered separately from the Asian elms, and all elms sorted in a clade distinct from the other species included.

Intergenic variability in the American elm chloroplast

We identified seven intergenic regions that appeared polymorphic between the two American elm chloroplast genomes. Based on resequencing in these regions (27,988 reads with > 10X coverage for each putative polymorphism) among six additional American elm samples (Table 6), alignment of the resequencing reads, and SNP calling, we found that the *rps12-ycf15* intergenic spacer contained 84 SNPs among the six genotypes, the *matK-trnK-UUU* spacer contained 37 SNPs, the *trnK-UUU-rps16* spacer contained 9 SNPs, and the *trnM-CAU-psbD* showed 8 SNPs.

DISCUSSION

We assembled from paired-end whole genome sequence data the whole chloroplast genomes of two American elm genotypes. The availability of these sequence data and identified variants increases considerably our knowledge of the chloroplast of American elm and provides a resource for American elm population genetics. Chloroplast variation can be used to understand genetic variation, spatial genetic structure, and gene flow, and is important for taxonomy (Wiegrefe et al., 1994). Sequence variation in uniparentally-inherited chloroplasts can also be used to detect ancestral and recent hybridization of American elm with other elm species, a common feature of modern elm breeding. Most *U. americana* are tetraploid (4n=56), but Whittemore and Olsen (2011) reported 20 percent of American elms were also diploid (2n=28). The presence of diploid *U. americana* opens the possibility of gene exchange between American elm and other diploid elm species, e.g., the exotic *U. pumila* (Brunet and Guries, 2016). Hybridization between American elm and the native sympatric diploid *U. rubra* seems improbable and has never been reported.

Chloroplast genome organization of American elm and comparison with Asian elm

The genome of American elm was intermediate in size in comparison with the Asian elms. A comparison of American elm chloroplasts with Asian elm chloroplast genomes showed variability in gene content, number of coding genes, and genome size (Table 2). For example, the *petB*, *petD*, *psbL*, *rps16*, and *trnK* were identified in the chloroplasts of *U. americana* but absent

from the chloroplasts of Asian elm species (Table 4). *trnH*, which encodes a histidine-accepting tRNA, is absent from the chloroplast of *U. americana* but present in the chloroplast of most Asian elms and related species (Table 4). Angiosperms show considerable variation in how they manage tRNAs missing from chloroplasts; they can be expressed from either the mitochondria or from the nucleus and then imported into the mitochondria (Salinas-Giegé et al., 2015).

The genes *petB* and *petD* were present in American elm but were lost in the chloroplasts of all Asian elms (Table 4). In plants, *petB* and *petD* are members of the *psbB* operon (Soltis et al., 1998), and the *petD* gene is necessary for photosynthesis (Huang et al., 2017). The *psbB* gene, which has been well studied in higher plants (Stoppel and Meurer, 2013) along with *psbT* and *psbH* have an important roles in photosystem II (PSII). *petB* is a component of cytochrome b6, which facilitates electron transfer between photosystem II and photosystem I (Stoppel and Meurer, 2013). The absence of *petB* and *petD* in Asian elm chloroplasts means those genes are found in the nucleus of those species (Lin et al., 2015). *psbL*, which encodes an essential protein of photosystem II (Rochaix et al., 1989; Cai et al., 2015; Huang et al., 2017), was also present in American elm chloroplasts but absent from the chloroplasts of Asian elm species. The loss or gain of genes from the chloroplast (i.e., their capture by the nuclear genome) has been considered a consequence of adaptive evolution (Huang et al., 2017). If so, the preservation or loss in *Ulmus* of the genes discussed above reflects an aspect of *Ulmus* evolution that is not yet understood. The study of the genetic diversity of the chloroplasts of additional *Ulmus* species across their entire range may clarify the relationship (if any) between gene loss in *Ulmus* and its biogeography. The genetic structure of cytoplasmic haplotypes in diploid versus tetraploid American elms may inform the nature and locations of hybrid zones (if any) between these populations and, at a more basic level, inform studies of how nuclear genome duplication affects the assembly of multi-subunit cytonuclear complexes, a poorly understood topic (Birchler and Veitia, 2012). Uncertainty about the role of chloroplast gene loss in evolution is compounded by homoplasy (e.g., non-sister species may independently shift a gene from the chloroplast to the nucleus) and by a lack of information about the coordination of expression and function of some organellar genes (Huang et al., 2017).

Variant identification within the American elm chloroplast

We identified and functionally annotated 240 high-quality SNPs and indels in the *U. americana* chloroplast genome. Although we did not experimentally examine the function of each protein-coding gene with an effect from a variant, our analyses allow us to predict certain changes as having a large effect on gene expression or function. The genes with high-impact effects (i.e. frame-shift or stop-gained variants) and/or missense variants (resulting in amino acid changes) are most likely to influence or reflect evolutionary change in American elm. These include genes involved in photosynthesis, namely subunits of NADH-dehydrogenase (*ndhC*, *ndhF*, and *ndhK*), a subunit of Photosystem I (*ycf4*), and a subunit of rubisco (*rbcL*) (Table 3, Supplementary Table 2). High-impact and/or missense variants were also predicted in genes involved in self-replication, including in the large subunit of the ribosome (*rpl2*) and in DNA-dependent RNA polymerase (*rpoC2*), as well as in a conserved open reading frame with unknown function (*ycf1*) (Table 3, Supplementary Table 2). Additionally, the exceptionally large number of variants found intragenically in the transfer RNA *trnL*-TAA and in the intron of *ndhA*, another subunit of NADH-dehydrogenase, may be of biological importance (Figure 3, Supplementary Table 1). Further study of these genes could elucidate what consequences, if any, these changes have for adaptation or development in American elm.

Phylogeny of *Ulmaceae*

We compared the whole chloroplast genome of two American elm genotypes with seven Asian elm species, species of *Morus*, *Ficus*, and *Cannabis*, and seven members of related genera as outgroup species (Table 1, Figure 5). American elm sorted closely with the Asian elms in a sister clade with representatives in the *Cannabaceae* and *Moraceae*, as expected (Zuo et al., 2017). The seven Asian elms sorted into subgroup that was not shared by American elm, which diverged earlier (Figure 5). A strong division between the western and eastern elms based on chloroplast and nuclear (rDNA) was previously noted (Wiegrefe et al., 1994). Our phylogeny agreed with the Zuo et al. (2017) study of five Asian elms which showed that the two *U. davidiana* lineages were not monophyletic. Our phylogeny clarified the timing of the divergence of *U. chenmoui* and *U. gaussenii* relative to the other Asian elms (Zhang et al., 2019a; Zhang et al., 2019b) and American elm.

Intergenic variability in the American elm chloroplast

After identifying putative polymorphic intergenic regions between the RV16 and Am. 57845 genotypes via alignment, we validated the candidate markers by resequencing those regions in six genotypes of American elm (Table 6). Among these, we identified four polymorphic intergenic spacers: *rps12-ycf15*, *matK-trnK-UUU*, *trnK-UUU-rps16*, and *trnM-CAU-psbD*. Further analysis of these intergenic spacers and the above-reported SNPs and indels within the *U. americana* chloroplast should prove useful for understanding American elm genetic diversity and structure.

Conclusion

We present the first complete chloroplast genome of American elm. The whole chloroplast genome data (deposited as MH324448 and MN043961) will be useful as a reference for assembling and annotating chloroplast genomes of other New World elms. Along with the chloroplast genome variants identified, these data can be used for as a tool for studying genetic diversity of American elm and for evaluating hybridization between American elm and Asian elm species.

ACKNOWLEDGMENTS

Mention of a trademark, proprietary product, or vendor does not constitute a guarantee or warranty of the product by the U.S. Dept. of Agriculture and does not imply its approval to the exclusion of other products or vendors that also may be suitable. DNA sequencing was performed at the Purdue University Agricultural Genomics Center, Philip San Miguel, Director.

AUTHOR CONTRIBUTION STATEMENT

AE: conceived and designed the project, analyzed the data and wrote the original manuscript; JDA: designed portions of the methods, analyzed the data, and revised and edited the final manuscript; CCP, JMS, CEF: provided leaves samples and revised the draft; KEW: supervised the project, edited and revised the manuscript. All authors contributed the editing of final manuscript.

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Funding

Funding was provided in part by a grant from the Manton Family Trust, the Hardwood Tree Improvement and Regeneration Center (United States Department of Agriculture Forest Service Northern Research Station), and the Department of Forestry & Natural Resources at Purdue University.

CONFLICT OF INTEREST STATEMENT

We declare no conflicts.

CONTRIBUTION TO THE FIELD STATEMENT

Genetic diversity within the chloroplast is considered a fundamental tool for understanding population genetic structure and species evolution. We report the assembly and public deposit of the full chloroplast DNA sequence of two genotypes of American elm. These sequences enabled us to identify highly polymorphic regions within the American elm chloroplast that can be used for future studies of genetic diversity, genetic structure, gene flow, hybridization, and genome evolution of American elm.

REFERENCES

Alexander, L.W., and Woeste, K.E. (2014). Pyrosequencing of the northern red oak (*Quercus rubra* L.) chloroplast genome reveals high quality polymorphisms for population management. *Tree Genetics & Genomes* 10, 803-812.

Altschul, S.F., Gish, W., Miller, W., Myers, E.W., and Lipman, D.J. (1990). Basic local alignment search tool. *J Mol Biol* 215, 403-410.

Amiryousefi, A., Hyvönen, J., and Poczai, P. (2018). IRscope: an online program to visualize the junction sites of chloroplast genomes. *Bioinformatics* 34, 3030-3031.

Beck, N., and Lang, B. (2010). *MFannot, organelle genome annotation webserver* [Online]. University of Montreal. Available: http://megasun.bch.umontreal.ca/cgi-bin/dev_mfa/mfannotInterface.pl [Accessed 2019].

Bey, C.F. (1990). *Ulmus americana* L. *American elm*. Washington, D.C: United States Forest Service, United States Department of Agriculture.

Birchler, J.A., and Veitia, R.A. (2012). Gene balance hypothesis: connecting issues of dosage sensitivity across biological disciplines. *Proceedings of the National Academy of Sciences* 109, 14746-14753.

Bolger, A.M., Lohse, M., and Usadel, B. (2014). Trimmomatic: a flexible trimmer for Illumina sequence data. *Bioinformatics* 30, 2114-2120.

Bouzat, J.L. (2010). Conservation genetics of population bottlenecks: the role of chance, selection, and history. *Conservation Genetics* 11, 463-478.

Brasier, C. (1983). "The future of Dutch elm disease in Europe", in: *Research on Dutch elm disease in Europe*. (ed.) D.A. Burdekin. (<https://www.forestresearch.gov.uk/>).

Brasier, C.M., and Buck, K.W. (2001). Rapid Evolutionary Changes in a Globally Invading Fungal Pathogen (Dutch Elm Disease). *Biological Invasions* 3, 223-233.

Brudno, M., Do, C.B., Cooper, G.M., Kim, M.F., Davydov, E., Green, E.D., Sidow, A., Batzoglou, S., and Program, N.C.S. (2003). LAGAN and Multi-LAGAN: efficient tools for large-scale multiple alignment of genomic DNA. *Genome research* 13, 721-731.

Brunet, J., and Guries, R.P. (2016). "Elm genetic diversity and hybridization in the presence of Dutch elm disease", in: *The American elm restoration workshop*. (eds.) C.C. Pinchot, K.S. Knight, L.M. Haugen, C.E. Flower & J.M. Slavicek. (Lewis Center, OH).

Bushnell, B. (2014). "BBMap: a fast, accurate, splice-aware aligner". Lawrence Berkeley National Lab, Berkeley, CA, USA).

Cai, J., Ma, P.F., Li, H.T., and Li, D.Z. (2015). Complete Plastid Genome Sequencing of Four *Tilia* Species (Malvaceae): A Comparative Analysis and Phylogenetic Implications. *PLoS One* 10, e0142705.

Cingolani, P., Platts, A., Wang, L.L., Coon, M., Nguyen, T., Wang, L., Land, S.J., Lu, X., and Ruden, D.M. (2012). A program for annotating and predicting the effects of single nucleotide polymorphisms, SnpEff: SNPs in the genome of *Drosophila melanogaster* strain w1118; iso-2; iso-3. *Fly* 6, 80-92.

Frazer, K.A., Pachter, L., Poliakov, A., Rubin, E.M., and Dubchak, I. (2004). VISTA: computational tools for comparative genomics. *Nucleic acids research* 32, W273-W279.

Grant, J.R., and Stothard, P. (2008). The CGView Server: a comparative genomics tool for circular genomes. *Nucleic Acids Res* 36, W181-184.

Greiner, S., Lehwark, P., and Bock, R. (2019). OrganellarGenomeDRAW (OGDRAW) version 1.3.1: expanded toolkit for the graphical visualization of organellar genomes. *Nucleic Acids Res* 47, W59-W64.

Guindon, S., Dufayard, J.F., Lefort, V., Anisimova, M., Hordijk, W., and Gascuel, O. (2010). New Algorithms and Methods to Estimate Maximum-Likelihood Phylogenies: Assessing the Performance of PhyML 3.0. *Systematic Biology* 59, 307-321.

Hoang, D.T., Chernomor, O., Von Haeseler, A., Minh, B.Q., and Vinh, L.S. (2018). UFBoot2: Improving the Ultrafast Bootstrap Approximation. *Mol Biol Evol* 35, 518-522.

Huang, Y., Wang, J., Yang, Y., Fan, C., and Chen, J. (2017). Phylogenomic Analysis and Dynamic Evolution of Chloroplast Genomes in Salicaceae. *Front Plant Sci* 8, 1050.

Kalyaanamoorthy, S., Minh, B.Q., Wong, T.K.F., Von Haeseler, A., and Jermini, L.S. (2017). ModelFinder: fast model selection for accurate phylogenetic estimates. *Nat Methods* 14, 587-589.

Kane, N., Sveinsson, S., Dempewolf, H., Yang, J.Y., Zhang, D., Engels, J.M., and Cronk, Q. (2012). Ultra-barcoding in cacao (*Theobroma* spp.; Malvaceae) using whole chloroplast genomes and nuclear ribosomal DNA. *Am J Bot* 99, 320-329.

Karnosky, D.F. (1979). Dutch Elm Disease - Review of the History, Environmental Implications, Control, and Research Needs. *Environmental Conservation* 6, 311-322.

Katoh, K., Misawa, K., Kuma, K.I., and Miyata, T. (2002). MAFFT: a novel method for rapid multiple sequence alignment based on fast Fourier transform. *Nucleic acids research* 30, 3059-3066.

Katoh, K., and Standley, D.M. (2013). MAFFT multiple sequence alignment software version 7: improvements in performance and usability. *Mol Biol Evol* 30, 772-780.

Kent, W.J. (2002). BLAT—the BLAST-like alignment tool. *Genome research* 12, 656-664.

Lang, B.F., Laforest, M.-J., and Burger, G. (2007). Mitochondrial introns: a critical view. *Trends in Genetics* 23, 119-125.

Langmead, B., Trapnell, C., Pop, M., and Salzberg, S.L. (2009). Ultrafast and memory-efficient alignment of short DNA sequences to the human genome. *Genome Biol* 10, R25.

Larkin, M.A., Blackshields, G., Brown, N.P., Chenna, R., Mcgettigan, P.A., McWilliam, H., Valentin, F., Wallace, I.M., Wilm, A., Lopez, R., Thompson, J.D., Gibson, T.J., and Higgins, D.G. (2007). Clustal W and Clustal X version 2.0. *Bioinformatics* 23, 2947-2948.

Laslett, D., and Canback, B. (2004). ARAGORN, a program to detect tRNA genes and tmRNA genes in nucleotide sequences. *Nucleic Acids Res* 32, 11-16.

Lin, C.-S., Chen, J.J., Huang, Y.-T., Chan, M.-T., Daniell, H., Chang, W.-J., Hsu, C.-T., Liao, D.-C., Wu, F.-H., and Lin, S.-Y. (2015). The location and translocation of *ndh* genes of chloroplast origin in the Orchidaceae family. *Scientific reports* 5, 9040.

Madeira, F., Park, Y.M., Lee, J., Buso, N., Gur, T., Madhusoodanan, N., Basutkar, P., Tivey, A.R.N., Potter, S.C., Finn, R.D., and Lopez, R. (2019). The EMBL-EBI search and sequence analysis tools APIs in 2019. *Nucleic Acids Res* 47, W636-W641.

Mckenna, A., Hanna, M., Banks, E., Sivachenko, A., Cibulskis, K., Kernytsky, A., Garimella, K., Altshuler, D., Gabriel, S., Daly, M., and Depristo, M.A. (2010). The Genome Analysis Toolkit: a MapReduce framework for analyzing next-generation DNA sequencing data. *Genome Res* 20, 1297-1303.

Narasimhan, V., Danecek, P., Scally, A., Xue, Y., Tyler-Smith, C., and Durbin, R. (2016). BCFtools/RoH: a hidden Markov model approach for detecting autozygosity from next-generation sequencing data. *Bioinformatics* 32, 1749-1751.

Ncbi (2016). *Sequin* [Online]. Available: <https://www.ncbi.nlm.nih.gov/projects/Sequin/> [Accessed 2019].

Nguyen, L.T., Schmidt, H.A., Von Haeseler, A., and Minh, B.Q. (2015). IQ-TREE: a fast and effective stochastic algorithm for estimating maximum-likelihood phylogenies. *Mol Biol Evol* 32, 268-274.

Nrcs (2017). *The Plants Database* [Online]. Greensboro, NC: National Plant Data Team. Available: <http://plants.usda.gov> [Accessed 2019].

Pinchot, C.C., Knight, K.S., Haugen, L.M., Flower, C.E., and Slavicek, J.M. (2017). Proceedings of the American elm restoration workshop 2016. *Gen. Tech. Rep. NRS-P-174. Newtown Square, PA: US Department of Agriculture, Forest Service, Northern Research Station. 148 p.* 174, 1-148.

Rochaix, J.D., Kuchka, M., Mayfield, S., Schirmerrahire, M., Girardbasco, J., and Bennoun, P. (1989). Nuclear and Chloroplast Mutations Affect the Synthesis or Stability of the Chloroplast Psbc Gene-Product in Chlamydomonas-Reinhardtii. *Embo Journal* 8, 1013-1021.

Ruhfel, B.R., Gitzendanner, M.A., Soltis, P.S., Soltis, D.E., and Burleigh, J.G. (2014). From algae to angiosperms-inferring the phylogeny of green plants (Viridiplantae) from 360 plastid genomes. *Bmc Evolutionary Biology* 14.

Sabir, J., Schwarz, E., Ellison, N., Zhang, J., Baeshen, N.A., Mutwakil, M., Jansen, R., and Ruhlman, T. (2014). Evolutionary and biotechnology implications of plastid genome variation in the inverted-repeat-lacking clade of legumes. *Plant Biotechnology Journal* 12, 743-754.

Salinas-Giegé, T., Giegé, R., and Giegé, P. (2015). tRNA biology in mitochondria. *International journal of molecular sciences* 16, 4518-4559.

Sanchez, R., Serra, F., Tarraga, J., Medina, I., Carbonell, J., Pulido, L., De Maria, A., Capella-Gutierrez, S., Huerta-Cepas, J., Gabaldon, T., Dopazo, J., and Dopazo, H. (2011). Phylemon 2.0: a suite of web-tools for molecular evolution, phylogenetics, phylogenomics and hypotheses testing. *Nucleic Acids Res* 39, W470-474.

Schwarz, M.B. (1922). "Das Zweigensterben der Olmen, Traueneiden und Pfirschbaurne". Mededelingen wit het Phytopathologisch laboratorium 'Willie Commelin Scholten',).

Setohigashi, Y., Hamaji, T., Hayama, M., Matsuzaki, R., and Nozaki, H. (2011). Uniparental Inheritance of Chloroplast DNA Is Strict in the Isogamous Volvocalean Gonium. *Plos One* 6.

Shimodaira, H., and Hasegawa, M. (1999). Multiple comparisons of log-likelihoods with applications to phylogenetic inference. *Molecular biology and evolution* 16, 1114-1114.

Slater, G.S.C., and Birney, E. (2005). Automated generation of heuristics for biological sequence comparison. *BMC bioinformatics* 6, 31.

Soltis, D., Soltis, P., and Doyle, J.J. (1998). *Molecular Systematics of Plants II: DNA Sequencing*. Springer Science & Business Media.

Soubrier, J., Steel, M., Lee, M.S.Y., Der Sarkissian, C., Guindon, S., Ho, S.Y.W., and Cooper, A. (2012). The Influence of Rate Heterogeneity among Sites on the Time Dependence of Molecular Rates. *Molecular Biology and Evolution* 29, 3345-3358.

Stoppel, R., and Meurer, J. (2013). Complex RNA metabolism in the chloroplast: an update on the psbB operon. *Planta* 237, 441-449.

- Stothard, P. (2000). The sequence manipulation suite: JavaScript programs for analyzing and formatting protein and DNA sequences. *Biotechniques* 28, 1102, 1104.
- Tillich, M., Lehwark, P., Pellizzer, T., Ulbricht-Jones, E.S., Fischer, A., Bock, R., and Greiner, S. (2017). GeSeq - versatile and accurate annotation of organelle genomes. *Nucleic Acids Research* 45, W6-W11.
- Whittemore, A.T., and Olsen, R.T. (2011). *Ulmus americana* (Ulmaceae) is a polyploid complex. *Am J Bot* 98, 754-760.
- Whittemore, A.T., and Xia, Z.-L. (2017). Genome size variation in Elms (*Ulmus* spp.) and related genera. *HortScience* 52, 547-553.
- Wiegrefe, S.J., Sytsma, K.J., and Guries, R.P. (1994). Phylogeny of Elms (*Ulmus*, Ulmaceae) - Molecular Evidence for a Sectional Classification. *Systematic Botany* 19, 590-612.
- Wysocki, A., Tibbetts, K., and Fennell, T. (2019). "Picard Tools". Broad Institute.
- Yang, Z. (1995). A space-time process model for the evolution of DNA sequences. *Genetics* 139, 993-1005.
- You, F.M., Huo, N., Gu, Y.Q., Luo, M.C., Ma, Y., Hane, D., Lazo, G.R., Dvorak, J., and Anderson, O.D. (2008). BatchPrimer3: a high throughput web application for PCR and sequencing primer design. *BMC Bioinformatics* 9, 253.
- Zhang, Q., Zhang, H., Li, Q., Bai, R., Ning, E., and Cai, X. (2019a). Characterization of the complete chloroplast genome sequence of an endangered elm species, *Ulmus gaussonii* (Ulmaceae). *Conservation Genetics Resources* 11, 71-74.
- Zhang, Y., Zhuang, X., Li, J., Li, P., and Wang, Z. (2019b). Characterization of the complete chloroplast genome sequence of *Ulmus chenmou* (Ulmaceae), an endangered plant endemic to China. *Mitochondrial DNA Part B* 4, 482-484.
- Zhao, P., and Woeste, K.E. (2011). DNA markers identify hybrids between butternut (*Juglans cinerea* L.) and Japanese walnut (*Juglans ailantifolia* Carr.). *Tree Genetics & Genomes* 7, 511-533.
- Zuo, L.H., Shang, A.Q., Zhang, S., Yu, X.Y., Ren, Y.C., Yang, M.S., and Wang, J.M. (2017). The first complete chloroplast genome sequences of *Ulmus* species by de novo sequencing: Genome comparative and taxonomic position analysis. *PLoS One* 12, e0171264.

FIGURE CAPTIONS

Figure 1. Map of the chloroplast genome of *Ulmus americana* (RV16). The direction of transcription is indicated by arrows. Genes inside the circle are transcribed clockwise, and those outside are transcribed counterclockwise. Gene functions are color-coded as shown in the legend. The darker gray in the inner circle shows the GC content, while the lighter gray shows the AT content. LSC (Large Single Copy region), SSC (Small Single Copy region), IRA, IRB (Inverted Repeat A and B, respectively). The bold black arrow indicates the start position of the chloroplast assembly; the numbering proceeds counter-clockwise.

Figure 2. Chloroplast region (IR/SSC/LSC) junctions among American elm and the seven Asian elms. The bold black arrow indicates the start position of the chloroplast assembly; the numbering proceeds to the left.

Figure 3. Histogram showing the distribution of variants (SNPs and indels) discovered in *U. americana* chloroplast from Am. 57845 and RV16 sequencing reads, using the RV16 assembly as a reference. Numbering is along the RV16 assembly, with a bin size of 1,000bp.

Figure 4. Sequence identities between the eight globally-aligned *Ulmus* genomes using the RV16 genotype of *U. americana* as a reference for alignment and annotation. Genome regions

are color-coded according to the legend. Non-protein-coding genes such as tRNAs are not labeled.

Figure 5: Phylogeny based on chloroplast sequences of American elm (*Ulmus americana*), seven Asian elms (*Ulmus spp.*), Mulberry (*Morus indica*; *Morus notabilis*; *Morus mongolica*), Fig (*Ficus racemosa*), and Cannabis (*Cannabis sativa*), genera belonging to the same tribe as elms, and some outgroup species as listed in Table 1. Trees are unrooted but outgroup black locust (*Robinia pseudoacacia*) is drawn at the root. (A) Rectangular phylogram, in which branch lengths represent inferred evolutionary change as the number of nucleotide substitutions per site; (B) The same tree as a cladogram with equal branch lengths.

CAPTIONS FOR SUPPLEMENTARY FIGURES AND TABLES

Supplementary Figure 1. Map of the chloroplast genome of *Ulmus americana* (Am. 57845). The direction of transcription is indicated by arrows. Genes inside the circle are transcribed clockwise, and those outside are transcribed counterclockwise. Genes of different functions are color-coded as shown in the legend. The darker gray in the inner circle shows the GC content, while the lighter gray shows the AT content. LSC (Large Single Copy region), SSC (Small Single Copy region), IRA, IRB (Inverted Repeat A and B, respectively). The bold black arrow indicates the start position of the chloroplast assembly; the numbering proceeds counterclockwise.

Supplementary Figure 2. Pairwise global nucleotide sequence alignment of *Ulmus americana* genotypes RV16 and Am. 57845.

Supplementary Figure 3. Larger version of Figure 4. Sequence identities between the eight *Ulmus* genomes using the RV16 genotype of *U. americana* as a reference for alignment and annotation. Genome regions are color-coded according to the legend. Non-protein-coding genes such as tRNAs are not labeled.

Supplementary Table 1. The vcf file containing all high-quality variants (SNPs and indels) discovered in the *U. americana* chloroplast, including functional annotations.

Supplementary Table 2. The genes in the *U. americana* chloroplast affected by variants (SNPs and indels).

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584 TABLES

585 **Table 1.** List of species and NCBI accession numbers used for comparative genomics and phylogenetic analyses.

Sample name	NCBI accession number
<i>Ulmus americana</i> (RV16)	MN043961.1
<i>Ulmus americana</i> (Am. 57845)	MH324448.3
<i>Ulmus pumila</i>	NC_032721.1
<i>Ulmus davidiana</i>	NC_032718.1
<i>Ulmus davidiana</i> var. <i>japonica</i>	KY244083.1
<i>Ulmus macrocarpa</i>	NC_032720.1
<i>Ulmus laciniata</i>	NC_032719.1
<i>Ulmus gaussenii</i>	NC_037840.1
<i>Ulmus chenmouii</i>	NC_037758.1
<i>Morus indica</i>	NC_008359.1
<i>Morus notabilis</i>	NC_027110.1
<i>Morus mongolica</i>	NC_025772.2
<i>Ficus racemosa</i>	NC_028185.1
<i>Cannabis sativa</i>	NC_027223.1
<i>Juglans hopeiensis</i>	NC_033894.1
<i>Juglans cathayensis</i>	NC_033893.1
<i>Populus trichocarpa</i>	NC_009143.1
<i>Salix interior</i>	NC_024681.1
<i>Salix purpurea</i>	NC_026722.1
<i>Robinia pseudoacacia</i>	NC_026684.1
<i>Nicotiana undulata</i>	NC_016068.1

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588 **Table 2.** Comparison of *Ulmus americana* chloroplast genomes with the published genomes of seven Asian elms.
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Chloroplast Feature	<i>U. americana</i> (RV16)	<i>U. americana</i> (Am. 57845)	<i>U. pumila</i>	<i>U. davidiana</i> var. <i>japonica</i>	<i>U. macrocarpa</i>	<i>U. davidiana</i>	<i>U. laciniata</i>	<i>U. chenmoui</i>	<i>U. gausсенii</i>
Genome size (bp)	158993	158935	159082	159411	159439	159453	158953	159777	160094
GC content (%)	35.6	35.6	35.6	35.6	35.6	35.6	35.6	35.5	35.5
LSC length (bp)	88112	89113	88103	88508	88647	87633	88032	88581	88875
SSC length (bp)	18737	18696	18850	18868	18853	18835	18846	19052	19179
IR length (bp)	26072	25563	26064	26017	26019	26492	26037	26072	26062
Genes (#)	127	127	137	145	142	143	139	121	122
tRNA (#)	34	34	46	48	46	47	46	30	30
rRNA (#)	8	8	8	8	8	8	8	8	8
Genes with introns (#)	16	16	13	16	16	18	14	8	8
Proteins (#)	84	84	83	89	88	88	85	79	79

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Table 3. Gene content of the *Ulmus americana* chloroplast genome. Genes with multiple copies are indicated in parentheses.

Gene Category	Gene group	Gene Names			
Self-replication	Ribosomal RNA genes	rrn4.5S (2)	rrn5S (2)	rrn16S (2)	rrn23S (2)
		trnA-UGC (2)	trnC-GCA	trnD-GTC	trnE-TTC
		trnF-GAA	trnG-GCC	trnI-CAT	trnI-GAT (2)
		trnK-TTT	trnL-TAA	trnL-TAG	trnL-CAT
	Transfer RNA genes	trnL-CAA (2)	trnfM-CAT	trnM-CAT	trnN-GTT (2)
		trnP-TGG	trnQ-TTG	trnR-TCT	trnR-ACG (2)
		trnS-GCT	trnS-GGA	trnS-TGA	trnT-GGT
		trnT-TGT	trnV-GAC (2)	trnW-CCA	trnY-GTA
	Small subunit of ribosome	rps2	rps3	rps4	rps7 (2)
		rps8	rps11	rps12	rps14
		rps15	rps16	rps18	rps19
	Large subunit of ribosome	rpl2	rpl14	rpl16	rpl20
		rpl23 (2)	rpl32	rpl33	rpl36
	DNA dependant RNA polymerase	rpoA	rpoB	rpoC1	rpoC2
	Translational initiation factor	infA			
Photosynthesis	Subunits of NADH-dehydrogenase	ndhA	ndhB (2)	ndhC	ndhD
		ndhE	ndhF	ndhG	ndhH
		ndhI	ndhJ	ndhK	
	Subunits of photosystem I	psaA	psaB	psaC	psaI
		psaJ	ycf3	ycf4	
	Subunits of photosystem II	psbA	psbB	psbC	psbD

			psbE	psbF	psbH	psbI
			psbJ	psbK	psbL	psbM
			psbT	psbZ	pbf1/psbN	
		Subunits of cytochrome b/f complex	petA	petB	petD	petG
			petL	petN		
		Subunits of ATP synthase	atpA	atpB	atpE	atpF
			atpH	atpI		
		Subunits of rubisco	rbcL			
		Maturase	matK			
		Protease	clpP			
Other	Envelope membrane protein	cemA				
	Subunits of Acetyl-CoA-carboxylase	accD				
	C-type cytochrome synthesis gene	ccsA				
Unknown function	Conserved open reading frames	ycf1	ycf2 (2)	ycf15 (2)		

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Table 4. Presence and absence of certain chloroplast genes in American elm compared with seven Asian elms and species of *Morus*, *Cannabis*, and *Arabidopsis*.

