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The contribution of mitochondrial metagenomics to large-scale data mining and phylogenetic analysis of Coleoptera

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Abstract

A phylogenetic tree at the species level is still far off for highly diverse insect orders, including the Coleoptera, but the taxonomic breadth of public sequence databases is growing. In addition, new types of data may contribute to increasing taxon coverage, such as metagenomic shotgun sequencing for assembly of mitogenomes from bulk specimen samples. The current study explores the application of these techniques for large-scale efforts to build the tree of Coleoptera. We used shotgun data from 17 different ecological and taxonomic datasets (5 unpublished) to assemble a total of 1942 mitogenome contigs of >3000 bp. These sequences were combined into a single dataset together with all mitochondrial data available at GenBank, in addition to nuclear markers widely used in molecular phylogenetics. The resulting matrix of nearly 16000 species with two or more loci produced trees (RAxML) showing overall congruence with the Linnaean taxonomy at hierarchical levels from suborders to genera. We tested the role of full-length mitogenomes in stabilizing the tree from GenBank data, as mitogenomes might link terminals with non-overlapping gene representation. However, the mitogenome data were only partly useful in this respect, presumably because of the purely automated approach to assembly and gene delimitation, but improvements in future may be possible by using multiple assemblers and manual curation. In conclusion, the combination of data mining and metagenomic sequencing of bulk samples provided the largest phylogenetic tree of Coleoptera to date, which represents a summary of existing phylogenetic knowledge and a defensible tree of great utility, in particular for studies at the intra-familial level, despite some shortcomings for resolving basal nodes.

Keywords

Coleoptera, mass-trapped samples, mitochondrial metagenomics, metagenome skimming, biodiversity discovery.

Introduction

Current studies aiming at the construction of an ever more complete Tree-of-Life can draw on rapidly growing public taxonomic DNA databases (Chesters, 2017; Hinchliff et al., 2015; Hunt and Vogler, 2008; McMahon and Sanderson, 2006; Peters et al., 2011; Price and Bhattacharya, 2017; Zhou et al., 2016). Hitherto most taxonomic DNA data of higher eukaryotes have been obtained by sequencing from individual specimens, based on studies dedicated to particular target species. In insects, this approach requires focused collecting efforts and careful taxonomic identification, and may not achieve the broader goal of a fully sampled Tree. However, a rapid increase in taxon coverage is possible by direct sequencing of pooled multi-species DNA extracts obtained from mass-trapped arthropod specimens. Metagenomic sequencing of arthropods readily yields mitochondrial genome sequences that are assembled preferentially from the mixture of shotgun reads due to their high copy number ('metagenome skimming'; Linard et al., 2016; Malé et al., 2014), allowing for species detection and phylogenetic placement of specimens in the samples. When focused on organelles, this approach is referred to as mitochondrial metagenomics or mito-metagenomics (MMG) (Crampton-Platt et al., 2016) and, if widely applied to samples from various habitats and biogeographic regions, may add large numbers of species to the assembly of the Tree-of-Life. The procedure is equally applicable to specimens that have not been formally described or characterized taxonomically, and thus even species that are new to science may be included in the tree, which can rapidly increase the taxonomic coverage especially in poorly known, species-rich and small-bodied groups of invertebrates.

In addition to greater species representation, mitochondrial genomes as those obtained through MMG are powerful markers to determine the phylogenetic position of the newly added taxa. Phylogenetic trees from MMG studies therefore may be more robustly supported than those resulting from conventional PCR-based analyses which usually only contain one or a few loci sequenced with 'universal' primers (Gómez-Rodríguez et al., 2015; Nie et al., 2017). In addition, existing studies have used different mitochondrial genes. Only the 658 bp barcode region of the *cox1* gene is now a widely agreed standard (Meusnier et al., 2008), while the representation of other genes in DNA databases varies greatly among taxa. Uneven gene coverage will result in data matrices with a high proportion of missing data and low phylogenetic support (Wiens, 1998). These matrices may be unable to define relationships among taxa represented by non-overlapping gene fragments (or provide poor support in case of partial overlap). However, the phylogenetic position of such taxa may still be approximated by establishing their relationships to a closely related mitogenome sequence, which determines their placement relative to each other indirectly through the

mitochondrial loci shared with the full-length mitogenome. Thus, the fast production of mitogenomes from MMG could act as scaffolds for otherwise unmatched clades and complete the overall species representation and tree topology. Equally, these mitogenome sequences may represent species with already existing partial entries, which can be recognized for example by high sequence similarity to an existing *cox1* barcode. In these cases, the addition of MMG sequences can fill the missing data for that species and increase the phylogenetic signal of the matrix.

The present study attempts to integrate the growing amount of sequence data held at NCBI (GenBank) with newly generated mitogenome data from shotgun sequencing of specimen pools, to increase taxon coverage of the joint phylogenetic tree. We apply this approach to the arguably most diverse group of animals, the Coleoptera (beetles), whose total species richness is estimated to be in the millions (Basset et al., 2012), although currently the most comprehensive published DNA-based trees contain no more than 8000 species (Bocak et al., 2014). The Coleoptera has already been the focus of various MMG studies, e.g. to analyze basal relationship within the order and within several family-level taxa (e.g. Scarabaeidae, Chrysomelidae, and Curculionoidea) (Gillett et al., 2014; Gómez-Rodríguez et al., 2015; Nie et al., 2017), or to investigate species diversity in rainforests (Crampton-Platt et al., 2015), the soil (Andújar et al., 2015; Cicconardi et al., 2017), pollinators communities (Tang et al., 2015), and temperate terrestrial and aquatic habitats (Linard et al., 2016). This growing number of available mitogenomes provides a unique opportunity to draw together diverse samples for cross-phylogeny mitogenomic studies, and to link them to taxonomic data in GenBank.

To explore the contribution of the metagenomic approach for Tree-of-Life studies, we compiled public sequence data for the Coleoptera, and tested the effects of adding MMG data to the phylogenetic analysis. We assembled mitogenomes from several sets of shotgun sequence data from recent ecological and taxonomic studies, including those from poorly characterised tropical beetle assemblages obtained by mass trapping. A simple automated bioinformatics approach was used to integrate with data mined from the NCBI database. The analysis focuses on the contribution that MMG data make to the Tree and searched for their potential role as an anchor for linking non-overlapping mitochondrial gene sequences from public databases. The resulting tree of some 16,000 species constitutes the most complete compilation of phylogenetic data for the Coleoptera and represents a scaffold for forthcoming MMG and other data sources, which will iteratively enrich the tree of beetles.

Material and Methods

GenBank sequence extractions

Following the general scheme of the bioinformatics pipeline (Figure 1), selected loci were extracted from GenBank (Benson et al., 2013) using a set of steps previously developed by (Bocak et al., 2014). Briefly, a set of “bait” sequences of some 200 species covering the major lineages of Coleoptera was built for each target locus, whereby taxa were selected for completeness of available data and maximum clade coverage. Next, the Coleoptera fraction of the non-redundant (*nr*) database was retrieved to recover all potential homologous GenBank entries, by selecting all entries attached to the Coleoptera taxonomic identifier (taxid=7041). These sequences were converted to build a Blast searchable database, using the blastdb software. The above bait sequences were used as queries in Blastn (Camacho et al., 2009) searches (Evalue=1e-5, word size =12 and align_length>=60% of the expected locus length) against this database. The matching sequence regions were trimmed and extracted, building separate sets of sequences for each targeted locus. When several sequences were available for the same species (as identified in the NCBI taxonomy), only the longest fragment was kept. If several sequences of equal length were available, only the first-hit sequence was kept without consideration of subspecies or specimen information.

In total, three commonly used nuclear genes and 13 mitochondrial loci genes were retrieved (October 2015). The nuclear loci included a partial coding region of Elongation Factor 1-alpha (*ef1a*; ~600 bp), the 18S rRNA, split in two segments denoted 18Sa (~650 bp) and 18Sb (~1100 bp) and the 28S rRNA expansion segment (D2-D3 region, ~800 bp). All mitochondrial genes were included and the full length of each gene was used, except for *rrnL* (16S rRNA), for which two fragments were retrieved. These were denoted 16Sa and 16Sb, located between the V2-V3 (~300 bp) and V3-V4 regions (~220 bp) of the RNA gene. Additionally, the *cox1* gene was split into 2 segments (*cox1a*, *cox1b*) to accommodate the *cox1*-5' 658 bp barcoding region and the widely represented *cox1*-3' portion bracketed by the Pat-Jerry primer pair (~700 bp). Thus, from these 16 genes we defined a total of 19 loci: *nad2*, *cox1a*, *cox1b*, *cox2*, *atp6*, *cox3*, *nad3*, *nad5*, *nad4*, *nad6*, *cob*, *nad1*, *rrnS*, *rrnLa*, *rrnLb*, *ef1a*, *18Sa*, *18Sb* and *28S*. The compiled data extracted in the above manner are referred to as ‘NCBI dataset’ (Fig. 1).

Mitochondrial Metagenomics

Metagenomic shotgun reads were obtained from various existing studies motivated initially by separate phylogenetic, taxonomic, methodological or ecological questions (Table 1; see Suppl. File S1 for GenBank accessions). Out of these, the MT1 and MT2 datasets were partially based on long-range PCR of mitochondrial genomes or were Sanger sequenced NCBI data (273 mitogenomes of which 80

were by long-range-PCR (Timmermans et al., 2015b, 2010), whereas all other datasets were obtained by bulk shotgun sequencing of genomic DNA. Mitogenomes were extracted from these mixtures using the MMG protocol of (Crampton-Platt et al., 2016). The published datasets had been assembled and manually curated to various degrees previously, but under slightly different parameter settings for each set (different quality control, different assemblers). Here, raw data were used to re-build these contigs under uniform conditions and without any manual curation steps, to test the data quality achievable under a fully automated approach that is appropriate to large-scale application of MMG. A small proportion of these data had already been deposited at NCBI at the time of data extraction but they were removed from the NCBI mined dataset to avoid duplication. The shotgun mixtures underwent mitochondrial assembly starting from the corresponding raw Illumina libraries with the following protocol: (i) Libraries were trimmed to remove residual library adaptors with Trimmomatic v0.32 (Bolger et al., 2014) and low-quality reads were filtered with Prinseq v0.20.4 (Schmieder and Edwards, 2011). Only paired reads were retained. (ii) Mitochondrial reads were filtered with Blastn (Camacho et al., 2009) using the same reference database (i.e., all complete coleopteran mitochondria from GenBank, October 2015), to remove reads lacking similarity to mitogenomes. (iii) The filtered reads were then assembled with IDBA-UD v1.1.1 (Camacho et al., 2009; Peng et al., 2012) and only contigs of a minimum length of 3 kb were kept. (iv) Similarly to the GenBank sequence extraction, mitochondrial contigs underwent loci extraction through the custom pipeline (Bocak et al., 2014) for 15 mitochondrial loci (splitting *cox1a*, *cox1b* and *rrnLa* and *rrnLb*). The aligned matrix of contigs obtained in the above manner is referred to as 'MMG dataset' (Fig. 1). All parameters settings used in the assembly and data compilation are given in Suppl. File S1.

Multiple alignments and supermatrix

Eight mitochondrial genomes from the supraorder Neuropterida, the presumed sister group of Coleoptera (+ Strepsiptera), were added as an outgroup to each locus (Suppl. File S1). All protein-coding loci from the NCBI and MMG datasets were aligned with transalign (Bininda-Emonds, 2005; Sievers et al., 2011), except for the larger *cox1a* and *cox1b* datasets (more than 40,000 sequences each), which were aligned with Clustal Omega (Sievers et al., 2011) that is more suitable to the alignment of large numbers of sequences, using the '-auto' configuration and default parameters. Each alignment was then manually curated and trimmed to start with the first and end with the last base of a codon. During this editing step, all gene boundaries extending beyond the average ORF length were removed. All rRNA fragments (*rrnS*, *rrnLa*, *rrnLb*, *18Sa*, *18Sb*, *28S*) were aligned in two steps. A first multiple alignment was built with Clustal Omega using default parameters, then

realigned with Mafft v7.123b (Katoh and Standley, 2013) using the FFT-NS-2 method, a gap extension value of 1.0 (option -gap) to favor longer indels in the conserved regions, and other parameters set to default.

All alignments were grouped under three concatenation schemes (Figure 1): (i) 'NCBI' based on the 19 concatenated loci (15 mitochondrial + 4 nuclear) of the 'NCBI dataset'; (ii) 'MMG' containing the 15 concatenated mitochondrial loci from the 'MMG dataset' (also including the Timmermans et al., 2015b) data; see above); and (iii) 'NCBI+MMG' containing 15 mitochondrial + 4 nuclear concatenated loci, merging the two original datasets (Fig. 1, center). For the latter, if NCBI and MMG loci were both available for the same species (identified by an exact match of an NCBI entry to any portion of the mitogenome), only the MMG-based sequence was kept. For the NCBI-only and NCBI+MMG datasets we built 4 separate matrices (Fig. 1) requiring either a minimum of 2 or 3 available loci for each taxon (denoted min2loci and min3loci), and either using all nucleotides or removing the 3rd codon positions and RY coding of 1st positions (denoted 1RY/3del). All mitogenomes included more than 2 loci, and thus for the MMG-only dataset we conducted searches on all available contigs. Note that genetic variants in pooled DNA extracts generally collapse into a single contig during assembly (Gómez-Rodríguez et al., 2016) and therefore separate contigs were considered equivalent to different species.

Tree labelling and taxonomic retention index

Leaves on the tree were labelled extensively (see Suppl. File S1 for details) with (i) the locus code, representing which of the 19 loci are available for a particular species in the matrix, (ii) the taxonomic code, a shorthand alphanumeric code that compresses the Linnaean taxonomy associated to the species (see Suppl. File S2 for complete list), (iii) the full Linnaean binomial as given on GenBank or from other sources, at the lowest taxonomic level available, and (iv) only for terminals based on MMG contigs, a short metadata string indicating the source dataset (Table 1), a contig identifier, the keyword "MERGED" when concatenated with GenBank data, in particular for nuclear genes, followed by a keyword referring to the method used to attribute a species identification to the MMG contig.

The locus code (see Suppl. File S1) is a vector of 19 positions either marked by 'X' (locus present in the supermatrix) or '-' (locus absent). The position of each symbol was given in the canonical mitochondrial gene order: *nad2*, *cox1a*, *cox1b*, *cox2*, *atp6*, *cox3*, *nad3*, *nad5*, *nad4*, *nad6*, *cob*, *nad1*, *rrnLa*, *rrnLb*, *rrnS*, followed by the 4 nuclear loci in the order: *ef1a*, *18Sa*, *18Sb*, *28S*. For instance, a common locus string is -XX-----X-----, indicating a species supported by a complete *cox1* gene

(loci *cox1a+cox1b*, in positions 2 and 3) and a 16S RNA fragment (*rrnLa*, position 13). Similarly, the code --XXXXXXXXXXXXX---X indicates a species supported by a nearly complete mitochondrial contig (only *nad2* and *cox1a* are missing) complemented by a 28S RNA sequence extracted from NCBI.

The taxonomic code compresses the Linnaean taxonomy associated to the sequence according to the GenBank classification (Federhen, 2012) for seven hierarchical levels: suborder, infraorder, superfamily, family, subfamily, tribe, genus, species. Names at each level were abbreviated to include only the first or second letter, with a third letter added to discriminate among names with the same starting letters. After each abbreviated name the hierarchical levels were given (1 to 7 from highest to lowest taxonomic level). The alphanumeric codes were also used as pseudocharacters to calculate the taxonomic Retention Index (tRI) at each hierarchical level, as a measure of the fit of the tree to the Linnaean classification (Hunt and Vogler, 2008).

The identification labels of assembled shotgun mitogenomes were based on identifications with the *cox1* barcodes generated during the original MMG studies (Table 1). Briefly, internal barcodes were produced for specimens prior to DNA mixing for bulk shotgun sequencing and were used as 'bait sequences' to link specimen and mitogenome (see Crampton-Platt et al., 2016). When barcodes were not available, contigs were identified to species level by Blast matches (>99% identity) to (i) *cox1* records from NCBI Genbank and (ii) the BOLD database, or (iii) where no such identification via existing entries was available, contigs were labelled at family level, based on their phylogenetic position in preliminary tree searches. The taxon label includes the method of identification (annotated from barcodes or from tree topology).

Tree searches

Phylogenetic trees were generated using likelihood searches under data partitioning. Mitochondrial genes were attributed to a total of 7 data partitions, one for each codon position of protein coding genes on the forward (3 partitions) and reverse (3 partitions) strands, plus one partition for the two rRNA genes. Each nuclear gene was assigned to a single additional partition (*ef1a*, *18Sa+18Sb*, *28S*), for a total of 10 partitions. Using both the CIPRES web server (Miller et al., 2010) and in-house servers, tree searches were performed with RAxML-HPC2 v8.2.6 (Stamatakis, 2014) under the GTRCAT model of nucleotide substitution, which approximates a GTR+ Γ model at reduced computational cost, and the likelihoods of the final tree topologies were re-evaluated under GTR+ Γ . For the different tree searches (NCBI-only, NCBI+MMG, MMG-only) based on a minimum of three loci (min3loci, see Suppl. File S1), 20 independent runs with different starting seeds were performed, and the tree with the best likelihood score was selected. For searches on the larger datasets with a minimum of 2 loci (min2loci), we used the min3loci tree as starting tree (RAxML option --t). This

starting tree option did not constrain the tree search, but started the taxon addition from a given topology of the smaller dataset. In addition, tree searches were performed under RY coding of 1st and removal of 3rd codon positions (1-RY/3-del), to reduce long-branch attraction due to compositional and rate heterogeneity. We did not obtain measures of node support (e.g. bootstrap values) due to the computing limitations imposed by the size of the studied matrices.

Results

NCBI and MMG extractions

The NCBI extraction revealed a preponderance of *cox1* sequences representing more than 46,000 species for each segment (*cox1a*, *cox1b*). The next highest numbers were for the *rnl* segments (*16Sa* and *16Sb*) with over 13,000 species, and the *cox2*, *cytb* and 18S rRNA genes, available for around 5,000 species each. These loci represented a great diversity at all taxonomic levels (Figure 2A, left). Other mitochondrial and nuclear loci were underrepresented, restricted to a few clades, and on average corresponded to sequence fragments shorter than the full-length coleopteran gene, which was particularly striking for the widely used *cox3*, *nad5* and *cytb* genes (Figure 2A, bottom-right histogram). Changes in the stringency of the Blast searches using e-values of $e=-12$ to $e=+1$ showed little differences in the number of sequences obtained, except under the least stringent conditions (Suppl. Table S1).

The mitogenome assembly conducted independently on each of the 17 shotgun datasets produced between 6 and 236 contigs, for a total of 1942 mitochondrial contigs, of which 561 contigs were obtained from previously unpublished datasets (Table 1). The contigs included complete (as indicated by their >15kb length) and partial mitochondrial genomes. For most shotgun datasets, a complete set of protein coding and rRNA genes was obtained in one half to two thirds of contigs, but with the notable exception of one dataset (Table 1). The distribution of recovered mitochondrial loci (Figure 2B, upper-right histogram) and their representation at all hierarchical levels were largely uniform (Figure 2B, left). The MMG-derived gene extractions were mostly composed of the expected full length sequences, in contrast to the partial genes in the NCBI dataset (Figure 2B, lower-right histogram). After assigning taxonomic names (see Materials and Methods), MMG contigs were complemented with NCBI data for the same species, adding the corresponding nuclear loci (and mitochondrial loci missing in incomplete contigs). In the min2loci NCBI+MMG matrix a total of 666 terminals were a combination of both sources, i.e. for ~1/3 of all MMG mitogenomes (see Suppl. File S1 for a list of all combined terminals). In many cases only the *cox1* sequences were available at

NCBI, and were consequently discarded in favor of the longer MMG contig (see Materials and Methods).

Taxonomic composition

The NCBI extraction recovered 165 out of 189 currently recognized beetle families, including 257 subfamilies, 5441 genera and 30,700 species (Table 2). After concatenation, 13,666 species were omitted from the tree searches on the final dataset because they did not have sequences for a minimum of 2 or 3 of the target loci and were mainly represented by *cox1* and *rrnL* fragments (data not shown). The minimum locus requirement mainly removed species at lower hierarchical levels, e.g. retaining only 39.0% and 52.1% of the total species available at NCBI for the min3loci and min2loci datasets, respectively, while retaining 95.8% and 97.6% of family level taxa (corresponding to 7 and 4 unrepresented families). The MMG set contained 120 families and 139 subfamilies, which is a minimum estimate, as many sequences remained unidentified. Both datasets overlapped in the coverage of higher taxa present but the proportion of taxa in the MMG set also represented in the NCBI extraction decreased towards the tip (species) level from 54.5% at the family level to a mere 3.4% at the species level (Table 2). At the same time, the MMG data contributed an increasing number of unique taxa for each hierarchical level. After redundancy correction for the species represented by both datasets, the total species representation in the min3loci and min2loci datasets was 11944 and 15983 terminals, respectively, including 1942 MMG contigs (Table 2).

Phylogenetic analyses

Tree searches were conducted on five datasets; the MMG contigs, the NCBI-only database requiring a minimum of either 3 or 2 loci, and the combined MMG and NCBI database with minimum of 3 or 2 loci (the min3loci and min2loci databases). Except for MMG-only, these datasets included >10,000 terminals with a large proportion of missing data in many sites. We first assessed the effect of different starting trees on the likelihood of the trees obtained with the RAxML software, launching 20 tree searches under different starting seeds on the min3loci dataset with all nucleotides partitioned into 10 partitions (Material and Methods). Each search took 5 to 9 days of calculation using 12 or 16 CPU cores on the Cipres web server and in-house server launches, respectively. The best tree had a likelihood score of -11,449,869.61, with other trees worse by between -263.00 and -1046.15 log likelihood units (final likelihoods were calculated under GTR+ Γ on each topology for direct comparisons). The resulting tree topologies were overall similar although they differed in various places, including the basal relationships of the polyphagan superfamilies (see Suppl. File S1 for an example).

Tree topologies were assessed with the tRI, a measure of fit to the Linnaean taxonomy, at four hierarchical levels (genus, subfamily, family, superfamily) (Table 3). The NCBI min3loci (10,063 taxa) and MMG+NCBI min3loci (pruned, 10,063 taxa) datasets showed the highest values at all four levels (Table 3, bold values), in particular for superfamilies, whose distributions were almost entirely consistent with the tree (tRI=0.996 and 0.997). The 1-RY/3-del coding (Table 3: trees T1, T3, T5, T7) produced the exact same or very similar tRI values at high taxonomic levels, but these dropped slightly at the subfamily and particularly genus level. The tRI values for MMG were much lower at all hierarchical levels, ranging between 0.650 and 0.693, except for superfamilies (tRI=0.963) (Table 3: T8, T9). These values were directly correlated to the completeness of taxonomical annotation of the different studies from which these datasets were obtained. For example, several ecological MMG datasets (Panama, French Guyana, Soil) had been fully identified at superfamily level but not necessarily at lower taxonomic levels. When NCBI and MMG data were analyzed together, whether using the min3loci or min2loci datasets, the values were slightly reduced compared to the tRIs from the NCBI data alone (Table 3: T4 and T5). However, after pruning of the MMG data from the tree, the original values were largely regained or even slightly increased (Table 3: T4 MMG-pruned and T5 MMG-pruned), indicating a similar phenomenon of signal dilution.

The largest MMG+NCBI tree (T4) was inspected for the details of the topology, as the most complete summary of coleopteran relationships obtainable from the current NCBI database (Fig. 3; Suppl. File S4). We made extensive comments on the tree topology in the 'small' suborders Myxophaga, Archostemata and Adephaga with 25, 9 and 3,406 terminals, respectively, in the light of existing taxonomic knowledge and previous studies, including those that generated these data (Suppl. File S1). The subclades of the tree in some cases were almost entirely from entries of a single phylogenetic study (e.g. in Gyrinoidea), whereas other subclades combined the results from multiple studies and thus extended the taxon sampling in this tree beyond any existing work (e.g. in Cicindelidae). We found a general agreement with the expected relationships, while inconsistencies mostly affected individual terminals or small subgroups that were apparently misplaced (see Suppl. File S1 for detailed discussion). Likewise, the expected major clades and basal relationships of Polyphaga, including almost the entire set of infraorders and superfamilies (Mckenna et al., 2015; Timmermans et al., 2015b; Zhang et al., 2018), were recovered (Fig. 3; Suppl. File S4). Basal relationships within Polyphaga showed the basal split of Scirtoidea from the 'core Polyphaga' (Hunt et al., 2007; Zhang et al., 2018), and the branching of the series (infraorder) Elateriformia (Byrrhoidea, Elateroidea), followed by the Staphyliniformia plus Scarabaeiformia (Staphylinioidea + Hydrophiloidea + Scarabaeoidea), and the Bostrichiformia as sister to the large series Cucujiformia, which are arranged in a plausible topology (((Tenebrionoidea (Cleroidea (Cucujoidea

(Chrysomeloidea, Curculionoidea). However, closer inspection of the tree (Fig. S4) also revealed individual species or smaller sublineages to be removed from the main clades representing a higher taxon, which was reflected in the tRI of <1.0. This is particularly evident in the two small suborders which were not monophyletic with respect to each other, presumably due to attraction of taxa with overlapping gene coverage, while the difficult basal relationships of the four suborders also were not in agreement with transcriptome data (Misof et al., 2014). Comparing the topologies from the min2loci NCBI-only and NCBI+MMG datasets (under 1-RY/3-del) many of the major lineages were monophyletic in both trees, but two groups (Bostrichiforma and Staphylinoidea) were recovered only with the MMG data included.

Discussion

MMG approaches and the Coleoptera Tree-of-Life

Phylogenetically informed studies of species diversity rely increasingly on genomic approaches (Maddison, 2016). While species-level trees already exist for major vertebrate phyla, and ambitious plans for full-genome sequencing of all species have been widely articulated (Zhang et al., 2014), the species-level phylogenetic analysis of a group of insects containing potentially millions of species has not been seriously considered. The MMG technology has the potential to provide rapid species recognition and phylogenetic placement of numerous species at the same time, thus setting the context for studies of evolutionary biology and ecology of the most diverse groups of animals (Crampton-Platt et al. 2016). With >1,900 contigs (representing nearly this number of different species, including 1000 fully identified species in 630 genera) the current database greatly exceeds the ~250 beetle mitogenomes previously available. In addition, this type of data will rapidly expand in the near future, not least because of the possibility of hybrid enrichment of mitochondrial genomes (Liu et al., 2016; Zhang et al., 2014) and improved sequencing methods that ensure efficient assembly (Mostovoy et al., 2016).

The inclusion of numerous mitogenome sequences into a highly incomplete matrix might improve the tree topologies and increase nodal support by reducing the overall proportion of missing data. They might also act as a scaffold to non-overlapping mitochondrial fragments from the NCBI entries. However, the improvements of tree topologies after inclusion of the MMG mitogenomes were negligible according to the test applied here. The comparison is based on the tRI values, i.e. a measure that integrates taxonomic information in relation to the Linnaean classification over the

entire tree. The Linnaean taxonomy seems to be an excellent fit to the tree obtained from the NCBI data, in particular at the highest levels (suborder and superfamily), indicating that the tRI is a good measure of tree quality. Yet, the MMG data did not perform well by this criterion. The interpretation of this result should consider that the mitogenome data were obtained in the course of studies of various lineages and ecosystems unrelated to the aims of the current work. Three of the largest datasets (Soil, Panama and FG) represent specimens identified based on close matches to DNA barcodes and GenBank entries, or based on in-house sequences from specimens identified with various degrees of confidence. Many of these identifications are incompletely defined, e. g. only at the superfamily level, which would reduce the per-character tRI due to lack of data, as consistency with the tree may not be recognizable. High levels of 'missing data' in the calculation of the tRI can reduce the measure of consistency with the tree (Lanfear et al., 2014; Maddison, 1993). In addition, some names may be incorrect, creating conflict with the taxonomy. Therefore the low tRI from the MMG data alone (Table 3) is not a meaningful representation of the phylogenetic power of these mitogenomes. More relevant is the fact that the NCBI+MMG combined tree shows high tRI, and after pruning the MMG data from this combined tree (to avoid the annotation effect described above) the pruned NCBI+MMG tree even shows a slightly higher tRI, i.e. the MMG data improved the tree topology obtained from the NCBI data.

The MMG data might be further strengthened with more uniform taxon selection, which differed greatly across various parts of the tree. For example, among 442 species of Cicindelidae (tiger beetles) only one species is represented by a mitogenome, whereas 1,649 species of Chrysomelidae (leaf beetles) include nearly 300 mitogenomes. If applied more widely, MMG can could easily contribute more uniform coverage and might stabilize the tree, as hypothesized. Second, the MMG data were obtained with fully automated procedures for mitogenome assembly and matrix construction, as the approach is designed for high-throughput analysis of biodiversity samples. Several steps of data curation including the use of multiple assemblers and super-assembly of the products generally result in longer contigs and help to recognize chimeras and other spurious portions mostly near the ends of a contig (Gomez-Rodriguez et al., 2015). These incorrect terminal portions may also be responsible for the split of partial contigs that would otherwise be fused, which are evident in the tree as closely related contigs with marginally overlapping locus strings (Suppl. File S1). In addition, the quality of the MMG data is further affected by the gene extractions performed using Blast (in analogy to the extractions from NCBI), as opposed to template-based annotations, e.g. with the MITOS algorithm (Bernt et al., 2013). This limits the precision of gene delimitation for detecting the start and stop codons and the resulting nucleotide alignment. In conclusion, the current MMG data neither help nor disturb the tree, but it is likely that after thorough taxonomic

identification and improved sequence editing we will see a positive impact on the tree generated from the incongruous NCBI data, ameliorating the effect of highly uneven gene coverage.

Current state of the Coleoptera tree

Data mining of the NCBI database provided a much greater number of taxa than the MMG datasets. However, among the >40,000 species represented at the time of data extraction (October 2015), a large proportion were represented only by a single short fragment, while just under 16,000 and 12,000 terminals, respectively, were represented by a minimum of two or three markers. Tree searches were challenging given the large number of taxa and high proportion of missing data. Yet, it was possible to apply the RAxML software (Bernt et al., 2013; Stamatakis, 2014), which is more reliable than methods designed for even larger trees, such as FastTree (Price et al., 2010), even if the algorithm is not very robust to compositional biases and high rate variation that are prevalent in mitogenome data (Pons et al., 2010; Sheffield et al., 2009; Timmermans et al., 2015b). The RAxML software permits data partitioning which improves the likelihood scores for trees from mitogenomes, whereby a split into six separate partitions for the protein coding genes (the three codon positions for forward and reverse strands) is known to provide nearly the same benefit as the separation of each gene and codon position (Lanfear et al., 2014; Timmermans et al., 2015b). Individual searches took approximately one week with our moderate local computing equipment or the CIPRES server. We observed that searches for the min3loci datasets were much faster than the min2loci, indicating that even adding a quarter more taxa and increasing the proportion of missing data put much greater demand on the searches. A search that also included species represented by only a single locus, mostly corresponding to the barcode *cox1* gene, added some 15,000 taxa to the matrix (for a total of >30,000 taxa), which was beyond the power of existing likelihood algorithms (Izquierdo-Carrasco et al., 2011), and our attempts to perform RAxML analyses on this dataset failed. Our largest tree using the min2loci dataset was obtained by using the tree from the min3loci dataset as starting tree. Thus, the greater information content (fewer missing data) of the min3loci data could be incorporated into the larger dataset without applying topological or backbone constraints based on the smaller set. This distinguishes our approach from similar efforts for species-level phylogenetics in other groups of insects, e.g. in Trichoptera, based on the barcode marker alone, which constrained several taxa at family and genus level to be monophyletic due to the limited power of these short sequences (Zhou et al., 2016). Finally, we combined the mitogenomes with the most widely used nuclear genes, in particular the 18S rRNA gene known to resolve basal relationships in the Coleoptera (Bocak et al., 2014). The end result is a generally defensible tree of an unprecedented magnitude, which now constitutes the first global assessment of relationships in all major lineages of Coleoptera (Suppl. File S3).

When evaluating the tree topology, it is tempting to focus on the basal relationships of the major subgroups, but the sequencing and sampling strategies used here are probably not the most appropriate for resolving this aspect. We consider the greatest value of the current tree of 16,000 species as a resource for the study of sublineages, e.g. within families or subfamilies. Given the high tRI, the trees are generally congruent with the existing taxonomy, which is remarkable given the rapid alignment and tree searches at the scale of many thousand taxa. This finding also implies that particularly at the highest taxonomic levels there are almost no errors in the database itself, i.e. the great majority of GenBank entries is accurate, at least at the level of families and above. We corrected a few known or suspected errors prior to the final tree searches (Suppl. File S1). The tree integrates data from independent studies that were focused on internal relationships within families or subfamilies. The relationships within these groups (discussed in detail for the families of Adephaga in the Suppl. File S1) were generally in agreement with the original studies, but the finer relationships inevitably differ because these studies may have used additional loci and more complex models.

Inconsistencies with the existing analyses were also due to non-overlapping gene sequences, in particular where either the nuclear rRNA or mitochondrial markers were available without any shared loci in these terminals or close relatives. For example, in the five representatives of the myxophagan genus *Sphaerius* (CM1S4Sp7) complete mitogenomes were available for two of the terminals, while two others were sequenced only for 18S rRNA and another one for *cox1a* and *ef1a*. Although some entries may correspond to close relatives, either gene marker placed the sequences in very different clades (the 18S-only terminals were even placed outside of Myxophaga, producing the only case that renders any of the suborders as non-monophyletic) (Suppl. File S1). To some extent the effect of non-overlapping genes can also be observed for the two subclades of Trachypachidae (the North American genus *Trachypachus* and the South American *Systolosoma*), which were placed in distant positions at the base of Carabini and Broscini, respectively. *Systolosoma* had only been sequenced for 18S rRNA and none of the mitochondrial markers, thus being attracted to other species sequenced exclusively for this gene, such as Broscini. In contrast, in *Trachypachus* the 18S rRNA was complemented by a complete mitogenome (Suppl. File S1), which allows placement relative to other mitochondrial sequences.

Another source of inconsistency is the naming of taxa. The myxophagan *Sphaerius* again illustrates a case where inconsistent naming at the species level creates extra terminals. None of the five terminals were identified to species in NCBI but instead were labeled with different alphanumeric identifiers. These specimens may correspond to the same species or even to the same specimen (e.g. submitted by the same research group as part of different datasets), and because our bioinformatics pipeline treats these as separate species entries, inflating the total number of terminals, and also

placing these terminals in distant positions due to the affinities of the various gene markers.

Further problems resulting from labelling of GenBank entries are due to the casual application of taxonomic ranks and the resulting discrepancies with the Linnaean taxonomy on which the tRI is based. This was particularly evident at the genus and subgenus ranks that were not applied consistently in the NCBI classification (and the original literature on which this scheme is based). For example, the Cicindelidae, and specifically the subtribe Cicindelina, has been subdivided into subgroups by Rivalier (1953) that have been interpreted to imply a hierarchical scheme of relationships, but this is inconsistently followed by modern taxonomists. Whereas some studies have recognized two main genera named *Cicindela* and *Cylindera*, besides several other 'genera', the extent and internal subgeneric subdivision of these two lineages remain largely unstudied. Inevitably the mixed application of certain names at both subgeneric and generic levels in the classification inflates the tRI measure.

Finally, the heavy reliance on mitogenomes caused problems of tree inference, due to well understood problems with rate and compositional heterogeneity affecting this marker. For example, mitochondrial genomes generally recover distorted basal relationships in Adephaga, with the highly divergent aquatic families Noteridae + Meruidae separated from all others at the basal node, which renders the remaining aquatic families (Hydradephaga) paraphyletic. This well-known phenomenon (Timmermans et al., 2015a) also is reflected in the current analysis. Only additional taxon sampling or expanded sequencing of the nuclear genome will resolve these problematic basal nodes conclusively.

Conclusions

This is the largest compilation of phylogenetic information for the Coleoptera to date. Various portions of the tree are now open to further investigation and data curation, to remove remaining errors in naming, classification, identification and sequencing. We noted in particular the errors from spelling of names and from different classificatory level to which names were attributed, which led to splitting of taxa into multiple entries in this database. Careful curation of the sequence database and the associated taxonomy database therefore is required, through requests for corrections at the NCBI database and the removal of erroneous sequence data or misassigned species. The tree enables us to identify the taxa which are placed in conflict with their identification. While some terminals may be misidentified or mislabeled, an unexpected position in certain cases can point to alternative phylogenetic relationships. The tree also offers a powerful framework for phylogenetic placement of mitochondrial reads or contigs from additional insect metagenomes or any type of environmental

sequencing, facilitating biodiversity discovery.

Yet, we still have a long way to go to achieve a stable species-level tree of the Coleoptera. We show here how MMG may be a new avenue for rapidly increasing the species representation and also adding tree support. Vice versa, linking these MMG data to the existing phylogenetic database also contributes to the characterization of samples from poorly known ecosystems, such as tropical rainforests. As these data are added to the growing database, the phylogenetic placement of ecological mixtures and the generation of a more secure tree topology go hand-in-hand. Due to the unconstrained searches and inclusion of very large numbers of taxa, our approach opens the possibility for discovery of new lineages, without prior notions of taxon choice and relationships. This includes the ability to reveal new deep lineages that have hitherto been overlooked by classical taxonomy (Andujar et al., 2016; Bocak et al., 2016). This kind of sequencing effort of samples from diverse ecological and biogeographical provenances will iteratively enrich the reference tree, for an increasingly complete picture of the Tree-of-Life. Considering that the Coleoptera is the largest metazoan order on Earth, building such a reference would be a major milestone and can lead the way for similar studies across the Tree-of-Life.

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Authors contribution

BL, APV conceived the study; ACP, JM, MJTNT, CA, PA, KEM, JL, EM, AH, CGR, CB, RN, CPDTG, TB, LB collected the specimen and/or obtained the molecular data; BL, ACP and APV analysed the data; BL, APV wrote the manuscript, and all the authors revised the manuscript.

TABLES

Table 1: Shotgun datasets used in this study and their origin.

Table 2: Taxonomic content of the NCBI, MMG and NCBI+MMG coleopteran supermatrices. “NCBI Proportion” describes the proportion of the NCBI coleopteran taxonomy covered by each dataset. * Numbers are low estimates as many contigs belongs to currently unidentified coleopteran species. ¹ Mitochondrial contigs belonging to clades which were not barcoded in BOLD or defined in the NCBI taxonomy in October 2015 (date of the NCBI data extraction).

Table 3: Taxonomic retention index of the NCBI, MMG and NCBI+MMG coleopteran trees. The taxonomic retention index (tRI) was calculated for four taxonomic level: genus, subfamily, family and superfamily. The 2 trees with best tRI scores are highlighted in bold. Asterisks mark MMG+NCBI trees resulting to less terminals than the summed of NCBI and MMG terminals, because of merged terminals (same species).

FIGURES

Figure 1: Sequence datasets built for this study and decision tree for generating the supermatrices.

Sets of loci were extracted from the GenBank and MMG contigs to respectively build the NCBI dataset (left, blue stippled lines) and the MMG dataset (right, green dashed lines). Both were merged in the MMG-NCBI dataset (center, purple solid lines). The loci support filters and sequence recoding applied to these datasets are reported and resulted in 10 different sequence matrices whose names are given at the bottom of the figure.

Figure 2: Composition of the extracted sequence data. Loci statistics are reported for (A.) the NCBI extraction (split in 15 mitochondrial and 4 nuclear loci) and (B.) the MMG datasets (15 mitochondrial loci). Left radars illustrate the taxonomic evenness of the extraction, with one unit corresponding to one clade of the following taxonomic levels: species (orange dashes), genera (blue dots), subfamilies (purple triangles), families (green squares) and superfamilies (red crosses). On the right side, dotted histograms report the total number of entries retrieved for each locus (including multiple entries belonging to the same species) on a log scale, while dashed histograms reports the corresponding average sequence length.

Figure 3: A graphical representation of the NCBI+MMG tree. This is a condensed version of the full tree of 15983 terminals requiring a minimum of two loci under 1RY/3del coding. The taxon labels were created with the Dendroscope tree viewer that displays sparse labels upon condensing of the tree. The complete unfolded tree is presented in Suppl. File S4. The naming scheme for terminals is according to the locus and name codes described in Material and Methods and Suppl. File S1. Ar1 Archostemata (red); A1, Adephaga (green); P1, Polyphaga (blue); C3, Caraboidea; D3, Dytiscoidea;

Sci3, Scirtoidea; E3, Elateroidea; B3, Byrrhoidea; S3, Staphylinoidea; H3, Hydrophiloidea; Sc3, Scarabaeoidea; Bo, Bostrichoidea; T3, Tenebrionoidea; C3, Cleroidea; Cu3, Cucujoidea; Ch3, Chrysomeloidea; Cur3, Curculionoidea. See Suppl. File S2 for detailed classification key.

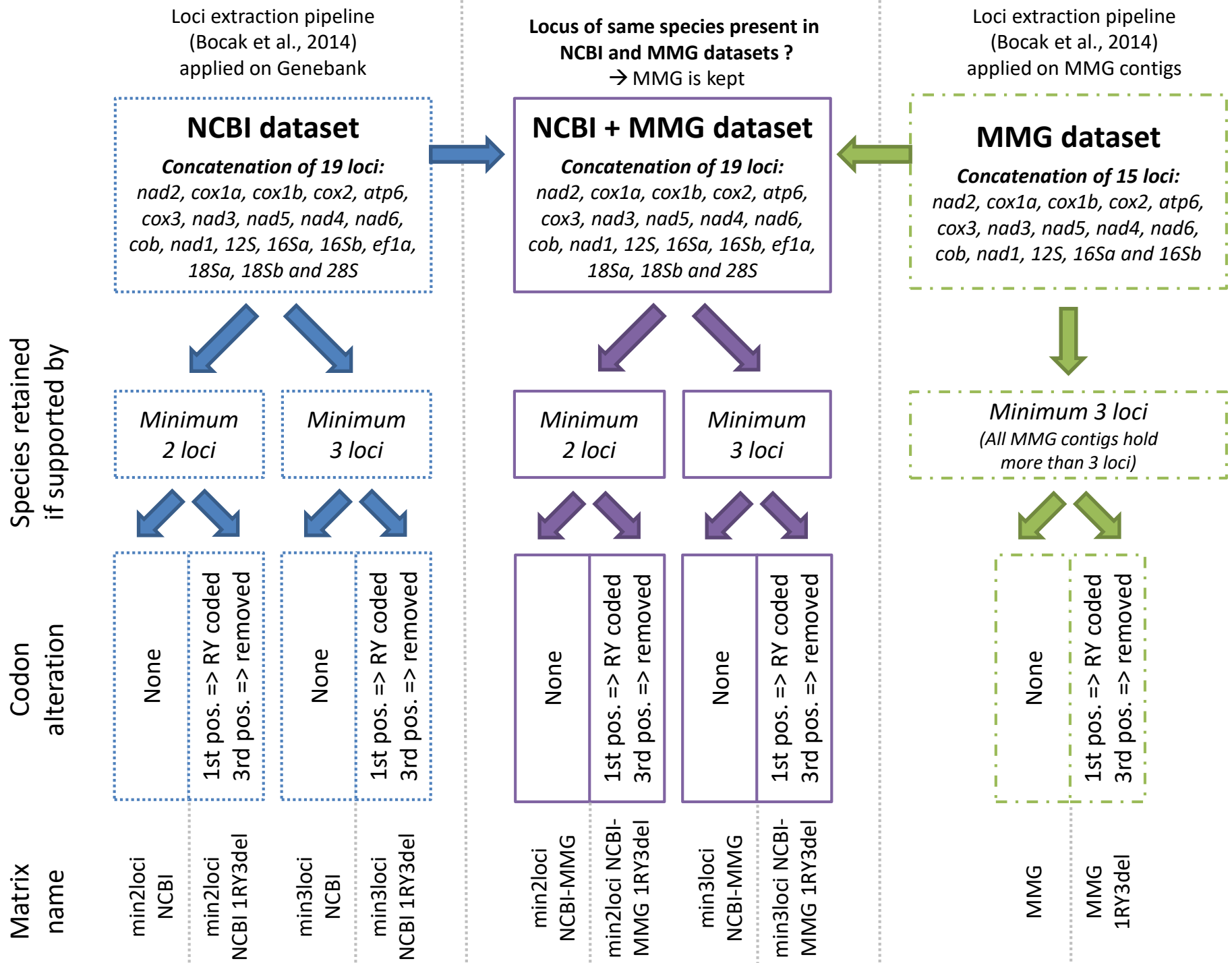
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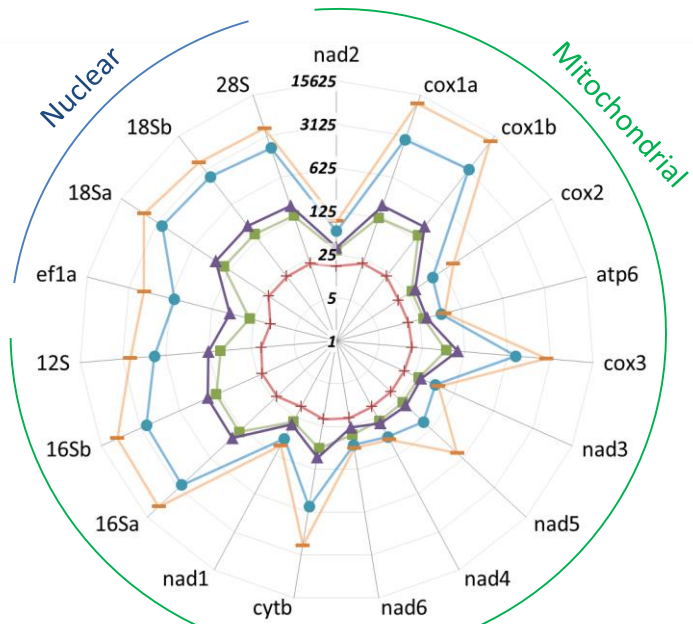
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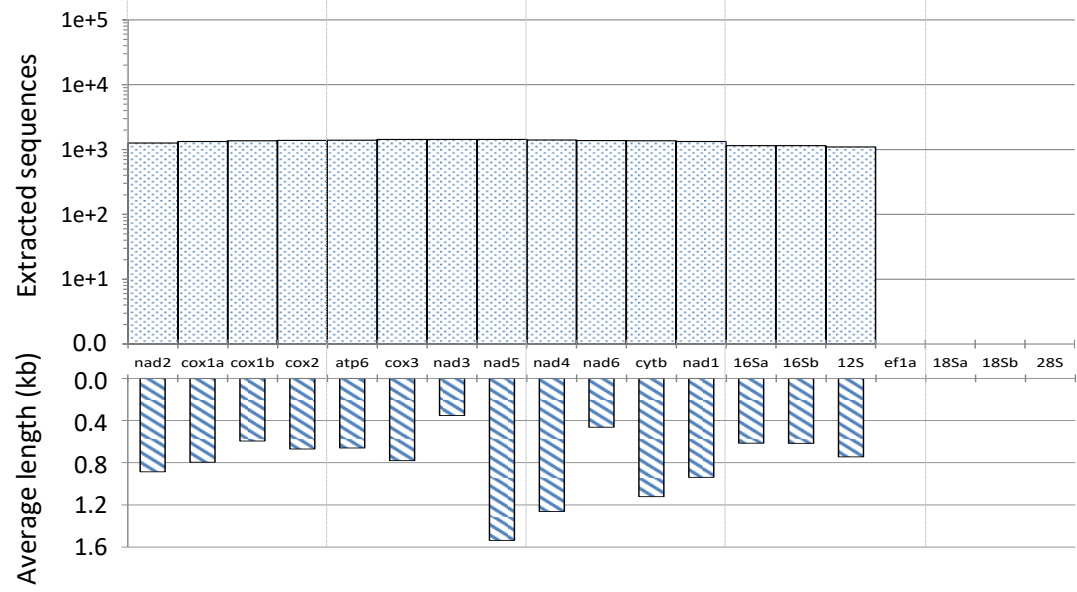
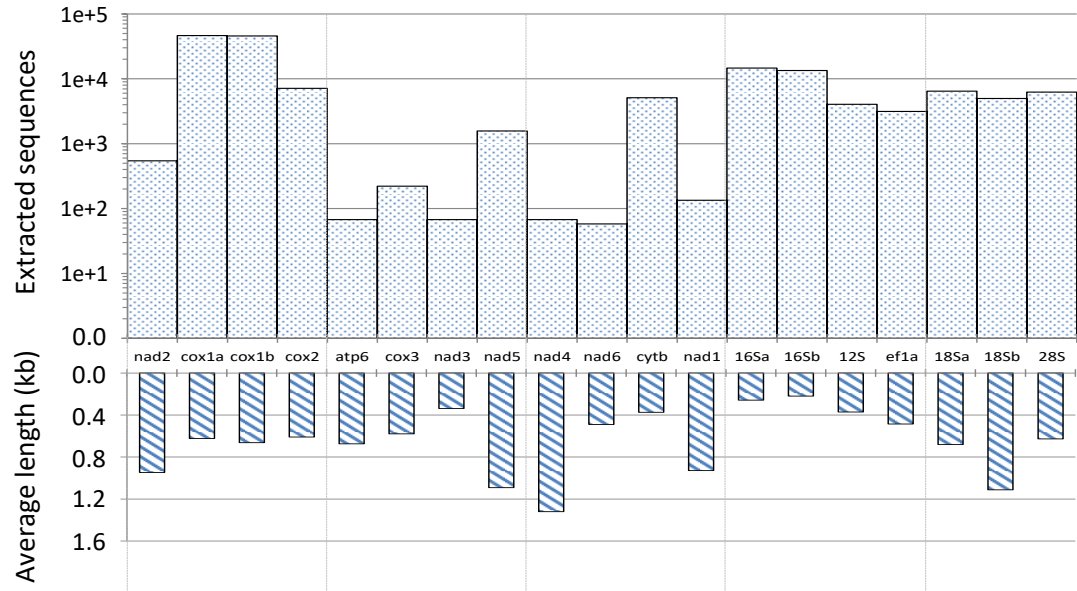
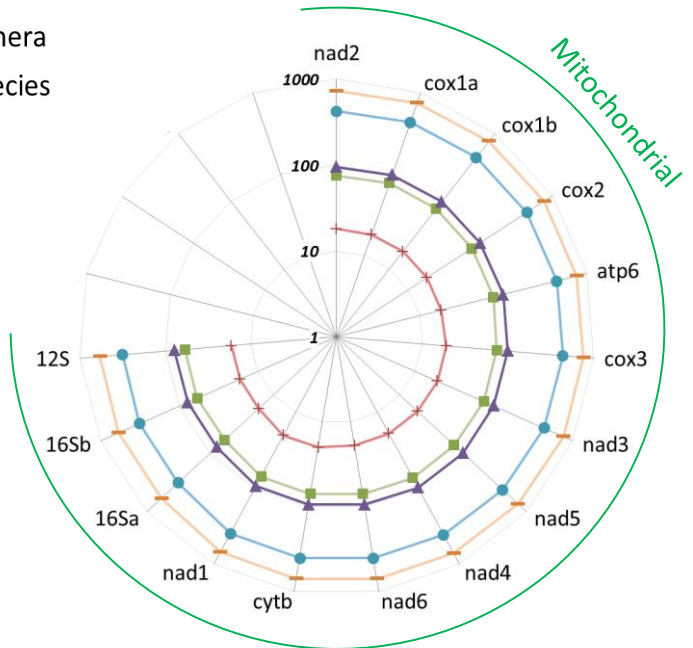


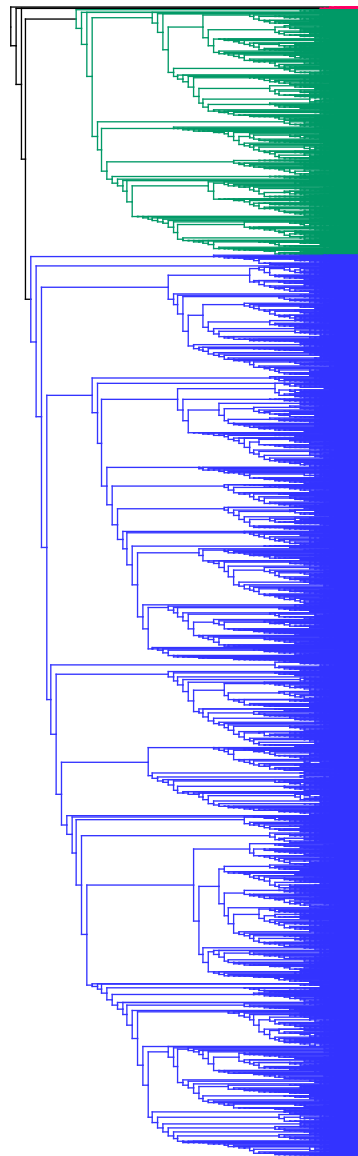
A. NCBI dataset



- + superfamilies
- families
- ▲ subfamilies
- genera
- species

B. MMG dataset





-----X---XX- Car1M4Mi7deb *Micromalthus debilis* NCBI
--XX-----CA1D3D4C5C6R7bou *Rhantus bouvieri* NCBI
--X-----X-XX-----CA1D3D4Co5C6Pa7MB267 *Papuadytes MB267* NCBI
--X-----X-XX-----CA1D3D4Co5C6Co7029TA593 *Copelatus 029TA593* NCBI
--X-----XX-----CA1D3D4H5H6St7lep *Stictonectes lepidus* NCBI
--X-----XX-----CA1D3D4H5H6Or7sno *Oreodytes snoqualmie* NCBI
-XXX-----X-X-----CA1G3G4An7sed *Andogyrus sedilloti* NCBI
--X-----X-XX-----CA1C3C4C5C6Cy7ovi *Cylindera ovipennis* NCBI
XXXXXXXXXXXXXXX-----CA1C3C4Ca6Cal7BYUC0241 *Calosoma BYUC0241* NCBI
--XX-----X---XX-----CA1C3C4T5B6Be7lun *Bembidion lunulatum* NCBI
--X-----XX-----CA1C3C4T5T6Du7les *Duvalius lespeii* NCBI
--XX-----CA1C3C4H5P6Ac7fer *Acanthoferonia ferox* NCBI
--X-----X-----CA1C3C4P15P6BL7ery *Blackburnia erythropus* NCBI
XXXXXXXXXXXXXXX-----CP1Sci3 *Scirtoidea* sp2 FG.idba.75 MMG ANNOT FROI
-----XXXXX-----CP1By3 *Byrrhoidea* sp2 B480tru.idba.155 MMG ANNO
--X-----XX---XXX-----CP1E3E4A5Ad7RK0064 *Adeocera RK0064* NCBI
-----XXXXXXXX-----CP1E3C4C5Rh7 *Rhagonycha* sp Soil.idba.140 MMG ANI
--X-----XX---XXX-----CP1E3P4RK0368 *Phengodidae* RK0368 NCBI
--X-----XXX-----CP1E3Ly4Met7000010 *Metriorrhynchus 000010* NCBI
--X-----XX---XX-----CP1S3S4Ps5Rh7JP2014 *Rhytus JP2014* NCBI
--X-----XX-X-X-----CP1S3S4M5Mi7AI521 *Micropeplus AI521* NCBI
-----XX---X-----CP1S3S4Sta5S6Ag7car *Agelosus carinatus* NCBI
-XXX-----CP1S3S4A5A6Al7spad *Aleochara spadicea* NCBI
-XXX-----XX-----CP1S3S4A5T6Pa7den *Paradilacra densissima* NCBI
--X-----XX-----CP1S3H4Li7mont *Limnebius montanus* NCBI
--X-----XX-----CP1S3H4Hy7ana *Hydraena anatolica* NCBI
--XX-----XX-----CP1H3H4S5Ph7car *Phaenonotum caribense* NCBI
-XXX-----XX-----CP1Sc3Ge4Ge7spi *Geotrupes spiniger* NCBI
XXXXXXXXXXXXXXX-----CP1Sc3S4S5Eu6Eu7foe *Eurysternus foedus* CS.idba.!
--X-----X-----CP1Sc3S4S5Ma7CLS2009 *Macroderes CLS2009* NCBI
-XXX-----CP1Sc3S4M5Pr7mod *Prodontria modesta* NCBI
--X-----XX-----CP1Sc3S4D5En7pan *Enema pan* NCBI
--XX-----CP1Sc3S4M5Phy7bip *Phyllophaga bipartita* NCBI
--X-----X---XXX-----CP1Bo3B4B5Bo7cap *Bostrichus capucinus* NCBI
-----XX-----CP1T3M4Mi7hol *Mimethes holgaticus* NCBI
--X-----X-----CP1T3Z4C5Ta7par *Tarphius parallelus* NCBI
--X-----X---X-----CP1T3NLG2012_6 *Tenebrionoidea NLG2012* NCBI
-XX-----X-X---X-----CP1C3T4P5Re7NLG2013 *Rentonellum NLG2013* NCBI
-XX-----X-X---X-----CP1C3C4Ze7cra *Zenithicola crassus* NCBI
--X-----X-XXX-----CP1Cu3Lat4Ak7atr *Akalyptoischion atrichos* NCBI
--XX-----CP1Cu3C4O5O6or7ccoc060 *Ortalia ccoc060* NCBI
XXXXXXXX-----CP1Cu3 *Cucujoidea* spB0LD AAU7028 *Panamā.idba.18*:
-XX-----XX-----CP1Ch3Ce4L5L6Al7tab *Alosterna tabacicolor* NCBI
-XX-----XX-X-----CP1Ch3C4P17rus *Plateumaris rustica* NCBI
-XX-----XX---X-----CP1Ch3C4B5B6Br7var *Bruchidius varius* NCBI
--X-----XX-----CP1Ch3C4C5C6Cy7eum *Cyrtonus eumolpus* NCBI
XXXXXXXX-----CP1Ch3C4G5A6Chal7aur *Chalcoides aurea* BIUK.idba
--X-----X---XX-----CP1Ch3C4G5G6Lo7scu *Löchmaea scu tellata* NCBI
--X-----X-----CP1Ch3C4E5S5a7fau *Samuelsonia fauveli* NCBI
-----XX-----CP1Cur3Ca4Ca7top *Caenominurus topali* NCBI
--X-----X---X-----CP1Cur3C4P6P17pah *Platypus pahangensis* NCBI
--X-----X-----CP1Cur3C4E5L6La7ang *Laparocerus angustus* NCBI
-XX-----CP1Cur3Bra4E5Sm7jun *Smicronyx jungermanniae* NCB:
--X-----XX-----CP1Cur3C4Cr5On7lui *Onyxalles luigionii* NCBI
--X-X-----X-XXX-----CP1Cur3C4C5M6Rh7nef *Rhinusa nef* NCBI
--X-----X-----CP1Cur3C4SPN003 *Curculionidae* SPN003 NCBI
--X-----X-----CP1Cur3C4S5Li7bic *Liparthrum bicaudatum* NCBI
--X-----X-X---X-----CP1Cur3C4S5Cn7sol *Cnestus solidus* NCBI

| Dataset Identifier | Tree identifier | Publication | Initial study purpose | Sequencing approach | mitochondrial contigs | complete mitochondria (all coding genes) |
|--------------------------------|------------------------|-------------------------------|------------------------------|----------------------------|------------------------------|---|
| B480 | B480 | Crampton-Platt et al., 2015 | Biodiversity | MMG | 155 | 85 |
| BIUK | BIUK | Crampton-Platt, PhD UCL 2015 | Biodiversity | MMG | 87 | 44 |
| MT1 | JX* | Timmermans et al., 2010 | Phylogeny | Long-range PCR | 28 | 0 |
| MT2 | JX* | Timmermans et al., 2016 | Phylogeny | Long-range PCR / MMG | 245 | 24 |
| Curc | Curc | Gillett et al., 2014 | Phylogeny | MMG | 110 | 74 |
| Germany Barcode-of-Life | amie | Present study | Phylogeny | MMG | 189 | 2 |
| Chryso | chryso | Gómez-Rodríguez, et al., 2015 | Ecology | MMG | 173 | 130 |
| Staphylinidae | staph | Present study | Phylogeny | MMG | 90 | 61 |
| Soil | soil | Andújar et al., 2015 | Ecology | MMG | 171 | 71 |
| Ethanol | 1VWB/2VGB | Linard et al., 2016 | Methodology | MMG | 45 | 29 |
| M2015 | m2015 | Present study | Phylogeny | MMG | 33 | 21 |
| Scarabaeidae | scarab | Breeschoten et al., 2016 | Phylogeny | MMG | 86 | 17 |
| ChrysoT | chrysot | Rui et al., submitted | Phylogeny | MMG | 72 | 49 |
| French Guyana | FG | Present study | Biodiversity | MMG | 153 | 71 |
| Panama | panama | Present study | Biodiversity | MMG | 236 | 100 |
| Scolytinae | scoly | Milller et al., 2015 | Methodology | MMG | 63 | 53 |
| Cocci | cocci | Paula et al., 2014 | Ecology | MMG | 6 | 6 |

| | NCBI dataset | MMG datasets | | | min2loci NCBI+MMG tree | |
|----------------------|--------------|--------------|------------------------|-----------------------------|------------------------|------------------------|
| | | Count | NCBI Proportion (%) | Novel taxa (not in NCBI) | count | NCBI Proportion (%) |
| <i>suborders</i> | 4 | 4 | 100.0 | 0 | 4 | 100.0 |
| <i>superfamilies</i> | 21 | 20 | 95.2 | 0 | 21 | 100.0 |
| <i>families</i> | 165 | >126* | >73.7* | >1 ^{*1} | 161 | 97.6 |
| <i>subfamilies</i> | 257 | >140* | >54.5* | >4 ^{*1} | 240 | 93.4 |
| <i>genera</i> | 5441 | >632* | >11.6* | >36 ^{*1} | 3999 | 73.5 |
| <i>species</i> | 30700 | >1053* | >3.4* | >59 ^{*1} | 16002 | 52.1 |

| Tree name | NCBI trees | | | | NCBI+MMG trees | | | | | | | | MMG trees | |
|------------------------|--------------|---------|----------|-------|----------------|-------------------|-------|-------------------|----------|-------------------|-------|-------------------|-----------|-------|
| | min3loci | | min2loci | | min3loci | | | | min2loci | | | | T8 | T9 |
| | T0 | T1 | T2 | T3 | T4 | T4, MMG pruned | T5 | T5, MMG pruned | T6 | T6, MMG pruned | T7 | T7, MMG pruned | | |
| Codon recoding | none | 1RY3del | none | 1RY3d | none | none | 1RY3d | 1RY3d | none | none | 1RY3d | 1RY3d | none | 1RY3d |
| terminals | 10063 | 10062 | 14612 | 14612 | 11944 | 10063 | 11942 | 10062 | 15983 | 14028* | 15983 | 14028* | 1876 | 1876 |
| tRI genus | 0.868 | 0.854 | 0.819 | 0.785 | 0.820 | 0.867 | 0.803 | 0.851 | 0.782 | 0.824 | 0.754 | 0.798 | 0.693 | 0.693 |
| tRI subfamily | 0.946 | 0.941 | 0.930 | 0.922 | 0.857 | 0.950 | 0.855 | 0.947 | 0.860 | 0.933 | 0.856 | 0.929 | 0.656 | 0.653 |
| tRI family | 0.986 | 0.985 | 0.977 | 0.977 | 0.896 | 0.987 | 0.896 | 0.986 | 0.910 | 0.982 | 0.910 | 0.980 | 0.650 | 0.663 |
| tRI superfamily | 0.995 | 0.995 | 0.991 | 0.991 | 0.942 | 0.996 | 0.942 | 0.997 | 0.953 | 0.995 | 0.953 | 0.995 | 0.953 | 0.963 |

The contribution of mitochondrial metagenomics to large-scale data mining and phylogenetic analysis of Coleoptera

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Neuropterida outgroups

A set of 8 complete Neuropterida mitochondrial genomes, from 8 different families were used as outgroups.

| Loci and Taxonomic code | Species | GenBank identifier |
|-------------------------------------|-------------------------------|---------------------------|
| XXXXXXXXXXXXXXXXXXXX---_NO4Th7lan | Thyridosmylus langii | NC_021415 |
| XXXXXXXXXXXXXXXXXXXX---_NMa4Di7bis | Ditaxis biseriata | NC_013257 |
| XXXXXXXXXXXXXXXXXXXX---_NCh4Chr7nip | Chrysoperla nipponensis | NC_015093 |
| XXXXXXXXXXXXXXXXXXXX---_NPo4Po7pun | Polystoechotes punctatus | NC_011278 |
| XXXXXXXXXXXXXXXXXXXX---_NR4Ra7xiz | Rapisma xizangense | NC_023362 |
| XXXXXXXXXXXXXXXXXXXX---_NNy4Ny7myr | Nymphes myrmeleonoides | NC_024825 |
| XXXXXXXXXXXXXXXXXXXX---_NMy4My7imm | Myrmeleon immanis | NC_024826 |
| XXXXXXXXXXXXXXXXXXXX---_NA4As7app | Ascaloptynx appendiculatus | NC_011277 |

GenBank accessions related to MMG contigs

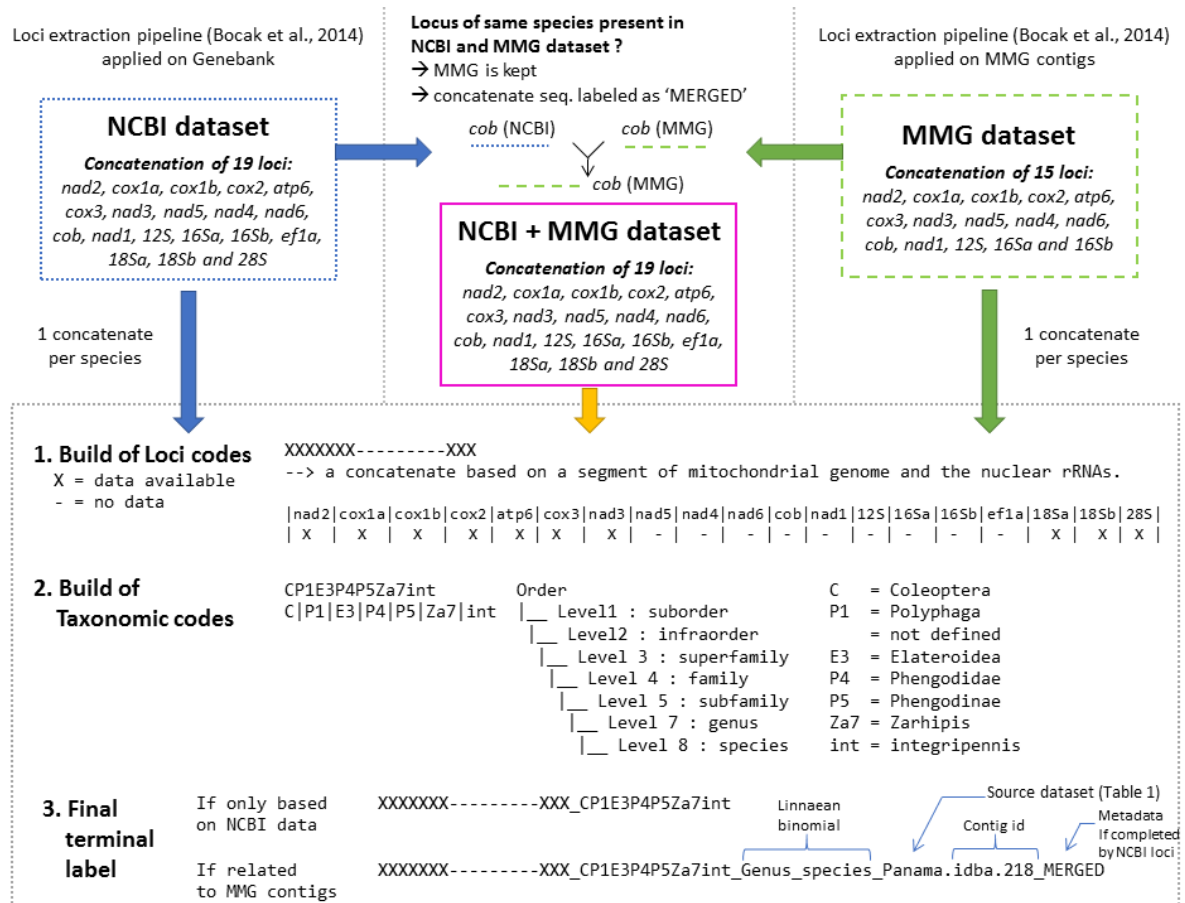
| Dataset Identifier | GenBank codes (# per subset) | Publication |
|--------------------------------|---|-------------------------------|
| B480 | Submitted to NCBI | Crampton-Platt et al., 2015 |
| BIUK | Submitted to NCBI | Crampton-Platt, PhD UCL 2015 |
| MT1 | HM486073 HQ232800-HQ232827 (27) | Timmermans et al., 2010 |
| MT2 | JX220988-JX221000 (13) JX313663-JX313692 (29) JX412724-JX412859 (127) JN039360 JN163945-JN163970 (25) JQ034414 JQ034416 JQ034419 | Timmermans et al., 2016 |
| Curc | Submitted to NCBI | Gillett et al., 2014 |
| Germany Barcode-of-Life | KX087231 - KX087368 (139) | Present study |
| Chryso | KX943331-KX943509 (179) | Gómez-Rodríguez, et al., 2015 |
| Staphylinidae | KT780620-KT780701 (82) | Present study |
| Soil | Submitted to NCBI | Andújar et al., 2015 |
| Ethanol | KT876876-KT876915 (42) | Linard et al., 2016 |
| M2015 | KX035130-KX035162 (33) | Present study |
| Scarabaeidae | KU39447-KU739446 (80) | Breeschoten et al., 2016 |
| ChrysoT | KX943331-KX943509 (179) | Rui et al., submitted |
| French Guyana | KT696173-KT696273 (101) | Present study |
| Panama | MG193322-MG193541 (220) | Present study |
| Scolytinae | KX035130-KX035226 (64) | Miller et al., unpublished |
| Cocci | KJ778881-KJ77883 (3) KJ778886 KJ778888-KJ778889 (2) | Paula et al., 2014 |

Illumina reads QC and mitochondrial loci selection:

1. Trimmomatic was used to discard eventual Illumina adapter left in the metagenomes:
java -jar trimmomatic-0.33.jar PE -threads 4 -phred33 -trimlog MyLibraryTrimlog
MyLibrary_R1.fq MyLibrary_R2.fq MyLibrary_R1.paired.fq MyLibrary_R1.unpaired.fq
MyLibrary_R2.paired.fq MyLibrary_R2.unpaired.fq
ILLUMINACLIP:MyLibrary_Truseq_trimseqs.fa:2:30:10
2. Prinseq was used to trim reads of low quality with:
perl prinseq-lite.pl -verbose -fastq MyLibrary.fq -log -out_format 3 -out_good
MyLibrary.QC -min_len 150 -min_qual_mean 25 -ns_max_n 0 -trim_qual_right 20
3. Mitochondrial reads were filtered with the help of blastn. First the quality controlled metagenomes were blasted to a custom database of a hundred of Coleopteran mitochondrial genomes with this command:
blastn -db MitogenomeReferences.fa -query MyLibrary.paired.fa -out
MyLibrary.paired.blastn -task blastn -evalue 1e-5 -max_target_seqs 1 -outfmt 6 -dust no
4. All reads matching this database at a Evalue inferior to 1e-3 and with at least 70% of identity were filtered out with a custom script to form a putative mitochondrial reads subset.
5. Following these quality control and filtering, the read subset was submitted to IDBA assembly with:
idba_ub --mink 80 --maxk 250or300 --min_contig 1000 --similar 0.98
6. All contigs <5kb were discarded (short contigs cannot be identified because they don't hold the cox1 or cytb regions)
7. All remaining contigs were submitted to the pipeline of Bocak et al., 2014.

Labelling of the tree tips

The tips labels contain 3 groups (see figure below), the locus code, the taxonomic code, the Linnaean binomial and metadata related to the mitochondrial contig if the tip is partially or fully based on loci extracted from the MMG dataset.



- **Locus code:** The ordered X/- symbols help the reader to determine which locus supports a particular tip. Typically, a X on the first 15 positions means a full mitochondria, while the 4 last positions represent the nuclear loci used in the analysis. The example in the figure below describe a species supported by a first half of mitochondrial genome (loci nad2 to nad3) and 3 nuclear loci.
- **Taxonomic code:** This code is similar to the one used in Bocak et al, 2014. Eight taxonomic orders are associated to combinations of 1 to 3 letters and a number. The numbers represent 8 taxonomical levels: 1=suborder, 2=infraorder, 3=superfamily, 4=family, 5=subfamily, 7=genus, 8=species. A tip may or may not be associated to each of these levels: see the example below where the infraorder of Zarhipis integripennis is undefined (level 3 absent). A tip may also be associated to only high taxonomic ranks if the sequence was extracted from poorly identified specimens. Example: a taxonomic code limited to "CP1E3" correspond to an Elateroidea sp. (specimen identified at superfamily level).
- **Linnaean binomial:** The genus and species in plain letter in most cases. When the sequence correspond to a specimen identified at higher taxonomic levels, this higher level is used

instead. Example: Elateroidea sp.

- Finally, if the tip is related to MMG sequences, the study and the contig from which were built at least 1 locus are reported as **supplementary keywords**. These metadata are labelled using the following set of keywords :
 - o **NCBI**: indicates that the tip is fully based on NCBI loci.
 - o **MMG**: indicates that the tip is fully based on a MMG contig.
 - o **MERGED**: indicates that at least one locus supporting the tip was from available both from the NCBI and MMG datasets. In such case the MMG locus was kept (ensuring coherence of the full mitochondrial contig).
 - o **ANNOT_FROM_BARCODE**: is related to MMG contigs for which study-related, NCBI or BOLD barcodes allowed DNA-based identification of the genus or species (match >99.8%, sequenced assigned to species, match >99% identity, sequenced assigned to genus level).
 - o **ANNOT_FROM_TREE**; is related to MMG contigs for which no matching barcodes or other reference sequences could be discovered. In such case, the superfamily to which was placed the sequence (through tree reconstruction) was used as a high-level taxonomic identification.

Taxonomic codes: detailed key file

All taxonomic codes and their detailed description can be found in Suppl. File S2 (excel table).

Terminals based on both NCBI and MMG loci (“MERGED” keyword)

(Ordered taxonomically via the column “NCBI original taxonomic code)

(Use Suppl. File S2 to get taxonomic code details)

| NCBI original loci code | NCBI original taxonomic code | MMG original loci code | MMG original taxonomic code | MERGED loci code | MERGED label |
|-------------------------|------------------------------|------------------------|--|------------------------|---|
| -XX----- | CA1C3C4B6Br7cre | XXXXXXXXXXXXXX | CA1C3C4B6Br7cre_Brachinus_crepitans_JX412826 | XXXXXXXXXXXXXX | CA1C3C4B6Br7cre_Brachinus_crepitans_JX412826_MERGED |
| --X-----X-XX--XX- | CA1C3C4C5C6Hab7cap | XXXXXXXXXXXXXX | CA1C3C4C5C6Hab7cap_Habrodera_capensis_JX412824 | XXXXXXXXXXXXXX-XX- | CA1C3C4C5C6Hab7cap_Habrodera_capensis_JX412824_MERGED |
| -XX---X--X-XXX-XXX | CA1C3C4Ca6Ca7n7em | -XXXXXXXXXXXXXX | CA1C3C4Ca6Ca7n7em_Carabus_nemoralis_BIUK.idba.47 | -XXXXXXXXXXXXXX-XXX | CA1C3C4Ca6Ca7n7em_Carabus_nemoralis_BIUK.idba.47_MERGED |
| -XX---X--X-XXX-X-X | CA1C3C4Ca6Ca7prob | XXXXX----- | CA1C3C4Ca6Ca7prob_Carabus_problematicus_BIUK.idba.82 | XXXXX--X--X-XXX-X-X | CA1C3C4Ca6Ca7prob_Carabus_problematicus_BIUK.idba.82_MERGED |
| -X-----X-XXX-XXX | CA1C3C4Cy6Cy7car | XXXXXXXXXXXXXX | CA1C3C4Cy6Cy7car_Cychrus_caraboides_BIUK.idba.13 | XXXXXXXXXXXXXX-XXX | CA1C3C4Cy6Cy7car_Cychrus_caraboides_BIUK.idba.13_MERGED |
| -X-----XX- | CA1C3C4E5E6B17mul | XXXXXXXXXX | CA1C3C4E5E6B17mul_Blethisa_multipunctata_ameie.idba.101 | XXXXXXXXXX-----XX- | CA1C3C4E5E6B17mul_Blethisa_multipunctata_ameie.idba.101_MERGED |
| -XX-----X--XX- | CA1C3C4E5E6E17cup | XXXXXXXXXXXXXX | CA1C3C4E5E6E17cup_Elaphrus_cupreus_ameie.idba.30 | XXXXXXXXXXXXXX--XX- | CA1C3C4E5E6E17cup_Elaphrus_cupreus_ameie.idba.30_MERGED |
| -XXX--X----- | CA1C3C4H5H6An7poe | XXXXXX----- | CA1C3C4H5H6An7poe_Anisodactylus_poeciloides_ameie.idba.172 | XXXXXX-X----- | CA1C3C4H5H6An7poe_Anisodactylus_poeciloides_ameie.idba.172_MERGED |
| -XX----- | CA1C3C4H5H6Br7ruf | XXXXXXXXXX | CA1C3C4H5H6Br7ruf_Bradycellus_ruficollis_ameie.idba.124 | XXXXXXXXXX----- | CA1C3C4H5H6Br7ruf_Bradycellus_ruficollis_ameie.idba.124_MERGED |
| -XX----- | CA1C3C4H5H6Cry7ten | XX----- | CA1C3C4H5H6Cry7ten_Cryptophonus_tenebrosus_ameie.idba.193 | XX----- | CA1C3C4H5H6Cry7ten_Cryptophonus_tenebrosus_ameie.idba.193_MERGED |
| -XX----- | CA1C3C4H5H6Op7ard | -XXXXXXXXXXXX | CA1C3C4H5H6Op7ard_Ophonus_ardosiacus_Soil.idba.8a | -XXXXXXXXXXXX----- | CA1C3C4H5H6Op7ard_Ophonus_ardosiacus_Soil.idba.8a_MERGED |
| -X----- | CA1C3C4H5L6Le7chl | XXXXXXXXXXXXXX | CA1C3C4H5L6Le7chl_Lebia_chlorocephala_ameie.idba.39 | XXXXXXXXXXXXXX----- | CA1C3C4H5L6Le7chl_Lebia_chlorocephala_ameie.idba.39_MERGED |
| -XX-----X- | CA1C3C4H5L6Mic7min | XXXXXXXXXXXXXX | CA1C3C4H5L6Mic7min_Microlestes_minutulus_ameie.idba.19 | XXXXXXXXXXXXXX-----X- | CA1C3C4H5L6Mic7min_Microlestes_minutulus_ameie.idba.19_MERGED |
| -XX----- | CA1C3C4H5L6Sy7fov | XXXXXXXXXX | CA1C3C4H5L6Sy7fov_Syntomus_foveatus_Soil.idba.104 | XXXXXXXXXX----- | CA1C3C4H5L6Sy7fov_Syntomus_foveatus_Soil.idba.104_MERGED |
| -XXX--X-----XX-XX- | CA1C3C4H5P6Ab7par | XXXXXXXXXXXXXX | CA1C3C4H5P6Ab7par_Abax_parallelepipedus_2VGB.idba.3 | XXXXXXXXXXXXXX-XX- | CA1C3C4H5P6Ab7par_Abax_parallelepipedus_2VGB.idba.3_MERGED |
| -X-----XX- | CA1C3C4H5P6Ab7para | -XXXXXX----- | CA1C3C4H5P6Ab7para_Abax_parallelus_ameie.idba.169 | -XXXXXX----XX---- | CA1C3C4H5P6Ab7para_Abax_parallelus_ameie.idba.169_MERGED |
| -XX----- | CA1C3C4H5P6Pt7mad | -XXXXXXXXXXXX | CA1C3C4H5P6Pt7mad_Pterostichus_madidus_BIUK.idba.54 | -XXXXXXXXXXXX----- | CA1C3C4H5P6Pt7mad_Pterostichus_madidus_BIUK.idba.54_MERGED |
| -XX-----XX- | CA1C3C4H5P6Pt7nig | XXXXXXXXXXXXXX | CA1C3C4H5P6Pt7nig_Pterostichus_niger_2VGB.idba.5 | XXXXXXXXXXXXXX-XX- | CA1C3C4H5P6Pt7nig_Pterostichus_niger_2VGB.idba.5_MERGED |
| -XXX-----XX- | CA1C3C4H5P6St7pum | XXXXXXXXXXXXXX | CA1C3C4H5P6St7pum_Stomis_pumicatus_2VGB.idba.4 | XXXXXXXXXXXXXX-XX- | CA1C3C4H5P6St7pum_Stomis_pumicatus_2VGB.idba.4_MERGED |
| -XX----- | CA1C3C4H5Z6Am7com | XXXXXXXXXXXXXX | CA1C3C4H5Z6Am7com_Amara_communis_677553_idba_contig.5 | XXXXXXXXXXXXXX----- | CA1C3C4H5Z6Am7com_Amara_communis_677553_idba_contig.5_MERGED |
| -XX-----X--XX- | CA1C3C4L5L6Lo7pil | XXXXXXXXXXXXXX | CA1C3C4L5L6Lo7pil_Loricera_pilicornis_BIUK.idba.49 | XXXXXXXXXXXXX-X--XX- | CA1C3C4L5L6Lo7pil_Loricera_pilicornis_BIUK.idba.49_MERGED |
| -XX-----XX-XX- | CA1C3C4Ne6Ne7bre | XXXXXXXXXXXXXX | CA1C3C4Ne6Ne7bre_Nebria_brevicollis_2VGB.idba.0 | XXXXXXXXXXXXXX-XX- | CA1C3C4Ne6Ne7bre_Nebria_brevicollis_2VGB.idba.0_MERGED |
| -XXX-----XXX- | CA1C3C4P15P6Ag7mue | -XXXXXXXXXXXX | CA1C3C4P15P6Ag7mue_Agonum_muelleri_JX412835 | -XXXXXXXXXXXX--XXX- | CA1C3C4P15P6Ag7mue_Agonum_muelleri_JX412835_MERGED |
| -XX----- | CA1C3C4P15P6Ox7obs | XXXXXXXXXXXXXX | CA1C3C4P15P6Ox7obs_Oxypselaphus_obscurus_BIUK.idba.26 | XXXXXXXXXXXXXX----- | CA1C3C4P15P6Ox7obs_Oxypselaphus_obscurus_BIUK.idba.26_MERGED |
| -XXX-----X-- | CA1C3C4P15S6Ca7me1 | XXXX--XXXX | CA1C3C4P15S6Ca7me1_Calathus_melanocephalus_2VGB.idba.15 | XXXX-----XXXX-- | CA1C3C4P15S6Ca7me1_Calathus_melanocephalus_2VGB.idba.15_MERGED |
| -XXXX-----XX- | CA1C3C4Pr5P6Pr7cra | XXXXXXXXXXXXXX | CA1C3C4Pr5P6Pr7cra_Promecognathus_crassus_JX313665 | XXXXXXXXXXXXXX--XX- | CA1C3C4Pr5P6Pr7cra_Promecognathus_crassus_JX313665_MERGED |
| -X-----XX- | CA1C3C4T5B6Be7lae | XXXXXXXXXXXXXX | CA1C3C4T5B6Be7lae_Bembidion_laetum_Soil.idba.40 | XXXXXXXXXXXXXX-XX- | CA1C3C4T5B6Be7lae_Bembidion_laetum_Soil.idba.40_MERGED |
| -X-----XX- | CA1C3C4T5B6Be7var | XXXXXXXXXXXXXX | CA1C3C4T5B6Be7var_Bembidion_varium_ameie.idba.56 | XXXXXXXXXXXXXX--XX- | CA1C3C4T5B6Be7var_Bembidion_varium_ameie.idba.56_MERGED |
| -X-----XX- | CA1C3C4T5B6Ta7nan | XXXXXXXXXXXXXX | CA1C3C4T5B6Ta7nan_Tachyta_nana_832958_idba_contig.6 | XXXXXXXXXXXXXX-XX- | CA1C3C4T5B6Ta7nan_Tachyta_nana_832958_idba_contig.6_MERGED |
| -X----- | CA1C3C4T5Po6Po7iri | XXXXXXXXXXXXXX | CA1C3C4T5Po6Po7iri_Pogonus_iridipennis_ameie.idba.48 | XXXXXXXXXXXXXX----- | CA1C3C4T5Po6Po7iri_Pogonus_iridipennis_ameie.idba.48_MERGED |
| -XXX-----XX-X- | CA1C3C4T5Tr7obt | XXXXXXXXXXXXXX | CA1C3C4T5Tr7obt_Trechus_obtusus_Soil.idba.42 | XXXXXXXXXXXXXX-X- | CA1C3C4T5Tr7obt_Trechus_obtusus_Soil.idba.42_MERGED |
| XXXXXXXXXX-XXX-XX- | CA1C3T4Tr7hol | XXXXXXXXXXXXXX | CA1C3T4Tr7hol_Trachypachus_holmbergi_NC_011329 | XXXXXXXXXXXXXX-XX- | CA1C3T4Tr7hol_Trachypachus_holmbergi_NC_011329_MERGED |
| -X-----X-XXX-XX- | CA1D3A4Am7ins | XX----- | CA1D3A4Am7ins_Amphizoa_insolens_799022_idba_contig.85 | XX-----X-XXX-XX- | CA1D3A4Am7ins_Amphizoa_insolens_799022_idba_contig.85_MERGED |
| XXXXXXXXXXXXXX-XX- | CA1D3As4As7nio | XXXXXXXXXXXXXX | CA1D3As4As7nio_Aspidytes_niobe_NC_012139 | XXXXXXXXXXXXXX-XX- | CA1D3As4As7nio_Aspidytes_niobe_NC_012139_MERGED |
| -XX-----XX- | CA1D3D4A5A6Ag7uli | XXXXXXXXXXXXXX | CA1D3D4A5A6Ag7uli_Agabus_uliginosus_ameie.idba.68 | XXXXXXXXXXXXXX----- | CA1D3D4A5A6Ag7uli_Agabus_uliginosus_ameie.idba.68_MERGED |
| -XXX-----X-XXXX- | CA1D3D4C5C6Co7fus | XXXXXXXXXXXXXX-X---- | CA1D3D4C5C6Co7fus_Colymbetes_fuscus_1VWB.idba.16 | XXXXXXXXXXXXXX----- | CA1D3D4C5C6Co7fus_Colymbetes_fuscus_1VWB.idba.16_MERGED |
| --X-----X-----XX- | CA1D3D4Co5C6L17hae | XXXXXXXXXXXXXX | CA1D3D4Co5C6L17hae_Liopterus_haemorrhoidalis_1VWB.idba.11 | XXXXXXXXXXXXXX-XX- | CA1D3D4Co5C6L17hae_Liopterus_haemorrhoidalis_1VWB.idba.11_MERGED |
| -XXX-----X--XX- | CA1D3D4D5Ac6Ac7sul | XXXXXXXXXXXXXX | CA1D3D4D5Ac6Ac7sul_Acilius_sulcatus_1VWB.idba.3 | XXXXXXXXXXXXXX-XX- | CA1D3D4D5Ac6Ac7sul_Acilius_sulcatus_1VWB.idba.3_MERGED |
| -XX-----XX-XX- | CA1D3D4D5C6Cy7lat | XXXXXXXXXX | CA1D3D4D5C6Cy7lat_Cybister_lateralimarginalis_ameie.idba.131 | XXXXXXXXXX--XX-XX- | CA1D3D4D5C6Cy7lat_Cybister_lateralimarginalis_ameie.idba.131_MERGED |
| -X-----XX---- | CA1D3D4H5H6Hy7dis | XXXXXXXXXX | CA1D3D4H5H6Hy7dis_Hydroporus_discretus_1VWB.idba.14 | XXXXXXXXXX--XX---- | CA1D3D4H5H6Hy7dis_Hydroporus_discretus_1VWB.idba.14_MERGED |
| -XX-----X--XX- | CA1D3D4H5H6Hy7ery | -----XXXXXXXXXX | CA1D3D4H5H6Hy7ery_Hydroporus_erythrocephalus_1VWB.idba.20 | -XX-----XXXXXXXXXX- | CA1D3D4H5H6Hy7ery_Hydroporus_erythrocephalus_1VWB.idba.20_MERGED |
| -XX-----XX---- | CA1D3D4H5H6Hy7gyl | XXXXXXXXXXXXXX | CA1D3D4H5H6Hy7gyl_Hydroporus_gyllenhalii_1VWB.idba.4 | XXXXXXXXXXXXXX--XX---- | CA1D3D4H5H6Hy7gyl_Hydroporus_gyllenhalii_1VWB.idba.4_MERGED |
| -XXX-----XX-X- | CA1D3D4H5H6Hy7obs | XXXXXXXXXXXXXX | CA1D3D4H5H6Hy7obs_Hydroporus_obscurus_1VWB.idba.1 | XXXXXXXXXXXXXX-X- | CA1D3D4H5H6Hy7obs_Hydroporus_obscurus_1VWB.idba.1_MERGED |

| | | | | | |
|-----------------------|---------------------|----------------------|--|----------------------------|---|
| -XX-----XX-XX- | CA1D3D4H5H6Hy7pa1 | -----XXXXXX-XXXX | CA1D3D4H5H6Hy7pa1_Hydroporus_palustris_JX313670 | -XX-XXXXXXXXXX-XX- | CA1D3D4H5H6Hy7pa1_Hydroporus_palustris_JX313670_MERGED |
| -XX-----XX-XX- | CA1D3D4H5H6Hy7pla | XXXXXXXXXXXXXXXXXXXX | CA1D3D4H5H6Hy7pla_Hydroporus_planus_1VWB.idba.2 | XXXXXXXXXXXXXXXXXXXX | CA1D3D4H5H6Hy7pla_Hydroporus_planus_1VWB.idba.2_MERGED |
| -XX-----X--XX- | CA1D3D4H5Hyg6Hy7con | XXXXXXXXXXXXXXXXXXXX | CA1D3D4H5Hyg6Hy7con_Hygrotytus_confluens_1VWB.idba.7 | XXXXXXXXXXXXXXXXXXXX-XX- | CA1D3D4H5Hyg6Hy7con_Hygrotytus_confluens_1VWB.idba.7_MERGED |
| -XX-----XX-XX- | CA1D3D4H5Hyg6Hy7ina | XXXXXXXXXXXXXXXXXXXX | CA1D3D4H5Hyg6Hy7ina_Hygrotytus_inaequalis_1VWB.idba.10 | XXXXXXXXXXXXXXXXXXXX-XX- | CA1D3D4H5Hyg6Hy7ina_Hygrotytus_inaequalis_1VWB.idba.10_MERGED |
| --X-----XX---- | CA1D3D4H5Hyg6Hy7nig | XXXXXXXXXXXXXXXXXXXX | CA1D3D4H5Hyg6Hy7nig_Hygrotytus_nigrolineatus_ameie.idba.11 | XXXXXXXXXXXXXXXXXXXX-XX- | CA1D3D4H5Hyg6Hy7nig_Hygrotytus_nigrolineatus_ameie.idba.11_MERGED |
| -XX-----X-XX-XX- | CA1D3D4L5L6La7poe | XXXXXXXXXXXXXXXXXXXX | CA1D3D4L5L6La7poe_Laccophilus_poecilus_ameie.idba.8 | XXXXXXXXXXXXXXXXXXXX-XX- | CA1D3D4L5L6La7poe_Laccophilus_poecilus_ameie.idba.8_MERGED |
| -XXX-----X-X-X-XX- | CA1D3H4Hy7her | XXXXXXXXXXXXXXXXXXXX | CA1D3H4Hy7her_Hygrobia_hermanni_1VWB.idba.13 | XXXXXXXXXXXXXXXXXXXX-XX- | CA1D3H4Hy7her_Hygrobia_hermanni_1VWB.idba.13_MERGED |
| -X-----X-XXX-XX- | CA1D3M4Me7phy | --XXXXXXXXXXXX-XXXX | CA1D3M4Me7phy_Meru_phyllisae_JX313691 | -XXXXXXXXXXXXXXXXXX-XX- | CA1D3M4Me7phy_Meru_phyllisae_JX313691_MERGED |
| -XXX-----X-XXX-XX- | CA1D3N4Not7cla | XXXXXXXXXXXXXXXXXXXX | CA1D3N4Not7cla_Noterus_clavicornis_1VWB.idba.5 | XXXXXXXXXXXXXXXXXXXX-XX- | CA1D3N4Not7cla_Noterus_clavicornis_1VWB.idba.5_MERGED |
| XXXXXXXXXXXXX-X-X-XX- | CA1G3G4Ma7obl | XXXXXXXXXXXXXXXXXXXX | CA1G3G4Ma7obl_Macrogyrus_oblongus_NC_013249 | XXXXXXXXXXXXXXXXXXXX-XX- | CA1G3G4Ma7obl_Macrogyrus_oblongus_NC_013249_MERGED |
| -X-----X-----XX- | CA1H3H4Ha7fla | XXXXXXXXXXXXXXXXXXXX | CA1H3H4Ha7fla_Haliplus_flavicollis_JX313677 | XXXXXXXXXXXXXXXXXXXX-XX- | CA1H3H4Ha7fla_Haliplus_flavicollis_JX313677_MERGED |
| -XX-----XX-----XX- | CA1H3H4Ha7imm | -XXXXXXXXXX-XXXX | CA1H3H4Ha7imm_Haliplus_immaculatus_1VWB.idba.22 | -XXXXXXXXXX-XXXX-XX- | CA1H3H4Ha7imm_Haliplus_immaculatus_1VWB.idba.22_MERGED |
| -XX-----X-X-X-XX- | CA1H3H4Ha7lin | XXXXXXXXXXXXXXXXXXXX | CA1H3H4Ha7lin_Haliplus_lineatocollis_1VWB.idba.6 | XXXXXXXXXXXXXXXXXXXX-XX- | CA1H3H4Ha7lin_Haliplus_lineatocollis_1VWB.idba.6_MERGED |
| -X-----X-----XX- | CA1H3H4Ha7sib | XXXXXXXXXXXXXXXXXXXX | CA1H3H4Ha7sib_Haliplus_sibiricus_ameie.idba.110 | XXXXXXXXXXXXXXXXXXXX-XX- | CA1H3H4Ha7sib_Haliplus_sibiricus_ameie.idba.110_MERGED |
| --X-----X-----XX- | CA1H3H4Pe7qua | --XXXXXXXXXX-XXXX | CA1H3H4Pe7qua_Peltodytes_quadratius_JX313685 | -XXXXXXXXXX-XXXX-XX- | CA1H3H4Pe7qua_Peltodytes_quadratius_JX313685_MERGED |
| -X-----XX-XX- | CAr1C4Pr7ser | --XXXXXXXXXX-XXXX | CAr1C4Pr7ser_Priacma_serrata_JX412806 | -XXXXXXXXXX-XXXX-XX- | CAr1C4Pr7ser_Priacma_serrata_JX412806_MERGED |
| XXXXXXXXXXXXX-X-XX- | CAr1O4Te7bru | XXXXXXXXXXXXXXXXXXXX | CAr1O4Te7bru_Tetraphalerus_bruchi_NC_011328 | XXXXXXXXXXXXXXXXXXXX-XX- | CAr1O4Te7bru_Tetraphalerus_bruchi_NC_011328_MERGED |
| XXXXXXXXXXXXX-XX- | CM1H4Hy7gra | XXXXXXXXXXXXXXXXXXXX | CM1H4Hy7gra_Hydroscapha_granulum_NC_012144 | XXXXXXXXXXXXXXXXXXXX-XX- | CM1H4Hy7gra_Hydroscapha_granulum_NC_012144_MERGED |
| -X-----X-----XX- | CM1T4In7mad | XXXXXXXXXXXXXXXXXXXX | CM1T4In7mad_Incoltorrida_madagassica_670733_idba_contig_2 | XXXXXXXXXXXXXXXXXXXX-XX- | CM1T4In7mad_Incoltorrida_madagassica_670733_idba_contig_2_MERGED |
| -X-----X-----XX- | CP1B3B4A5Ag7big | --XXXXXXXXXX-XXXX | CP1B3B4A5Ag7big_Agrilus_biguttatus_JX412786 | -XXXXXXXXXX-XXXX-XX- | CP1B3B4A5Ag7big_Agrilus_biguttatus_JX412786_MERGED |
| -X-----X-XX- | CP1B3B4A5Tr7tro | XXXXXXXXXXXXXXXXXXXX | CP1B3B4A5Tr7tro_Trachys_trogodytiformis_ameie.idba.40 | XXXXXXXXXXXXXXXXXXXX-X-XX- | CP1B3B4A5Tr7tro_Trachys_trogodytiformis_ameie.idba.40_MERGED |
| XXXX-XXXXXXXX-X-XX- | CP1B3B4C5Ch7ful | XXXXXXXXXXXXXXXXXXXX | CP1B3B4C5Ch7ful_Chrysochroa_fulgidissima_NC_012765 | XXXXXXXXXXXXXXXXXXXX-XX- | CP1B3B4C5Ch7ful_Chrysochroa_fulgidissima_NC_012765_MERGED |
| -X-----X-----XX- | CP1B3B4Ch5Pe7lug | --XXXXXXXXXX-XXXX | CP1B3B4Ch5Pe7lug_Perotis_lugubris_JX412762 | -XXXXXXXXXX-XXXX-XX- | CP1B3B4Ch5Pe7lug_Perotis_lugubris_JX412762_MERGED |
| -X-----X-----XX- | CP1Bo3A4Ga7lae | XXXXXXXXXXXXXXXXXXXX | CP1Bo3A4Ga7lae_Gastrallus_laevigatus_ameie.idba.78 | XXXXXXXXXXXXXXXXXXXX-XX- | CP1Bo3A4Ga7lae_Gastrallus_laevigatus_ameie.idba.78_MERGED |
| -X-----X-----XX- | CP1Bo3A4La7red | XXXXXXXXXXXXXXXXXXXX | CP1Bo3A4La7red_Lasioderma_redtenbacheri_ameie.idba.91 | XXXXXXXXXXXXXXXXXXXX-XX- | CP1Bo3A4La7red_Lasioderma_redtenbacheri_ameie.idba.91_MERGED |
| XXXXXXXXXXXXX-X-X-XX- | CP1Bo3B4B5Ap7for | XXXXXXXXXXXXXXXXXXXX | CP1Bo3B4B5Ap7for_Apatides_fortis_NC_013582 | XXXXXXXXXXXXXXXXXXXX-XX- | CP1Bo3B4B5Ap7for_Apatides_fortis_NC_013582_MERGED |
| -X-----X-----XX- | CP1Bo3B4D5D17min | XXXXXXXXXXXXXXXXXXXX | CP1Bo3B4D5D17min_Dinoderus_minutus_ameie.idba.76 | XXXXXXXXXXXXXXXXXXXX-XX- | CP1Bo3B4D5D17min_Dinoderus_minutus_ameie.idba.76_MERGED |
| -XX-----X-----XX- | CP1Bo3D4An7ver | XXXXXXXXXXXXXXXXXXXX | CP1Bo3D4An7ver_Anthrenus_verbasci_ameie.idba.111 | XXXXXXXXXX-X-XX-XX- | CP1Bo3D4An7ver_Anthrenus_verbasci_ameie.idba.111_MERGED |
| -XX-----XX-XXX | CP1Bo3D4De7per | --XXXXXXXXXX-XXXX | CP1Bo3D4De7per_Dermestes_peruvianus_JX313683 | -XXXXXXXXXXXXXXXXXX-XXX | CP1Bo3D4De7per_Dermestes_peruvianus_JX313683_MERGED |
| -X-----X-----XX- | CP1Bo3D4Tr7hir | --XXXXXXXXXX-XXXX | CP1Bo3D4Tr7hir_Trinodes_hirtus_JX313664 | -XXXXXXXXXXXXXXXXXX-XX- | CP1Bo3D4Tr7hir_Trinodes_hirtus_JX313664_MERGED |
| -X-----X-----XX- | CP1Bo3N4No7fas | XXXXXXXXXXXXXXXXXXXX | CP1Bo3N4No7fas_Nosodendron_fasciculare_ameie.idba.85 | XXXXXXXXXXXXXXXXXXXX-XX- | CP1Bo3N4No7fas_Nosodendron_fasciculare_ameie.idba.85_MERGED |
| -X-----X-----XX- | CP1Bo3P4Nip7hol | XXXXXX-XXXX | CP1Bo3P4Nip7hol_Niptus_hololeucus_ameie.idba.138 | XXXXXX-XXXX-XX- | CP1Bo3P4Nip7hol_Niptus_hololeucus_ameie.idba.138_MERGED |
| -X-----X-----XX- | CP1Bo3P4Pt7ruf | --XXXXXXXXXX-XXXX | CP1Bo3P4Pt7ruf_Ptinus_rufipes_HQ232819 | -XXXXXXXXXXXXXXXXXX-XX- | CP1Bo3P4Pt7ruf_Ptinus_rufipes_HQ232819_MERGED |
| -X-----X-----XX- | CP1By3D4Dr7ern | XXXXXXXXXXXXXXXXXXXX | CP1By3D4Dr7ern_Dryops_ernesti_833433_idba_contig_9 | XXXXXXXXXXXXXXXXXXXX-XX- | CP1By3D4Dr7ern_Dryops_ernesti_833433_idba_contig_9_MERGED |
| -XX-----XX-XXX | CP1By3D4Dr7lur | XXXXXXXXXXXXXXXXXXXX | CP1By3D4Dr7lur_Dryops_luridus_1VWB.idba.12 | XXXXXXXXXXXXXXXXXXXX-XX- | CP1By3D4Dr7lur_Dryops_luridus_1VWB.idba.12_MERGED |
| -X-----XX-XXX | CP1By3E4E5Li7per | --XXXXXXXXXX-XXXX | CP1By3E4E5Li7per_Limnius_perrisi_JX412747 | -XXXXXXXXXXXXXXXXXX-XXX | CP1By3E4E5Li7per_Limnius_perrisi_JX412747_MERGED |
| -X-----XX-X-XX- | CP1By3H4He7fen | --XXXXXXXXXX-XXXX | CP1By3H4He7fen_Heterocerus_fenestratus_HQ232811 | -XXXXXXXXXXXXXXXXXX-X-XX- | CP1By3H4He7fen_Heterocerus_fenestratus_HQ232811_MERGED |
| -X-----X-----XX- | CP1By3H4He7par | XXXXXXXXXXXXXXXXXXXX | CP1By3H4He7par_Heterocerus_parallelus_ameie.idba.47 | XXXXXXXXXXXXXXXXXXXX-XX- | CP1By3H4He7par_Heterocerus_parallelus_ameie.idba.47_MERGED |
| -XX-----XX-XXX | CP1C3C4Tr7leu | XXXXXX-XXXX | CP1C3C4Tr7leu_Trichodes_leucopsidens_ameie.idba.184 | XXXXXX-XXXX-XX-XXX | CP1C3C4Tr7leu_Trichodes_leucopsidens_ameie.idba.184_MERGED |
| XXXXXXXXXXXXX-XX- | CP1C3M4C5Ch7sca | XXXXXXXXXXXXXXXXXXXX | CP1C3M4C5Ch7sca_Chaetosoma_scaritides_NC_011324 | XXXXXXXXXXXXXXXXXXXX-XX- | CP1C3M4C5Ch7sca_Chaetosoma_scaritides_NC_011324_MERGED |
| -X-----XX-XXX | CP1C3P4Ph7edw | XXXXXXXXXXXXXXXXXXXX | CP1C3P4Ph7edw_Phloiophilus_edwardsi_JX412815 | XXXXXXXXXXXXXXXXXXXX-XX- | CP1C3P4Ph7edw_Phloiophilus_edwardsi_JX412815_MERGED |
| -X-----XX-XXX | CP1C3T4T5Tem7vir | XXXXXXXXXXXXXXXXXXXX | CP1C3T4T5Tem7vir_Temnoscheila_virescens_JX412752 | XXXXXXXXXXXXXXXXXXXX-XXX | CP1C3T4T5Tem7vir_Temnoscheila_virescens_JX412752_MERGED |
| -X-----XXX-XX- | CP1Ch3C4C5C6Ch7ame | -----XXXXXXXXXX-XXXX | CP1Ch3C4C5C6Ch7ame_Chrysolina_americanus_Chryso.idba.155 | -X-XX-XXXXXXXXXX-XX- | CP1Ch3C4C5C6Ch7ame_Chrysolina_americanus_Chryso.idba.155_MERGED |
| -XX-----XXX-X- | CP1Ch3C4C5C6Ch7ban | XXXXXXXXXXXXXXXXXXXX | CP1Ch3C4C5C6Ch7ban_Chrysolina_bankii_Chryso.idba.17 | XXXXXXXXXXXXXXXXXXXX-XX- | CP1Ch3C4C5C6Ch7ban_Chrysolina_bankii_Chryso.idba.17_MERGED |
| -XX-----XXX-XX- | CP1Ch3C4C5C6Ch7hae | XXXXXXXXXXXXXXXXXXXX | CP1Ch3C4C5C6Ch7hae_Chrysolina_haemoptera_Chryso.idba.38 | XXXXXXXXXXXXXXXXXXXX-XX- | CP1Ch3C4C5C6Ch7hae_Chrysolina_haemoptera_Chryso.idba.38_MERGED |
| -XX-----XXX-XX- | CP1Ch3C4C5C6Ch7her | XXXXXXXXXXXXXXXXXXXX | CP1Ch3C4C5C6Ch7her_Chrysolina_herbaea_Chryso.idba.10 | XXXXXXXXXXXXXXXXXXXX-XX- | CP1Ch3C4C5C6Ch7her_Chrysolina_herbaea_Chryso.idba.10_MERGED |
| -XX-----XXX-XX- | CP1Ch3C4C5C6Ch7hyp | -XXXXXXXXXX-XXXX | CP1Ch3C4C5C6Ch7hyp_Chrysolina_hyperici_Chryso.idba.134 | -XXXXXXXXXX-XXXX-XX- | CP1Ch3C4C5C6Ch7hyp_Chrysolina_hyperici_Chryso.idba.134_MERGED |
| -X-----XXX-XX- | CP1Ch3C4C5C6Ch7lep | XXXXXX-XXXX | CP1Ch3C4C5C6Ch7lep_Chrysolina_lepida_Chryso.idba.151 | XXXXXX-XXXX-XX-XX- | CP1Ch3C4C5C6Ch7lep_Chrysolina_lepida_Chryso.idba.151_MERGED |
| -XX-----XXX-XX- | CP1Ch3C4C5C6Ch7pol | XXXXXXXXXXXXXXXXXXXX | CP1Ch3C4C5C6Ch7pol_Chrysolina_polita_Chryso.idba.123 | XXXXXXXXXXXXXXXXXXXX-XX- | CP1Ch3C4C5C6Ch7pol_Chrysolina_polita_Chryso.idba.123_MERGED |
| -X-----X-----XX- | CP1Ch3C4C5C6Ch7ruf | XXXXXXXXXXXXXXXXXXXX | CP1Ch3C4C5C6Ch7ruf_Chrysolina_rufoaeana_Chryso.idba.131 | XXXXXXXXXXXXXXXXXXXX-XX- | CP1Ch3C4C5C6Ch7ruf_Chrysolina_rufoaeana_Chryso.idba.131_MERGED |
| -X-----XX-XX- | CP1Ch3C4C5C6Ch7ver | XXXXXXXXXXXXXXXXXXXX | CP1Ch3C4C5C6Ch7ver_Chrysolina_vernalis_Chryso.idba.25 | XXXXXXXXXXXXXXXXXXXX-XX- | CP1Ch3C4C5C6Ch7ver_Chrysolina_vernalis_Chryso.idba.25_MERGED |
| -XXX-----X-XXX-XX- | CP1Ch3C4C5C6Ch7pop | XXXXXXXXXXXXXXXXXXXX | CP1Ch3C4C5C6Ch7pop_Chrysolina_populi_ameie.idba.70 | XXXXXXXXXXXXXXXXXXXX-XX- | CP1Ch3C4C5C6Ch7pop_Chrysolina_populi_ameie.idba.70_MERGED |
| -X-----X-----XX- | CP1Ch3C4C5C6Col7bar | XXXXXXXXXXXXXXXXXXXX | CP1Ch3C4C5C6Col7bar_Colaspidea_barbarum_Chryso.idba.24 | XXXXXXXXXXXXXXXXXXXX-XX- | CP1Ch3C4C5C6Col7bar_Colaspidea_barbarum_Chryso.idba.24_MERGED |
| -X-----X-----XX- | CP1Ch3C4C5C6Go7aeg | XXXXXXXXXXXXXXXXXXXX | CP1Ch3C4C5C6Go7aeg_Gonioctena_aegrotata_Chryso.idba.29 | XXXXXXXXXXXXXXXXXXXX-XX- | CP1Ch3C4C5C6Go7aeg_Gonioctena_aegrotata_Chryso.idba.29_MERGED |
| -X-----X-----XX- | CP1Ch3C4C5C6Go7lep | XXXXXXXXXXXXXXXXXXXX | CP1Ch3C4C5C6Go7lep_Gonioctena_lepraeuri_Chryso.idba.15 | XXXXXXXXXXXXXXXXXXXX-XX- | CP1Ch3C4C5C6Go7lep_Gonioctena_lepraeuri_Chryso.idba.15_MERGED |