Species	<i>petB</i>	<i>petD</i>	<i>psbL</i>	<i>rps16</i>	<i>trnK</i>	<i>ycf15</i>	<i>trnH</i>	<i>trnfM</i>
<i>U. americana</i>	+	+	+	+	+	+	--	+
<i>U. davidiana</i>	--	--	--	--	--	+	--	--
<i>U. davidiana</i> var. <i>japonica</i>	--	--	--	--	--	+	+	+
<i>U. pumila</i>	--	--	--	--	--	+	+	--
<i>U. laciniata</i>	--	--	--	--	--	+	+	--
<i>U. macrocarpa</i>	--	--	--	--	--	+	+	--
<i>U. chenmoui</i>	--	--	--	--	--	+	+	+
<i>U. gaussenii</i>	--	--	--	--	--	+	--	+
<i>M. mongolica</i>	+	+	+	+	+	--	+	+
<i>C. sativa</i>	+	+	+	+	+	--	+	+
<i>A. thaliana</i> (NC_000932.1)	+	+	+	+	+	--	+	+

Table 5. Summary of high-quality variants (SNPs and indels) discovered in the chloroplast of *U. americana* MN043961.1 (RV16) and MH324448.3 (Am. 57845).

Change rate by chromosome		
Chromosome	Length	Changes
MN043961	158993	240
Variants by type		
Type	Count	Percent
Deletion	88	36.7%
Insertion	85	35.4%
SNP	67	27.9%
Effects by impact		
Type	Count	Percent
High	4	1.2%
Low	6	1.8%
Moderate	8	2.4%
Modifier	310	94.5%
Effects by functional class		
Type	Count	Percent
Missense	8	61.5%
Silent	5	38.5%
Missense/silent ratio	1.6	

Count by effects

Type	Count	Percent
Downstream gene variant	50	15.1%
Frameshift variant	4	1.2%
Intergenic region	149	44.9%
Intragenic variant	28	8.4%
Intron variant	52	15.7%
Missense variant	8	2.4%
Splice region variant	2	0.6%
Stop gained	2	0.6%
Stop retained variant	1	0.3%
Synonymous variant	4	1.2%
Upstream gene variant	32	9.6%

Count by genomic region

Type	Count	Percent
Downstream	50	15.2%
Exon	16	4.9%
Intergenic	149	45.4%
Intron	51	15.5%
Splice site region	2	0.6%
Transcript	28	8.5%
Upstream	32	9.8%

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Table 6. Genotype and origin of the American elm samples used to identify intergenic chloroplast variability. Genotypes with asterisks were used for chloroplast genome assembly, annotation, and additional analyses.

Genotype	Accession number	Seedling/clone	Origin
*RV 16	DOHEP-1367	Cross between clones R18-2 and Valley Forge	Mother originated in NY and father in NE
*Am 57845		Clone	Unknown
26		Clone	Northfield, MA
29		Clone	Salsibury, CT
Charlotte 1	DOHMP-4489	Clone	Charlotte, MI
Avon 2293	DOHMP-2293	Clone	Avon, IL
Chippewa 3201	DOHMP-3201	Seedling from open-pollinated cross.	Mother originated in Cass Lake, MN
Chippewa 3207	DOHMP-3207	Seedling from open-pollinated cross.	Mother originated in Cass Lake, MN

RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>AAAAATAAGGAGCAATACCAAACCTCTTGATAGAACAGAAATTTATTATTGCTCCTTTATTTCCAAAACTCGTATACACTAATACCAAAGTCTTATCC</u>	100
	<u>AAAAATAAGGAGCAATACCAAACCTCTTGATAGAACAGAAATTTATTATTGCTCCTTTATTTCCAAAACTCGTATACACTAATACCAAAGTCTTATCC</u>	100
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>GTTTGTAGCTGGAACCTTCAACAGCAGCTAGGCTCTAGAGGGAAGTTATGAGCATTACGTTTCATGCATAACTTCCATACCAAGGTTAGCGGGTTAATAATA</u>	200
	<u>GTTTGTAGCTGGAACCTTCAACAGCAGCTAGGCTCTAGAGGGAAGTTATGAGCATTACGTTTCATGCATAACTTCCATACCAAGGTTAGCGGGTTAATAATA</u>	200
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>TCCGCCAGGTATTAATTACACGACCTTGACTATCAACTACAGATTGGTTGAAATGAAACCATTTAAGTTGAAAGCCATGGTGCTGATACCTTAAGCAG</u>	300
	<u>TCCGCCAGGTATTAATTACACGACCTTGACTATCAACTACAGATTGGTTGAAATGAAACCATTTAAGTTGAAAGCCATGGTGCTGATACCTTAAGCAG</u>	300
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>TAAACCAAATACCTACTACAGGCCAAGCAGCTAGAAAGAGTGTAATGAACGAGAATTGTTGAAACTAGCATATTGGAAGATCAATCGGCCAAAAATAACC</u>	400
	<u>TAAACCAAATACCTACTACAGGCCAAGCAGCTAGAAAGAGTGTAATGAACGAGAATTGTTGAAACTAGCATATTGGAAGATCAATCGGCCAAAAATAACC</u>	400
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>GTGAGCGGCTACGATATTATAGGTTTCTTCTCTTGACCGAATCTGTAACCTTCATTAGCAGATTCAATTTCTGTGGTTTCCCTGATCAAACCTAGAGGTT</u>	500
	<u>GTGAGCGGCTACGATATTATAGGTTTCTTCTCTTGACCGAATCTGTAACCTTCATTAGCAGATTCAATTTCTGTGGTTTCCCTGATCAAACCTAGAGGTT</u>	500
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>ACCAAGGAACCATGCATAGCACTGAATAGGAGCCGCCGAATACACCAGCTACGCCATACATATGAAATGGGTGCATAAGGATGTTGTGCTCAGCTTGGA</u>	600
	<u>ACCAAGGAACCATGCATAGCACTGAATAGGAGCCGCCGAATACACCAGCTACGCCATACATATGAAATGGGTGCATAAGGATGTTGTGCTCAGCTTGGA</u>	600
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>ATACAATCATGAAGTTGAAAGTACCAGAGATTCTTAAAGGCATACCGTCAGAAAAGCTTCCTTGACCAATTGGATAGATCAAGAAAACGGCAGTAGCAGC</u>	700
	<u>ATACAATCATGAAGTTGAAAGTACCAGAGATTCTTAAAGGCATACCGTCAGAAAAGCTTCCTTGACCAATTGGATAGATCAAGAAAACGGCAGTAGCAGC</u>	700
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>TGCAACAGGAGCTGAGTATGCAACAGCAATCCAAGGACGCATACCCAGACGGAAACTAAGTTCCCACTCACGACCCATATAACAGCTACACCAAGTAAG</u>	800
	<u>TGCAACAGGAGCTGAGTATGCAACAGCAATCCAAGGACGCATACCCAGACGGAAACTAAGTTCCCACTCACGACCCATATAACAGCTACACCAAGTAAG</u>	800
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>AAGTGTAGAACCAATTAGTTCATAAGGACCACCATTTGATAACCATTCATCAACAGAAGCTGCTTCCCATATCGGGTAAAAGTGCAAACTATAGCTGCAG</u>	900
	<u>AAGTGTAGAACCAATTAGTTCATAAGGACCACCATTTGATAACCATTCATCAACAGAAGCTGCTTCCCATATCGGGTAAAAGTGCAAACTATAGCTGCAG</u>	900
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>AAGTAGGAATAATGGCACCAGAAATAATTTGTTTCCATAAAGTAGAGATCCAGAAACAGGTTCCAGAAATACCATCAATATCTACCGGAGGGGCAGCAAT</u>	1000
	<u>AAGTAGGAATAATGGCACCAGAAATAATTTGTTTCCATAAAGTAGAGATCCAGAAACAGGTTCCAGAAATACCATCAATATCTACCGGAGGGGCAGCAAT</u>	1000
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>GAAAGCAATAATAAATACAGAAGTTGCGGTCAATAAGGTAGGGATCATCAAAACACCAAAACCATCCAATGTAAAGACGGTTTTAGTGTGTTTATCCAA</u>	1100
	<u>GAAAGCAATAATAAATACAGAAGTTGCGGTCAATAAGGTAGGGATCATCAAAACACCAAAACCATCCAATGTAAAGACGGTTTTAGTGTGTTTATCCAA</u>	1100
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>TTACAAAAGCGACCCCATAGGCTTTCGCTTTCGCGTCTCTCTAAAATGTCAGTCATGGTAAAATCTTGGTTTATTTAATCAAAAATCATCAGGGACTCCC</u>	1200
	<u>TTACAAAAGCGACCCCATAGGCTTTCGCTTTCGCGTCTCTCTAAAATGTCAGTCATGGTAAAATCTTGGTTTATTTAATCAAAAATCATCAGGGACTCCC</u>	1200
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>AAGCACATGAATTATCTACAAC TAGAAATAGAAAATGCGGGCTTGTTATTCTAACAGTATAACATGACTTATATACCCATGTCAACCAATATCAACATCC</u>	1300
	<u>AAGCACATGAATTATCTACAAC TAGAAATAGAAAATGCGGGCTTGTTATTCTAACAGTATAACATGACTTATATACCCATGTCAACCAATATCAACATCC</u>	1300
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>ATAGATATATCTATGTGCTTATCTATTAGATTATCCATTTTTTTTTTTGAGAAATAAAGAGTTAAAAAATCCAAAATTCAAAATTTATATACATTATAT</u>	1400
	<u>ATAGATATATCTATGTGCTTATCTATTAGATTATCCATTTTTTTTTTTGAGAAATAAAGAGTTAAAAAATCCAAAATTCAAAATTTATATACATTATAT</u>	1400
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>ACATATGATTTCTATATATTAAGTATTTCTATATATTAAGTAAATGGGTTGCCCGGGATTCGAACCCGGAAGTGTGGATGGAGTAGATAATTTACT</u>	1500
	<u>ACATATGATTTCTATATATTAAGTATTTCTATATATTAAGTAAATGGGTTGCCCGGGATTCGAACCCGGAAGTGTGGATGGAGTAGATAATTTACT</u>	1500
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>TGTTTAATTTACTTGTAGAAAATAAAAAAATAA - TAGGTAAATCTCTCCCCAAGCCGTGCTTGCAATTTTCATTGTCACACGGCTTTCCTATGTA</u>	1599
	<u>TGTTTAATTTACTTGTAGAAAATAAAAAAATAA - TAGGTAAATCTCTCCCCAAGCCGTGCTTGCAATTTTCATTGTCACACGGCTTTCCTATGTA</u>	1600
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>TACATTTACAATTCATTCCTTCTCGAGACACGACTCTAAGAAAATGAATACTCAGTTGATCAACCCCTACTCTTACTGTCATGAACATTTTCATAATAGA</u>	1699
	<u>TACATTTACAATTCATTCCTTCTCGAGACACGACTCTAAGAAAATGAATACTCAGTTGATCAACCCCTACTCTTACTGTCATGAACATTTTCATAATAGA</u>	1700
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>ATAATAGAAAATAAATGAATTTTTTTGTTATATCATCAGCATTAAAGAGAATTTTCATTTCCATGGTGCATAACCAATTTATTCATGATTGACAAAATCA</u>	1799
	<u>ATAATAGAAAATAAATGAATTTTTTTGTTATATCATCAGCATTAAAGAGAATTTTCATTTCCATGGTGCATAACCAATTTATTCATGATTGACAAAATCA</u>	1800
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>TTGATGCAAAAAATATCCAAATACCAAATTCGCCCTCTATATAAGCGCCGCAAGATATAAAGTTCTTGGAATAAAGAGAACCTCTTCTTCTTT</u>	1899
	<u>TTGATGCAAAAAATATCCAAATACCAAATTCGCCCTCTATATAAGCGCCGCAAGATATAAAGTTCTTGGAATAAAGAGAACCTCTTCTTCTTT</u>	1900
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>CCATAAAGAAATCTTCCAATAATTCGGAACCTAATCTTTTCAAAAAGCGCGTACAGTACTTTTGTGTTTACGAGCCAAAGTTTTAACACAAGAACTCG</u>	1999
	<u>CCATAAAGAAATCTTCCAATAATTCGGAACCTAATCTTTTCAAAAAGCGCGTACAGTACTTTTGTGTTTACGAGCCAAAGTTTTAACACAAGAACTCG</u>	2000
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>AAGTATATATTTTATTCGATACAGCTCTTTTTTTTGAGGATCCGCTATAAATGAAAAGATTTCTCCATATACGCACAAATTCGATCAATATATCC</u>	2099
	<u>AAGTATATATTTTATTCGATACAGCTCTTTTTTTTGAGGATCCGCTATAAATGAAAAGATTTCTCCATATACGCACAAATTCGATCAATATATCC</u>	2100
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>AAATCTGACGAATCCGCCAGGTTGACTTACTAATGGGATGCCCTAATGCATTACAAAATTTTCATTTTAGCCAATGATCCAATCAAAGGACTAATGGAA</u>	2199
	<u>AAATCTGACGAATCCGCCAGGTTGACTTACTAATGGGATGCCCTAATGCATTACAAAATTTTCATTTTAGCCAATGATCCAATCAAAGGACTAATGGAA</u>	2200
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>CTAATGTATCAATCTTTTCATAGCATTATCCATTAGAAATGAATTTCTAACATTTGACTCCGTACCCTGAAAGATTAGTGCATACTTGAAAGATA</u>	2299
	<u>CTAATGTATCAATCTTTTCATAGCATTATCCATTAGAAATGAATTTCTAACATTTGACTCCGTACCCTGAAAGATTAGTGCATACTTGAAAGATA</u>	2300
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>ACCCAAAAAAGAGAGAATGTTGGATAATGGTTTATATGGATTCTTCTGGTTGAGACCACACATAAAAAATGACATTGCCATAAATGGACAAGGTAA</u>	2399
	<u>ACCCAAAAAAGAGAGAATGTTGGATAATGGTTTATATGGATTCTTCTGGTTGAGACCACACATAAAAAATGACATTGCCATAAATGGACAAGGTAA</u>	2400
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>TATTTCCATTTATTCATCAAAAGAGGCGTATCTTTTGAAACGAGAATGGATTTTCCTTGATATCTAACATAAATGCATGAAAGGATCCTGGAAGAACATG</u>	2499
	<u>TATTTCCATTTATTCATCAAAAGAGGCGTATCTTTTGAAACGAGAATGGATTTTCCTTGATATCTAACATAAATGCATGAAAGGATCCTGGAAGAACATG</u>	2500
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>GGATAGCCGGAATCGTTAGAAAAGACTTCTTTCTAGGATGCTTTATTTTTTCATAGAAATATATTCGCTCAAAAAGCTCCCGAAGATGTTAATCG</u>	2599
	<u>GGATAGCCGGAATCGTTAGAAAAGACTTCTTTCTAGGATGCTTTATTTTTTCATAGAAATATATTCGCTCAAAAAGCTCCCGAAGATGTTAATCG</u>	2600
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>TAAATGACAAGATTGGTTACGGATAAAAAAGTAGATGGATTATATTCACAAACATGAGAATTATATAGGAATAAAGAAATCTCGAATTTATTTTAAA</u>	2699
	<u>TAAATGACAAGATTGGTTACGGATAAAAAAGTAGATGGATTATATTCACAAACATGAGAATTATATAGGAATAAAGAAATCTCGAATTTATTTTAAA</u>	2700
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>AAAAAGAAAATAGATTTTATTTGAAATAAAGACTATTCCAATTATAAATCGTGAAGAAAAGACGTAATAAATGCAACGAGAGGCATCTTTTACCC</u>	2799
	<u>AAAAAGAAAATAGATTTTATTTGAAATAAAGACTATTCCAATTATAAATCGTGAAGAAAAGACGTAATAAATGCAACGAGAGGCATCTTTTACCC</u>	2800
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>AGTAGCGAAGGATTGAACTAAGATTTCCAAATGAATAGGGTAGGGTATTAGTACATCCGATACATAATTTAAATACGGGAATTTGTCTCTAAAATGG</u>	2899
	<u>AGTAGCGAAGGATTGAACTAAGATTTCCAAATGAATAGGGTAGGGTATTAGTACATCCGATACATAATTTAAATACGGGAATTTGTCTCTAAAATGG</u>	2900
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>AAATATTGAATGAATTGATCGTAAATAGAAATTTTACAATTTCTGTCCCTTTAAAGAGATACTAATCGTATGGAATAAAGGATTTCCACAATGACC</u>	2999
	<u>AAATATTGAATGAATTGATCGTAAATAGAAATTTTACAATTTCTGTCCCTTTAAAGAGATACTAATCGTATGGAATAAAGGATTTCCACAATGACC</u>	3000
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>GCAATCCCTCGGATATCAGTTGAGAAATACAAATCTTATTGGACAAAAAACTTTATTTTGGTTAGAAATCATGAGCAACAAGAAATCAATGATTCTGTT</u>	3099
	<u>GCAATCCCTCGGATATCAGTTGAGAAATACAAATCTTATTGGACAAAAAACTTTATTTTGGTTAGAAATCATGAGCAACAAGAAATCAATGATTCTGTT</u>	3100

RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>GATACATTCGAGTAATTAACGTTTTACAATTAGTAAACTAGATTATTGTGCATAACCTACATTTTCTAACAACTCGATTTAGTTAAACCACGATCATG</u>	3199
	<u>GATACATTCGAGTAATTAACGTTTTACAATTAGTAAACTAGATTATTGTGCATAACCTACATTTTCTAACAACTCGATTTAGTTAAACCACGATCATG</u>	3200
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>AGCAAATGCATAAAATATACTCCCGAAAGATAAGTGGGTATAGGAAGTCATGTTTCCAAAATCTATCTAGTTCTAAATATCCTTGAAATTTTGGCATTGGA</u>	3299
	<u>AGCAAATGCATAAAATATACTCCCGAAAGATAAGTGGGTATAGGAAGTCATGTTTCCAAAATCTATCTAGTTCTAAATATCCTTGAAATTTTGGCATTGGA</u>	3300
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>AATTTCGATTTGAACAGTAAGTAACTAAGAGATTTATTTGGGTTATCAAAATGATACATAGTACGATACAGCCAAAACAAGGTATTACAAGGTAAATATAAT</u>	3399
	<u>AATTTCGATTTGAACAGTAAGTAACTAAGAGATTTATTTGGGTTATCAAAATGATACATAGTACGATACAGCCAAAACAAGGTATTACAAGGTAAATATAAT</u>	3400
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>AAGAAAAACCTCGGAAAAAGGTAAGACTCATCAACCATCAACGGACTCTCTATCCTCTGTCTTTTTTTTTTTT - CATTTAATTTGGTTTATTTATGTTTCATT</u>	3498
	<u>AAGAAAAACCTCGGAAAAAGGTAAGACTCATCAACCATCAACGGACTCTCTATCCTCTGTCTTTTTTTTTTTT - CATTTAATTTGGTTTATTTATGTTTCATT</u>	3500
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>CTATAATAACAGATGATTAGAAATCCTTTATTTTACAATCCAATCGCTCTTTTGATTTTGAAACAAAAAATAAATATTTTATCAATGTACTG</u>	3598
	<u>CTATAATAACAGATGATTAGAAATCCTTTATTTTACAATCCAATCGCTCTTTTGATTTTGAAACAAAAAATAAATATTTTATCAATGTACTG</u>	3600
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>CCTTCTTTTACACATCTATCCCCACCTCATAATTCAGAAATGGAGAATAAATAAGTTAGGACTCATAAAAAATAAATAATCCACTTATGGGAAAAAAC</u>	3698
	<u>CCTTCTTTTACACATCTATCCCCACCTCATAATTCAGAAATGGAGAATAAATAAGTTAGGACTCATAAAAAATAAATAATCCACTTATGGGAAAAAAC</u>	3700
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>TTCCCGCGGGCAAGCACTAATATATTGTTAACTCTAATTAGATCGGGGAATAATTCATTCAAAAAATTCAGAACAGGAGCTCGTTACTTTTTATTTCCTT</u>	3798
	<u>TTCCCGCGGGCAAGCACTAATATATTGTTAACTCTAATTAGATCGGGGAATAATTCATTCAAAAAATTCAGAACAGGAGCTCGTTACTTTTTATTTCCTT</u>	3800
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>ATAATTAGAACCGTAGCAGGGCTCTATCCATTTATTTCCTCGACCCAGCTGTAACCTTTAGTTTCATTTTTTTTTTTCCACGCCCCAAGAATAAAAAAAA</u>	3898
	<u>ATAATTAGAACCGTAGCAGGGCTCTATCCATTTATTTCCTCGACCCAGCTGTAACCTTTAGTTTCATTTTTTTTTTTCCACGCCCCAAGAATAAAAAAAA</u>	3900
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>AAAAAAATGAACAAGGTTTTGACCTATACGGCAAGAATGAAATATTCTTAGAATTCCTCATTGATACGACATGCTGCTTTTCCATTTCATTCTTTTCAG</u>	3998
	<u>AAAAAAATGAACAAGGTTTTGACCTATACGGCAAGAATGAAATATTCTTAGAATTCCTCATTGATACGACATGCTGCTTTTCCATTTCATTCTTTTCAG</u>	4000
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>GATCAGTCGCGGTCTTACAAACTCTACCGATGGTATGGACGAATCCATTGCTTCATACAAATGTGTAAAGATGCTAGTCGCACTTAAAGCCGAGTACT</u>	4098
	<u>GATCAGTCGCGGTCTTACAAACTCTACCGATGGTATGGACGAATCCATTGCTTCATACAAATGTGTAAAGATGCTAGTCGCACTTAAAGCCGAGTACT</u>	4100
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>CTACCGTTGAGTTAGCAACCCCAATCAAAATAGCTAAATGTATAGATACAACCGAAATCCCAATAAATAAATTGCAAAAGCGCAATCAAAACATTAAAAAT</u>	4198
	<u>CTACCGTTGAGTTAGCAACCCCAATCAAAATAGCTAAATGTATAGATACAACCGAAATCCCAATAAATAAATTGCAAAAGCGCAATCAAAACATTAAAAAT</u>	4200
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>GGCAAAACAAAAATATAAAATTTGTCAAATCAAAATATAGATAAAATATGGATAAAGTCAAAATATTTGTAGAGCAATTCCTGTCTCTTATGTTATCCAT</u>	4298
	<u>GGCAAAACAAAAATATAAAATTTGTCAAATCAAAATATAGATAAAATATGGATAAAGTCAAAATATTTGTAGAGCAATTCCTGTCTCTTATGTTATCCAT</u>	4300
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>TATTATATGTTATCCATTATTTATTTTATTTTCAATTTTAAATAAATAAATAAAGGACTTATTGTATCACAGAAAAATCCAAATGGAAACCGGTTATTGGAAT</u>	4398
	<u>TATTATATGTTATCCATTATTTATTTTATTTTCAATTTTAAATAAATAAATAAAGGACTTATTGTATCACAGAAAAATCCAAATGGAAACCGGTTATTGGAAT</u>	4400
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>AAAAATAAATCTAGGGAAACGGAGATAAATAAATGCATTTATCCACGATCGGATTATATTATTGATACATTGTTGTCAATATGAATGGAAATGTTGAGA</u>	4498
	<u>AAAAATAAATCTAGGGAAACGGAGATAAATAAATGCATTTATCCACGATCGGATTATATTATTGATACATTGTTGTCAATATGAATGGAAATGTTGAGA</u>	4500
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>AAAGAATACAATGAAGAAATAGAAGAAATAGAAAAATCAATTAGAAATTTGAAATAAAAATTTGAAATATTTAACTAATAAAAAATGAATTAATAACAA</u>	4598
	<u>AAAGAATACAATGAAGAAATAGAAGAAATAGAAAAATCAATTAGAAATTTGAAATAAAAATTTGAAATATTTAACTAATAAAAAATGAATTAATAACAA</u>	4600
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>AATAGAAATATTAAAGAAATCAATTTTAAATAAATAAATAAATAAAGGACTTGTGTTGGATTGGCACTCCATAGATAATTGACATATATACAAAAATAAGG</u>	4698
	<u>AATAGAAATATTAAAGAAATCAATTTTAAATAAATAAATAAATAAAGGACTTGTGTTGGATTGGCACTCCATAGATAATTGACATATATACAAAAATAAGG</u>	4700
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>TATAAACGGAAGAATCAATTTAATTAATAAATAAATAAATAAAGTTCGAAAAATCGGGTTTATTTCATTATTCAATCAATAAAAAATAAATAAATACTT</u>	4798
	<u>TATAAACGGAAGAATCAATTTAATTAATAAATAAATAAATAAAGTTCGAAAAATCGGGTTTATTTCATTATTCAATCAATAAAAAATAAATAAATACTT</u>	4800
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>AACCTTTTTATTTTTATTATTTTTTTATTTCTCATAGAAATTCACAAAAAACACCCCATATGACATGAAAAATAATATCCAAATTTGAAGACCAATTTAT</u>	4898
	<u>AACCTTTTTATTTTTATTATTTTTTTATTTCTCATAGAAATTCACAAAAAACACCCCATATGACATGAAAAATAATATCCAAATTTGAAGACCAATTTAT</u>	4890
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>CTCTTGATATTTTTCTATCTATCTATCAATATATATCAATAAAATTTTATCAATAAAATATATTTTGATCGTTATAAACGACGACATCTCTATAGTAACA</u>	4998
	<u>CTCTTGATATTTTTCTATCTATCTATCAATATATATCAATAAAATTTTATCAATAAAATATATTTTGATCGTTATAAACGACGACATCTCTATAGTAACA</u>	4990
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>ATAATAAATTTGAGTATGATATGAATAGAACAAAGTGAGGAGAGAAAAATAGCGAAGAAAGCTTATATAAAGCTATATCTATATACAAAGTAATCCACACTCT</u>	5098
	<u>ATAATAAATTTGAGTATGATATGAATAGAACAAAGTGAGGAGAGAAAAATAGCGAAGAAAGCTTATATAAAGCTATATCTATATACAAAGTAATCCACACTCT</u>	5090
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>CTTTTTTATATATTTTCATTATATAATTTTCATTAAATGAACTTCATTGGTGATTAAAGCAAGTTCCATAAAAAACCCCTGCTTCTTTAAATATCATGA</u>	5198
	<u>CTTTTTTATATATTTTCATTATATAATTTTCATTAAATGAACTTCATTGGTGATTAAAGCAAGTTCCATAAAAAACCCCTGCTTCTTTAAATATCATGA</u>	5190
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>ACAGTTCCTGTAGGCTGAGCGCCTTTTTCAAGGAAATATAGAATAGCAGGAACATTAAATCGGTTTGATTCTTTATCGGATCATAAAAACCCACTTTCC</u>	5298
	<u>ACAGTTCCTGTAGGCTGAGCGCCTTTTTCAAGGAAATATAGAATAGCAGGAACATTAAATCGGTTTGATTCTTTATCGGATCATAAAAACCCACTTTCC</u>	5290
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>GAAGATCTCTTCTTCTCTTCGGATCGAACATCAATTGCAACGATTTCGATAAATAGCTCATTGGGATAGATGTAGATGAACAATACCCCCCGAGAAAC</u>	5398
	<u>GAAGATCTCTTCTTCTCTTCGGATCGAACATCAATTGCAACGATTTCGATAAATAGCTCATTGGGATAGATGTAGATGAACAATACCCCCCGAGAAAC</u>	5390
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>GTATAAGAAGTTTTCTCCTCGTACGGCTCCAGAAATTCGAAATATGTCTATGTATAGAATTCTAATATCAGATAAACCAATAAAATCATCAATCAATT</u>	5498
	<u>GTATAAGAAGTTTTCTCCTCGTACGGCTCCAGAAATTCGAAATATGTCTATGTATAGAATTCTAATATCAGATAAACCAATAAAATCATCAATCAATT</u>	5490
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>AGATCACGAATTTCTCTTTCTTCTATGACTTAAATACTTTTTCTTATTCTTTCCAAAAAATAAATTTGCATCCTCATAACTCAAGTTGTATAATTCTC</u>	5598
	<u>AGATCACGAATTTCTCTTTCTTCTATGACTTAAATACTTTTTCTTATTCTTTCCAAAAAATAAATTTGCATCCTCATAACTCAAGTTGTATAATTCTC</u>	5590
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>AAATAACTCAAGGAAACCTTTTATAACATTTTCATGTATTGAGCGGTCTTTAATCCCTTTTGTCTGTCTCTTTTAGAATTTATTTATTTTTTATTCTAA</u>	5698
	<u>AAATAACTCAAGGAAACCTTTTATAACATTTTCATGTATTGAGCGGTCTTTAATCCCTTTTGTCTGTCTCTTTTAGAATTTATTTATTTTTTATTCTAA</u>	5690
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>TCTTTTTGTTTCAGACAATTGAAAACGGTATTTCTTGTTTCCAGGATCCCTTATCTTTGCTTGAATCATTTGGGTTTAGACATAAATTCGGTGATTTTTAA</u>	5798
	<u>TCTTTTTGTTTCAGACAATTGAAAACGGTATTTCTTGTTTCCAGGATCCCTTATCTTTGCTTGAATCATTTGGGTTTAGACATAAATTCGGTGATTTTTAA</u>	5790
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>TCGTTTCAAAATGGCAGCAACATACCATTTTTGTGATTTTTTCCATCAAAATATCATATAAATGGTTGATTCTTGTTTAAATACACTTTTAATTTGATCA</u>	5898
	<u>TCGTTTCAAAATGGCAGCAACATACCATTTTTGTGATTTTTTCCATCAAAATATCATATAAATGGTTGATTCTTGTTTAAATACACTTTTAATTTGATCA</u>	5890
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>AAAGAGTTTTTACCAATTCAAAAAAAACTTTGGATTGGAACCTTGCTTGAATTGGATCTTTTCGATTATATATCGAAAAATAGACTTACAAAGTTGTCCC</u>	5998
	<u>AAAGAGTTTTTACCAATTCAAAAAAAACTTTGGATTGGAACCTTGCTTGAATTGGATCTTTTCGATTATATATCGAAAAATAGACTTACAAAGTTGTCCC</u>	5990
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>AATTTATTGATTGATACTAACCTTAGATTCTTGCCCCGAGAAATGAATCAATACTTTTCTGCTCGAGCTCCATCGTGTACAGTAAATTTATATCAAAACCA</u>	6098
	<u>AATTTATTGATTGATACTAACCTTAGATTCTTGCCCCGAGAAATGAATCAATACTTTTCTGCTCGAGCTCCATCGTGTACAGTAAATTTATATCAAAACCA</u>	6090
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>CAATACCCCTCAAAAAAATGAGAGGTCTAGTGAAAAAGAACAAATGATGTCGAGTCAAGAGCACTTTCATTCTCTATATAATTACTATATTATATAGTAT</u>	6198
	<u>CAATACCCCTCAAAAAAATGAGAGGTCTAGTGAAAAAGAACAAATGATGTCGAGTCAAGAGCACTTTCATTCTCTATATAATTACTATATTATATAGTAT</u>	6190

RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>ATAATGGTGGATTAAAGACTCCACAATGGATCGTGCTCTCAAGTCGCACGTTGCTTTCTACCACATCGTTTTAAACGAAGTTTTACCATAACATTCCCTTT</u>	6298
	<u>ATAATGGTGGATTAAAGACTCCACAATGGATCGTGCTCTCAAGTCGCACGTTGCTTTCTACCACATCGTTTTAAACGAAGTTTTACCATAACATTCCCTTT</u>	6290
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>AGTTTGTAAACCGGTATCTAATTGATTCCATCATGGAATTATGAATAGTCATTGGTTTCGGTTGGTACTGGTACATAGTAATCTATACCTTTCTATACCTTT</u>	6398
	<u>AGTTTGTAAACCGGTATCTAATTGATTCCATCATGGAATTATGAATAGTCATTGGTTTCGGTTGGTACTGGTACATAGTAATCTATACCTTTCTATACCTTT</u>	6390
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>ATTCAATTCATATAAAATAACAATATAAAATAAAATGGGTAGTTTCTGAAGAAGTTTTCAGCAAAATTCATTTAACTCCAGATCCATATAAATTATTA</u>	6498
	<u>ATTCAATTCATATAAAATAACAATATAAAATAAAATGGGTAGTTTCTGAAGAAGTTTTCAGCAAAATTCATTTAACTCCAGATCCATATAAATTATTA</u>	6490
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>TTAAATAAAATTAATAAAATTTTACAATTATATACCAATTATATCCATAAATATATACATATTATATATAAATCTATTAA</u>	6598
	<u>TTAAATAAAATTAATAAAATTTTACAATTATATACCAATTATATCCATAAATATATACATATTATATATAAATCTATTAA</u>	6576
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>ATATATAAATAAATGAATAAATTTAATTTTATAAGAATCTATAATTAATAAGAATATATAAATCTAATAAATTTAGAATAAATAATTAATCAATTA</u>	6698
	<u>ATATATAAATAAATGAATAAATTTAATTTTATAAGAATCTATAATTAATAAGAATATATAAATCTAATAAATTTAGAATAAATAATTAATCAATTA</u>	6665
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>ATATTTCAAAATATATATATTTAAAAAATTTAATTTATAAATAGTAATAGCAGCAATCTAATAAAAAAATTCAGTTTTTTTGAATCTGCATCTTC</u>	6798
	<u>ATATTTCAAAATATATATATTTAAAAAATTTAATTTATAAATAGTAATAGCAGCAATCTAATAAAAAAATTCAGTTTTTTTGAATCTGCATCTTC</u>	6765
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>AAGTAACCTGTAGTGTGTGATAGTGATAGGATAAATTCACAATTTCTATTTTTTAGTGAAATGGTGGATAAAACTGATGTAAGGGAAGATTCCGGTTT</u>	6898
	<u>AAGTAACCTGTAGTGTGTGATAGTGATAGGATAAATTCACAATTTCTATTTTTTAGTGAAATGGTGGATAAAACTGATGTAAGGGAAGATTCCGGTTT</u>	6865
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>TTTTTTTCTACTGATGTGATAAGAAATAATGGATACCTATATCTATCGAATAGACTAAACAATTTGTACTGAAAGAAATATAGATATTCTATCTTA</u>	6998
	<u>TTTTTTTCTACTGATGTGATAAGAAATAATGGATACCTATATCTATCGAATAGACTAAACAATTTGTACTGAAAGAAATATAGATATTCTATCTTA</u>	6964
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>AATATTTAAGATTTAGAACTCTTTATAATTTTAAAAATTTAGAGATCACAAATACAAATAGAGTGAATTTTATCTGTGCTTTATTTGAATCGATTCAATTT</u>	7098
	<u>AATATTTAAGATTTAGAACTCTTTATAATTTTAAAAATTTAGAGATCACAAATACAAATAGAGTGAATTTTATCTGTGCTTTATTTGAATCGATTCAATTT</u>	7064
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>GTGAAAAAGATATGATTCCAGAAGAATTATTAAGCATCACATTTTCCCAATTTCTTACTCTAAAATGAAATAAAAATGAAATAAAAAATGAAATAG</u>	7198
	<u>GTGAAAAAGATATGATTCCAGAAGAATTATTAAGCATCACATTTTCCCAATTTCTTACTCTAAAATGAAATAAAAATGAAATAAAAAATGAAATAG</u>	7164
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>AAAGTTGTAAAAAAGACTGGAATCGAATCTATATTATCTATATCTATATCAGAAATATAAAATAATTTTTAATGTTATAGATGGATTGAATCT</u>	7298
	<u>AAAGTTGTAAAAAAGACTGGAATCGAATCTATATTATCTATATCTATATCAGAAATATAAAATAATTTTTAATGTTATAGATGGATTGAATCT</u>	7264
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>GTGATAATGTTATAATAGATTTGGTATGCTCTGGGACGGAAGGATTCGAACCTCCGAATAGCGGGACCAAAACCCGATGCCTTACCACCTGGCCACGCCC</u>	7398
	<u>GTGATAATGTTATAATAGATTTGGTATGCTCTGGGACGGAAGGATTCGAACCTCCGAATAGCGGGACCAAAACCCGATGCCTTACCACCTGGCCACGCCC</u>	7364
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>CATTCTCTATTGACACTAATAAACACTAATATTATTAGTAGTTGTTTCGTCGAATCCAGCTCTAATATCTATAAAAAAATCTGATGTTTAATAAAATTT</u>	7498
	<u>CATTCTCTATTGACACTAATAAACACTAATATTATTAGTAGTTGTTTCGTCGAATCCAGCTCTAATATCTATAAAAAAATCTGATGTTTAATAAAATTT</u>	7464
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>TGTTATATGTAGATATAAAATGAAACTCAATTTATTGATCATTACATATAAATCAATTAAGATATTGTATGAAATATGATTGAGAATTAAGTTGAAG</u>	7598
	<u>TGTTATATGTAGATATAAAATGAAACTCAATTTATTGATCATTACATATAAATCAATTAAGATATTGTATGAAATATGATTGAGAATTAAGTTGAAG</u>	7564
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>GATTTTTGATTGGGCGAGTTCAAATCAAGAAAGTTTTTTTGTCTATCTTTTATTTTATTCATTTTCCCTCTATCAATAACTCAACTTATTAACTCA</u>	7698
	<u>GATTTTTGATTGGGCGAGTTCAAATCAAGAAAGTTTTTTTGTCTATCTTTTATTTTATTCATTTTCCCTCTATCAATAACTCAACTTATTAACTCA</u>	7664
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>ATCAAAATAAATACAAGTATCTTCAAGAACAATTTGTTATGCTTAATATATTAGTTTGTATCTGTATCTGCTTAAATCTACCCCTTTATTCAAATAGTTT</u>	7798
	<u>ATCAAAATAAATACAAGTATCTTCAAGAACAATTTGTTATGCTTAATATATTAGTTTGTATCTGTATCTGCTTAAATCTACCCCTTTATTCAAATAGTTT</u>	7764
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>TTTCGTCGCCAAATGCCCCGAGGCTTACGCTTTTTTGAATCCAATCGTAGATTTTATGCCAGTAATACCTTTGCTGTTTTTCTTTTAGCTTTTGTGTTG</u>	7898
	<u>TTTCGTCGCCAAATGCCCCGAGGCTTACGCTTTTTTGAATCCAATCGTAGATTTTATGCCAGTAATACCTTTGCTGTTTTTCTTTTAGCTTTTGTGTTG</u>	7864
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>CAAGCTGCTGAAGTTTTCGATAAGATCTTTAATACATTCTAGACAAATTTATGATTTATTCGAAAAAACAACAAAAAATTTCTAACAATTTGATAAG</u>	7998
	<u>CAAGCTGCTGAAGTTTTCGATAAGATCTTTAATACATTCTAGACAAATTTATGATTTATTCGAAAAAACAACAAAAAATTTCTAACAATTTGATAAG</u>	7964
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>ATCAGATAAGTTTTACAGTATAAATCCTCGATTCAAATATTGAAATTATTATACAGCCCTGATAAATTTTTATCACCCCTTATTCCATTCCTCATCTGA</u>	8098
	<u>ATCAGATAAGTTTTACAGTATAAATCCTCGATTCAAATATTGAAATTATTATACAGCCCTGATAAATTTTTATCACCCCTTATTCCATTCCTCATCTGA</u>	8064
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>CCTCTTCCATTGAAAGACCATATTGAGTTCCCTCAAAATATCTCATTTTGGATATAAAAGAAAAATTTTGTAAATGAAAACTCAACTTTTATTACATA</u>	8198
	<u>CCTCTTCCATTGAAAGACCATATTGAGTTCCCTCAAAATATCTCATTTTGGATATAAAAGAAAAATTTTGTAAATGAAAACTCAACTTTTATTACATA</u>	8164
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>TTACAATTCAAATTTTTTCTCTAATTATAAAAAACACTTTATTCTTGGTGTAAATCCAAAATAAATTTAAATAGTTAGGGTATGCGGTATAAAA</u>	8298
	<u>TTACAATTCAAATTTTTTCTCTAATTATAAAAAACACTTTATTCTTGGTGTAAATCCAAAATAAATTTAAATAGTTAGGGTATGCGGTATAAAA</u>	8264
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>TAAAAATAGAGATCTATTCTCTTTTCTTAAAAAATCTTGGAGATTGTCGATGCTTACTCTCAAACTATTGTTTACACGGTAGTGATATTCTTT</u>	8398
	<u>TAAAAATAGAGATCTATTCTCTTTTCTTAAAAAATCTTGGAGATTGTCGATGCTTACTCTCAAACTATTGTTTACACGGTAGTGATATTCTTT</u>	8364
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>GTTTCTCTCTCATCTTCGGATTCTATCTAATGATCCGGGTCGTAATCTCGGACGTGAAGAATAAAAAAATTTGTTTTCTTGCTTGATTTTAAAG</u>	8496
	<u>GTTTCTCTCTCATCTTCGGATTCTATCTAATGATCCGGGTCGTAATCTCGGACGTGAAGAATAAAAAAATTTGTTTTCTTGCTTGATTTTAAAG</u>	8464
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>GTTCTTAGTAAGATTTTATCTATTCCACACCTTTAACTATTAAAAAATAAAAAATAAATCGCGATTCTTTTTCTTTTCGCGATAAATTCGAAAGAA</u>	8596
	<u>GTTCTTAGTAAGATTTTATCTATTCCACACCTTTAACTATTAAAAAATAAAAAATAAATCGCGATTCTTTTTCTTTTCGCGATAAATTCGAAAGAA</u>	8564
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>AATACCAAGTTTTAGATGAAAACGGAAGAGAGGGATTTCGAACCCCTCGGTACAAAAAATCTGTACACCGGATTAGCAATCCGACGCTTTAGTCCACTCAG</u>	8696
	<u>AATACCAAGTTTTAGATGAAAACGGAAGAGAGGGATTTCGAACCCCTCGGTACAAAAAATCTGTACACCGGATTAGCAATCCGACGCTTTAGTCCACTCAG</u>	8664
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>CCATCTCTCCCCGATTGAAAAAGAAAAATGACTATGTTACATTAGTAACAAACATAAAACTTGAAAAAGCTCTTTCCCTTCTTAATTTTATTTTA</u>	8796
	<u>CCATCTCTCCCCGATTGAAAAAGAAAAATGACTATGTTACATTAGTAACAAACATAAAACTTGAAAAAGCTCTTTCCCTTCTTAATTTTATTTTA</u>	8764
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>TTTCATCTTTCTTTCTATTATTTAAATTTTAAATAGAAATTTTATAAATTAACATAAATATTAATTAACATATAAATGTTAAATATAGTTTTTATAAAT</u>	8896
	<u>TTTCATCTTTCTTTCTATTATTTAAATTTTAAATAGAAATTTTATAAATTAACATAAATATTAATTAACATATAAATGTTAAATATAGTTTTTATAAAT</u>	8864
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>AAAAATATAAAGTGAAATAAACAATAAAAAATAAATAAATTAATTAATTTCTTTTATTATTATTAATTTCTTTTAAATATTATTATTAATTTA</u>	8996
	<u>AAAAATATAAAGTGAAATAAACAATAAAAAATAAATAAATTAATTAATTTCTTTTATTATTATTAATTTCTTTTAAATATTATTATTAATTTA</u>	8964
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>ATTATATATATTTAATTAATTTT-TA-ATTTAATATTATA---TATATATTGAAATTTTCATTTTA-ATTGAATATTATATTAAATATAATTTCA</u>	9089
	<u>ATTATATATATTTAATTAATTTT-TA-ATTTAATATTATA---TATATATTGAAATTTTCATTTTA-ATTGAATATTATATTAAATATAATTTT-A</u>	9062
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>AATATATATAAATAAAAAATTCCAAATAAAATCTTTTTTTTTTTTTTATTCATCCAAAGAAACCTTTTATTTCCACGGCTTGGCTTGGTCAGTACC</u>	9189
	<u>AATATATATAAATAAAAAATTCCAAATAAAATCTTTTTTTTTTTTTTATTCATCCAAAGAAACCTTTTATTTCCACGGCTTGGCTTGGTCAGTACC</u>	9149
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>TAGCTGGCGGGCCCTCTTTTGTTCACAGCAATCGGAATAAAATTTATTTATTAATAAATTTAATAAAGTCAAATTCGTTTTTTAATAAAAAAGCTAAGT</u>	9289
	<u>TAGCTGGCGGGCCCTCTTTTGTTCACAGCAATCGGAATAAAATTTATTTATTAATAAATTTAATAAAGTCAAATTCGTTTTTTAATAAAAAAGCTAAGT</u>	9249

RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>AAAGAAAAGAAATGGAACCTCTATTATTAGTTATTAAATGAGTTAAATGAGTCCTCTAAATGAGTCCTCGTTTCCTAATCTTAATCTCATTAGGTCCT</u>	9389
	<u>AAAGAAAAGAAATGGAACCTCTATTATTAGTTATTAAATGAGTTAAATGAGTCCTCTAAATGAGTCCTCGTTTCCTAATCTTAATCTCATTAGGTCCT</u>	9349
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>CTGACAAAACACGTTAACTTTCTAATTTTCATGATTCTTTCTTTCTCTTTCTCTGATCCTATCTTTTATTATGGACGAGTTTTTTGTCGACAAAAG</u>	9489
	<u>CTGACAAAACACGTTAACTTTCTAATTTTCATGATTCTTTCTTTCTCTTTCTCTGATCCTATCTTTTATTATGGACGAGTTTTTTGTCGACAAAAG</u>	9449
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>TCTATTTATATACAATAATCGGATTGTAGCGGGTATAGTTTAGTGGTAAAGGTGATTCGTTCTATTAAATCCCTTAATAGTTAAGGGATCCCTCGGTTT</u>	9589
	<u>TCTATTTATATACAATAATCGGATTGTAGCGGGTATAGTTTAGTGGTAAAGGTGATTCGTTCTATTAAATCCCTTAATAGTTAAGGGATCCCTCGGTTT</u>	9549
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>GATTAATATACCACTCCGATCAAAAACCTTTATCTCTTAAAGGATTTTATCCTTTACCTCTCAATGAAAATTCGAGGAAGAATAAATTATTGTGATTG</u>	9689
	<u>GATTAATATACCACTCCGATCAAAAACCTTTATCTCTTAAAGGATTTTATCCTTTACCTCTCAATGAAAATTCGAGGAAGAATAAATTATTGTGATTG</u>	9649
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>TATCCAAGAGTCAATTAAAAATTGAAAAATTGGATTATGAAATTACGAAACATAAATTCCTTTTAAATGAAATGGATCAATACCTCCAACCTGAATGAA</u>	9789
	<u>TATCCAAGAGTCAATTAAAAATTGAAAAATTGGATTATGAAATTACGAAACATAAATTCCTTTTAAATGAAATGGATCAATACCTCCAACCTGAATGAA</u>	9749
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>TATAAGTAATAAATCCATGGATAAAAGTAAAAAGTGATTTCTAATCGTAACTAAATCTTCAATTTATAATTTTTATAGGGAAAATTGAAGCAAAATGGC</u>	9889
	<u>TATAAGTAATAAATCCATGGATAAAAGTAAAAAGTGATTTCTAATCGTAACTAAATCTTCAATTTATAATTTTTATAGGGAAAATTGAAGCAAAATGGC</u>	9849
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>TATCAAAATAAGACTTTAGTTTACTAGAGACATCGGCAATTGGTTTAGCTCGGTAGAAAATAAATGTTTTTCTAAGGATTTTCTCGACTCGAAATAGA</u>	9989
	<u>TATCAAAATAAGACTTTAGTTTACTAGAGACATCGGCAATTGGTTTAGCTCGGTAGAAAATAAATGTTTTTCTAAGGATTTTCTCGACTCGAAATAGA</u>	9949
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>GAACGAAGTAATTAGAAAGATTGGTATAATCCCTTCTTTCTATAAGGATCATCTAGAAAGCGGGTCATTTGAATAATTCAGACCGAAAAGCTGACCTA</u>	10089
	<u>GAACGAAGTAATTAGAAAGATTGGTATAATCCCTTCTTTCTATAAGGATCATCTAGAAAGCGGGTCATTTGAATAATTCAGACCGAAAAGCTGACCTA</u>	10049
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>GATGTTATAGGTTTCATTTTTTTCTTTCTGTTTCATATCTTAAATTTATCCATCTTCCATAAAGGAGCGGAATGAAACAAAAGTTTCACGTTTCGGTTTTGA</u>	10189
	<u>GATGTTATAGGTTTCATTTTTTTCTTTCTGTTTCATATCTTAAATTTATCCATCTTCCATAAAGGAGCGGAATGAAACAAAAGTTTCACGTTTCGGTTTTGA</u>	10149
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>ATTAGAGACGTTAAAAATGATGAATCAACGTCGACTATAACCCCTAGCCTTCCAAGCTAACGATGCGGGTTCGATTCCCGCTACCCGCTTGTACTTAACT</u>	10289
	<u>ATTAGAGACGTTAAAAATGATGAATCAACGTCGACTATAACCCCTAGCCTTCCAAGCTAACGATGCGGGTTCGATTCCCGCTACCCGCTTGTACTTAACT</u>	10249
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>TGTACTTAGTTTAGTTCTTAGCTCTATTCTATATTATTCTATATTATGAATCTTTCTATTGATTATTATAAAAAATGGATTTTTATTATTAATCTATAT</u>	10389
	<u>TGTACTTAGTTTAGTTCTTAGCTCTATTCTATATTATTCTATATTATGAATCTTTCTATTGATTATTATAAAAAATGGATTTTTATTATTAATCTATAT</u>	10349
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>TTTATTATTTTATTTTTAGAAAAATTTTGTAGAAATTTTTTAATAAATTTTAAATATTATAAATGATTAATGATTAATGATTAATGATTAATGATTAAT</u>	10489
	<u>TTTATTATTTTATTTTTAGAAAAATTTTGTAGAAATTTTTTAATAAATTTTAAATATTATAAATGATTAATGATTAATGATTAATGATTAATGATTAAT</u>	10449
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>ATATTATTATATATAATAAATTTAATATAATTATAAATATTAAATATAATATGAATGACTATATGAATAGATAATGCATCCTTAAATTTGAATACGCAA</u>	10589
	<u>ATATTATTATATATAATAAATTTAATATAATTATAAATATTAAATATAATATGAATGACTATATGAATAGATAATGCATCCTTAAATTTGAATACGCAA</u>	10549
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>TTTCCGGAATTCCTTCACATATTCGTTTTTCCGAACAAGAAATAAAAAAATGGAATGAAAGCGCTCCATTGTCTAATGGATAGGACAGAGGTCCT</u>	10689
	<u>TTTCCGGAATTCCTTCACATATTCGTTTTTCCGAACAAGAAATAAAAAAATGGAATGAAAGCGCTCCATTGTCTAATGGATAGGACAGAGGTCCT</u>	10649
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>CTAAACCTTTGGTATAGGTTCAATCCATTGGACGCAATATATTCCATATATATATTCTTTGAGAATATCTATATTAGATAGATATTTTGAATGAA</u>	10789
	<u>CTAAACCTTTGGTATAGGTTCAATCCATTGGACGCAATATATTCCATATATATATTCTTTGAGAATATCTATATTAGATAGATATTTTGAATGAA</u>	10749
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>TTGAAGAAGAGATAAACCCTCATTTATATGGATTGTTACTTATATATGGATTGTTACTTATAATATATAATATACATATATTATTCTATTATAATAG</u>	10889
	<u>TTGAAGAAGAGATAAACCCTCATTTATATGGATTGTTACTTATATATGGATTGTTACTTATAATATATAATATACATATATTATTCTATTATAATAG</u>	10829
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>AATCTTTTGTAAATATATTACTTTTCATAATATATTACAAAAGATCAAAAAGATTTTAAGATTATATAAAATTCGAAAATAAATAGAAAAGATTATAGAAA</u>	10989
	<u>AATCTTTTGTAAATATATTACTTTTCATAATATATTACAAAAGATCAAAAAGATTTTAAGATTATATAAAATTCGAAAATAAATAGAAAAGATTATAGAAA</u>	10929
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>CATAATTATATATATAAATTAATAAATTAACCTCAAAATGATATATTGATAAAGATTAAAAATGATAAATTTCTTTATACCTTGTTCTTGAAGTAGAAAAC</u>	11089
	<u>CATAATTATATATATAAATTAATAAATTAACCTCAAAATGATATATTGATAAAGATTAAAAATGATAAATTTCTTTATACCTTGTTCTTGAAGTAGAAAAC</u>	11029
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>GTTCATCTGTTCTGAAATAGCGTCTTTCAAAGAGCTTCTGCTTCCCTCAGTAAATGTCTTAGTAGAAGATATGATTCTTGGAACTGAGGTTTATTCGT</u>	11189
	<u>GTTCATCTGTTCTGAAATAGCGTCTTTCAAAGAGCTTCTGCTTCCCTCAGTAAATGTCTTAGTAGAAGATATGATTCTTGGAACTGAGGTTTATTCGT</u>	11129
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>TTTTAAATAAGTGCCTAATCAACGAGAAATTTCCCTTACCTGTCGAATTTCTAATGAATCAAGATAACCATTCGTTCCGGTATATATAGTAATTTATCTGT</u>	11289
	<u>TTTTAAATAAGTGCCTAATCAACGAGAAATTTCCCTTACCTGTCGAATTTCTAATGAATCAAGATAACCATTCGTTCCGGTATATATAGTAATTTATCTGT</u>	11229
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>TCTTCCACCGCGAGAGGGCTGCTTGAGATTGTTTAAAGCAACTCAGTAATCGTTGACCTCTTGCCAATTGATTCTGAGTAGCTTTATCAAGATCAGAAG</u>	11389
	<u>TCTTCCACCGCGAGAGGGCTGCTTGAGATTGTTTAAAGCAACTCAGTAATCGTTGACCTCTTGCCAATTGATTCTGAGTAGCTTTATCAAGATCAGAAG</u>	11329
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>CAAAATGTGCAAAAGGCTTCTAATCTCGGAATTCGCCCAATTTCAAAATTTAAATTTGCCGGCTACTTGTTTCAATGGCTTTAATTTGAGCTGCAGATCCTAC</u>	11489
	<u>CAAAATGTGCAAAAGGCTTCTAATCTCGGAATTCGCCCAATTTCAAAATTTAAATTTGCCGGCTACTTGTTTCAATGGCTTTAATTTGAGCTGCAGATCCTAC</u>	11429
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>TCTAGAAACCGAAATACCCACATTAATAGCAGGTCTGATTCCAGCATTGAATAGATCGGCAGATAAGAATATTGTCCATCTGTAATGGAATTTACATTA</u>	11589
	<u>TCTAGAAACCGAAATACCCACATTAATAGCAGGTCTGATTCCAGCATTGAATAGATCGGCAGATAAGAATATTGTCCATCTGTAATGGAATTTACATTA</u>	11529
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>GTAGGAATATAAGCCGAAACATCTCCCGATTGGGTCTCAACTATTGGTAAAGCAGTCATACTTCTTCACTTAAAGGAGAACTTGATTAGCAGCTCTTT</u>	11689
	<u>GTAGGAATATAAGCCGAAACATCTCCCGATTGGGTCTCAACTATTGGTAAAGCAGTCATACTTCTTCACTTAAAGGAGAACTTGATTAGCAGCTCTTT</u>	11629
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>CCAAAAGTCGTAATGCAAAATAAAAAACATCTCCCGGATAAGCTTCGCGGCTGGCGGCTCTCGTAATAAAGAGACATTGGCGGATAAGCTTGTGCTTG</u>	11789
	<u>CCAAAAGTCGTAATGCAAAATAAAAAACATCTCCCGGATAAGCTTCGCGGCTGGCGGCTCTCGTAATAAAGAGACATTGGCGGATAAGCTTGTGCTTG</u>	11729
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>TTTGAGGGATCATCATAAATGATTAAAGTATGTTGTTACGATACATAAAATATTACGCCAGAGCCGCTCCCGTGAAGGAGCGAGGTATTGTAATGTA</u>	11889
	<u>TTTGAGGGATCATCATAAATGATTAAAGTATGTTGTTACGATACATAAAATATTACGCCAGAGCCGCTCCCGTGAAGGAGCGAGGTATTGTAATGTA</u>	11829
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>GCCGAGAATCCGCTGTTTCAGCTACCAATAGTGTATTCCATTGCTCCCTTTCTGTAAGAGTAGTTACCACTTGAGCCACAGAAGATGCTTTTTGAC</u>	11989
	<u>GCCGAGAATCCGCTGTTTCAGCTACCAATAGTGTATTCCATTGCTCCCTTTCTGTAAGAGTAGTTACCACTTGAGCCACAGAAGATGCTTTTTGAC</u>	11929
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>CAATAGCTACATAAAGCATATTACATTTTGCTCTGTTGATTGAGAATCGTATCTGTGGCTACTGCTGTTTTACCAGTTTGCTGTCTCCAATAATTA</u>	12089
	<u>CAATAGCTACATAAAGCATATTACATTTTGCTCTGTTGATTGAGAATCGTATCTGTGGCTACTGCTGTTTTACCAGTTTGCTGTCTCCAATAATTA</u>	12029
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>TTCTCGCTGGCCAGCTCCTATAGGTATCATCGAATCAATAGCAATAAGTCTGTTTGAAGAGGCTCATATACAGAAGCTCTCGAAATAATACCCGGAGCA</u>	12189
	<u>TTCTCGCTGGCCAGCTCCTATAGGTATCATCGAATCAATAGCAATAAGTCTGTTTGAAGAGGCTCATATACAGAAGCTCTCGAAATAATACCCGGAGCA</u>	12129
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>GGAGATTCAATTAACGATATTGAGAAGCTGAAATTTACCTTCGACCATCAATAGGTTTAGCCAGGGCATTTAGAACACGCCCAAAAAGCCTCACTTA</u>	12289
	<u>GGAGATTCAATTAACGATATTGAGAAGCTGAAATTTACCTTCGACCATCAATAGGTTTAGCCAGGGCATTTAGAACACGCCCAAAAAGCCTCACTTA</u>	12229
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>CCGGTATTGAGCAATTCGCTCTGTTGCTTTTACAGAACTGCCCTCTTGATATCATCAACCCGTCACCCATTAAATACAACACCGACATTATTGATTCCAA</u>	12389
	<u>CCGGTATTGAGCAATTCGCTCTGTTGCTTTTACAGAACTGCCCTCTTGATATCATCAACCCGTCACCCATTAAATACAACACCGACATTATTGATTCCAA</u>	12329

RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>ATTCAGTGAATGCCTATCGTACCTTCTTCAAATTTCTACTAATTCACCTGCCATTACTTCATCAAGACCATAAATACGAGCAATGCCATCGCCTACTTGA</u>	12489
	<u>ATTCAGTGAATGCCTATCGTACCTTCTTCAAATTTCTACTAATTCACCTGCCATTACTTCATCAAGACCATAAATACGAGCAATGCCATCGCCTACTTGA</u>	12429
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>AGTACGGTACCGGTATTTAAATCTTGACTTCTCTATTATATTTGTTCAATACGTTACGGATAATATTACTAATCTCATCTGCTCGAATGGTTACCATGA</u>	12589
	<u>AGTACGGTACCGGTATTTAAATCTTGACTTCTCTATTATATTTGTTCAATACGTTACGGATAATATTACTAATCTCATCTGCTCGAATGGTTACCATGA</u>	12529
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>GTATTTCTTAATTTCTTTATTTTGTGTTGAAAGAAAAAATAATGCCGCAATAGAGGACTAACCCGTTATTTCTTTTCATCGTTCCAAACATGCCAATA</u>	12689
	<u>GTATTTCTTAATTTCTTTATTTTGTGTTGAAAGAAAAAATAATGCCGCAATAGAGGACTAACCCGTTATTTCTTTTCATCGTTCCAAACATGCCAATA</u>	12629
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>TTAGTATTAATGGTACGTAATGTAACTCGTTATTCAAACAACATTAGAGTTCTAGAGCTCCTTGTAAGCTTGTGGAAGAACCCGTTGTCGAACCT</u>	12789
	<u>TTAGTATTAATGGTACGTAATGTAACTCGTTATTCAAACAACATTAGAGTTCTAGAGCTCCTTGTAAGCTTGTGGAAGAACCCGTTGTCGAACCT</u>	12729
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>GGTTAATTTGCTCTTTGTTGTTCAAATGAATAGTTTCGTTTTGTAATTTTCTAATTTGTTCCAAAGTCTTATAAGTTGAATTAATCAAGTTTAACTTTTC</u>	12889
	<u>GGTTAATTTGCTCTTTGTTGTTCAAATGAATAGTTTCGTTTTGTAATTTTCTAATTTGTTCCAAAGTCTTATAAGTTGAATTAATCAAGTTTAACTTTTC</u>	12829
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>TCGTTCTATTTTCAGAGTATCCATTCACTCGAACTGATCTGCTTCCATTTTCGATTTTTCGCAAGCGGTCCCTAGCTTTTTCCAACTGTTCCAGGGCCCC</u>	12989
	<u>TCGTTCTATTTTCAGAGTATCCATTCACTCGAACTGATCTGCTTCCATTTTCGATTTTTCGCAAGCGGTCCCTAGCTTTTTCCAACTGTTCCAGGGCCCC</u>	12929
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>CCGCGTAGTTCTTCTGAATTTGGAATAGTCTTCAAATCCTCTGTTTTGCGATTATCTAATAAATCACTTAATGAAAGTAGATTATCTTTCCATTTCATTTC</u>	13089
	<u>CCGCGTAGTTCTTCTGAATTTGGAATAGTCTTCAAATCCTCTGTTTTGCGATTATCTAATAAATCACTTAATGAAAGTAGATTATCTTTCCATTTCATTTC</u>	13029
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>AAAACCTCCACGATCCCTTCCCGAACCAACATGAATCTTTTGATTCAATTGGCTCTCACGCTCAATCACTTCAATTATGATAGGAATCCCATATCTTT</u>	13189
	<u>AAAACCTCCACGATCCCTTCCCGAACCAACATGAATCTTTTGATTCAATTGGCTCTCACGCTCAATCACTTCAATTATGATAGGAATCCCATATCTTT</u>	13129
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>TTTTATGTAATGAGCCTGTCCCTCTCTCTATTCATATCAATCATATCAAAAAAATAATAAATGAAACTGATCACTAATCCAAGATAGAATA</u>	13289
	<u>TTTTATGTAATGAGCCTGTCCCTCTCTCTATTCATATCAATCATATCAAAAAAATAATAAATGAAACTGATCACTAATCCAAGATAGAATA</u>	13229
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>TTTGAGGACTCTTCTGACCAACAAATAATTGTCAGCAAGTTGTTCTTTTTTTTTTTT - ATTCAAATCCAAGAATTCCTCTTACTTTATACATAGG</u>	13388
	<u>TTTGAGGACTCTTCTGACCAACAAATAATTGTCAGCAAGTTGTTCTTTTTTTTTTTT / ATTCAAATCCAAGAATTCCTCTTACTTTATACATAGG</u>	13329
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>TCATTAATTCAGCATTGGATAAAAAATGGATAAAGGGGGGATTAAATCTCCATTTTATCCAAATTTTTTCAAAGTATTCAAATCATTTTTTTATCGAC</u>	13488
	<u>TCATTAATTCAGCATTGGATAAAAAATGGATAAAGGGGGGATTAAATCTCCATTTTATCCAAATTTTTTCAAAGTATTCAAATCATTTTTTTATCGAC</u>	13429
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>ATGAGCGTTTTATATCGAAAAACGAAAAAATAATCCAACCTCTCTTTTTGAAACCATTCTTATTAACATAGTAGTAGAAGAGTACCGTGCTGTA</u>	13588
	<u>ATGAGCGTTTTATATCGAAAAACGAAAAAATAATCCAACCTCTCTTTTTGAAACCATTCTTATTAACATAGTAGTAGAAGAGTACCGTGCTGTA</u>	13529
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>TCGTGA¹TTCAAACCGTTTAGCTTTAAACCTTATTAATGTTCCACATTATTGGTTGTTAGAGAATCAAAGTAGATTACCAATGAATCACGAAATGCTAT</u>	13688
	<u>TCGTGA¹TTCAAACCGTTTAGCTTTAAACCTTATTAATGTTCCACATTATTGGTTGTTAGAGAATCAAAGTAGATTACCAATGAATCACGAAATGCTAT</u>	13629
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>GGTTCCTTAAATATGATTTCTTAATTTATTAGAAATGATTTCGCGGAATCGTGCACTTTTCTTAGTTATAACGAAAAAGTGTAGTTGGTTGGATCCAA</u>	13788
	<u>GGTTCCTTAAATATGATTTCTTAATTTATTAGAAATGATTTCGCGGAATCGTGCACTTTTCTTAGTTATAACGAAAAAGTGTAGTTGGTTGGATCCAA</u>	13729
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>CCTATTCTTGAATAAACAAC¹CGCACACACTCCCTTTCCAAAGAAATCAATACACCAAGCACTACACTTAGATTATTGGATTAGTTGCTAAAATATC</u>	13888
	<u>CCTATTCTTGAATAAACAAC¹CGCACACACTCCCTTTCCAAAGAAATCAATACACCAAGCACTACACTTAGATTATTGGATTAGTTGCTAAAATATC</u>	13829
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>AGTATTTAACCAGAACTCCCGCGGACGGCCAAAAACCAAGAAAGGAAGGATCGGTTACATTTTTCATATGATCTCCTCTTTCTTATAGATAGACT</u>	13988
	<u>AGTATTTAACCAGAACTCCCGCGGACGGCCAAAAACCAAGAAAGGAAGGATCGGTTACATTTTTCATATGATCTCCTCTTTCTTATAGATAGACT</u>	13929
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>AATATCTATATATATAATATAATATATTTTTTTTATTTTGAATTCATTATTTTCTAAATACTACTACTAAATAAATAAATACTAAATAGAGTAAAAATA</u>	14088
	<u>AATATCTATATATATAATATAATATATTTTTTTTATTTTGAATTCATTATTTTCTAAATACTACTACTAAATAAATAAATACTAAATAGAGTAAAAATA</u>	14029
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>TATATATATTGATTATATAAATTATTTT --- TTGGAAATTTCCAATAAGTGGAAATTTCCAATAAGAATGATACTTATTAGAATTAGGTATCGGGTCT</u>	14183
	<u>TATATATATTGATTATATAAATTATTTT^{AAAAA}TTGGAAATTTCCAATAAGTGGAAATTTCCAATAAGAATGATACTTATTAGAATTAGGTATCGGGTCT</u>	14129
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>TACGTGAATTGCGAAATATTTTCGTTTGTGCAATCTTCTTAAAAAAGTTCCATTGGACTAAGAGGATAAAGGAAGAAAGCGAATTTGGTGTGCTAAT</u>	14283
	<u>TACGTGAATTGCGAAATATTTTCGTTTGTGCAATCTTCTTAAAAAAGTTCCATTGGACTAAGAGGATAAAGGAAGAAAGCGAATTTGGTGTGCTAAT</u>	14229
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>TCCTCCTCCTCAAATAAGCCCCCTCCCATGGGTTGTTGCCCAACGAATAAGAAATTTAAATCTGAATAGAATTCGAAAAGAGCAAGAGCTGCAATCCAA</u>	14383
	<u>TCCTCCTCCTCAAATAAGCCCCCTCCCATGGGTTGTTGCCCAACGAATAAGAAATTTAAATCTGAATAGAATTCGAAAAGAGCAAGAGCTGCAATCCAA</u>	14329
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>GGAAATAAATATATATATGCATTTTAGGATTAAACAAAGGATTTCGCAATAAAGTGTCTAATGCCACAACAGCCCATAAATTTGTTAAAGCTTCCATA</u>	14483
	<u>GGAAATAAATATATATATGCATTTTAGGATTAAACAAAGGATTTCGCAATAAAGTGTCTAATGCCACAACAGCCCATAAATTTGTTAAAGCTTCCATA</u>	14429
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>AAAGCAAGACTAAGCAATAAAGTACCTCGTATTTTTCCTTCTGCTTCTGGTTGTCTCGCAATCCCTTCTACAGCCTGGCCTGCAGCAGTACCTTGACCAA</u>	14583
	<u>AAAGCAAGACTAAGCAATAAAGTACCTCGTATTTTTCCTTCTGCTTCTGGTTGTCTCGCAATCCCTTCTACAGCCTGGCCTGCAGCAGTACCTTGACCAA</u>	14529
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>CCCCAGGTCCAATAGAAGCAAGCCCCACGGCTAATCCAGCAGCAATAACGGAAGCGGCAGAAATCAGTGGATTATGATAAGTTCTTCGCACCAAAAA¹AA</u>	14683
	<u>CCCCAGGTCCAATAGAAGCAAGCCCCACGGCTAATCCAGCAGCAATAACGGAAGCGGCAGAAATCAGTGGATTATGATAAGTTCTTCGCACCAAAAA¹AA</u>	14629
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>AAAAAATAAAGAAATAGTTAATGATACAATAAACCAATGAATTATGACTTATCAAAGTAACTAAGAAACCAATAATATTAATATTCTGGAATTATGA</u>	14783
	<u>AAAAAATAAAGAAATAGTTAATGATACAATAAACCAATGAATTATGACTTATCAAAGTAACTAAGAAACCAATAATATTAATATTCTGGAATTATGA</u>	14729
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>GAACTACTTCGATATCTCTTTTTTAGTTCCATCTCGCGTAATTTTGTGAATCCGTATAAATTTTGTCTTCCGTTCTTCTTTTTTGAATTTGAATTTCT</u>	14883
	<u>GAACTACTTCGATATCTCTTTTTTAGTTCCATCTCGCGTAATTTTGTGAATCCGTATAAATTTTGTCTTCCGTTCTTCTTTTTTGAATTTGAATTTCT</u>	14829
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>TTGTTCTTTTTTGGTGATTGAAATTAGTTCAATATTCAATTCAAAATTACAGACGAAACGGACGGACTTGCATTAGAATCCCTATATAAATTCACAGTAGT</u>	14983
	<u>TTGTTCTTTTTTGGTGATTGAAATTAGTTCAATATTCAATTCAAAATTACAGACGAAACGGACGGACTTGCATTAGAATCCCTATATAAATTCACAGTAGT</u>	14929
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>AAGGAAAAAATAATATATTTATATATATCTTTAGTTTCATATATCTTAGTTGATATCTAATATACATATACTTGTGTTTCCCCCTAACGTAAACCAACT</u>	15083
	<u>AAGGAAAAAATAATATATTTATATATATCTTTAGTTTCATATATCTTAGTTGATATCTAATATACATATACATATCTGTTGTTTAAAGCTAAACCAACT</u>	15029
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>ATTCCTATCTTAGATTAGTTGATTCTAGAAATCTTCTCGACACCCACAAGAATTTGTCTTAGAACAATTTTATTACATACACCTAGTTTGGACCTCC</u>	15183
	<u>ATTCCTATCTTAGATTAGTTGATTCTAGAAATCTTCTCGACACCCACAAGAATTTGTCTTAGAACAATTTTATTACATACACCTAGTTTGGACCTCC</u>	15129
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>CTCTTCCCTTAACCAACCTTTTTTTTAAATTACTTACTATCATAACGTAATATCTTTTTTATTATTACTTTAGATCGTATATACTTTGTTTATACCTTAAC</u>	15283
	<u>CTCTTCCCTTAACCAACCTTTTTTTTAAATTACTTACTATCATAACGTAATATCTTTTTTATTATTACTTTAGATCGTATATACTTTGTTTATACCTTAAC</u>	15229
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>CTTATTTGATTTTGTATATTGAATATTTATATTCCCTAAACCTAAGCGGATTACCTGAAGACGCGTATACATTGTGTCAGGTTAAGCTAAAAAAGACTATG</u>	15383
	<u>CTTATTTGATTTTGTATATTGAATATTTATATTCCCTAAACCTAAGCGGATTACCTGAAGACGCGTATACATTGTGTCAGGTTAAGCTAAAAAAGACTATG</u>	15329
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>CTATGTCGAAAACCTAGTCAATGATGACCTTCCATGGATTCTCCTATATAAGCTCGCGCTAAAGTTGCAAAAAAAGAGCTTGAATGCCACTTGTAAATAA</u>	15483
	<u>CTATGTCGAAAACCTAGTCAATGATGACCTTCCATGGATTCTCCTATATAAGCTCGCGCTAAAGTTGCAAAAAAAGAGCTTGAATGCCACTTGTAAATAA</u>	15429

RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>TCCAAGAAACATGACAGGTATAGGAAC TACTAAAGGTACTAAAGAAACAAGAACCAACTACTAATTCATCAGCTAATATATTTCCGAAAAGTCGAAAA</u> <u>TCCAAGAAACATGACAGGTATAGGAAC TACTAAAGGTACTAAAGAAACAAGAACCAACTACTAATTCATCAGCTAATATATTTCCGAAAAGTCGAAAA</u>	15583 15529
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>CTAAGTGATAAGGGTTTTGTGAAATCTTCTAAGATGTTAATGGGCAAAAGGATTGGGGTTGGTTGAATGTATTACCGAAAATAACCTAATCCTTTTTTGG</u> <u>CTAAGTGATAAGGGTTTTGTGAAATCTTCTAAGATGTTAATGGGCAAAAGGATTGGGGTTGGTTGAATGTATTACCGAAAATAACCTAATCCTTTTTTGG</u>	15683 15629
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>TAAGGCCCGCATAAAAATAGGCTACTGATGTGAGTAAAGCTAAAGCAACGGTAGTATTATATCATTTGTGGGTGCGGCTAACTCACCATGAGGTAAC TG</u> <u>TAAGGCCCGCATAAAAATAGGCTACTGATGTGAGTAAAGCTAAAGCAACGGTAGTATTATATCATTTGTGGGTGCGGCTAACTCACCATGAGGTAAC TG</u>	15783 15729
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>TATGATTTTCCAGGGTAAAGAGCCCTTGACCAATTTCGAAACAAAAATAAATAGAAACATAGTTCGAATAAATGGAACCCATGGACCATATTCTTCTCCA</u> <u>TATGATTTTCCAGGGTAAAGAGCCCTTGACCAATTTCGAAACAAAAATAAATAGAAACATAGTTCGAATAAATGGAACCCATGGACCATATTCTTCTCCA</u>	15883 15829
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>ATCTGGGTTTTGTCTAACGCTCTCGAATGAATTCAGGACATATTCAAAGAAATCTGACCATCAGTAGGAATGGTTTGGGGATTACGAACAGCTATAATGA</u> <u>ATCTGGGTTTTGTCTAACGCTCTCGAATGAATTCAGGACATATTCAAAGAAATCTGACCATCAGTAGGAATGGTTTGGGGATTACGAACAGCTATAATGA</u>	15983 15929
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>CTGAACCTAATAAGATAGCAATTACAACCCAAAGTAATAAGTACTTGGCCATGGACTTGGAAACCTCCTATTTCGCAATAGAAATGTGGCCCTACTTC</u> <u>CTGAACCTAATAAGATAGCAATTACAACCCAAAGTAATAAGTACTTGGCCATGGACTTGGAAACCTCCTATTTCGCAATAGAAATGTGGCCCTACTTC</u>	16083 16029
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>CACGCCGATATATCGTATAAACTTTTTAGTGTGTGTAGAGAACATAATAAACATTTCATATTACCTCTGAAAGAAATAGAACTTAAAAAATAA TTAT</u> <u>CACGCCGATATATCGTATAAACTTTTTAGTGTGTGTAGAGAACATAATAAACATTTCATATTACCTCTGAAAGAAATAGAACTTAAAAAATAA TTAT</u>	16182 16129
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>TTTGATTCATCATCTCTTTTTCGACTTGCCTACTTGAATGTATATTAAAAATCAACTAATCACATAATAGCCTCAATATTTTTATCTCTTTTGTG</u> <u>TTTGATTCATCATCTCTTTTTCGACTTGCCTACTTGAATGTATATTAAAAATCAACTAATCACATAATAGCCTCAATATTTTTATCTCTTTTGTG</u>	16282 16229
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>CTATTTCAGGATATAGTAACCAATTTCGATTCAATCAATATATTCTATGGAGTTCAAAAAATAATGACTTATCTTATTATTAATCAAGAATTTTCGTATAT</u> <u>CTATTTCAGGATATAGTAACCAATTTCGATTCAATCAATATATTCTATGGAGTTCAAAAAATAATGACTTATCTTATTATTAATCAAGAATTTTCGTATAT</u>	16382 16329
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>AGCTAGAACGACCCCTCACAAATTGCAAACTAATTTGTGTAAGAAATTAATCGGATTGAAGCTATAGCGTCATCATTTCGCTGGAATCGAAATATCTGCTAA</u> <u>AGCTAGAACGACCCCTCACAAATTGCAAACTAATTTGTGTAAGAAATTAATCGGATTGAAGCTATAGCGTCATCATTTCGCTGGAATCGAAATATCTGCTAA</u>	16482 16429
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>ATCTGGGTTCACAAATTTGTATCGATTAAACAAATAGTTGGAATTCCCAAAGTAATACATTCTCGAAGAGCCGTATATTCTTCTTGTCTGATCAACAATTATT</u> <u>ATCTGGGTTCACAAATTTGTATCGATTAAACAAATAGTTGGAATTCCCAAAGTAATACATTCTCGAAGAGCCGTATATTCTTCTTGTCTGATCAACAATTATT</u>	16582 16529
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>ACAATATCAGGTAACCCCGTCATATATTTAATCCCGCCAGATATGTTTGAAGTGAGATAATTGTCTTTTCAATACAGCCGCATCTCTTTTCGGAAGAC</u> <u>ACAATATCAGGTAACCCCGTCATATATTTAATCCCGCCAGATATGTTTGAAGTGAGATAATTGTCTTTTCAATACAGCCGCATCTCTTTTCGGAAGAC</u>	16682 16629
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>GGTTGAGTCTCCCTGTTTTTTGTTCCGTTCTTAAGTCCCTGAACTTATGAAGTCTCGTTTCTGTAGTATACCAATTTCGTTAAACATACCACCAAGCCATT</u> <u>GGTTGAGTCTCCCTGTTTTTTGTTCCGTTCTTAAGTCCCTGAACTTATGAAGTCTCGTTTCTGTAGTATACCAATTTCGTTAAACATACCACCAAGCCATT</u>	16782 16729
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>TTTATTAACATAATGACACCGGGCCTTTATTCGAGCAGCGCTACTGAATCAGCTGCTTTATTTTTTGGTACCAACATTAAGAATTTGTTTTCCCTACTT</u> <u>TTTATTAACATAATGACACCGGGCCTTTATTCGAGCAGCGCTACTGAATCAGCTGCTTTATTTTTTGGTACCAACATTAAGAATTTGTTTTCCCTACTT</u>	16882 16829
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>GCTGCATCAAAAACTAAATCACAAGCTTCTGATAAAAAACCGAGCAGTTCGAGTAAGATTATAATATGAATACCTTTACGCTTTTCGAGAGATATAAGGTG</u> <u>GCTGCATCAAAAACTAAATCACAAGCTTCTGATAAAAAACCGAGCAGTTCGAGTAAGATTATAATATGAATACCTTTACGCTTTTCGAGAGATATAAGGTG</u>	16982 16929
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>CCATTCTAGGATTCATTTTCCTAGTACCATGACCAAAATGAAGTCTGCTTCCATCATCTCTTCAAAATTTGATGTTTCCAAATATCTTCTTGTCTATTCTCT</u> <u>CCATTCTAGGATTCATTTTCCTAGTACCATGACCAAAATGAAGTCTGCTTCCATCATCTCTTCAAAATTTGATGTTTCCAAATATCTTCTTGTCTATTCTCT</u>	17082 17029
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>CCATACTTTTTCTCTTTTTTTTTTAAAAAAGAGATAAGGATAAGGCACCCGAAAAAATAAATAAATTTGTTCCCATGGAACCTTC</u> <u>CCATACTTTTTCTCTTTTTTTTTTAAAAAAGAGATAAGGATAAGGCACCCGAAAAAATAAATAAATTTGTTCCCATGGAACCTTC</u>	17182 17129
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>TCTTCACCGGAGATGGCCGTTGATACACGATCCATATATTTCATTGCTTATTATCTTTATATCAAAATGACCAACACAATAGAAAAAAGGATG</u> <u>TCTTCACCGGAGATGGCCGTTGATACACGATCCATATATTTCATTGCTTATTATCTTTATATCAAAATGACCAACACAATAGAAAAAAGGATG</u>	17282 17229
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>AAATTGCTCTTAAAAATTTATTAATTCAGAAATGATTTGTTCTGATGTATCATATCCATTCTTTGAAATACAAAAATCAAAATTTCTATGGTGAAAC</u> <u>AAATTGCTCTTAAAAATTTATTAATTCAGAAATGATTTGTTCTGATGTATCATATCCATTCTTTGAAATACAAAAATCAAAATTTCTATGGTGAAAC</u>	17382 17329
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>AAAAATATCTCTGATTTCCCACTCGAATAAATCTCTTTTTTGGTTTCCAAAGAAATGTTGTTATGCTGCCTTGAACGGTGCACTAATCCTTTGAATCCGG</u> <u>AAAAATATCTCTGATTTCCCACTCGAATAAATCTCTTTTTTGGTTTCCAAAGAAATGTTGTTATGCTGCCTTGAACGGTGCACTAATCCTTTGAATCCGG</u>	17482 17429
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>TACCAACGGGTATCATCCCCCTAGAACCAAGCTTCTCTTTCAACCTTTCAACCAATCGATACGACCACGAGAGCGGCTTTTGATAAACTCGAGCAGT</u> <u>TACCAACGGGTATCATCCCCCTAGAACCAAGCTTCTCTTTCAACCTTTCAACCAATCGATACGACCACGAGAGCGGCTTTTGATAAACTCGAGCAGT</u>	17582 17529
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>TTCTTGAAAACTCGCTTCGGATATGAACTTTGAGTATTAGAGATGCTTTCGTTATTTCCCAATAATATGGCTCGGTAACAAATTTGCTTCTTCCAAAGCA</u> <u>TTCTTGAAAACTCGCTTCGGATATGAACTTTGAGTATTAGAGATGCTTTCGTTATTTCCCAATAATATGGCTCGGTAACAAATTTGCTTCTTCCAAAGCA</u>	17682 17629
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>CGCCCCGTTGCTTCGCTCGCAACATCCAATCAGTTCTCCGGGTAAAAAATAGTATGACATTCCATCTTCTGAACTAACACTTTTGATGTTATTGTC</u> <u>CGCCCCGTTGCTTCGCTCGCAACATCCAATCAGTTCTCCGGGTAAAAAATAGTATGACATTCCATCTTCTGAACTAACACTTTTGATGTTATTGTC</u>	17782 17729
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>GTACAATAATTTCTATATGTCTATTATGGATCTGCACACCTGGGATCGATAAACCTTTTGGATCTTATTAACCAAGAGATACGACTTTGCAATATAGT</u> <u>GTACAATAATTTCTATATGTCTATTATGGATCTGCACACCTGGGATCGATAAACCTTTTGGATCTTATTAACCAAGAGATACGACTTTGCAATATAGT</u>	17882 17829
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>TAGCTTAGCACCAATTAAAGATCCCAAGGAATTCGAAGTCTTGTATAGGTTTCGTTCCAACTTCAACTCTCTTTTCTAGGTTCAATGATATTGAA</u> <u>TAGCTTAGCACCAATTAAAGATCCCAAGGAATTCGAAGTCTTGTATAGGTTTCGTTCCAACTTCAACTCTCTTTTCTAGGTTCAATGATATTGAA</u>	17982 17929
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>TCAACCGAACGCACTTCTAACACCTGTTCCACTTTTGGAGACCTGCGTTATATCACCAGATCTCGATTTCATATATAAATGTAACATAATGTATCTC</u> <u>TCAACCGAACGCACTTCTAACACCTGTTCCACTTTTGGAGACCTGCGTTATATCACCAGATCTCGATTTCATATATAAATGTAACATAATGTATCTC</u>	18082 18029
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>CTTCAGAAAGTATTTTCCATAATGGCCATGAACAGTTGCTCCTGGATGGCCAAATAGGCTTCGCGCAATCTTATTACTACATAATCCATTGGAACAAT</u> <u>CTTCAGAAAGTATTTTCCATAATGGCCATGAACAGTTGCTCCTGGATGGCCAAATAGGCTTCGCGCAATCTTATTACTACATAATCCATTGGAACAAT</u>	18182 18129
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>TATAACTTGACCGGATTTTAGGTGGAGTCCATTTTGGCTATACATACATTTTCAAAAAAAGCTGCCCCAAGGCTAATTTATGTCATGTTTTCACAA</u> <u>TATAACTTGACCGGATTTTAGGTGGAGTCCATTTTGGCTATACATACATTTTCAAAAAAAGCTGCCCCAAGGCTAATTTATGTCATGTTTTCACAA</u>	18282 18229
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>AAATTTATATCATAAATATGATGGAGAAAAACCAATTCAAGTTGAATGGATTCAAAAGATGTTACTGTATGGATCGGAATGATAAATTTCTCCCGTTTT</u> <u>AAATTTATATCATAAATATGATGGAGAAAAACCAATTCAAGTTGAATGGATTCAAAAGATGTTACTGTATGGATCGGAATGATAAATTTCTCCCGTTTT</u>	18382 18329
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>CATCCATTAATAATATTTAAGTACTTGAAAGCTGTTTGAATTTGCAAAATTCGAATATTTAGTTACCGAAATCTGATTATGAGTTTTTAAAGGTA</u> <u>CATCCATTAATAATATTTAAGTACTTGAAAGCTGTTTGAATTTGCAAAATTCGAATATTTAGTTACCGAAATCTGATTATGAGTTTTTAAAGGTA</u>	18482 18429
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>ATAAAAAATTCGCAATTTGAGAGGCTGTTCCATAAGGGCCTAACGAAATCCTAATTTGGAATTCGAGGATCTCTTTTAATGATTCTTTTATCCCATTTGGA</u> <u>ATAAAAAATTCGCAATTTGAGAGGCTGTTCCATAAGGGCCTAACGAAATCCTAATTTGGAATTCGAGGATCTCTTTTAATGATTCTTTTATCCCATTTGGA</u>	18582 18529

RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>TATTTTACATTGTTCAATGGACCCATTGAAAAACAATTAGAAGATGACAAAAATGATCAAAGATTGAGATTCCCTTACTTCTATTCAACAACGTATGAATAG</u> <u>TATTTTACATTGTTCAATGGACCCATTGAAAAACAATTAGAAGATGACAAAAATGATCAAAGATTGAGATTCCCTTACTTCTATTCAACAACGTATGAATAG</u>	18682 18629
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>TTCCCTTGATTTTGGCTAAGTAATTTTGAATCCCTTTCCCTTGGAAATAAAGATAAACAACGGATTGGTACGATCTGACCTATTATCAAAGATCAATCCTGA</u> <u>TTCCCTTGATTTTGGCTAAGTAATTTTGAATCCCTTTCCCTTGGAAATAAAGATAAACAACGGATTGGTACGATCTGACCTATTATCAAAGATCAATCCTGA</u>	18782 18729
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>ACCTAACAGATTATTCCTTTTCCCTGATATACGAAATATGGGATTTCACATAAGTTGATTCTTAGGAAATTTGCAATCAGACCAATTGTATTTACTTCAACA</u> <u>ACCTAACAGATTATTCCTTTTCCCTGATATACGAAATATGGGATTTCACATAAGTTGATTCTTAGGAAATTTGCAATCAGACCAATTGTATTTACTTCAACA</u>	18882 18829
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>AAGGAAGCGTAGGCTTCTTCGATAGAAGAACTTTTTTGTCTTGGTCCAGTTCAACACTAAACAAGTCCGAACTAATTGAATACTTGTTCGCGAAATTC</u> <u>AAGGAAGCGTAGGCTTCTTCGATAGAAGAACTTTTTTGTCTTGGTCCAGTTCAACACTAAACAAGTCCGAACTAATTGAATACTTGTTCGCGAAATTC</u>	18982 18929
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>CCCGAATGGGTTTGCCATTTCATATAAGAAATATAATTTAGAAGTCTAAGTTCTAGATTATCCCGTTCCTGTAACGGATCCTGGGGAAAAAGTGTTCCTCA</u> <u>CCCGAATGGGTTTGCCATTTCATATAAGAAATATAATTTAGAAGTCTAAGTTCTAGATTATCCCGTTCCTGTAACGGATCCTGGGGAAAAAGTGTTCCTCA</u>	19082 19029
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>ATTTATACCAATTTGCTATTTTCATATATGATTACAGGTTGAACAAAAACAAAATATTTTTCTTTGTAGATGGGATCCATTGGACATAGATCCCATTTTTC</u> <u>ATTTATACCAATTTGCTATTTTCATATATGATTACAGGTTGAACAAAAACAAAATATTTTTCTTTGTAGATGGGATCCATTGGACATAGATCCCATTTTTC</u>	19182 19129
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>AAATTTTTTGATTGCTTAATTTTTTTTTTAACCCCTTTCGGGTGGTATCAAAATGCCACTGGGTTCGGAATATCTTATCCATATCTATAGGAAAAATGGATAT</u> <u>AAATTTTTTGATTGCTTAATTTTTTTTTTAACCCCTTTCGGGTGGTATCAAAATGCCACTGGGTTCGGAATATCTTATCCATATCTATAGGAAAAATGGATAT</u>	19282 19229
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>CTCCAGAAAAATTTTAAGTTCATCCCTTTTTTTTTTCTCTCCACTCGGACCAATCCACCTACTCGGCTTCGTGTATTAAAGTAATTCGTGTATCTAC</u> <u>CTCCAGAAAAATTTTAAGTTCATCCCTTTTTTTTTTCTCTCCACTCGGACCAATCCACCTACTCGGCTTCGTGTATTAAAGTAATTCGTGTATCTAC</u>	19382 19329
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>TCCAATAATACTATTGTTCCGTACCATTATGGAAGAAGATTTCAGGTAAATATGCACCTCTTCGGGAATGAAAAAAATGGATCCACTTTTCATTGGGTAT</u> <u>TCCAATAATACTATTGTTCCGTACCATTATGGAAGAAGATTTCAGGTAAATATGCACCTCTTCGGGAATGAAAAAAATGGATCCACTTTTCATTGGGTAT</u>	19482 19429
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>TTTGCTTAAATCTTTGACTCCTCGATCTCAATCAAACTCTCTTTTTTGAAGATTGAATGCAACCCCTATAACCCCATATTTAGTAATTCCTGAACTCT</u> <u>TTTGCTTAAATCTTTGACTCCTCGATCTCAATCAAACTCTCTTTTTTGAAGATTGAATGCAACCCCTATAACCCCATATTTAGTAATTCCTGAACTCT</u>	19582 19529
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>TTCTTCTATATTGAGGATCATCAAAATAGCAAAATACATTTTCTACGAAAAATACCATTATTTGGTATTTCATCGAAATACCTGGAACGATGCGTTAG</u> <u>TTCTTCTATATTGAGGATCATCAAAATAGCAAAATACATTTTCTACGAAAAATACCATTATTTGGTATTTCATCGAAATACCTGGAACGATGCGTTAG</u>	19682 19629
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>TTCTTTTCTCGTTCTTGAATCCATTGGAATGGAATGATGAATCTATTTCTTCGCTCTTTGCCAATAAAAAAAATAAGAATATTGTGGAGAATAGAA</u> <u>TTCTTTTCTCGTTCTTGAATCCATTGGAATGGAATGATGAATCTATTTCTTCGCTCTTTGCCAATAAAAAAAATAAGAATATTGTGGAGAATAGAA</u>	19782 19729
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>GGGATTATGAGAGTCCAGGAATACTACTTTCTTTTTTACCAGGAAGACCCGAACTAAAGAATTTGTTTTTCACTTGATTATTATTACTGAAAGGCTAG</u> <u>GGGATTATGAGAGTCCAGGAATACTACTTTCTTTTTTACCAGGAAGACCCGAACTAAAGAATTTGTTTTTCACTTGATTATTATTACTGAAAGGCTAG</u>	19882 19829
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>AAATTTTTTTTTCTTTGTGAGAAAGAAAAATAAATGTTTCGTTTGATCTTGATCTTTATGATTGAAAAAAGGACTCCACTGGATCTGCACAAACCTCCCGA</u> <u>AAATTTTTTTTTCTTTGTGAGAAAGAAAAATAAATGTTTCGTTTGATCTTGATCTTTATGATTGAAAAAAGGACTCCACTGGATCTGCACAAACCTCCCGA</u>	19982 19929
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>TAATATCCATAAATGACTTGTTTTTTGGTAAAGATGCACATTACTATATGTAATTCGGGTGCATGGTATACATCGATACTCCAGTGCATTTCTCCCTCT</u> <u>TAATATCCATAAATGACTTGTTTTTTGGTAAAGATGCACATTACTATATGTAATTCGGGTGCATGGTATACATCGATACTCCAGTGCATTTCTCCCTCT</u>	20082 20029
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>GAGTCAGAAATAATATGTTTTCGAACCCCTCTCTTTAAAAATTAAGAATAATGTTCCCGCGCAATCTCGGCAATCACTTGTCTGATTCTACATATTGAT</u> <u>GAGTCAGAAATAATATGTTTTCGAACCCCTCTCTTTAAAAATTAAGAATAATGTTCCCGCGCAATCTCGGCAATCACTTGTCTGATTCTACATATTGAT</u>	20182 20129
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>CATTTTGAAGTAGAATCAAACTTTTGGTGGAAATAGTCAGTTATGTAGAATATCTTCACTTTCAATAGTTACATACAAGTCTATATAACATAGAAAAAGC</u> <u>CATTTTGAAGTAGAATCAAACTTTTGGTGGAAATAGTCAGTTATGTAGAATATCTTCACTTTCAATAGTTACATACAAGTCTATATAACATAGAAAAAGC</u>	20282 20229
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>GGGATGCCCATGACGTGTACGTGTGGGATGAACCAATCCTCATTGAATTTTATTTTTCCATTGGAGGGGGCTCGTACATGTTCTGCAGTACCCCTGTG</u> <u>GGGATGCCCATGACGTGTACGTGTGGGATGAACCAATCCTCATTGAATTTTATTTTTCCATTGGAGGGGGCTCGTACATGTTCTGCAGTACCCCTGTG</u>	20382 20329
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>AAATCTCCGCGGTATGAAAGGTTCTTAATGTTAGTTGAGTGCCCGGTTCCCAATAGATTGACCCGCAATAATACCCACAGCTTCTCCCAATTCTGACAA</u> <u>AAATCTCCGCGGTATGAAAGGTTCTTAATGTTAGTTGAGTGCCCGGTTCCCAATAGATTGACCCGCAATAATACCCACAGCTTCTCCCAATTCTGACAA</u>	20482 20429
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>GATCGCCATGAGTAGGGCTCCGGCCATAACATAATCGGCAGATCCAAGACGTACTCTTACAAGTAAAGGGAGTTCGAATCGATATTGGTTGTGTTGAAA</u> <u>GATCGCCATGAGTAGGGCTCCGGCCATAACATAATCGGCAGATCCAAGACGTACTCTTACAAGTAAAGGGAGTTCGAATCGATATTGGTTGTGTTGAAA</u>	20582 20529
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>GGTTATGAATCGAGTGACAAGTCCAATACCAATATCTTGATTTCGAACGGCAATGCATCGTGGGCCATATATATATATCGTCTGCTAATACACGGCCAATT</u> <u>GGTTATGAATCGAGTGACAAGTCCAATACCAATATCTTGATTTCGAACGGCAATGCATCGTGGGCCATATATATATATATCGTCTGCTAATACACGGCCAATT</u>	20682 20629
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>AATGTTTGATATAAAAAATCTTTCCGGCATCATCCCAATTTTCGAGGACTCACAGAAATCCCTTGGATGGTGCCACAATCTGTTTCGAGCTACAACAATGTGTT</u> <u>AATGTTTGATATAAAAAATCTTTCCGGCATCATCCCAATTTTCGAGGACTCACAGAAATCCCTTGGATGGTGCCACAATCTGTTTCGAGCTACAACAATGTGTT</u>	20782 20729
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>GAACACTTCAACAAGTCTGCGTGTAAAGATATCCAGCATCCGATGTTTCGTACAGCAGTATCTACAACCTCTTTCGAGAGTCCATAACAAGAAATGATATA</u> <u>GAACACTTCAACAAGTCTGCGTGTAAAGATATCCAGCATCCGATGTTTCGTACAGCAGTATCTACAACCTCTTTCGAGAGTCCATAACAAGAAATGATATA</u>	20882 20829
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>TTCTGTTAAAGATAGTCCCTTCACGTAAATGCTTTGAATAGGTAAATCAATCATTTTGTCTTGGGGATCCGACATTAATCCTCTCATACCTACTAATTGG</u> <u>TTCTGTTAAAGATAGTCCCTTCACGTAAATGCTTTGAATAGGTAAATCAATCATTTTGTCTTGGGGATCCGACATTAATCCTCTCATACCTACTAATTGG</u>	20982 20929
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>TGTAATTGAGATGCAATTCCTCTAGCTCCTGAAAGGACATCATGTGGACTGGATTAAAAGGATCAGTCATCCTAAAATTAGGATTCAATTTCTGTGCGCA</u> <u>TGTAATTGAGATGCAATTCCTCTAGCTCCTGAAAGGACATCATGTGGACTGGATTAAAAGGATCAGTCATCCTAAAATTAGGATTCAATTTCTGTGCGCA</u>	21082 21029
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>AATATTCACTTGTGTCATACCATATTTCAATAGATTGTCGTAATTTTCTACCGCGTGATACATTCCTAATGATGGTGTTTTTCCAAAACCAAACTTTG</u> <u>AATATTCACTTGTGTCATACCATATTTCAATAGATTGTCGTAATTTTCTACCGCGTGATACATTCCTAATGATGGTGTTTTTCCAAAACCAAACTTTG</u>	21182 21129
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>TTGTTTCAGCATCTTGGACTAGCCATCCCTTAGAAGGATTTGTTAAAGATCATCAATTCCTAATGAAATGGATGTAGCAGTGGCTTCCGGGAACCCGAGA</u> <u>TTGTTTCAGCATCTTGGACTAGCCATCCCTTAGAAGGATTTGTTAAAGATCATCAATTCCTAATGAAATGGATGTAGCAGTGGCTTCCGGGAACCCGAGA</u>	21282 21229
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>GTCTTTACTTGATCCAGGATGTGTGATGTATATGCCATTCCAAGTGATCTATTAATCGACTAATAAGTCGTTTAAATGGCAGTTCATCTATCACTTTAT</u> <u>GTCTTTACTTGATCCAGGATGTGTGATGTATATGCCATTCCAAGTGATCTATTAATCGACTAATAAGTCGTTTAAATGGCAGTTCATCTATCACTTTAT</u>	21382 21329
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>TGTGAAAGACCAGATTGGCCCGTTCTGCCATAAAATACCTCCATATTCGATGAGTGGGTTTCGACAATGGGTTTGTAGTCAATGATTGAAAACTTCCTTTT</u> <u>TGTGAAAGACCAGATTGGCCCGTTCTGCCATAAAATACCTCCATATTCGATGAGTGGGTTTCGACAATGGGTTTGTAGTCAATGATTGAAAACTTCCTTTT</u>	21482 21429
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>CTCGATCTTGATTTCGATAAAAAATTCGGGAAGTATGTTCTTAGTTGAAGTGGAGATCTCGAATTCACAACAGTTTCATAGAACTACTTAGCTTGAATAC</u> <u>CTCGATCTTGATTTCGATAAAAAATTCGGGAAGTATGTTCTTAGTTGAAGTGGAGATCTCGAATTCACAACAGTTTCATAGAACTACTTAGCTTGAATAC</u>	21582 21529
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>CATATGATTGGTATCATATGAGAATACCATATGATTAGGTACCATATGAGCAGGCCCGGCAAAACCCCTTGTATAGCTTCTTCAATTTCTCGATAAAAAAGA</u> <u>CATATGATTGGTATCATATGAGAATACCATATGATTAGGTACCATATGAGCAGGCCCGGCAAAACCCCTTGTATAGCTTCTTCAATTTCTCGATAAAAAAGA</u>	21682 21629

RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>AATATGACCAACAGTGGTTCGAACGTAGATACAAAGAATTCTTTTTTATACTTCTTGTCTATTAATAGTGTCCATAAATCTCATGATAAGTACCAAAA</u>	21782
	<u>AATATGACCAACAGTGGTTCGAACGTAGATACAAAGAATTCTTTTTTATACTTCTTGTCTATTAATAGTGTCCATAAATCTCATGATAAGTACCAAAA</u>	21729
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>GATTTCATAATGAACCTCAATGGGAGCTTCTCTTGAAGTAATAACACGGTGATCTAGTTGCCACCGGAGCCACAAGGACTATCTAAATGAATCTTTTCT</u>	21882
	<u>GATTTCATAATGAACCTCAATGGGAGCTTCTCTTGAAGTAATAACACGGTGATCTAGTTGCCACCGGAGCCACAAGGACTATCTAAATGAATCTTTTCT</u>	21829
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>GCCGATAAGCTCCAATTGCATCATAGGAATTACAAAAAAGGGTCTTTTGTATACCTTATAGTTATTGTGCGTCAATCTTTTCATTTTGATAATTTCTGTG</u>	21982
	<u>GCCGATAAGCTCCAATTGCATCATAGGAATTACAAAAAAGGGTCTTTTGTATACCTTATAGTTATTGTGCGTCAATCTTTTCATTTTGATAATTTCTGTG</u>	21929
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>ATTACACGGATTATACCTATTTCGATAAAATACCTCGGCGATTCCCACTCGTTAATACATAGAGCCCAATAAGCATATCTTGAGTAGGTACAGAAATGGGA</u>	22082
	<u>ATTACACGGATTATACCTATTTCGATAAAATACCTCGGCGATTCCCACTCGTTAATACATAGAGCCCAATAAGCATATCTTGAGTAGGTACAGAAATGGGA</u>	22029
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>TCCCCAATAGCTGGAGACAAGAGATTTCGTATGAGAAAAACATAAGTAAACGAGCCTCCGCTTGAGCCTCCAAGATAAAGGTACATGAACGGCCATTGGAT</u>	22182
	<u>TCCCCAATAGCTGGAGACAAGAGATTTCGTATGAGAAAAACATAAGTAAACGAGCCTCCGCTTGAGCCTCCAAGATAAAGGTACATGAACGGCCATTGGAT</u>	22129
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>CCCCATCAAAGTCTGCATTGAATCCCTTACAACTAATGGATGTAACAAATAGCATGTCTTCTACTAAAACGGGTTGGAAGGCGGTGTATGCCATAATCT</u>	22282
	<u>CCCCATCAAAGTCTGCATTGAATCCCTTACAACTAATGGATGTAACAAATAGCATGTCTTCTACTAAAACGGGTTGGAAGGCGGTGTATGCCATAATCT</u>	22229
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>ATGCAGAGTGGGCGCTCTATTCAACAATACAGGATGCCCTTGCACTAATCTCCTGAAGTATTTCCCAACACAAGTGGCTCTTTTCTCGAATTTTACTCTTC</u>	22382
	<u>ATGCAGAGTGGGCGCTCTATTCAACAATACAGGATGCCCTTGCACTAATCTCCTGAAGTATTTCCCAACACAAGTGGCTCTTTTCTCGAATTTTACTCTTC</u>	22329
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>GCAACTCTATATTTCGAAGCAAAATGTTGTCTAATTAACCCACGAATTACAAATGTCTGGAAAAGCTCTATTGCTATTTTCGCGAGGCAATCCACATCGAT</u>	22482
	<u>GCAACTCTATATTTCGAAGCAAAATGTTGTCTAATTAACCCACGAATTACAAATGTCTGGAAAAGCTCTATTGCTATTTTCGCGAGGCAATCCACATCGAT</u>	22429
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>GTAATGAAAGTGAGGGACCTACGACAATGACAGAACGCCCGGAATAATCAACCCGTTTGCCAAGTAGAGTCTCACGAAATCTTCCCTCTTTACCTTCAAT</u>	22582
	<u>GTAATGAAAGTGAGGGACCTACGACAATGACAGAACGCCCGGAATAATCAACCCGTTTGCCAAGTAGAGTCTCACGAAATCTTCCCTCTTTACCTTCAAT</u>	22529
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>TACATCTGAAAACGACTTGTAAACCTTATTATGACCGTCTCTCATTGGTTGTCGCGGAGTCCATTATCAAGAAGTGTATCAACGGCTCTTGTACCAAT</u>	22682
	<u>TACATCTGAAAACGACTTGTAAACCTTATTATGACCGTCTCTCATTGGTTGTCGCGGAGTCCATTATCAAGAAGTGTATCAACGGCTCTTGTACCAAT</u>	22629
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>TTCTCCTGACACATTACTAATTTCCCTGGCGTGGATCTACTTGTGTGTTAATAAATCAATAAGAGTATTGTTCCGATAGATAACTCTTCTATAGAGTTTCAT</u>	22782
	<u>TTCTCCTGACACATTACTAATTTCCCTGGCGTGGATCTACTTGTGTGTTAATAAATCAATAAGAGTATTGTTCCGATAGATAACTCTTCTATAGAGTTTCAT</u>	22729
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>TAATATCCGAAGTCTAGTTTACCCCATCTATCTGAATGATAGGCCTCAACTCGGAGGAAGAACTGGTAATACACATAAAACCATCCATTCTGGTTC</u>	22882
	<u>TAATATCCGAAGTCTAGTTTACCCCATCTATCTGAATGATAGGCCTCAACTCGGAGGAAGAACTGGTAATACACATAAAACCATCCATTCTGGTTC</u>	22829
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>TATATTTGTTTCGAATAAAATGCTTAGCTAATTCATACGCTCTAACCAAAAATCCTTTCTTCTTCCAACTTTTTCGATCTTCCCATTCATTACCCGTGGGC</u>	22982
	<u>TATATTTGTTTCGAATAAAATGCTTAGCTAATTCATACGCTCTAACCAAAAATCCTTTCTTCTTCCAACTTTTTCGATCTTCCCATTCATTACCCGTGGGC</u>	22929
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>CCTTCTTCCCCTAATTTCTTCCATTCTAACACGAATAATCGATAATAATTCGCAAAATCCAGATCGGCTAATTTGTTCTCGGATAGCACTTGCTCCAGTAG</u>	23082
	<u>CCTTCTTCCCCTAATTTCTTCCATTCTAACACGAATAATCGATAATAATTCGCAAAATCCAGATCGGCTAATTTGTTCTCGGATAGCACTTGCTCCAGTAG</u>	23029
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>AAATTTCTCGATTTCGAAATGCATCGAAGCCTTGGGTAGTAAAAAAGTGGAAATGCTGTATTTCCAGGATGTATTTTCATATTTCGAATGAACCTCGTAA</u>	23182
	<u>AAATTTCTCGATTTCGAAATGCATCGAAGCCTTGGGTAGTAAAAAAGTGGAAATGCTGTATTTCCAGGATGTATTTTCATATTTCGAATGAACCTCGTAA</u>	23129
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>TCGTAAGAAAGTAGGTTTTTTAGCTACGGGCTTAGCAAAAAGAAAAATTTGGATAGGATCCTATAGGATCTCCCCCTTTCAAATCGGACGTGAAAGTTTC</u>	23282
	<u>TCGTAAGAAAGTAGGTTTTTTAGCTACGGGCTTAGCAAAAAGAAAAATTTGGATAGGATCCTATAGGATCTCCCCCTTTCAAATCGGACGTGAAAGTTTC</u>	23229
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>CTTTCATCCGCTCAAGTAGTTACACCAATAAAGATAAAAAAAGAGGGGTTTACCTTCAAATTCATAAAAAAACCACAAAAAGATATATCT</u>	23382
	<u>CTTTCATCCGCTCAAGTAGTTACACCAATAAAGATAAAAAAAGAGGGGTTTACCTTCAAATTCATAAAAAAACCACAAAAAGATATATCT</u>	23329
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>CTTACTCAAGTTCCCAAAGAGATCAAGCAACATTTTCATTGATTCACTCTTTTTTTTTT ATTTTATTATTTTTTAGTAGATATTTTATATTATTAGTA</u>	23482
	<u>CTTACTCAAGTTCCCAAAGAGATCAAGCAACATTTTCATTGATTCACTCTTTTTTTTTT ATTTTATTATTTTTTAGTAGATATTTTATATTATTAGTA</u>	23428
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>GTAGTATTCGATTTTTTGGAAATCTTTATTCAATCTTAAATACGACATAAAATAAATGAAATGCTGAAATCTTGAGTAGTCTACTTCCCTTCGAATGATT</u>	23582
	<u>GTAGTATTCGATTTTTTGGAAATCTTTATTCAATCTTAAATACGACATAAAATAAATGAAATGCTGAAATCTTGAGTAGTCTACTTCCCTTCGAATGATT</u>	23528
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>AAGCCCTTAAATTAAGGTATAAGTAAAGTGCTTTTGAATTCATAAGGGATTATTTGTCTATGTATCGTTCTATTCAATCTTTTAGGTCCTTATTTTG</u>	23682
	<u>AAGCCCTTAAATTAAGGTATAAGTAAAGTGCTTTTGAATTCATAAGGGATTATTTGTCTATGTATCGTTCTATTCAATCTTTTAGGTCCTTATTTTG</u>	23628
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>CCTCGACGGTTATGTCAGATGTTCTTAAAGCCTATATGCGATGCATAAACTCCTGTAACCATGACATATTTTTGCTTATTTTATTGTACATAAAACAT</u>	23782
	<u>CCTCGACGGTTATGTCAGATGTTCTTAAAGCCTATATGCGATGCATAAACTCCTGTAACCATGACATATTTTTGCTTATTTTATTGTACATAAAACAT</u>	23728
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>AAATTTCTTTCTTCTTAAACGAAAGGGAGTAGTTAATTCACAAAAGAAATAAAGTTTTTTTT CACGAGGTACAACATAAACCTATTATTGTGTACT</u>	23882
	<u>AAATTTCTTTCTTCTTAAACGAAAGGGAGTAGTTAATTCACAAAAGAAATAAAGTTTTTTTT CACGAGGTACAACATAAACCTATTATTGTGTACT</u>	23827
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>GAATCGACCATAGACCAATTTCCCTTTTTTATTGGGAGTATTGAACACACCCATAATCTGAGCTTCATGTTACTCTTACCAAGAGACATGTCAGATCCA</u>	23982
	<u>GAATCGACCATAGACCAATTTCCCTTTTTTATTGGGAGTATTGAACACACCCATAATCTGAGCTTCATGTTACTCTTACCAAGAGACATGTCAGATCCA</u>	23927
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>GGGCATCCTAATTCGATTGAATGGGATGACAGTTTCTCATTCTGAATTTGTAATATCATAATTTTATCAAATACACATCGCAATATACTAGGCCCTTCT</u>	24082
	<u>GGGCATCCTAATTCGATTGAATGGGATGACAGTTTCTCATTCTGAATTTGTAATATCATAATTTTATCAAATACACATCGCAATATACTAGGCCCTTCT</u>	24027
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>AAATCTTTAAGAGGCTTATCTAAAAGATTTCGCGATATAACTAGGAAGACGTTTCAAATACCAACATGAGTTACTGGGCATGCCAGTTTGTATGAGCCCA</u>	24182
	<u>AAATCTTTAAGAGGCTTATCTAAAAGATTTCGCGATATAACTAGGAAGACGTTTCAAATACCAACATGAGTTACTGGGCATGCCAGTTTGTATGAGCCCA</u>	24127
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>TTTGATATCTTCGTATCTGAGAATCAACAAATTCGACTCCGATTGTTTCACAAAATTGAGGGTCTTCTTTTCATTTCCTATTACTCGATAATTTCCACA</u>	24282
	<u>TTTGATATCTTCGTATCTGAGAATCAACAAATTCGACTCCGATTGTTTCACAAAATTGAGGGTCTTCTTTTCATTTCCTATTACTCGATAATTTCCACA</u>	24227
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>AGCACAAATCCCACTTTTTATAGGTCCAAAAATTTTTTACAAAAATATCCATCTTTTTTCAGGTTTATTGGTCTTGAATGAAAAGTGAAGGTTTTTGTG</u>	24382
	<u>AGCACAAATCCCACTTTTTATAGGTCCAAAAATTTTTTACAAAAATATCCATCTTTTTTCAGGTTTATTGGTCTTGAATGAAAAGTGAAGGTTTTTGTG</u>	24327
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>ACCTCTCCAATTATTCTCCATTAGGTAGGATTTTTTTTGCCCAAGCACTTATTGTTGAGGAGAACTGATCCAATTGGAAGTTGTTGATGTTTATACC</u>	24482
	<u>ACCTCTCCAATTATTCTCCATTAGGTAGGATTTTTTTTGCCCAAGCACTTATTGTTGAGGAGAACTGATCCAATTGGAAGTTGTTGATGTTTATACC</u>	24427
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>GATCGATCATAGAAGAAAAATCTGATTCAATTCGATTAAAGCATCTTCTTATTAATCTGGAATTTCTTCTCAGATACAAGGAAATGATTCAATTCAGA</u>	24582
	<u>GATCGATCATAGAAGAAAAATCTGATTCAATTCGATTAAAGCATCTTCTTATTAATCTGGAATTTCTTCTCAGATACAAGGAAATGATTCAATTCAGA</u>	24527
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>GCCAAGGATCGTAGTTCTCGAACGAGCAATCGAAAAGATTCTGGAGCATCCTCAGGTTTAGGTATTATTCCTCCAATGATCGTAGTACCAAGTACTTCTT</u>	24682
	<u>GCCAAGGATCGTAGTTCTCGAACGAGCAATCGAAAAGATTCTGGAGCATCCTCAGGTTTAGGTATTATTCCTCCAATGATCGTAGTACCAAGTACTTCTT</u>	24627
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>GGCGAGCTCTAATATGATCCGATTATAAGTAAGCATTTCTTGTAATAATATGAGCAACACCAAAATCCCTCGAGGGCCCAAACTTCCATTCTCTTACC</u>	24782
	<u>GGCGAGCTCTAATATGATCCGATTATAAGTAAGCATTTCTTGTAATAATATGAGCAACACCAAAATCCCTCGAGGGCCCAAACTTCCATTCTCTTACC</u>	24727

RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>TTGTCCCCCTTGCTTGGCCCTTCCTCTAAGGGGTGTTGTGTAAACAAGTGCATAATGCCACTGCAACGTCCATGTATTTTATCATCAACTTGATGAATT</u>	24882
	<u>TTGTCCCCCTTGCTTGGCCCTTCCTCTAAGGGGTGTTGTGTAAACAAGTGCATAATGCCACTGCAACGTCCATGTATTTTATCATCAACTTGATGAATT</u>	24827
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>AATTTCAAGATATAAGGCTTTCCTATTATAACAGGTGTTTCAAAAGGATCTCCCGTCTTCCATCAAATATTCTGCTTTTTCCCGGATACTCGGGTTCAA</u>	24982
	<u>AATTTCAAGATATAAGGCTTTCCTATTATAACAGGTGTTTCAAAAGGATCTCCCGTCTTCCATCAAATATTCTGCTTTTTCCCGGATACTCGGGTTCAA</u>	24927
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>ATACCCATGGATTGCTGTTTGTCTTACTGGCTTCATATAAATCAGAAAAGACTAGTTTTCTCGAAGCCTCTTGTTTCATATCTCTCATCAAAAAGTGCTAT</u>	25082
	<u>ATACCCATGGATTGCTGTTTGTCTTACTGGCTTCATATAAATCAGAAAAGACTAGTTTTCTCGAAGCCTCTTGTTTCATATCTCTCATCAAAAAGTGCTAT</u>	25027
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>TCGATAATGTCTATCTAACAACGCTCCCGCTAACCCAGCGAGCATTCAAATATCTGTCTACATTCAATTCGTGAAGGGACTCCCTAATGGGTTGAAGACC</u>	25182
	<u>TCGATAATGTCTATCTAACAACGCTCCCGCTAACCCAGCGAGCATTCAAATATCTGTCTACATTCAATTCGTGAAGGGACTCCCTAATGGGTTGAAGACC</u>	25127
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>ATATCAACAGGTCTTCCATCTTGCAAAATAGGCATATCTTGCTAGGTAAATTTTGGAAACGATACCCCTTATTTCCATGTCTTCCAGCTACCTTATCAC</u>	25282
	<u>ATATCAACAGGTCTTCCATCTTGCAAAATAGGCATATCTTGCTAGGTAAATTTTGGAAACGATACCCCTTATTTCCATGTCTTCCAGCTACCTTATCAC</u>	25227
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>CTACTTTGATTTCACGTTTTTGTGAAATATATACAGGAATCATTCTGAGTTATAACTAGAGCCTCCCTTTTTCTGGATCCATCTCACATCAATAACTCG</u>	25382
	<u>CTACTTTGATTTCACGTTTTTGTGAAATATATACAGGAATCATTCTGAGTTATAACTAGAGCCTCCCTTTTTCTGGATCCATCTCACATCAATAACTCG</u>	25327
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>ACCTCTACCACCTATAGGTAGTTTTAAACAAGTTTCCTTTGAAGTGGATACCTGAATGCCGAGTATGGCTCGTAATAATCTATCTTCCGGAGCATACGAT</u>	25482
	<u>ACCTCTACCACCTATAGGTAGTTTTAAACAAGTTTCCTTTGAAGTGGATACCTGAATGCCGAGTATGGCTCGTAATAATCTATCTTCCGGAGCATACGAT</u>	25427
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>GATTCCTTTCGCCATCTGAGGAGTTAATTTACCTACTAAAATATCGCCCGTTTCCACCCAAGATCCCAACATCACAATTCATTTTTGTCTAAATTCGCGGA</u>	25582
	<u>GATTCCTTTCGCCATCTGAGGAGTTAATTTACCTACTAAAATATCGCCCGTTTCCACCCAAGATCCCAACATCACAATTCATTTTTGTCTAAATTCGCGGA</u>	25527
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>GTAAATGGGCTTCTAAATGCGGTATTTTCATTAGTAATCTTTTCAGGACCGTGACTTGTGCATGAGTCTGAATTTTCATATTTCCGATGTGAAAAGAAGT</u>	25682
	<u>GTAAATGGGCTTCTAAATGCGGTATTTTCATTAGTAATCTTTTCAGGACCGTGACTTGTGCATGAGTCTGAATTTTCATATTTCCGATGTGAAAAGAAGT</u>	25627
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>ATAAATATCCCTATATACCAGACGCTCGTTAATGAGTACCGCATCCTCAAATTTGTAACCTTCCCATGGCATATAAGCCACTAATACGTTTTTTCCCAAA</u>	25782
	<u>ATAAATATCCCTATATACCAGACGCTCGTTAATGAGTACCGCATCCTCAAATTTGTAACCTTCCCATGGCATATAAGCCACTAATACGTTTTTTCCCAAA</u>	25727
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>GCAAGTTCGCCACCACTGTAGCAGCACCATCCGCTAAAATTTGTCCTTTTTTAATACATTTACCTCGTGAACCTTGGGGTTTTGTATGCATACAAGTAT</u>	25882
	<u>GCAAGTTCGCCACCACTGTAGCAGCACCATCCGCTAAAATTTGTCCTTTTTTAATACATTTACCTCGTGAACCTTGGGGTTTTGTATGCATACAAGTAT</u>	25827
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>TTTTGTTGGAACGCTGATATATAACTAATGGAATGCTTAGAGTATGCCCATTACCCGATAAAATGATCTTGTGAGTATCGGTAGAAATGATCTTTCCCTTC</u>	25982
	<u>TTTTGTTGGAACGCTGATATATAACTAATGGAATGCTTAGAGTATGCCCATTACCCGATAAAATGATCTTGTGAGTATCGGTAGAAATGATCTTTCCCTTC</u>	25927
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>ATGTTTCGGCTATAGCAGGAACCCCGGAATCTAGGGCTGCTTGGCATTCCAATCCAGTTCCAACAATGCACATTTTCGGACCGGAGAAAGCGGAAGTCTGTA</u>	26082
	<u>ATGTTTCGGCTATAGCAGGAACCCCGGAATCTAGGGCTGCTTGGCATTCCAATCCAGTTCCAACAATGCACATTTTCGGACCGGAGAAAGCGGAAGTCTGTA</u>	26027
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>CGTTGCATATTAGAACTCATTAAGGCCGATTTCGCATCATTTATGCTCGATAAAAGGAATGAGGGGAAGCTCCAATAGAAAAATATTGGAAGGGAAAAATAT</u>	26182
	<u>CGTTGCATATTAGAACTCATTAAGGCCGATTTCGCATCATTTATGCTCGATAAAAGGAATGAGGGGAAGCTCCAATAGAAAAATATTGGAAGGGAAAAATAT</u>	26127
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>TTCCGAAGATGCACCTGTTCCCATTCATAGTCAGGAATCTTGACGGTATCGAGCCGGAACAACTTGTCTTCTCTGACTACCTCGATTACGCGCCAAAGA</u>	26282
	<u>TTCCGAAGATGCACCTGTTCCCATTCATAGTCAGGAATCTTGACGGTATCGAGCCGGAACAACTTGTCTTCTCTGACTACCTCGATTACGCGCCAAAGA</u>	26227
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>ATTTCCCGCCGCTACCATATAGTATTCTACTTCTGTTGATAAATAAGGATACGTACTTTTTTTGATCTTTCAGAGATTTTCATAAAATGGGCTCTCT</u>	26382
	<u>ATTTCCCGCCGCTACCATATAGTATTCTACTTCTGTTGATAAATAAGGATACGTACTTTTTTTGATCTTTCAGAGATTTTCATAAAATGGGCTCTCT</u>	26327
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>AGAGACCCCAATGACCAATCCTTGATGAATTGCTAAGGATCCAATAAGTCCAACATTGATTCCTTCGGACGTGCAATGGGGCAAATGCGTCCATAGT</u>	26482
	<u>AGAGACCCCAATGACCAATCCTTGATGAATTGCTAAGGATCCAATAAGTCCAACATTGATTCCTTCGGACGTGCAATGGGGCAAATGCGTCCATAGT</u>	26427
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>GACTAGGATGGATATCTCGTATACGAAAACTAGCAGTTTCGCCCTGTCAATCCTCCAGGGCCAGATAACTCGATTTTCTCCCATGAACATTGTTGTCAA</u>	26582
	<u>GACTAGGATGGATATCTCGTATACGAAAACTAGCAGTTTCGCCCTGTCAATCCTCCAGGGCCAGATAACTCGATTTTCTCCCATGAACATTGTTGTCAA</u>	26527
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>TGGATTAGTTCGATCCAAAACCTTGATGAATGGGTGTAATCCGAAAAAAGATTCAATAGTAGTGTGTTAATGATGTTGAAGTTACCAAAATCTGAGGAGTT</u>	26682
	<u>TGGATTAGTTCGATCCAAAACCTTGATGAATGGGTGTAATCCGAAAAAAGATTCAATAGTAGTGTGTTAATGATGTTGAAGTTACCAAAATCTGAGGAGTT</u>	26627
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>GGTATCAATTTATGCCTAATTTGCTCCACATATAGTTCCCTCTAACCATATTTTCTAAACGAACATAGGGCCAATCCGAATTGATCTTGTGAAGAGATCCGATA</u>	26782
	<u>GGTATCAATTTATGCCTAATTTGCTCCACATATAGTTCCCTCTAACCATATTTTCTAAACGAACATAGGGCCAATCCGAATTGATCTTGTGAAGAGATCCGATA</u>	26727
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>CAGAACGAATCCGTTTATTTTTCAAATGATTATATCATCAAGTGTCCCATTTCCAAATTTTCATTCCAATCAAATGATCCGCTGCTGCCAATATATCTCG</u>	26882
	<u>CAGAACGAATCCGTTTATTTTTCAAATGATTATATCATCAAGTGTCCCATTTCCAAATTTTCATTCCAATCAAATGATCCGCTGCTGCCAATATATCTCG</u>	26827
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>TGGTAACAAAAATGATTGTTCTGAGGTATATCAAGATTTCAGTCTACGGTTTCATTTTCGCCGACCAATCCTTCCTAATTCACATCTTTGTTGAAAGAAT</u>	26982
	<u>TGGTAACAAAAATGATTGTTCTGAGGTATATCAAGATTTCAGTCTACGGTTTCATTTTCGCCGACCAATCCTTCCTAATTCACATCTTTGTTGAAAGAAT</u>	26927
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>TTCTTTTGTAAATCCTTACATAAGGATTACAGAAATCTGGATCTCCGCCCTACACAAGCAAATTTGTTGATAAACTCCAAAATAGCATTTTCTTTTGACT</u>	27082
	<u>TTCTTTTGTAAATCCTTACATAAGGATTACAGAAATCTGGATCTCCGCCCTACACAAGCAAATTTGTTGATAAACTCCAAAATAGCATTTTCTTTTGACT</u>	27027
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>TAATTTTCTTTTCTCCTTATCATTCAGAAAAGACAAGAAAATTTTCAGGGTAACAAACATTCTCTAGAATTTCTCTTAGATTTCGAACCCATAGCTGATGA</u>	27182
	<u>TAATTTTCTTTTCTCCTTATCATTCAGAAAAGACAAGAAAATTTTCAGGGTAACAAACATTCTCTAGAATTTCTCTTAGATTTCGAACCCATAGCTGATGA</u>	27127
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>TAGAAGTGAAGATAGATATTTCTGTTTCTCTACTCACACGAGCCCATATCCTTGCTTTTCTATCAATCTCTAATTTCTAATCTTCTCCCCCAATCTGATATT</u>	27282
	<u>TAGAAGTGAAGATAGATATTTCTGTTTCTCTACTCACACGAGCCCATATCCTTGCTTTTCTATCAATCTCTAATTTCTAATCTTCTCCCCCAATCTGATATT</u>	27227
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>ATGGTGCCCGTATAAAACGAGATTCCATTATGGTCCAATTTCTGACCGGTAAATAGATACCCGGGCTTGTGAATATTGATTGATCACAATTTCTGTATATTC</u>	27382
	<u>ATGGTGCCCGTATAAAACGAGATTCCATTATGGTCCAATTTCTGACCGGTAAATAGATACCCGGGCTTGTGAATATTGATTGATCACAATTTCTGTATATTC</u>	27327
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>CATTTACTATAGAAGTTCCCGAGGAATTCATTAGAGGAATGTTTCCAATAAAAATTTGTTTGTCTTGCATATCCCTACCGGTTTTTCCAATAATATCTCTCG</u>	27482
	<u>CATTTACTATAGAAGTTCCCGAGGAATTCATTAGAGGAATGTTTCCAATAAAAATTTGTTTGTCTTGCATATCCCTACCGGTTTTTCCAATAATATCTCTCG</u>	27427
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>GGATACATATAAATTCAGACGAATATGTGAGTGATTTCATATACAGCATCTTCTCTTTTAGCAACGGTTCTACCAATTGATATGTTTCCACAAAAATTTGA</u>	27582
	<u>GGATACATATAAATTCAGACGAATATGTGAGTGATTTCATATACAGCATCTTCTCTTTTAGCAACGGTTCTACCAATTGATATGTTTCCACAAAAATTTGA</u>	27527
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>AATTCAAATTTCTTGATCTGTATCTGCAATTTTGGAAACTTATAAAGCTCTTCTGTTAAGCCCTGATCAATGAACCTACAAAATCCTTCAAATTTGTATCT</u>	27682
	<u>AATTCAAATTTCTTGATCTGTATCTGCAATTTTGGAAACTTATAAAGCTCTTCTGTTAAGCCCTGATCAATGAACCTACAAAATCCTTCAAATTTGTATCT</u>	27627
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>GATTAAATCCAGGTATTGTAGACATTTCTCATTTCCACCCCAAGCATTTTTTTTTTCCCGTTTATAGATATAGAAAAAATCCCATTTATTTGCGCATTT</u>	27782
	<u>GATTAAATCCAGGTATTGTAGACATTTCTCATTTCCACCCCAAGCATTTTTTTTTTCCCGTTTATAGATATAGAAAAAATCCCATTTATTTGCGCATTT</u>	27727
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>CTTCATCAAAATCATATGTATCGATATAGCAGTGATGGAATTTATATTTCTGTTTACTGAATCGCATGAAATTTTAACTAACTCCATTTTAACTAACTCCAT</u>	27882
	<u>CTTCATCAAAATCATATGTATCGATATAGCAGTGATGGAATTTATATTTCTGTTTACTGAATCGCATGAAATTTTAACTAACTCCATTTTAACTAACTCCAT</u>	27827

RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>AGAACTCTATGGAATGTATGAAATACGTATGAACGGAGGAATAAGAGAAATTTATACTGAAATTTGGAATTTGCAACAAATACAAACGGAAAGGAATTGAT</u>	27982
	<u>AGAATCTATGGAATGTATGAAATACGTATGAACGGAGGAATAAGAGAAATTTATACTGAAATTTGGAATTTGCAACAAATACAAACGGAAAGGAATTGAT</u>	27927
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>AAATTCCTTTTAGACTTATGGAGTTTGTATAGAATATCCAACAAAAAGTGATTCACCCAAAGTGATTCAATTTCTACCATTTATTATGATATTCGGTAT</u>	28082
	<u>AAATTCCTTTTAGACTTATGGAGTTTGTATAGAATATCCAACAAAAAGTGATTCACCCAAAGTGATTCAATTTCTACCATTTATTATGATATTCGGTAT</u>	28027
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>TCCAATCTAATTTGGATACCAATAAATGTGTTCAAGATTTGATTTATTCATGAATAATGAGATAAAGACATAAATATCAGAAACAATATAGAATTTCCCTT</u>	28182
	<u>TCCAATCTAATTTGGATACCAATAAATGTGTTCAAGATTTGATTTATTCATGAATAATGAGATAAAGACATAAATATCAGAAACAATATAGAATTTCCCTT</u>	28127
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>TTTTTTAGCACTTAACTTTTCTTTTCGTGGATTCAATTTGTTCAAAAAAGAAATTCGCAGAGAAGAGAAACATTGTTTACCTATTGTTTTTTAGTCGAATT</u>	28282
	<u>TTTTTTAGCACTTAACTTTTCTTTTCGTGGATTCAATTTGTTCAAAAAAGAAATTCGCAGAGAAGAGAAACATTGTTTACCTATTGTTTTTTAGTCGAATT</u>	28227
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>CATAGAAATATGATTGAAATCTATAAAAGGCTGATATTTATTAATATTAATAATGCGCAGATATAACTCTAGCTATCTATAGTTACACCCCTTTT---</u>	28379
	<u>CATAGAAATATGATTGAAATCTATAAAAGGCTGATATTTATTAATATTAATAATGCGCAGATATAACTCTAGCTATCTATAGTTACACCCCTTTT---</u>	28327
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>ATTATTTTTTATTATATTACAGCTTTATTCGGGATAGCACCAGTCGTGCTCGATCAAAATTTCTATTTTATA</u>	28479
	<u>ATTATTTTTTATTATATTACAGCTTTATTCGGGATAGCACCAGTCGTGCTCGATCAAAATTTCTATTTTATA</u> ----- <u>TATTCAAATTTATGCAATGA</u>	28418
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>AAAATGTAAAAATTGAAGCAGGAGAATTTCTGAAATGACTTCTAGACACATATGACAATTACTTTATAGACACATATACAGATAACAGATAAGATACC</u>	28579
	<u>AAAATGTAAAAATTGAAGCAGGAGAATTTCTGAAATGACTTCTAGACACATATGACAATTACTTTATAGACACATATACAGATAACAGATAAGATACC</u>	28518
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>TTATTAGATAATATTGTATAACGTAACAAATTTATCTTACAATTTCTGTTTATGGGGTTTACATATACTCATAATTGCTGTTATAATTGAAATTGAAAAGA</u>	28679
	<u>TTATTAGATAATATTGTATAACGTAACAAATTTATCTTACAATTTCTGTTTATGGGGTTTACATATACTCATAATTGCTGTTATAATTGAAATTGAAAAGA</u>	28618
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>ATTTTTTTTTT---AAAAAAAATAAGACGGATTAGTTAGGTATAAATTTTGATTTCCTTATATCATTAGGGAAAGGGAATTTTATATATTTTATATT</u>	28776
	<u>ATTTTTTTTTTGA</u> AAAAAAAATAAGACGGATTAGTTAGGTATAAATTTTGATTTCCTTATATCATTAGGGAAAGGGAATTTTATATATTTTATATT	28718
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>CAAAATAAAGTTAAAGAATTGTCTCTGAATTCACAATCAATAGTTAATGGTTCAAATTTGTCTGAATTTTGTCTTTGTGACTGAAATGGAATATCCA</u>	28876
	<u>CAAAATAAAGTTAAAGAATTGTCTCTGAATTCACAATCAATAGTTAATGGTTCAAATTTGTCTGAATTTTGTCTTTGTGACTGAAATGGAATATCCA</u>	28818
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>TTTTTGGTTTTTCAATAGAAAGGGGAAAGAAGTTTTTATAGATTGTGTGTTTTAAGACTATACAAATCAATCGAAGGGATGGATCTAATTCAAACAAA</u>	28976
	<u>TTTTTGGTTTTTCAATAGAAAGGGGAAAGAAGTTTTTATAGATTGTGTGTTTTAAGACTATACAAATCAATCGAAGGGATGGATCTAATTCAAACAAA</u>	28918
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>AAAGGAAGGATTTCTTTTAGGAAAGGGATTAAAGAAAACGGAATTAAGAAAAAATAAGGAATTTTTTTTGATATATTTTGTATCATTTTGGCGGCAT</u>	29076
	<u>AAAGGAAGGATTTCTTTTAGGAAAGGGATTAAAGAAAACGGAATTAAGAAAAAATAAGGAATTTTTTTTGATATATTTTGTATCATTTTGGCGGCAT</u>	29018
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>GGCCGAGCGGTAAAGCGGGGACTGCAAAATCCTTTTCCCGAGTTCAAATCCGGGTGTCGCCTGATCAACAAAAGAATAAAAAAATTTATTCTGTTTTG</u>	29176
	<u>GGCCGAGCGGTAAAGCGGGGACTGCAAAATCCTTTTCCCGAGTTCAAATCCGGGTGTCGCCTGATCAACAAAAGAATAAAAAAATTTATTCTGTTTTG</u>	29118
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>CTGATATAACTTGCATTTTTCAGCAGAGCAACCGGAGGAAAAGAACTCTTGATCTGCTCGATTCTAAGGATCTGGGTAGGGGGTTCTGTCTCT</u>	29276
	<u>CTGATATAACTTGCATTTTTCAGCAGAGCAACCGGAGGAAAAGAACTCTTGATCTGCTCGATTCTAAGGATCTGGGTAGGGGGTTCTGTCTCT</u>	29218
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>CTAAATGCCGTAATACTTATGCTAAGGTTTAAAGAAAAATATAGTAGTGAAAAAGAACTGGTAAATCTTGATATTATAGCCCTTCCATTACTAATT</u>	29376
	<u>CTAAATGCCGTAATACTTATGCTAAGGTTTAAAGAAAAATATAGTAGTGAAAAAGAACTGGTAAATCTTGATATTATAGCCCTTCCATTACTAATT</u>	29318
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>CCATTACTAATGGAGTGTCTACTGACCGGGTCTTGAATTAGATTGGATAGTCAGACGGAGAATCTAATTCATTTTAAATTTGCGAAAGATAGAAAGATT</u>	29476
	<u>CCATTACTAATGGAGTGTCTACTGACCGGGTCTTGAATTAGATTGGATAGTCAGACGGAGAATCTAATTCATTTTAAATTTGCGAAAGATAGAAAGATT</u>	29418
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>GGAAGATATTTGTATACATATTCATAAAATCTCTGAGTCCTTAGCATTAATTCATTAATTAATTAATTAATTAATAGCTTGAATGGATAATTTTC</u>	29576
	<u>GGAAGATATTTGTATACATATTCATAAAATCTCTGAGTCCTTAGCATTAATTCATTAATTAATTAATTAATTAATAGCTTGAATGGATAATTTTC</u>	29518
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>TTTTCTTTTTTCTTAAATATTATATATATATTAATATTCATTTTATATTAATTTTATATATTATATATATATTTATATTCTATTT</u>	29676
	<u>TTTTCTTTTTTCTTAAATATTATATATATATTAATATTCATTTTATATTAATTTTATATATTATATATATATTTATATTCTATTT</u>	29618
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>TACTTAATGAAATGAAAGACAACAAAAGAAAGAATAAGCTTATTATTCCTATATGTTATTAAACATTCCTTTGATATTTCAAAGGACGCTCTCTGTGATT</u>	29776
	<u>TACTTAATGAAATGAAAGACAACAAAAGAAAGAATAAGCTTATTATTCCTATATGTTATTAAACATTCCTTTGATATTTCAAAGGACGCTCTCTGTGATT</u>	29718
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>TTGCTTGTGCTTAATGTTTTTCGATTAGATTGCAATCTTATACTTAGAAGAACTTGTCTAATTTGGATTATTGGATTGTTTCATCAACGATGTTGGAT</u>	29876
	<u>TTGCTTGTGCTTAATGTTTTTCGATTAGATTGCAATCTTATACTTAGAAGAACTTGTCTAATTTGGATTATTGGATTGTTTCATCAACGATGTTGGAT</u>	29818
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>CAGAATTCCTTTTGACTCTGCGCTAGGGATTCTACTATTATTAGTGAGCACTAATGAATAATTCCTTCATAGAGATCGAGGACATAATTTACATGGAT</u>	29976
	<u>CAGAATTCCTTTTGACTCTGCGCTAGGGATTCTACTATTATTAGTGAGCACTAATGAATAATTCCTTCATAGAGATCGAGGACATAATTTACATGGAT</u>	29918
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>ATAGTAAGCTTGTCTTGGGCTGCTTTAATGGTAGTCTTTACCTTTTCTCTTCACTCGTAGTAGTGGGGAAGAAGTGGACTTTAGAAGTCCTACTAATTC</u>	30076
	<u>ATAGTAAGCTTGTCTTGGGCTGCTTTAATGGTAGTCTTTACCTTTTCTCTTCACTCGTAGTAGTGGGGAAGAAGTGGACTTTAGAAGTCCTACTAATTC</u>	30018
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>AATTGAGTTTAGGAATTTTGGAAATCAACCGGTATCCATTTTTATAGATCGTTCTGCAAGGCCTTTTTTTTTTTATTATTAACTATCCATTTTCAAA</u>	30176
	<u>AATTGAGTTTAGGAATTTTGGAAATCAACCGGTATCCATTTTTATAGATCGTTCTGCAAGGCCTTTTTTTTTTTATTATTAACTATCCATTTTCAAA</u>	30117
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>TTGAAATCCAAAATTTCTTTATTTCGAAATCTATTGGAGTAATGATTCTATGAATAATAGAGGAACCTTTCAATCAACAAATATTTCATTTCTTTT</u>	30276
	<u>TTGAAATCCAAAATTTCTTTATTTCGAAATCTATTGGAGTAATGATTCTATGAATAATAGAGGAACCTTTCAATCAACAAATATTTCATTTCTTTT</u>	30217
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>CATGTCGTATTACGAAATACGAAAGTAAAAGGAATACAAATGGTAGGGAGTTTATTCCAATAAAATGATTCAAAATTTTCTATTTTGACGAACCGACT</u>	30376
	<u>CATGTCGTATTACGAAATACGAAAGTAAAAGGAATACAAATGGTAGGGAGTTTATTCCAATAAAATGATTCAAAATTTTCTATTTTGACGAACCGACT</u>	30317
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>CTTACCGCGGAACCTTTTTTACTTTTCTTCGCTCTTACTGTTCAAAGAGAAAAGAAAAATTTGTTATTCTATTACTAGATACACATTTTTATGGAA</u>	30476
	<u>CTTACCGCGGAACCTTTTTTACTTTTCTTCGCTCTTACTGTTCAAAGAGAAAAGAAAAATTTGTTATTCTATTACTAGATACACATTTTTATGGAA</u>	30417
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>AACAACATAGTAGTTGTCCAATGAGATACTACACATAATAACATAATAAATATTAGCTTGGGCGAGTCGTATATTGCGTACTTACCCCTTAGTTTGATT</u>	30576
	<u>AACAACATAGTAGTTGTCCAATGAGATACTACACATAATAACATAATAAATATTAGCTTGGGCGAGTCGTATATTGCGTACTTACCCCTTAGTTTGATT</u>	30517
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>ATTTCTTTTTTTTTTATAACTTTTATTATGCTGTGCTTTTTTTCATATCATGGTACACAAACGTTTAAAAATGGGTGAGTTTCTCTAATCTCTTTTCA</u>	30676
	<u>ATTTCTTTTTTTTTTATAACTTTTATTATGCTGTGCTTTTTTTCATATCATGGTACACAAACGTTTAAAAATGGGTGAGTTTCTCTAATCTCTTTTCA</u>	30617
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>AATCCGAAGAAGTTCACATGAATCCCTGGATTCTCTGTTAACTGCTCAATCAATTACTTCTTCGTGCGAATGCTAACAAAAGATTACTTGATTTTCTT</u>	30776
	<u>AATCCGAAGAAGTTCACATGAATCCCTGGATTCTCTGTTAACTGCTCAATCAATTACTTCTTCGTGCGAATGCTAACAAAAGATTACTTGATTTTCTT</u>	30717
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>TATATTATACCCATACCCCTTTTTCTCTCATTGATTGATTTCATTGATTGATTCTTTCTTTCAATGGATATCGGAATTCCTATTAAAAAGAAATCTGAA</u>	30876
	<u>TATATTATACCCATACCCCTTTTTCTCTCATTGATTGATTTCATTGATTGATTCTTTCTTTCAATGGATATCGGAATTCCTATTAAAAAGAAATCTGAA</u>	30817
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>ATCTAGGAATTAGAATCGTAAGAGTTGTCTTTTCGATTATTTCAGATTAAATGGAATCAACACAAATTAATAGAAAATAAGAAATAGATGAAGCAAAA</u>	30976
	<u>ATCTAGGAATTAGAATCGTAAGAGTTGTCTTTTCGATTATTTCAGATTAAATGGAATCAACACAAATTAATAGAAAATAAGAAATAGATGAAGCAAAA</u>	30917

RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>AAATCAAATGGAACACACACTATGTACATTATATACATAAATGTATATCTATATATGAAATATGAAGATAAAAAATGTCATTGATATATATTAATTA</u>	31076
	<u>AAATCAAATGGAACACACACTATGTACATTATATACATAAATGTATATCTATATATGAAATATGAAGATAAAAAATGTCATTGATATATATTAATTA</u>	31017
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>ACCTGTATTTTCATACAGTAAACTTTATACAGTACAAGAAGAAATATTCAATAGTAGTGGTAGAAATTTTTTCTACCATACTATCGAGTATTTTCATAGAAT</u>	31176
	<u>ACCTGTATTTTCATACAGTAAACTTTATACAGTACAAGAAGAAATATTCAATAGTAGTGGTAGAAATTTTTTCTACCATACTATCGAGTATTTTCATAGAAT</u>	31117
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>ACTGCTCTCATATAATACTGTTGATTCTAGTTCGCTTATTTTCATCGAAATTTGGAATCCCTTTTCGTTTTTTCTCTCTCTCAATCAATCATTGATAAGAAC</u>	31276
	<u>ACTGCTCTCATATAATACTGTTGATTCTAGTTCGCTTATTTTCATCGAAATTTGGAATCCCTTTTCGTTTTTTCTCTCTCTCAATCAATCATTGATAAGAAC</u>	31217
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>TAAAAAATCAAGTTTAAAGTCAAATTAATCACTTTGACTTACGGTTTTTACGTATATTATAAGTAAAAAGCAGTAGGAATTAATGAACAGTGCAGTAG</u>	31376
	<u>TAAAAAATCAAGTTTAAAGTCAAATTAATCACTTTGACTTACGGTTTTTACGTATATTATAAGTAAAAAGCAGTAGGAATTAATGAACAGTGCAGTAG</u>	31317
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>CAATAAATGCGAGAATATTACTTCCATAATTTTCATCGTTTCATTTTTCTTTAATTCGCAATAACTCGGGATTTAATCCCATAGAGATGATAAATCTTTT</u>	31476
	<u>CAATAAATGCGAGAATATTACTTCCATAATTTTCATCGTTTCATTTTTCTTTAATTCGCAATAACTCGGGATTTAATCCCATAGAGATGATAAATCTTTT</u>	31417
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>GTCTGTAAATTCATGGGATGAATTCATTTCGATGGAATCGGATCAATATCATGAATAACAATATCGGAACATCAAAATCGATTTCATCGTCAATAATTG</u>	31576
	<u>GTCTGTAAATTCATGGGATGAATTCATTTCGATGGAATCGGATCAATATCATGAATAACAATATCGGAACATCAAAATCGATTTCATCGTCAATAATTG</u>	31517
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>AATAGTATACCATAGGAAGATCTTTATCCATACCGAATTCAAAAATTCAAAAGTGGATTCTTATCCAAATCAAAAATCTTTGACTCTATTTTTATTTA</u>	31676
	<u>AATAGTATACCATAGGAAGATCTTTATCCATACCGAATTCAAAAATTCAAAAGTGGATTCTTATCCAAATCAAAAATCTTTGACTCTATTTTTATTTA</u>	31617
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>TATTTTCTTTTTTTCACCTCTTTATTTTCTAAAAATCTATTGCCTTCCTTGTACAATCATCTGATGAAGTATCATTAACTGCTTTTACATTACCATTTG</u>	31776
	<u>TATTTTCTTTTTTTCACCTCTTTATTTTCTAAAAATCTATTGCCTTCCTTGTACAATCATCTGATGAAGTATCATTAACTGCTTTTACATTACCATTTG</u>	31717
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>TTTATAAACAAAACCAAACAATAGAAGAGAAATGAAAAAAGAGAGGGATCCCTATTGGGAATGAAATTCCTACTATTGTACTCCCTTTCACAGAA</u>	31876
	<u>TTTATAAACAAAACCAAACAATAGAAGAGAAATGAAAAAAGAGAGGGATCCCTATTGGGAATGAAATTCCTACTATTGTACTCCCTTTCACAGAA</u>	31817
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>AAATGGAGAAATGCATTGATGTATTTTTTATTGGATTGGATCCGTCGGGACTGACGGGGCTCGAACCCGACGCTTCGCGCTTGACAGGCGGTGCTCT</u>	31976
	<u>AAATGGAGAAATGCATTGATGTATTTTTTATTGGATTGGATCCGTCGGGACTGACGGGGCTCGAACCCGACGCTTCGCGCTTGACAGGCGGTGCTCT</u>	31917
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>GACCAATGAACTACAATCCCAGAGAAATAACATAAGAAAAATCAAGTGTACAGTATACATATTCTTATGATTTTCATTCAAATACCTTTTGATTTTTATTTT</u>	32076
	<u>GACCAATGAACTACAATCCCAGAGAAATAACATAAGAAAAATCAAGTGTACAGTATACATATTCTTATGATTTTCATTCAAATACCTTTTGATTTTTATTTT</u>	32017
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>AGATTCCAATTTGTTGCTTGTAAACAGATTGGAACAGAGACGCGAATGATATATTGATTGATATCCATATGGATATGCATTTTAACGAGAGCAACATGGAT</u>	32176
	<u>AGATTCCAATTTGTTGCTTGTAAACAGATTGGAACAGAGACGCGAATGATATATTGATTGATATCCATATGGATATGCATTTTAACGAGAGCAACATGGAT</u>	32117
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>TACTATAATCTTTTCATTATTTCCAAATAAATTAGCTAATCCATTTTTCAATGAAAAGGGTCTTTTTTTTTTTTTTACTCTTTTTCTGAGACTTTCCACT</u>	32276
	<u>TACTATAATCTTTTCATTATTTCCAAATAAATTAGCTAATCCATTTTTCAATGAAAAGGGTCTTTTTTTTTTTTTTACTCTTTTTCTGAGACTTTCCACT</u>	32217
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>TACAGATCCTGATATGAATCTATATCATTAGCAAGATAAGAATTTGTTGGAAAAAGAAATAAGAAATAAAGAAAAGTAAATAGTGGTAAAGATATATCC</u>	32376
	<u>TACAGATCCTGATATGAATCTATATCATTAGCAAGATAAGAATTTGTTGGAAAAAGAAATAAGAAATAAAGAAAAGTAAATAGTGGTAAAGATATATCC</u>	32317
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>AAAATTTTTCTTTTTTCTATTGGGATCGCGCATTTCTGGAGAACAAACAATGATTATATTATTTTCATGGTGGGATCGGCGAATTATGGGCCGAGCTG</u>	32476
	<u>AAAATTTTTCTTTTTTCTATTGGGATCGCGCATTTCTGGAGAACAAACAATGATTATATTATTTTCATGGTGGGATCGGCGAATTATGGGCCGAGCTG</u>	32417
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>GATTGGAACCGCTAGACATATTGCCAACGAATTTACAGTCCGTCGCCATTAAACGCTCGGGCATCGACCCAGGAAGTAAATTTTCAGGCTTATTGA</u>	32576
	<u>GATTGGAACCGCTAGACATATTGCCAACGAATTTACAGTCCGTCGCCATTAAACGCTCGGGCATCGACCCAGGAAGTAAATTTTCAGGCTTATTGA</u>	32517
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>TAATTCATGATCAACTTCCTTTTCGTAGTACCCTACCCCCAGGGGAAGTCGAATCCCCGCTGCCTCCTTGAAGAGAGATGTCTTAAACCGCTAGACGATG</u>	32676
	<u>TAATTCATGATCAACTTCCTTTTCGTAGTACCCTACCCCCAGGGGAAGTCGAATCCCCGCTGCCTCCTTGAAGAGAGATGTCTTAAACCGCTAGACGATG</u>	32617
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>GGGGCATGCTTGCCCCGACCATCATGCCATCATATTATGATCATAGTATGAATAGTTTTTTTTTAATTGTCAATATAATGGAATGCTATAACTCAATACGAA</u>	32776
	<u>GGGGCATGCTTGCCCCGACCATCATGCCATCATATTATGATCATAGTATGAATAGTTTTTTTTTAATTGTCAATATAATGGAATGCTATAACTCAATACGAA</u>	32717
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>GAATCTTTTCGCTTTTCACGATTCTATATAGAATTTTTTGATTCAACATTTCTATTTCATGAATAGTTTCATTCTAATCGCCGTTCTATAAATCCATAAAAA</u>	32876
	<u>GAATCTTTTCGCTTTTCACGATTCTATATAGAATTTTTTGATTCAACATTTCTATTTCATGAATAGTTTCATTCTAATCGCCGTTCTATAAATCCATAAAAA</u>	32817
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>ATGGATTTTCTTTTTTTTTT-ATTTAGATTGAATTGGTAGATAGATCTATCAATCAAATGAATTTTCGTTAGGATGGCAATGGCAATTAGGGTTGTCTTG</u>	32975
	<u>ATGGATTTTCTTTTTTTTTT-ATTTAGATTGAATTGGTAGATAGATCTATCAATCAAATGAATTTTCGTTAGGATGGCAATGGCAATTAGGGTTGTCTTG</u>	32917
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>AAACAATTCATTGCATTGATATTATCAATCCAATAGCAATAAACCGTTTTATTTTATCTATACTTAAATAGTATATCCTATACTCACTAAGTTTTATT</u>	33075
	<u>AAACAATTCATTGCATTGATATTATCAATCCAATAGCAATAAACCGTTTTATTTTATCTATACTTAAATAGTATATCCTATACTCACTAAGTTTTATT</u>	33017
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>GTTTCTGAGTGAACACTATACGTTTATGATATTATAATATATTAACACTTATAACGTATAATATAACGTAAAGATATATCTATATATATAACATATAAT</u>	33175
	<u>GTTTCTGAGTGAACACTATACGTTTATGATATTATAATATATTAACACTTATAACGTATAATATAACGTAAAGATATATCTATATATATAACATATAAT</u>	33117
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>AAGTATATACACTAAACACATAGGGCTAGTAACCTTATTCAGGAATTGAATCAAATAAGCCCTTTTAACCTAGTGGTAGAGTAACGCCATGGTAAGGCCTA</u>	33275
	<u>AAGTATATACACTAAACACATAGGGCTAGTAACCTTATTCAGGAATTGAATCAAATAAGCCCTTTTAACCTAGTGGTAGAGTAACGCCATGGTAAGGCCTA</u>	33217
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>AGTCATCGGTTCAAATCCGATAAGGGGCTTTGCCCTTTTTCATAAACTCTGGAGGCACATTTTGGAGGGAAATAGAGATCTTGTGATATTGTGAATA</u>	33375
	<u>AGTCATCGGTTCAAATCCGATAAGGGGCTTTGCCCTTTTTCATAAACTCTGGAGGCACATTTTGGAGGGAAATAGAGATCTTGTGATATTGTGAATA</u>	33317
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>AAAAAAA-GTAACAAACCACAAACCATATAAAAACCATATAATTTAATAGAATTTTCATTCTTAAAAAATAAGTATAAGTATAAATAATCCCTATT</u>	33474
	<u>AAAAAAA-GTAACAAACCACAAACCATATAAAAACCATATAATTTAATAGAATTTTCATTCTTAAAAAATAAGTATAAGTATAAATAATCCCTATT</u>	33417
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>TATATTCTAATTTTATACTAGAATAGTATAGTAATTATAAGGATAGTAATTATAAGGTTGAACATTTGCTATTCTTAAATTTGCTATTCTAATAATATAA</u>	33574
	<u>TATATTCTAATTTTATACTAGAATAGTATAGTAATTATAAGGATAGTAATTATAAGGTTGAACATTTGCTATTCTTAAATTTGCTATTCTAATAATATAA</u>	33517
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>ATTCTATTCTATTATTATAAATTCATTCTATTATATATATATTAATTATATTAAATTCATTAAATATATATAAATTAATAGAAATATTATATAAT</u>	33674
	<u>ATTCTATTCTATTATTATAAATTCATTCTATTATATATATTAATTATATTAAATTCATTAAATATATATAAATTAATAGAAATATTATATAAT</u>	33606
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>CTATATTTTATATTATTACTATTGAAATTTTATTATTCAATTGGATTTTTTATTATATAAAATATTCAATATTATAATGTATAAATAGTTATAATGTAT</u>	33774
	<u>CTATATTTTATATTATTACTATTGAAATTTTATTATTCAATTGGATTTTTTATTATATAAAATATTCAATATTATAATGTATAAATAGTTATAATGTAT</u>	33706
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>TAACTAATATAATGAAATAAATAGAATAATGAATAATTCAGTTTATAATGAATACTGATAAGTTGTCTACTTGAATCTTCAAATATTCTTATTACTTA</u>	33874
	<u>TAACTAATATAATGAAATAAATAGAATAATGAATAATTCAGTTTATAATGAATACTGATAAGTTGTCTACTTGAATCTTCAAATATTCTTATTACTTA</u>	33806
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>ATATTTTATATTACTCCAATCAAATCAATTAGAAATCAACAAAGAAAAAGTAAGTGGACCTAACCCATTGAATCATAACTATACCCACTATTCTGATA</u>	33974
	<u>ATATTTTATATTACTCCAATCAAATCAATTAGAAATCAACAAAGAAAAAGTAAGTGGACCTAACCCATTGAATCATAACTATACCCACTATTCTGATA</u>	33906
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>TTCAAATTCATAGAGATGAAATTTGGAACAGTGTATATATAAAAAAATAAGTAAAGTAAATAGAAAGTAAATATATGATACTGTAGTAGG</u>	34074
	<u>TTCAAATTCATAGAGATGAAATTTGGAACAGTGTATATATAAAAAAATAAGTAAAGTAAATAGAAAGTAAATATATGATACTGTAGTAGG</u>	34006

RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>TTAATACACATAGAACTTAGAAGAATACAAATGATAAAAAAAAAAATGGATAAAAAATCAATATTTTTATCAATTGCCCAACCGGAATTCAAGAATAAGATT</u>	34174
	<u>TTAATACACATAGAACTTAGAAGAATACAAATGATAAAAAAAAAAATGGATAAAAAATCAATATTTTTATCAATTGCCCAACCGGAATTCAAGAATAAGATT</u>	34106
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>GGTTAATGGAACGAGAGTAATATGCTCGGGAATCTATCGGTAAACAGAAAGGGGATCACTTGTTCCTTGAATAGTCTCTTCCAAAAATAATCTATCTGA</u>	34274
	<u>GGTTAATGGAACGAGAGTAATATGCTCGGGAATCTATCGGTAAACAGAAAGGGGATCACTTGTTCCTTGAATAGTCTCTTCCAAAAATAATCTATCTGA</u>	34206
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>TTGATGAATCATAAGACAATTTCATGGTTTGGTTGGGTATTAAGAATAGGAAAGGATAACCAAAATTGAGTTCATGGATTAACTTGGTCCGGTTACAGACC</u>	34374
	<u>TTGATGAATCATAAGACAATTTCATGGTTTGGTTGGGTATTAAGAATAGGAAAGGATAACCAAAATTGAGTTCATGGATTAACTTGGTCCGGTTACAGACC</u>	34306
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>AATAAATCTTTTTATATTCGAAATCCCTTCTTTCGAAGGGACAATGTACGAGAAAAATAATACATGATAGAAACCTCGAACGTTCTTAAATGCTAT</u>	34474
	<u>AATAAATCTTTTTATATTCGAAATCCCTTCTTTCGAAGGGACAATGTACGAGAAAAATAATACATGATAGAAACCTCGAACGTTCTTAAATGCTAT</u>	34406
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>GAGGTGTTTCGAAAAATGGTTGAAGTAGTTGAATAGGAGGATCACTATGACTATAGCCCTTGGTAAATTTACCAAGACGAAAAATGATTATTTGATATTAT</u>	34574
	<u>GAGGTGTTTCGAAAAATGGTTGAAGTAGTTGAATAGGAGGATCACTATGACTATAGCCCTTGGTAAATTTACCAAGACGAAAAATGATTATTTGATATTAT</u>	34506
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>GGATGACTGGTTACGGAGGACCGTTTCGTTTTGTAGGCTGGTCCGCTCTATTGCTCTTTCCGTGTGCCATTTCGCTTTAGGGGGTGGTTTCACAGGT</u>	34674
	<u>GGATGACTGGTTACGGAGGACCGTTTCGTTTTGTAGGCTGGTCCGCTCTATTGCTCTTTCCGTGTGCCATTTCGCTTTAGGGGGTGGTTTCACAGGT</u>	34606
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>ACAACCTTTGTAACCTTCATGGTATACCCATGGATTAGCAAGTTCCTATTTTGAAGGATGCAACTTCTTAACCGCCGAGTTTCTACTCCGGCTAATAGTT</u>	34774
	<u>ACAACCTTTGTAACCTTCATGGTATACCCATGGATTAGCAAGTTCCTATTTTGAAGGATGCAACTTCTTAACCGCCGAGTTTCTACTCCGGCTAATAGTT</u>	34706
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>TAGCACATCTTTTGTGTACTATGGGGTCTGAAGCACAAGGAGATTTTACTCGTTGGTGCAATTAGGTGGTCTGTGGACTTTTGTGCTCTCCACGG</u>	34874
	<u>TAGCACATCTTTTGTGTACTATGGGGTCTGAAGCACAAGGAGATTTTACTCGTTGGTGCAATTAGGTGGTCTGTGGACTTTTGTGCTCTCCACGG</u>	34806
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>CGCTTTCGGACTAATCGGTTTTATGTTACGTCAATTTGAACCTTGCTCGATCTGTTCAATTGCGACCTTATAATGCGATCGCATTCCTCCGGTCCAATTGCA</u>	34974
	<u>CGCTTTCGGACTAATCGGTTTTATGTTACGTCAATTTGAACCTTGCTCGATCTGTTCAATTGCGACCTTATAATGCGATCGCATTCCTCCGGTCCAATTGCA</u>	34906
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>GTTTTGTCTTCTGTAATCTTATTTATCCGCTGGGTCAGTCTGGTTGGTTTTTTCGACCCAGTTTGGTGTAGCAGCTATATTTAGATTATCATCTCTTTT</u>	35074
	<u>GTTTTGTCTTCTGTAATCTTATTTATCCGCTGGGTCAGTCTGGTTGGTTTTTTCGACCCAGTTTGGTGTAGCAGCTATATTTAGATTATCATCTCTTTT</u>	35006
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>TCCAAGGGTTTCATAATTGGACATTGAACCCATTTCATATGATGGAGTTGCGGGGGTATTGGGCGCTGCTCTGCTATGCTATTTCATGGTCTACTGT</u>	35174
	<u>TCCAAGGGTTTCATAATTGGACATTGAACCCATTTCATATGATGGAGTTGCGGGGGTATTGGGCGCTGCTCTGCTATGCTATTTCATGGTCTACTGT</u>	35106
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>AGAAAAATACGTTATTTGAAGATGGTGATGGTGCAATACATTCCGTGCTTTTAAACCAACTCAAGCTGAAGAAACTTATTCAATGGTCACCGCTAACCGC</u>	35274
	<u>AGAAAAATACGTTATTTGAAGATGGTGATGGTGCAATACATTCCGTGCTTTTAAACCAACTCAAGCTGAAGAAACTTATTCAATGGTCACCGCTAACCGC</u>	35206
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>TTTTGGTCCCAATCTTTGGGGTGTCTTTTTCCAATAAAGCTTGGTTACATTTCTTTATGTTATTTGTACCCGTAACCGGTTTATGGATGAGTGCTCTTG</u>	35374
	<u>TTTTGGTCCCAATCTTTGGGGTGTCTTTTTCCAATAAAGCTTGGTTACATTTCTTTATGTTATTTGTACCCGTAACCGGTTTATGGATGAGTGCTCTTG</u>	35306
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>GAGTAGTCGGTCTGGCTCTGAATCTACGTGCCTATGACTTCGTTTCTCAGGAAATCCGTGCAGCGGAAGATCCTGAATTTGAGACTTTCTACACCAAAA</u>	35474
	<u>GAGTAGTCGGTCTGGCTCTGAATCTACGTGCCTATGACTTCGTTTCTCAGGAAATCCGTGCAGCGGAAGATCCTGAATTTGAGACTTTCTACACCAAAA</u>	35406
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>TATTCCTTTAAACGAGGGTATTCGTGCTTGGATGGCGGCTCAAGATCAGCCTCATGAAATCTTATATCCCTGAGGAGGTTCTACCCCGTGGAACCGCT</u>	35574
	<u>TATTCCTTTAAACGAGGGTATTCGTGCTTGGATGGCGGCTCAAGATCAGCCTCATGAAATCTTATATCCCTGAGGAGGTTCTACCCCGTGGAACCGCT</u>	35506
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>CTTTAATGGAACCTTTAGCTTTAGCTGGTCGTGACCAAGAAACCCCGTTTCGCTTGGTGGGCCGGGAATGCCCGACTTATCAATTTATCCGGTAAATTG</u>	35674
	<u>CTTTAATGGAACCTTTAGCTTTAGCTGGTCGTGACCAAGAAACCCCGTTTCGCTTGGTGGGCCGGGAATGCCCGACTTATCAATTTATCCGGTAAATTG</u>	35606
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>CTGGGGGCTCATGTAGCTCATGCCGATTAAATCGTATTCTGGGCCGGAGCAATGAACCTATTGGAAGTGGCTCATTTCGTACACAGAGAAGCCTATGTATG</u>	35774
	<u>CTGGGGGCTCATGTAGCTCATGCCGATTAAATCGTATTCTGGGCCGGAGCAATGAACCTATTGGAAGTGGCTCATTTCGTACACAGAGAAGCCTATGTATG</u>	35706
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>AACAAGGATTAAATTTACTTCCCCACCTAGCTACTCTAGGTTGGGGGGTAGGTCCAGGCGGGGAAGTTCTAGACACCTTTCCATACTTCGTGTCCGGAGT</u>	35874
	<u>AACAAGGATTAAATTTACTTCCCCACCTAGCTACTCTAGGTTGGGGGGTAGGTCCAGGCGGGGAAGTTCTAGACACCTTTCCATACTTCGTGTCCGGAGT</u>	35806
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>ACTTCACTTAATTTCTCTGCAATATGGGCTTTGGCGGTATTTATCACGCACTTCTGGGACCTGAGACTCTTGAAGAATCTTTTCCATCTTCGGTTAT</u>	35974
	<u>ACTTCACTTAATTTCTCTGCAATATGGGCTTTGGCGGTATTTATCACGCACTTCTGGGACCTGAGACTCTTGAAGAATCTTTTCCATCTTCGGTTAT</u>	35906
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>GTATGGAAGATAGAAATAAAATGACTACAATTTTGGGTATTCATTTAATCTTGTAGGTATAGGCGCCTTCTTTTAGTATTCAAGGCTCTTTATTTTG</u>	36074
	<u>GTATGGAAGATAGAAATAAAATGACTACAATTTTGGGTATTCATTTAATCTTGTAGGTATAGGCGCCTTCTTTTAGTATTCAAGGCTCTTTATTTTG</u>	36006
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>GGGGTGATATGATACCTGGGCTCCGGGAGGGGGCATGTAAGAAAAATACCAACTTGACCTTAGCCCAAGTATTGTATTGGTTATTACTAAAAATC</u>	36174
	<u>GGGGTGATATGATACCTGGGCTCCGGGAGGGGGCATGTAAGAAAAATACCAACTTGACCTTAGCCCAAGTATTGTATTGGTTATTACTAAAAATC</u>	36106
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>CCCTTTTGGCGGAGAAGGGTGAGTTGTAGTGTGGACGATTTGAAGATATAAATGGAGGGCATGTATGGTTAGGTTCATTGTATACTTGGTGGAAATC</u>	36274
	<u>CCCTTTTGGCGGAGAAGGGTGAGTTGTAGTGTGGACGATTTGAAGATATAAATGGAGGGCATGTATGGTTAGGTTCATTGTATACTTGGTGGAAATC</u>	36206
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>TGGCATATCTTAAACCAACCCCTTGCATGGGCTCGACGTGCATTTGTATGGTCTGGAGAGGCTTACTTGTCTTATAGTTTAGGTGCTTTATCTGTTTTG</u>	36374
	<u>TGGCATATCTTAAACCAACCCCTTGCATGGGCTCGACGTGCATTTGTATGGTCTGGAGAGGCTTACTTGTCTTATAGTTTAGGTGCTTTATCTGTTTTG</u>	36306
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>GTTTTATTGCTTGTGCTTTGCTGGTTCAACAATACCGCTTATCCTAGTGAGTTTACGGGCCCTACTGGACCAGAAGCTTCTCAAGCTCAAGCATTAC</u>	36474
	<u>GTTTTATTGCTTGTGCTTTGCTGGTTCAACAATACCGCTTATCCTAGTGAGTTTACGGGCCCTACTGGACCAGAAGCTTCTCAAGCTCAAGCATTAC</u>	36406
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>TTTTCTGGTTAGAGACCAACGCTCTTGGGGCTAACGTGGGATCCGCTCAAGGACCCACCGGTTAGGTAAATATTTAATGCGTTCCCGGACTGGAGAAGTT</u>	36574
	<u>TTTTCTGGTTAGAGACCAACGCTCTTGGGGCTAACGTGGGATCCGCTCAAGGACCCACCGGTTAGGTAAATATTTAATGCGTTCCCGGACTGGAGAAGTT</u>	36506
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>ATTTTGGAGGGGAAACTATGCGTTTTTGGGATCTACGAGCTCCTTGGTTAGAACCTCTAAGAGGTCCTAATGGTTGGACTTGAGTAGGCTGAAAAAG</u>	36674
	<u>ATTTTGGAGGGGAAACTATGCGTTTTTGGGATCTACGAGCTCCTTGGTTAGAACCTCTAAGAGGTCCTAATGGTTGGACTTGAGTAGGCTGAAAAAG</u>	36606
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>ACATACAGCCTTGGCAAGAACGGCGTTCTCGAGAATATATGACTCATGCTCCTTTAGGTTCTTTAAATCCGTTGGTGGTGTAGTACCCGAAATCAATGC</u>	36774
	<u>ACATACAGCCTTGGCAAGAACGGCGTTCTCGAGAATATATGACTCATGCTCCTTTAGGTTCTTTAAATCCGTTGGTGGTGTAGTACCCGAAATCAATGC</u>	36706
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>AGTCAATTATGTCTCTCCTAGAAGTGGTTAGCTACCTCTCATTTTGTCTAGGATTCTTCCTATTCTGATAGTCAATTTATGGCATGCGGGGAAGGGCTCGT</u>	36874
	<u>AGTCAATTATGTCTCTCCTAGAAGTGGTTAGCTACCTCTCATTTTGTCTAGGATTCTTCCTATTCTGATAGTCAATTTATGGCATGCGGGGAAGGGCTCGT</u>	36806
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>GCAGCTGCAGCAGGATTGAAAAAGGAATTGATCGTGATTTTGAACCTGTCTTCCATGACTCCTCTTAACTGAGCCGGGAGATCCAATGCTTGAAGTA</u>	36974
	<u>GCAGCTGCAGCAGGATTGAAAAAGGAATTGATCGTGATTTTGAACCTGTCTTCCATGACTCCTCTTAACTGAGCCGGGAGATCCAATGCTTGAAGTA</u>	36906
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>GGAATCAAATGATTCCACCATACCATATATATTAGATATTAGGTTAGACGAGTCAGGTTGTATTAAAAAGTATTCAATTTTCTTTCTTTTCGACTCA</u>	37074
	<u>GGAATCAAATGATTCCACCATACCATATATATTAGATATTAGGTTAGACGAGTCAGGTTGTATTAAAAAGTATTCAATTTTCTTTCTTTTCGACTCA</u>	37006
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>GTTCTATCTAATCTATTTTCTATTTTTTTTTTCTGGCTCGGCTATCCTACTTAGCCGAGCCATTCCCTTTATGATACTGAAAGGGTAAAAACAATAA</u>	37174
	<u>GTTCTATCTAATCTATTTTCTATTTTTTTTTTCTGGCTCGGCTATCCTACTTAGCCGAGCCATTCCCTTTATGATACTGAAAGGGTAAAAACAATAA</u>	37106

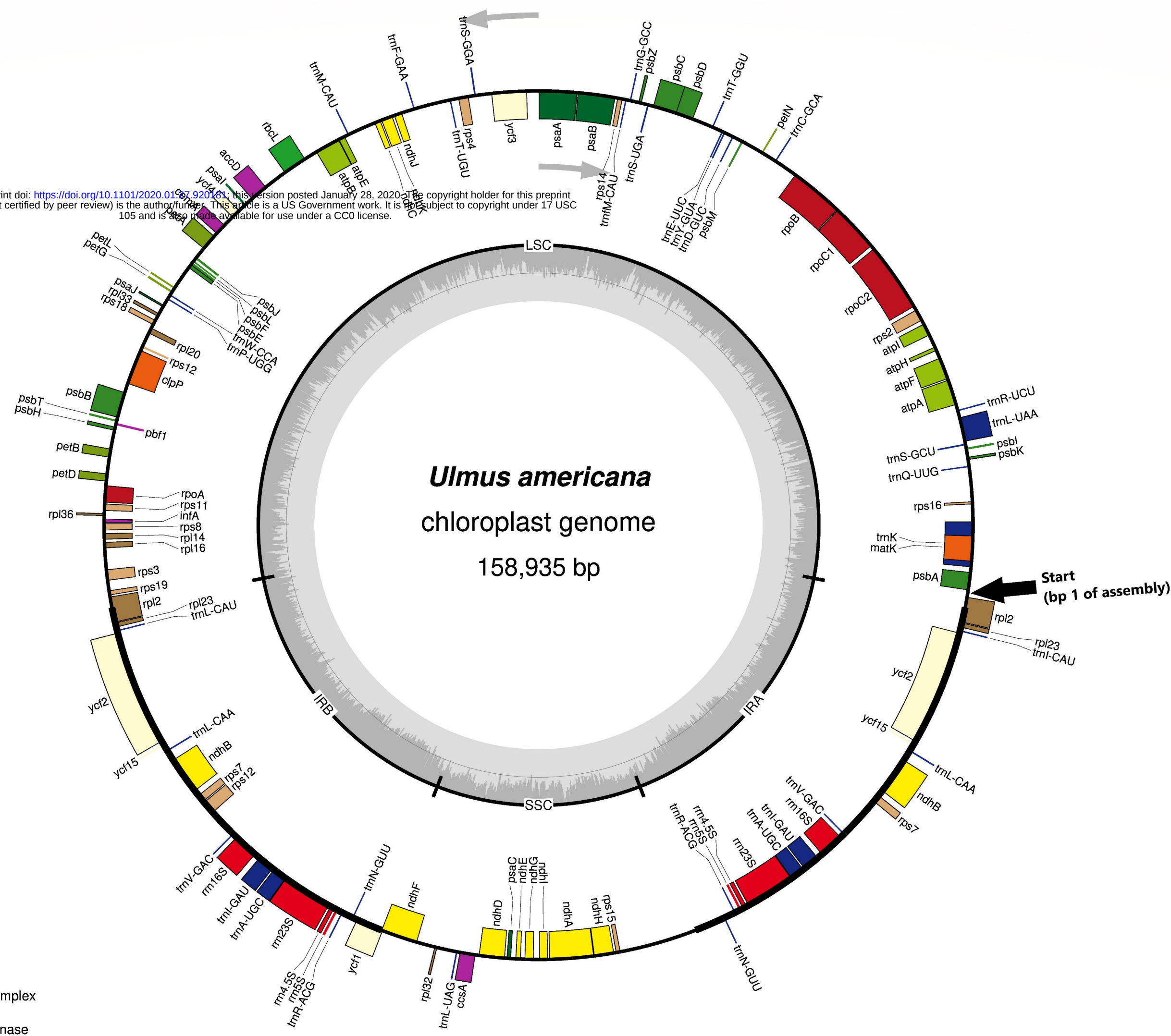
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>AATAAGAAAAGCAACAAATGTATTCAACAAGAAAAGGAGAGAGAGGGATTTCGAACCCTCGATAGTCTTTGTTTCGAACATATACCGGTTTCAAGACC</u> <u>AATAAGAAAAGCAACAAATGTATTCAACAAGAAAAGGAGAGAGAGGGATTTCGAACCCTCGATAGTCTTTGTTTCGAACATATACCGGTTTCAAGACC</u>	37274 37206
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>GGAGCTATCAACCACTCAGCCATCTCTCCGAAGATAAATTCATTCTATT</u> <u>TTATTTTTTTTTCTACCGAATAGAAATAGCCATATAAGTTGATAGCATT</u> <u>GGAGCTATCAACCACTCAGCCATCTCTCCGAAGATAAATTCATTCTATT</u> <u>TTATTTTTTTTTCTACCGAATAGAAATAGCCATATAAGTTGATAGCATT</u>	37374 37301
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>ACTATCTATCTAAAGTGGGTATCAATCTCTAGGTCTATCTATCTGGATATAGATGCATGATCCAGCGTACCTTTTTGTAAAGTAAAAAACTGCCATGCCT</u> <u>ACTATCTATCTAAAGTGGGTATCAATCTCTAGGTCTATCTATCTGGATATAGATGCATGATCCAGCGTACCTTTTTGTAAAGTAAAAAACTGCCATGCCT</u>	37474 37401
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>GAATAAAGTTCAAAAAGTGGTAAGGTAATAAGTCATATAGAATCTAATAAGTTATATAGAATCAATGATGGATTCTCGGTAAATCCATCCATGATGCTT</u> <u>GAATAAAGTTCAAAAAGTGGTAAGGTAATAAGTCATATAGAATCTAATAAGTTATATAGAATCAATGATGGATTCTCGGTAAATCCATCCATGATGCTT</u>	37574 37501
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>TTTTTTTACAACCTTTTGTGTTTGACTAATAAAGAGATAAAATGGTATAAGTCTTTTGTGATAGATTGGAGGATTAGAAACATGACTATTGCTTTCCAAT</u> <u>TTTTTTTACAACCTTTTGTGTTTGACTAATAAAGAGATAAAATGGTATAAGTCTTTTGTGATAGATTGGAGGATTAGAAACATGACTATTGCTTTCCAAT</u>	37674 37601
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>TGGCTGTTTTTGCATTAATTGCTACTTTCATCAATCTTACTGATTAGTGTACCCGTTGATTGTTGCTTCTCTGATGGTTGGTGGGTAAATAAAATGTTGT</u> <u>TGGCTGTTTTTGCATTAATTGCTACTTTCATCAATCTTACTGATTAGTGTACCCGTTGATTGTTGCTTCTCTGATGGTTGGTGGGTAAATAAAATGTTGT</u>	37774 37701
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>ATTTTCCGGTACATCCTTATGGATTGGATTAGTCTTCTCGTGGGTATCCTTAATTCTCTTATCTCTTGACCCCTTTTGGTTCTAGATCCAAAAATGACCC</u> <u>ATTTTCCGGTACATCCTTATGGATTGGATTAGTCTTCTCGTGGGTATCCTTAATTCTCTTATCTCTTGACCCCTTTTGGTTCTAGATCCAAAAATGACCC</u>	37874 37801
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>CTCCCAAGTTTTTCAGGTTGTGAGACACACTCAAATTCATATAAGTTATAAGTCCATAAAATGCAAAATAATAATAAAGAAAACGTAGCGGGAGGG</u> <u>CTCCCAAGTTTTTCAGGTTGTGAGACACACTCAAATTCATATAAGTTATAAGTCCATAAAATGCAAAATAATAATAAAGAAAACGTAGCGGGAGGG</u>	37974 37901
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>GTCAAACTTATTGTATTGCTATTGTTGTTTTATAAATTTTGTGTAATAATAAACAATAAAAAATAAATAGATTTCATTTGAAATTCAAATTTCAAA</u> <u>GTCAAACTTATTGTATTGCTATTGTTGTTTTATAAATTTTGTGTAATAATAAACAATAAAAAATAAATAGATTTCATTTGAAATTCAAATTTCAAA</u>	38074 38001
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>TTAAATAATATAGATTATTTCATATTATTTTAAATATTATTTAAATTTAATTGAAATTTAAATAGATTTCGAAATAAAAAAAAATTGAAATAAATCTTA</u> <u>TTAAATAATATAGATTATTTCATATTATTTTAAATATTATTTAAATTTAATTGAAATTTAAATAGATTTCGAAATAAAAAAAAATTGAAATAAATCTTA</u>	38174 38101
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>AATTTTCATATAATAA</u> <u>-----TAAAAATAAAAAAGAAAGAGAAATATCTGACCTAGCTCTGCTCAAATATGATCCATACATTGTGTATCAGCAAAAAAA</u> <u>AATTTTCATATAATAA</u> <u>AAAAATAA</u> <u>TAAAAATAAAAAAGAAAGAGAAATATCTGACCTAGCTCTGCTCAAATATGATCCATACATTGTGTATCAGCAAAAAAA</u>	38268 38201
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>AGCGCGGATGCGGATATAGTCGAATGGTAAAAATTTCTCTTTGCCAAGGAGAAGATGCGGGTTCGATTCCCGCTATCCGCCCAGAATAATAGATTAAATCTA</u> <u>AGCGCGGATGCGGATATAGTCGAATGGTAAAAATTTCTCTTTGCCAAGGAGAAGATGCGGGTTCGATTCCCGCTATCCGCCCAGAATAATAGATTAAATCTA</u>	38368 38301
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>TTTAATTTAAATTCATTTTATAAATTTAATAGGATAAAGGATTAAAGTATAGTTGATTATGATAGTATAGTGGTTCTATCCTTCCCTTCTTCCACCCCA</u> <u>TTTAATTTAAATTCATTTTATAAATTTAATAGGATAAAGGATTAAAGTATAGTTGATTATGATAGTATAGTGGTTCTATCCTTCCCTTCTTCCACCCCA</u>	38468 38401
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>AAAAACGGTAATTAATTAATTTTAGTTAACAAAAACAAATCAAACTAATTTTTTTTTTCGCAAAAAATGTTGCGGAGACGGGATTGAACCCGTGA</u> <u>AAAAACGGTAATTAATTAATTTTAGTTAACAAAAACAAATCAAACTAATTTTTTTTTTCGCAAAAAATGTTGCGGAGACGGGATTGAACCCGTGA</u>	38568 38501
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>CCTCAAGGTTATGAGCCTTGCGAGCTACCAAGCTGCTCTACCCCGCATGAAGAGAAGAAATGAGAACTAATGGGCCAACAGGATTGTTTGCGCCCTT</u> <u>CCTCAAGGTTATGAGCCTTGCGAGCTACCAAGCTGCTCTACCCCGCATGAAGAGAAGAAATGAGAACTAATGGGCCAACAGGATTGTTTGCGCCCTT</u>	38668 38601
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>GACCATATCTGTACAAATAGAATAGCCCATTTATACAGAATGGTAAGGGGGCCTCTACCTCTATGATCGATGATCATAGAAATAAATAGACAAAAGAAG</u> <u>GACCATATCTGTACAAATAGAATAGCCCATTTATACAGAATGGTAAGGGGGCCTCTACCTCTATGATCGATGATCATAGAAATAAATAGACAAAAGAAG</u>	38768 38701
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>GGATATTTTAATCCCTACCAACTTGATCTTGTGCTCCAGGCAACAAACATGCGTGAACCAATTCACGAAGTATGTGTCGGGATAGCCCAAGTCTCGAT</u> <u>GGATATTTTAATCCCTACCAACTTGATCTTGTGCTCCAGGCAACAAACATGCGTGAACCAATTCACGAAGTATGTGTCGGGATAGCCCAAGTCTCGAT</u>	38868 38801
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>AGTTAGCTCTCGGTCTTCCAGTCGAAAAACAACGTCGATGAAGGCGTGTAGGTGCACTATTACGTGGCAAGGATTGTAATTTTCCATGAATTTCCCATTT</u> <u>AGTTAGCTCTCGGTCTTCCAGTCGAAAAACAACGTCGATGAAGGCGTGTAGGTGCACTATTACGTGGCAAGGATTGTAATTTTCCATGAATTTCCCATTT</u>	38968 38901
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>CTCACTCAACGATGGAACCTTGCTTATTCTTTTTTGGAGGATCGACGAATCAAAATGATATTTTGTTCCAATTTGTGCTCTTCTCTCCCTCTCAATC</u> <u>CTCACTCAACGATGGAACCTTGCTTATTCTTTTTTGGAGGATCGACGAATCAAAATGATATTTTGTTCCAATTTGTGCTCTTCTCTCCCTCTCAATC</u>	39068 39001
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>AAACTTTTTCTTGCCATAATGGTTCAATTCCTATTAGTTTCAATGATACAAGTCGGATCCTAGATGTAGAAATATAAGAAAGCGAATCCCCCTCTATATC</u> <u>AAACTTTTTCTTGCCATAATGGTTCAATTCCTATTAGTTTCAATGATACAAGTCGGATCCTAGATGTAGAAATATAAGAAAGCGAATCCCCCTCTATATC</u>	39168 39101
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>GAAGAATATATCGAGGATACAACACATAAAATAAAGAAATTAACCAAAATTTGCCCGATGTAGAGGCAATCAAGAAAGCCGCATAAGTGAATATATACCTTA</u> <u>GAAGAATATATCGAGGATACAACACATAAAATAAAGAAATTAACCAAAATTTGCCCGATGTAGAGGCAATCAAGAAAGCCGCATAAGTGAATATATACCTTA</u>	39268 39201
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>CAGAAAAGTGAGCTAACCCAACCAATCTTGCTTGAACAATGGAAGAGCCACCGGTTTATCTCTCCATCGAATCAAATTAGCCAAAGGTGTTGCTTCATG</u> <u>CAGAAAAGTGAGCTAACCCAACCAATCTTGCTTGAACAATGGAAGAGCCACCGGTTTATCTCTCCATCGAATCAAATTAGCCAAAGGTGTTGCTTCATG</u>	39368 39301
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>AGCCCATGCTAAAGTTTCAATCAATCTTGCCAAATATCCACGCCAGGAATTAAGAACATAAAATCCAGTAGCCCAAACAGATGTCCAAATAAGAACATC</u> <u>AGCCCATGCTAAAGTTTCAATCAATCTTGCCAAATATCCACGCCAGGAATTAAGAACATAAAATCCAGTAGCCCAAACAGATGTCCAAATAAGAACATC</u>	39468 39401
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>CACGCCCAGACCGATAAACTATTATACCAAAAGGATTATATCCGTTGATAAGTTGTGAAGAGTTTAACCATAGATAATCTCTTAACCATCCCATCAAAT</u> <u>CACGCCCAGACCGATAAACTATTATACCAAAAGGATTATATCCGTTGATAAGTTGTGAAGAGTTTAACCATAGATAATCTCTTAACCATCCCATCAAAT</u>	39568 39501
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>AAGTGAAGACTCATTAATCTGTGAACGTTACCTGCCATAATGTGATGTGCTTCCAATGCCAATAAAAAGTGACCCATCCAATGGTATTTAACATCCA</u> <u>AAGTGAAGACTCATTAATCTGTGAACGTTACCTGCCATAATGTGATGTGCTTCCAATGCCAATAAAAAGTGACCCATCCAATGGTATTTAACATCCA</u>	39668 39601
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>GAAAACCGCCAAATAAAATGCGTCCAGGCTGAAATATCACAAGTACCACCTCGTCCCGGACCATCGCAAGGAAAACATAACCAAAATCCTTTTTATCT</u> <u>GAAAACCGCCAAATAAAATGCGTCCAGGCTGAAATATCACAAGTACCACCTCGTCCCGGACCATCGCAAGGAAAACATAACCAAAATCCTTTTTATCT</u>	39768 39701
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>GGCATTAACTTCGAACCCCGTGATCTAAAGCCCTTTTACTAAGATCAATGTAGTTGTATGTAACCTAGAGCAATAGCATGATGAACCAAGAAGTCTC</u> <u>GGCATTAACTTCGAACCCCGTGATCTAAAGCCCTTTTACTAAGATCAATGTAGTTGTATGTAACCTAGAGCAATAGCATGATGAACCAAGAAGTCTC</u>	39868 39801
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>CTGGTCTTATTGTTAAGAAATAGTGAATTACTATTCTCATTAAACAGCATTAAACACCCGGGCAACCATATGCTTCGACCCGATTGAACGCTGGACCATT</u> <u>CTGGTCTTATTGTTAAGAAATAGTGAATTACTATTCTCATTAAACAGCATTAAACACCCGGGCAACCATATGCTTCGACCCGATTGAACGCTGGACCATT</u>	39968 39901
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>CGTTGAAGATAAAAAGTACATCGAACCCTATGAAGTTTACCATGAGCAGATTGTATCCATTGGGCAAAATATAGGTTTCATCAAGATTGTTTTCCGGA</u> <u>CGTTGAAGATAAAAAGTACATCGAACCCTATGAAGTTTACCATGAGCAGATTGTATCCATTGGGCAAAATATAGGTTTCATCAAGATTGTTTTCCGGA</u>	40068 40001
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>GTACCAAAAGCAAGCATGACATCATTATGAACATAAAGTCCCAAAGTATGGAACCCAGAAAAAGGCTGGCCCACTTAAATGGGATATGATAGCTTCTT</u> <u>GTACCAAAAGCAAGCATGACATCATTATGAACATAAAGTCCCAAAGTATGGAACCCAGAAAAAGGCTGGCCCACTTAAATGGGATATGATAGCTTCTT</u>	40168 40101
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>TATGGTCTAACATTTCTTGCCAATACATTATCTCTATTGTTTCCGGATTGTAATCTCTAATAAAAAATATAGTCCATGAGCAAAAGCTCCTGTCATGAT</u> <u>TATGGTCTAACATTTCTTGCCAATACATTATCTCTATTGTTTCCGGATTGTAATCTCTAATAAAAAATATAGTCCATGAGCAAAAGCTCCTGTCATGAT</u>	40268 40201

RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>GAATCCTGCGATGATTGGTGATGGGTATATAAAGCAGCTTGAGTAGTAAAGTCTTGTGCTATGAATGCATAAGCGGGTAAAGAATACATATGTTGAGCG</u> <u>GAATCCTGCGATGATTGGTGATGGGTATATAAAGCAGCTTGAGTAGTAAAGTCTTGTGCTATGAATGCATAAGCGGGTAAAGAATACATATGTTGAGCG</u>	40368 40301
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>ACCAAGGAAGTAATAACCCCTAAAGAGGCTAGAGCAAGGCCATAATTGAAAGTGAATCGAATTATTGATTGTGCATAAAGACCTTTATGTCCACGTCCTCA</u> <u>ACCAAGGAAGTAATAACCCCTAAAGAGGCTAGAGCAAGGCCATAATTGAAAGTGAATCGAATTATTGATTGTGCATAAAGACCTTTATGTCCACGTCCTCA</u>	40468 40401
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>ATCGACCCCTGGAGGAATATGTGCTTCTAAAAGATTTTTATACTGTGCCAATCCCGAAATTTGTTCTATACATATGACCAGCAACAAGAAAAATAAA</u> <u>ATCGACCCCTGGAGGAATATGTGCTTCTAAAAGATTTTTATACTGTGCCAATCCCGAAATTTGTTCTATACATATGACCAGCAACAAGAAAAATAAA</u>	40568 40501
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>TGCAATAGCTAAATGATGATGAGCAATATCGGTGAGCCATAAACTTTGCGTTTGTGGATGGAATCCCCGAGAAGGGTTAGAATGGCAGTTCCTGCTCCT</u> <u>TGCAATAGCTAAATGATGATGAGCAATATCGGTGAGCCATAAACTTTGCGTTTGTGGATGGAATCCCCGAGAAGGGTTAGAATGGCAGTTCCTGCTCCT</u>	40668 40601
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>TGGGATGTACTAAATAAATGATTACTTGAATCAGGGTTTTTGAGCATAAAGATTCCACTGACCCGTAAAAAGTGGTCTAATCCTTGGGGATGCGGCAATA</u> <u>TGGGATGTACTAAATAAATGATTACTTGAATCAGGGTTTTTGAGCATAAAGATTCCACTGACCCGTAAAAAGTGGTCTAATCCTTGGGGATGCGGCAATA</u>	40768 40701
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>CATCTAAGAAATTTATCCATCGAAGCTATTCCCCCTGGATCCCGGAATAGCGACATGAACATAATGTCTGTCCAAGCCAAGGAGCTTACTCCGAATAG</u> <u>CATCTAAGAAATTTATCCATCGAAGCTATTCCCCCTGGATCCCGGAATAGCGACATGAACATAATGTCTGTCCAAGCCAAGGAGCTTACTCCGAATAG</u>	40868 40801
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>TCCTGACAAATGATGATTGAGACGAGATTCGGCATTTTTAAACCATGAAACGCTTGGTTTCCATTTCGGTTGTAGGTGTAACCAACCCGCTATTAAAGAT</u> <u>TCCTGACAAATGATGATTGAGACGAGATTCGGCATTTTTAAACCATGAAACGCTTGGTTTCCATTTCGGTTGTAGGTGTAACCAACCCGCTATTAAAGAT</u>	40968 40901
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>ATGGCAGAAAAGAAATAAGAAAAGAGCTCCAGTATAAAGATCTTCATTAGTACGTAACCAATTGTATACCACCACTGATAAACACCCAGAATAGGCCAA</u> <u>ATGGCAGAAAAGAAATAAGAAAAGAGCTCCAGTATAAAGATCTTCATTAGTACGTAACCAATTGTATACCACCACTGATAAACACCCAGAATAGGCCAA</u>	41068 41001
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>TATTCACCTGGGCCAAGAGCACCCCGGAGTAAAAGCTTCCACAGCCGGTTGACCAAAATGAGGATCCCAAAATGCGATGAGCAATAGGTCTTATATGTAA</u> <u>TATTCACCTGGGCCAAGAGCACCCCGGAGTAAAAGCTTCCACAGCCGGTTGACCAAAATGAGGATCCCAAAATGCGATGAGCAATAGGTCTTATATGTAA</u>	41168 41101
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>AGGATCTTGTACCCATGCCTCAAAGTTTCCCTTGCCAAGCTACATGAAACAGATTTCGGAAGTCCACAAAAAATTTATGCTAATTGCCCGAAATGAGAG</u> <u>AGGATCTTGTACCCATGCCTCAAAGTTTCCCTTGCCAAGCTACATGAAACAGATTTCGGAAGTCCACAAAAAATTTATGCTAATTGCCCGAAATGAGAG</u>	41268 41201
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>GCAAAAAATTTCTGATAAAGACGTTCTTCAGTAATATCATCATGACTTTCGAAGTCATGGGCGGTAGCAATACCAACCAATACGACGAGTAGTGGGGT</u> <u>GCAAAAAATTTCTGATAAAGACGTTCTTCAGTAATATCATCATGACTTTCGAAGTCATGGGCGGTAGCAATACCAACCAATACGACGAGTAGTGGGGT</u>	41368 41301
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>CCTGAGCTAAGCCTTGGCTAAACCTTGGAATCTTAATGCCATAATGCCTTTCAAATCCTCCTAGCCATTATCCTACTGCAATAATCTTGCTAAGAAGA</u> <u>CCTGAGCTAAGCCTTGGCTAAACCTTGGAATCTTAATGCCATAATGCCTTTCAAATCCTCCTAGCCATTATCCTACTGCAATAATCTTGCTAAGAAGA</u>	41468 41401
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>ATGCCCATGTTGTGGCAATTCCACCAGAAGGTAATGGGTTACTCCTACAGCAGCCCTTGACAAATGCTCAAGGCTCTAGGCTGAGTAGCAGGAGCAAC</u> <u>ATGCCCATGTTGTGGCAATTCCACCAGAAGGTAATGGGTTACTCCTACAGCAGCCCTTGACAAATGCTCAAGGCTCTAGGCTGAGTAGCAGGAGCAAC</u>	41568 41501
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>TTTTAATTTATTATGAGCCCAACCAATGGATTCAATAAGTTCTTGCCAATAACCAAGCCCGCTGAATAGAAACATTAGACTAAAAGCCCATACAAAATGA</u> <u>TTTTAATTTATTATGAGCCCAACCAATGGATTCAATAAGTTCTTGCCAATAACCAAGCCCGCTGAATAGAAACATTAGACTAAAAGCCCATACAAAATGA</u>	41668 41601
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>GCACCTAGGAAAAAAGGCCATATGCAGATAATGAAGAACCATAGGACTGAATTACCTGGGATGCCTGTGCCCATAGAAATCGCGGAGCCATCCATTAA</u> <u>GCACCTAGGAAAAAAGGCCATATGCAGATAATGAAGAACCATAGGACTGAATTACCTGGGATGCCTGTGCCCATAGAAATCGCGGAGCCATCCATTAA</u>	41768 41701
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>TAGTAATGGAACCTTTCGCGAAAGTTTCCTCCCGTGATATGAGTTATCACTCCTTGATCACTTATACTACCCCAACATCTGACTGCATTTTCCAAGTAA</u> <u>TAGTAATGGAACCTTTCGCGAAAGTTTCCTCCCGTGATATGAGTTATCACTCCTTGATCACTTATACTACCCCAACATCTGACTGCATTTTCCAAGTAA</u>	41868 41801
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>ATGGAATATTACTACTGAAATTGAATTATACATCCAGATAGTCTTAAGAAGACATGATCCCAAGCGGATACTTGACATGTCCCCCTCTTCCAGGGCCA</u> <u>ATGGAATATTACTACTGAAATTGAATTATACATCCAGATAGTCTTAAGAAGACATGATCCCAAGCGGATACTTGACATGTCCCCCTCTTCCAGGGCCA</u>	41968 41901
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>TCACAAGGGAAACGAAACCAAGATTGCTTTATCTGGTATCAAACGAGAGCTACGAGAAAAAGAACACCTTTCAGAAGTATCAATACTGTACATGAA</u> <u>TCACAAGGGAAACGAAACCAAGATTGCTTTATCTGGTATCAAACGAGAGCTACGAGAAAAAGAACACCTTTCAGAAGTATCAATACTGTACATGAA</u>	42068 42001
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>TCGTAATATGATGATGATGATGGACAAAAAATCTCGCGTTCTTAATGGAATAGGTAACAAAGCAACTTTGCGGCCACTGCCACTAAATCACCACCCCT</u> <u>TCGTAATATGATGATGATGATGGACAAAAAATCTCGCGTTCTTAATGGAATAGGTAACAAAGCAACTTTGCGGCCACTGCCACTAAATCACCACCCCT</u>	42168 42101
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>CCAAGTCAAACTGGTCTTGTGTTGTCACCAAGGGGCTGTTGACCGGGTGCTAAAGCATGGGTGTTTGTATCCATTGAGCAAGACGGGTGTAATTGT</u> <u>CCAAGTCAAACTGGTCTTGTGTTGTCACCAAGGGGCTGTTGACCGGGTGCTAAAGCATGGGTGTTTGTATCCATTGAGCAAGACGGGTGTAATTGT</u>	42268 42201
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>ATAGCGGTATCTGAAAAACATATCTTGGGGACGCCCTAAAGCGCTCATAGTATCATTTAATGAATATACAAACCAAGCTGTGAAAGCCTAAAAATATACATA</u> <u>ATAGCGGTATCTGAAAAACATATCTTGGGGACGCCCTAAAGCGCTCATAGTATCATTTAATGAATATACAAACCAAGCTGTGAAAGCCTAAAAATATACATA</u>	42368 42301
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>CCCAGTTGAGATGTGATATGATTGCATCAGCATGCCTAAGGACACGATCTAATAGATCGTTGTATCGAGTAGTTGGATCATAGTCTCTTACCATAAAAAAT</u> <u>CCCAGTTGAGATGTGATATGATTGCATCAGCATGCCTAAGGACACGATCTAATAGATCGTTGTATCGAGTAGTTGGATCATAGTCTCTTACCATAAAAAAT</u>	42468 42401
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>AGCTGCATGCGCAGCAGCACCAACGATGAGAAATCCACCAATCCACATGTGATGTGTAACCAATGAAAGTTGTGTACCATAGTCAGTGGCTAGATATGGA</u> <u>AGCTGCATGCGCAGCAGCACCAACGATGAGAAATCCACCAATCCACATGTGATGTGTAACCAATGAAAGTTGTGTACCATAGTCAGTGGCTAGATATGGA</u>	42568 42501
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>TAAGGGGGCATCGAATACATATGGTGAGCTACAACAATGGTTAAAGAGCCCAACATAGCTAGGTTAAGAGATAAATTGAGCATGCCATGACGTTGTTAGGA</u> <u>TAAGGGGGCATCGAATACATATGGTGAGCTACAACAATGGTTAAAGAGCCCAACATAGCTAGGTTAAGAGATAAATTGAGCATGCCATGACGTTGTTAGGA</u>	42668 42601
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>TCTCATATAAGCCTTTATGGCCCTGGCCGGTAAATGGTCCTTTATGAGCCTCTAAAAATATCTTTTATGCCATGACCAATGCCCCAGTTGGTCTCTATACAT</u> <u>TCTCATATAAGCCTTTATGGCCCTGGCCGGTAAATGGTCCTTTATGAGCCTCTAAAAATATCTTTTATGCCATGACCAATGCCCCAGTTGGTCTCTATACAT</u>	42768 42701
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>GTGACCCGCTACTAGGAAAAGAAATTGCAATAGCTAAATGATGGTGCAATATCGGTCAACAGAGACCCCGAGTTACTGGATCCAATCTCCACGAAAAA</u> <u>GTGACCCGCTACTAGGAAAAGAAATTGCAATAGCTAAATGATGGTGCAATATCGGTCAACAGAGACCCCGAGTTACTGGATCCAATCTCCACGAAAAA</u>	42868 42801
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>GTAAGAAATTCGGAATATTTTGACCAATTCAGGTGAAAAATGGGGTTGCTCCCTCAGCAAAACTGGGATAAAGTTGGGCCAAAAGATCTCGATTCAAGA</u> <u>GTAAGAAATTCGGAATATTTTGACCAATTCAGGTGAAAAATGGGGTTGCTCCCTCAGCAAAACTGGGATAAAGTTGGGCCAAAAGATCTCGATTCAAGA</u>	42968 42901
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>TAAATTCATGAGGAAGTGAATCTCTTTAGGATCTACTCCAGCATTAGAAATTTGATTAATCGGTAAAGATACATGTACTTGATGTCCCGCCCAAGAAAG</u> <u>TAAATTCATGAGGAAGTGAATCTCTTTAGGATCTACTCCAGCATTAGAAATTTGATTAATCGGTAAAGATACATGTACTTGATGTCCCGCCCAAGAAAG</u>	43068 43001
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>AGACCCAAGTCTTAGTACCCCTGCTAAATGGTGATTCAACATAGATTGCACATCTTGGAACCAAGCCAGTTTGGAGCAGCTTTGTGATAATGGAACCAA</u> <u>AGACCCAAGTCTTAGTACCCCTGCTAAATGGTGATTCAACATAGATTGCACATCTTGGAACCAAGCCAGTTTGGAGCAGCTTTGTGATAATGGAACCAA</u>	43168 43101
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>CCAGCAAAAAGCATTAAGGCTGCAAAAACCAATGCACCAATTCAGTACAATATAGTTGTAATTCTACTAGTTATTCAGATGCTCGCCAAATCTGAAAAA</u> <u>CCAGCAAAAAGCATTAAGGCTGCAAAAACCAATGCACCAATTCAGTACAATATAGTTGTAATTCTACTAGTTATTCAGATGCTCGCCAAATCTGAAAAA</u>	43268 43201
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>ACCCAGAGGTTATTGTTATCTCTCGGAACCCCGCCTACATCACCATTCAATATTTCTTGACCCACTATTGGCCAAACACCTGGGCACTAGGTCCAAT</u> <u>ACCCAGAGGTTATTGTTATCTCTCGGAACCCCGCCTACATCACCATTCAATATTTCTTGACCCACTATTGGCCAAACACCTGGGCACTAGGTCCAAT</u>	43368 43301

RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>ATGAGTAGGATCGCTTAGCCATGCCTTCATAATTGGAAAAACGAGCACCATGGAATACATACCACCTTAGCCAAAGAAAGATGATGGAGAGTTGACCAAAA</u>	43468
	<u>ATGAGTAGGATCGCTTAGCCATGCCTTCATAATTGGAAAAACGAGCACCATGGAATACATACCACCTTAGCCAAAGAAAGATGATGGAGAGTTGACCAAAA</u>	43401
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>TGGGCACTAAATATTTTCTAGAGATCTCCTCCAAATCACTGGTATGGCTATCGAAATCGTGAGCATCAGCGTGTAGGTTCAGATCCAAGTCGTAGTAT</u>	43568
	<u>TGGGCACTAAATATTTTCTAGAGATCTCCTCCAAATCACTGGTATGGCTATCGAAATCGTGAGCATCAGCGTGTAGGTTCAGATCCAAGTCGTAGTAT</u>	43501
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>CAGGACCCCTTAGCTATTGTTCTTGAGAAATGACCTGGTCTGGCCCACTCCTCGAAAGATGTTTTATGGGATCCCTATCTACCAAAATTTTAACTTCTGG</u>	43668
	<u>CAGGACCCCTTAGCTATTGTTCTTGAGAAATGACCTGGTCTGGCCCACTCCTCGAAAGATGTTTTATGGGATCCCTATCTACCAAAATTTTAACTTCTGG</u>	43601
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>TTCCGGCGAACGAATAATCATTGAGTCTCCTCTTTCCGGCAACACATACAAGAGAGACCCGCAATAGTTAAGTAATTAGTGAATCTATGAAAGATGTT</u>	43768
	<u>TTCCGGCGAACGAATAATCATTGAGTCTCCTCTTTCCGGCAACACATACAAGAGAGACCCGCAATAGTTAAGTAATTAGTGAATCTATGAAAGATGTT</u>	43701
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>TAGACTTAGTTTTTTTATATCTTGATCTCTCCATTTTTTTCTTTAGTTATTCACTAGAGCAATTATGATCTGGAAGTCGATCCGGGGCAAGTGTTCGGA</u>	43868
	<u>TAGACTTAGTTTTTTTATATCTTGATCTCTCCATTTTTTTCTTTAGTTATTCACTAGAGCAATTATGATCTGGAAGTCGATCCGGGGCAAGTGTTCGGA</u>	43799
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>TCTATTATGACATAGCCGTAAGGCGCTTAAACGGACCTTTTTTGAATCTTATAAATTTTTGTGCAACCTAGTATATTCATATCTCAATTAGAAGTTCCTA</u>	43968
	<u>TCTATTATGACATAGCCGTAAGGCGCTTAAACGGACCTTTTTTGAATCTTATAAATTTTTGTGCAACCTAGTATATTCATATCTCAATTAGAAGTTCCTA</u>	43899
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>AATGGAACACTTTATGTCTTATGTCGAACATATTATTTTATCCAAATCTTTATTCCAAACACAGTCATTAGTCATTACTAAGAGACATCCCAGTAT</u>	44068
	<u>AATGGAACACTTTATGTCTTATGTCGAACATATTATTTTATCCAAATCTTTATTCCAAACACAGTCATTAGTCATTACTAAGAGACATCCCAGTAT</u>	43999
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>TTATATTTAGTTATTTCGAAGATCTCTTTTATTAGTTTATTAGTTTAAATAGCAGAAAAGAAATATATCTCTACTTTATCTGTATATCGTTTATCCCTAC</u>	44168
	<u>TTATATTTAGTTATTTCGAAGATCTCTTTTATTAGTTTATTAGTTTAAATAGCAGAAAAGAAATATATCTCTACTTTATCTGTATATCGTTTATCCCTAC</u>	44099
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>GAAATACCAGACCAAAATAGAACGATCTGAAATAAAAAGGATATAATGAAATTTTTTGATTTGGTTCTTCCAGAGAAATGATCCTTTTTTATTGACTGAT</u>	44268
	<u>GAAATACCAGACCAAAATAGAACGATCTGAAATAAAAAGGATATAATGAAATTTTTTGATTTGGTTCTTCCAGAGAAATGATCCTTTTTTATTGACTGAT</u>	44199
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>AGAGACAATAAACAAATTAATTATAACAAATAGAAAACAATTGAAACTTAACTAATAATAGAACTAAATAAACATTAGAATAATAAGAAAAATAGT</u>	44368
	<u>AGAGACAATAAACAAATTAATTATAACAAATAGAAAACAATTGAAACTTAACTAATAATAGAACTAAATAAACATTAGAATAATAAGAAAAATAGT</u>	44299
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>GTCTTTTTCTTATTCGAAACGCCTTGTGATCTTCAACCAATTCTGTGCTTCAATATAAATTACCAGGAGTAAGCGCTATAGCTTGTTCCTAATCTCGGCA</u>	44468
	<u>GTCTTTTTCTTATTCGAAACGCCTTGTGATCTTCAACCAATTCTGTGCTTCAATATAAATTACCAGGAGTAAGCGCTATAGCTTGTTCCTAATCTCGGCA</u>	44399
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>GCTTGATCAAACCAAGCCTCCGCAATTTGAGATCTCCTTGTGCAATGGCCTGTTCTCCCCGGTCGGAATAGGTGGTTAAATTCCTTCCCTTAGAACCGT</u>	44568
	<u>GCTTGATCAAACCAAGCCTCCGCAATTTGAGATCTCCTTGTGCAATGGCCTGTTCTCCCCGGTCGGAATAGGTGGTTAAATTCCTTCCCTTAGAACCGT</u>	44499
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>ACTTGAGAGTTTCCGACCTCATACGGCTCAGCAGTCAAGTCTTTTGGTGTCTCATTTTTTTCATCTACTATATCTAATTGAATGAGATTTCTCATGGAT</u>	44668
	<u>ACTTGAGAGTTTCCGACCTCATACGGCTCAGCAGTCAAGTCTTTTGGTGTCTCATTTTTTTCATCTACTATATCTAATTGAATGAGATTTCTCATGGAT</u>	44599
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>CTATCCCTTTTTTTTTCTCGAGTTAACCAAAACAAAGAGGTTATGAGTTTCAAACTGAGTTTGTCTTAATAATTTAATAAGTAATAAGTTTTATCTTT</u>	44768
	<u>CTATCCCTTTTTTTTTCTCGAGTTAACCAAAACAAAGAGGTTATGAGTTTCAAACTGAGTTTGTCTTAATAATTTAATAAGTAATAAGTTTTATCTTT</u>	44699
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>TCTCCACCTTCATAAAACATAGGCATTTCCCATATCATTCGAATTTTTCTGAAAGGTAACATATCGGTTTCATATATAAAATTTATATAGAACTCCTGAA</u>	44868
	<u>TCTCCACCTTCATAAAACATAGGCATTTCCCATATCATTCGAATTTTTCTGAAAGGTAACATATCTCGGTTTCATATATAAAATTTATATAGAACTCCTGAA</u>	44799
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>AAAGACTTTCCTTTTATAAGAAGGAAAGAGACTTACTATCTTTGGGATCTGATGCTACACCGCTGCTCAATACCTTAGGGGATCAACTCTATTACATAAGTT</u>	44968
	<u>AAAGACTTTCCTTTTATAAGAAGGAAAGAGACTTACTATCTTTGGGATCTGATGCTACACCGCTGCTCAATACCTTAGGGGATCAACTCTATTACATAAGTT</u>	44899
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>GATTCTTAACTTTTTATCTCATATCATGACAATAAAAAAGCAGTTCTTTATGTATCGGCTCAAAACCTCGCGAATTGATCTTTACGATGCTTCTCTATC</u>	45068
	<u>GATTCTTAACTTTTTATCTCATATCATGACAATAAAAAAGCAGTTCTTTATGTATCGGCTCAAAACCTCGCGAATTGATCTTTACGATGCTTCTCTATC</u>	44999
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>AATTAGATCCTTTATCCATAGAAATAAGTATCTAGGCATACCTATTTCTTCATATTTTCGACTTCTATGACGTTTATTTCTTTGCTACAGCTGATAAAAAAT</u>	45168
	<u>AATTAGATCCTTTATCCATAGAAATAAGTATCTAGGCATACCTATTTCTTCATATTTTCGACTTCTATGACGTTTATTTCTTTGCTACAGCTGATAAAAAAT</u>	45099
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>CGTTGTTTGAACGATACATATGTAGAAAGCCTATTTTTTTATAGTATTTTTTAAATGGATTTGCTCTTTCTTTCCCTTTTTATTCTTATAGTGGAGATAG</u>	45268
	<u>CGTTGTTTGAACGATACATATGTAGAAAGCCTATTTTTTTATAGTATTTTTTAAATGGATTTGCTCTTTCTTTCCCTTTTTATTCTTATAGTGGAGATAG</u>	45199
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>TCGCACGTAATGACAGATCACGGCCATATTATTAAGAGCTTGTGGTAAGAATGGATTCCGCTCTAGTGCACGAAAATAATTTCCAAAGCTTTTCGTATGT</u>	45368
	<u>TCGCACGTAATGACAGATCACGGCCATATTATTAAGAGCTTGTGGTAAGAATGGATTCCGCTCTAGTGCACGAAAATAATTTCCAAAGCTTTTCGTATGT</u>	45299
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>TCTCCGTTCTTGTGGGATAAGGCCATGTTATAGAGTATATAACTTCGATCATAGGGATCAATTTCTAGTCGCATAGCTTCATAATAATTCTGTAAAG</u>	45468
	<u>TCTCCGTTCTTGTGGGATAAGGCCATGTTATAGAGTATATAACTTCGATCATAGGGATCAATTTCTAGTCGCATAGCTTCATAATAATTCTGTAAAG</u>	45399
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>CTTCAGCATAAATTTCTTCGGATTGAGCCGACATCCGTTACGGTCTGTCGAAAGAACTCCGTTTTCAGAACCGTACATGAGATTTTCATCTCATACGGCTC</u>	45568
	<u>CTTCAGCATAAATTTCTTCGGATTGAGCCGACATCCGTTACGGTCTGTCGAAAGAACTCCGTTTTCAGAACCGTACATGAGATTTTCATCTCATACGGCTC</u>	45499
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>CTCCTTTATGTGCATAATGAAATAATACATAGAAATCAAAAAAGATTGAAATATTCTCATTATAAACTGAGCAGGGCTAGTGTTTTTACAAAAAATCTC</u>	45668
	<u>CTCCTTTATGTGCATAATGAAATAATACATAGAAATCAAAAAAGATTGAAATATTCTCATTATAAACTGAGCAGGGCTAGTGTTTTTACAAAAAATCTC</u>	45599
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>TAGCCAACCTTCTTGTAAGAGATTTTTCTTAAATCAAGTATGTTGTTACTAGATAAAAAAGGGTGACTTCAACAATTTCTTTGTCTTAAACGCCTCTT</u>	45768
	<u>TAGCCAACCTTCTTGTAAGAGATTTTTCTTAAATCAAGTATGTTGTTACTAGATAAAAAAGGGTGACTTCAACAATTTCTTTGTCTTAAACGCCTCTT</u>	45699
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>AAATTTTCAGGAATTAGTCACTTCAACAGTCTTCGATGGTTATACGGGTATCCAAAAACGAAACGAGATGGATGTTTGTGTGCCAACCATCTTGTGTAGT</u>	45868
	<u>AAATTTTCAGGAATTAGTCACTTCAACAGTCTTCGATGGTTATACGGGTATCCAAAAACGAAACGAGATGGATGTTTGTGTGCCAACCATCTTGTGTAGT</u>	45799
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>CCCGATCTGTATAGGAAAAGGGAGAAATTTATAACAAAGTTTATGATTTGTTGATTTCTAGGAGTAGTGCTCTTCTCTATAGCCTCCTATTGGTACTGG</u>	45968
	<u>CCCGATCTGTATAGGAAAAGGGAGAAATTTATAACAAAGTTTATGATTTGTTGATTTCTAGGAGTAGTGCTCTTCTCTATAGCCTCCTATTGGTACTGG</u>	45899
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>CGCAGTAGGTTTGACCTAACCCTATAGGTGTAACTTTTCGCTCAACTTTTGAATCAACAATTAAGTATTTAAGGCTGCATTAAATCGGGGATACACGA</u>	46068
	<u>CGCAGTAGGTTTGACCTAACCCTATAGGTGTAACTTTTCGCTCAACTTTTGAATCAACAATTAAGTATTTAAGGCTGCATTAAATCGGGGATACACGA</u>	45999
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>CAGAAGGACTTGTTTTATTACAAACTTCACCTTCAACAAGCGTAATTTATTTCAAAAATTTTTTCTTTCTATCCCGAATAATCTTTCTTCTCCTAA</u>	46168
	<u>CAGAAGGACTTGTTTTATTACAAACTTCACCTTCAACAAGCGTAATTTATTTCAAAAATTTTTTCTTTCTATCCCGAATAATCTTTCTTCTCCTAA</u>	46099
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>GACTGAGAGCGGTAAAAAATTTTATATTATATATAAATATAAAAAAATTTATATTATAAATTTATATATAAATATAAATAAATATATATATAA</u>	46268
	<u>GACTGAGAGCGGTAAAAAATTTTATATTATATATAAATATAAAAAAATTTATATTATAAATTTATATATAAATATAAATAAATATATATATAA</u>	46199
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>AAAAATAAAAAATAAAAAATATATAAATATATAAATAAATAAAAAAATTAACATAATCAAAATCGCACCATCTCTGTAATAGGCGAATGCCTCTTTTTCTC</u>	46368
	<u>AAAAATAAAAAATAAAAAATATATAAATATATAAATAAATAAAAAAATTAACATAATCAAAATCGCACCATCTCTGTAATAGGCGAATGCCTCTTTTTCTC</u>	46299
RV16_UlmusAmericana Am.57845_UlmusAmeric	<u>CTGAAGTTGTGCGGAATTATTTCGTAATAAGATATTGGCTACAATTGAAAGGCTTATCAATAAAAATTTCCATTATTTCGAGATCTAGACATATGAAGAAA</u>	46468
	<u>CTGAAGTTGTGCGGAATTATTTCGTAATAAGATATTGGCTACAATTGAAAGGCTTATCAATAAAAATTTCCATTATTTCGAGATCTAGACATATGAAGAAA</u>	46399

RV16_UlmusAmericana	<u>TCCATTATATAATTTCTTTTAATTACCTTTTCGTGAGAAAAGAAATCCCAACAAAGGAATTTTACAGTACGAAATAACATAAAAAACAGACTCATTAAA</u>	46568
Am.57845_UlmusAmeric	<u>TCCATTATATAATTTCTTTTAATTACCTTTTCGTGAGAAAAGAAATCCCAACAAAGGAATTTTACAGTACGAAATAACATAAAAAACAGACTCATTAAA</u>	46499
RV16_UlmusAmericana	<u>AAAGATAATTTTCTATTCAAATTGTTCTTTTGTATGGGAATCGCTAAAACTAAGAAATATTTGAATCCAATTAGATTTCATCCATATAGTAGTATAAG</u>	46668
Am.57845_UlmusAmeric	<u>AAAGATAATTTTCTATTCAAATTGTTCTTTTGTATGGGAATCGCTAAAACTAAGAAATATTTGAATCCAATTAGATTTCATCCATATAGTAGTATAAG</u>	46599
RV16_UlmusAmericana	<u>AATGAAGGGAACATTCCAATTTTCATCAAGAAGAATCAAAGAATTTATCCTACAGATTAGGATAATTCGAGAAATTTTGATTGAATTAATTTCTGTATGA</u>	46768
Am.57845_UlmusAmeric	<u>AATGAAGGGAACATTCCAATTTTCATCAAGAAGAATCAAAGAATTTATCCTACAGATTAGGATAATTCGAGAAATTTTGATTGAATTAATTTCTGTATGA</u>	46699
RV16_UlmusAmericana	<u>CCAAAGAGGAAAAAGAATCGAATAATCATTTCTATGATGGATGAAAATAGAATAACTATACGTTTTGTGTTGTGTATATATGGGTATACGCTATAGAATC</u>	46868
Am.57845_UlmusAmeric	<u>CCAAAGAGGAAAAAGAATCGAATAATCATTTCTATGATGGATGAAAATAGAATAACTATACGTTTTGTGTTGTGTATATATGGGTATACGCTATAGAATC</u>	46799
RV16_UlmusAmericana	<u>AAATATCAAAATTCCTGGGACGTTTTTGGAAATAAACCTATGGGGTAATAAGTTGGGGTAAGGGGTTCTTGTTGAAAGATCTAAAAACGGGAAAGGAAAGTCA</u>	46968
Am.57845_UlmusAmeric	<u>AAATATCAAAATTCCTGGGACGTTTTTGGAAATAAACCTATGGGGTAATAAGTTGGGGTAAGGGGTTCTTGTTGAAAGATCTAAAAACGGGAAAGGAAAGTCA</u>	46899
RV16_UlmusAmericana	<u>TTTTCGAATTTTATGAAAATAGAATAATAGTCTAATAATAGTCTAACTAAATAGAATCAATGATCTAAAGATATCCATTAAACATAGTCTAAAAAAAT</u>	47068
Am.57845_UlmusAmeric	<u>TTTTCGAATTTTATGAAAATAGAATAATAGTCTAATAATAGTCTAACTAAATAGAATCAATGATCTAAAGATATCCATTAAACATAGTCTAAAAAAAT</u>	46999
RV16_UlmusAmericana	<u>GGATCAATCGGTGGATTTCGTTCCAATTCATTATTTAACCAGATATAAATATTAGAAAGGGTCGTGAATGCCGTCTTGGCAAACATGAATAGATATATAT</u>	47168
Am.57845_UlmusAmeric	<u>GGATCAATCGGTGGATTTCGTTCCAATTCATTATTTAACCAGATATAAATATTAGAAAGGGTCGTGAATGCCGTCTTGGCAAACATGAATAGATATATAT</u>	47099
RV16_UlmusAmericana	<u>CTTTATTTATGTTTTTAACAGAACAGTTTTTACAAAAAATAAATGATTCTTATCCCCAGCTTTGAAAGAAGGGTTTGTCTTTGATCAAGGTTTT</u>	47268
Am.57845_UlmusAmeric	<u>CTTTATTTATGTTTTTAACAGAACAGTTTTTACAAAAAATAAATGATTCTTATCCCCAGCTTTGAAAGAAGGGTTTGTCTTTGATCAAGGTTTT</u>	47199
RV16_UlmusAmericana	<u>TTCTATTTTCTAGTTAAAAATAGAGTGTCTATACCTATCCAAAAATCGAATATGAGTAAATCACTATTAACCTCGGTTTGGGGACCTAATCACTAGGTAG</u>	47368
Am.57845_UlmusAmeric	<u>TTCTATTTTCTAGTTAAAAATAGAGTGTCTATACCTATCCAAAAATCGAATATGAGTAAATCACTATTAACCTCGGTTTGGGGACCTAATCACTAGGTAG</u>	47299
RV16_UlmusAmericana	<u>GAGAGATGGCCGAGTGGTTCAAGGCGTAGCATTGGAAGTCTATGTAGGCTTTTGTTTACCGAGGGTTCGAATCCCTCTCTTTCCGTACTAATTCACCAA</u>	47468
Am.57845_UlmusAmeric	<u>GAGAGATGGCCGAGTGGTTCAAGGCGTAGCATTGGAAGTCTATGTAGGCTTTTGTTTACCGAGGGTTCGAATCCCTCTCTTTCCGTACTAATTCACCAA</u>	47399
RV16_UlmusAmericana	<u>TGTTACTGACCGCAATGTATCAAATCAAATAAGAGTGGATATTATTATTTCCAACAGTTAGACCTTGCTTTGATATGAATTTCTCTATTCTTAATCCTAATT</u>	47568

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Ulmus americana
chloroplast genome
158,935 bp

- photosystem I
- photosystem II
- cytochrome b/f complex
- ATP synthase
- NADH dehydrogenase
- RubisCO large subunit
- RNA polymerase
- ribosomal proteins (SSU)
- ribosomal proteins (LSU)
- clpP, matK
- other genes
- hypothetical chloroplast reading frames (ycf)
- transfer RNAs
- ribosomal RNAs