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|-----------------|---------------------|--------------------|--|--------------------|---|
| -XX-----XX-XX | CP1Ch3C4C5C6Go7o1i | XXXXXXXXXXXXX---- | CP1Ch3C4C5C6Go7o1i_Gonioctena_olivacea_Chryso.idba.3 | XXXXXXXXXXXXX-XX | CP1Ch3C4C5C6Go7o1i_Gonioctena_olivacea_Chryso.idba.3_MERGED |
| --X-----XX- | CP1Ch3C4C5C6Hy7fai | XXXXXXXXXXXXX---- | CP1Ch3C4C5C6Hy7fai_Hydrothassa_fairmairei_Chryso.idba.12 | XXXXXXXXXXXXX-XX | CP1Ch3C4C5C6Hy7fai_Hydrothassa_fairmairei_Chryso.idba.12_MERGED |
| --X-----X--XX | CP1Ch3C4C5C6Hy7gla | XXXXXXXXXXXXX---- | CP1Ch3C4C5C6Hy7gla_Hydrothassa_glabra_Chryso.idba.9 | XXXXXXXXXXXXX-XX | CP1Ch3C4C5C6Hy7gla_Hydrothassa_glabra_Chryso.idba.9_MERGED |
| -XX-----XXXXXX | CP1Ch3C4C5C6Li7aen | XXXXXXXXXXXXX---- | CP1Ch3C4C5C6Li7aen_Plagiosterna_aenea_Chryso.idba.2 | XXXXXXXXXXXXX-XX | CP1Ch3C4C5C6Li7aen_Plagiosterna_aenea_Chryso.idba.2_MERGED |
| -XX-----XX-XXX | CP1Ch3C4C5C6Ph7arm | --XXXXXXXXXXXX-- | CP1Ch3C4C5C6Ph7arm_Phaedon_armoraciae_JX220992 | -XXXXXXXXXXXX-XX | CP1Ch3C4C5C6Ph7arm_Phaedon_armoraciae_JX220992_MERGED |
| -X-----X--XX | CP1Ch3C4C5C6Ph7tum | XXXXXXXXXXXXX---- | CP1Ch3C4C5C6Ph7tum_Phaedon_tumidulus_Chryso.idba.4 | XXXXXXXXXXXXX-XX | CP1Ch3C4C5C6Ph7tum_Phaedon_tumidulus_Chryso.idba.4_MERGED |
| -XX-----XXXX | CP1Ch3C4C5C6Phr7vit | XXXXXXXXXXXXX---- | CP1Ch3C4C5C6Phr7vit_Phratora_vitellinae_Chryso.idba.79 | XXXXXXXXXXXXX-XX | CP1Ch3C4C5C6Phr7vit_Phratora_vitellinae_Chryso.idba.79_MERGED |
| -XX-----X--XX | CP1Ch3C4C5C6Phr7vul | XXXXXXXXXXXXX---- | CP1Ch3C4C5C6Phr7vul_Phratora_vulgatissima_amie.idba.119 | XXXXXXXXXXXX-XX-XX | CP1Ch3C4C5C6Phr7vul_Phratora_vulgatissima_amie.idba.119_MERGED |
| -----XX---- | CP1Ch3C4C5E6En7ado | XXXXXXXXXXXXX---- | CP1Ch3C4C5E6En7ado_Entomoscelis_adonidis_Chryso.idba.57 | XXXXXXXXXXXXX-XX | CP1Ch3C4C5E6En7ado_Entomoscelis_adonidis_Chryso.idba.57_MERGED |
| XXX-----XX---- | CP1Ch3C4C5T6Ti7goe | -XXXXXXXXXXXX---- | CP1Ch3C4C5T6Ti7goe_Timarcha_goettingensis_JX412789 | -XXXXXXXXXXXX-XX | CP1Ch3C4C5T6Ti7goe_Timarcha_goettingensis_JX412789_MERGED |
| -X-----XX-XXX | CP1Ch3C4Ca5Ar7lab | --XXXXXXXXXXXX-- | CP1Ch3C4Ca5Ar7lab_Arescus_labiatus_JX220988 | -XXXXXXXXXXXX-XX | CP1Ch3C4Ca5Ar7lab_Arescus_labiatus_JX220988_MERGED |
| -XX-----X--XX | CP1Ch3C4Ca5Ca7den | XXXXXXXXXXXXX---- | CP1Ch3C4Ca5Ca7den_Cassida_denticollis_Chryso.idba.59 | XXXXXXXXXXXXX-XX | CP1Ch3C4Ca5Ca7den_Cassida_denticollis_Chryso.idba.59_MERGED |
| -XX-----XX-XXX | CP1Ch3C4Ca5Ca7rub | XXXXXXXXXXXXX---- | CP1Ch3C4Ca5Ca7rub_Cassida_rubiginosa_Chryso.idba.121 | XXXXXXXXXXXXX-XX | CP1Ch3C4Ca5Ca7rub_Cassida_rubiginosa_Chryso.idba.121_MERGED |
| -XX-----X--XX | CP1Ch3C4Ca5Ca7vib | --XXXXXXXXXXXX-- | CP1Ch3C4Ca5Ca7vib_Cassida_vibex_Chryso.idba.154 | -XXXXXXXXXXXX-XX | CP1Ch3C4Ca5Ca7vib_Cassida_vibex_Chryso.idba.154_MERGED |
| -XX-----X--XX | CP1Ch3C4Ca5Ca7vir | XXXXXXXXXXXXX---- | CP1Ch3C4Ca5Ca7vir_Cassida_viridis_Chryso.idba.6 | XXXXXXXXXXXXX-XX | CP1Ch3C4Ca5Ca7vir_Cassida_viridis_Chryso.idba.6_MERGED |
| --X-----XX-XXX | CP1Ch3C4Ca5Im7cap | --XXXXXXXXXXXX-- | CP1Ch3C4Ca5Im7cap_Imatidium_capense_JX220993 | -XXXXXXXXXXXX-XX | CP1Ch3C4Ca5Im7cap_Imatidium_capense_JX220993_MERGED |
| -X-----X--XX | CP1Ch3C4C15Ch7obe | XXXXXXXXXXXXX---- | CP1Ch3C4C15Ch7obe_Chilotomina_obethuri_Chryso.idba.32 | XXXXXXXXXXXXX-XX | CP1Ch3C4C15Ch7obe_Chilotomina_obethuri_Chryso.idba.32_MERGED |
| -X-----X--XX | CP1Ch3C4C15La7gal | XXXXXXXXXXXXX---- | CP1Ch3C4C15La7gal_Lachnaia_gallaeca_Chryso.idba.66 | XXXXXXXXXXXXX-XX | CP1Ch3C4C15La7gal_Lachnaia_gallaeca_Chryso.idba.66_MERGED |
| -X-----X--XX | CP1Ch3C4C15La7hir | XXXXXXXXXXXXX---- | CP1Ch3C4C15La7hir_Lachnaia_hirta_Chryso.idba.55 | XXXXXXXXXXXXX-XX | CP1Ch3C4C15La7hir_Lachnaia_hirta_Chryso.idba.55_MERGED |
| -X-----X--XX | CP1Ch3C4C15La7pub | XXXXXXXXXXXXX---- | CP1Ch3C4C15La7pub_Lachnaia_pubescens_Chryso.idba.36 | XXXXXXXXXXXXX-XX | CP1Ch3C4C15La7pub_Lachnaia_pubescens_Chryso.idba.36_MERGED |
| --X-----XX-XXX | CP1Ch3C4C15La7tri | XXXXXXXXXXXXX---- | CP1Ch3C4C15La7tri_Lachnaia_tristigma_Chryso.idba.68 | XXXXXXXXXXXXX-XX | CP1Ch3C4C15La7tri_Lachnaia_tristigma_Chryso.idba.68_MERGED |
| -----X--XX | CP1Ch3C4C15Lab7ghi | XXXXXXXXXXXXX---- | CP1Ch3C4C15Lab7ghi_Labidostomis_ghiliani_Chryso.idba.91 | XXXXXXXXXXXXX-XX | CP1Ch3C4C15Lab7ghi_Labidostomis_ghiliani_Chryso.idba.91_MERGED |
| -X-----X--XX | CP1Ch3C4C15Lab7luc | XXXXXXXXXXXXX---- | CP1Ch3C4C15Lab7luc_Labidostomis_lucida_Chryso.idba.90 | XXXXXXXXXXXXX-XX | CP1Ch3C4C15Lab7luc_Labidostomis_lucida_Chryso.idba.90_MERGED |
| -----XX-XXX | CP1Ch3C4C15Lab7lus | XXXXXXXXXXXXX---- | CP1Ch3C4C15Lab7lus_Labidostomis_lusitanica_Chryso.idba.65 | XXXXXXXXXXXXX-XX | CP1Ch3C4C15Lab7lus_Labidostomis_lusitanica_Chryso.idba.65_MERGED |
| -----X--XX | CP1Ch3C4C15Lab7tax | XXXXXXXXXXXXX---- | CP1Ch3C4C15Lab7tax_Labidostomis_taxicornis_Chryso.idba.92 | XXXXXXXXXXXXX-XX | CP1Ch3C4C15Lab7tax_Labidostomis_taxicornis_Chryso.idba.92_MERGED |
| -X-----XX-XXX | CP1Ch3C4C15Sm7con | XXXXXXXXXXXXX---- | CP1Ch3C4C15Sm7con_Smaragdina_concolor_Chryso.idba.37 | XXXXXXXXXXXXX-XX | CP1Ch3C4C15Sm7con_Smaragdina_concolor_Chryso.idba.37_MERGED |
| -X-----XX-XXX | CP1Ch3C4C15Sm7rey | XXXXXXXXXXXXX---- | CP1Ch3C4C15Sm7rey_Smaragdina_reyi_Chryso.idba.52 | XXXXXXXXXXXXX-XX | CP1Ch3C4C15Sm7rey_Smaragdina_reyi_Chryso.idba.52_MERGED |
| -X-----X--XX | CP1Ch3C4C15Sm7ruf | XXXXXXXXXXXXX---- | CP1Ch3C4C15Sm7ruf_Smaragdina_rufimana_Chryso.idba.20 | XXXXXXXXXXXXX-XX | CP1Ch3C4C15Sm7ruf_Smaragdina_rufimana_Chryso.idba.20_MERGED |
| XXXXXXXXXXXXX-X | CP1Ch3C4Cr5Cr7duo | XXXXXXXXXXXXX---- | CP1Ch3C4Cr5Cr7duo_Crioceris_duodecimpunctata_NC_003372 | XXXXXXXXXXXXX-X | CP1Ch3C4Cr5Cr7duo_Crioceris_duodecimpunctata_NC_003372_MERGED |
| -X-----X--XX | CP1Ch3C4Cr5Ou7gal | XXXXXXXXXXXXX---- | CP1Ch3C4Cr5Ou7gal_Oulema_gallaeciana_Chryso.idba.130 | XXXXXXXXXXXXX-XX | CP1Ch3C4Cr5Ou7gal_Oulema_gallaeciana_Chryso.idba.130_MERGED |
| -XX-----X--XXX | CP1Ch3C4Cr5Ou7mel | XXXXXXXXXXXXX---- | CP1Ch3C4Cr5Ou7mel_Oulema_melanopus_Chryso.idba.13 | XXXXXXXXXXXXX-XX | CP1Ch3C4Cr5Ou7mel_Oulema_melanopus_Chryso.idba.13_MERGED |
| -XX-----X---- | CP1Ch3C4Cry5Cr7and | XXXXXXXXXXXXX---- | CP1Ch3C4Cry5Cr7and_Cryptocephalus_androgyne_Chryso.idba.100 | XXXXXXXXXXXXX-XX | CP1Ch3C4Cry5Cr7and_Cryptocephalus_androgyne_Chryso.idba.100_MERGED |
| -XX-----X---- | CP1Ch3C4Cry5Cr7aur | XXXXXXXXXXXXX---- | CP1Ch3C4Cry5Cr7aur_Cryptocephalus_aureolus_Chryso.idba.54 | XXXXXXXXXXXXX-XX | CP1Ch3C4Cry5Cr7aur_Cryptocephalus_aureolus_Chryso.idba.54_MERGED |
| -XX-----X-XXX | CP1Ch3C4Cry5Cr7bip | XXXXXXXXXXXXX---- | CP1Ch3C4Cry5Cr7bip_Cryptocephalus_bipunctatus_Chryso.idba.99 | XXXXXXXXXXXXX-XX | CP1Ch3C4Cry5Cr7bip_Cryptocephalus_bipunctatus_Chryso.idba.99_MERGED |
| -X-----X-X-XX | CP1Ch3C4Cry5Cr7can | XXXXXXXXXXXXX---- | CP1Ch3C4Cry5Cr7can_Cryptocephalus_cantabricus_Chryso.idba.87 | XXXXXXXXXXXXX-XX | CP1Ch3C4Cry5Cr7can_Cryptocephalus_cantabricus_Chryso.idba.87_MERGED |
| -X-----X--XX | CP1Ch3C4Cry5Cr7cel | XXXXXXXXXXXXX---- | CP1Ch3C4Cry5Cr7cel_Cryptocephalus_celtibericus_Chryso.idba.56 | XXXXXXXXXXXXX-XX | CP1Ch3C4Cry5Cr7cel_Cryptocephalus_celtibericus_Chryso.idba.56_MERGED |
| -X-----X-X-XX | CP1Ch3C4Cry5Cr7cyn | XXXXXXXXXXXXX---- | CP1Ch3C4Cry5Cr7cyn_Cryptocephalus_cynarae_Chryso.idba.63 | XXXXXXXXXXXXX-XX | CP1Ch3C4Cry5Cr7cyn_Cryptocephalus_cynarae_Chryso.idba.63_MERGED |
| -X-----X--XX | CP1Ch3C4Cry5Cr7liv | XXXXXXXXXXXXX---- | CP1Ch3C4Cry5Cr7liv_Cryptocephalus_lividimanus_Chryso.idba.85 | XXXXXXXXXXXXX-XX | CP1Ch3C4Cry5Cr7liv_Cryptocephalus_lividimanus_Chryso.idba.85_MERGED |
| -XX-----XXXX | CP1Ch3C4Cry5Cr7mor | XXXXXXXXXXXXX---- | CP1Ch3C4Cry5Cr7mor_Cryptocephalus_moraei_Chryso.idba.107 | XXXXXXXXXXXXX-XX | CP1Ch3C4Cry5Cr7mor_Cryptocephalus_moraei_Chryso.idba.107_MERGED |
| -X-----X--XX | CP1Ch3C4Cry5Cr7mys | XXXXXXXXXXXXX---- | CP1Ch3C4Cry5Cr7mys_Cryptocephalus_mystacatus_Chryso.idba.41 | XXXXXXXXXXXXX-XX | CP1Ch3C4Cry5Cr7mys_Cryptocephalus_mystacatus_Chryso.idba.41_MERGED |
| -X-----X--XX | CP1Ch3C4Cry5Cr7obl | XXXXXXXXXXXXX---- | CP1Ch3C4Cry5Cr7obl_Cryptocephalus_obliteratifer_Chryso.idba.104 | XXXXXXXXXXXXX-XX | CP1Ch3C4Cry5Cr7obl_Cryptocephalus_obliteratifer_Chryso.idba.104_MERGED |
| -XX-----X-X-XX | CP1Ch3C4Cry5Cr7oct | XXXXXXXXXXXXX---- | CP1Ch3C4Cry5Cr7oct_Cryptocephalus_octoguttatus_Chryso.idba.124 | XXXXXXXXXXXXX-XX | CP1Ch3C4Cry5Cr7oct_Cryptocephalus_octoguttatus_Chryso.idba.124_MERGED |
| -X-----X-X-XX | CP1Ch3C4Cry5Cr7pom | XXXXXXXXXXXXX---- | CP1Ch3C4Cry5Cr7pom_Cryptocephalus_pominorum_Chryso.idba.94 | XXXXXXXXXXXXX-XX | CP1Ch3C4Cry5Cr7pom_Cryptocephalus_pominorum_Chryso.idba.94_MERGED |
| -XX-----XXXX | CP1Ch3C4Cry5Cr7pus | XXXXXXXXXXXXX---- | CP1Ch3C4Cry5Cr7pus_Cryptocephalus_pusillus_Chryso.idba.53 | XXXXXXXXXXXXX-XX | CP1Ch3C4Cry5Cr7pus_Cryptocephalus_pusillus_Chryso.idba.53_MERGED |
| -X-----X---- | CP1Ch3C4Cry5Cr7qua | XXXXXXXXXXXXX---- | CP1Ch3C4Cry5Cr7qua_Cryptocephalus_quadripunctatus_Chryso.idba.83 | XXXXXXXXXXXXX-XX | CP1Ch3C4Cry5Cr7qua_Cryptocephalus_quadripunctatus_Chryso.idba.83_MERGED |
| -X-----X-X-XX | CP1Ch3C4Cry5Cr7ram | XXXXXXXXXXXXX---- | CP1Ch3C4Cry5Cr7ram_Cryptocephalus_ramburii_Chryso.idba.88 | XXXXXXXXXXXXX-XX | CP1Ch3C4Cry5Cr7ram_Cryptocephalus_ramburii_Chryso.idba.88_MERGED |
| -X-----XXXX | CP1Ch3C4Cry5Cr7ruf | XXXXXXXXXXXXX---- | CP1Ch3C4Cry5Cr7ruf_Cryptocephalus_rufipes_Chryso.idba.77 | XXXXXXXXXXXXX-XX | CP1Ch3C4Cry5Cr7ruf_Cryptocephalus_rufipes_Chryso.idba.77_MERGED |
| -X-----X-XX | CP1Ch3C4Cry5Cr7rug | XXXXXXXXXXXXX---- | CP1Ch3C4Cry5Cr7rug_Cryptocephalus_rugicollis_Chryso.idba.95 | XXXXXXXXXXXXX-XX | CP1Ch3C4Cry5Cr7rug_Cryptocephalus_rugicollis_Chryso.idba.95_MERGED |
| -X-----X--XX | CP1Ch3C4Cry5Cr7sau | XXXXXXXXXXXX-XX-XX | CP1Ch3C4Cry5Cr7sau_Cryptocephalus_saucius_Chryso.idba.143 | XXXXXXXXXXXX-XX-XX | CP1Ch3C4Cry5Cr7sau_Cryptocephalus_saucius_Chryso.idba.143_MERGED |
| -X-----XXXX | CP1Ch3C4Cry5Cr7sch | XXXXXXXXXXXXX---- | CP1Ch3C4Cry5Cr7sch_Cryptocephalus_schaefferi_Chryso.idba.49 | XXXXXXXXXXXXX-XX | CP1Ch3C4Cry5Cr7sch_Cryptocephalus_schaefferi_Chryso.idba.49_MERGED |
| -X-----X-X-XX | CP1Ch3C4Cry5Cr7tib | XXXXXXXXXXXXX---- | CP1Ch3C4Cry5Cr7tib_Cryptocephalus_tibialis_Chryso.idba.101 | XXXXXXXXXXXXX-XX | CP1Ch3C4Cry5Cr7tib_Cryptocephalus_tibialis_Chryso.idba.101_MERGED |
| -XX-----X--XX | CP1Ch3C4Cry5Cr7vit | XXXXXXXXXXXXX---- | CP1Ch3C4Cry5Cr7vit_Cryptocephalus_vittatus_Chryso.idba.81 | XXXXXXXXXXXXX-XX | CP1Ch3C4Cry5Cr7vit_Cryptocephalus_vittatus_Chryso.idba.81_MERGED |
| -XX-----X--XX | CP1Ch3C4Cry5Pa7reg | XXXXXXXXXXXXX---- | CP1Ch3C4Cry5Pa7reg_Pachybrachis_regius_Chryso.idba.138 | XXXXXXXXXXXX-XX | CP1Ch3C4Cry5Pa7reg_Pachybrachis_regius_Chryso.idba.138_MERGED |
| -X-----X--XX | CP1Ch3C4Cry5Pa7suf | XXXXXXXXXXXXX---- | CP1Ch3C4Cry5Pa7suf_Pachybrachis_suffriani_Chryso.idba.98 | XXXXXXXXXXXXX-XX | CP1Ch3C4Cry5Pa7suf_Pachybrachis_suffriani_Chryso.idba.98_MERGED |
| -X-----XXXX | CP1Ch3C4Cry5Pa7ter | XXXXXXXXXXXXX---- | CP1Ch3C4Cry5Pa7ter_Pachybrachis_terminalis_Chryso.idba.96 | XXXXXXXXXXXXX-XX | CP1Ch3C4Cry5Pa7ter_Pachybrachis_terminalis_Chryso.idba.96_MERGED |

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|------------------|----------------------|-----------------|--|------------------------|---|
| --X-----X--XX- | CP1Ch3C4Cry5St7ili | XXXXXXXXXXXXXXX | CP1Ch3C4Cry5St7ili_Stylosomus_illicicola_Soil.idba.48 | XXXXXXXXXXXXXXX-XX- | CP1Ch3C4Cry5St7ili_Stylosomus_illicicola_Soil.idba.48_MERGED |
| --X-----X--XX- | CP1Ch3C4Cry5St7rug | XXXXXXXXXXXXXXX | CP1Ch3C4Cry5St7rug_Stylosomus_rugithorax_Chryso.idba.39 | XXXXXXXXXXXXXXX-XX- | CP1Ch3C4Cry5St7rug_Stylosomus_rugithorax_Chryso.idba.39_MERGED |
| --X-----XX-XXX- | CP1Ch3C4Do7dis | ---XXXXXXXXXX | CP1Ch3C4Do7dis_Donacia_distincta_JX220999 | --XXXXXXXXXXXXXXX-XXX- | CP1Ch3C4Do7dis_Donacia_distincta_JX220999_MERGED |
| --X-----X--- | CP1Ch3C4Do7ful | XXXXXXXXXXXXXXX | CP1Ch3C4Do7ful_Doryidomorpha_fulva_CS.idba.19 | XXXXXXXXXXXXXXX--- | CP1Ch3C4Do7ful_Doryidomorpha_fulva_CS.idba.19_MERGED |
| --X-----X--XXX | CP1Ch3C4E5Br7obs | XXXXXXXXXXXXXXX | CP1Ch3C4E5Br7obs_Bromius_obscurus_ameie.idba.82 | XXXXXXXXXXXXXXX--XXX | CP1Ch3C4E5Br7obs_Bromius_obscurus_ameie.idba.82_MERGED |
| --X-----X--XXX- | CP1Ch3C4E5Colas7glo | XXXXXXXXXXXXXXX | CP1Ch3C4E5Colas7glo_Colaspdea_globosa_Chryso.idba.110 | XXXXXXXXXXXXXXX-XX- | CP1Ch3C4E5Colas7glo_Colaspdea_globosa_Chryso.idba.110_MERGED |
| --X-----XX-XXX | CP1Ch3C4E5Phy7dil | -----XXXXXXXXXX | CP1Ch3C4E5Phy7dil_Phytorus_dilatatus_B480tru.idba.116 | --X-----XXXXXXXXXX-XXX | CP1Ch3C4E5Phy7dil_Phytorus_dilatatus_B480tru.idba.116_MERGED |
| --X-----X--XXX | CP1Ch3C4Ex7can | ---XXXXXXXXXX | CP1Ch3C4Ex7can_Exema_canadensis_JX220990 | --XXXXXXXXXXXXXXX--XXX | CP1Ch3C4Ex7can_Exema_canadensis_JX220990_MERGED |
| -----XXX | CP1Ch3C4G5A6Ac7ass | XXXXXXXXXXXXXXX | CP1Ch3C4G5A6Ac7ass_Acrocrypta_assamensis_CS.idba.43 | XXXXXXXXXXXXXXX-XXX | CP1Ch3C4G5A6Ac7ass_Acrocrypta_assamensis_CS.idba.43_MERGED |
| XXX-----X--XX- | CP1Ch3C4G5A6Alt7amp | XXXXXXX | CP1Ch3C4G5A6Alt7amp_Altica_ampelophaga_Chryso.idba.149 | XXXXXXXXXX--X--XX- | CP1Ch3C4G5A6Alt7amp_Altica_ampelophaga_Chryso.idba.149_MERGED |
| --XX-----X--XX- | CP1Ch3C4G5A6Alt7eri | XXXXXXX | CP1Ch3C4G5A6Alt7eri_Altica_ericeti_Chryso.idba.163 | XXXXXXXXXX--X--XX- | CP1Ch3C4G5A6Alt7eri_Altica_ericeti_Chryso.idba.163_MERGED |
| -----XXX | CP1Ch3C4G5A6Alt7ole | XXXXXXXXXXXXXXX | CP1Ch3C4G5A6Alt7ole_Altica_oleracea_Chryso.idba.51 | XXXXXXXXXXXXXXX--- | CP1Ch3C4G5A6Alt7ole_Altica_oleracea_Chryso.idba.51_MERGED |
| --XX-----X--XXX- | CP1Ch3C4G5A6Ap7orb | XXXXXXXXXXXXXXX | CP1Ch3C4G5A6Ap7orb_Apteropeda_orbiculata_Chryso.idba.18 | XXXXXXXXXXXXXXX-XX- | CP1Ch3C4G5A6Ap7orb_Apteropeda_orbiculata_Chryso.idba.18_MERGED |
| --XX-----X--XX- | CP1Ch3C4G5A6Ap7ovu | XXXXXXXXXXXXXXX | CP1Ch3C4G5A6Ap7ovu_Apteropeda_ovulum_Chryso.idba.23 | XXXXXXXXXXXXXXX-XX- | CP1Ch3C4G5A6Ap7ovu_Apteropeda_ovulum_Chryso.idba.23_MERGED |
| -----XXX | CP1Ch3C4G5A6Aph7col | XXXXXXXXXXXXXXX | CP1Ch3C4G5A6Aph7col_Aphthonomorpha_collaris_ChrysoT.idba.34 | XXXXXXXXXXXXXXX-XXX | CP1Ch3C4G5A6Aph7col_Aphthonomorpha_collaris_ChrysoT.idba.34_MERGED |
| -----X--XX- | CP1Ch3C4G5A6Aph7alb | XXXXXXXXXXXXXXX | CP1Ch3C4G5A6Aph7alb_Aphthona_albertinae_Chryso.idba.48 | XXXXXXXXXXXXXXX-XX- | CP1Ch3C4G5A6Aph7alb_Aphthona_albertinae_Chryso.idba.48_MERGED |
| --XX-----X--XX- | CP1Ch3C4G5A6Aph7eup | XXXXXXXXXXXXXXX | CP1Ch3C4G5A6Aph7eup_Aphthona_euphorbiae_Chryso.idba.42 | XXXXXXXXXXXXXXX-XX- | CP1Ch3C4G5A6Aph7eup_Aphthona_euphorbiae_Chryso.idba.42_MERGED |
| --XX-----X--XX- | CP1Ch3C4G5A6Aph7lut | XXXXXXXXXXXXXXX | CP1Ch3C4G5A6Aph7lut_Aphthona_lutescens_Chryso.idba.103 | XXXXXXXXXXXXXXX-XX- | CP1Ch3C4G5A6Aph7lut_Aphthona_lutescens_Chryso.idba.103_MERGED |
| --X-----X--XX- | CP1Ch3C4G5A6Aph7mel | XXXXXXXXXXXXXXX | CP1Ch3C4G5A6Aph7mel_Aphthona_melanchollica_Chryso.idba.71 | XXXXXXXXXXXXXXX-XX- | CP1Ch3C4G5A6Aph7mel_Aphthona_melanchollica_Chryso.idba.71_MERGED |
| --X-----XX-XXX | CP1Ch3C4G5A6As17tra | XXXXXXXXXXXXXXX | CP1Ch3C4G5A6As17tra_Asiorestia_transversa_ChrysoT.idba.7 | XXXXXXXXXXXXXXX-XXX | CP1Ch3C4G5A6As17tra_Asiorestia_transversa_ChrysoT.idba.7_MERGED |
| --X-----X--XX- | CP1Ch3C4G5A6Ba7aer | XXXXXXXXXXXXXXX | CP1Ch3C4G5A6Ba7aer_Batophila_aerata_Chryso.idba.47 | XXXXXXXXXXXXXXX-XX- | CP1Ch3C4G5A6Ba7aer_Batophila_aerata_Chryso.idba.47_MERGED |
| -----XXX | CP1Ch3C4G5A6Ch7ang | XXXXXXXXXXXXXXX | CP1Ch3C4G5A6Ch7ang_Chabria_nr_angulicollis_ChrysoT.idba.36 | XXXXXXXXXXXXXXX-XXX | CP1Ch3C4G5A6Ch7ang_Chabria_nr_angulicollis_ChrysoT.idba.36_MERGED |
| -----X--XX- | CP1Ch3C4G5A6Chae7ari | XXXXXXXXXXXXXXX | CP1Ch3C4G5A6Chae7ari_Chaetocnema_arida_Chryso.idba.82 | XXXXXXXXXXXXXXX-XX- | CP1Ch3C4G5A6Chae7ari_Chaetocnema_arida_Chryso.idba.82_MERGED |
| --X-----X--XX- | CP1Ch3C4G5A6Chae7dep | XXXXXXXXXXXXXXX | CP1Ch3C4G5A6Chae7dep_Chaetocnema_depressa_Chryso.idba.43 | XXXXXXXXXXXXXXX-XX- | CP1Ch3C4G5A6Chae7dep_Chaetocnema_depressa_Chryso.idba.43_MERGED |
| --XX-----XX- | CP1Ch3C4G5A6Chae7hor | XXXXXXXXXXXXXXX | CP1Ch3C4G5A6Chae7hor_Chaetocnema_hortensis_Chryso.idba.125 | XXXXXXXXXXXXXXX-XX- | CP1Ch3C4G5A6Chae7hor_Chaetocnema_hortensis_Chryso.idba.125_MERGED |
| --X-----XX- | CP1Ch3C4G5A6Chae7obe | XXXXXXXXXXXXXXX | CP1Ch3C4G5A6Chae7obe_Chaetocnema_obesa_Chryso.idba.93 | XXXXXXXXXXXXXXX-XX- | CP1Ch3C4G5A6Chae7obe_Chaetocnema_obesa_Chryso.idba.93_MERGED |
| --X-----X--XX- | CP1Ch3C4G5A6Chae7pag | XXXXXXXXXXXXXXX | CP1Ch3C4G5A6Chae7pag_Chaetocnema_paganettii_Chryso.idba.78 | XXXXXXXXXXXXXXX-XX- | CP1Ch3C4G5A6Chae7pag_Chaetocnema_paganettii_Chryso.idba.78_MERGED |
| --X-----XX- | CP1Ch3C4G5A6Chae7pe1 | XXXXXXXXXXXXXXX | CP1Ch3C4G5A6Chae7pe1_Chaetocnema_pelagica_Chryso.idba.21 | XXXXXXXXXXXXXXX-XX- | CP1Ch3C4G5A6Chae7pe1_Chaetocnema_pelagica_Chryso.idba.21_MERGED |
| -----X--XX- | CP1Ch3C4G5A6Chae7sch | XXXXXXXXXXXXXXX | CP1Ch3C4G5A6Chae7sch_Chaetocnema_scheffleri_Chryso.idba.69 | XXXXXXXXXXXXXXX-XX- | CP1Ch3C4G5A6Chae7sch_Chaetocnema_scheffleri_Chryso.idba.69_MERGED |
| --XX-----X--XX- | CP1Ch3C4G5A6Chae7tib | XXXXXXXXXXXXXXX | CP1Ch3C4G5A6Chae7tib_Chaetocnema_tibialis_Chryso.idba.75 | XXXXXXXXXXXXXXX-XX- | CP1Ch3C4G5A6Chae7tib_Chaetocnema_tibialis_Chryso.idba.75_MERGED |
| --X-----XX-XXX | CP1Ch3C4G5A6Chal7ful | -----XXXXXXXXXX | CP1Ch3C4G5A6Chal7ful_Chalcoides_fulvicornis_Chryso.idba.153 | --X-----XXXXXXXXXX-XXX | CP1Ch3C4G5A6Chal7ful_Chalcoides_fulvicornis_Chryso.idba.153_MERGED |
| --X-----X--XXX | CP1Ch3C4G5A6Cre7p1u | -----XXXXXXXXXX | CP1Ch3C4G5A6Cre7p1u_Crepidodera_pluta_ameie.idba.98 | -XXXXXXXXXXXXXXX--XXX | CP1Ch3C4G5A6Cre7p1u_Crepidodera_pluta_ameie.idba.98_MERGED |
| --X-----X--XX- | CP1Ch3C4G5A6Dib7occ | XXXXXXXXXXXXXXX | CP1Ch3C4G5A6Dib7occ_Dibolia_occultans_Chryso.idba.132 | XXXXXXXXXXXXXXX--XX- | CP1Ch3C4G5A6Dib7occ_Dibolia_occultans_Chryso.idba.132_MERGED |
| --X-----XX- | CP1Ch3C4G5A6Dib7rug | XXXXXXXXXXXXXXX | CP1Ch3C4G5A6Dib7rug_Dibolia_rugulosa_ameie.idba.94 | XXXXXXXXXXXXXXX----- | CP1Ch3C4G5A6Dib7rug_Dibolia_rugulosa_ameie.idba.94_MERGED |
| --X-----XXX | CP1Ch3C4G5A6Ep7abe | XXXXXXXXXXXXXXX | CP1Ch3C4G5A6Ep7abe_Epitrix_abeillei_CS.idba.39 | XXXXXXXXXXXXXXX-XXX | CP1Ch3C4G5A6Ep7abe_Epitrix_abeillei_CS.idba.39_MERGED |
| --XX-----XX-XXX | CP1Ch3C4G5A6He7p1a | XXXXXXXXXXXXXXX | CP1Ch3C4G5A6He7p1a_Hemipyxis_plagioderoides_ChrysoT.idba.5 | XXXXXXXXXXXXXXX-XXX | CP1Ch3C4G5A6He7p1a_Hemipyxis_plagioderoides_ChrysoT.idba.5_MERGED |
| --X-----X--XX- | CP1Ch3C4G5A6Her7cic | XXXXXXXXXX | CP1Ch3C4G5A6Her7cic_Hermaeophaga_cicatrix_CS.idba.66 | XXXXXXXXXX--X--XX- | CP1Ch3C4G5A6Her7cic_Hermaeophaga_cicatrix_CS.idba.66_MERGED |
| -----XX-XXX | CP1Ch3C4G5A6Lan7ram | XXXXXXXXXXXXXXX | CP1Ch3C4G5A6Lan7ram_Lanka_ramakrishnai_ChrysoT.idba.39 | XXXXXXXXXXXXXXX-XXX | CP1Ch3C4G5A6Lan7ram_Lanka_ramakrishnai_ChrysoT.idba.39_MERGED |
| --X-----X--XX- | CP1Ch3C4G5A6Lo7aen | XXXXXXXXXXXXXXX | CP1Ch3C4G5A6Lo7aen_Longitarsus_aeneus_Chryso.idba.115 | XXXXXXXXXXXXXXX-XX- | CP1Ch3C4G5A6Lo7aen_Longitarsus_aeneus_Chryso.idba.115_MERGED |
| --XX-----X--XX- | CP1Ch3C4G5A6Lo7atr | XXXXXXXXXXXXXXX | CP1Ch3C4G5A6Lo7atr_Longitarsus_atricillus_Chryso.idba.40 | XXXXXXXXXXXXXXX-XX- | CP1Ch3C4G5A6Lo7atr_Longitarsus_atricillus_Chryso.idba.40_MERGED |
| --X-----X--XX- | CP1Ch3C4G5A6Lo7cer | XXXXXXXXXXXXXXX | CP1Ch3C4G5A6Lo7cer_Longitarsus_cerinthos_Chryso.idba.50 | XXXXXXXXXXXXXXX-XX- | CP1Ch3C4G5A6Lo7cer_Longitarsus_cerinthos_Chryso.idba.50_MERGED |
| --XX-----X--XX- | CP1Ch3C4G5A6Lo7dor | XXXXXXXXXXXXXXX | CP1Ch3C4G5A6Lo7dor_Longitarsus_dorsalis_Chryso.idba.108 | XXXXXXXXXXXXXXX-XX- | CP1Ch3C4G5A6Lo7dor_Longitarsus_dorsalis_Chryso.idba.108_MERGED |
| --XX-----XX-XXX | CP1Ch3C4G5A6Lo7exs | XXXXXXXXXXXXXXX | CP1Ch3C4G5A6Lo7exs_Longitarsus_exsoletus_Chryso.idba.102 | XXXXXXXXXXXXXXX-XXX | CP1Ch3C4G5A6Lo7exs_Longitarsus_exsoletus_Chryso.idba.102_MERGED |
| --X-----XX- | CP1Ch3C4G5A6Lo7ibe | XXXXXXXXXXXXXXX | CP1Ch3C4G5A6Lo7ibe_Longitarsus_ibericus_Chryso.idba.67 | XXXXXXXXXXXXXXX--- | CP1Ch3C4G5A6Lo7ibe_Longitarsus_ibericus_Chryso.idba.67_MERGED |
| --XX-----X--XX- | CP1Ch3C4G5A6Lo7lur | XXXXXXXXXXXXXXX | CP1Ch3C4G5A6Lo7lur_Longitarsus_luridus_Chryso.idba.72 | XXXXXXXXXXXXXXX-XX- | CP1Ch3C4G5A6Lo7lur_Longitarsus_luridus_Chryso.idba.72_MERGED |
| --X-----X--XX- | CP1Ch3C4G5A6Lo7me1 | XXXXXXXXXXXXXXX | CP1Ch3C4G5A6Lo7me1_Longitarsus_melanocephalus_Chryso.idba.26 | XXXXXXXXXXXXXXX-XX- | CP1Ch3C4G5A6Lo7me1_Longitarsus_melanocephalus_Chryso.idba.26_MERGED |
| --X-----XX-XXX- | CP1Ch3C4G5A6Lo7mem | XXXXXXXXXXXXXXX | CP1Ch3C4G5A6Lo7mem_Longitarsus_membranaceus_Chryso.idba.45 | XXXXXXXXXXXXXXX-XXX | CP1Ch3C4G5A6Lo7mem_Longitarsus_membranaceus_Chryso.idba.45_MERGED |
| --X-----XX- | CP1Ch3C4G5A6Lo7nig | XXXXXXXXXXXXXXX | CP1Ch3C4G5A6Lo7nig_Longitarsus_nigrofasciatus_Chryso.idba.89 | XXXXXXXXXXXXXXX--- | CP1Ch3C4G5A6Lo7nig_Longitarsus_nigrofasciatus_Chryso.idba.89_MERGED |
| --XX-----X--XX- | CP1Ch3C4G5A6Lo7ord | XXXXXXXXXXXXXXX | CP1Ch3C4G5A6Lo7ord_Longitarsus_ordinatus_Chryso.idba.106 | XXXXXXXXXXXXXXX--- | CP1Ch3C4G5A6Lo7ord_Longitarsus_ordinatus_Chryso.idba.106_MERGED |
| --XX-----X--XX- | CP1Ch3C4G5A6Lo7par | XXXXXXXXXX | CP1Ch3C4G5A6Lo7par_Longitarsus_parvulus_Chryso.idba.145 | XXXXXXXXXX--X--XX- | CP1Ch3C4G5A6Lo7par_Longitarsus_parvulus_Chryso.idba.145_MERGED |
| --X-----X--XX- | CP1Ch3C4G5A6Lo7pra | XXXXXXXXXXXXXXX | CP1Ch3C4G5A6Lo7pra_Longitarsus_pratensis_Chryso.idba.127 | XXXXXXXXXXXXXXX-XX- | CP1Ch3C4G5A6Lo7pra_Longitarsus_pratensis_Chryso.idba.127_MERGED |
| --X-----X--XX- | CP1Ch3C4G5A6Lo7rut | XXXXXXXXXXXXXXX | CP1Ch3C4G5A6Lo7rut_Longitarsus_rutilus_Chryso.idba.61 | XXXXXXXXXXXXXXX-XX- | CP1Ch3C4G5A6Lo7rut_Longitarsus_rutilus_Chryso.idba.61_MERGED |
| --XX-----X--XX- | CP1Ch3C4G5A6Lo7tab | XXXXXXXXXXXXXXX | CP1Ch3C4G5A6Lo7tab_Longitarsus_tabidus_Chryso.idba.86 | XXXXXXXXXXXXXXX-XX- | CP1Ch3C4G5A6Lo7tab_Longitarsus_tabidus_Chryso.idba.86_MERGED |
| --XX-----XX-XXX | CP1Ch3C4G5A6Lup7xan | XXXXXXXXXX | CP1Ch3C4G5A6Lup7xan_Luperomorpha_xanthodera_ameie.idba.160 | XXXXXXX--X--XXX | CP1Ch3C4G5A6Lup7xan_Luperomorpha_xanthodera_ameie.idba.160_MERGED |
| --X-----X--XXX | CP1Ch3C4G5A6Lyp7pub | XXXXXXXXXXXXXXX | CP1Ch3C4G5A6Lyp7pub_Lypnea_pubipennis_CS.idba.34 | XXXXXXXXXXXXXXX-XXX | CP1Ch3C4G5A6Lyp7pub_Lypnea_pubipennis_CS.idba.34_MERGED |

| | | | | | |
|------------------|----------------------|----------------------|--|-----------------------|---|
| -X-----XX-XXX | CP1Ch3C4G5A6Mac7sub | XXXXXXXXXXXXXX---- | CP1Ch3C4G5A6Mac7sub_Macrohaltica_subplicata_ChrysoT.idba.16 | XXXXXXXXXXXXXX-XX | CP1Ch3C4G5A6Mac7sub_Macrohaltica_subplicata_ChrysoT.idba.16_MERGED |
| -XX-----X--XX- | CP1Ch3C4G5A6Mant7chr | XXXXXXXXXXXXXX---- | CP1Ch3C4G5A6Mant7chr_Mantura_chrysanthem1_Chryso.idba.58 | XXXXXXXXXXXXXX-XX- | CP1Ch3C4G5A6Mant7chr_Mantura_chrysanthem1_Chryso.idba.58_MERGED |
| -X-----X--XX- | CP1Ch3C4G5A6Ne7bre | XXXXXXXXXXXXXX---- | CP1Ch3C4G5A6Ne7bre_Neocrepidodera_brevicollis_Chryso.idba.35 | XXXXXXXXXXXXXX-XX- | CP1Ch3C4G5A6Ne7bre_Neocrepidodera_brevicollis_Chryso.idba.35_MERGED |
| -XX-----X--XX- | CP1Ch3C4G5A6Ne7fer | XXXXXXXXXXXXXX---- | CP1Ch3C4G5A6Ne7fer_Neocrepidodera_ferruginea_Chryso.idba.112 | XXXXXXXXXXXXXX-XX- | CP1Ch3C4G5A6Ne7fer_Neocrepidodera_ferruginea_Chryso.idba.112_MERGED |
| -XX-----X--XX- | CP1Ch3C4G5A6Ne7tra | XXXXXXXXXXXXXX---- | CP1Ch3C4G5A6Ne7tra_Neocrepidodera_transversa_Chryso.idba.16 | XXXXXXXXXXXXXX-XX- | CP1Ch3C4G5A6Ne7tra_Neocrepidodera_transversa_Chryso.idba.16_MERGED |
| -XX-----X--XXX | CP1Ch3C4G5A6Oe7cin | XXXXXXXXXXXXXX---- | CP1Ch3C4G5A6Oe7cin_Oedionychus_cinctus_ChrysoT.idba.19 | XXXXXXXXXXXXXX-XXX | CP1Ch3C4G5A6Oe7cin_Oedionychus_cinctus_ChrysoT.idba.19_MERGED |
| --X-----XX- | CP1Ch3C4G5A6Ore7pun | --XXXXXXXXXX----- | CP1Ch3C4G5A6Ore7pun_Orestia_punctipennis_CS.idba.63 | --XXXXXXXXXX-----XX- | CP1Ch3C4G5A6Ore7pun_Orestia_punctipennis_CS.idba.63_MERGED |
| -X-----X--XX- | CP1Ch3C4G5A6Phi7vib | XXXXXXXXXXXXXX---- | CP1Ch3C4G5A6Phi7vib_Philopona_vibex_ChrysoT.idba.38 | XXXXXXXXXXXXXX-XX- | CP1Ch3C4G5A6Phi7vib_Philopona_vibex_ChrysoT.idba.38_MERGED |
| -XXX-----XX- | CP1Ch3C4G5A6Phy7cru | XXXXXXXXXXXXXX---- | CP1Ch3C4G5A6Phy7cru_Phyllostreta_cruciferae_Chryso.idba.105 | XXXXXXXXXXXXXX-XX- | CP1Ch3C4G5A6Phy7cru_Phyllostreta_cruciferae_Chryso.idba.105_MERGED |
| -X-----X--XX- | CP1Ch3C4G5A6Phy7fou | XXXXXXXXXXXXXX---- | CP1Ch3C4G5A6Phy7fou_Phyllostreta_foudrasi_Chryso.idba.113 | XXXXXXXXXXXXXX-XX- | CP1Ch3C4G5A6Phy7fou_Phyllostreta_foudrasi_Chryso.idba.113_MERGED |
| -X-----X--XX- | CP1Ch3C4G5A6Phy7hem | XXXXXXXXXXXXXX---- | CP1Ch3C4G5A6Phy7hem_Phyllostreta_hemipoda_Chryso.idba.109 | XXXXXXXXXXXXXX-XX- | CP1Ch3C4G5A6Phy7hem_Phyllostreta_hemipoda_Chryso.idba.109_MERGED |
| -XX-----XX- | CP1Ch3C4G5A6Phy7nig | XXXXXXXXXX----- | CP1Ch3C4G5A6Phy7nig_Phyllostreta_nigripes_ChrysoT.idba.54 | XXXXXXXXXX-----XX- | CP1Ch3C4G5A6Phy7nig_Phyllostreta_nigripes_ChrysoT.idba.54_MERGED |
| -XX-----XX- | CP1Ch3C4G5A6Phy7tet | XXXXXXXXXXXXXX---- | CP1Ch3C4G5A6Phy7tet_Phyllostreta_tetrastigma_Chryso.idba.80 | XXXXXXXXXXXXXX-XX- | CP1Ch3C4G5A6Phy7tet_Phyllostreta_tetrastigma_Chryso.idba.80_MERGED |
| -XX-----X--XX- | CP1Ch3C4G5A6Phy7und | XXXXXXXXXXXXXX---- | CP1Ch3C4G5A6Phy7und_Phyllostreta_undulata_Chryso.idba.114 | XXXXXXXXXXXXXX-XX- | CP1Ch3C4G5A6Phy7und_Phyllostreta_undulata_Chryso.idba.114_MERGED |
| -X-----X--XX- | CP1Ch3C4G5A6Phy7var | XXXXXXXXXXXXXX---- | CP1Ch3C4G5A6Phy7var_Phyllostreta_variipennis_Chryso.idba.119 | XXXXXXXXXXXXXX-XX- | CP1Ch3C4G5A6Phy7var_Phyllostreta_variipennis_Chryso.idba.119_MERGED |
| -X-----XXX | CP1Ch3C4G5A6Po7lut | XXXXXXXXXXXXXX---- | CP1Ch3C4G5A6Po7lut_Podontia_lutea_ChrysoT.idba.3 | XXXXXXXXXXXXXX-XXX | CP1Ch3C4G5A6Po7lut_Podontia_lutea_ChrysoT.idba.3_MERGED |
| -XX-----X--XX- | CP1Ch3C4G5A6Pod7fus | --XXXXXXXXXXXXXX---- | CP1Ch3C4G5A6Pod7fus_Podagrica_fuscipes_Chryso.idba.135 | --XXXXXXXXXXXXXX-XX- | CP1Ch3C4G5A6Pod7fus_Podagrica_fuscipes_Chryso.idba.135_MERGED |
| -XX-----X--XXX | CP1Ch3C4G5A6Psy7chr | XXXXXXXXXXXXXX---- | CP1Ch3C4G5A6Psy7chr_Psylliodes_chrysocephalus_Chryso.idba.76 | XXXXXXXXXXXXXX-XXX | CP1Ch3C4G5A6Psy7chr_Psylliodes_chrysocephalus_Chryso.idba.76_MERGED |
| -X-----X--XXX- | CP1Ch3C4G5A6Psy7cup | XXXXXXXXXXXXXX---- | CP1Ch3C4G5A6Psy7cup_Psylliodes_cupreatus_Chryso.idba.117 | XXXXXXXXXXXXXX-XXX- | CP1Ch3C4G5A6Psy7cup_Psylliodes_cupreatus_Chryso.idba.117_MERGED |
| -X-----X--XXX- | CP1Ch3C4G5A6Psy7fus | XXXXXXXXXXXXXX---- | CP1Ch3C4G5A6Psy7fus_Psylliodes_fusiiformis_Chryso.idba.0 | XXXXXXXXXXXXXX-XXX- | CP1Ch3C4G5A6Psy7fus_Psylliodes_fusiiformis_Chryso.idba.0_MERGED |
| -X-----X--XXX- | CP1Ch3C4G5A6Psy7gou | XXXXXXXXXXXXXX---- | CP1Ch3C4G5A6Psy7gou_Psylliodes_gougeleti_Chryso.idba.128 | XXXXXXXXXXXXXX-XXX- | CP1Ch3C4G5A6Psy7gou_Psylliodes_gougeleti_Chryso.idba.128_MERGED |
| -X-----X--XXX- | CP1Ch3C4G5A6Psy7his | XXXXXXXXXXXXXX---- | CP1Ch3C4G5A6Psy7his_Psylliodes_hispnus_Chryso.idba.1 | XXXXXXXXXXXXXX-XXX- | CP1Ch3C4G5A6Psy7his_Psylliodes_hispnus_Chryso.idba.1_MERGED |
| -X-----X--XX- | CP1Ch3C4G5A6Psy7lae | -XXXXXXXXXXXXXX---- | CP1Ch3C4G5A6Psy7lae_Psylliodes_laevicollis_Chryso.idba.129 | -XXXXXXXXXXXXXX-XX- | CP1Ch3C4G5A6Psy7lae_Psylliodes_laevicollis_Chryso.idba.129_MERGED |
| -XX-----X--XX- | CP1Ch3C4G5A6Psy7thl | XXXXXXXXXXXXXX---- | CP1Ch3C4G5A6Psy7thl_Psylliodes_thlasps_Chryso.idba.120 | XXXXXXXXXXXXXX-XX- | CP1Ch3C4G5A6Psy7thl_Psylliodes_thlasps_Chryso.idba.120_MERGED |
| -X-----XXX | CP1Ch3C4G5A6Si7ful | XXXXXXXXXXXXXX---- | CP1Ch3C4G5A6Si7ful_Sinorepis_fulva_ChrysoT.idba.14 | XXXXXXXXXXXXXX-XXX | CP1Ch3C4G5A6Si7ful_Sinorepis_fulva_ChrysoT.idba.14_MERGED |
| -X-----X--XXX | CP1Ch3C4G5A6Te7ker | XXXXXXXXXXXXXX---- | CP1Ch3C4G5A6Te7ker_Tegyrius_keralaensis_ChrysoT.idba.32 | XXXXXXXXXXXXXX-XXX | CP1Ch3C4G5A6Te7ker_Tegyrius_keralaensis_ChrysoT.idba.32_MERGED |
| -XX-----X--XX- | CP1Ch3C4G5G6Gal7int | XXXXXXXXXXXXXX---- | CP1Ch3C4G5G6Gal7int_Galeruca_interrupta_Chryso.idba.33 | XXXXXXXXXXXXXX-XX- | CP1Ch3C4G5G6Gal7int_Galeruca_interrupta_Chryso.idba.33_MERGED |
| -X-----X--XX- | CP1Ch3C4G5G6Gal7mac | XXXXXXXXXXXXXX---- | CP1Ch3C4G5G6Gal7mac_Galeruca_macchoi_Chryso.idba.28 | XXXXXXXXXXXXXX-XX- | CP1Ch3C4G5G6Gal7mac_Galeruca_macchoi_Chryso.idba.28_MERGED |
| -XX-----X--X---- | CP1Ch3C4G5G6Gal7nig | XXXXXXXXXXXXXX---- | CP1Ch3C4G5G6Gal7nig_Galeruca_nigrolineata_ChrysoT.idba.33 | XXXXXXXXXXXXXX-XX- | CP1Ch3C4G5G6Gal7nig_Galeruca_nigrolineata_ChrysoT.idba.33_MERGED |
| -X-----XXX | CP1Ch3C4G5G6Is7dim | XXXXXXXXXXXXXX---- | CP1Ch3C4G5G6Is7dim_Isshikia_dimidiaticornis_ChrysoT.idba.28 | XXXXXXXXXXXXXX-XXX | CP1Ch3C4G5G6Is7dim_Isshikia_dimidiaticornis_ChrysoT.idba.28_MERGED |
| -X-----X--XXX | CP1Ch3C4G5G6Pe7vig | XXXXXXXX----- | CP1Ch3C4G5G6Pe7vig_Periclitena_vigorsi_ChrysoT.idba.66 | XXXXXXXX-----X--XXX | CP1Ch3C4G5G6Pe7vig_Periclitena_vigorsi_ChrysoT.idba.66_MERGED |
| -XX-----X--XX- | CP1Ch3C4G5G6Py7aen | XXXXXXXXXXXXXX---- | CP1Ch3C4G5G6Py7aen_Pyrrhalta_aenescens_ChrysoT.idba.17 | XXXXXXXXXXXXXX-XX- | CP1Ch3C4G5G6Py7aen_Pyrrhalta_aenescens_ChrysoT.idba.17_MERGED |
| -X-----XXX-XXX | CP1Ch3C4G5G6Tr7vir | XXXXXXXX----- | CP1Ch3C4G5G6Tr7vir_Trirhabda_virgata_ChrysoT.idba.57 | XXXXXXXX-----XXX-XXX | CP1Ch3C4G5G6Tr7vir_Trirhabda_virgata_ChrysoT.idba.57_MERGED |
| -X-----X--XXX | CP1Ch3C4G5L6Ag7mir | XXXXXXXXXXXXXX---- | CP1Ch3C4G5L6Ag7mir_Agetocera_mirabilis_CS.idba.48 | XXXXXXXXXXXXXX-XXX | CP1Ch3C4G5L6Ag7mir_Agetocera_mirabilis_CS.idba.48_MERGED |
| -XX-----XX-XXX | CP1Ch3C4G5L6Ca7cir | XXXXXXXXXX----- | CP1Ch3C4G5L6Ca7cir_Calomacrus_circumfusus_Chryso.idba.139 | XXXXXXXXXX-XX-XXX | CP1Ch3C4G5L6Ca7cir_Calomacrus_circumfusus_Chryso.idba.139_MERGED |
| -X-----X--XX- | CP1Ch3C4G5L6Ca7pin | XXXXXXXXXXXXXX---- | CP1Ch3C4G5L6Ca7pin_Calomacrus_pinicola_amie.idba.64 | XXXXXXXXXXXXXX-XX- | CP1Ch3C4G5L6Ca7pin_Calomacrus_pinicola_amie.idba.64_MERGED |
| -X-----X--XX- | CP1Ch3C4G5L6Ca7sut | XXXXXXXXXXXXXX---- | CP1Ch3C4G5L6Ca7sut_Calomacrus_suturalis_Chryso.idba.22 | XXXXXXXXXXXXXX-XX- | CP1Ch3C4G5L6Ca7sut_Calomacrus_suturalis_Chryso.idba.22_MERGED |
| XXXXXXXXXXXXXXXX | CP1Ch3C4G5L6Dia7bar | XXXXXXXXXXXXXX---- | CP1Ch3C4G5L6Dia7bar_Diabrotica_barberi_NC_022935 | XXXXXXXXXXXXXXXX-XX- | CP1Ch3C4G5L6Dia7bar_Diabrotica_barberi_NC_022935_MERGED |
| XXXXXXXXXXXXXXXX | CP1Ch3C4G5L6Dia7vir | XXXXXXXXXXXXXX---- | CP1Ch3C4G5L6Dia7vir_Diabrotica_virgifera_KF658070 | XXXXXXXXXXXXXXXX-XX- | CP1Ch3C4G5L6Dia7vir_Diabrotica_virgifera_KF658070_MERGED |
| -X-----XX-XXX | CP1Ch3C4G5L6Ex7lus | XXXXXXXXXXXXXX---- | CP1Ch3C4G5L6Ex7lus_Exosoma_lusitanicum_Chryso.idba.116 | XXXXXXXXXXXXXX-XXX | CP1Ch3C4G5L6Ex7lus_Exosoma_lusitanicum_Chryso.idba.116_MERGED |
| -X-----XX-XXX | CP1Ch3C4G5L6Ho7uni | XXXXXXXXXXXXXX---- | CP1Ch3C4G5L6Ho7uni_Hoplasoma_unicolor_ChrysoT.idba.50 | XXXXXXXXXXXXXX-XXX | CP1Ch3C4G5L6Ho7uni_Hoplasoma_unicolor_ChrysoT.idba.50_MERGED |
| -X-----X--XXX | CP1Ch3C4G5L6Hop7sub | XXXXXXXXXXXXXX---- | CP1Ch3C4G5L6Hop7sub_Hoplosaenidea_subcostata_ChrysoT.idba.41 | XXXXXXXXXXXXXX-XXX | CP1Ch3C4G5L6Hop7sub_Hoplosaenidea_subcostata_ChrysoT.idba.41_MERGED |
| -X-----XX- | CP1Ch3C4G5L6Lep7ery | XXXXXXXXXXXXXX---- | CP1Ch3C4G5L6Lep7ery_Leptomoma_erythrocephala_Chryso.idba.46 | XXXXXXXXXXXXXX-XX- | CP1Ch3C4G5L6Lep7ery_Leptomoma_erythrocephala_Chryso.idba.46_MERGED |
| -XX-----X--XX- | CP1Ch3C4G5L6Ph7qua | XXXXXXXXXXXXXX---- | CP1Ch3C4G5L6Ph7qua_Phyllobrotica_quadrimaculata_amie.idba.53 | XXXXXXXXXXXXXX-XX- | CP1Ch3C4G5L6Ph7qua_Phyllobrotica_quadrimaculata_amie.idba.53_MERGED |
| -X-----X--XX- | CP1Ch3C4G5L6St7nip | XXXXXXXXXXXXXX---- | CP1Ch3C4G5L6St7nip_Stenoluperus nipponensis_ChrysoT.idba.29 | XXXXXXXXXXXXXX-XX- | CP1Ch3C4G5L6St7nip_Stenoluperus nipponensis_ChrysoT.idba.29_MERGED |
| -X--X--X--XX- | CP1Ch3C4G5O6i7mac | XXXXXXXXXXXXXX---- | CP1Ch3C4G5O6i7mac_Oides_maculatus_ChrysoT.idba.45 | XXXXXXXXXXXXXX-XX- | CP1Ch3C4G5O6i7mac_Oides_maculatus_ChrysoT.idba.45_MERGED |
| -X-----X--XXX | CP1Ch3C4G5Op7sca | XXXXXXXXXX----- | CP1Ch3C4G5Op7sca_Ophrida_scapoides_CS.idba.69 | XXXXXXXXXX-----X--XXX | CP1Ch3C4G5Op7sca_Ophrida_scapoides_CS.idba.69_MERGED |
| -X-----X--XXX | CP1Ch3C4G5Par7fla | XXXXXXXXXXXXXX---- | CP1Ch3C4G5Par7fla_Paragetocera_favipes_ChrysoT.idba.24 | XXXXXXXXXXXXXX-XXX | CP1Ch3C4G5Par7fla_Paragetocera_favipes_ChrysoT.idba.24_MERGED |
| -XX-----X--XXX- | CP1Ch3C4G5S6Age7aln | XXXXXXXXXXXXXX---- | CP1Ch3C4G5S6Age7aln_Agelastica_alni_CS.idba.57 | XXXXXXXXXXXXXX-X-XXX- | CP1Ch3C4G5S6Age7aln_Agelastica_alni_CS.idba.57_MERGED |
| -X-----XXX | CP1Ch3C4G5S6Ar7chi | XXXXXXXXXXXXXX---- | CP1Ch3C4G5S6Ar7chi_Arthrotus_chinensis_CS.idba.16 | XXXXXXXXXXXXXX-XXX | CP1Ch3C4G5S6Ar7chi_Arthrotus_chinensis_CS.idba.16_MERGED |
| -XX-----XXXXXX | CP1Ch3C4G5S6Se7hal | XXXXXXXXXXXXXX---- | CP1Ch3C4G5S6Se7hal_Sermylassa_halensis_ChrysoT.idba.11 | XXXXXXXXXXXXXX-XXX | CP1Ch3C4G5S6Se7hal_Sermylassa_halensis_ChrysoT.idba.11_MERGED |
| -X-----X--XX- | CP1Ch3C4G5S17sub | XXXXXXXXXXXXXX---- | CP1Ch3C4G5S17sub_Sinoluperus_subcostatus_ChrysoT.idba.44 | XXXXXXXXXXXXXX-XXX | CP1Ch3C4G5S17sub_Sinoluperus_subcostatus_ChrysoT.idba.44_MERGED |
| -XX-----X--XX- | CP1Ch3C4G5Sp7rub | XXXXXXXXXXXXXX---- | CP1Ch3C4G5Sp7rub_Sphaeroderma_rubidum_Chryso.idba.27 | XXXXXXXXXXXXXX-XX- | CP1Ch3C4G5Sp7rub_Sphaeroderma_rubidum_Chryso.idba.27_MERGED |
| -XX-----XXXXXX | CP1Ch3C4P17ser | XXXXXXXXXXXXXX---- | CP1Ch3C4P17ser_Plateumaris_sericea_Chryso.idba.118 | XXXXXXXXXXXXXXXX-XXX | CP1Ch3C4P17ser_Plateumaris_sericea_Chryso.idba.118_MERGED |
| -X-----XX-XXX | CP1Ch3C4S5Sp7sum | -XXXXXXXXXXXXXX---- | CP1Ch3C4S5Sp7sum_Spilopyra_sumptuosa_JX220997 | -XXXXXXXXXXXXXX-XXX | CP1Ch3C4S5Sp7sum_Spilopyra_sumptuosa_JX220997_MERGED |

| | | | | | |
|------------|------------------------|-------------|--|-------------|---|
| -X----- | CP1Ch3Ce4C5Ca6Py7san | XXXXXXXXXX | CP1Ch3Ce4C5Ca6Py7san_Pyrrhidium_sanguineum_amei.idba.43 | XXXXXXXXXX | CP1Ch3Ce4C5Ca6Py7san_Pyrrhidium_sanguineum_amei.idba.43_MERGED |
| XXXXXXXXXX | CP1Ch3Ce4C5Ce6Ma7rad | XXXXXXXXXX | CP1Ch3Ce4C5Ce6Ma7rad_Massicus_raddei_NC_023937 | XXXXXXXXXX | CP1Ch3Ce4C5Ce6Ma7rad_Massicus_raddei_NC_023937_MERGED |
| -X----- | CP1Ch3Ce4L5L6Cort7hum | XXXXXXXXXX | CP1Ch3Ce4L5L6Cort7hum_Cortodera_humeralis_amei.idba.52 | XXXXXXXXXX | CP1Ch3Ce4L5L6Cort7hum_Cortodera_humeralis_amei.idba.52_MERGED |
| -XX----- | CP1Ch3Ce4L5L6St7nig | XXXXXXXXXX | CP1Ch3Ce4L5L6St7nig_Stenurella_nigra_amei.idba.31 | XXXXXXXXXX | CP1Ch3Ce4L5L6St7nig_Stenurella_nigra_amei.idba.31_MERGED |
| -X----- | CP1Ch3Ce4L5L6St7sep | XXXXXXXXXX | CP1Ch3Ce4L5L6St7sep_Stenurella_septempunctata_amei.idba.16 | XXXXXXXXXX | CP1Ch3Ce4L5L6St7sep_Stenurella_septempunctata_amei.idba.16_MERGED |
| -X----- | CP1Ch3Ce4L5R6Br7int | XXXXXXXXXX | CP1Ch3Ce4L5R6Br7int_Brachyta_interrogationis_amei.idba.3 | XXXXXXXXXX | CP1Ch3Ce4L5R6Br7int_Brachyta_interrogationis_amei.idba.3_MERGED |
| -XX----- | CP1Ch3Ce4L5R6Rh7mor | XXXXXXXXXX | CP1Ch3Ce4L5R6Rh7mor_Rhagium_mordax_JX412743 | XXXXXXXXXX | CP1Ch3Ce4L5R6Rh7mor_Rhagium_mordax_JX412743_MERGED |
| XXXXXXXXXX | CP1Ch3Ce4La5Agn6Ps7hil | XXXXXXXXXX | CP1Ch3Ce4La5Agn6Ps7hil_Psacotha_hilaris_NC_013070 | XXXXXXXXXX | CP1Ch3Ce4La5Agn6Ps7hil_Psacotha_hilaris_NC_013070_MERGED |
| XXXXXXXXXX | CP1Ch3Ce4La5B6Ba7lin | XXXXXXXXXX | CP1Ch3Ce4La5B6Ba7lin_Batocera_lineolata_NC_022671 | XXXXXXXXXX | CP1Ch3Ce4La5B6Ba7lin_Batocera_lineolata_NC_022671_MERGED |
| XXXXXXXXXX | CP1Ch3Ce4La5L6An7gla | XXXXXXXXXX | CP1Ch3Ce4La5L6An7gla_Anoplophora_glabripennis_NC_008221 | XXXXXXXXXX | CP1Ch3Ce4La5L6An7gla_Anoplophora_glabripennis_NC_008221_MERGED |
| XXXXXXXXXX | CP1Ch3Ce4La5Mo6Mo7alt | XXXXXXXXXX | CP1Ch3Ce4La5Mo6Mo7alt_Monochamus_alternatus_NC_024652 | XXXXXXXXXX | CP1Ch3Ce4La5Mo6Mo7alt_Monochamus_alternatus_NC_024652_MERGED |
| -XX----- | CP1Ch3Ce4N5N6Ne7u1m | XXXXXXXXXX | CP1Ch3Ce4N5N6Ne7u1m_Necydalis_ulmi_JX220989 | XXXXXXXXXX | CP1Ch3Ce4N5N6Ne7u1m_Necydalis_ulmi_JX220989_MERGED |
| -X----- | CP1Ch3040r7cer | XXXXXXXXXX | CP1Ch3040r7cer_Orsodacne_cerasi_amei.idba.18 | XXXXXXXXXX | CP1Ch3040r7cer_Orsodacne_cerasi_amei.idba.18_MERGED |
| -X----- | CP1Ch3040r7lin | XXXXXXXXXX | CP1Ch3040r7lin_Orsodacne_lineola_JX220994 | XXXXXXXXXX | CP1Ch3040r7lin_Orsodacne_lineola_JX220994_MERGED |
| -XX----- | CP1Cu3B4By7och | XXXXXXXXXX | CP1Cu3B4By7och_Byturus_ochraceus_677381_idba_contig_12 | XXXXXXXXXX | CP1Cu3B4By7och_Byturus_ochraceus_677381_idba_contig_12_MERGED |
| -X----- | CP1Cu3Bot4An7duo | XXXXXXXXXX | CP1Cu3Bot4An7duo_Anommatus_duodecimstriatus_Soil.idba.105 | XXXXXXXXXX | CP1Cu3Bot4An7duo_Anommatus_duodecimstriatus_Soil.idba.105_MERGED |
| XXXXXXXXXX | CP1Cu3Bot4Da7hel | XXXXXXXXXX | CP1Cu3Bot4Da7hel_Dastarcus_helophoroides_NC_024271 | XXXXXXXXXX | CP1Cu3Bot4Da7hel_Dastarcus_helophoroides_NC_024271_MERGED |
| -XX----- | CP1Cu3Bot4Te7cyl | XXXXXXXXXX | CP1Cu3Bot4Te7cyl_Teredus_cylindricus_amei.idba.176 | XXXXXXXXXX | CP1Cu3Bot4Te7cyl_Teredus_cylindricus_amei.idba.176_MERGED |
| -XX----- | CP1Cu3C4C5Ad7dec | XXXXXXXXXX | CP1Cu3C4C5Ad7dec_Adalia_decempunctata_BIUK.idba.56 | XXXXXXXXXX | CP1Cu3C4C5Ad7dec_Adalia_decempunctata_BIUK.idba.56_MERGED |
| -XX----- | CP1Cu3C4C5An7nov | XXXXXXXXXX | CP1Cu3C4C5An7nov_Anisosticta_novemdecimpunctata_2VGB.idba.9 | XXXXXXXXXX | CP1Cu3C4C5An7nov_Anisosticta_novemdecimpunctata_2VGB.idba.9_MERGED |
| -X----- | CP1Cu3C4C5Ana7oce | XXXXXXXXXX | CP1Cu3C4C5Ana7oce_Anatis_ocellata_833044_idba_contig_22 | XXXXXXXXXX | CP1Cu3C4C5Ana7oce_Anatis_ocellata_833044_idba_contig_22_MERGED |
| -X----- | CP1Cu3C4C5Ca7dec | XXXXXXXXXX | CP1Cu3C4C5Ca7dec_Calvia_decemguttata_amei.idba.50 | XXXXXXXXXX | CP1Cu3C4C5Ca7dec_Calvia_decemguttata_amei.idba.50_MERGED |
| XXXXXXXXXX | CP1Cu3C4C5Ch7sex | XXXXXXXXXX | CP1Cu3C4C5Ch7sex_Cheilomenes_sexmaculata_KM244706 | XXXXXXXXXX | CP1Cu3C4C5Ch7sex_Cheilomenes_sexmaculata_KM244706_MERGED |
| -X----- | CP1Cu3C4C5Co7mag | XXXXXXXXXX | CP1Cu3C4C5Co7mag_Coccinella_magnifica_amei.idba.0 | XXXXXXXXXX | CP1Cu3C4C5Co7mag_Coccinella_magnifica_amei.idba.0_MERGED |
| -XX----- | CP1Cu3C4C5Ha7qua | XXXXXXXXXX | CP1Cu3C4C5Ha7qua_Harmonia_quadripunctata_amei.idba.4 | XXXXXXXXXX | CP1Cu3C4C5Ha7qua_Harmonia_quadripunctata_amei.idba.4_MERGED |
| -XX----- | CP1Cu3C4C5Hal7sed | XXXXXXXXXX | CP1Cu3C4C5Hal7sed_Halyzia_sedecimguttata_Staph.idba.68 | XXXXXXXXXX | CP1Cu3C4C5Hal7sed_Halyzia_sedecimguttata_Staph.idba.68_MERGED |
| -X----- | CP1Cu3C4C5Hi7und | XXXXXXXXXX | CP1Cu3C4C5Hi7und_Hippodamia_undecimnotata_amei.idba.26 | XXXXXXXXXX | CP1Cu3C4C5Hi7und_Hippodamia_undecimnotata_amei.idba.26_MERGED |
| XXXXXXXXXX | CP1Cu3C4C5Pr7jap | XXXXXXXXXX | CP1Cu3C4C5Pr7jap_Propylea_japonica_KM244660 | XXXXXXXXXX | CP1Cu3C4C5Pr7jap_Propylea_japonica_KM244660_MERGED |
| -XX----- | CP1Cu3C4Co5Co7ruf | XXXXXXXXXX | CP1Cu3C4Co5Co7ruf_Coccidula_rufa_JX412767 | XXXXXXXXXX | CP1Cu3C4Co5Co7ruf_Coccidula_rufa_JX412767_MERGED |
| XXXXXXXXXX | CP1Cu3C4E5E6He7pusi | XXXXXXXXXX | CP1Cu3C4E5E6He7pusi_Henosepilachna_pusillanima_NC_023469 | XXXXXXXXXX | CP1Cu3C4E5E6He7pusi_Henosepilachna_pusillanima_NC_023469_MERGED |
| -XX----- | CP1Cu3C4E5E6Su7vig | XXXXXXXXXX | CP1Cu3C4E5E6Su7vig_Suboccinella_vigintiquatuorpunctata_Staph.idba.64 | XXXXXXXXXX | CP1Cu3C4E5E6Su7vig_Suboccinella_vigintiquatuorpunctata_Staph.idba.64_MERGED |
| -XX----- | CP1Cu3Ce4Ce7his | XXXXX-X-XXX | CP1Cu3Ce4Ce7his_Cerylon_histeroides_HQ232821 | XXXXX-X-XXX | CP1Cu3Ce4Ce7his_Cerylon_histeroides_HQ232821_MERGED |
| -XX----- | CP1Cu3Cr4Cr7pil | XXXXXXXXXX | CP1Cu3Cr4Cr7pil_Cryptophagus_pilosus_Soil.idba.15 | XXXXXXXXXX | CP1Cu3Cr4Cr7pil_Cryptophagus_pilosus_Soil.idba.15_MERGED |
| -X----- | CP1Cu3Cr4Mi7vil | XXXXXXXXXX | CP1Cu3Cr4Mi7vil_Micrambe_villosus_amei.idba.34 | XXXXXXXXXX | CP1Cu3Cr4Mi7vil_Micrambe_villosus_amei.idba.34_MERGED |
| XXXXXXXXXX | CP1Cu3Cu4Cu7cla | XXXXXXXXXX | CP1Cu3Cu4Cu7cla_Cucujus_clavipes_NC_018350 | XXXXXXXXXX | CP1Cu3Cu4Cu7cla_Cucujus_clavipes_NC_018350_MERGED |
| -X----- | CP1Cu3Cu4Cu7hae | XXXXXXXXXX | CP1Cu3Cu4Cu7hae_Cucujus_haematodes_amei.idba.42 | XXXXXXXXXX | CP1Cu3Cu4Cu7hae_Cucujus_haematodes_amei.idba.42_MERGED |
| -XX----- | CP1Cu3E4Tr7bip | XXXX-XXXX | CP1Cu3E4Tr7bip_Tritoma_bipustulata_HQ232822 | XXXX-XXXX | CP1Cu3E4Tr7bip_Tritoma_bipustulata_HQ232822_MERGED |
| -XX----- | CP1Cu3En4End7coc | XXXXXXXXXX | CP1Cu3En4End7coc_Endomychus_coccineus_JX313667 | XXXXXXXXXX | CP1Cu3En4End7coc_Endomychus_coccineus_JX313667_MERGED |
| -X----- | CP1Cu3K4Bra7ves | XXXXXXXXXX | CP1Cu3K4Bra7ves_Brachypterolus_vestitus_amei.idba.107 | XXXXXXXXXX | CP1Cu3K4Bra7ves_Brachypterolus_vestitus_amei.idba.107_MERGED |
| -XX----- | CP1Cu3K4Ka7ped | XXXX-XXXX | CP1Cu3K4Ka7ped_Kateretes_pedicularius_amei.idba.175 | XXXX-XXXX | CP1Cu3K4Ka7ped_Kateretes_pedicularius_amei.idba.175_MERGED |
| -XXX----- | CP1Cu3Lat4Ca7nod | XXXXXXXXXX | CP1Cu3Lat4Ca7nod_Cartodere_nodifer_BIUK.idba.51 | XXXXXXXXXX | CP1Cu3Lat4Ca7nod_Cartodere_nodifer_BIUK.idba.51_MERGED |
| -XX----- | CP1Cu3Lat4Co7gib | XXXXXXXXXX | CP1Cu3Lat4Co7gib_Corticinara_gibbosa_BIUK.idba.27 | XXXXXXXXXX | CP1Cu3Lat4Co7gib_Corticinara_gibbosa_BIUK.idba.27_MERGED |
| -XX----- | CP1Cu3Lat4Co7sim | XXXXXXXXXX | CP1Cu3Lat4Co7sim_Corticinara_similata_BIUK.idba.1a | XXXXXXXXXX | CP1Cu3Lat4Co7sim_Corticinara_similata_BIUK.idba.1a_MERGED |
| -X----- | CP1Cu3Lat4En7bre | XXXXXXXXXX | CP1Cu3Lat4En7bre_Enicmus_brevicornis_JX313681 | XXXXXXXXXX | CP1Cu3Lat4En7bre_Enicmus_brevicornis_JX313681_MERGED |
| -X----- | CP1Cu3M4M5Mo7qua | XXXXXXXXXX | CP1Cu3M4M5Mo7qua_Monotoma_quadricollis_676892_idba_contig_27-86 | XXXXXXXXXX | CP1Cu3M4M5Mo7qua_Monotoma_quadricollis_676892_idba_contig_27-86_MERGED |
| -X----- | CP1Cu3M4R5Rh7aen | XXXXXXXXXX | CP1Cu3M4R5Rh7aen_Rhizophagus_aeneus_amei.idba.45 | XXXXXXXXXX | CP1Cu3M4R5Rh7aen_Rhizophagus_aeneus_amei.idba.45_MERGED |
| -XX----- | CP1Cu3M4R5Rh7dis | XXXX-XXXX | CP1Cu3M4R5Rh7dis_Rhizophagus_dispr_676912_idba_contig_113 | XXXX-XXXX | CP1Cu3M4R5Rh7dis_Rhizophagus_dispr_676912_idba_contig_113_MERGED |
| -XX----- | CP1Cu3N4C5Ep7me1 | XXXXXXXXXX | CP1Cu3N4C5Ep7me1_Epuraea_melanocephala_BIUK.idba.43 | XXXXXXXXXX | CP1Cu3N4C5Ep7me1_Epuraea_melanocephala_BIUK.idba.43_MERGED |
| -XX----- | CP1Cu3N4Cr5G17hor | XXXXXXXXXX | CP1Cu3N4Cr5G17hor_Glischrochilus_hortensis_JX412778 | XXXXXXXXXX | CP1Cu3N4Cr5G17hor_Glischrochilus_hortensis_JX412778_MERGED |
| -XX----- | CP1Cu3N4N5Po7adu | XXXXXXXXXX | CP1Cu3N4N5Po7adu_Pocadius_ajustus_BIUK.idba.12 | XXXXXXXXXX | CP1Cu3N4N5Po7adu_Pocadius_ajustus_BIUK.idba.12_MERGED |
| -XX----- | CP1Cu3P4Er7syl | XXX----- | CP1Cu3P4Er7syl_Ericmodes_sylvaticus_697044_idba_contig_61 | XXX----- | CP1Cu3P4Er7syl_Ericmodes_sylvaticus_697044_idba_contig_61_MERGED |
| XXXXXXXXXX | CP1Cu3Ph4Pr7obs | XXXXXXXXXX | CP1Cu3Ph4Pr7obs_Priasilpha_obscura_NC_011326 | XXXXXXXXXX | CP1Cu3Ph4Pr7obs_Priasilpha_obscura_NC_011326_MERGED |
| -XX----- | CP1Cu3S4As7orb | XXXXXXXXXX | CP1Cu3S4As7orb_Aspidiphorus_orbiculatus_Staph.idba.13 | XXXXXXXXXX | CP1Cu3S4As7orb_Aspidiphorus_orbiculatus_Staph.idba.13_MERGED |
| -XX----- | CP1Cu3S4Sp7dub | XXXXXXXXXX | CP1Cu3S4Sp7dub_Sphindus_dubius_JX412803 | XXXXXXXXXX | CP1Cu3S4Sp7dub_Sphindus_dubius_JX412803_MERGED |
| -X----- | CP1Cu3S14S50r7sur | XXXXXXXXXX | CP1Cu3S14S50r7sur_Oryzaephilus_surinamensis_Soil.idba.57 | XXXXXXXXXX | CP1Cu3S14S50r7sur_Oryzaephilus_surinamensis_Soil.idba.57_MERGED |

| | | | | | |
|-------------------|-------------------------|-----------------------|--|-----------------------|---|
| -XX-----XX-XXX | CP1Cu3S14S5S17uni | -----XXXX-XXXX | CP1Cu3S14S5S17uni_Silvanus_unidentatus_JX313687 | -X---XXXXXX-XX | CP1Cu3S14S5S17uni_Silvanus_unidentatus_JX313687_MERGED |
| -XX-----X---XX- | CP1Cur3A4A5P6P17alb | -XXXXXXXXXXXX-XXXX | CP1Cur3A4A5P6P17alb_Platystomos_albinus_JN163968 | -XXXXXXXXXXXX-XX- | CP1Cur3A4A5P6P17alb_Platystomos_albinus_JN163968_MERGED |
| -XX-----XX- | CP1Cur3AT4A5AT7nit | XXXXXXXXXXXX-XXXX | CP1Cur3AT4A5AT7nit_AtteLabus_nitens_ameie_idba.73 | XXXXXXXXXXXX-XX- | CP1Cur3AT4A5AT7nit_AtteLabus_nitens_ameie_idba.73_MERGED |
| -X-----X----- | CP1Cur3AT4A5P7cor | -XXXXXXXXXXXX-XXXX | CP1Cur3AT4A5P7cor_Apoderus_coryli_JN163966 | -XXXXXXXXXXXX-XXXX | CP1Cur3AT4A5P7cor_Apoderus_coryli_JN163966_MERGED |
| -X-----X----- | CP1Cur3AT4R5B7pop | --XXXXXXXXXX-XXXX | CP1Cur3AT4R5B7pop_Byctiscus_populi_NC_018760 | -X-XXXXXXXXXX-XXXX | CP1Cur3AT4R5B7pop_Byctiscus_populi_NC_018760_MERGED |
| -XX-----XX- | CP1Cur3AT4R5De7bet | --XXXXXXXXXX-XXXX | CP1Cur3AT4R5De7bet_Deporaus_betulae_JN163945 | -XXXXXXXXXXXX-XX- | CP1Cur3AT4R5De7bet_Deporaus_betulae_JN163945_MERGED |
| -X-----X----- | CP1Cur3AT4R5De7tri | XXXXXXXXXXXX-XXXX | CP1Cur3AT4R5De7tri_Deporaus_tristis_ameie_idba.109 | XXXXXXXXXXXX-XXXX | CP1Cur3AT4R5De7tri_Deporaus_tristis_ameie_idba.109_MERGED |
| -XX-----X---XX- | CP1Cur3Br4A5Be7sim | XXXXXXXXXXXXXXXX-XXXX | CP1Cur3Br4A5Be7sim_Betulapion_simile_BIUK_idba.36 | XXXXXXXXXXXXXXXX-XX- | CP1Cur3Br4A5Be7sim_Betulapion_simile_BIUK_idba.36_MERGED |
| -X-----X----- | CP1Cur3Br4A5Pr7int | XXXXXXXXXXXX-XXXX | CP1Cur3Br4A5Pr7int_Protapion_interjectum_Soil_idba.118 | XXXXXXXXXXXX-XXXX | CP1Cur3Br4A5Pr7int_Protapion_interjectum_Soil_idba.118_MERGED |
| -XX-----XX- | CP1Cur3Br4A5Pr7tri | XXXXXXXXXXXXXXXX-XXXX | CP1Cur3Br4A5Pr7tri_Protapion_trifolii_Soil_idba.58 | XXXXXXXXXXXXXXXX-XXXX | CP1Cur3Br4A5Pr7tri_Protapion_trifolii_Soil_idba.58_MERGED |
| -X-----X----- | CP1Cur3Br4A5Rh7lon | --XXXXXXXXXX-XXXX | CP1Cur3Br4A5Rh7lon_Rhopalapion_longirostre_JN163967 | -XXXXXXXXXXXX-XXXX | CP1Cur3Br4A5Rh7lon_Rhopalapion_longirostre_JN163967_MERGED |
| -XX-----X---XX- | CP1Cur3Br4N5Na7mar | -----XXXXXXXXXX-XXXX | CP1Cur3Br4N5Na7mar_Nanophyes_marmoratus_Curc_idba.93 | -XX-XXXXXXXXXX-XX- | CP1Cur3Br4N5Na7mar_Nanophyes_marmoratus_Curc_idba.93_MERGED |
| -----XX- | CP1Cur3Bra4B5Br7mur | --XXXXXXXXXX-XXXX | CP1Cur3Bra4B5Br7mur_Brachycerus_muricatus_JN163970 | --XXXXXXXXXX-XX- | CP1Cur3Bra4B5Br7mur_Brachycerus_muricatus_JN163970_MERGED |
| -X-----XXX | CP1Cur3Bra4B5Ha7DDM2009 | -----XXXXXXXXXX-XXXX | CP1Cur3Bra4B5Ha7DDM2009_Haplonyx_spDDM-2009_Curc_idba.98 | -X-----XXXXXXXX-XXX | CP1Cur3Bra4B5Ha7DDM2009_Haplonyx_spDDM-2009_Curc_idba.98_MERGED |
| -X-----X----- | CP1Cur3Bra4E5D07tor | XXXXXXXXXXXX-XXXX | CP1Cur3Bra4E5D07tor_Dorytomus_tortrix_ameie_idba.139 | XXXXXXXXXXXX-XXXX | CP1Cur3Bra4E5D07tor_Dorytomus_tortrix_ameie_idba.139_MERGED |
| -XX-----X---X- | CP1Cur3C4C5A6An7pom | --XXXXXXXXXX-XXXX | CP1Cur3C4C5A6An7pom_Anthonomus_pomorum_JN163951 | -XXXXXXXXXXXX-XX- | CP1Cur3C4C5A6An7pom_Anthonomus_pomorum_JN163951_MERGED |
| -X-----X----- | CP1Cur3C4C5A6Br7ke1 | XXXXXXXXXXXX-XXXX | CP1Cur3C4C5A6Br7ke1_Bradybatus_kellneri_ameie_idba.54 | XXXXXXXXXXXX-XXXX | CP1Cur3C4C5A6Br7ke1_Bradybatus_kellneri_ameie_idba.54_MERGED |
| -XX-----X---X- | CP1Cur3C4C5C6Cu7ele | XXXXXXXXXXXX-XXXX | CP1Cur3C4C5C6Cu7ele_Curculio_elephas_ameie_idba.5 | XXXXXXXXXXXX-XX- | CP1Cur3C4C5C6Cu7ele_Curculio_elephas_ameie_idba.5_MERGED |
| -XX-----X-X-XXX- | CP1Cur3C4C5C6Cu7gla | -----XXXXXXXXXX-XXXX | CP1Cur3C4C5C6Cu7gla_Curculio_glandium_BIUK_idba.52 | -XX-XXXXXXXXXXXX-XX- | CP1Cur3C4C5C6Cu7gla_Curculio_glandium_BIUK_idba.52_MERGED |
| -----X-X-XX- | CP1Cur3C4C5E6An7tar | XXXXXXXXXXXXXXXX-XXXX | CP1Cur3C4C5E6An7tar_Ancyrtalia_tarsalis_Curc_idba.45 | XXXXXXXXXXXXXXXX-XX | CP1Cur3C4C5E6An7tar_Ancyrtalia_tarsalis_Curc_idba.45_MERGED |
| -X-X-----XX- | CP1Cur3C4C5M6Me7jan | --XXXXXX-XXXX | CP1Cur3C4C5M6Me7jan_Mecinus_janthinus_ameie_idba.143 | -XXXXXX-XXXX | CP1Cur3C4C5M6Me7jan_Mecinus_janthinus_ameie_idba.143_MERGED |
| -XXX-----X--- | CP1Cur3C4Ce5Ce7obs | --XXXXXXXXXX-XXXX | CP1Cur3C4Ce5Ce7obs_Ceutorhynchus_obstrictus_JN163956 | -XXXXXXXXXXXX-XX- | CP1Cur3C4Ce5Ce7obs_Ceutorhynchus_obstrictus_JN163956_MERGED |
| -X-----X----- | CP1Cur3C4Ce5Mon7pun | XXXXXXXXXXXXXXXX-XXXX | CP1Cur3C4Ce5Mon7pun_Mononychus_punctumalbum_Curc_idba.3 | XXXXXXXXXXXXXXXX-XXXX | CP1Cur3C4Ce5Mon7pun_Mononychus_punctumalbum_Curc_idba.3_MERGED |
| -XX-----X----- | CP1Cur3C4Ce5Rh7per | XXXXXXXXXXXXXXXX-XXXX | CP1Cur3C4Ce5Rh7per_Rhinoncus_pericarpus_Curc_idba.24 | XXXXXXXXXXXXXXXX-XXXX | CP1Cur3C4Ce5Rh7per_Rhinoncus_pericarpus_Curc_idba.24_MERGED |
| -X-----X---X- | CP1Cur3C4C15C17ole | --XXXXXXXXXX-XXXX | CP1Cur3C4C15C17ole_Cionus_olens_JN163958 | -XXXXXXXXXXXX-XX- | CP1Cur3C4C15C17ole_Cionus_olens_JN163958_MERGED |
| -XX-----X-X--- | CP1Cur3C4C15La7tur | --XXXXXXXXXX-XXXX | CP1Cur3C4C15La7tur_Larinus_turbinatus_JN163952 | -XXXXXXXXXXXX-XX- | CP1Cur3C4C15La7tur_Larinus_turbinatus_JN163952_MERGED |
| -X-----X----- | CP1Cur3C4C5C6Co7cyc | XXXXXXXXXXXXXXXX-XXXX | CP1Cur3C4C5C6Co7cyc_Coptonotus_cyclopus_Curc_idba.67 | XXXXXXXXXXXXXXXX-XXXX | CP1Cur3C4C5C6Co7cyc_Coptonotus_cyclopus_Curc_idba.67_MERGED |
| -XX-----XX- | CP1Cur3C4Cr5Ac7mis | -----XXXXXXXXXX-XXXX | CP1Cur3C4Cr5Ac7mis_Acalles_misellus_BIUK_idba.57 | -XX-XXXXXXXXXXXX-XX- | CP1Cur3C4Cr5Ac7mis_Acalles_misellus_BIUK_idba.57_MERGED |
| -XX-----XX-XX- | CP1Cur3C4Cr5Ac7pti | XXXXXXXXXXXXXXXX-XXXX | CP1Cur3C4Cr5Ac7pti_Acalles_ptinoides_BIUK_idba.42 | XXXXXXXXXXXXXXXX-XX- | CP1Cur3C4Cr5Ac7pti_Acalles_ptinoides_BIUK_idba.42_MERGED |
| -X-----X----- | CP1Cur3C4Cr5Ec7and | XXXX-XXXX | CP1Cur3C4Cr5Ec7and_Echinodera_andalusiensis_Soil_idba.193 | XXXX-XXXX-XX- | CP1Cur3C4Cr5Ec7and_Echinodera_andalusiensis_Soil_idba.193_MERGED |
| --X-----XX- | CP1Cur3C4Cr5Ky7aub | -XXXXXXXXXXXX-XXXX | CP1Cur3C4Cr5Ky7aub_Kyklioacalles_aubei_JN163957 | XXXXXXXXXXXXXXXX-XXXX | CP1Cur3C4Cr5Ky7aub_Kyklioacalles_aubei_JN163957_MERGED |
| -X-----XX- | CP1Cur3C4Cr5Ky7rob | -----XXXXXX-XXXX | CP1Cur3C4Cr5Ky7rob_Kyklioacalles_roboris_BIUK_idba.79 | -X-----XXXXXX-XXXX | CP1Cur3C4Cr5Ky7rob_Kyklioacalles_roboris_BIUK_idba.79_MERGED |
| -XX-----XXX-X- | CP1Cur3C4Cr5Ou7squ | XXXXXXXXXXXXXXXX-XXXX | CP1Cur3C4Cr5Ou7squ_Ouroproterus_squamiventris_Curc_idba.5 | XXXXXXXXXXXXXXXX-XX- | CP1Cur3C4Cr5Ou7squ_Ouroproterus_squamiventris_Curc_idba.5_MERGED |
| -X-----X----- | CP1Cur3C4Cy5D17man | XXXXXXXXXXXX-XXXX | CP1Cur3C4Cy5D17man_Dichotrachelus_manueli_Curc_idba.88 | XXXXXXXXXXXX-XXXX | CP1Cur3C4Cy5D17man_Dichotrachelus_manueli_Curc_idba.88_MERGED |
| -XX-----XX- | CP1Cur3C4D5Co7sor | XXXXXXXXXXXXXXXX-XXXX | CP1Cur3C4D5Co7sor_Cosmopolites_sordidus_Curc_idba.8 | XXXXXXXXXXXXXXXX-XXXX | CP1Cur3C4D5Co7sor_Cosmopolites_sordidus_Curc_idba.8_MERGED |
| -XX-----XXX- | CP1Cur3C4D5Rhi7bar | XXXXXXXXXXXXXXXX-XXXX | CP1Cur3C4D5Rhi7bar_Rhinostomus_barbirostris_Panama_idba.10 | XXXXXXXXXXXXXXXX-XXXX | CP1Cur3C4D5Rhi7bar_Rhinostomus_barbirostris_Panama_idba.10_MERGED |
| -X-X-----XXX- | CP1Cur3C4D5Si7gra | --XXXXXX-XX-XXXX | CP1Cur3C4D5Si7gra_Sitophilus_granarius_JN163959 | -XXXXXX-XX-XXXX | CP1Cur3C4D5Si7gra_Sitophilus_granarius_JN163959_MERGED |
| -XXX-----X-X-XX- | CP1Cur3C4E5B6St7mel | --XXXXXXXXXX-XXXX | CP1Cur3C4E5B6St7mel_Strophosoma_melanogrammum_JN163949 | -XXXXXXXXXXXX-XX- | CP1Cur3C4E5B6St7mel_Strophosoma_melanogrammum_JN163949_MERGED |
| -----XX- | CP1Cur3C4E5G6Ba7obs | -XXXXXXXXXXXX-XXXX | CP1Cur3C4E5G6Ba7obs_Barynotus_obscurus_JN163950 | -XXXXXXXXXXXX-XX- | CP1Cur3C4E5G6Ba7obs_Barynotus_obscurus_JN163950_MERGED |
| XXXXXXXXXXXX-XXXX | CP1Cur3C4E5N6Na7xan | XXXXXXXXXXXXXXXX-XXXX | CP1Cur3C4E5N6Na7xan_Naupactus_xanthographus_NC_018354 | XXXXXXXXXXXXXXXX-XXXX | CP1Cur3C4E5N6Na7xan_Naupactus_xanthographus_NC_018354_MERGED |
| -X-X-----X-X-XX- | CP1Cur3C4E5Ot60T7mor | XXXXXXXXXXXX-XXXX | CP1Cur3C4E5Ot60T7mor_Otiorhynchus_morio_ameie_idba.90 | XXXXXXXXXXXX-XXXX | CP1Cur3C4E5Ot60T7mor_Otiorhynchus_morio_ameie_idba.90_MERGED |
| -XXX-----X----- | CP1Cur3C4E5Ot60T7rug | --XXXXXXXXXX-XXXX | CP1Cur3C4E5Ot60T7rug_Otiorhynchus_rugosostriatus_JN163969 | -XXXXXXXXXXXX-XXXX | CP1Cur3C4E5Ot60T7rug_Otiorhynchus_rugosostriatus_JN163969_MERGED |
| -XXX-----X-XXX- | CP1Cur3C4E5Ot60T7sul | XXXXXXXXXXXXXXXX-XXXX | CP1Cur3C4E5Ot60T7sul_Otiorhynchus_sulcatus_Curc_idba.36 | XXXXXXXXXXXXXXXX-XXXX | CP1Cur3C4E5Ot60T7sul_Otiorhynchus_sulcatus_Curc_idba.36_MERGED |
| -X-----X----- | CP1Cur3C4E5Po6P7mar | -----XXXXXXXXXX-XXXX | CP1Cur3C4E5Po6P7mar_Polydrusus_marginatus_JN039360 | -XXXXXXXXXXXX-XXXX | CP1Cur3C4E5Po6P7mar_Polydrusus_marginatus_JN039360_MERGED |
| -XX-----X--- | CP1Cur3C4E5S6Si7dis | XXXXXXXXXXXXXXXX-XXXX | CP1Cur3C4E5S6Si7dis_Sitona_discoideus_Soil_idba.86 | XXXXXXXXXXXXXXXX-XX- | CP1Cur3C4E5S6Si7dis_Sitona_discoideus_Soil_idba.86_MERGED |
| -XX-----X---X- | CP1Cur3C4E5S6Si7lin | --XXXXXXXXXX-XXXX | CP1Cur3C4E5S6Si7lin_Sitona_lineatus_JN163948 | -XXXXXXXXXXXX-XX- | CP1Cur3C4E5S6Si7lin_Sitona_lineatus_JN163948_MERGED |
| -X-----X----- | CP1Cur3C4E5T6T77ele | XXXXXXXXXXXX-XXXX | CP1Cur3C4E5T6T77ele_Tropiphorus_elevatus_ameie_idba.114 | XXXXXXXXXXXX-XXXX | CP1Cur3C4E5T6T77ele_Tropiphorus_elevatus_ameie_idba.114_MERGED |
| -----XXX- | CP1Cur3C4H5Hy7bru | XXXXXXXXXXXXXXXX-XXXX | CP1Cur3C4H5Hy7bru_Hypera_brunneipennis_Soil_idba.79 | XXXXXXXXXXXXXXXX-XXXX | CP1Cur3C4H5Hy7bru_Hypera_brunneipennis_Soil_idba.79_MERGED |
| -XXX-----XXXX- | CP1Cur3C4H5Hy7pos | --XXXXXXXXXX-XXXX | CP1Cur3C4H5Hy7pos_Hypera_postica_JN163953 | -XXXXXXXXXXXX-XXXX | CP1Cur3C4H5Hy7pos_Hypera_postica_JN163953_MERGED |
| -XX-----X----- | CP1Cur3C4M5H6Hy7abi | --XXXXXXXXXX-XXXX | CP1Cur3C4M5H6Hy7abi_Hylobius_abietis_JN163954 | -XXXXXXXXXXXX-XXXX | CP1Cur3C4M5H6Hy7abi_Hylobius_abietis_JN163954_MERGED |
| XXXXXXXX-XXXX- | CP1Cur3C4M5H6Hy17xia | XXXXXXXXXXXXXXXX-XXXX | CP1Cur3C4M5H6Hy17xia_Hylobitelus_xiaoi_NC_022680 | XXXXXXXXXXXXXXXX-XXXX | CP1Cur3C4M5H6Hy17xia_Hylobitelus_xiaoi_NC_022680_MERGED |
| -X-----X----- | CP1Cur3C4M5P6P17pin | XXXXXXXXXXXXXXXX-XXXX | CP1Cur3C4M5P6P17pin_Pissodes_pini_Curc_idba.48 | XXXXXXXXXXXXXXXX-XXXX | CP1Cur3C4M5P6P17pin_Pissodes_pini_Curc_idba.48_MERGED |
| -X-----X----- | CP1Cur3C4P6Dia7uni | XXXXXXXXXXXXXXXX-XXXX | CP1Cur3C4P6Dia7uni_Diapus_unispneus_Curc_idba.33 | XXXXXXXXXXXXXXXX-XXXX | CP1Cur3C4P6Dia7uni_Diapus_unispneus_Curc_idba.33_MERGED |
| -XX-----XXX- | CP1Cur3C4P6Eu7par | XXXXXXXXXXXXXXXX-XXXX | CP1Cur3C4P6Eu7par_Euplatypus_parallelus_Scoly_idba.25 | XXXXXXXXXXXXXXXX-XXXX | CP1Cur3C4P6Eu7par_Euplatypus_parallelus_Scoly_idba.25_MERGED |
| -XX-----XX- | CP1Cur3C4P6P17cyl | XXXXXXXXXXXXXXXX-XXXX | CP1Cur3C4P6P17cyl_Platypus_cylindrus_Curc_idba.22 | XXXXXXXXXXXXXXXX-XX- | CP1Cur3C4P6P17cyl_Platypus_cylindrus_Curc_idba.22_MERGED |

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|-------------------|----------------------|-----------------------|--|-----------------------|---|
| -XX-----X--XX- | CP1Cur3C4Po5Li7tes | --XXXXXXXXX----- | CP1Cur3C4Po5Li7tes_Liophloeus_tessulatus_JN163947 | -XXXXXXXXXXXX--XX- | CP1Cur3C4Po5Li7tes_Liophloeus_tessulatus_JN163947_MERGED |
| -XX-----X----- | CP1Cur3C4Rh5Rh7que | XXXXXXXXXXXXXXXXX---- | CP1Cur3C4Rh5Rh7que_Rhynchaenus_quercus_BIUK_idba.11 | XXXXXXXXXXXXXXXXX---- | CP1Cur3C4Rh5Rh7que_Rhynchaenus_quercus_BIUK_idba.11_MERGED |
| -X-----X----- | CP1Cur3C4S5An7dis | XXXXXXXXXXXXXXXXX---- | CP1Cur3C4S5An7dis_Anisandrus_dispr_Scoly_idba.47 | XXXXXXXXXXXXXXXXX---- | CP1Cur3C4S5An7dis_Anisandrus_dispr_Scoly_idba.47_MERGED |
| -XX-----XX--- | CP1Cur3C4S5Co7cyp | XXXXXXXXXXXXXXXXX---- | CP1Cur3C4S5Co7cyp_Coccotrypes_cyper_i FG_idba.60 | XXXXXXXXXXXXXXXXX---- | CP1Cur3C4S5Co7cyp_Coccotrypes_cyper_i FG_idba.60_MERGED |
| -X-----X----- | CP1Cur3C4S5Co7rub | XXXXXXXXX----- | CP1Cur3C4S5Co7rub_Corthylus_rubricollis_Curc_idba.99 | XXXXXXXXX-----X--- | CP1Cur3C4S5Co7rub_Corthylus_rubricollis_Curc_idba.99_MERGED |
| -X-----X----- | CP1Cur3C4S5Cr7sal | XXXXXXXXXXXXXXXXX---- | CP1Cur3C4S5Cr7sal_Cryphalus_saltuarius_Curc_idba.19 | XXXXXXXXXXXXXXXXX---- | CP1Cur3C4S5Cr7sal_Cryphalus_saltuarius_Curc_idba.19_MERGED |
| -X-----X----- | CP1Cur3C4S5Cry7pus | XXXXXXXXXXXXXXXXX---- | CP1Cur3C4S5Cry7pus_Crypturgus_pusillus_Curc_idba.42 | XXXXXXXXXXXXXXXXX---- | CP1Cur3C4S5Cry7pus_Crypturgus_pusillus_Curc_idba.42_MERGED |
| -X-----X----- | CP1Cur3C4S5Cyc7bod | XXXXXXXXXXXXXXXXX---- | CP1Cur3C4S5Cyc7bod_Cyclorhipidion_bodoanus_Scoly_idba.52 | XXXXXXXXXXXXXXXXX---- | CP1Cur3C4S5Cyc7bod_Cyclorhipidion_bodoanus_Scoly_idba.52_MERGED |
| -X-----X----- | CP1Cur3C4S5Di7ine | XXXXXXXXXXXXXXXXX---- | CP1Cur3C4S5Di7ine_Diamerus_inermis_Curc_idba.58 | XXXXXXXXXXXXXXXXX---- | CP1Cur3C4S5Di7ine_Diamerus_inermis_Curc_idba.58_MERGED |
| -XX-----XXXX- | CP1Cur3C4S5Dry7aut | -----XXXXX---- | CP1Cur3C4S5Dry7aut_Dryocoetes_autographus_Curc_idba.118 | -XX-----XXXXXXX | CP1Cur3C4S5Dry7aut_Dryocoetes_autographus_Curc_idba.118_MERGED |
| -X-----X----- | CP1Cur3C4S5Dry7vil | XXXXXXXXXXXXXXXXX---- | CP1Cur3C4S5Dry7vil_Dryocoetes_villosus_Scoly_idba.38 | XXXXXXXXXXXXXXXXX---- | CP1Cur3C4S5Dry7vil_Dryocoetes_villosus_Scoly_idba.38_MERGED |
| -X-----X----- | CP1Cur3C4S5Ern7fag | XXXXXXXXXXXXXXXXX---- | CP1Cur3C4S5Ern7fag_Ernoporicus_fagi_amie_idba.75 | XXXXXXXXXXXXXXXXX---- | CP1Cur3C4S5Ern7fag_Ernoporicus_fagi_amie_idba.75_MERGED |
| -XX-----X--- | CP1Cur3C4S5Gna7mat | XXXXXXXXXXXXXXXXX---- | CP1Cur3C4S5Gna7mat_Gnathotrichus_materiarius_Scoly_idba.22 | XXXXXXXXXXXXXXXXX---- | CP1Cur3C4S5Gna7mat_Gnathotrichus_materiarius_Scoly_idba.22_MERGED |
| -X-----XXX- | CP1Cur3C4S5Hyl7ate | XXXXXXXXXXXXXXXXX---- | CP1Cur3C4S5Hyl7ate_Hylastes_ater_Scoly_idba.54 | XXXXXXXXXXXXXXXXX---- | CP1Cur3C4S5Hyl7ate_Hylastes_ater_Scoly_idba.54_MERGED |
| -X-----X----- | CP1Cur3C4S5Hyl7att | XXXXXXXXXXXXXXXXX---- | CP1Cur3C4S5Hyl7att_Hylastes_attenuatus_Scoly_idba.12 | XXXXXXXXXXXXXXXXX---- | CP1Cur3C4S5Hyl7att_Hylastes_attenuatus_Scoly_idba.12_MERGED |
| -X-----XXX- | CP1Cur3C4S5Hyl7bru | XXXXXXXXXXXXXXXXX---- | CP1Cur3C4S5Hyl7bru_Hylastes_brunneus_Scoly_idba.41 | XXXXXXXXXXXXXXXXX---- | CP1Cur3C4S5Hyl7bru_Hylastes_brunneus_Scoly_idba.41_MERGED |
| -X-----XXX- | CP1Cur3C4S5Hyl7opa | XXXXXXXXXXXXXXXXX---- | CP1Cur3C4S5Hyl7opa_Hylastes_opacus_Curc_idba.62 | XXXXXXXXXXXXXXXXX---- | CP1Cur3C4S5Hyl7opa_Hylastes_opacus_Curc_idba.62_MERGED |
| -X-----XXX- | CP1Cur3C4S5Hyle7var | --XXXXX----- | CP1Cur3C4S5Hyle7var_Hylesinus_varius_amie_idba.170 | -XXXXXX-----XXX- | CP1Cur3C4S5Hyle7var_Hylesinus_varius_amie_idba.170_MERGED |
| -X-----X--XXX- | CP1Cur3C4S5Hylur7pal | XXXXXXXXXXXXXXXXX---- | CP1Cur3C4S5Hylur7pal_Hylurgops_palliatus_Scoly_idba.48 | XXXXXXXXXXXXXXXXX---- | CP1Cur3C4S5Hylur7pal_Hylurgops_palliatus_Scoly_idba.48_MERGED |
| -X-----X----- | CP1Cur3C4S5Hyp7fic | XXXXXXXXXXXXXXXXX---- | CP1Cur3C4S5Hyp7fic_Hypoborus_ficus_Curc_idba.77 | XXXXXXXXXXXXXXXXX---- | CP1Cur3C4S5Hyp7fic_Hypoborus_ficus_Curc_idba.77_MERGED |
| -XX-----X--XXX- | CP1Cur3C4S5Ip7acu | XXXXXXXXXXXXXXXXX---- | CP1Cur3C4S5Ip7acu_Ips_acuminatus_Curc_idba.2 | XXXXXXXXXXXXXXXXX---- | CP1Cur3C4S5Ip7acu_Ips_acuminatus_Curc_idba.2_MERGED |
| -X-----X--XXX- | CP1Cur3C4S5Ip7cem | --XXX--XXX----- | CP1Cur3C4S5Ip7cem_Ips_cembrae_JN163961 | -XXX--XXX--XXX- | CP1Cur3C4S5Ip7cem_Ips_cembrae_JN163961_MERGED |
| -XX-----X--XXX- | CP1Cur3C4S5Ip7sex | XXXXXXXXXXXXXXXXX---- | CP1Cur3C4S5Ip7sex_Ips_sexdentatus_Scoly_idba.4 | XXXXXXXXXXXXXXXXX---- | CP1Cur3C4S5Ip7sex_Ips_sexdentatus_Scoly_idba.4_MERGED |
| -XX-----X--XX- | CP1Cur3C4S5Or7lar | XXXXXXXXXXXXXXXXX---- | CP1Cur3C4S5Or7lar_Orthotomicus_laricis_Scoly_idba.3 | XXXXXXXXXXXXXXXXX--X- | CP1Cur3C4S5Or7lar_Orthotomicus_laricis_Scoly_idba.3_MERGED |
| -X-----X--X--- | CP1Cur3C4S5P17qua | XXXXXXXXXXXXXXXXX---- | CP1Cur3C4S5P17qua_Pityogenes_quadridens_Scoly_idba.23 | XXXXXXXXXXXXXXXXX---- | CP1Cur3C4S5P17qua_Pityogenes_quadridens_Scoly_idba.23_MERGED |
| -XX-----XXXX- | CP1Cur3C4S5P17tre | XXXXXXXXXXXXXXXXX---- | CP1Cur3C4S5P17tre_Pityogenes_trepanatus_Scoly_idba.5 | XXXXXXXXXXXXXXXXX---- | CP1Cur3C4S5P17tre_Pityogenes_trepanatus_Scoly_idba.5_MERGED |
| -X-----X----- | CP1Cur3C4S5P17mic | XXXXXXXXXXXXXXXXX---- | CP1Cur3C4S5P17mic_Pityophthorus_micrographus_Curc_idba.39 | XXXXXXXXXXXXXXXXX---- | CP1Cur3C4S5P17mic_Pityophthorus_micrographus_Curc_idba.39_MERGED |
| -X-----X----- | CP1Cur3C4S5P17pub | XXXXXXXXXXXXXXXXX---- | CP1Cur3C4S5P17pub_Pityophthorus_pubescens_Scoly_idba.14 | XXXXXXXXXXXXXXXXX---- | CP1Cur3C4S5P17pub_Pityophthorus_pubescens_Scoly_idba.14_MERGED |
| -XX-----X--- | CP1Cur3C4S5Po7pol | XXXXXXXXXXXXXXXXX---- | CP1Cur3C4S5Po7pol_Polygraphus_poligraphus_Curc_idba.16 | XXXXXXXXXXXXXXXXX---- | CP1Cur3C4S5Po7pol_Polygraphus_poligraphus_Curc_idba.16_MERGED |
| -XX-----X--X--X | CP1Cur3C4S5Pr7cav | XXXXXXXXXXXXXXXXX---- | CP1Cur3C4S5Pr7cav_Premnobius_cavipennis_Curc_idba.4 | XXXXXXXXXXXXXXXXX--X | CP1Cur3C4S5Pr7cav_Premnobius_cavipennis_Curc_idba.4_MERGED |
| -XX-----XX--- | CP1Cur3C4S5Sa7dam | XXXXXXXXX----- | CP1Cur3C4S5Sa7dam_Sampsonius_dampfi_Scoly_idba.59 | XXXXXXXXX-----XX--- | CP1Cur3C4S5Sa7dam_Sampsonius_dampfi_Scoly_idba.59_MERGED |
| -X-----X----- | CP1Cur3C4S5Scol7sco | XXXXXXXXXXXXXXXXX---- | CP1Cur3C4S5Scol7sco_Scolytus_scolytus_Curc_idba.23 | XXXXXXXXXXXXXXXXX---- | CP1Cur3C4S5Scol7sco_Scolytus_scolytus_Curc_idba.23_MERGED |
| -X-----XXX- | CP1Cur3C4S5Te7dew | -XXXXXXXX----- | CP1Cur3C4S5Te7dew_Tesserocerus_dewalquei_Curc_idba.95 | -XXXXXXXX-----XXX- | CP1Cur3C4S5Te7dew_Tesserocerus_dewalquei_Curc_idba.95_MERGED |
| -XX-----XXXX- | CP1Cur3C4S5To7pin | XXXXXXXXXXXXXXXXX---- | CP1Cur3C4S5To7pin_Tomicus_piniperda_Scoly_idba.17 | XXXXXXXXXXXXXXXXX---- | CP1Cur3C4S5To7pin_Tomicus_piniperda_Scoly_idba.17_MERGED |
| -X-----X----- | CP1Cur3C4S5Tr7dom | XXXXXXXXXXXXXXXXX---- | CP1Cur3C4S5Tr7dom_Trypodendron_domesticum_Scoly_idba.7 | XXXXXXXXXXXXXXXXX---- | CP1Cur3C4S5Tr7dom_Trypodendron_domesticum_Scoly_idba.7_MERGED |
| -XX-----X--- | CP1Cur3C4S5Tr7sig | XXXXXXXXXXXXXXXXX---- | CP1Cur3C4S5Tr7sig_Trypodendron_signatum_Scoly_idba.49 | XXXXXXXXXXXXXXXXX---- | CP1Cur3C4S5Tr7sig_Trypodendron_signatum_Scoly_idba.49_MERGED |
| -XX-----XXX- | CP1Cur3C4S5Xy7saxe | XXXXXXXXXXXXXXXXX---- | CP1Cur3C4S5Xy7saxe_Xyleborinus_saxesenii_Scoly_idba.28 | XXXXXXXXXXXXXXXXX---- | CP1Cur3C4S5Xy7saxe_Xyleborinus_saxesenii_Scoly_idba.28_MERGED |
| -XX-----XX--- | CP1Cur3C4S5Xyl7aff | XXXXXXXXXXXXXXXXX---- | CP1Cur3C4S5Xyl7aff_Xyleborus_affinis_Scoly_idba.33 | XXXXXXXXXXXXXXXXX---- | CP1Cur3C4S5Xyl7aff_Xyleborus_affinis_Scoly_idba.33_MERGED |
| -XX-----XX--- | CP1Cur3C4S5Xyl7per | XXXXXXXXXXXXXXXXX---- | CP1Cur3C4S5Xyl7per_Xyleborus_perforans_Scoly_idba.27 | XXXXXXXXXXXXXXXXX---- | CP1Cur3C4S5Xyl7per_Xyleborus_perforans_Scoly_idba.27_MERGED |
| -X-----X----- | CP1Cur3C4S5Xyl7vol | XXXXXXXXX----- | CP1Cur3C4S5Xyl7vol_Xyleborus_volvulus_Scoly_idba.63 | XXXXXXXXX-----X--- | CP1Cur3C4S5Xyl7vol_Xyleborus_volvulus_Scoly_idba.63_MERGED |
| -X-----X----- | CP1Cur3C4S5Xyl7com | XXXXXXXXXXXXXXXXX---- | CP1Cur3C4S5Xyl7com_Xylosandrus_compactus_FG_idba.55 | XXXXXXXXXXXXXXXXX---- | CP1Cur3C4S5Xyl7com_Xylosandrus_compactus_FG_idba.55_MERGED |
| -XX-----XX--- | CP1Cur3C4S5Xyl7cra | XXXXXXXXXXXXXXXXX---- | CP1Cur3C4S5Xyl7cra_Xylosandrus_crassiusculus_Scoly_idba.34 | XXXXXXXXXXXXXXXXX---- | CP1Cur3C4S5Xyl7cra_Xylosandrus_crassiusculus_Scoly_idba.34_MERGED |
| -XX-----X--- | CP1Cur3C4S5Xyl7ger | XXXXXXXXXXXXXXXXX---- | CP1Cur3C4S5Xyl7ger_Xylosandrus_germanus_Scoly_idba.35 | XXXXXXXXXXXXXXXXX---- | CP1Cur3C4S5Xyl7ger_Xylosandrus_germanus_Scoly_idba.35_MERGED |
| -X-----X----- | CP1Cur3C4S5Xyl7mor | XXXXXXXXXXXXXXXXX---- | CP1Cur3C4S5Xyl7mor_Xylosandrus_morigerus_Scoly_idba.37 | XXXXXXXXXXXXXXXXX---- | CP1Cur3C4S5Xyl7mor_Xylosandrus_morigerus_Scoly_idba.37_MERGED |
| -X-----X----- | CP1Cur3C4S5Xyl7mac | XXXXXXXXXXXXXXXXX---- | CP1Cur3C4S5Xyl7mac_Xyloctonus_maculatus_Curc_idba.71 | XXXXXXXXXXXXXXXXX---- | CP1Cur3C4S5Xyl7mac_Xyloctonus_maculatus_Curc_idba.71_MERGED |
| -XX-----XX--- | CP1Cur3C4T5T7pus | XXXXXXXXXXXXXXXXX---- | CP1Cur3C4T5T7pus_Tychius_pusillus_Soil_idba.71 | XXXXXXXXXXXXXXXXX---- | CP1Cur3C4T5T7pus_Tychius_pusillus_Soil_idba.71_MERGED |
| -X-----X--XXX- | CP1Cur3N4D07aus | -XXXXXXXX----- | CP1Cur3N4D07aus_Doydirhynchus_austriacus_JN163964 | -XXXXXXXX-----XXX- | CP1Cur3N4D07aus_Doydirhynchus_austriacus_JN163964_MERGED |
| -XX-----XX--XXX- | CP1D3D4Da7cer | --XXXXXXXX----- | CP1D3D4Da7cer_Dascillus_cervinus_J0034414 | -XXXXXXXX-----XXX- | CP1D3D4Da7cer_Dascillus_cervinus_J0034414_MERGED |
| -XX-----XXXX- | CP1E3C4C5Ca7pel | -XXXXXXXX----- | CP1E3C4C5Ca7pel_Cantharis_pellucida_HQ232817 | -XXXXXXXX-----XXXX- | CP1E3C4C5Ca7pel_Cantharis_pellucida_HQ232817_MERGED |
| -X-----X----- | CP1E3C4C5Ca7tri | -XXXXXXXX----- | CP1E3C4C5Ca7tri_Cantharis_tristis_amie_idba.95 | -XXXXXXXX-----X--- | CP1E3C4C5Ca7tri_Cantharis_tristis_amie_idba.95_MERGED |
| XXXXXXXXXX-XXXXXX | CP1E3C4Ch5Ch7opa | XXXXXXXXXXXXXXXXX---- | CP1E3C4Ch5Ch7opa_Chauliognathus_opacus_NC_013576 | XXXXXXXXXXXXXXXXX---- | CP1E3C4Ch5Ch7opa_Chauliognathus_opacus_NC_013576_MERGED |
| -X-----X----- | CP1E3C4M5Ma7bal | XXXXXXXXXXXXXXXXX---- | CP1E3C4M5Ma7bal_Malthinus_balteatus_Soil_idba.38 | XXXXXXXXXXXXXXXXX---- | CP1E3C4M5Ma7bal_Malthinus_balteatus_Soil_idba.38_MERGED |
| -XX-----XXXX- | CP1E3C4M5Ma7mar | XXXXXXX----- | CP1E3C4M5Ma7mar_Malthodes_marginatus_BIUK_idba.61 | XXXXXXX-----XXXX- | CP1E3C4M5Ma7mar_Malthodes_marginatus_BIUK_idba.61_MERGED |
| -XX-----XX--XXX- | CP1E3D4Dr7fla | XXXXXXXXXXXXXXXXX---- | CP1E3D4Dr7fla_Drilus_flavescens_HQ232815 | XXXXXXXXXXXXXXXXX---- | CP1E3D4Dr7fla_Drilus_flavescens_HQ232815_MERGED |
| XXXX-XXXXX-X-X--- | CP1E3E4A5Py7div | XXXXXXXXXXXXXXXXX---- | CP1E3E4A5Py7div_Pyrophorus_divergens_NC_009964 | XXXXXXXXXXXXXXXXX---- | CP1E3E4A5Py7div_Pyrophorus_divergens_NC_009964_MERGED |

| | | | | | |
|----------------------|----------------------|-----------------------|---|--------------------------|--|
| -XX-----XX-XXX | CP1E3E4C5Dc7c9in | -XXXXXXXXXX----- | CP1E3E4C5Dc7c9in_Dicronychus_cinereus_amie.idba.96 | -XXXXXXXXXXXX-XXX | CP1E3E4C5Dc7c9in_Dicronychus_cinereus_amie.idba.96_MERGED |
| -X-----XX-XXX | CP1E3E4D5Ca7bip | XXXXXXXXXXXXXXXX----- | CP1E3E4D5Ca7bip_Calambus_bipustulatus_BIUK.idba.31 | XXXXXXXXXXXXXXXX----- | CP1E3E4D5Ca7bip_Calambus_bipustulatus_BIUK.idba.31_MERGED |
| -X-----XX-XXX | CP1E3E4D5Hyp7inu | XXXXXXXXXXXXXXXX----- | CP1E3E4D5Hyp7inu_Hypoganus_inunctus_amie.idba.58 | XXXXXXXXXXXXXXXX----- | CP1E3E4D5Hyp7inu_Hypoganus_inunctus_amie.idba.58_MERGED |
| -XX-----XX-XXX | CP1E3E4D5PH7que | XXXXXXXXXX----- | CP1E3E4D5PH7que_Pheletes_quercus_amie.idba.137 | XXXXXXXXXX-----XX-XXX | CP1E3E4D5PH7que_Pheletes_quercus_amie.idba.137_MERGED |
| -X-----XX-XXX | CP1E3E4De5An7cas | XXXXXXXXXXXXXXXX----- | CP1E3E4De5An7cas_Anostirus_castaneus_amie.idba.28 | XXXXXXXXXXXXXXXX----- | CP1E3E4De5An7cas_Anostirus_castaneus_amie.idba.28_MERGED |
| -XX-----XX-XXX | CP1E3E4De5At7hae | XXXXXXXXXXXXXXXX----- | CP1E3E4De5At7hae_Athous_haemorrhoidalis_2VGB.idba.8 | XXXXXXXXXXXXXXXX-----XXX | CP1E3E4De5At7hae_Athous_haemorrhoidalis_2VGB.idba.8_MERGED |
| -XX-----XX-XXX | CP1E3E4De5Lim7min | XXXXXXXXXXXXXXXX----- | CP1E3E4De5Lim7min_Limonius_minutus_amie.idba.27 | XXXXXXXXXXXXXXXX----- | CP1E3E4De5Lim7min_Limonius_minutus_amie.idba.27_MERGED |
| -X-----XX-XXX | CP1E3E4E5Ad7rac | XXXXXXXXXXXXXXXX----- | CP1E3E4E5Ad7rac_Adrastus_rachifer_amie.idba.32 | XXXXXXXXXXXXXXXX----- | CP1E3E4E5Ad7rac_Adrastus_rachifer_amie.idba.32_MERGED |
| -XX-----XX-XXX | CP1E3E4E5Ag7obs | XXXXXXXXXXXXXXXX----- | CP1E3E4E5Ag7obs_Agriotes_obscurus_2VGB.idba.10 | XXXXXXXXXXXXXXXX-----XXX | CP1E3E4E5Ag7obs_Agriotes_obscurus_2VGB.idba.10_MERGED |
| -XX-----XX-XXX | CP1E3E4E5Ag7ust | -XXXXXXXXXXXX----- | CP1E3E4E5Ag7ust_Agriotes_ustulatus_JX412737 | -XXXXXXXXXXXX-----XXX | CP1E3E4E5Ag7ust_Agriotes_ustulatus_JX412737_MERGED |
| -X-----XX-XXX | CP1E3E4E5Da7mar | XXXXXXXXXXXXXXXX----- | CP1E3E4E5Da7mar_Dalopius_marginatus_BIUK.idba.34 | XXXXXXXXXXXXXXXX----- | CP1E3E4E5Da7mar_Dalopius_marginatus_BIUK.idba.34_MERGED |
| -X-----XX-XXX | CP1E3E4E5Id7pic | XXXXXXXXXXXXXXXX----- | CP1E3E4E5Id7pic_Idolus_picipennis_amie.idba.67 | XXXXXXXXXXXXXXXX----- | CP1E3E4E5Id7pic_Idolus_picipennis_amie.idba.67_MERGED |
| -XX-----XX-XXX | CP1E3E4M5Me7vil | XXXXXXXXXXXXXXXX----- | CP1E3E4M5Me7vil_Melanotus_villosus_2VGB.idba.11 | XXXXXXXXXXXXXXXX-----XXX | CP1E3E4M5Me7vil_Melanotus_villosus_2VGB.idba.11_MERGED |
| -X-----XX-XXX | CP1E3E4N5Ne7sab | XXXXXX----- | CP1E3E4N5Ne7sab_Negastrius_sabulicola_amie.idba.161 | XXXXXX----- | CP1E3E4N5Ne7sab_Negastrius_sabulicola_amie.idba.161_MERGED |
| -XX-----XX-XXX | CP1E3E4U4Me7bup | XXXXXXXXXXXXXXXX----- | CP1E3E4U4Me7bup_Melasis_buprestoides_amie.idba.87 | XXXXXXXXXXXXXXXX-----XXX | CP1E3E4U4Me7bup_Melasis_buprestoides_amie.idba.87_MERGED |
| -XX-----X--XX- | CP1E3L4L5La7noc | XXXXXXXXXXXXXXXX----- | CP1E3L4L5La7noc_Lampyrus_noctiluca_amie.idba.10 | XXXXXXXXXXXXXXXX-----XX- | CP1E3L4L5La7noc_Lampyrus_noctiluca_amie.idba.10_MERGED |
| XXXXXXXXXXXX-XXX-XXX | CP1E3L4L5Py7ruf | XXXXXXXXXXXXXXXX----- | CP1E3L4L5Py7ruf_Pyrocoelia_rufa_NC_003970 | XXXXXXXXXXXXXXXX----- | CP1E3L4L5Py7ruf_Pyrocoelia_rufa_NC_003970_MERGED |
| XXXXXXXXXXXX-XXX-XXX | CP1E3L4Lu5Aq7lei | XXXXXXXXXXXXXXXX----- | CP1E3L4Lu5Aq7lei_Aquatica_lei_NC_025276 | XXXXXXXXXXXXXXXX----- | CP1E3L4Lu5Aq7lei_Aquatica_lei_NC_025276_MERGED |
| XXXXXXXXXXXX-XXX-XXX | CP1E3L4Lu5Lu7cru | XXXXXXXXXXXXXXXX----- | CP1E3L4Lu5Lu7cru_Luciola_cruciata_NC_022472 | XXXXXXXXXXXXXXXX----- | CP1E3L4Lu5Lu7cru_Luciola_cruciata_NC_022472_MERGED |
| -XX-----X--XXX | CP1E3Ly4Be7tay | XXXXXXXXXXXXXXXX----- | CP1E3Ly4Be7tay_Benibotarus_taygetanus_amie.idba.23 | XXXXXXXXXXXXXXXX-----XXX | CP1E3Ly4Be7tay_Benibotarus_taygetanus_amie.idba.23_MERGED |
| -XX-----X--XXX | CP1E3Ly4Dic7aur | XXXXXXXXXXXXXXXX----- | CP1E3Ly4Dic7aur_Dictyoptera_aurora_JX412733 | XXXXXXXXXXXXXXXX-----XXX | CP1E3Ly4Dic7aur_Dictyoptera_aurora_JX412733_MERGED |
| -X-----X--XXX | CP1E3Ly4Li7gra | -----XXXXXXXX----- | CP1E3Ly4Li7gra_Libnetis_granicollis_JX412813 | -X-----XXXXXXXX----- | CP1E3Ly4Li7gra_Libnetis_granicollis_JX412813_MERGED |
| -XX-----X--XXX | CP1E3Ly4Pl7cos | XXXXXXXX----- | CP1E3Ly4Pl7cos_Platycis_cosnardi_amie.idba.135 | XXXXXXXX-----X--XXX | CP1E3Ly4Pl7cos_Platycis_cosnardi_amie.idba.135_MERGED |
| -XX-----X-XX-XXX | CP1E3040m7fon | -XXXXXXXXXXXX----- | CP1E3040m7fon_Omalisus_fontisbellaquei_JX412744 | -XXXXXXXXXXXX-----XXX | CP1E3040m7fon_Omalisus_fontisbellaquei_JX412744_MERGED |
| -X-----X--XXX | CP1E30m4Dr7str | -XXXXXXXXXXXX----- | CP1E30m4Dr7str_Drilonius_striatulus_JX412822 | -XXXXXXXXXXXX-----XXX | CP1E30m4Dr7str_Drilonius_striatulus_JX412822_MERGED |
| XXXXXXXX-XXXX-XXX | CP1E3P4R5Rh7luf | XXXXXXXXXXXXXXXX----- | CP1E3P4R5Rh7luf_Rhagophthalmus_lufengensis_NC_010969 | XXXXXXXXXXXXXXXX----- | CP1E3P4R5Rh7luf_Rhagophthalmus_lufengensis_NC_010969_MERGED |
| XXXXXXXXXXXX-XXX-XXX | CP1E3P4R5Rh7ohb | XXXXXXXXXXXXXXXX----- | CP1E3P4R5Rh7ohb_Rhagophthalmus_ohbai_NC_010964 | XXXXXXXXXXXXXXXX-----XX- | CP1E3P4R5Rh7ohb_Rhagophthalmus_ohbai_NC_010964_MERGED |
| -XX-----X--XXX | CP1E3T4Tr7der | XXXXXXXXXXXXXXXX----- | CP1E3T4Tr7der_Trixaqus_dermestoides_BIUK.idba.35 | XXXXXXXXXXXXXXXX-----XXX | CP1E3T4Tr7der_Trixaqus_dermestoides_BIUK.idba.35_MERGED |
| -X-----X--XXX | CP1H3H4H5Be7aff | XXXXXXXXXXXXXXXX----- | CP1H3H4H5Be7aff_Berosus_affinis_1VWB.idba.9 | XXXXXXXXXXXXXXXX----- | CP1H3H4H5Be7aff_Berosus_affinis_1VWB.idba.9_MERGED |
| -XXX-----X-X-XXX | CP1H3H4H5Cy7mar | XXXXXXXXXXXXXXXX----- | CP1H3H4H5Cy7mar_Cymbiodyta_marginella_amie.idba.89 | XXXXXXXXXXXXXXXX-----XXX | CP1H3H4H5Cy7mar_Cymbiodyta_marginella_amie.idba.89_MERGED |
| -XX-----XX-XXX | CP1H3H4S5Ce7uni | XXXXXXXXXXXXXXXX----- | CP1H3H4S5Ce7uni_Cercyon_unipunctatus_amie.idba.9 | XXXXXXXXXXXXXXXX----- | CP1H3H4S5Ce7uni_Cercyon_unipunctatus_amie.idba.9_MERGED |
| -XXX-----XX-XXX | CP1H3H4S5Cr7min | XXXXXXXXXXXXXXXX----- | CP1H3H4S5Cr7min_Cryptopleurum_minutum_Staph.idba.52 | XXXXXXXXXXXXXXXX-----XX- | CP1H3H4S5Cr7min_Cryptopleurum_minutum_Staph.idba.52_MERGED |
| -X-----XX-XXX | CP1H3H4S5Da7abd | XXXXXXXXXXXXXXXX----- | CP1H3H4S5Da7abd_Dactylosternum_abdominale_amie.idba.74 | XXXXXXXXXXXXXXXX----- | CP1H3H4S5Da7abd_Dactylosternum_abdominale_amie.idba.74_MERGED |
| -XX-----X-X-XXX | CP1H3H4S5Sp7bip | XXXXXXXXXXXXXXXX----- | CP1H3H4S5Sp7bip_Sphaeridium_bipustulatum_Staph.idba.49 | XXXXXXXXXXXXXXXX-----XXX | CP1H3H4S5Sp7bip_Sphaeridium_bipustulatum_Staph.idba.49_MERGED |
| -XX-----XXX-XX- | CP1H3Hy4Hy7car | XXXXXXXXXXXXXXXX----- | CP1H3Hy4Hy7car_Hydrochus_carinatus_729517_idba_contig_25 | XXXXXXXXXXXXXXXX-----XX- | CP1H3Hy4Hy7car_Hydrochus_carinatus_729517_idba_contig_25_MERGED |
| -X-----XX-XXX | CP1H13H4D5P6Ki7min | XXXXXXXXXXXXXXXX----- | CP1H13H4D5P6Ki7min_Kissister_minimus_Soil.idba.27 | XXXXXXXXXXXXXXXX-----XX- | CP1H13H4D5P6Ki7min_Kissister_minimus_Soil.idba.27_MERGED |
| -XX-----XXX-XXX | CP1H13H4D5P6Pa7f1a | -XXXXXXXXXXXX----- | CP1H13H4D5P6Pa7f1a_Paromalus_flavicornis_JX412766 | -XXXXXXXXXXXX-----XXX | CP1H13H4D5P6Pa7f1a_Paromalus_flavicornis_JX412766_MERGED |
| -X-----XX-XXX | CP1H13H4H5H16Mar7mer | XXXXXXXXXXXXXXXX----- | CP1H13H4H5H16Mar7mer_Margarinotus_merdarius_Staph.idba.57 | XXXXXXXXXXXXXXXX----- | CP1H13H4H5H16Mar7mer_Margarinotus_merdarius_Staph.idba.57_MERGED |
| XXXXXXXXXXXX-XXX-XXX | CP1H13H4S5Eu7sci | XXXXXXXXXXXXXXXX----- | CP1H13H4S5Eu7sci_Euspilotus_scissus_NC_018353 | XXXXXXXXXXXXXXXX-----XX | CP1H13H4S5Eu7sci_Euspilotus_scissus_NC_018353_MERGED |
| -XX-----XXX-XXX | CP1L3L4Hy7der | -XXXXXXXXXXXX----- | CP1L3L4Hy7der_Hylecoetus_dermestoides_HQ232820 | -XXXXXXXXXXXX-----XXX | CP1L3L4Hy7der_Hylecoetus_dermestoides_HQ232820_MERGED |
| -XX-----XX-XXX | CP1L3L4Ly7nav | XXXXXXXXXXXXXXXX----- | CP1L3L4Ly7nav_Lymexylon_navale_amie.idba.55 | XXXXXXXXXXXXXXXX-----XX- | CP1L3L4Ly7nav_Lymexylon_navale_amie.idba.55_MERGED |
| -X-----XX-XXX | CP1S3H4Me7MEM1 | XXXXXXXXXXXXXXXX----- | CP1S3H4Me7MEM1_Meropathus_MEM1_675618_idba_contig_21 | XXXXXXXXXXXXXXXX-----XX- | CP1S3H4Me7MEM1_Meropathus_MEM1_675618_idba_contig_21_MERGED |
| -X-----XX-XXX | CP1S3L4C5Ag7lab | -XXXXXXXXXXXX----- | CP1S3L4C5Ag7lab_Agyrtodes_labralis_JX412779 | -XXXXXXXXXXXX-----XX- | CP1S3L4C5Ag7lab_Agyrtodes_labralis_JX412779_MERGED |
| -X-----XX-XXX | CP1S3L4Ch5Ca7cor | XXXXXXXXXXXXXXXX----- | CP1S3L4Ch5Ca7cor_Catops_coracinus_BIUK.idba.2 | XXXXXXXXXXXXXXXX-----XXX | CP1S3L4Ch5Ca7cor_Catops_coracinus_BIUK.idba.2_MERGED |
| -X-----XX-XXX | CP1S3L4Ch5Es7jea | XXXXXX----- | CP1S3L4Ch5Es7jea_Espnoliella_jeanneli_Staph.idba.86 | XXXXXX-----XX-XXX | CP1S3L4Ch5Es7jea_Espnoliella_jeanneli_Staph.idba.86_MERGED |
| -XX-----XX-XXX | CP1S3L4Ch5Na7ve1 | -XXXXXXXXXXXX----- | CP1S3L4Ch5Na7ve1_Nargus_velox_JX313674 | -XXXXXXXXXXXX-----XX- | CP1S3L4Ch5Na7ve1_Nargus_velox_JX313674_MERGED |
| -X-----XX-XXX | CP1S3L4Ch5Pha7fra | XXXXXXXXXXXXXXXX----- | CP1S3L4Ch5Pha7fra_Phacomorphus_fratryi_Staph.idba.18 | XXXXXXXXXXXXXXXX-----XXX | CP1S3L4Ch5Pha7fra_Phacomorphus_fratryi_Staph.idba.18_MERGED |
| -X-----XX-X-X | CP1S3L4Ch5Pt7ten | XXXXXXXXXXXXXXXX----- | CP1S3L4Ch5Pt7ten_Ptomaphagus_tenuicornis_Soil.idba.24 | XXXXXXXXXXXXXXXX-----X-X | CP1S3L4Ch5Pt7ten_Ptomaphagus_tenuicornis_Soil.idba.24_MERGED |
| -XX-----X-XX-XXX | CP1S3L4Ch5Sc7wat | XXXXXXXXXXXXXXXX----- | CP1S3L4Ch5Sc7wat_Sciodrepoides_watsoni_Staph.idba.6 | XXXXXXXXXXXXXXXX-----XXX | CP1S3L4Ch5Sc7wat_Sciodrepoides_watsoni_Staph.idba.6_MERGED |
| -X-----X-XX-XXX | CP1S3L4Ch5Tr7oro | XXXXXXXXXXXXXXXX----- | CP1S3L4Ch5Tr7oro_Trapezodirus_oroobios_Staph.idba.25 | XXXXXXXXXXXXXXXX-----X-X | CP1S3L4Ch5Tr7oro_Trapezodirus_oroobios_Staph.idba.25_MERGED |
| -XX-----XX-XXX | CP1S3L4L5Ag7atr | XXXXXXXXXXXXXXXX----- | CP1S3L4L5Ag7atr_Agathidium_atrum_BIUK.idba.3 | XXXXXXXXXXXXXXXX----- | CP1S3L4L5Ag7atr_Agathidium_atrum_BIUK.idba.3_MERGED |
| -XX-----XX-XXX | CP1S3L4L5An7hum | -XXXXXXXXXXXX----- | CP1S3L4L5An7hum_Anisotoma_humeralis_amie.idba.93 | -XXXXXXXXXXXX-----XX- | CP1S3L4L5An7hum_Anisotoma_humeralis_amie.idba.93_MERGED |
| -X-----XX-XXX | CP1S3L4L5Le7pic | XXXXXX----- | CP1S3L4L5Le7pic_Leiodes_picea_amie.idba.151 | XXXXXX----- | CP1S3L4L5Le7pic_Leiodes_picea_amie.idba.151_MERGED |
| -X-----XX-XXX | CP1S3L4L5Tr7mae | XXXXXXXXXXXXXXXX----- | CP1S3L4L5Tr7mae_Triarthron_maerkelii_amie.idba.15 | XXXXXXXXXXXXXXXX----- | CP1S3L4L5Tr7mae_Triarthron_maerkelii_amie.idba.15_MERGED |
| -XX-----XX-XXX | CP1S3P4A5Ac7ins | -XXXXXXXXXXXX----- | CP1S3P4A5Ac7ins_Acrotrichis_insularis_BIUK.idba.28 | -XXXXXXXXXXXX----- | CP1S3P4A5Ac7ins_Acrotrichis_insularis_BIUK.idba.28_MERGED |

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|--------------|--------------------|---------------------|---|------------------|--|
| -XX- - - - - | CP1S3S4A5A6A17lan | XXXXXXXXXXXXX | CP1S3S4A5A6A17lan_Aleochara_lanuginosa_BIUk.idba.29 | XXXXXXXXXXXXX | CP1S3S4A5A6A17lan_Aleochara_lanuginosa_BIUk.idba.29_MERGED |
| -XX- - - - - | CP1S3S4A5A6A17ver | -XXXXX- - - - - | CP1S3S4A5A6A17ver_Aleochara_verna_Staph.idba.93 | -XXXXX- - - - - | CP1S3S4A5A6A17ver_Aleochara_verna_Staph.idba.93_MERGED |
| -X- - - - - | CP1S3S4A5A6A7obf | XXXX- - - - - | CP1S3S4A5A6A7obf_Acrotona_obfuscata_Staph.idba.85 | XXXX- - - - - | CP1S3S4A5A6A7obf_Acrotona_obfuscata_Staph.idba.85_MERGED |
| -XX- - - - - | CP1S3S4A5A6A7cur | XXXXXXXXXXXXX | CP1S3S4A5A6A7cur_Alloconota_currax_Staph.idba.39 | XXXXXXXXXXXXX | CP1S3S4A5A6A7cur_Alloconota_currax_Staph.idba.39_MERGED |
| -XX- - - - - | CP1S3S4A5A6A7ana | XX- - - - - | CP1S3S4A5A6A7ana_Amischa_analis_Staph.idba.70 | XXXX- - - - - | CP1S3S4A5A6A7ana_Amischa_analis_Staph.idba.70_MERGED |
| -X- - - - - | CP1S3S4A5A6A7ami | XXXXXXXXXXXXX | CP1S3S4A5A6A7ami_Atheta_amicula_Staph.idba.42 | XXXXXXXXXXXXX | CP1S3S4A5A6A7ami_Atheta_amicula_Staph.idba.42_MERGED |
| -XX- - - - - | CP1S3S4A5A6A7cas | XXXXXXXXXXXXX | CP1S3S4A5A6A7cas_Atheta_castanoptera_BIUk.idba.6 | XXXXXXXXXXXXX | CP1S3S4A5A6A7cas_Atheta_castanoptera_BIUk.idba.6_MERGED |
| -XX- - - - - | CP1S3S4A5A6A7fun | XXXXXXXXXXXXX | CP1S3S4A5A6A7fun_Atheta_fungi_Soil.idba.12 | XXXXXXXXXXXXX | CP1S3S4A5A6A7fun_Atheta_fungi_Soil.idba.12_MERGED |
| -X- - - - - | CP1S3S4A5A6A7fung | XXXXXXXXXXXXX | CP1S3S4A5A6A7fung_Atheta_fungivora_Staph.idba.37 | XXXXXXXXXXXXX | CP1S3S4A5A6A7fung_Atheta_fungivora_Staph.idba.37_MERGED |
| -XX- - - - - | CP1S3S4A5A6A7gag | XXXXXXXXXXXXX | CP1S3S4A5A6A7gag_Atheta_gagatina_Staph.idba.20 | XXXXXXXXXXXXX | CP1S3S4A5A6A7gag_Atheta_gagatina_Staph.idba.20_MERGED |
| -XX- - - - - | CP1S3S4A5A6A7hyp | XXXXXXXXXXXXX | CP1S3S4A5A6A7hyp_Atheta_hypnorum_BIUk.idba.4 | XXXXXXXXXXXXX | CP1S3S4A5A6A7hyp_Atheta_hypnorum_BIUk.idba.4_MERGED |
| -XX- - - - - | CP1S3S4A5A6A7vol | -XXXXXXXXXXXXX | CP1S3S4A5A6A7vol_Atheta_volans_Staph.idba.63 | -XXXXXXXXXXXXX | CP1S3S4A5A6A7vol_Atheta_volans_Staph.idba.63_MERGED |
| -XX- - - - - | CP1S3S4A5A6Ca7obs | XXXXXXXXXXXXX | CP1S3S4A5A6Ca7obs_Callicerus_obscurus_Staph.idba.39 | XXXXXXXXXXXXX | CP1S3S4A5A6Ca7obs_Callicerus_obscurus_Staph.idba.39_MERGED |
| -XX- - - - - | CP1S3S4A5A6Ge7cir | XXXXXXXXXXXXX | CP1S3S4A5A6Ge7cir_Geostiba_circellaris_BIUk.idba.25 | XXXXXXXXXXXXX | CP1S3S4A5A6Ge7cir_Geostiba_circellaris_BIUk.idba.25_MERGED |
| -XX- - - - - | CP1S3S4A5A6Li7mic | XXXXXXXXXXXXX | CP1S3S4A5A6Li7mic_Lioglutula_longiuscula_BIUk.idba.24 | XXXXXXXXXXXXX | CP1S3S4A5A6Li7mic_Lioglutula_longiuscula_BIUk.idba.24_MERGED |
| -XX- - - - - | CP1S3S4A5A6Mo7fun | -XXXXX- - - - - | CP1S3S4A5A6Mo7fun_Mocyta_fungi_BIUk.idba.80 | -XXXXX- - - - - | CP1S3S4A5A6Mo7fun_Mocyta_fungi_BIUk.idba.80_MERGED |
| -XX- - - - - | CP1S3S4A5B6Eu7opt | XXXXXXXXXXXXX | CP1S3S4A5B6Eu7opt_Euryusa_optabilis_Staph.idba.22 | XXXXXXXXXXXXX | CP1S3S4A5B6Eu7opt_Euryusa_optabilis_Staph.idba.22_MERGED |
| -XX- - - - - | CP1S3S4A5Lo6Lo7pub | XXXXXXXXXXXXX | CP1S3S4A5Lo6Lo7pub_Lomechusa_publicollis_Soil.idba.4 | XXXXXXXXXXXXX | CP1S3S4A5Lo6Lo7pub_Lomechusa_publicollis_Soil.idba.4_MERGED |
| -XX- - - - - | CP1S3S4A5O6Cr7sut | -XXXXXXXXXXXXX | CP1S3S4A5O6Cr7sut_Crataraea_suturalis_Staph.idba.50 | -XXXXXXXXXXXXX | CP1S3S4A5O6Cr7sut_Crataraea_suturalis_Staph.idba.50_MERGED |
| -XX- - - - - | CP1S3S4A5O6De7cor | XXXXXXXXXXXXX | CP1S3S4A5O6De7cor_Dexiogyia_corticina_Staph.idba.34 | XXXXXXXXXXXXX | CP1S3S4A5O6De7cor_Dexiogyia_corticina_Staph.idba.34_MERGED |
| -XX- - - - - | CP1S3S4A5O6Ox7acu | XXXXXXXXXXXXX | CP1S3S4A5O6Ox7acu_Oxypoda_acuminata_BIUk.idba.20 | XXXXXXXXXXXXX | CP1S3S4A5O6Ox7acu_Oxypoda_acuminata_BIUk.idba.20_MERGED |
| -X- - - - - | CP1S3S4A5O6Ox7bre | XXXXXXXXXXXXX | CP1S3S4A5O6Ox7bre_Oxypoda_brevicornis_BIUk.idba.22 | XXXXXXXXXXXXX | CP1S3S4A5O6Ox7bre_Oxypoda_brevicornis_BIUk.idba.22_MERGED |
| -XX- - - - - | CP1S3S4A5O6Ox7lon | XXXXXXXXXXXXX | CP1S3S4A5O6Ox7lon_Oxypoda_longipes_Staph.idba.36 | XXXXXXXXXXXXX | CP1S3S4A5O6Ox7lon_Oxypoda_longipes_Staph.idba.36_MERGED |
| -XX- - - - - | CP1S3S4A5O6Ox7opa | X-XXXXXX-XXXX | CP1S3S4A5O6Ox7opa_Oxypoda_opaca_JX412751 | XXXXXXXXXX-XXXX | CP1S3S4A5O6Ox7opa_Oxypoda_opaca_JX412751_MERGED |
| -XX- - - - - | CP1S3S4A5O6Par7lon | -XXXXXXXXXXXX | CP1S3S4A5O6Par7lon_Parocycusa_longitarsis_JX313678 | -XXXXXXXXXXXX | CP1S3S4A5O6Par7lon_Parocycusa_longitarsis_JX313678_MERGED |
| -XX- - - - - | CP1S3S4A5O6Ph7tes | -XXXXXX- - - - - | CP1S3S4A5O6Ph7tes_Phloeopora_testacea_Staph.idba.81 | -XXXXXX- - - - - | CP1S3S4A5O6Ph7tes_Phloeopora_testacea_Staph.idba.81_MERGED |
| -XX- - - - - | CP1S3S4A5T6Da7fal | XXXXXXXXXXXXX | CP1S3S4A5T6Da7fal_Dacrila_fallax_Staph.idba.43 | XXXXXXXXXXXXX | CP1S3S4A5T6Da7fal_Dacrila_fallax_Staph.idba.43_MERGED |
| -XX- - - - - | CP1S3S4A5T6Th7atr | XXXXXXXXXXXXX | CP1S3S4A5T6Th7atr_Thinonoma_atra_Staph.idba.40 | XXXXXXXXXXXXX | CP1S3S4A5T6Th7atr_Thinonoma_atra_Staph.idba.40_MERGED |
| -XX- - - - - | CP1S3S4Eu5Eu7ruf | XXXXXXXXXXXXX | CP1S3S4Eu5Eu7ruf_Euaesthetus_ruficapillus_Staph.idba.45 | XXXXXXXXXXXXX | CP1S3S4Eu5Eu7ruf_Euaesthetus_ruficapillus_Staph.idba.45_MERGED |
| -XX- - - - - | CP1S3S4H5Ha7cap | XXXXXXXXXXXXX | CP1S3S4H5Ha7cap_Habrocerus_capillaricornis_JX412795 | XXXXXXXXXXXXX | CP1S3S4H5Ha7cap_Habrocerus_capillaricornis_JX412795_MERGED |
| -XX- - - - - | CP1S3S4O5An7atr | XXXXXX- - - - - | CP1S3S4O5An7atr_Anthobium_atrocephalum_BIUk.idba.67 | XXXXXX- - - - - | CP1S3S4O5An7atr_Anthobium_atrocephalum_BIUk.idba.67_MERGED |
| -X- - - - - | CP1S3S4O5An7mel | XXXXXXXXXXXXX | CP1S3S4O5An7mel_Anthobium_melanocephalum_ameie.idba.2 | XXXXXXXXXXXXX | CP1S3S4O5An7mel_Anthobium_melanocephalum_ameie.idba.2_MERGED |
| -X- - - - - | CP1S3S4O5Eu7tor | XXXXXXXXXXXXX | CP1S3S4O5Eu7tor_Euspalerum_torquatum_Staph.idba.31 | XXXXXXXXXXXXX | CP1S3S4O5Eu7tor_Euspalerum_torquatum_Staph.idba.31_MERGED |
| - - - - - | CP1S3S4O5Ne7bru | XXXXXXXXXXXXX | CP1S3S4O5Ne7bru_Neophonus_bruchi_Staph.idba.0 | XXXXXXXXXXXXX | CP1S3S4O5Ne7bru_Neophonus_bruchi_Staph.idba.0_MERGED |
| -X- - - - - | CP1S3S4O5O17pic | XXXXXXXXXXXXX | CP1S3S4O5O17pic_Olophrum_piceum_Staph.idba.35 | XXXXXXXXXXXXX | CP1S3S4O5O17pic_Olophrum_piceum_Staph.idba.35_MERGED |
| -XX- - - - - | CP1S3S4O5Om7riv | -XXXXXXXXXXXX | CP1S3S4O5Om7riv_Omalium_rivulare_JX412759 | -XXXXXXXXXXXX | CP1S3S4O5Om7riv_Omalium_rivulare_JX412759_MERGED |
| -XX- - - - - | CP1S3S4O5Om7rug | XXXXXXXXXXXXX | CP1S3S4O5Om7rug_Omalium_rugatum_BIUk.idba.7 | XXXXXXXXXXXXX | CP1S3S4O5Om7rug_Omalium_rugatum_BIUk.idba.7_MERGED |
| -X- - - - - | CP1S3S4Ox5An7mut | -XXXXXXXXXXXX | CP1S3S4Ox5An7mut_Anotylus_mutator_BIUk.idba.48 | -XXXXXXXXXXXX | CP1S3S4Ox5An7mut_Anotylus_mutator_BIUk.idba.48_MERGED |
| -XX- - - - - | CP1S3S4Ox5An7scu | -XXXXXX- - - - - | CP1S3S4Ox5An7scu_Anotylus_sculpturatus_Staph.idba.76 | -XXXXXX- - - - - | CP1S3S4Ox5An7scu_Anotylus_sculpturatus_Staph.idba.76_MERGED |
| -X- - - - - | CP1S3S4Ox5Ca7ful | X-XXXXXXXX- - - - - | CP1S3S4Ox5Ca7ful_Carpelimus_fuliginosus_ameie.idba.60 | XXXXXXXXXXXXX | CP1S3S4Ox5Ca7ful_Carpelimus_fuliginosus_ameie.idba.60_MERGED |
| -XX- - - - - | CP1S3S4Ox5Ox7pic | XXXXXXXXXXXXX | CP1S3S4Ox5Ox7pic_Oxytelus_piceus_ameie.idba.86 | XXXXXXXXXXXXX | CP1S3S4Ox5Ox7pic_Oxytelus_piceus_ameie.idba.86_MERGED |
| -X- - - - - | CP1S3S4P5As7lyo | XXXXXXXXXXXXX | CP1S3S4P5As7lyo_Astenus_lyonessius_Staph.idba.17 | XXXXXXXXXXXXX | CP1S3S4P5As7lyo_Astenus_lyonessius_Staph.idba.17_MERGED |
| -X- - - - - | CP1S3S4P5Hy7deb | -XXXXXXXXXXXX | CP1S3S4P5Hy7deb_Hypomedon_debiliaricornis_JX313672 | -XXXXXXXXXXXX | CP1S3S4P5Hy7deb_Hypomedon_debiliaricornis_JX313672_MERGED |
| -XX- - - - - | CP1S3S4P5La7bru | XXXXXXXXXXXXX | CP1S3S4P5La7bru_Lathrobium_brunnipes_Staph.idba.10 | XXXXXXXXXXXXX | CP1S3S4P5La7bru_Lathrobium_brunnipes_Staph.idba.10_MERGED |
| -XX- - - - - | CP1S3S4P5La7ful | XXXXXX- - - - - | CP1S3S4P5La7ful_Lathrobium_fulvipenne_BIUk.idba.70 | XXXXXX- - - - - | CP1S3S4P5La7ful_Lathrobium_fulvipenne_BIUk.idba.70_MERGED |
| -XX- - - - - | CP1S3S4P5Me7api | XXXXXXXXXXXXX | CP1S3S4P5Me7api_Medon_apicalis_Staph.idba.9 | XXXXXXXXXXXXX | CP1S3S4P5Me7api_Medon_apicalis_Staph.idba.9_MERGED |
| -X- - - - - | CP1S3S4P5Me7pic | XXXXXXXXXXXXX | CP1S3S4P5Me7pic_Medon_piceus_ameie.idba.112 | XXXXXXXXXXXXX | CP1S3S4P5Me7pic_Medon_piceus_ameie.idba.112_MERGED |
| -XX- - - - - | CP1S3S4P5Ru7gen | XXXXXXXXXXXXX | CP1S3S4P5Ru7gen_Rugilus_geniculatus_Staph.idba.38 | XXXXXXXXXXXXX | CP1S3S4P5Ru7gen_Rugilus_geniculatus_Staph.idba.38_MERGED |
| -X- - - - - | CP1S3S4P5Su7mel | XXXXXXXXXXXXX | CP1S3S4P5Su7mel_Sunius_melanocephalus_Staph.idba.61 | XXXXXXXXXXXXX | CP1S3S4P5Su7mel_Sunius_melanocephalus_Staph.idba.61_MERGED |
| -XX- - - - - | CP1S3S4P5Te7ter | XXXXXXXXXXXXX | CP1S3S4P5Te7ter_Tetartopeus_terminatus_Staph.idba.27 | XXXXXXXXXXXXX | CP1S3S4P5Te7ter_Tetartopeus_terminatus_Staph.idba.27_MERGED |
| -XX- - - - - | CP1S3S4Ps5Bra7fos | XXXXXXXXXXXXX | CP1S3S4Ps5Bra7fos_Brachygluta_fossulata_BIUk.idba.21 | XXXXXXXXXXXXX | CP1S3S4Ps5Bra7fos_Brachygluta_fossulata_BIUk.idba.21_MERGED |
| -XX- - - - - | CP1S3S4Ps5Bra7hel | XXXXXX- - - - - | CP1S3S4Ps5Bra7hel_Brachygluta_helferi_Staph.idba.82 | XXXXXX- - - - - | CP1S3S4Ps5Bra7hel_Brachygluta_helferi_Staph.idba.82_MERGED |
| -X- - - - - | CP1S3S4Ps5Ct7pic | XXXXX- - - - - | CP1S3S4Ps5Ct7pic_Ctenisodes_piceus_Staph.idba.88 | XXXXX- - - - - | CP1S3S4Ps5Ct7pic_Ctenisodes_piceus_Staph.idba.88_MERGED |
| -XX- - - - - | CP1S3S4Ps5Eu7pic | -XXXXXXXXXXXX | CP1S3S4Ps5Eu7pic_Euplectus_piceus_BIUk.idba.53 | -XXXXXXXXXXXX | CP1S3S4Ps5Eu7pic_Euplectus_piceus_BIUk.idba.53_MERGED |
| -XX- - - - - | CP1S3S4Ps5Ty7nig | XXXXXXXXXXXXX | CP1S3S4Ps5Ty7nig_Tychus_niger_BIUk.idba.17 | XXXXXXXXXXXXX | CP1S3S4Ps5Ty7nig_Tychus_niger_BIUk.idba.17_MERGED |

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|------------------|---------------------|-----------------|---|-----------------|--|
| --X----- | CP1S3S4Q5Qu7nem | XXXXXXXXXXXXX | CP1S3S4Q5Qu7nem_Quedius_nemoralis_BIUK.idba.5 | XXXXXXXXXXXXX | CP1S3S4Q5Qu7nem_Quedius_nemoralis_BIUK.idba.5_MERGED |
| --X-----XX- | CP1S3S4S5Br7lat | --XXXXXXXXX | CP1S3S4S5Br7lat_Brachynopus_latus_JX412745 | --XXXXXXXXX | CP1S3S4S5Br7lat_Brachynopus_latus_JX412745_MERGED |
| -XX-----XX-XXX | CP1S3S4S5Sc7qua | XXXXXXXXXXXXX | CP1S3S4S5Sc7qua_Scaphidium_quadrimaculatum_Staph.idba.5 | XXXXXXXXXXXXX | CP1S3S4S5Sc7qua_Scaphidium_quadrimaculatum_Staph.idba.5_MERGED |
| -X----- | CP1S3S4S5Sca7bol | XXXXXXXXXXXXX | CP1S3S4S5Sca7bol_Scaphisoma_boleti_Staph.idba.55 | XXXXXXXXXXXXX | CP1S3S4S5Sca7bol_Scaphisoma_boleti_Staph.idba.55_MERGED |
| -XX-----X----- | CP1S3S4St5St7cla | XXXXXXXXXXXXX | CP1S3S4St5St7cla_Stenus_clavicornis_2VGB.idba.1 | XXXXXXXXXXXXX | CP1S3S4St5St7cla_Stenus_clavicornis_2VGB.idba.1_MERGED |
| -XX-----X----- | CP1S3S4St5St7com | XXXXXXXXXXXXX | CP1S3S4St5St7com_Stenus_comma_Staph.idba.58 | XXXXXXXXXXXXX | CP1S3S4St5St7com_Stenus_comma_Staph.idba.58_MERGED |
| -XX-----XX- | CP1S3S4St506At7aff | XXXXXXXXXXXXX | CP1S3S4St506At7aff_Atreucus_affinis_Staph.idba.41 | XXXXXXXXXXXXX | CP1S3S4St506At7aff_Atreucus_affinis_Staph.idba.41_MERGED |
| -XX----- | CP1S3S4St5060t7lae | XXXXXX | CP1S3S4St5060t7lae_Othius_laeviusculus_amei.idba.150 | XXXXXX | CP1S3S4St5060t7lae_Othius_laeviusculus_amei.idba.150_MERGED |
| -XX----- | CP1S3S4St5060t7pun | XXXXXX | CP1S3S4St5060t7pun_Othius_punctulatus_Soil.idba.158 | XXXXXX | CP1S3S4St5060t7pun_Othius_punctulatus_Soil.idba.158_MERGED |
| -XX----- | CP1S3S4St5066a7pil | XXXXXXXXXXXXX | CP1S3S4St5066a7pil_Gabrius_piliger_Staph.idba.12 | XXXXXXXXXXXXX | CP1S3S4St5066a7pil_Gabrius_piliger_Staph.idba.12_MERGED |
| -XX----- | CP1S3S4St5066B17sor | XXXXXXXXXXXXX | CP1S3S4St5066B17sor_Bisnius_sordidus_Staph.idba.16 | XXXXXXXXXXXXX | CP1S3S4St5066B17sor_Bisnius_sordidus_Staph.idba.16_MERGED |
| -X----- | CP1S3S4St5066ab7the | XXXXXXXXXXXXX | CP1S3S4St5066ab7the_Gabronthus_thermarum_Staph.idba.53 | XXXXXXXXXXXXX | CP1S3S4St5066ab7the_Gabronthus_thermarum_Staph.idba.53_MERGED |
| -XX----- | CP1S3S4St5066Ne7vil | XXXXXXXXXXXXX | CP1S3S4St5066Ne7vil_Neobisnius_villosulus_Staph.idba.1 | XXXXXXXXXXXXX | CP1S3S4St5066Ne7vil_Neobisnius_villosulus_Staph.idba.1_MERGED |
| -XX----- | CP1S3S4St5060c7aet | XXXXXXXXXXXXX | CP1S3S4St5060c7aet_Ocypus_aethiops_Soil.idba.34 | XXXXXXXXXXXXX | CP1S3S4St5060c7aet_Ocypus_aethiops_Soil.idba.34_MERGED |
| -X----- | CP1S3S4St5060c7bru | XXXXXXXXXXXXX | CP1S3S4St5060c7bru_Ocypus_brunnipes_Staph.idba.56 | XXXXXXXXXXXXX | CP1S3S4St5060c7bru_Ocypus_brunnipes_Staph.idba.56_MERGED |
| -XX----- | CP1S3S4St5060c7ole | XXXXXXXXXXXXX | CP1S3S4St5060c7ole_Ocypus_olens_2VGB.idba.7 | XXXXXXXXXXXXX | CP1S3S4St5060c7ole_Ocypus_olens_2VGB.idba.7_MERGED |
| -XX-----XX- | CP1S3S4St5060c7oph | XXXXXXXXXXXXX | CP1S3S4St5060c7oph_Ocypus_ophthalmicus_amei.idba.21 | XXXXXXXXXXXXX | CP1S3S4St5060c7oph_Ocypus_ophthalmicus_amei.idba.21_MERGED |
| -XX-----XX- | CP1S3S4St5060n7tes | XXXXXXXXXXXXX | CP1S3S4St5060n7tes_Ontholestes_tessellatus_amei.idba.69 | XXXXXXXXXXXXX | CP1S3S4St5060n7tes_Ontholestes_tessellatus_amei.idba.69_MERGED |
| -XX-----XX- | CP1S3S4St506Ph7fim | XXXXXXXXXXXXX | CP1S3S4St506Ph7fim_Philonthus_fimeticus_Staph.idba.11 | XXXXXXXXXXXXX | CP1S3S4St506Ph7fim_Philonthus_fimeticus_Staph.idba.11_MERGED |
| -X----- | CP1S3S4St506Ta7mor | XXXXXXXXXXXXX | CP1S3S4St506Ta7mor_Tasgius_morsitans_Staph.idba.32 | XXXXXXXXXXXXX | CP1S3S4St506Ta7mor_Tasgius_morsitans_Staph.idba.32_MERGED |
| -XX----- | CP1S3S4St506Gy7fra | XXXXXXXXXXXXX | CP1S3S4St506Gy7fra_Gyrohypnus_fracticornis_Staph.idba.29 | XXXXXXXXXXXXX | CP1S3S4St506Gy7fra_Gyrohypnus_fracticornis_Staph.idba.29_MERGED |
| -XX-----XX- | CP1S3S4St506Nu7len | XXXXXX | CP1S3S4St506Nu7len_Nudobius_lentus_Staph.idba.72 | XXXXXX | CP1S3S4St506Nu7len_Nudobius_lentus_Staph.idba.72_MERGED |
| -X----- | CP1S3S4T5Bo7cas | XXXXXXXXXXXXX | CP1S3S4T5Bo7cas_Bolitobius_castaneus_BIUK.idba.14 | XXXXXXXXXXXXX | CP1S3S4T5Bo7cas_Bolitobius_castaneus_BIUK.idba.14_MERGED |
| -X----- | CP1S3S4T5Lo7exo | XXXXXXXXXXXXX | CP1S3S4T5Lo7exo_Lordithon_exoletus_amei.idba.7 | XXXXXXXXXXXXX | CP1S3S4T5Lo7exo_Lordithon_exoletus_amei.idba.7_MERGED |
| -X-----XX- | CP1S3S4T5Se7bip | XXXXXXXXXXXXX | CP1S3S4T5Se7bip_Sepedophilus_bipunctatus_Staph.idba.23 | XXXXXXXXXXXXX | CP1S3S4T5Se7bip_Sepedophilus_bipunctatus_Staph.idba.23_MERGED |
| -XX----- | CP1S3S4T5Ta7chr | XXXXXXXXXXXXX | CP1S3S4T5Ta7chr_Tachyporus_chrysomelinus_Soil.idba.10 | XXXXXXXXXXXXX | CP1S3S4T5Ta7chr_Tachyporus_chrysomelinus_Soil.idba.10_MERGED |
| -X----- | CP1S3S4T5Tac7lat | XXXXXXXXXXXXX | CP1S3S4T5Tac7lat_Tachinus_laticollis_BIUK.idba.8 | XXXXXXXXXXXXX | CP1S3S4T5Tac7lat_Tachinus_laticollis_BIUK.idba.8_MERGED |
| -XX----- | CP1S3S4T5Tac7sub | XXXXXXXXXXXXX | CP1S3S4T5Tac7sub_Tachinus_subterraneus_amei.idba.1 | XXXXXXXXXXXXX | CP1S3S4T5Tac7sub_Tachinus_subterraneus_amei.idba.1_MERGED |
| -XX-----XX- | CP1S3Sc4Ce7gal | XXXXXX | CP1S3Sc4Ce7gal_Cephennium_gallicum_BIUK.idba.66 | XXXXXX | CP1S3Sc4Ce7gal_Cephennium_gallicum_BIUK.idba.66_MERGED |
| XXXXXXXXXXXXX--X | CP1S3S14S5Ne7ame | XXXXXXXXXXXXX | CP1S3S14S5Ne7ame_Necrophila_americae_NC_018352 | XXXXXXXXXXXXX | CP1S3S14S5Ne7ame_Necrophila_americae_NC_018352_MERGED |
| -X----- | CP1S3S14S5S17tyr | XXXXXXXXXXXXX | CP1S3S14S5S17tyr_Silpha_tyrolensis_amei.idba.102 | XXXXXXXXXXXXX | CP1S3S14S5S17tyr_Silpha_tyrolensis_amei.idba.102_MERGED |
| -XX-----XX-XX- | CP1Sc3Ge4An7ste | --XXXXXXXXXXXXX | CP1Sc3Ge4An7ste_Anoplotrupes_stercorosus_JX412838 | --XXXXXXXXXXXXX | CP1Sc3Ge4An7ste_Anoplotrupes_stercorosus_JX412838_MERGED |
| -XX-----XX- | CP1Sc3L4Lu5Do7par | XXXXXX | CP1Sc3L4Lu5Do7par_Dorcus_parallepipedus_2VGB.idba.16 | XXXXXX | CP1Sc3L4Lu5Do7par_Dorcus_parallepipedus_2VGB.idba.16_MERGED |
| -XX----- | CP1Sc3L4Lu5Lu7cer | XXXXXXXXXXXXX | CP1Sc3L4Lu5Lu7cer_Lucanus_cervus_2VGB.idba.13 | XXXXXXXXXXXXX | CP1Sc3L4Lu5Lu7cer_Lucanus_cervus_2VGB.idba.13_MERGED |
| XXXXXXXXXXXXX--X | CP1Sc3L4Lu5Lu7maz | XXXXXXXXXXXXX | CP1Sc3L4Lu5Lu7maz_Lucanus_mazama_NC_013578 | XXXXXXXXXXXXX | CP1Sc3L4Lu5Lu7maz_Lucanus_mazama_NC_013578_MERGED |
| -X-----X--X | CP1Sc3L4S5Ce7chr | XXXXXXXXXXXXX | CP1Sc3L4S5Ce7chr_Ceruchus_chrysomelinus_amei.idba.108 | XXXXXXXXXXXXX | CP1Sc3L4S5Ce7chr_Ceruchus_chrysomelinus_amei.idba.108_MERGED |
| --XX----- | CP1Sc3S4A5Ap7ele | XXXXXXXXXXXXX | CP1Sc3S4A5Ap7ele_Aphodius_elevatus_Soil.idba.32 | XXXXXXXXXXXXX | CP1Sc3S4A5Ap7ele_Aphodius_elevatus_Soil.idba.32_MERGED |
| -XX----- | CP1Sc3S4A5Ap7foe | -----XXXXXXXXX | CP1Sc3S4A5Ap7foe_Aphodius_foetens_amei.idba.115 | -XX-XXXXXXXXX | CP1Sc3S4A5Ap7foe_Aphodius_foetens_amei.idba.115_MERGED |
| -XX----- | CP1Sc3S4A5Ap7mer | XXXXXXXXXXXXX | CP1Sc3S4A5Ap7mer_Aphodius_merdarius_Soil.idba.93 | XXXXXXXXXXXXX | CP1Sc3S4A5Ap7mer_Aphodius_merdarius_Soil.idba.93_MERGED |
| -XX-----X--XXX | CP1Sc3S4A5Ox7syl | XXXXXXXXXXXXX | CP1Sc3S4A5Ox7syl_Oxyomus_sylvestris_amei.idba.121 | XXXXXXXXXXXXX | CP1Sc3S4A5Ox7syl_Oxyomus_sylvestris_amei.idba.121_MERGED |
| -XX-----X | CP1Sc3S4A5Ple7cae | XXXXXXXXXXXXX | CP1Sc3S4A5Ple7cae_Pleurophorus_caesus_Soil.idba.33 | XXXXXXXXXXXXX | CP1Sc3S4A5Ple7cae_Pleurophorus_caesus_Soil.idba.33_MERGED |
| -X-----XX--X | CP1Sc3S4D5Cyp7val | XXXXXXXXXXXXX | CP1Sc3S4D5Cyp7val_Cyphonistes_vallatus_JX412731 | XXXXXXXXXXXXX | CP1Sc3S4D5Cyp7val_Cyphonistes_vallatus_JX412731_MERGED |
| XXXXXXXXXX-X-X-X | CP1Sc3S4M5Chei7jan | XXXXXXXXXXXXX | CP1Sc3S4M5Chei7jan_Cheirotonus_jansoni_NC_023246 | XXXXXXXXXXXXX | CP1Sc3S4M5Chei7jan_Cheirotonus_jansoni_NC_023246_MERGED |
| -XX----- | CP1Sc3S4M5Me7hip | XXXXXXXXXXXXX | CP1Sc3S4M5Me7hip_Melolontha_hippocastani_amei.idba.79 | XXXXXXXXXXXXX | CP1Sc3S4M5Me7hip_Melolontha_hippocastani_amei.idba.79_MERGED |
| XXXXXXXXXXXXX--X | CP1Sc3S4M5Rh7mag | XXXXXXXXXXXXX | CP1Sc3S4M5Rh7mag_Rhopaea_magnicornis_NC_013252 | XXXXXXXXXXXXX | CP1Sc3S4M5Rh7mag_Rhopaea_magnicornis_NC_013252_MERGED |
| -XX-----XX-XXX | CP1Sc3S4R5Ph7hor | --XXXXX | CP1Sc3S4R5Ph7hor_Phyllopertha_horticola_amei.idba.189 | XXXXXX | CP1Sc3S4R5Ph7hor_Phyllopertha_horticola_amei.idba.189_MERGED |
| -XX-----X--X | CP1Sc3S4S5Bu7bis | XXXXXXXXXXXXX | CP1Sc3S4S5Bu7bis_Bubas_bison_CS.idba.2 | XXXXXXXXXXXXX | CP1Sc3S4S5Bu7bis_Bubas_bison_CS.idba.2_MERGED |
| --XX-----X--X | CP1Sc3S4S5Bu7bub | XXXXXXXXXXXXX | CP1Sc3S4S5Bu7bub_Bubas_bubalus_CS.idba.14 | XXXXXXXXXXXXX | CP1Sc3S4S5Bu7bub_Bubas_bubalus_CS.idba.14_MERGED |
| -X----- | CP1Sc3S4S5C6Ca7aeq | XXXXXX | CP1Sc3S4S5C6Ca7aeq_Canthon_aequinoctialis_Panama.idba.243 | XXXXXX | CP1Sc3S4S5C6Ca7aeq_Canthon_aequinoctialis_Panama.idba.243_MERGED |
| -X-----X--XXX | CP1Sc3S4S5Ca7bin | XXXXXXXXXXXXX | CP1Sc3S4S5Ca7bin_Caccobius_binodulus_CS.idba.46 | XXXXXXXXXXXXX | CP1Sc3S4S5Ca7bin_Caccobius_binodulus_CS.idba.46_MERGED |
| -X-----X--X | CP1Sc3S4S5Ca7nig | XXXXXXXXXXXXX | CP1Sc3S4S5Ca7nig_Caccobius_nigriritulus_CS.idba.25 | XXXXXXXXXXXXX | CP1Sc3S4S5Ca7nig_Caccobius_nigriritulus_CS.idba.25_MERGED |
| -X-----X--XXX | CP1Sc3S4S5Cl7con | XXXXXX | CP1Sc3S4S5Cl7con_Cleptocaccobius_convexifrons_CS.idba.80 | XXXXXX | CP1Sc3S4S5Cl7con_Cleptocaccobius_convexifrons_CS.idba.80_MERGED |
| -X-----X--XXX | CP1Sc3S4S5Dig7dia | XXXXXXXXXXXXX | CP1Sc3S4S5Dig7dia_Onthophagus_diabolicus_Scarab.idba.18 | XXXXXXXXXXXXX | CP1Sc3S4S5Dig7dia_Onthophagus_diabolicus_Scarab.idba.18_MERGED |
| -XXX-----X-XX--X | CP1Sc3S4S5Dig7gaz | XXXXXXXXXXXXX | CP1Sc3S4S5Dig7gaz_Digitonthophagus_gazella_Scarab.idba.8 | XXXXXXXXXXXXX | CP1Sc3S4S5Dig7gaz_Digitonthophagus_gazella_Scarab.idba.8_MERGED |
| -X-----X--X | CP1Sc3S4S5Dr7kir | XXXXXXXXXXXXX | CP1Sc3S4S5Dr7kir_Drepanocerus_kirbyi_CS.idba.15 | XXXXXXXXXXXXX | CP1Sc3S4S5Dr7kir_Drepanocerus_kirbyi_CS.idba.15_MERGED |

| | | | | | |
|-------------------|---------------------|--------------------|---|-------------------|--|
| --X-----X---- | CP1Sc3S4S5Eu6Eu7car | XXXXXXXXXXXXX---- | CP1Sc3S4S5Eu6Eu7car_Cheironitis_hoplosternus_Scarab.idba.15 | XXXXXXXXXXXXX---- | CP1Sc3S4S5Eu6Eu7car_Cheironitis_hoplosternus_Scarab.idba.15_MERGED |
| --X-----X---- | CP1Sc3S4S5Eu6Eu7foe | XXXXXXXXXXXXX---- | CP1Sc3S4S5Eu6Eu7foe_Eurysternus_foedus_Scarab.idba.1 | XXXXXXXXXXXXX---- | CP1Sc3S4S5Eu6Eu7foe_Eurysternus_foedus_Scarab.idba.1_MERGED |
| --X-----X---- | CP1Sc3S4S5Eu6Eu7ham | XXXXXXXXXXXXX---- | CP1Sc3S4S5Eu6Eu7ham_Eurysternus_hamaticollis_CS.idba.53 | XXXXXXXXXXXXX---- | CP1Sc3S4S5Eu6Eu7ham_Eurysternus_hamaticollis_CS.idba.53_MERGED |
| --X-----X---- | CP1Sc3S4S5Eu6Eu7inf | XXXXXXXXXXXXX---- | CP1Sc3S4S5Eu6Eu7inf_Eurysternus_inflexus_CS.idba.17 | XXXXXXXXXXXXX---- | CP1Sc3S4S5Eu6Eu7inf_Eurysternus_inflexus_CS.idba.17_MERGED |
| -XX-----X---- | CP1Sc3S4S5Eu7ful | XXXXXXXXXXXXX---- | CP1Sc3S4S5Eu7ful_Euoniticellus_fulvus_Scarab.idba.0 | XXXXXXXXXXXXX-XX | CP1Sc3S4S5Eu7ful_Euoniticellus_fulvus_Scarab.idba.0_MERGED |
| -XX-----X---- | CP1Sc3S4S5Eu7int | XXXXXXXXXXXXX---- | CP1Sc3S4S5Eu7int_Euoniticellus_intermedius_CS.idba.5 | XXXXXXXXXXXXX-XX | CP1Sc3S4S5Eu7int_Euoniticellus_intermedius_CS.idba.5_MERGED |
| --X-----X---- | CP1Sc3S4S5Euon7car | -XXXXXXXXXXXXX---- | CP1Sc3S4S5Euon7car_Onthophagus_carbonarius_Scarab.idba.19 | -XXXXXXXXXXXXX-XX | CP1Sc3S4S5Euon7car_Onthophagus_carbonarius_Scarab.idba.19_MERGED |
| --X-----X-XX-XXX | CP1Sc3S4S5Hel7qua | XXXX-----X-XX-XXX | CP1Sc3S4S5Hel7qua_Helictopleurus_quadripunctatus_CS.idba.79 | XXXX-----X-XX-XXX | CP1Sc3S4S5Hel7qua_Helictopleurus_quadripunctatus_CS.idba.79_MERGED |
| --X-----X-XXX | CP1Sc3S4S5Het7cas | XXXXXXXXXXXXX---- | CP1Sc3S4S5Het7cas_Heteronitis_castelnaui_CS.idba.56 | XXXXXXXXXXXXX-XX | CP1Sc3S4S5Het7cas_Heteronitis_castelnaui_CS.idba.56_MERGED |
| --X-----X-XXX | CP1Sc3S4S5Hy7alc | XXXXXXXXXXXXX---- | CP1Sc3S4S5Hy7alc_Hyalonthophagus_alcyon_CS.idba.42 | XXXXXXXXXXXXX-XX | CP1Sc3S4S5Hy7alc_Hyalonthophagus_alcyon_CS.idba.42_MERGED |
| --X-----X-X---- | CP1Sc3S4S5Li7mil | --XXXXXXXX----- | CP1Sc3S4S5Li7mil_Liatongus_militaris_Scarab.idba.22 | --XXXXXXXX-X---- | CP1Sc3S4S5Li7mil_Liatongus_militaris_Scarab.idba.22_MERGED |
| --X-----X-XXX | CP1Sc3S4S5Mi7api | XXXXXXXXXXXXX---- | CP1Sc3S4S5Mi7api_Millichus_apicalis_CS.idba.13 | XXXXXXXXXXXXX-XX | CP1Sc3S4S5Mi7api_Millichus_apicalis_CS.idba.13_MERGED |
| --X-----X-XXX | CP1Sc3S4S5On7ale | XXXXXXXXXXXXX---- | CP1Sc3S4S5On7ale_Onitis_alexis_CS.idba.60 | XXXXXXXXXXXXX-XX | CP1Sc3S4S5On7ale_Onitis_alexis_CS.idba.60_MERGED |
| --X-----X-XXX | CP1Sc3S4S5On7caf | XXXXXXXXXXXXX---- | CP1Sc3S4S5On7caf_Onitis_caffer_CS.idba.6 | XXXXXXXXXXXXX-XX | CP1Sc3S4S5On7caf_Onitis_caffer_CS.idba.6_MERGED |
| --X-----X-XXX | CP1Sc3S4S5On7fal | XXXXXXXXXXXXX---- | CP1Sc3S4S5On7fal_Onitis_falcatius_CS.idba.22 | XXXXXXXXXXXXX-XX | CP1Sc3S4S5On7fal_Onitis_falcatius_CS.idba.22_MERGED |
| -XX-----X-XXX | CP1Sc3S4S5On7ful | -----XXXXXXXX---- | CP1Sc3S4S5On7ful_Onitis_fulgidus_CS.idba.62 | -----XXXXXXXX-XX | CP1Sc3S4S5On7ful_Onitis_fulgidus_CS.idba.62_MERGED |
| --X-----X-XXX | CP1Sc3S4S5On7egr | XXXXXXXXXXXXX---- | CP1Sc3S4S5On7egr_Oniticeilus_egregius_CS.idba.9 | XXXXXXXXXXXXX-XX | CP1Sc3S4S5On7egr_Oniticeilus_egregius_CS.idba.9_MERGED |
| --X-----X-XXX | CP1Sc3S4S5On7bid | -----XXXXXXXX---- | CP1Sc3S4S5On7bid_Onthophagus_bidentatus_CS.idba.77 | --X-----XXXXX---- | CP1Sc3S4S5On7bid_Onthophagus_bidentatus_CS.idba.77_MERGED |
| -XX-----XX---- | CP1Sc3S4S5On7cly | XXXXXXXXXXXXX---- | CP1Sc3S4S5On7cly_Onthophagus_clypeatus_CS.idba.50 | XXXXXXXXXXXXX-XX | CP1Sc3S4S5On7cly_Onthophagus_clypeatus_CS.idba.50_MERGED |
| -XX-----XX---- | CP1Sc3S4S5On7coe | XXXXXXXXXXXXX---- | CP1Sc3S4S5On7coe_Onthophagus_coenobita_CS.idba.24 | XXXXXXXXXXXXX-XX | CP1Sc3S4S5On7coe_Onthophagus_coenobita_CS.idba.24_MERGED |
| -X-----X-XXX | CP1Sc3S4S5On7fim | XXXXXXXXXXXXX---- | CP1Sc3S4S5On7fim_Onthophagus_fimetarius_Scarab.idba.6 | XXXXXXXXXXXXX-XX | CP1Sc3S4S5On7fim_Onthophagus_fimetarius_Scarab.idba.6_MERGED |
| -X-----X-XXX | CP1Sc3S4S5On7gra | XXXXXXXXXXXXX---- | CP1Sc3S4S5On7gra_Onthophagus_gracillipes_Scarab.idba.3 | XXXXXXXXXXXXX-XX | CP1Sc3S4S5On7gra_Onthophagus_gracillipes_Scarab.idba.3_MERGED |
| -XX-----XX---- | CP1Sc3S4S5On7hae | XXXXXXXXXXXXX---- | CP1Sc3S4S5On7hae_Onthophagus_haematopus_CS.idba.41 | XXXXXXXXXXXXX-XX | CP1Sc3S4S5On7hae_Onthophagus_haematopus_CS.idba.41_MERGED |
| --XX----- | CP1Sc3S4S5On7lat | -XXXXXXXXXXXXX---- | CP1Sc3S4S5On7lat_Onthophagus_laticollis_Scarab.idba.13 | -XXXXXXXXXXXXX-XX | CP1Sc3S4S5On7lat_Onthophagus_laticollis_Scarab.idba.13_MERGED |
| --X-----X-XXX | CP1Sc3S4S5On7lon | XXXXXXXXXXXXX---- | CP1Sc3S4S5On7lon_Onthophagus_longimanus_CS.idba.23 | XXXXXXXXXXXXX-XX | CP1Sc3S4S5On7lon_Onthophagus_longimanus_CS.idba.23_MERGED |
| --X-----X-XXX | CP1Sc3S4S5On7nit | -XXXXXXXXXXXXX---- | CP1Sc3S4S5On7nit_Onthophagus_nitidior_CS.idba.10 | -XXXXXXXXXXXXX-XX | CP1Sc3S4S5On7nit_Onthophagus_nitidior_CS.idba.10_MERGED |
| --X-----X-XXX | CP1Sc3S4S5On7obs | XXXXXXXXXXXXX---- | CP1Sc3S4S5On7obs_Onthophagus_obscurior_CS.idba.31 | XXXXXXXXXXXXX-XX | CP1Sc3S4S5On7obs_Onthophagus_obscurior_CS.idba.31_MERGED |
| -XX-----X-XXX | CP1Sc3S4S5On7och | -----XXXXX---- | CP1Sc3S4S5On7och_Onthophagus_ochreatus_Scarab.idba.30 | -----XXXXX-XX | CP1Sc3S4S5On7och_Onthophagus_ochreatus_Scarab.idba.30_MERGED |
| --X-----X-XXX | CP1Sc3S4S5On7rhi | XXXXXXXXXXXXX---- | CP1Sc3S4S5On7rhi_Onthophagus_rhinolophus_Scarab.idba.2 | XXXXXXXXXXXXX-XX | CP1Sc3S4S5On7rhi_Onthophagus_rhinolophus_Scarab.idba.2_MERGED |
| --X-----X-XXX | CP1Sc3S4S5On7ror | XXXXXXXXXXXXX---- | CP1Sc3S4S5On7ror_Onthophagus_rorarius_CS.idba.1 | XXXXXXXXXXXXX-XX | CP1Sc3S4S5On7ror_Onthophagus_rorarius_CS.idba.1_MERGED |
| --X-----X-XXX | CP1Sc3S4S5On7sem | XXXXXXXXXXXXX---- | CP1Sc3S4S5On7sem_Onthophagus_semiaureus_CS.idba.51 | XXXXXXXXXXXXX-XX | CP1Sc3S4S5On7sem_Onthophagus_semiaureus_CS.idba.51_MERGED |
| -XX-----X-X-XX | CP1Sc3S4S5On7sim | XXXXXXXXXXXXX---- | CP1Sc3S4S5On7sim_Onthophagus_similis_CS.idba.37 | XXXXXXXXXXXXX-XX | CP1Sc3S4S5On7sim_Onthophagus_similis_CS.idba.37_MERGED |
| -XX-----X-XXX | CP1Sc3S4S5On7vac | -XXXXXXXXXXXXX---- | CP1Sc3S4S5On7vac_Onthophagus_vacca_CS.idba.55 | -XXXXXXXXXXXXX-XX | CP1Sc3S4S5On7vac_Onthophagus_vacca_CS.idba.55_MERGED |
| --X-----X-XXX | CP1Sc3S4S5On7vul | -----XXXXXXXX---- | CP1Sc3S4S5On7vul_Onthophagus_vulpes_CS.idba.70 | --X-----XXXXX---- | CP1Sc3S4S5On7vul_Onthophagus_vulpes_CS.idba.70_MERGED |
| --X-----X-XXX | CP1Sc3S4S5Ph7ard | XXXXXXXXXXXXX---- | CP1Sc3S4S5Ph7ard_Phalops_ardea_CS.idba.8 | XXXXXXXXXXXXX-XX | CP1Sc3S4S5Ph7ard_Phalops_ardea_CS.idba.8_MERGED |
| --X-----X-XXX | CP1Sc3S4S5Pr7bic | XXXXXXXXXXXXX---- | CP1Sc3S4S5Pr7bic_Proagoderus_bicallosus_CS.idba.3 | XXXXXXXXXXXXX-XX | CP1Sc3S4S5Pr7bic_Proagoderus_bicallosus_CS.idba.3_MERGED |
| --X-----X-XXX | CP1Sc3S4S5Pr7sch | XXXXXXXXXXXXX---- | CP1Sc3S4S5Pr7sch_Proagoderus_schwani CS.idba.12 | XXXXXXXXXXXXX-XX | CP1Sc3S4S5Pr7sch_Proagoderus_schwani CS.idba.12_MERGED |
| -X-----X-XXX | CP1Sc3S4S5Ti7sar | XXXXXXXXXXXXX---- | CP1Sc3S4S5Ti7sar_Tiniocellus_sarawacus_CS.idba.21 | XXXXXXXXXXXXX-XX | CP1Sc3S4S5Ti7sar_Tiniocellus_sarawacus_CS.idba.21_MERGED |
| --X-----X-XXX | CP1Sc3S4S5Tra7dim | XXXXXXXXXXXXX---- | CP1Sc3S4S5Tra7dim_Tragiscus_dimidiatus_Scarab.idba.4 | XXXXXXXXXXXXX-XX | CP1Sc3S4S5Tra7dim_Tragiscus_dimidiatus_Scarab.idba.4_MERGED |
| -XX-----XX---- | CP1Sc3S4T5Gn7var | XXXXXXXXXXXXX---- | CP1Sc3S4T5Gn7var_Gnorimus_variabilis_ameie.idba.13 | XXXXXXXXXXXXX-XX | CP1Sc3S4T5Gn7var_Gnorimus_variabilis_ameie.idba.13_MERGED |
| -XX-----X-XXX | CP1Sc3E4Eu7hae | XXXXXXXXXXXXX---- | CP1Sci3E4Eu7hae_Eucinetus_haemorrhoidolus_842710_idba.contig_14 | XXXXXXXXXXXXX-XX | CP1Sci3E4Eu7hae_Eucinetus_haemorrhoidolus_842710_idba.contig_14_MERGED |
| -XX-----X-XXX | CP1Sci3S4E17min | XXXXXXXXXXXXX---- | CP1Sci3S4E17min_Elodes_minuta_ameie.idba.24 | XXXXXXXXXXXXX-XX | CP1Sci3S4E17min_Elodes_minuta_ameie.idba.24_MERGED |
| -X-----X-XXX | CP1Sci3S4Sc7orb | XXXXXXXXXXXXX---- | CP1Sci3S4Sc7orb_Scirtes_orbicularis_ameie.idba.100 | XXXXXXXXXXXXX-XX | CP1Sci3S4Sc7orb_Scirtes_orbicularis_ameie.idba.100_MERGED |
| -XX----- | CP1T3An40m7f1o | -XXXXXXXXXXXXX---- | CP1T3An40m7f1o_Omonadus_floralis_HQ232825 | -XXXXXXXXXXXXX-XX | CP1T3An40m7f1o_Omonadus_floralis_HQ232825_MERGED |
| -XX----- | CP1T3An4St7tob | XXXXXXXXXXXXX---- | CP1T3An4St7tob_Stricticomus_tobias_ameie.idba.57 | XXXXXXXXXXXXX-XX | CP1T3An4St7tob_Stricticomus_tobias_ameie.idba.57_MERGED |
| -XX-----X-XXX | CP1T3B4Bo7sch | XXXXX----- | CP1T3B4Bo7sch_Boros_schneideri_ameie.idba.177 | XXXXX-----X-XXX | CP1T3B4Bo7sch_Boros_schneideri_ameie.idba.177_MERGED |
| -X-----X-XXX | CP1T3C4C5C17mic | XXXXXXXXXXXXX---- | CP1T3C4C5C17mic_Cis_micans_ameie.idba.118 | XXXXXXXXXXXXX-XX | CP1T3C4C5C17mic_Cis_micans_ameie.idba.118_MERGED |
| -XX-----XX-XXX | CP1T3C4C50r7pyg | --XXXXXX----- | CP1T3C4C50r7pyg_Orthocis_pygmaeus_ameie.idba.147 | -XXXXXX--XX-XXX | CP1T3C4C50r7pyg_Orthocis_pygmaeus_ameie.idba.147_MERGED |
| -X-----X-XXX | CP1T3Me4Mik7gra | --XXXXXXXX----- | CP1T3Me4Mik7gra_Mikadonius_gracilis_JX412823 | -XXXXXXXXXXXXX-XX | CP1T3Me4Mik7gra_Mikadonius_gracilis_JX412823_MERGED |
| -X-----X-XXX | CP1T3Me40s7bip | --XXXXXXXX----- | CP1T3Me40s7bip_Osypa_bipunctata_JX313675 | -X-XXXXXXXXXXXX- | CP1T3Me40s7bip_Osypa_bipunctata_JX313675_MERGED |
| XXXXXXXXXXXXX---- | CP1T3Mo4Mo7atr | XXXXXXXXXXXXX---- | CP1T3Mo4Mo7atr_Mordella atrata_NC_013254 | XXXXXXXXXXXXX-XX | CP1T3Mo4Mo7atr_Mordella atrata_NC_013254_MERGED |
| -X-----X-XXX | CP1T3Mo4Morde7mil | XXXXXXXXXXXXX---- | CP1T3Mo4Morde7mil_Mordellochroa_millieri_ameie.idba.36 | XXXXXXXXXXXXX-XX | CP1T3Mo4Morde7mil_Mordellochroa_millieri_ameie.idba.36_MERGED |
| -XX-----XX---- | CP1T3Mo4To7buc | XXXXXXXXXXXXX---- | CP1T3Mo4To7buc_Tomoxia_bucephala_ameie.idba.63 | XXXXXXXXXXXXX-XX | CP1T3Mo4To7buc_Tomoxia_bucephala_ameie.idba.63_MERGED |
| -XX-----XX-XXX | CP1T3My4My7qua | --XXXXXXXX----- | CP1T3My4My7qua_Mycetophagus_quadripustulatus_HQ232824 | -XXXXXXXXXXXXX-XX | CP1T3My4My7qua_Mycetophagus_quadripustulatus_HQ232824_MERGED |
| -X-----X-XXX | CP1T3O4I7s7cae | XXXXXXXXXXXXX---- | CP1T3O4I7s7cae_Tschnomera caerulea_JX412790 | XXXXXXXXXXXXX-XX | CP1T3O4I7s7cae_Tschnomera caerulea_JX412790_MERGED |

| | | | | | |
|-----------------------|-------------------|---------------------|--|-----------------------|---|
| -XX----- | CP1T304Is7cya | XXXXXXXXXXXXX---- | CP1T304Is7cya_Ischnomera_cyanea_BIUK.idba.38 | XXXXXXXXXXXXX---- | CP1T304Is7cya_Ischnomera_cyanea_BIUK.idba.38_MERGED |
| -XX-----XXX | CP1T3040e7vir | --XXXXXXXXXXXXX---- | CP1T3040e7vir_Oedemera_virescens_HQ232826 | -XXXXXXXXXXXXX----XXX | CP1T3040e7vir_Oedemera_virescens_HQ232826_MERGED |
| -X----- | CP1T3P4Sc7pec | XXXXXXXXXXXXX----- | CP1T3P4Sc7pec_Schizotus_pectinicornis_ameie.idba.83 | XXXXXXXXXXXXX----- | CP1T3P4Sc7pec_Schizotus_pectinicornis_ameie.idba.83_MERGED |
| --X-----XX--XXX | CP1T3R4Pe7fen | XXXXXXXXXXXXX----- | CP1T3R4Pe7fen_Pelecotoma_fennica_842676_idba_contig_23 | XXXXXXXXXXXXX-----XXX | CP1T3R4Pe7fen_Pelecotoma_fennica_842676_idba_contig_23_MERGED |
| -X----- | CP1T3Sa4Li7cur | XXXXXXXXXXXXX----- | CP1T3Sa4Li7cur_Lissodema_cursor_ameie.idba.80 | XXXXXXXXXXXXX----- | CP1T3Sa4Li7cur_Lissodema_cursor_ameie.idba.80_MERGED |
| --X-----XX--XXX | CP1T3Sa4Rh7ruf | XXXXXXXXXXXXX----- | CP1T3Sa4Rh7ruf_Rhinosimus_ruficollis_BIUK.idba.39 | XXXXXXXXXXXXX-----XXX | CP1T3Sa4Rh7ruf_Rhinosimus_ruficollis_BIUK.idba.39_MERGED |
| -X----- | CP1T3Sa4Sa7aen | -----XXXXX----- | CP1T3Sa4Sa7aen_Salpingus_aeneus_JX313680 | -X-----XXXXX----- | CP1T3Sa4Sa7aen_Salpingus_aeneus_JX313680_MERGED |
| -XX-----XXX | CP1T3Sa4Vi7ruf | XXXXXXXXXXXXX----- | CP1T3Sa4Vi7ruf_Vincenzellus_ruficollis_833403_Salpingidae_Vincenzellus | XXXXXXXXXXXXX-----XXX | CP1T3Sa4Vi7ruf_Vincenzellus_ruficollis_833403_Salpingidae_Vincenzellus_MERGED |
| -XX-----XX--XXX | CP1T3Sc5An7mac | XXXXXXXXXXXXX----- | CP1T3Sc5An7mac_Anasps_maculata_BIUK.idba.33 | XXXXXXXXXXXXX-----XXX | CP1T3Sc5An7mac_Anasps_maculata_BIUK.idba.33_MERGED |
| -X----- | CP1T3Sc5Cy7pha | XXXXXXXXXXXXX----- | CP1T3Sc5Cy7pha_Cyrtanasps_phalerata_ameie.idba.38 | XXXXXXXXXXXXX----- | CP1T3Sc5Cy7pha_Cyrtanasps_phalerata_ameie.idba.38_MERGED |
| -X----- | CP1T3T4D5Sc7met | XXXXXXXXXXXXX----- | CP1T3T4D5Sc7met_Scaphidema_metallicum_ameie.idba.104 | XXXXXXXXXXXXX----- | CP1T3T4D5Sc7met_Scaphidema_metallicum_ameie.idba.104_MERGED |
| XXXX-XXX-X-XXX---- | CP1T3T4D5U17der | XXXXXXXXXXXXX----- | CP1T3T4D5U17der_Ulomoides_dermestoides_NC_025332 | XXXXXXXXXXXXX----- | CP1T3T4D5U17der_Ulomoides_dermestoides_NC_025332_MERGED |
| -XX----- | CP1T3T4T5Na7lae | XXXXXXXXXXXXX----- | CP1T3T4T5Na7lae_Nalassus_laevioctostriatus_2VGB.idba.14 | XXXXXXXXXXXXX----- | CP1T3T4T5Na7lae_Nalassus_laevioctostriatus_2VGB.idba.14_MERGED |
| -----X--X-X-- | CP1T3T4T5Sca7unc | XXXXXXX-XXXXX---- | CP1T3T4T5Sca7unc_Scaurus_uncinus_Soil.idba.92 | XXXXXXX-XXXXX-X- | CP1T3T4T5Sca7unc_Scaurus_uncinus_Soil.idba.92_MERGED |
| XXXXXXXXX-X-XXX-XXX | CP1T3T4T5Te7mol | XXXXXXXXXXXXX----- | CP1T3T4T5Te7mol_Tenebrio_molitor_NC_024633 | XXXXXXXXXXXXX-----XXX | CP1T3T4T5Te7mol_Tenebrio_molitor_NC_024633_MERGED |
| XXXXXXXXXXXXX-XXX---- | CP1T3T4Tr7aud | XXXXXXXXXXXXX----- | CP1T3T4Tr7aud_Tribolium_audax_NC_024600 | XXXXXXXXXXXXX----- | CP1T3T4Tr7aud_Tribolium_audax_NC_024600_MERGED |
| -XX-----XX--XXX | CP1T3Te4T5Te7fun | XXXXXXXXXXXXX----- | CP1T3Te4T5Te7fun_Tetratoma_fungorum_ameie.idba.12 | XXXXXXXXXXXXX-----XXX | CP1T3Te4T5Te7fun_Tetratoma_fungorum_ameie.idba.12_MERGED |
| --X-----XX--XXX | CP1T3Z4Z5U6Us7lac | XXXXXXXXXXXXX----- | CP1T3Z4Z5U6Us7lac_Usechus_lacerta_679350_idba_contig_8 | XXXXXXXXXXXXX-----XXX | CP1T3Z4Z5U6Us7lac_Usechus_lacerta_679350_idba_contig_8_MERGED |

Manual correction of erroneous sequences

This list summarizes the manual corrections done for the tree of Figure 3 (and the complete tree below). These correspond to NCBI terminals whose taxonomic identification (their NCBI taxonomic id) appears erroneous in light of their phylogenetic placement.

NCBI terminals with probable erroneous taxonomic identifications

- CP1Cur3C4M5M6Li7cor
- CP1Cu3Lat4Ak7sle
- CP1S3S4Ps5Ba7del
- CP1Hi3H4S5Gn7com
- CP1Cu3N4Am7C27
- CP1Bo3D4Tro7MC2010
- CP1Cur3C4Ma5Ma7cer
- CP1Ch3Ce4D5Cy7asa
- CP1Cur3C4M5Ph6Cr7pun
- CP1S3Si4S5De7qua
- CP1Cu3N4Cy5Cy7MJM2013

*** minor errors detected in Genbank ****

- CP1S3S4Ox5Ox7_Oxytelus_sp_JX412796 (should use *Anotylus rugatilis*)
- CP1S3S4O5Ne7TJH2005 is same species as
CP1S3S4O5Ne7bru_Neophonus_bruchi_Staph.idba.0_MERGED

NCBI extraction and Blast threshold

The following table reports the number of mitochondrial loci extracted from the NCBI at different blast Evalue thresholds. A value of 1E-5 was retained and is the baseline used for the differences reported below:

| Locus | #sequence at 1E-5 | Variation at different Blast thresholds | | | | | |
|-----------------|-------------------|---|-------|------------------|-------|-------|-------|
| | | 1E-12 | 1E-09 | 1E-05 (baseline) | 1E-03 | 1E+00 | 1E+01 |
| <i>12S</i> | 4105 | -5 | -1 | 0 | 0 | +5 | +19 |
| <i>16Sa</i> | 14723 | -4 | 0 | 0 | 0 | +33 | +49 |
| <i>16Sb</i> | 13487 | -13 | 0 | 0 | 0 | +54 | +96 |
| <i>ATP6</i> | 292 | -1 | 0 | 0 | 0 | +7 | +51 |
| <i>cox3</i> | 448 | 0 | 0 | 0 | 0 | 0 | +4 |
| <i>cox2</i> | 7363 | -1 | 0 | 0 | 0 | +44 | +148 |
| <i>cox1seg1</i> | 46546 | -8 | 0 | 0 | 0 | +7 | +11 |
| <i>cox1seg2</i> | 46009 | -1 | 0 | 0 | 0 | +1 | +64 |
| <i>cytb</i> | 5370 | -6 | 0 | 0 | 0 | +0 | +1 |
| <i>ef1a</i> | 3153 | -9 | -3 | 0 | +3 | +3 | +3 |
| <i>nad1</i> | 360 | 0 | 0 | 0 | 0 | +6 | +63 |
| <i>nad2</i> | 612 | -2 | -2 | 0 | 0 | +28 | +87 |
| <i>nad3</i> | 287 | -1 | 0 | 0 | 0 | +6 | +30 |
| <i>nad4</i> | 290 | 0 | 0 | 0 | 0 | +15 | +35 |
| <i>nad5</i> | 1800 | 0 | 0 | 0 | 0 | +9 | +105 |
| <i>nad6</i> | 191 | -29 | -19 | 0 | +14 | +30 | +76 |

We ran the blast extraction at different Blast evalue thresholds and observed the variation in the number of sequences extracted. When changing the blast Evalue threshold between 1e-12 and 1e-3, there is almost no change in the number of extracted sequences. This indicates that the criteria used in the pipeline are efficient in extracting all loci from the Genbank Coleopteran data (evalue<1e-5, word size =12, align_length>=60% of the expected locus length). The only notable exception is the locus nad6, for which the number of extracted sequences is more dependant to the used threshold. After observing in detail, the new sequences extracted at higher Evalue thresholds, we observed that the corresponding Blast alignments were very short (dozens of bases) and were mainly disturbed by the second half of this gene, which contains a large portion of AT-rich segments. AT-rich segments are typically producing lower Evalues, because they are abundant in reference databases and the probability to have detected homology by chance and not because of a real signal (the meaning of the EValue), is higher. This mean that in the future, the Evalue value threshold should be raised for this Locus, or that better bait sequences should be used. Finally, for several loci, dozens of new sequences are extracted when very weak (and generally not recommended) thresholds of 0.1 or 1 are chosen. This is particularly true for cox2 and some nad genes. These numbers should however be taken with caution. In fact, several of the new sequences are erroneous hits due to the sequence patterns shared by the different mitochondrial genes (similar regions between the different nad gene).

Likelihood of the 20 tree searches based on the NCBI+MMG min3loci 1RY_3Del matrix

We launched 20 searches based on the NCBI+MMG min3loci 1RY_3Del matrix, the best tree (see below, seed = 12000) was used as starting tree for the search based on the NCBI+MMG min2loci 1RY_3Del matrix (topology unconstrained). RAxML command:

```
raxmlHPC-PTHREADS -T 12 -n result_min3loci_smv5.1_seed12000 -s infile.txt -q partitions.txt -p 12000 -k -c 25 -m GTRCAT
```

| RAxML seed (-p) | Gamma-based Likelihood | GAMMA-based Score of best tree | time (hours) | diff to best. |
|-----------------|------------------------|--------------------------------|--------------|------------------|
| 1000 | -11450706.323166 | -11450306.278547 | 118.416336 | -436.6692709997 |
| 2000 | -11451121.951837 | -11450571.131743 | 99.527583 | -701.5224670004 |
| 3000 | -11450905.917378 | -11450424.776289 | 117.397756 | -555.1670129988 |
| 4000 | -11450695.323051 | -11450132.612988 | 113.556559 | -263.0037120003 |
| 5000 | -11450574.745977 | -11450226.311419 | 131.865519 | -356.7021430004 |
| 6000 | -11451095.862001 | -11450515.188733 | 150.632361 | -645.5794569999 |
| 7000 | -11450840.566406 | -11450141.221002 | 112.649898 | -271.611725999 |
| 8000 | -11451099.812055 | -11450562.367976 | 103.53299 | -692.7587000001 |
| 9000 | -11451038.838944 | -11450574.763927 | 107.389821 | -705.1546509992 |
| 10000 | -11450999.71374 | -11450638.532262 | 119.203391 | -768.9229859989 |
| 11000 | -11450803.022373 | -11450319.245878 | 100.511854 | -449.6366019994 |
| 12000 | -11450428.470626 | -11449869.609276 | 124.213404 | (best) |
| 13000 | -11450558.60822 | -11450214.256986 | 106.185383 | -344.6477099992 |
| 14000 | -11450694.326608 | -11450315.357446 | 114.860602 | -445.7481699996 |
| 15000 | -11450675.505885 | -11450182.739883 | 153.660767 | -313.1306069996 |
| 16000 | -11450922.880813 | -11450268.350853 | 110.463154 | -398.7415769994 |
| 17000 | -11450701.234511 | -11450250.937053 | 111.724028 | -381.3277770001 |
| 18000 | -11450850.682595 | -11450266.0749 | 101.416929 | -396.465623999 |
| 19000 | -11451405.119621 | -11450915.764047 | 120.598017 | -1046.1547710002 |
| 20000 | -11451133.805351 | -11450629.176252 | 121.664275 | -759.5669759996 |

Annotation of NCBI+MMG min2loci 1RY_3Del tree

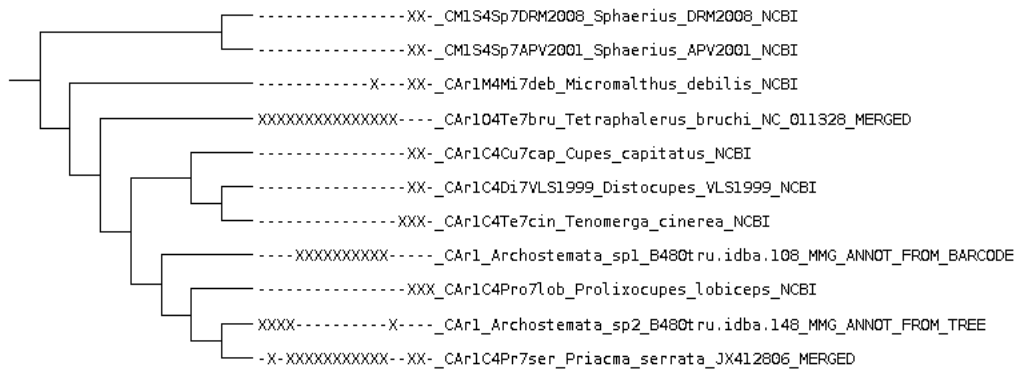
Total number in this tree based on a minimum of two loci is 15983.
Use Suppl. File S2 to access taxonomic code details.

1. Suborder monophyly and basal relationships.

Molecular studies have generally recovered the four suborders as monophyletic, but their relationships are not supported. Recent consensus is (Out (Pol (Arc (Myx + Ade)))) based on transcriptomes (Misof et al., 2014), PhyloBayes analysis of mitogenomes (Timmermans et al., 2016), and multiple nuclear markers (Mckenna et al., 2015). Observed relationships in minimum-2 tree is (Out (Myx (Arc (Ade + Pol))))). Other trees from min3 and NCBI-only data show (Out (Myx (Arc (Pol+Ade))))).

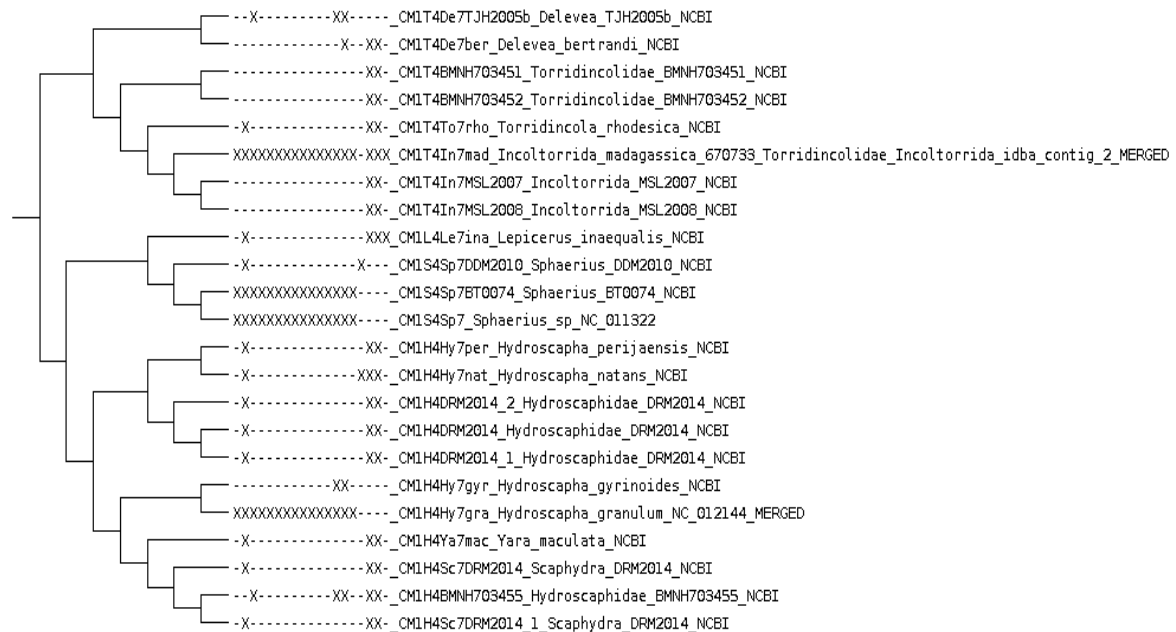
2. Archostemata (total number of terminals: 9; codes starting with code CAr1).

All monophyletic except for two 18S sequences of Myx sister to Ar. Three families are represented: (Micromalthidae, (Cupedidae + Ommatidae)). Two contigs from a Bornean metagenome probably correspond to a single specimen.



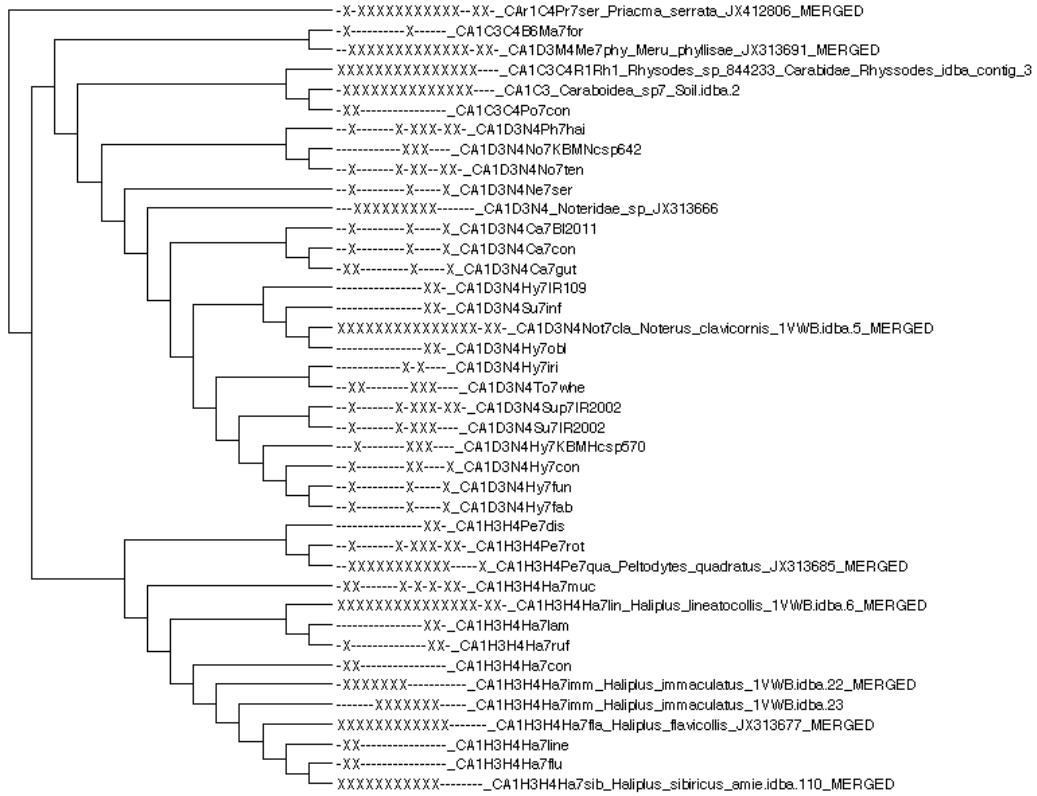
3. Myxophaga (25 terminals, ; codes starting with CM1).

The suborders are monophyletic except for two cox1+18S sequences of Sphaeriusidae that are sister to Archostemata. Four families are represented, with relationships (Torridincolidae ((Lepiceridae, Sphaeriusidae) Hydroscaphidae)).



4. **Adephaga (3403 terminals, codes starting with CA1).**

Basal relationships have been separated into reciprocally monophyletic aquatic Hydradephaga and terrestrial Geadephaga (Maddison et al., 2009; Shull et al., 2001) which is confirmed by recent full mitogenome studies (Lopez et al., submitted). Here we find a paraphyletic Hydradephaga, with a comb-like arrangement of ((Noteridae + Meruidae) (Haliplidae + Dytiscoidea) ((Gyrinidae (Cicindelidae + Carabidae/Trachypachidae))))). The topology with basal split of (Noteridae + Meruidae) from all others matches Timmermans et al. 2016. Hydradephaga are paraphyletic also in (Bocak et al., 2014), but with Gyrinidae at the basal split. (Mckenna et al., 2015) constrain the monophyly of Geadephaga and Hydradephaga.



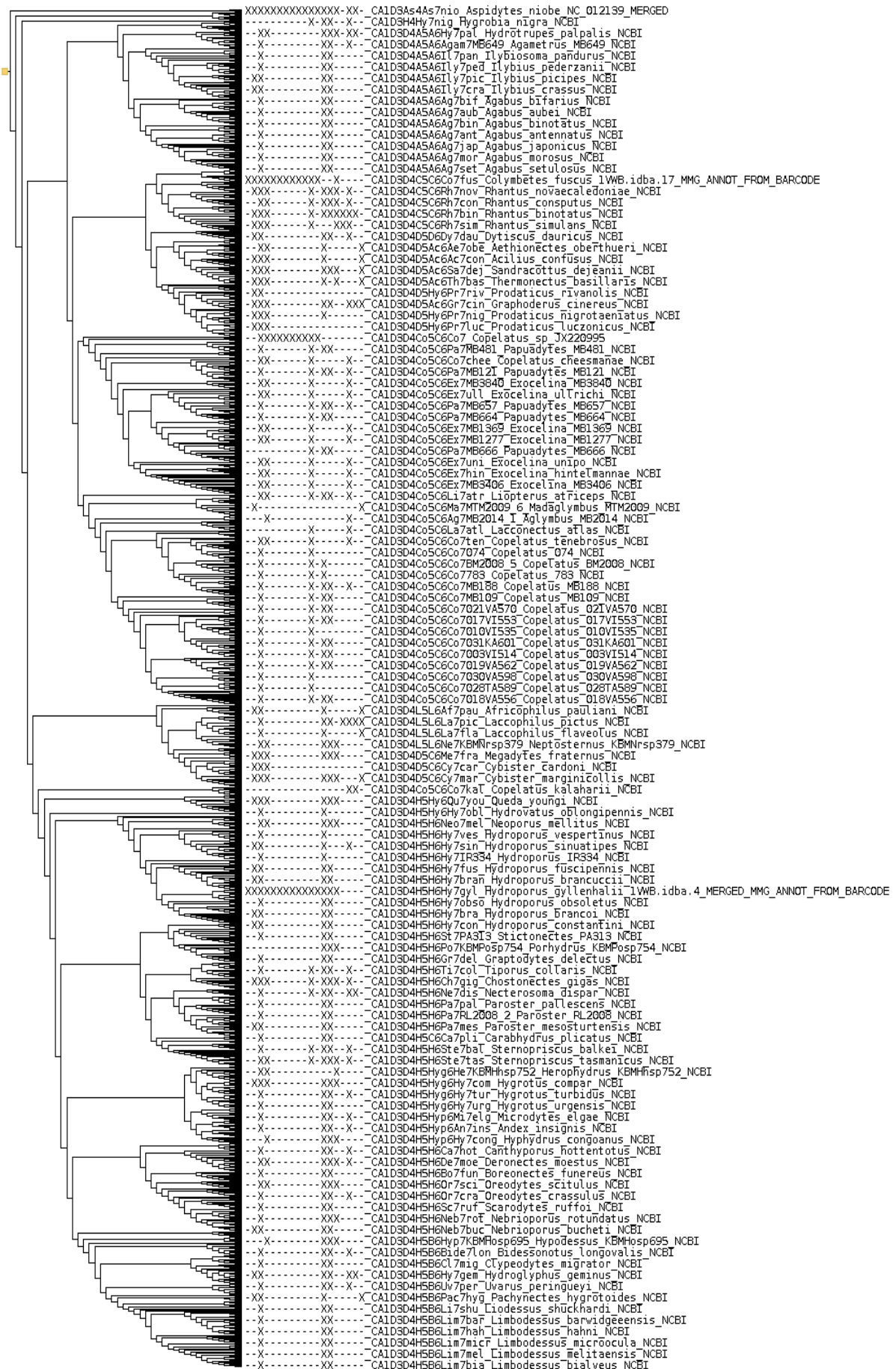
5. **Dytiscoidea (1518 terminals, codes starting with CA1D3).**The superfamily contains six families.

- a. **Basal relationships of Dytiscoidea.** The tree shows ((Aspyditidae + Amphizoidae) (Hygrobiidae (Dytiscidae))), which is in agreement with (Balke et al., 2008). Noteridae + Meruidae is placed distantly at the base of Adephaga tree (see above). All families are monophyletic, except for a few representatives of Laccophilinae are included with Hygrobiidae.
- b. **Dytiscidae (1488 terminals, codes starting with CA1D3D4).**

The most complete molecular tree available is (Ribera, 2008), which found several subfamilies non-monophyletic. The current tree is more in agreement with the subfamily classification than the summary tree of which are recovered as monophyletic here.

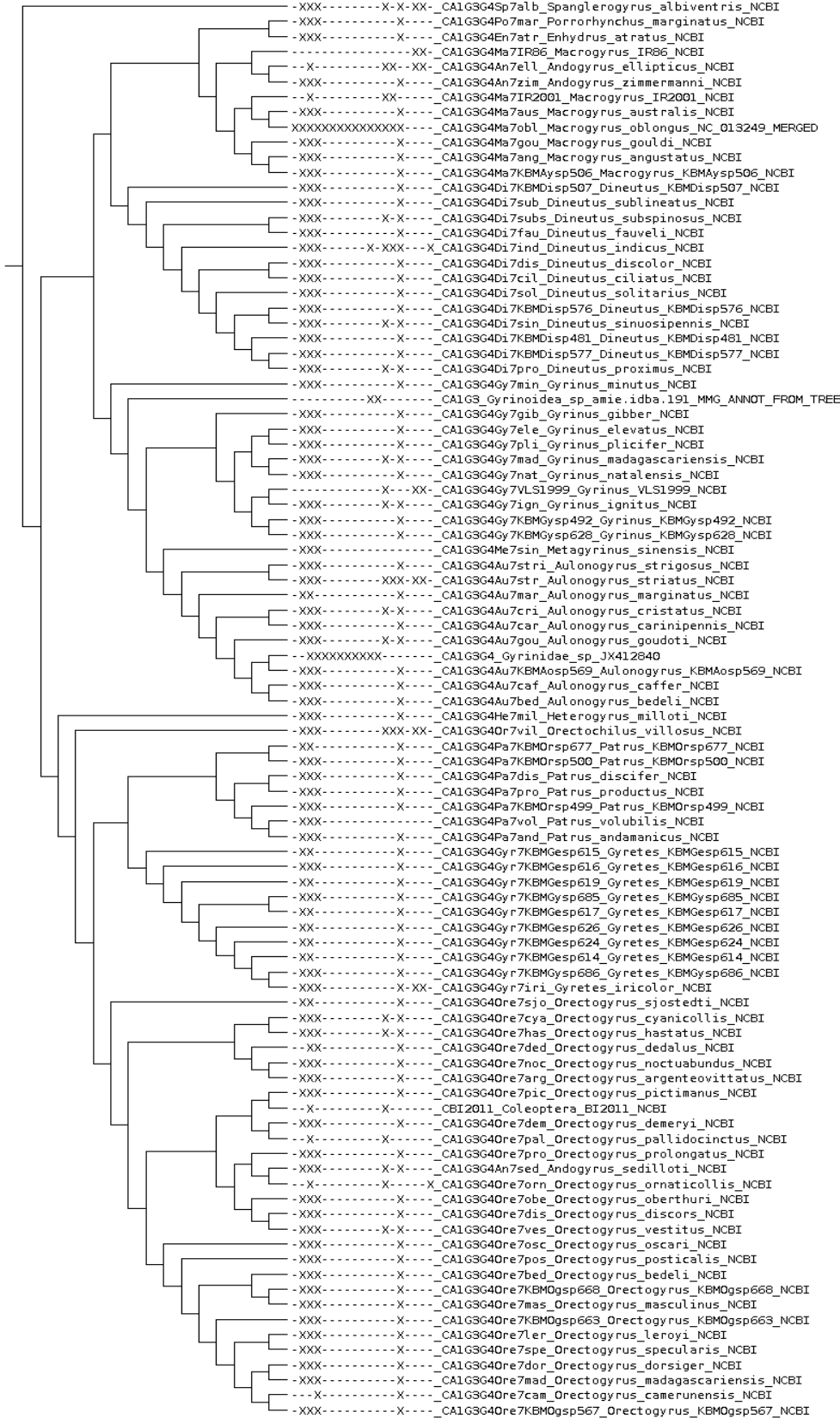
 - i. Dytiscinae is monophyletic, except for the distantly related Cybristrini. Ribera, 2008 recovered tribes Acilini and Hydatcini/Hyderodini in a clade different from Dytiscini, which is not observed here.
 - ii. Agabinae is monophyletic: Hydrotrupes is sister to Platynectes and relatives, which combined are sister to Agabini; these groups were not a monophylum in Ribera, 2008. The two large genera Ilybius/Ilybiosoma and Agabus are reciprocally monophyletic except for species of Platambus which are scattered throughout the Agabini.
 - iii. Laccophilinae is monophyletic and includes Agabetini, which was recovered distant to Laccophilini in Ribera, 2008.
 - iv. Copelatinae: Agaporomorphus is deeply embedded in this subfamily, near Madaglymbus (not recovered as closely related to other Copelatinae in Ribera, 2008. Liopterus is sister to the large Aglymbus/Copelatus clade, which is reciprocally monophyletic to the Exocelina/Papuadytes clade (Balke et al., 2004).
 - v. Relationships within Dytiscidae show four main lineages:
 1. Basal split is Aubehydrini (Dytiscinae) as sister to all others. In Ribera, 2008 Aubehydrini is recovered near the base together with Hydrodytinae /Matinae (here found nearer Hydroporinae, clade 4.)
 2. ((Coptotominae + Lancetinae) Agabinae)
 3. ((Colymbetinae + Dytiscinae)) Copelatinae) (NB: Copelatinae are not fully monophyletic because of four species represented by 18S only are placed distantly).
 4. ((Matinae (Laccophilinae Cybistrini)) ((Hydrodytinae) Hydroporinae))).

Important note: The following tree is a compressed version of the 1488 Dytiscidae terminals. Details are part of the complete tree included in Suppl File S4 and S5 (which spans over many pages). The corresponding tree can be reached by searching for the Label prefix “CA1D3D4”.



6. **Gyrinoidea (Gyrinidae) (93 terminals, codes starting with CA1G3).**

A recent study of (Miller and Bergsten, 2012) produced a tree very similar to that found here. The basal split is Spanglerogyrus versus all others, as expected; two main clades include ((Macrogyrus + Dineutus) Gyrinus) and (Heterochilus (Orectochilus ((Patrus + Gyretes) Orectogyrus))). Miller and Bergsten recover (Macrogyrus + Dineutus) as sister to the latter clade, but with low support.



7. **Carabaeoidea (=Geadephaga) (1774 terminals, codes starting with CA1C3).**

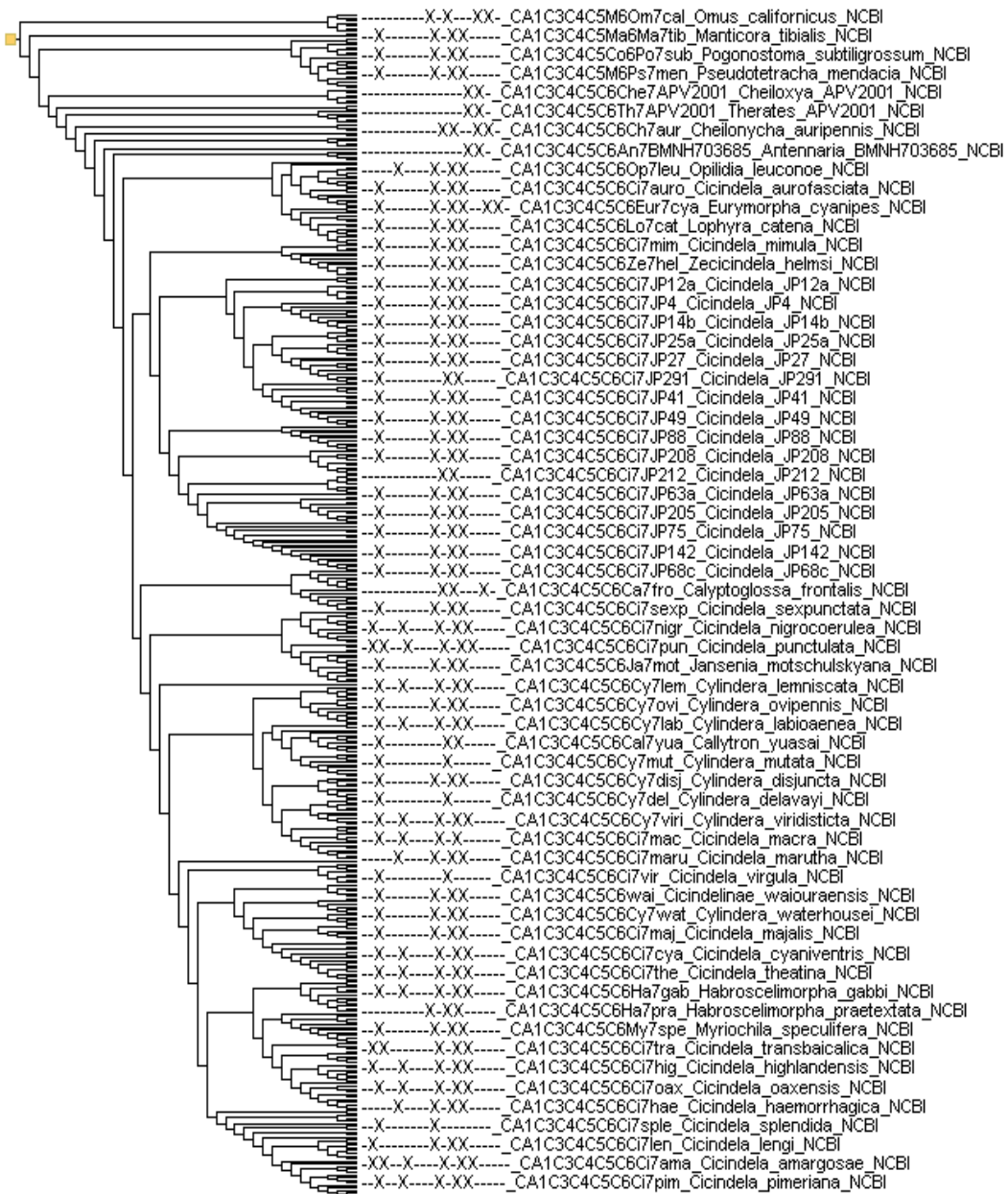
A major attempt for resolving basal relationships was by (Maddison et al., 1999) using 18S, and basal relationships in the large subfamily Harpalinae (Ober, 2002) based on 28S and wingless. The NCBI taxonomy recognises four families, Carabidae, Cicindelidae, Trachypachidae and Rhysodidae. We find Cicindelidae and Carabidae + Trachypachidae split into two sister lineages. (The single representative of Rhysodidae groups with Cicindelidae).

a. **Cicindelidae (442 terminals, codes starting with CA1C3C4C5).**

Basal relationships have been assessed by (Vogler and Pearson, 1996) using 16S and 18S rRNA. Treated as subfamily of Carabidae in the GenBank taxonomy but is sister to all other caraboids in the current tree (except for three members of tribe Rhysodini represented by 18S sequences and thus deserves family status (also see (López-López and Vogler, n.d.) et al., in press). Cicindelidae is monophyletic, with three main groups recognised in NCBI.

- i. Megacephalini: split into two clades, including a diverse set of species of several species poor Southern Hemisphere genera (subtribe Omina), and the cosmopolitan genus Megacephala s.l. (subtribe Megacephalina). The latter is sister to Collyridini, a group of mainly arboreal species. Some inconsistencies in tree due to double entry for misspelling of Platychile and Platychila
- ii. Cicindelini: recovered as monophyletic, includes several genera frequently assigned to subtribe Prothymina. Basal split is genus (Pseud)oxycheila, and comb-like arrangement of other genera, in agreement with Vogler and Pearson 1996.
 1. Cicindelina: this group is recovered as the terminal portion of Cicindelidae, and recovers broadly the subclades of North American groups (Vogler et al., 2005) and worldwide clades based on a smaller subsample, including clades I, II, and III of (Pons et al., 2004), and Asian lineages (Sota et al., 2011). Genus and subgenus assignments in Cicindelina have been applied inconsistently, which complicates the use of measures of monophyly.

Important note: The following tree is a compressed version of the 442 Cicindelidae terminals. Details are part of the complete tree included in Suppl File S4 and S5 (which spans over many pages). The corresponding tree can be reached by searching for the Label prefix “CA1C3C4C5”.



b. **Carabidae (1332 terminals, codes starting with CA1C3C4).**

Data are contributed by Maddison et al.'s (1999) study using 18S, and basal relationships in the large subfamily Harpalinae (Ober and Heider, 2010) based on 28S and wingless. This is complemented by several studies on large genera, e.g. on *Carabus* (Deuve et al., 2012), *Bembidion* (Maddison, 2012), Trechitae and various genera of Harpalinae.

i. **Carabidae.** They are a monophyletic (with the inclusion of Trachypachidae) and are sister to all other Carabidae. This branch includes several clades in a comb-shaped arrangement, including Trachypachidae + Nebriini, Elaphrini, the southern-hemisphere *Pamborus* + *Ceroglossus*, *Cychnus*, and *Calosoma* as sister to *Carabus*. These five major genus-level lineages are monophyletic except for two genera of Trachypachidae, *Trachypachis* (represented by full mitogenome) and *Systolosoma* (represented by 18S only) are widely separated.

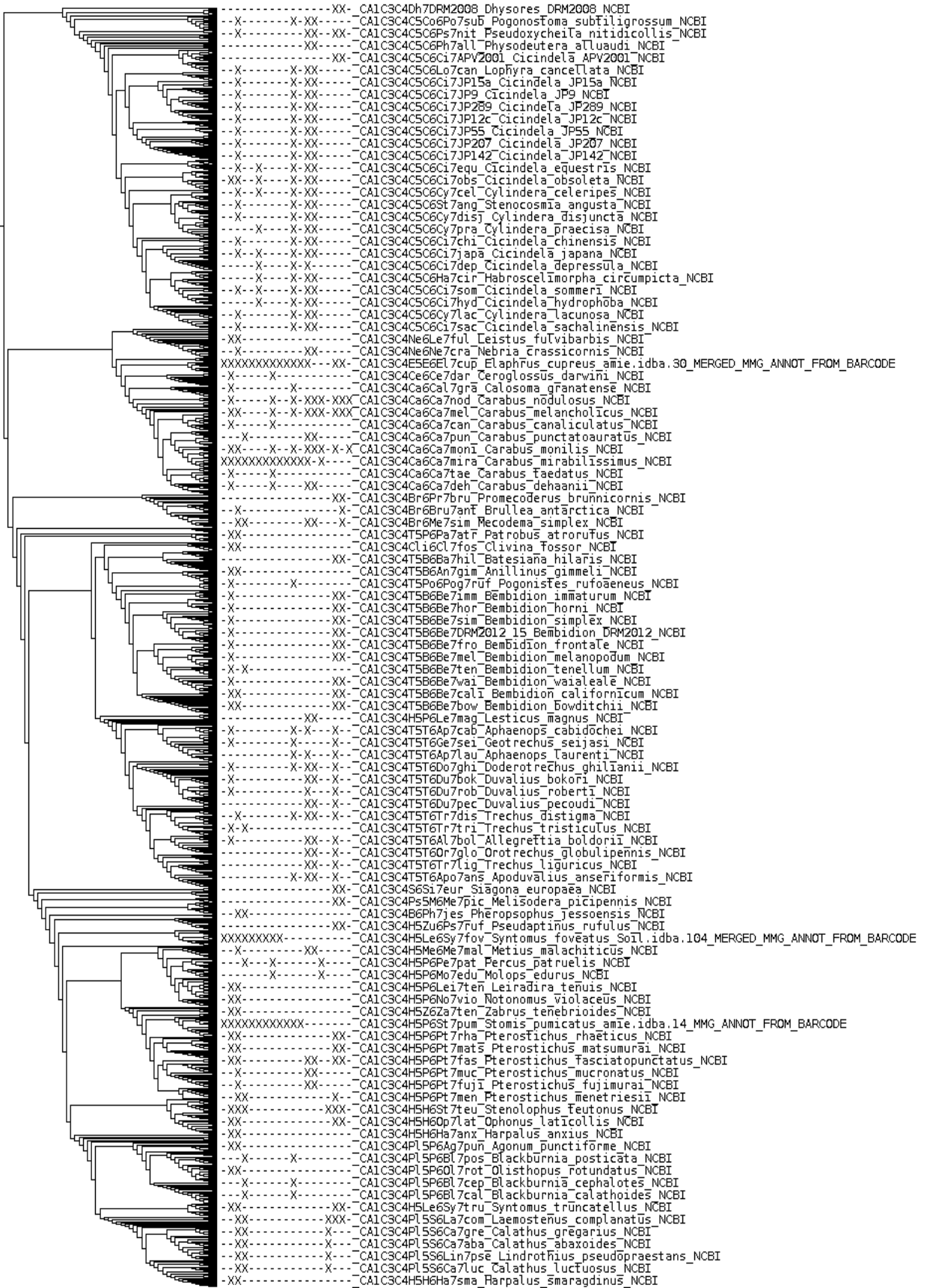
1. *Carabus*: the species groups of (Deuve et al., 2012) are mostly recovered but with slightly different relationships to each other. For example, Neocarabi are part of a wider clade including *Ohomopterus* and Archicarabus. This clade is embedded in a set of species groups of Multistriati, which are rendered paraphyletic with regard to the extended Neocarabi. Note that *Ohomopterus* from a different dataset (Sota et al., 2001) is embedded in Multistriati sister to *C. granulatus/hortensis*. The sister group of the large Multistriati + Neocarabi clade is (*Ctenocarabus* + *Tachypus*). Basal splits in *Carabus* largely correspond to the structure in Deuve et al. 2012.

2. Remaining Carabidae: Broscini sister to all others, followed by several small groups including (Promecognathinae, (Omophroninae + Psydrini)), Migadopini and Loricerini. Most of these groups have been sequenced for 18S only. The terminal split includes two very large clades, separating Trechitae and Harpalinae, each clade includes several smaller group of uncertain placement. Harpalinae is a terminal group that is embedded in various major lineages, including Scaritini, Clvini, Psydrini, Brachinini and others.

ii. **Trechitae (469 terminals).** Consisting of two major groups, with >200 available species of *Bembidion* internal relationships and relationships with smaller genera were arranged very similarly to the study of (Maddison and Ober, 2011). Patrobini are part of Trechitae (sister to *Trechus*), as found by (Maddison and Ober, 2011).

iii. **Harpalinae.** The NCBI taxonomy splits this group into multiple subfamilies, including Harpalinae, Licininae and Platyninae. Basal relationships in this very large group have been treated by (Ober and Heider, 2010) based on 28S and wingless, thus only one locus of those used here. Taxa present are derived from several large genus level studies (each ~100 species), for Blackburnia, Pterostichus, and Calathus. Harpalinae are monophyletic. The resolution in this part of the tree shows various incongruences with the tribal taxonomy. Basal splits are Zuphiini splitting before the Lebiini/Cyclosominini, which are sister to two large terminal clades corresponding mainly to (Zabrini + Pterostichini) and (Harpalini + Platinini). The sister relationships of Harpalinae are not clear.

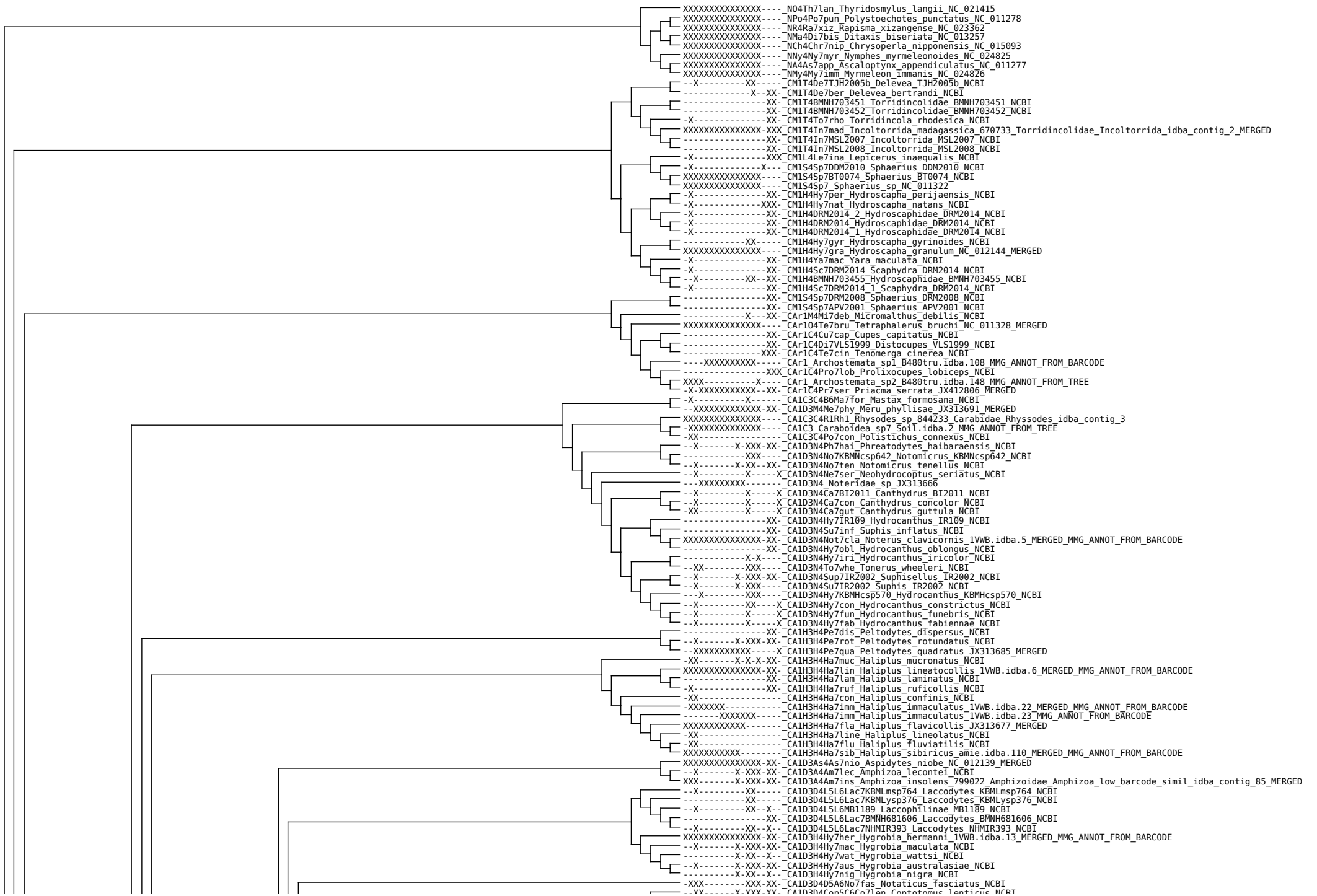
Important note: The following tree is a compressed version of the 1332 Carabidae terminals. Details are part of the complete tree included in Suppl File S4 and S5 (which spans over many pages). The corresponding tree can be reached by searching for the Label prefix "CA1C3C4".



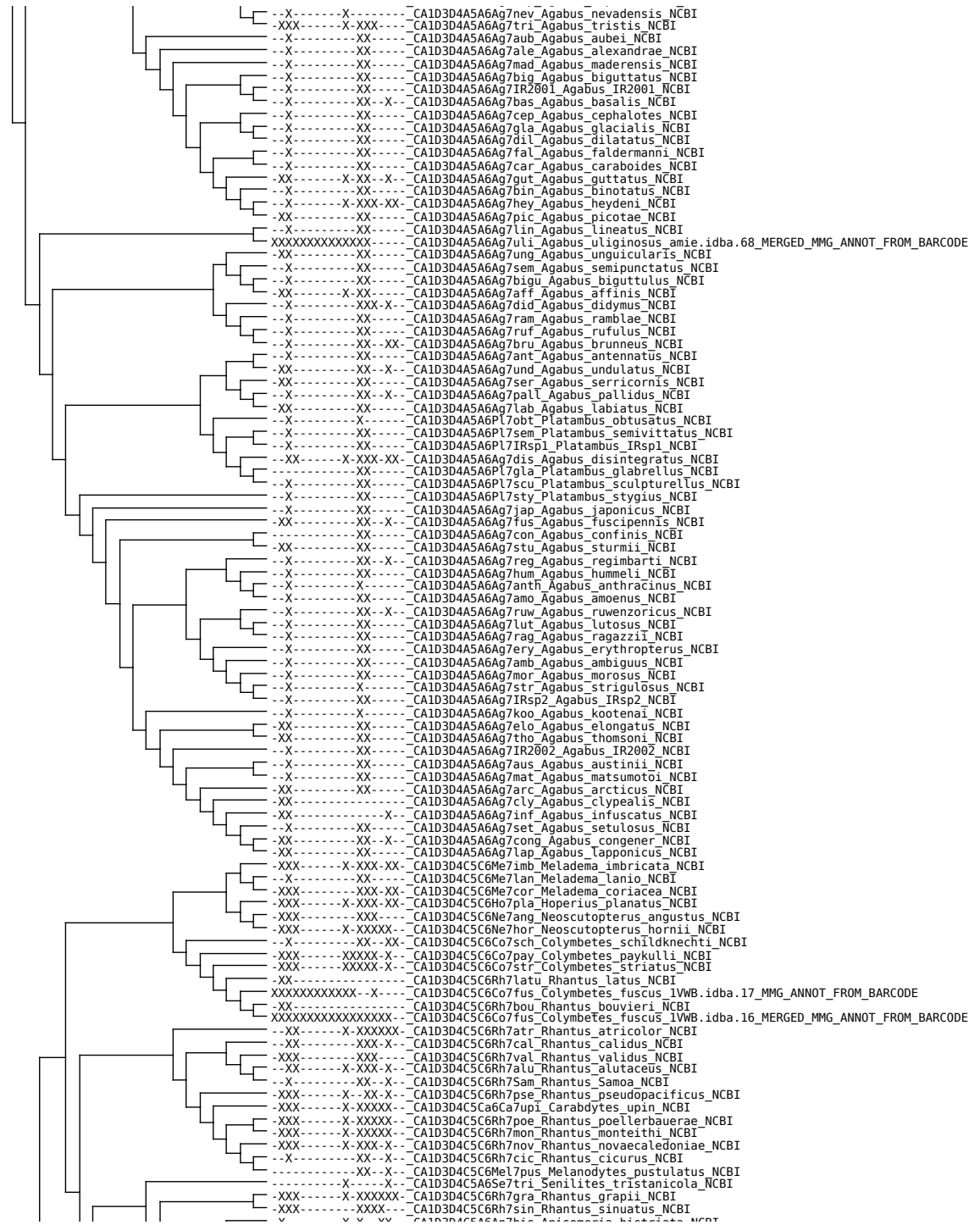
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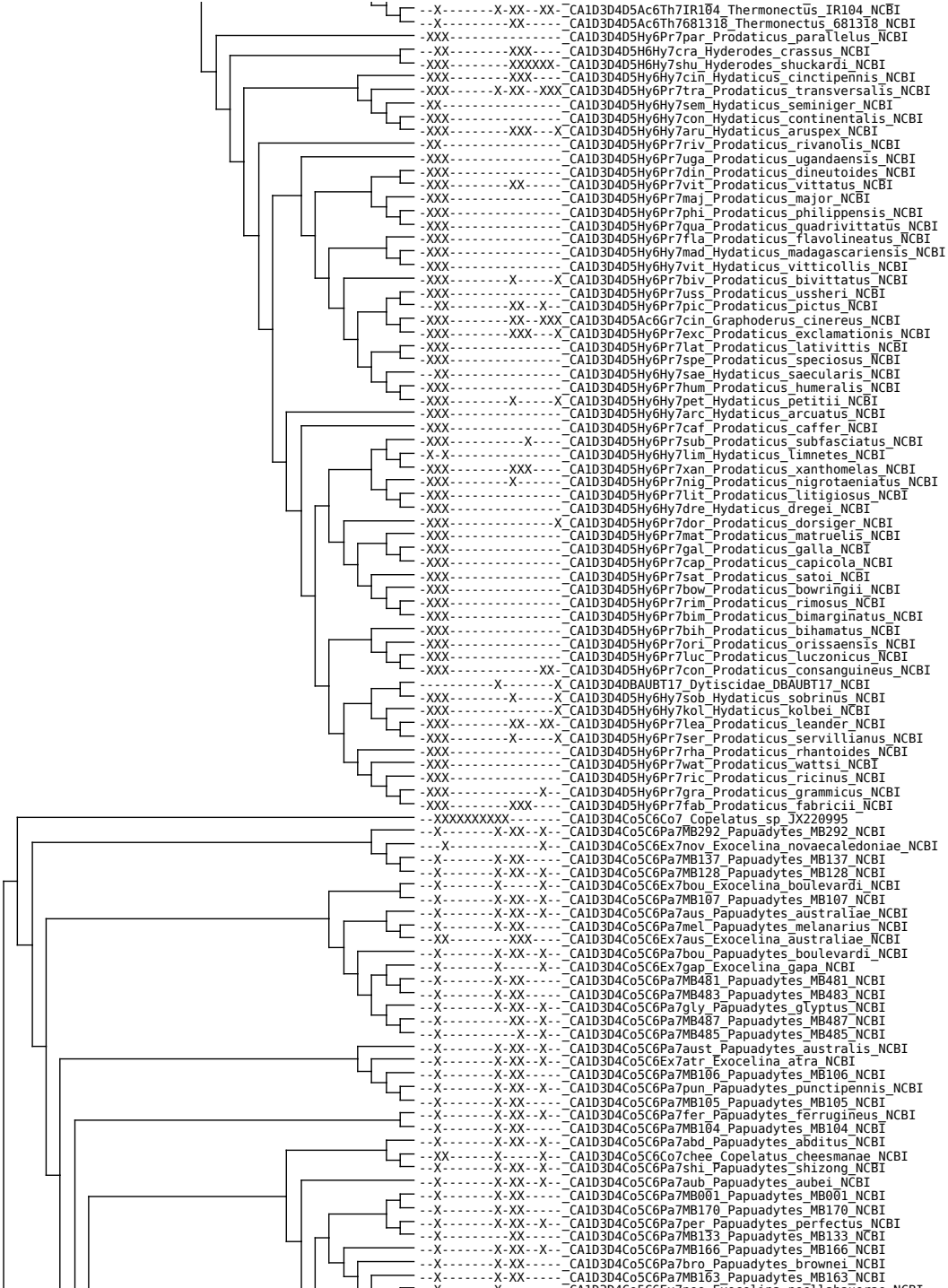
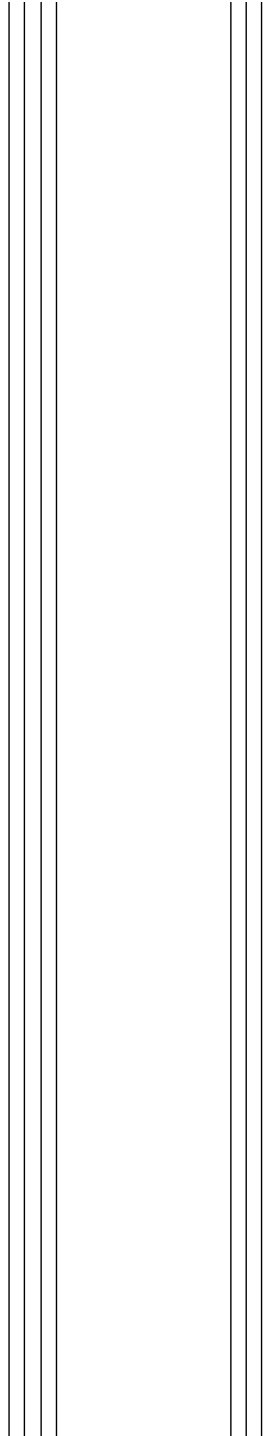
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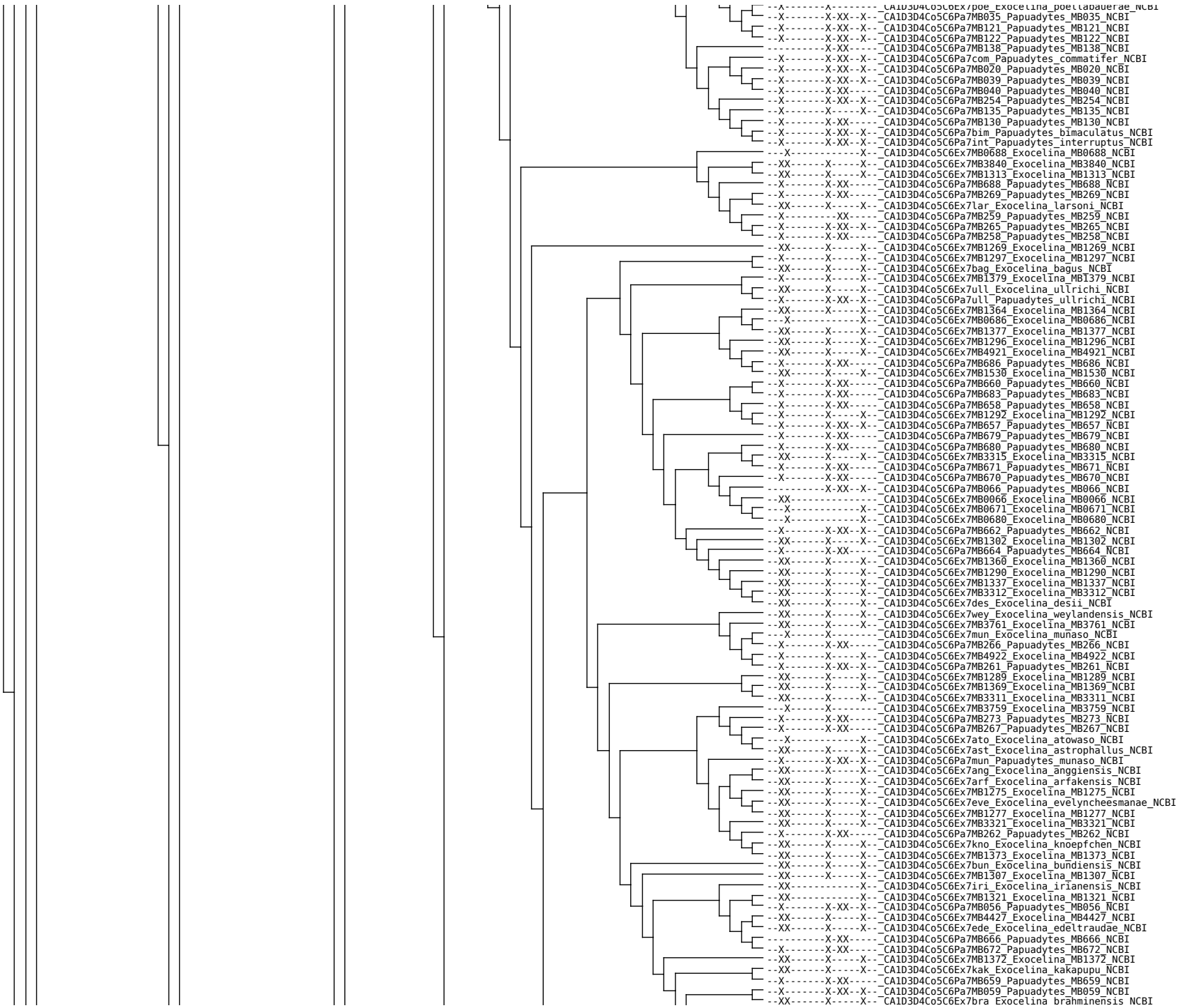




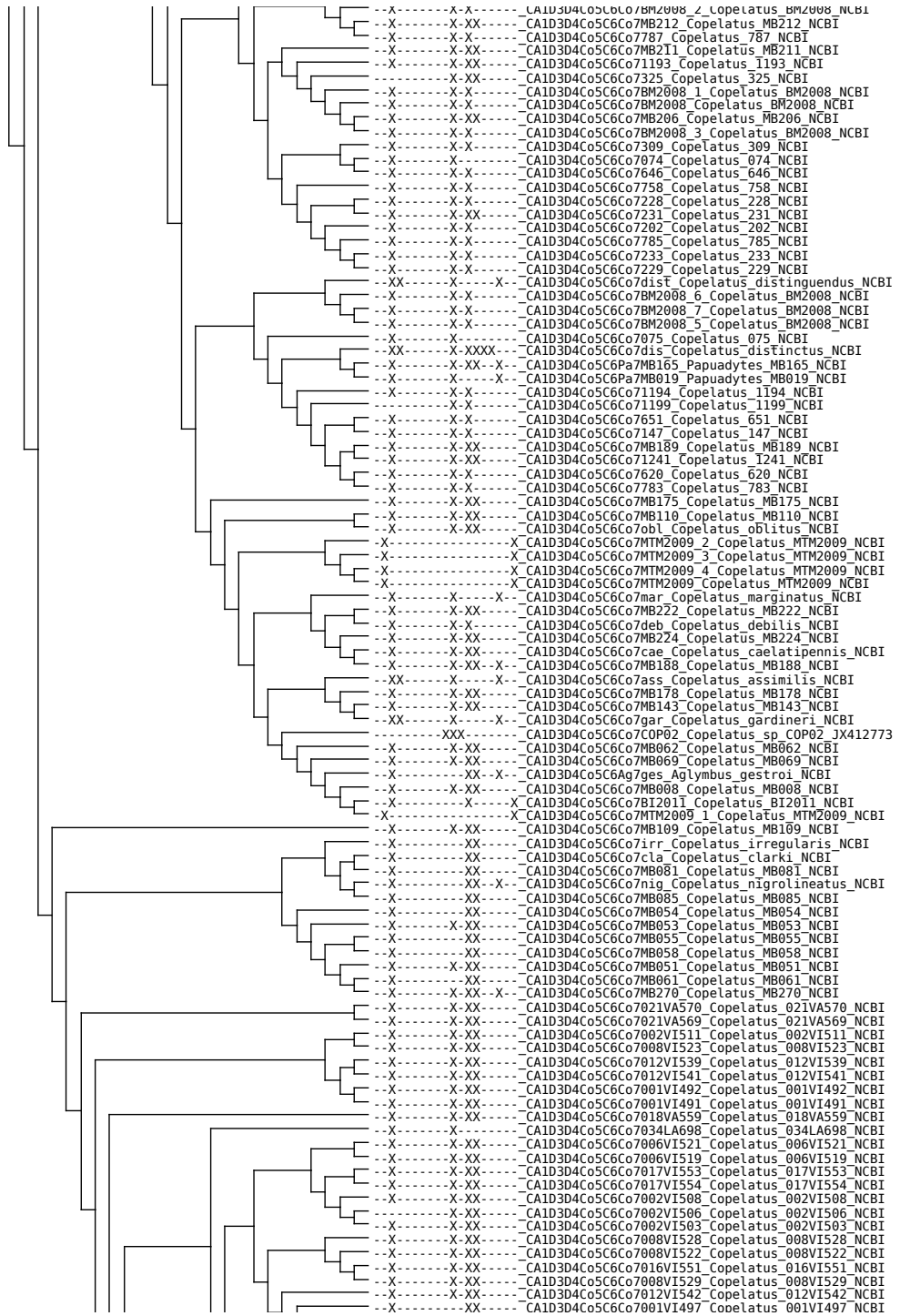
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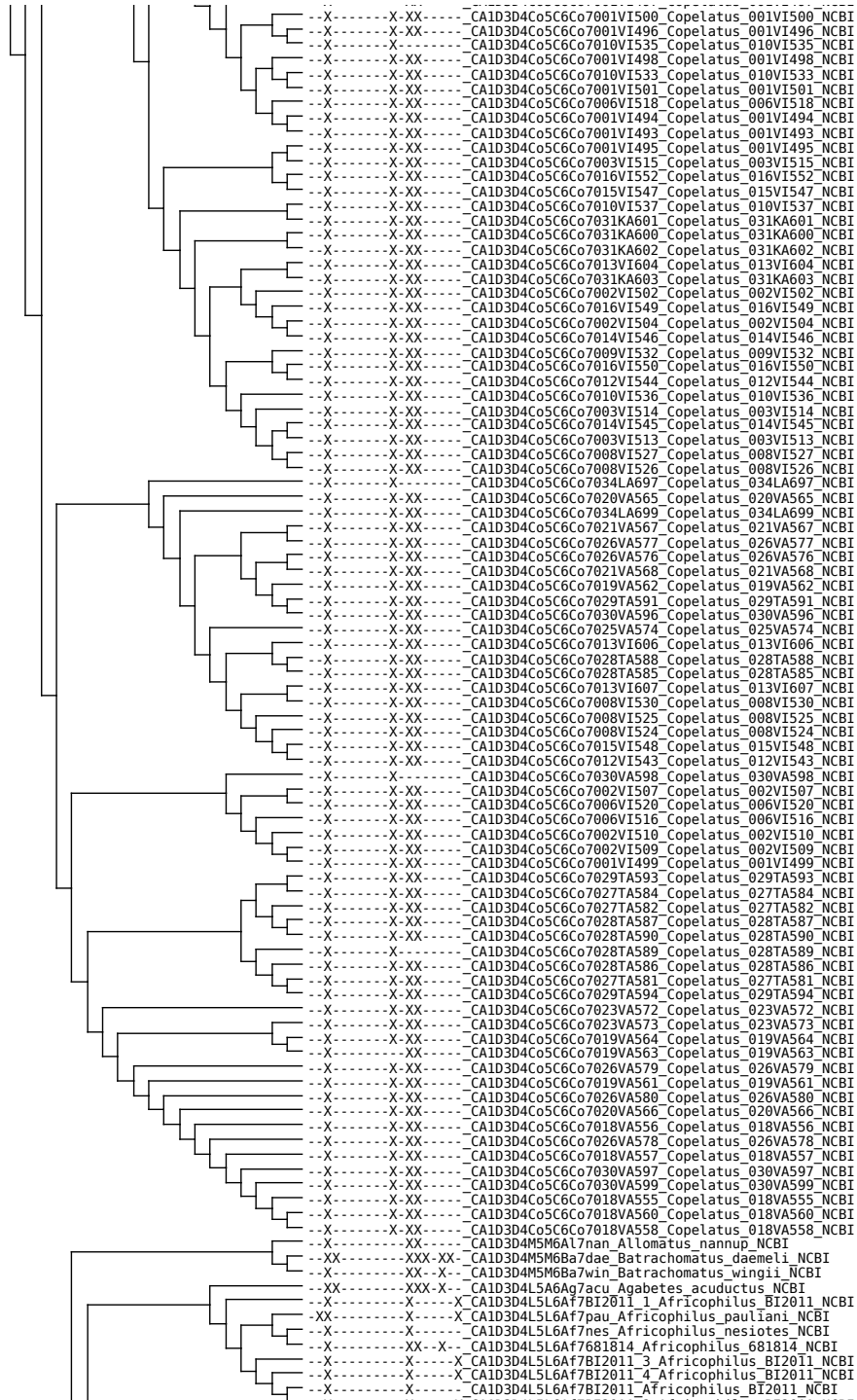
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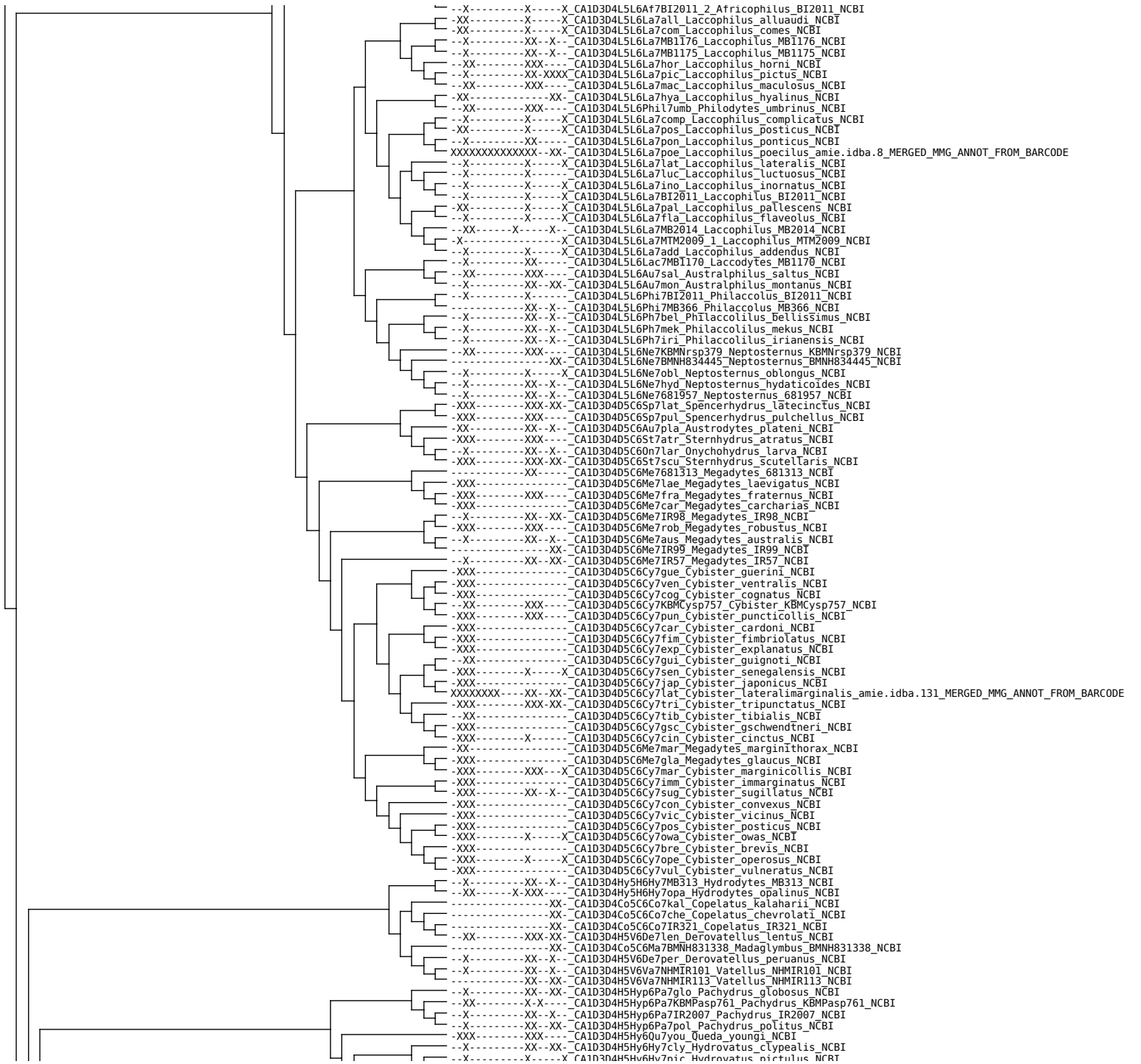




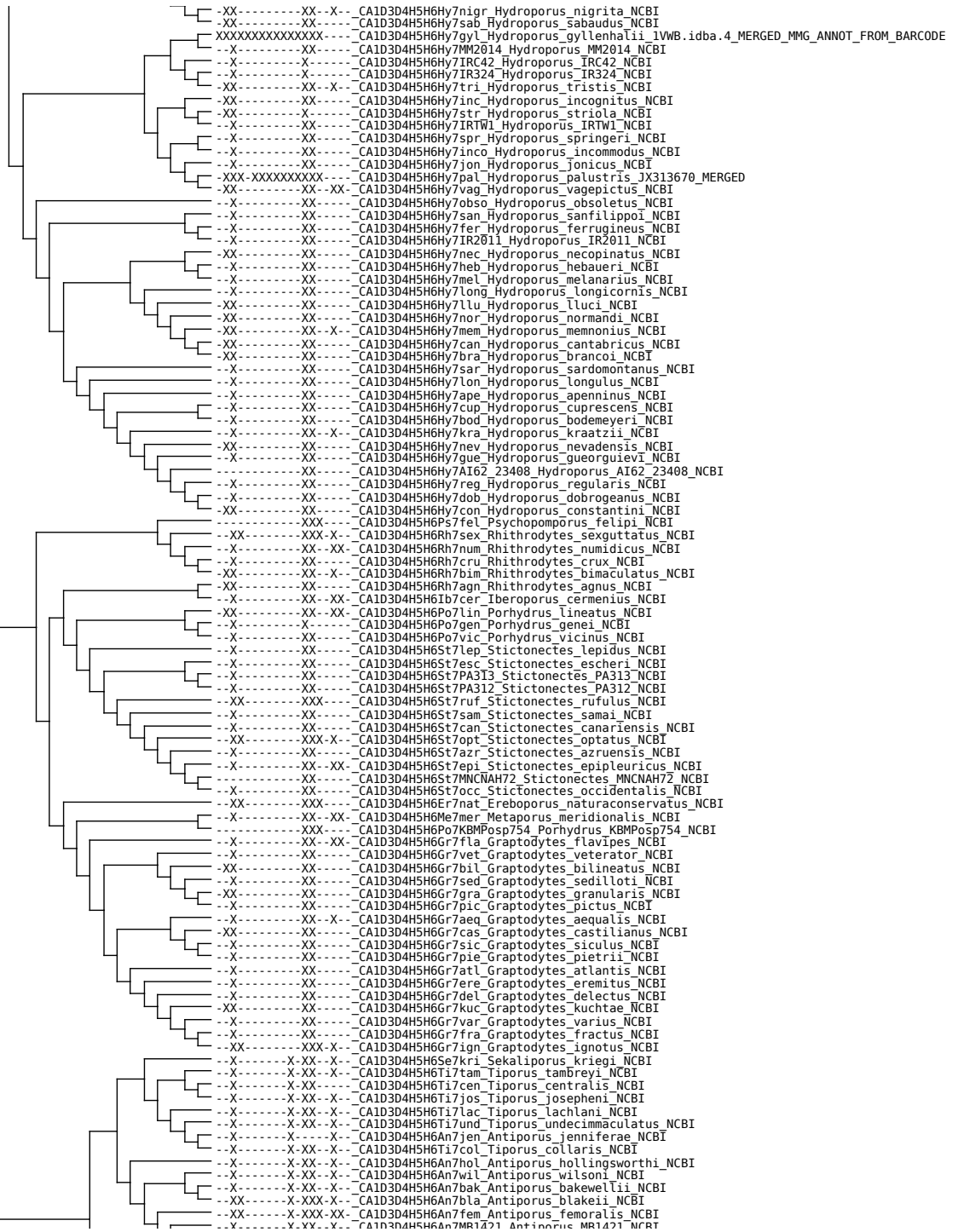


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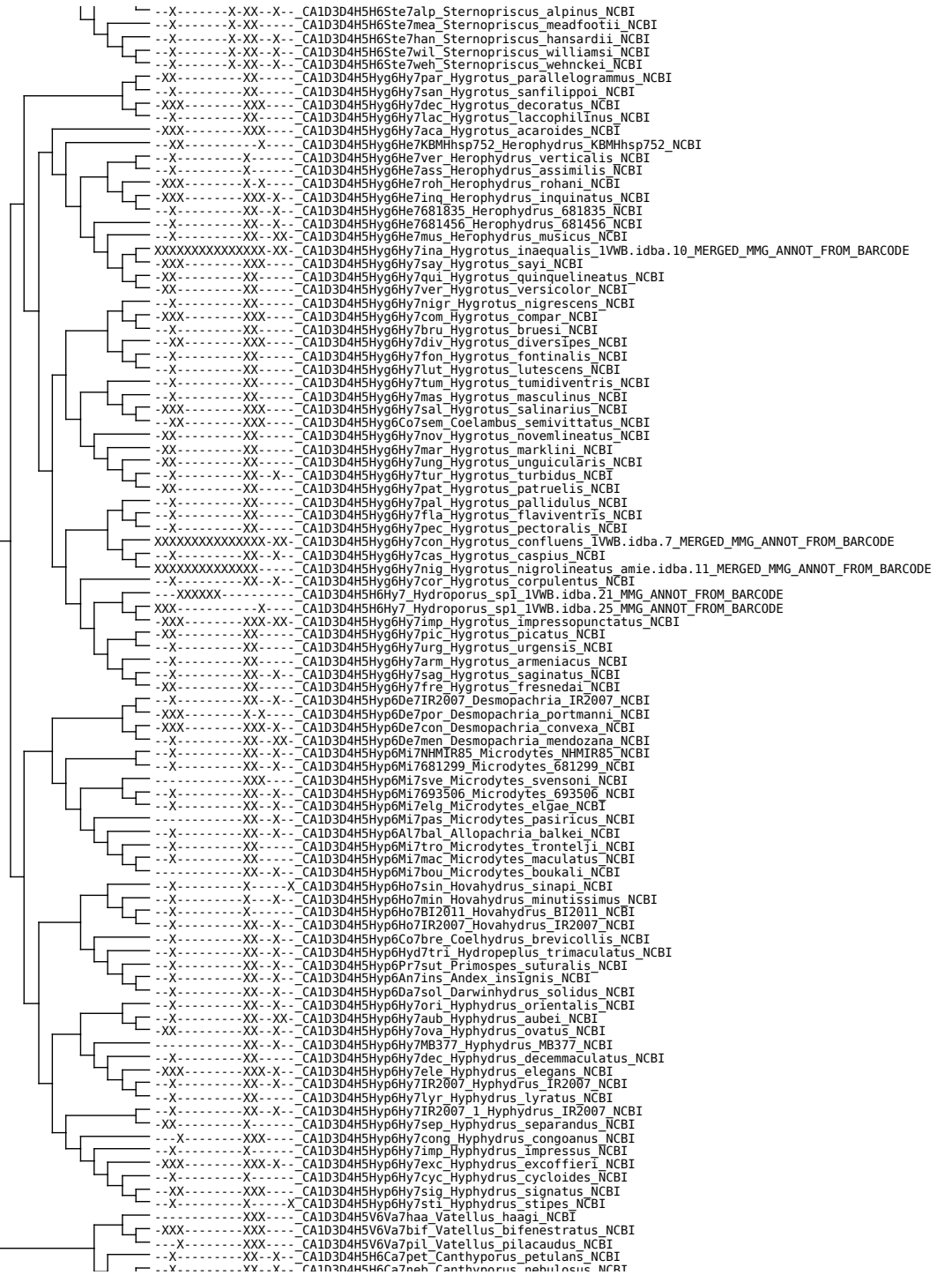




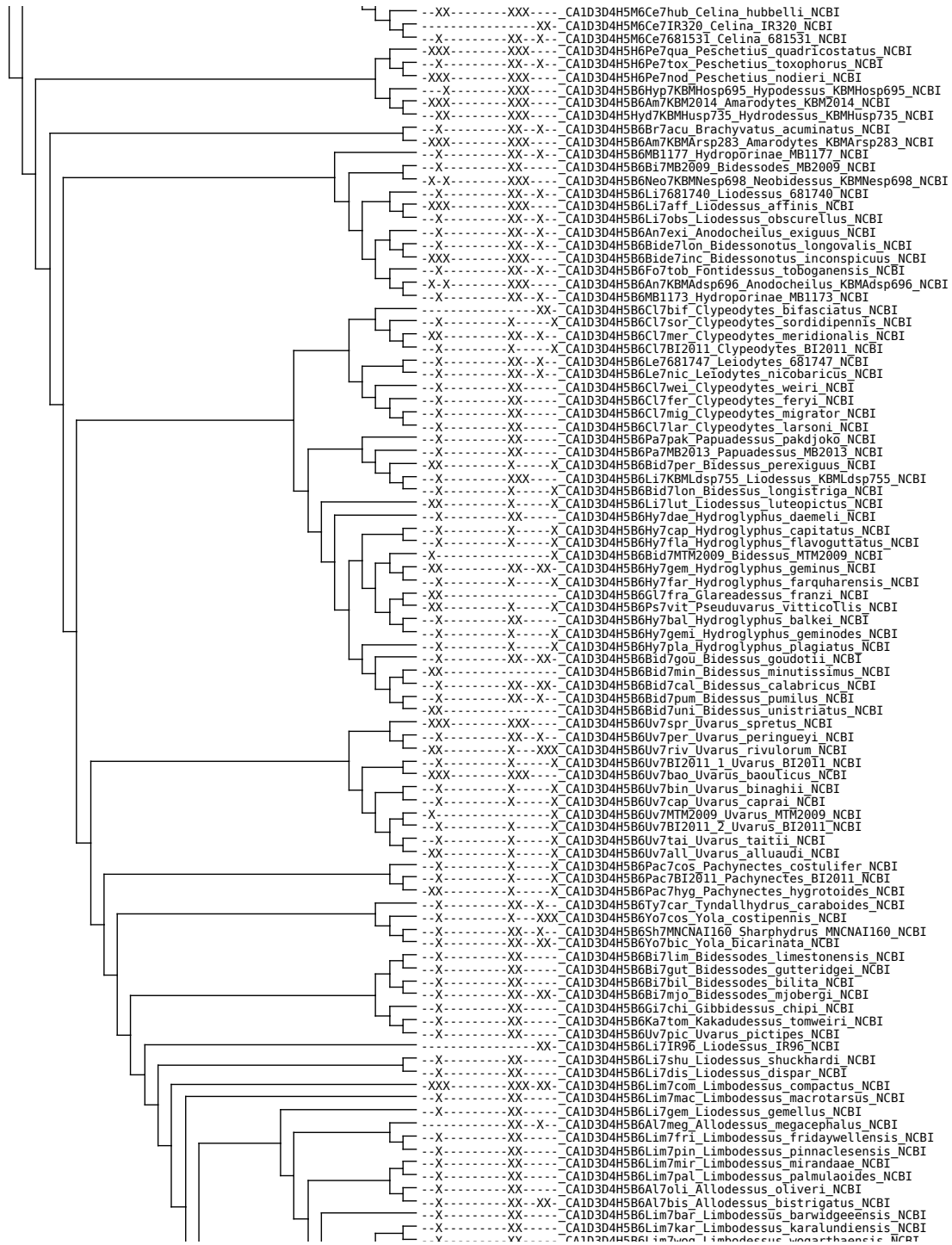
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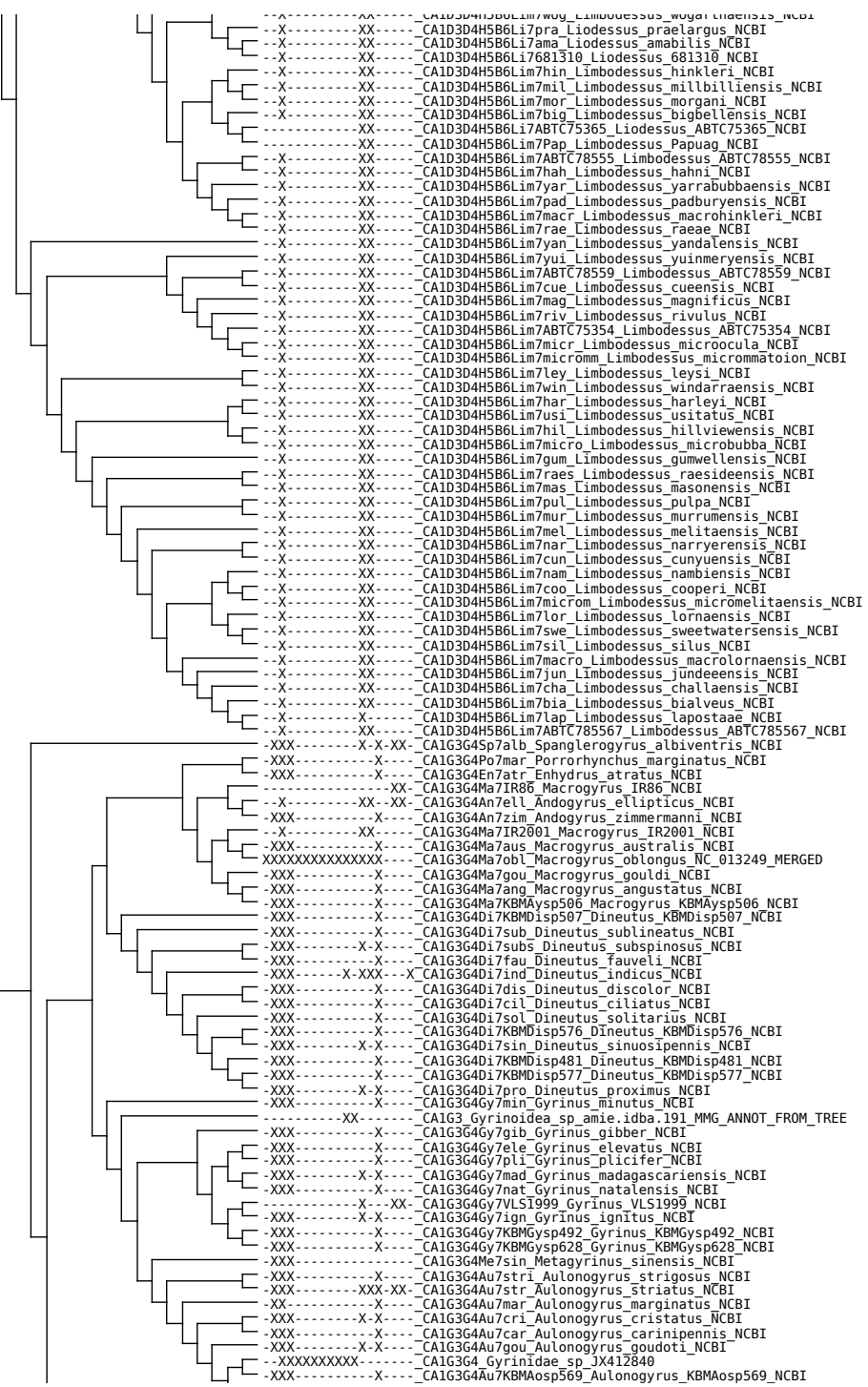


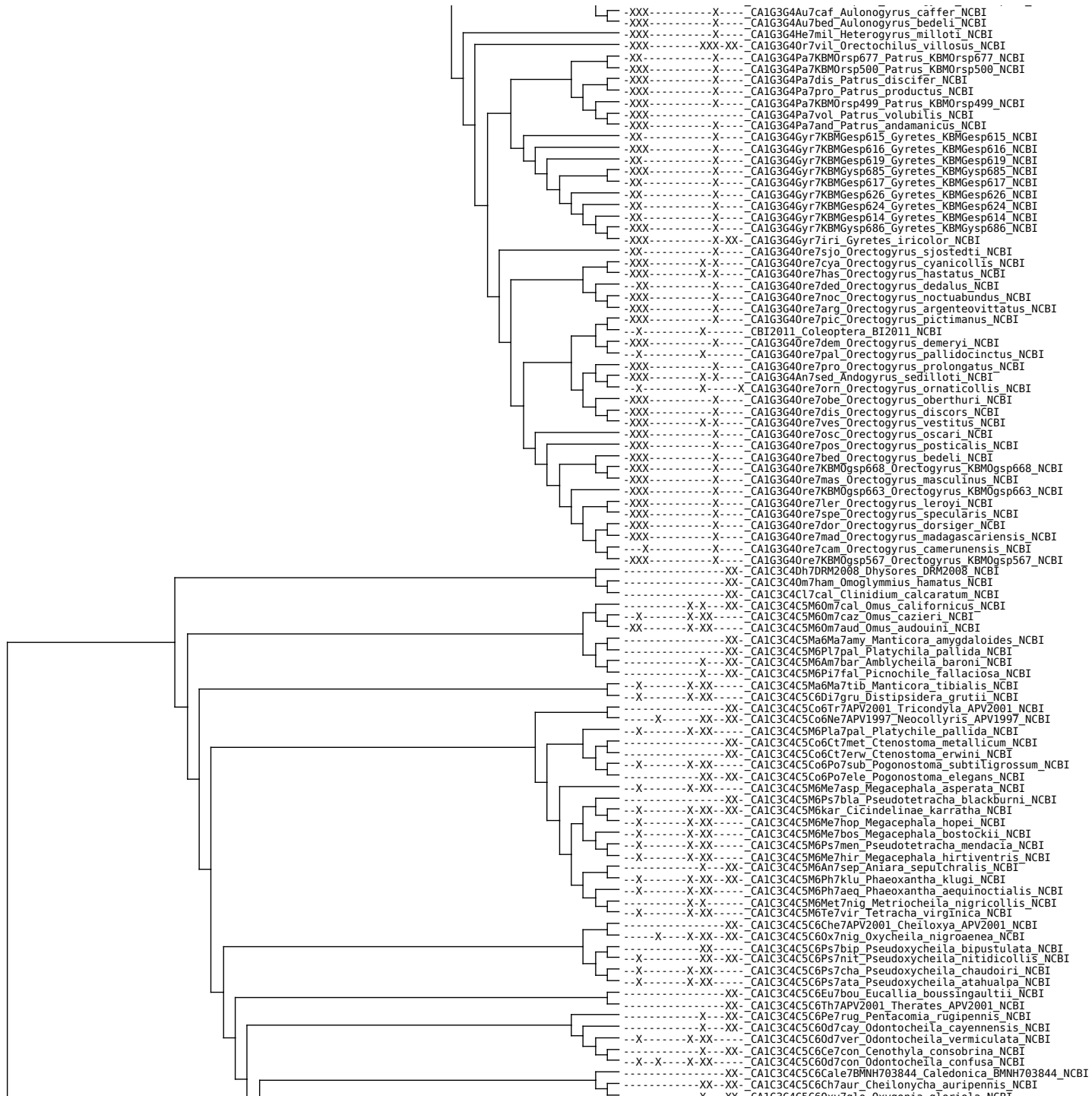
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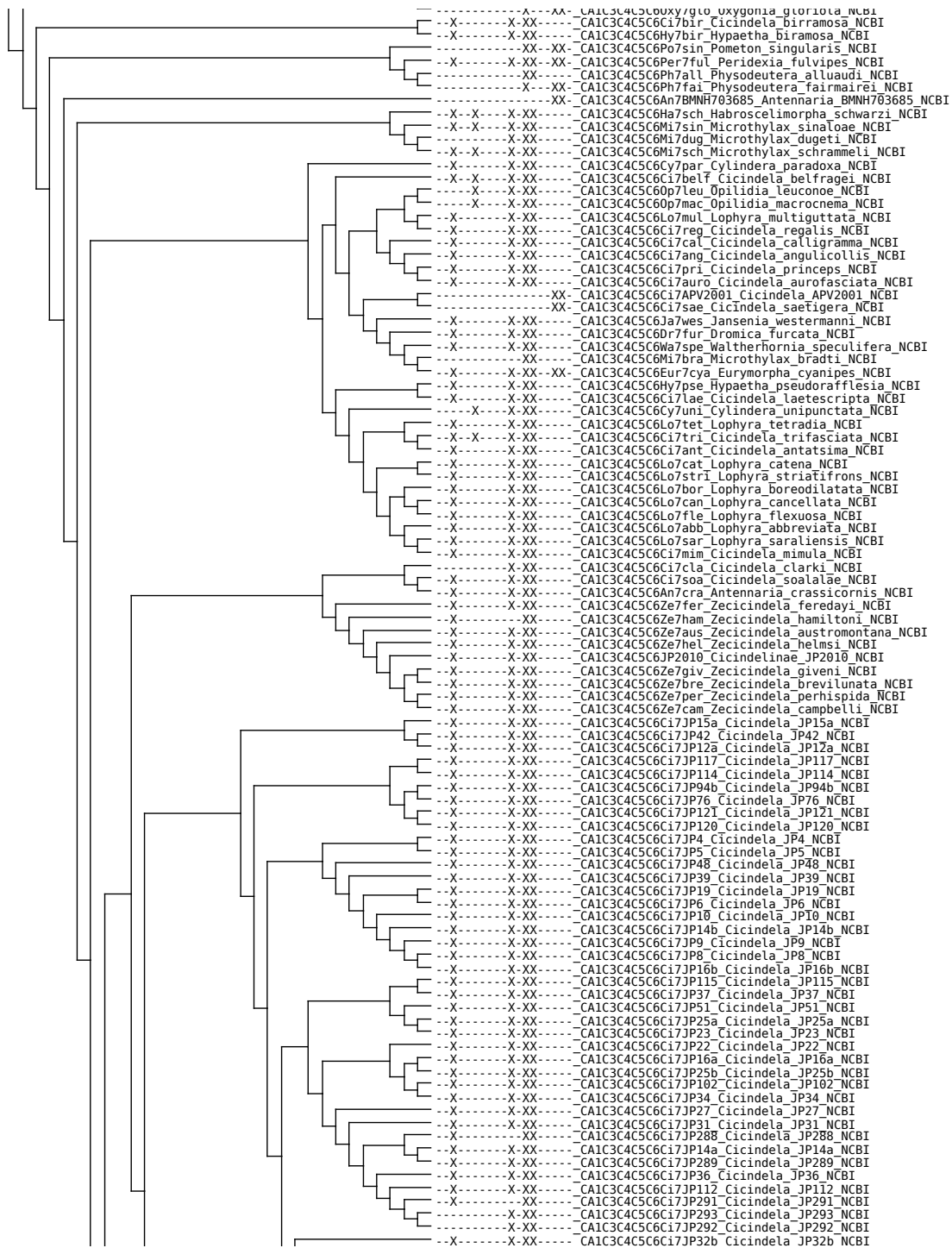


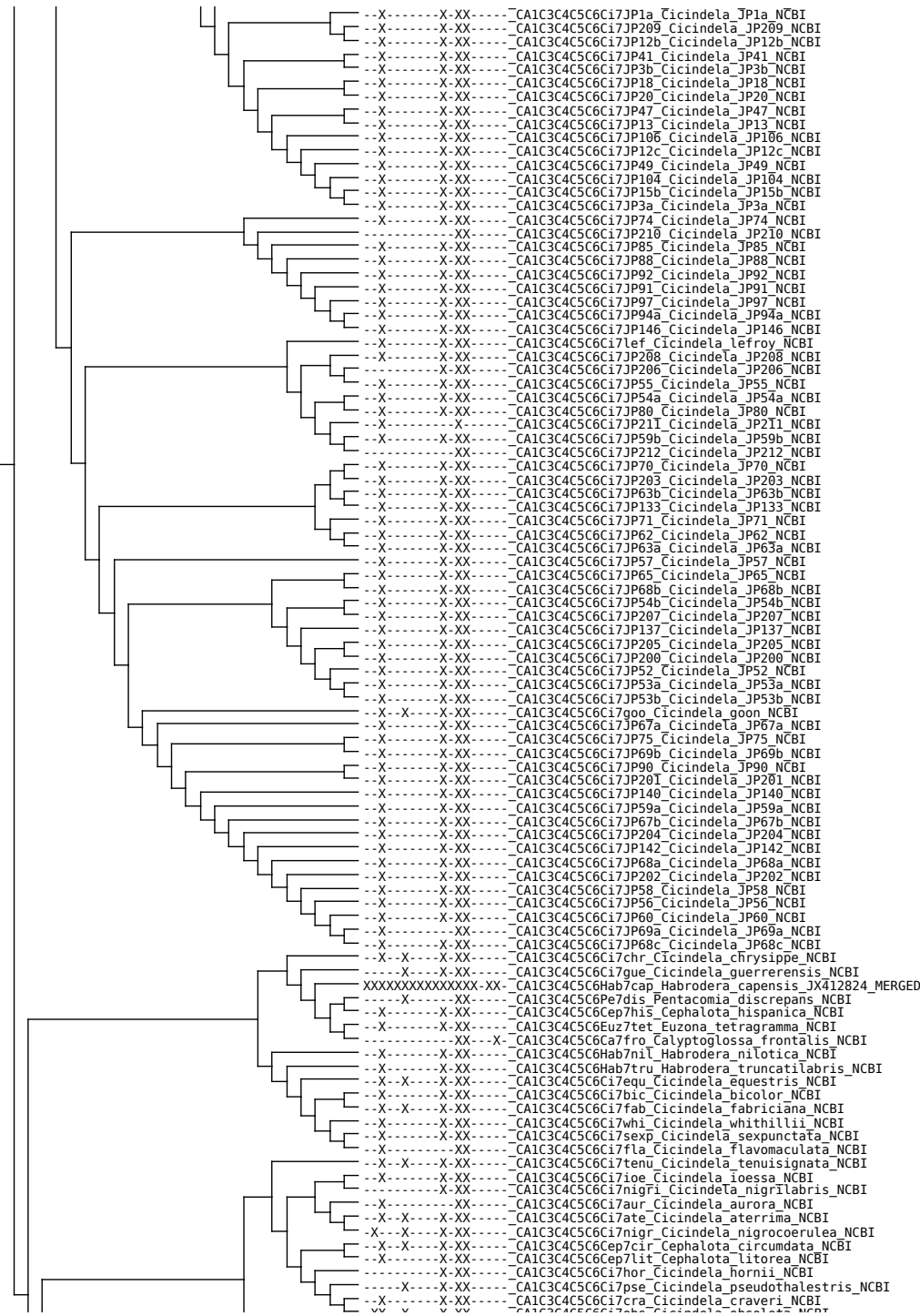
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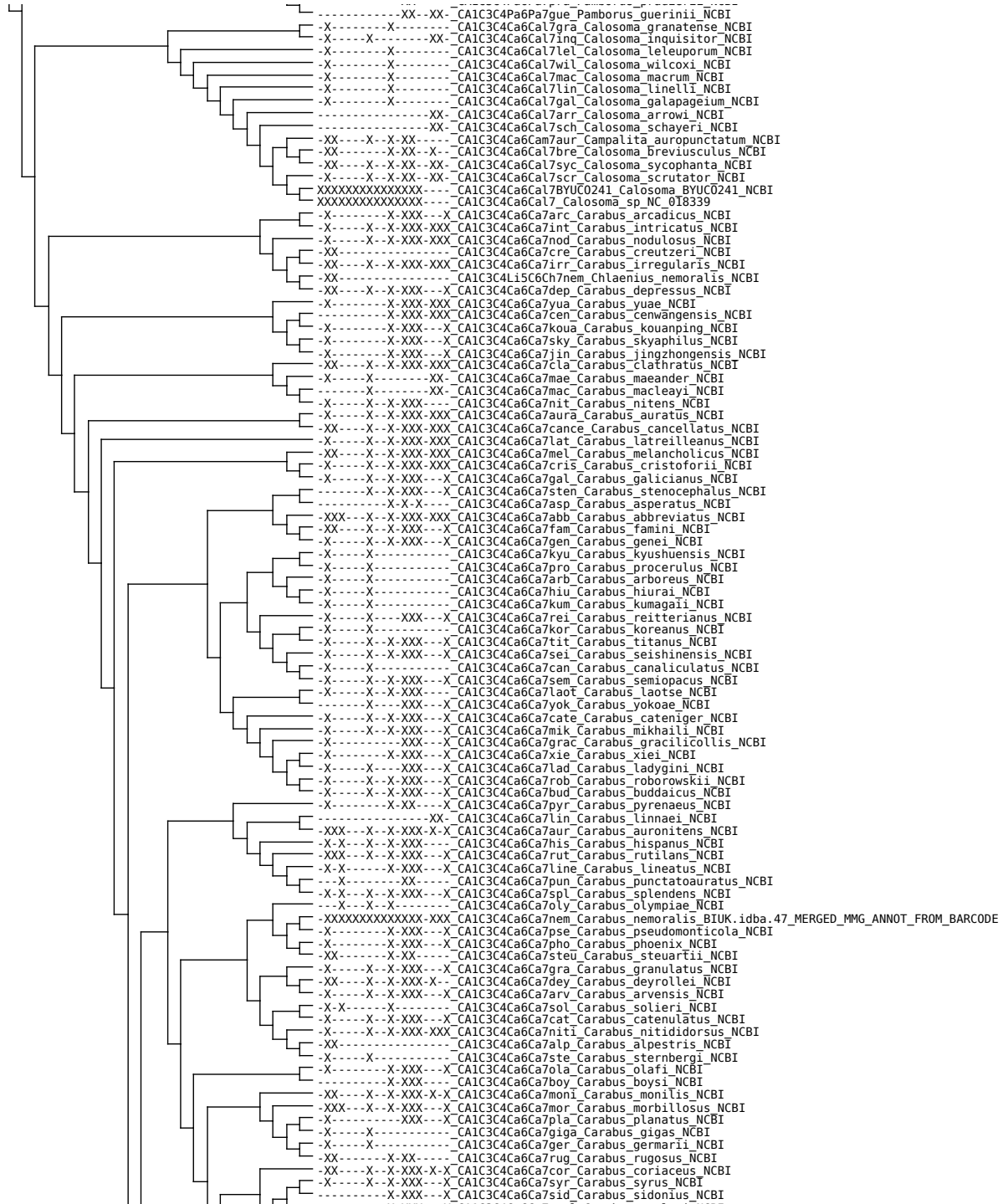




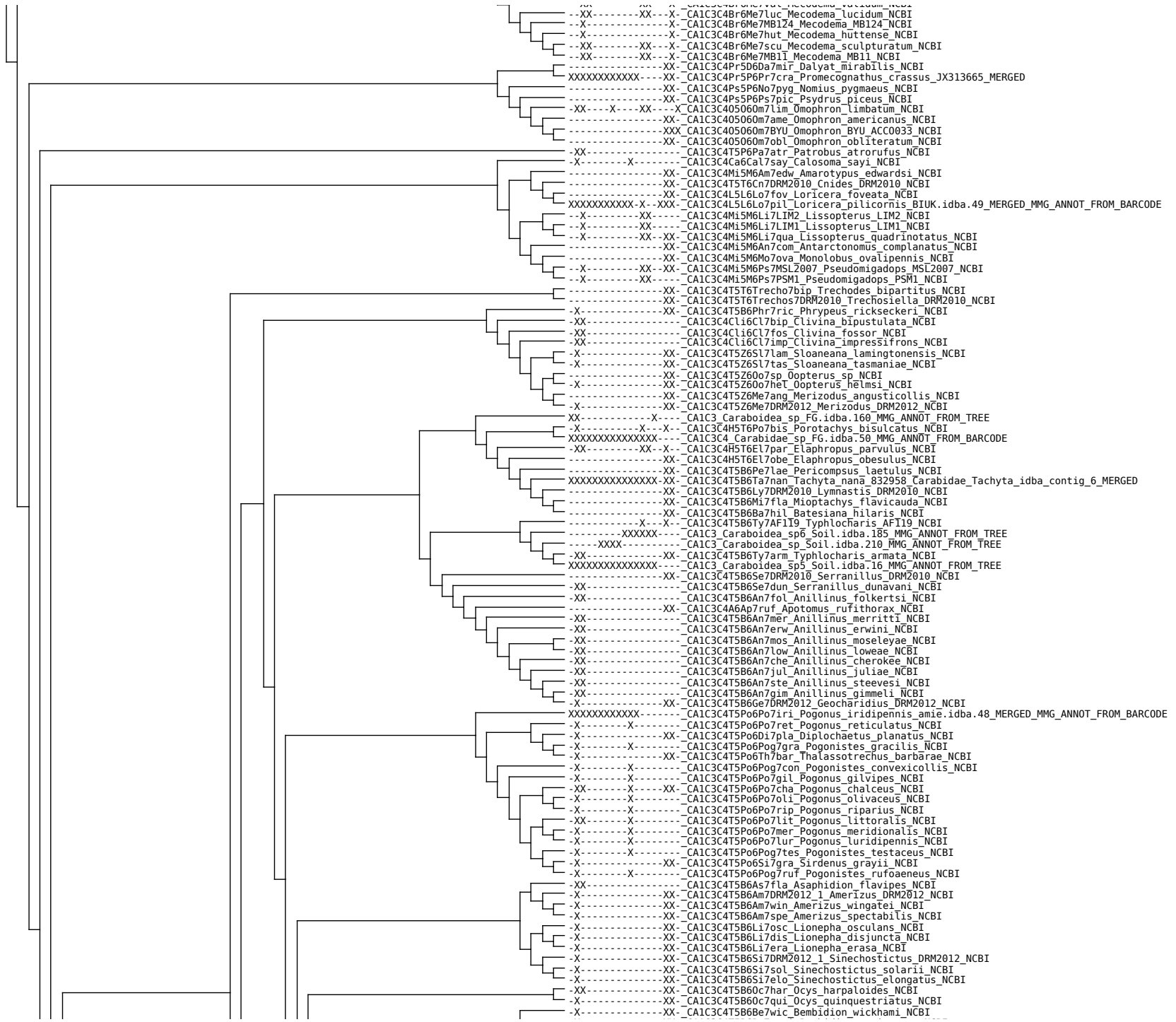
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Phylogenetic tree showing relationships between various species, with taxon names and accession numbers listed on the right side. The tree is rooted on the left and branches out to the right. The species names are listed in a column on the right, with their corresponding accession numbers and some additional identifiers. The tree shows a complex branching pattern, indicating the evolutionary relationships between these species. The species names are listed in a column on the right, with their corresponding accession numbers and some additional identifiers. The tree shows a complex branching pattern, indicating the evolutionary relationships between these species.

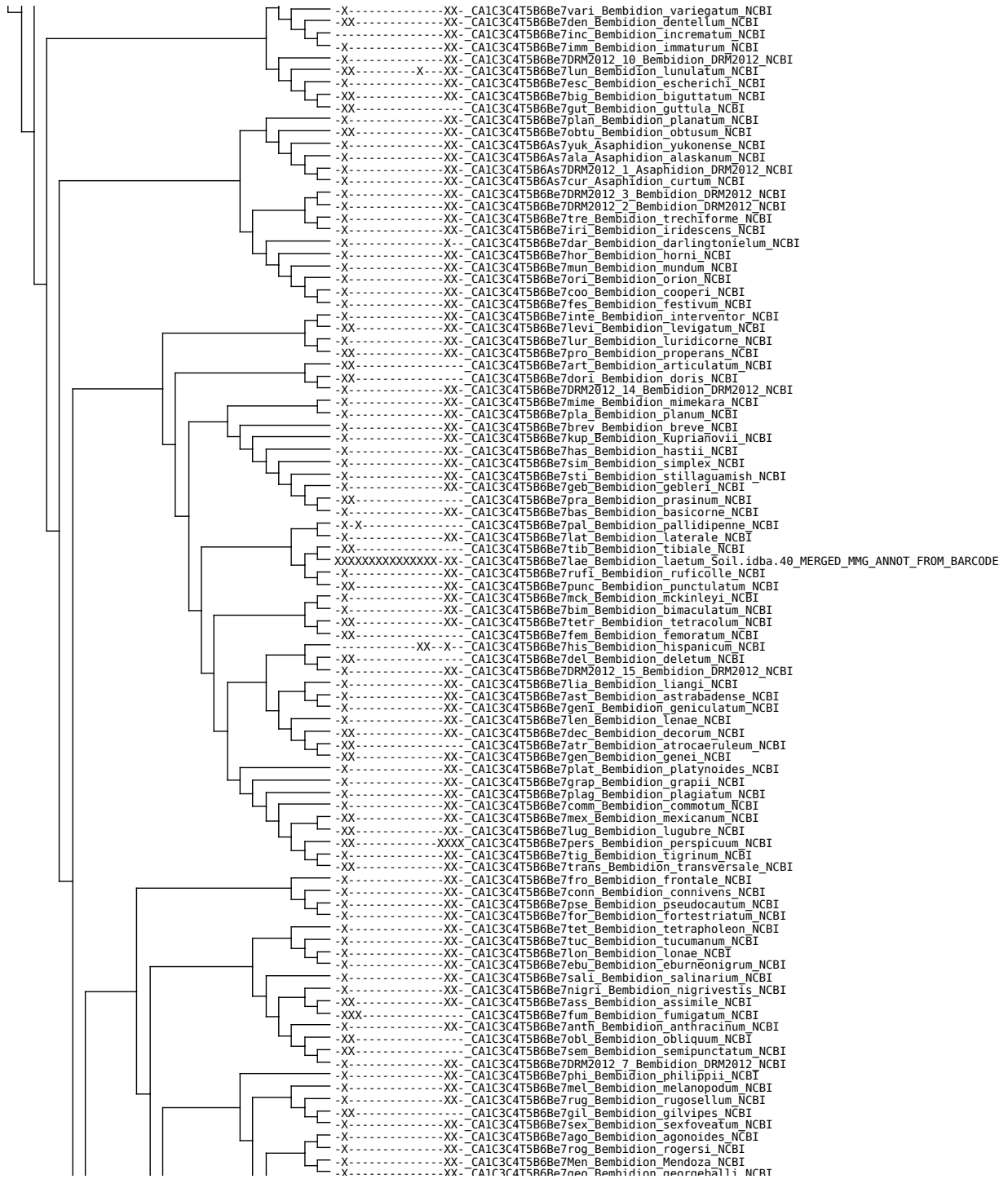
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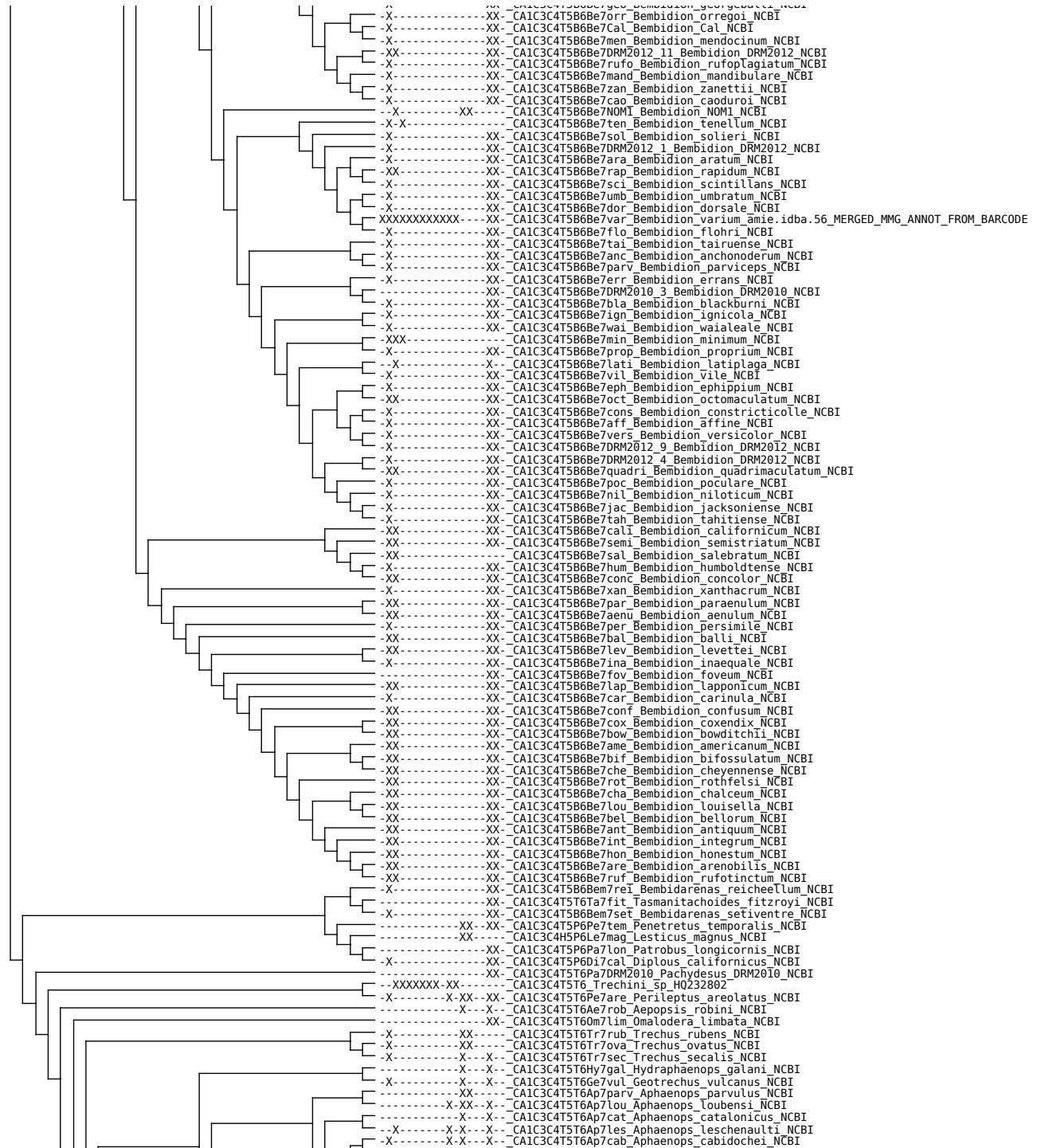




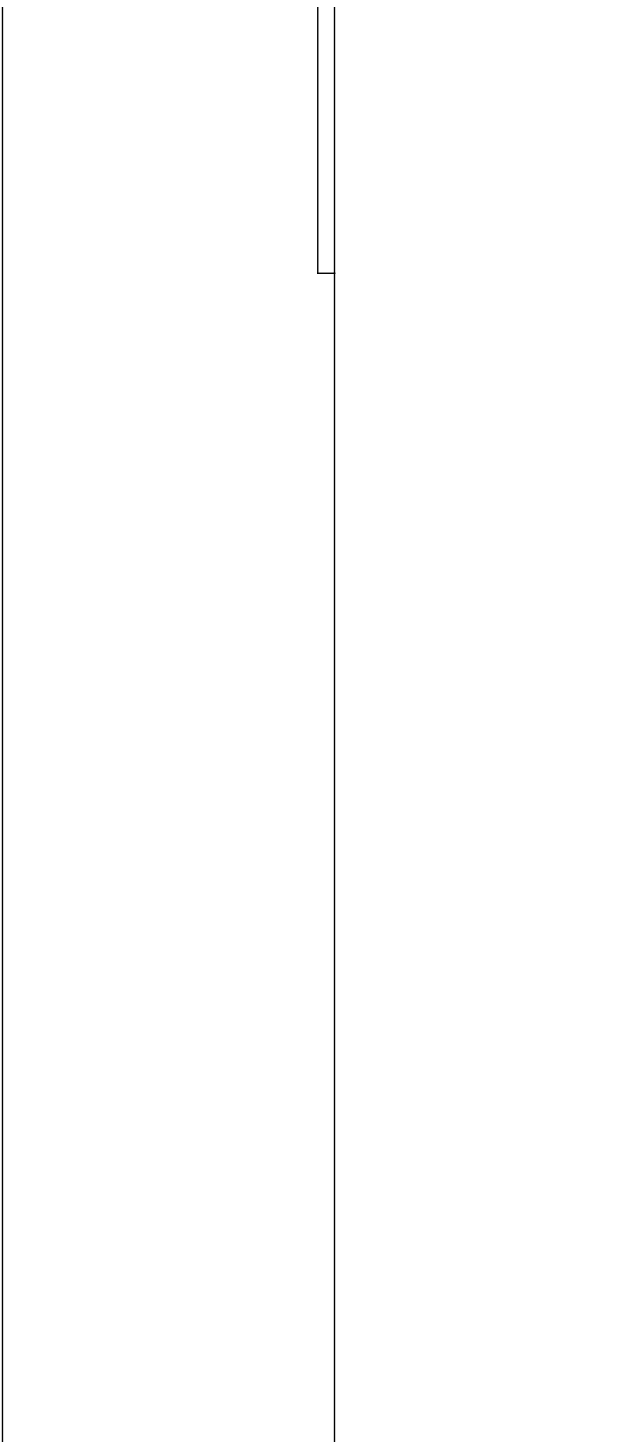
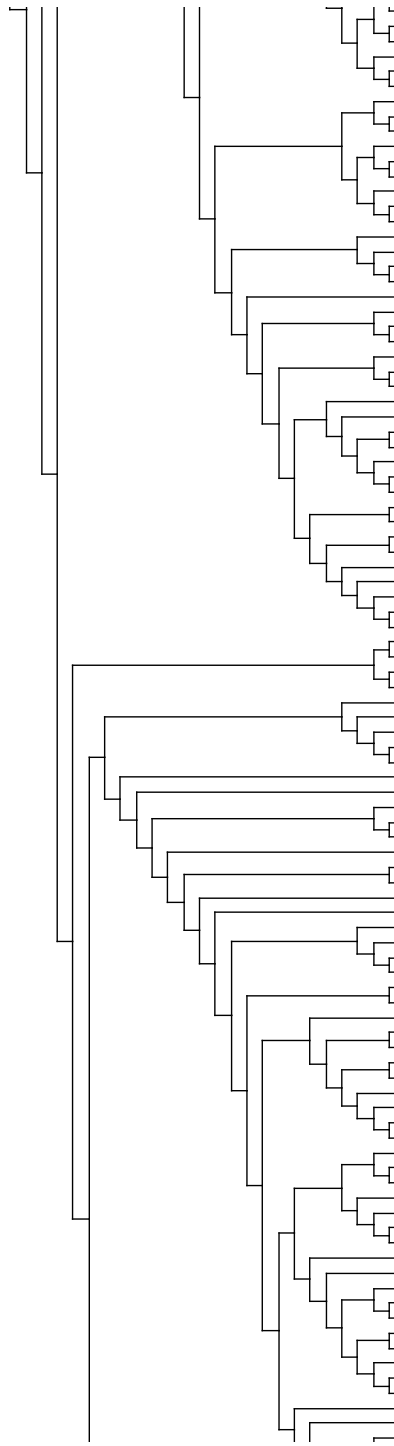


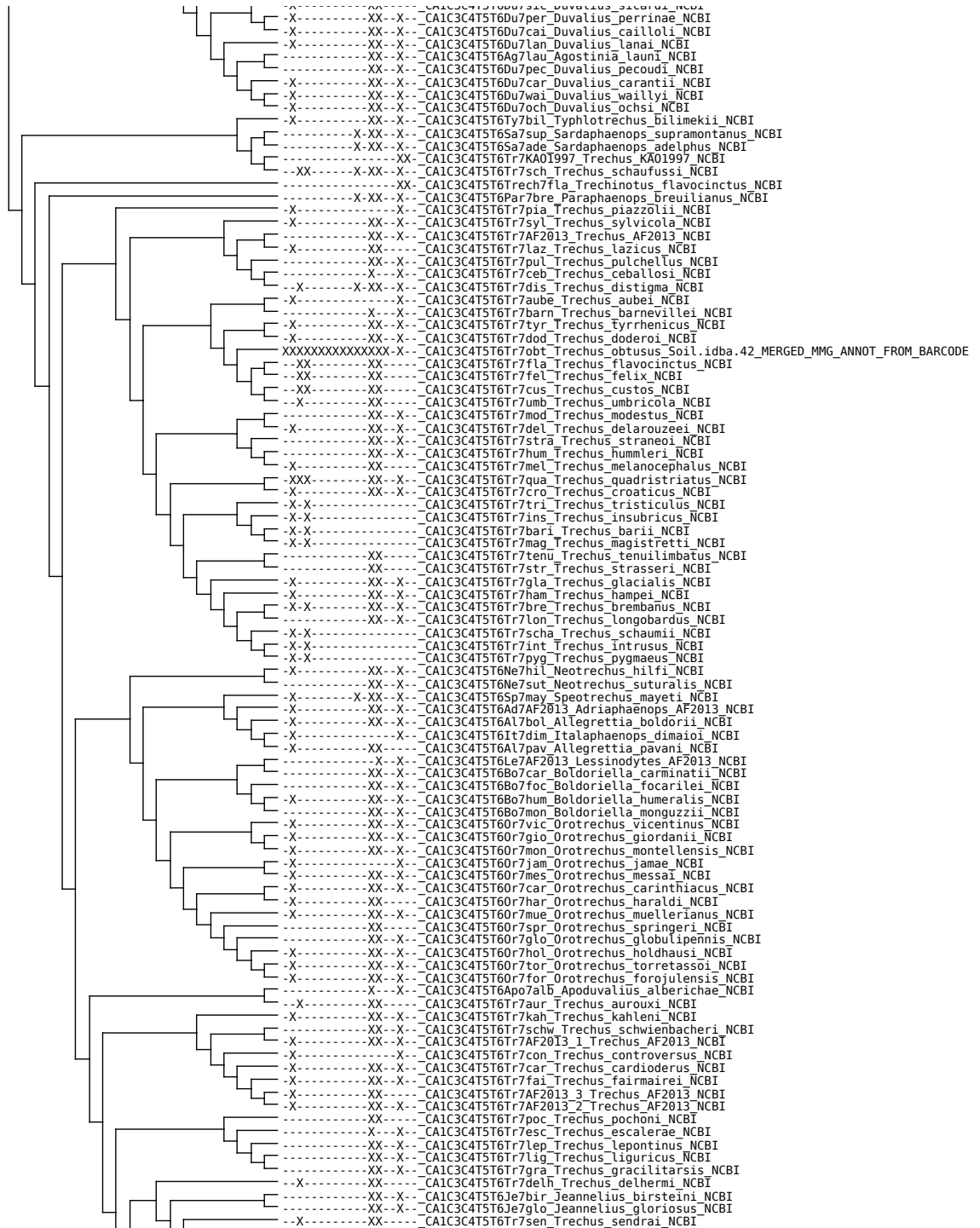
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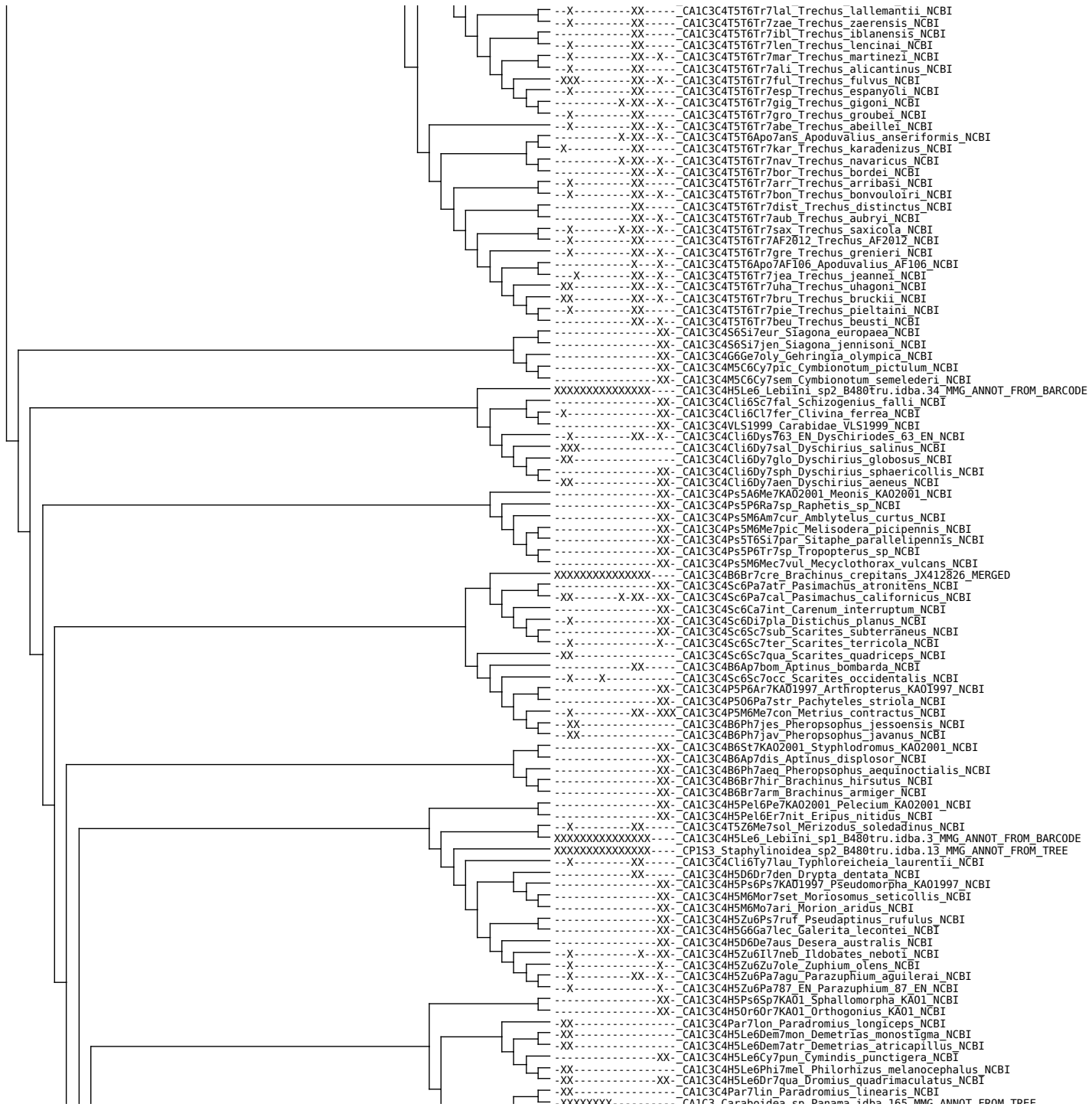




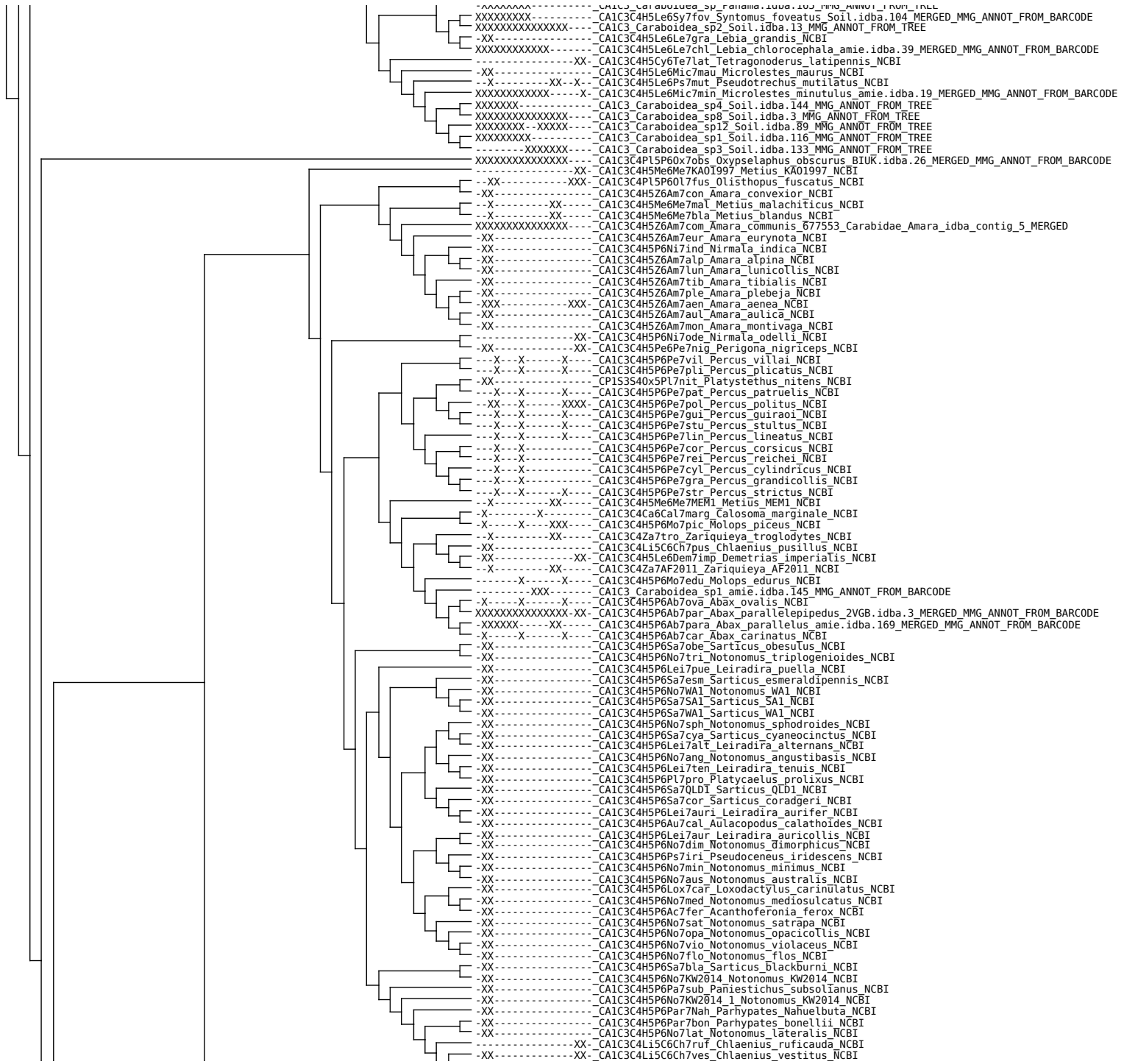
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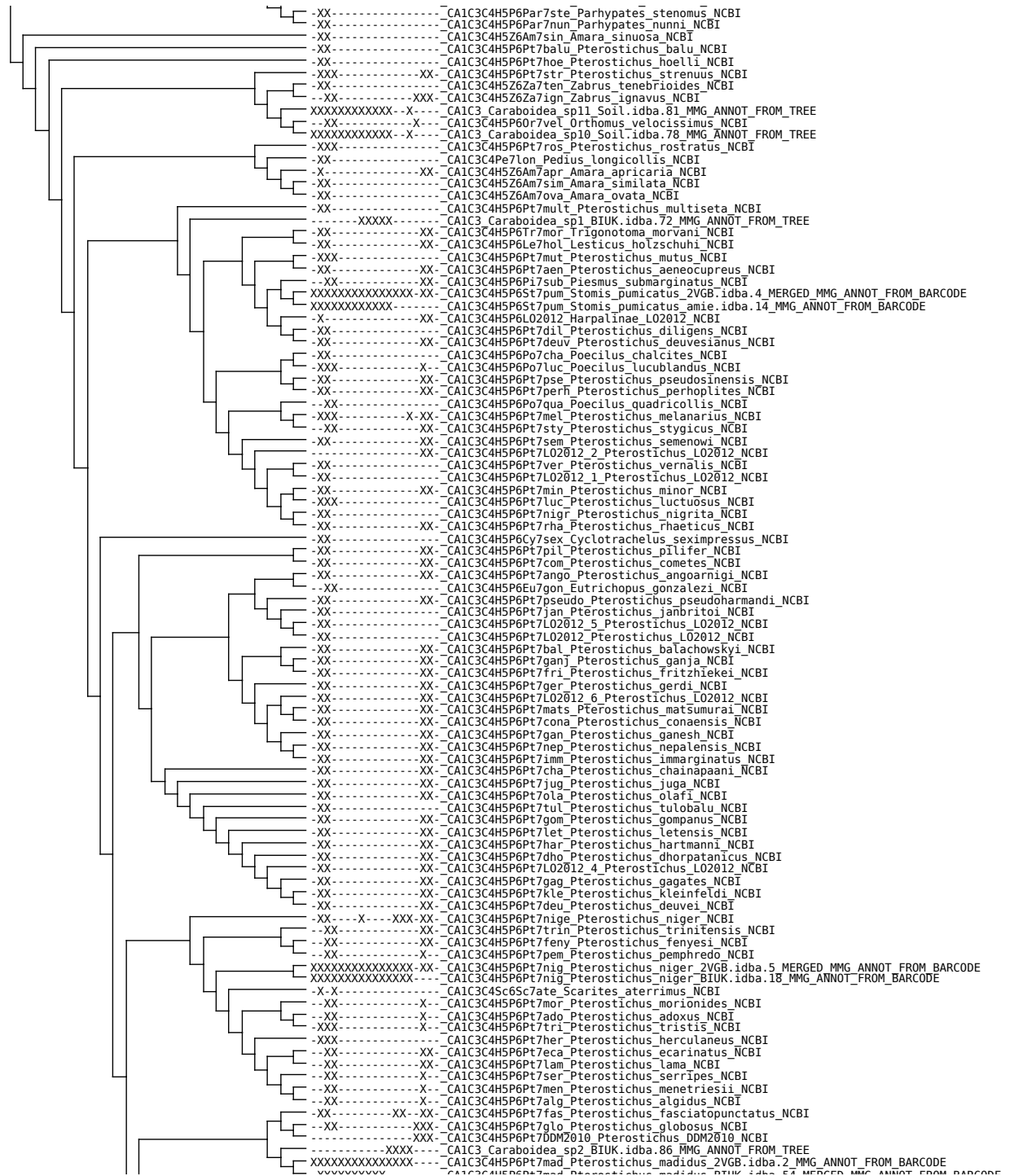


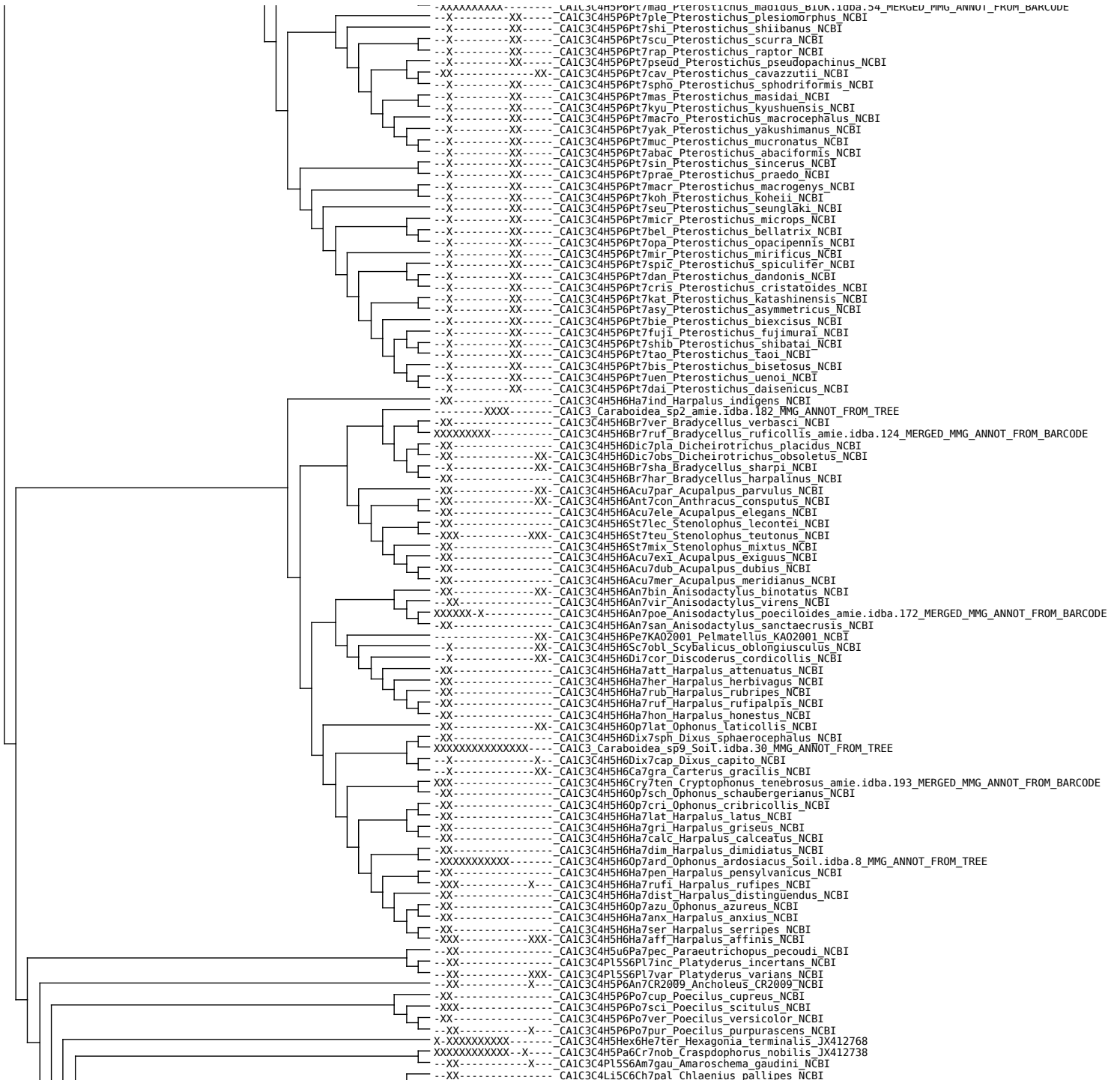


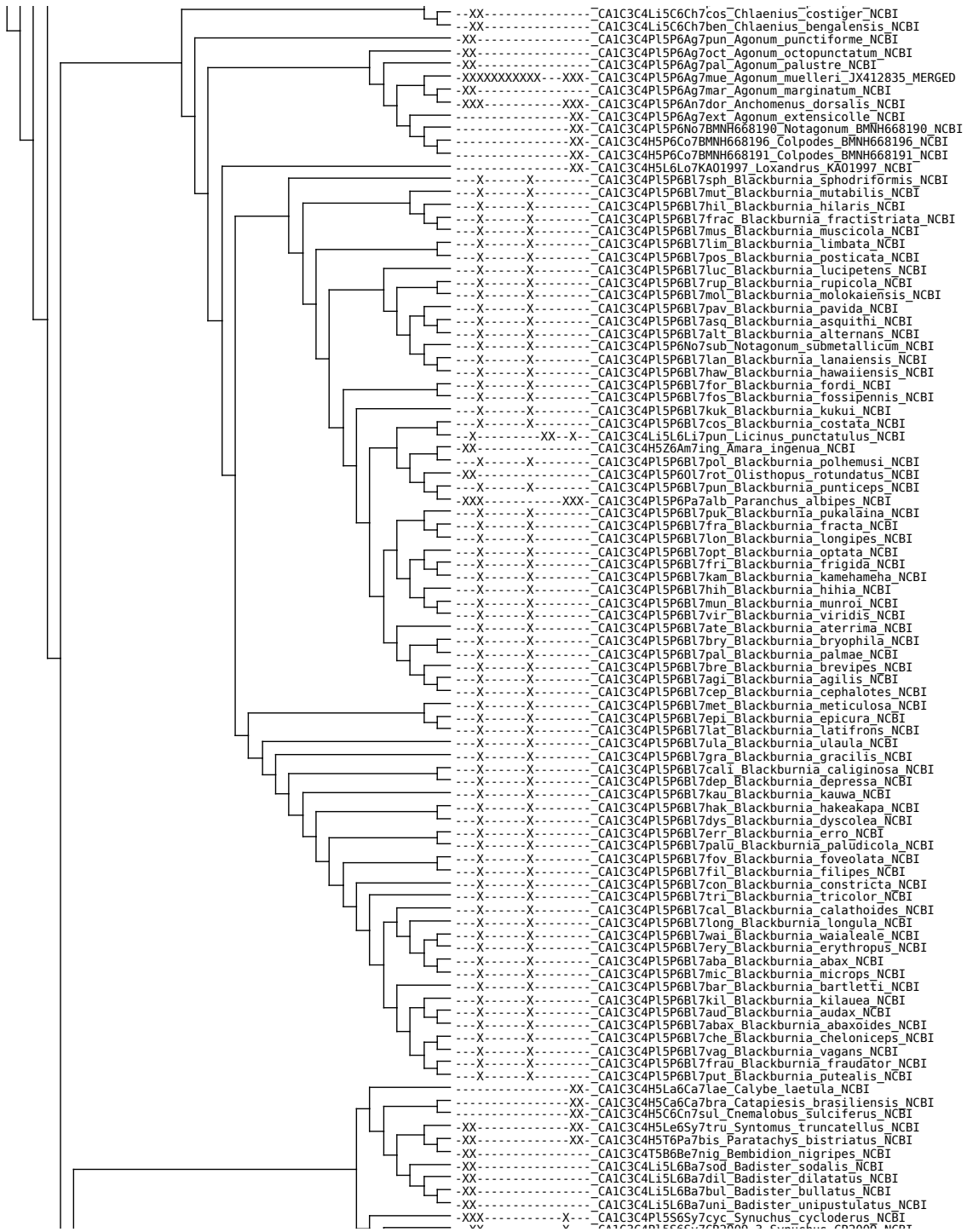


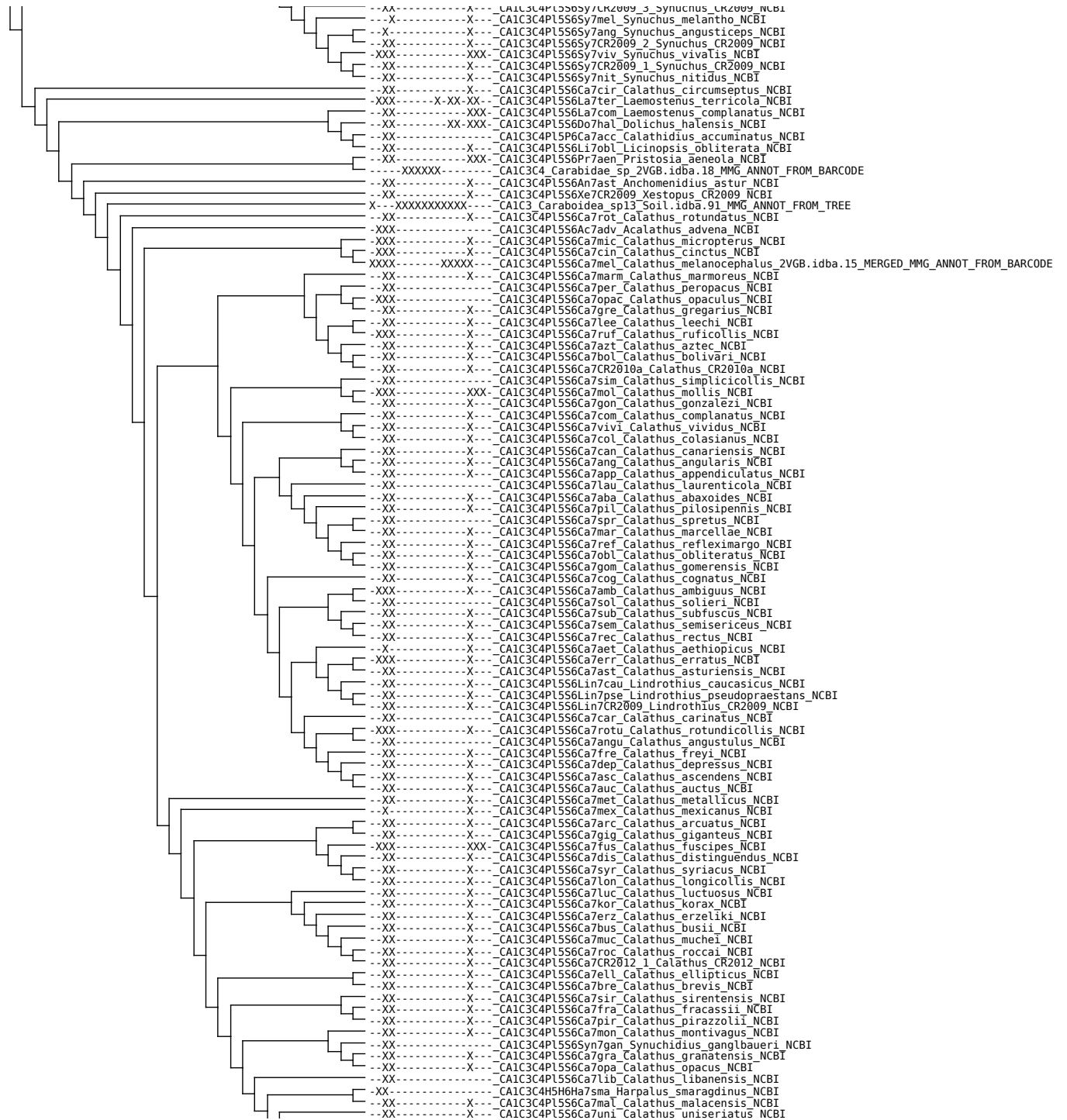
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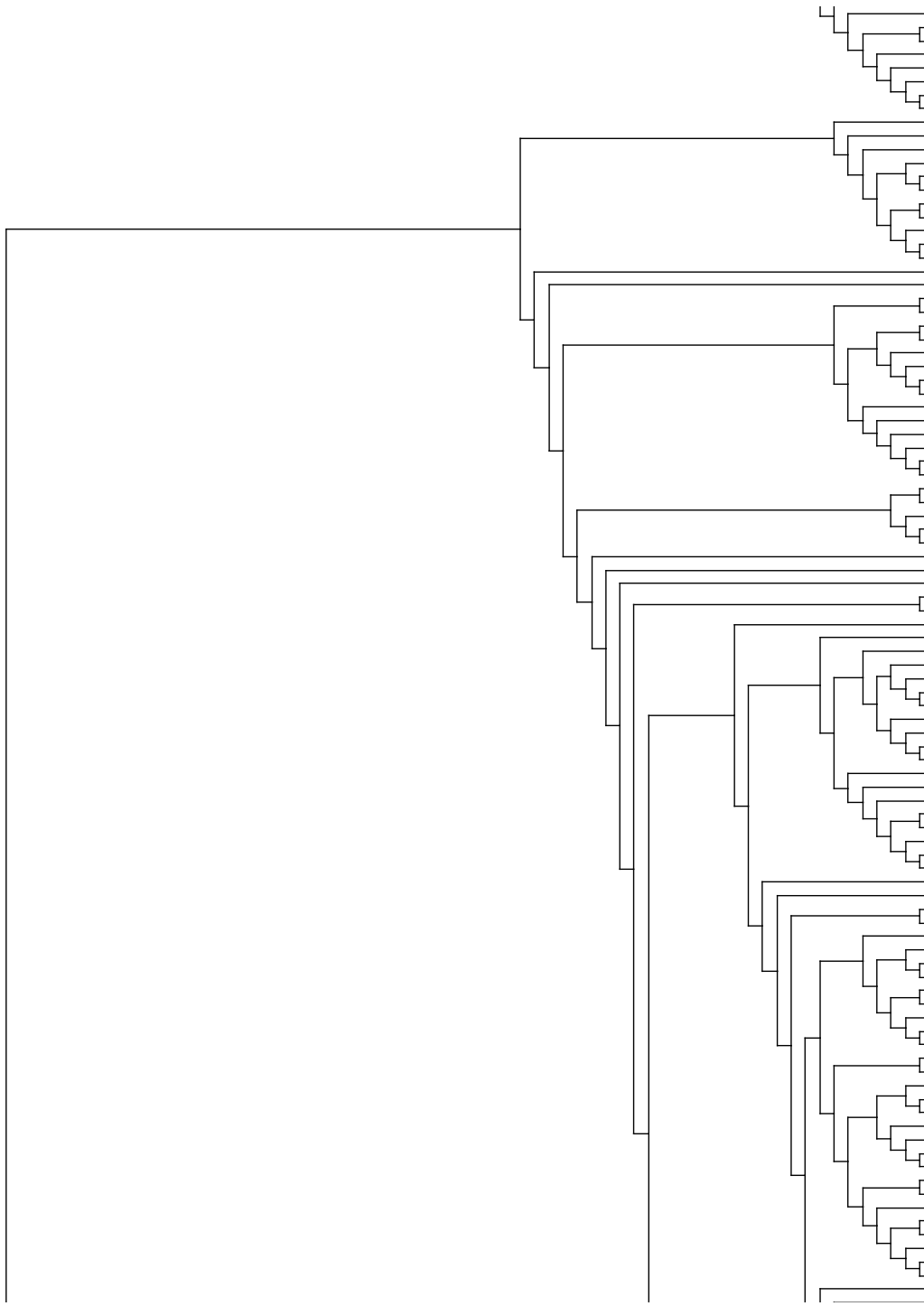






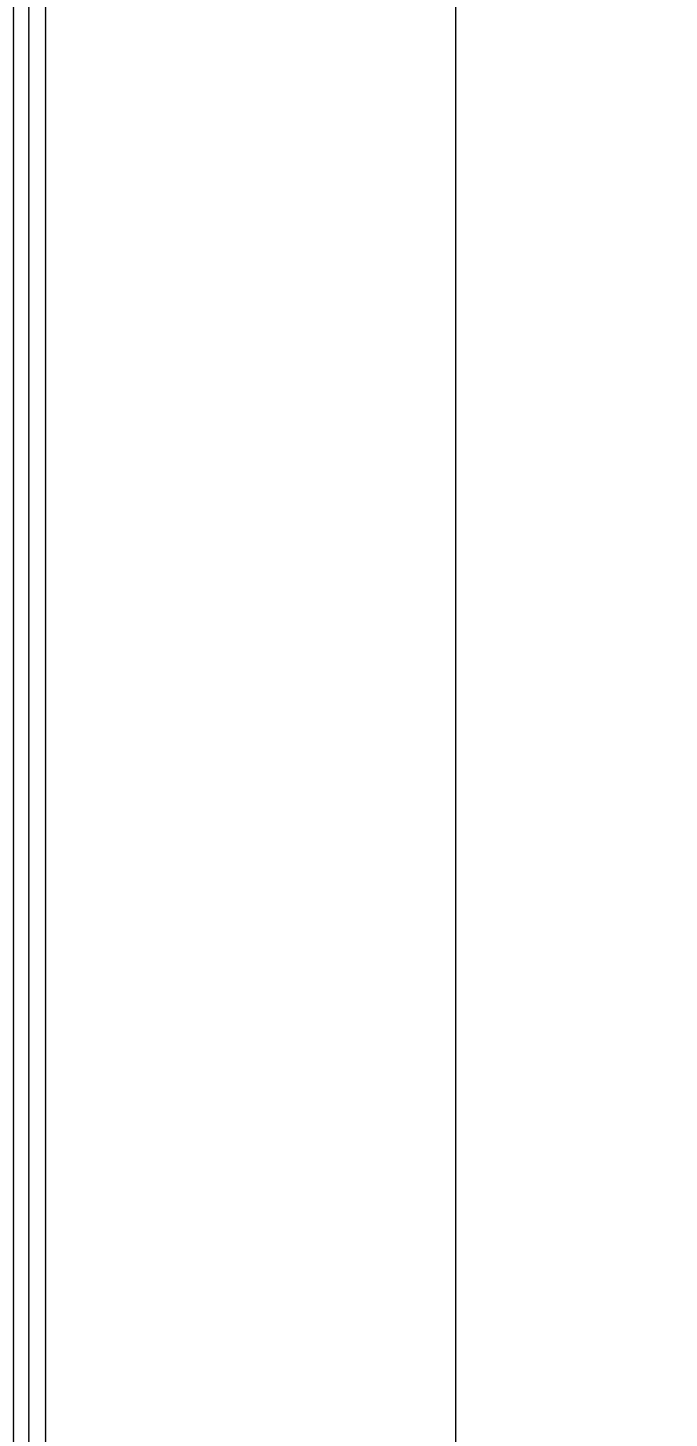
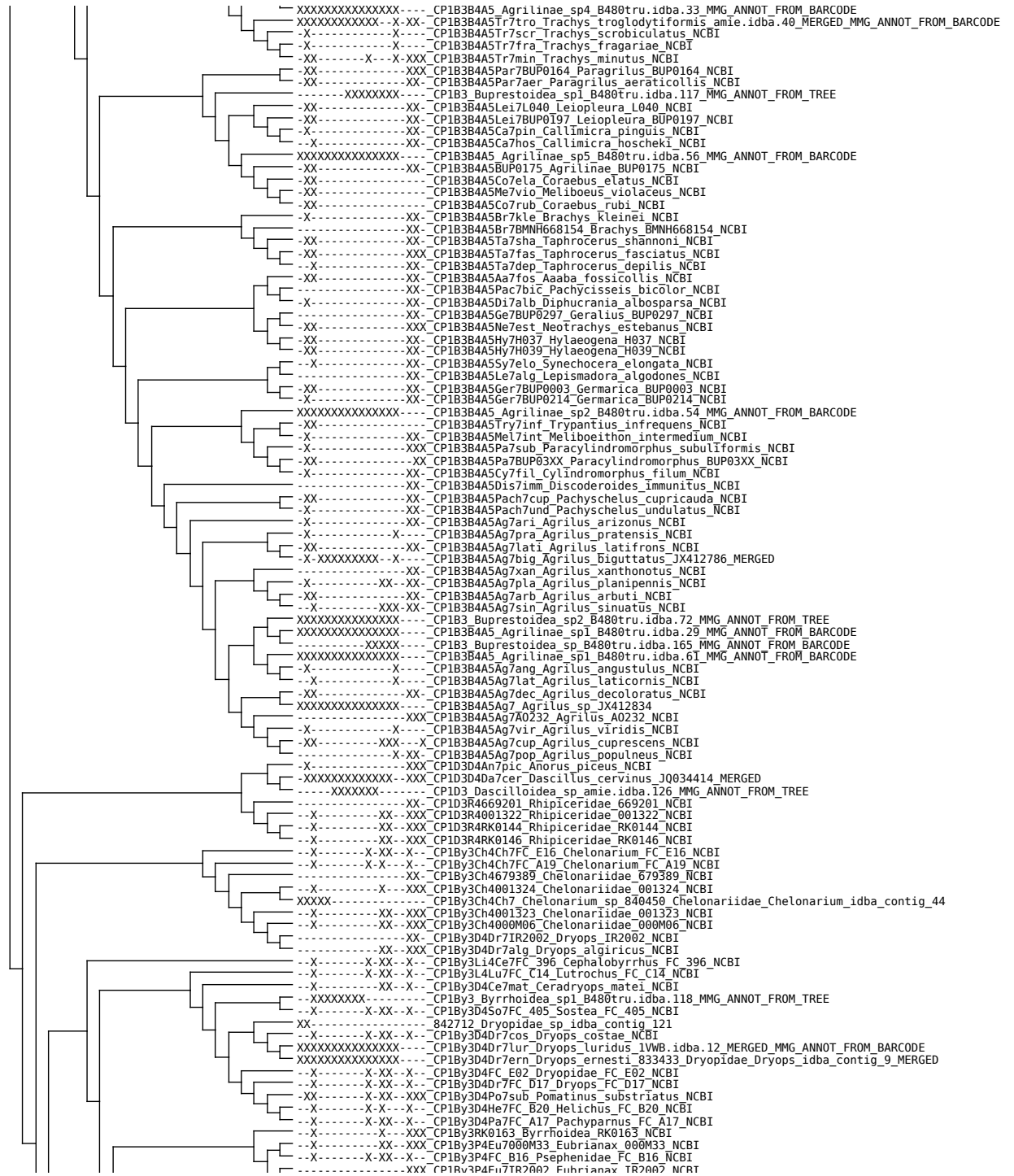


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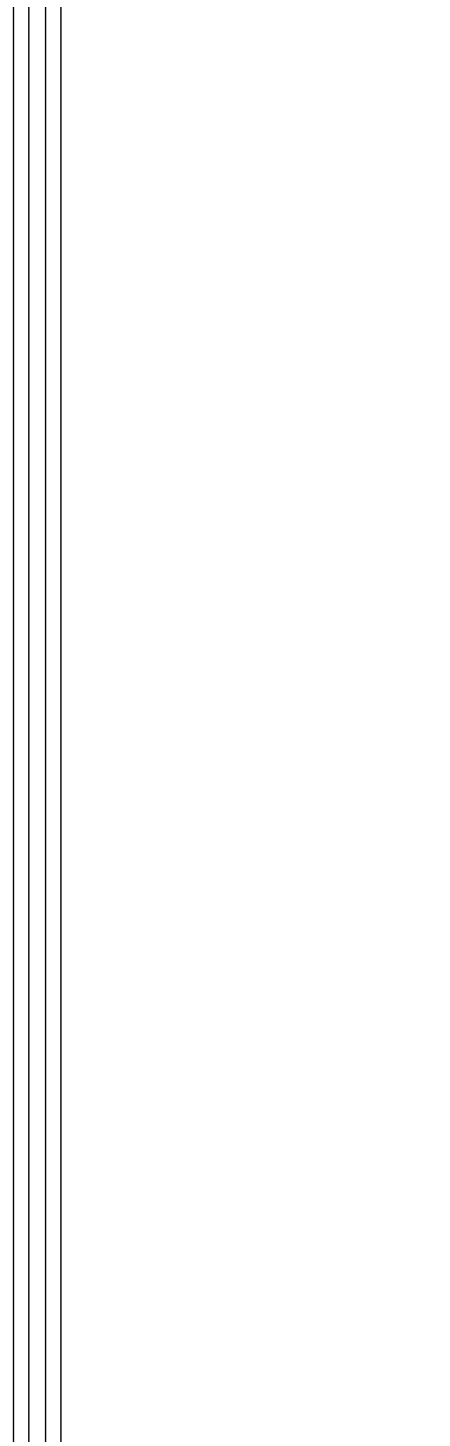




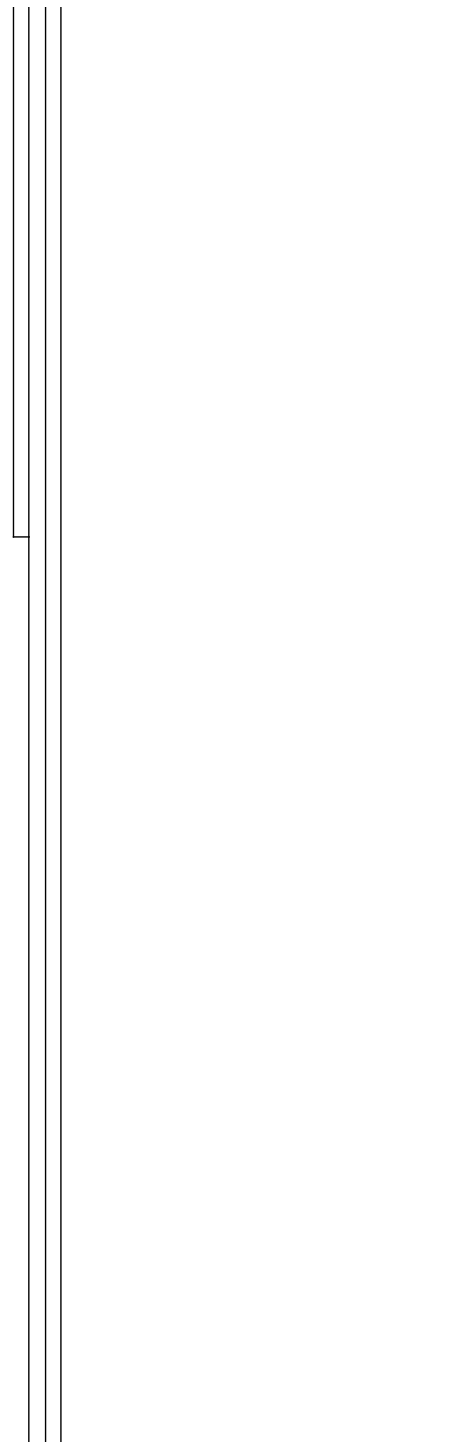
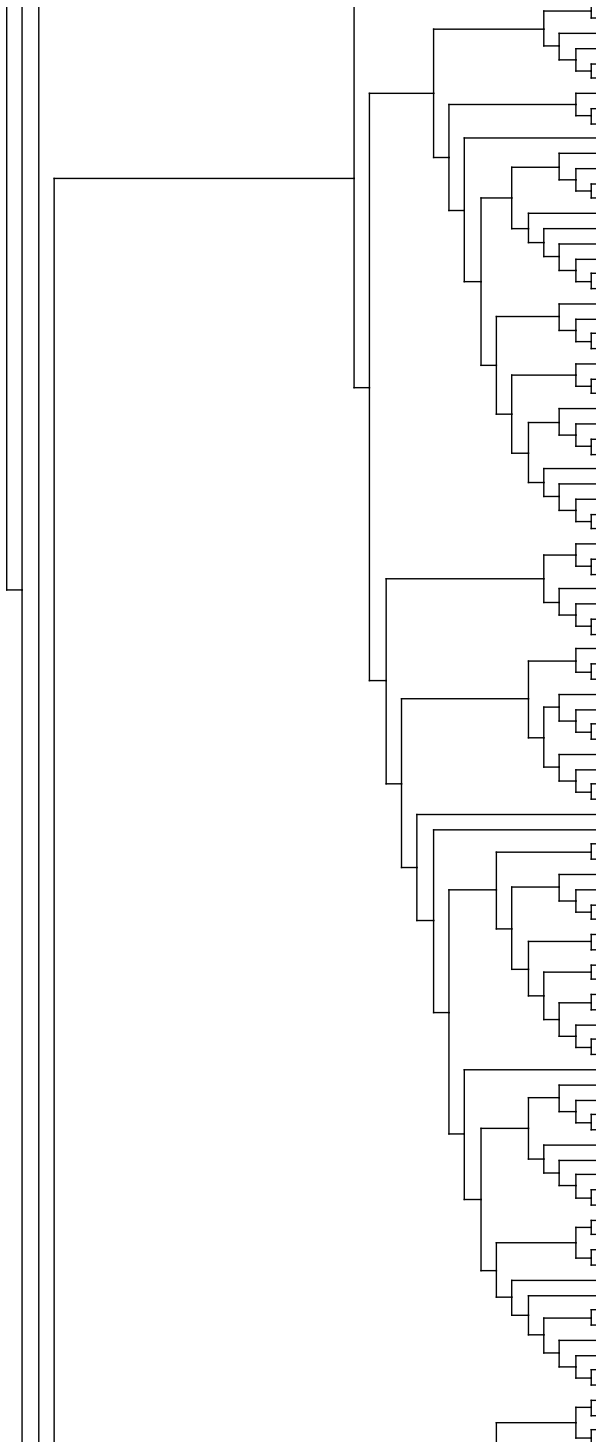
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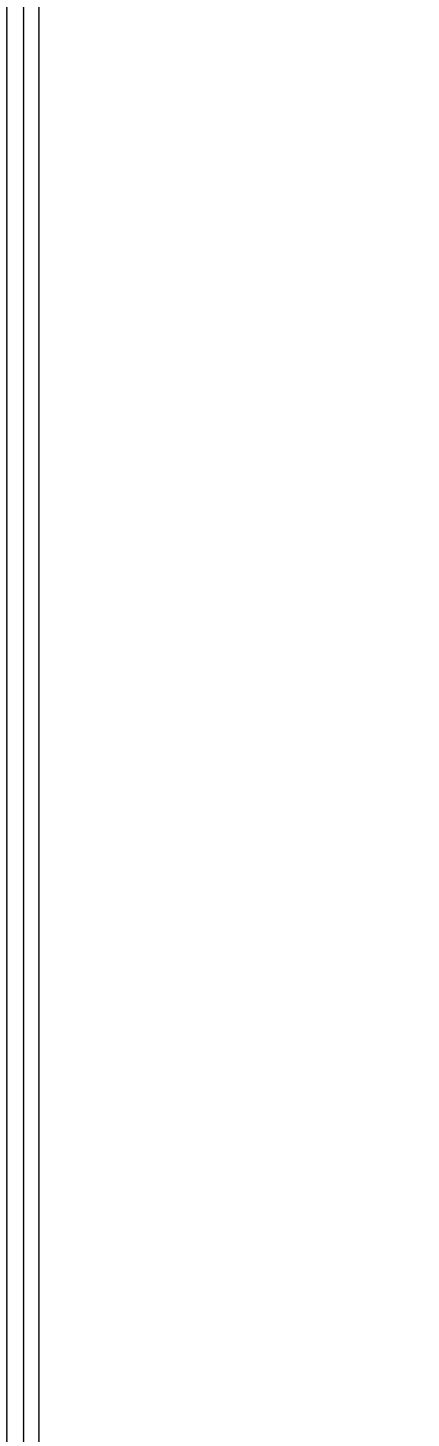
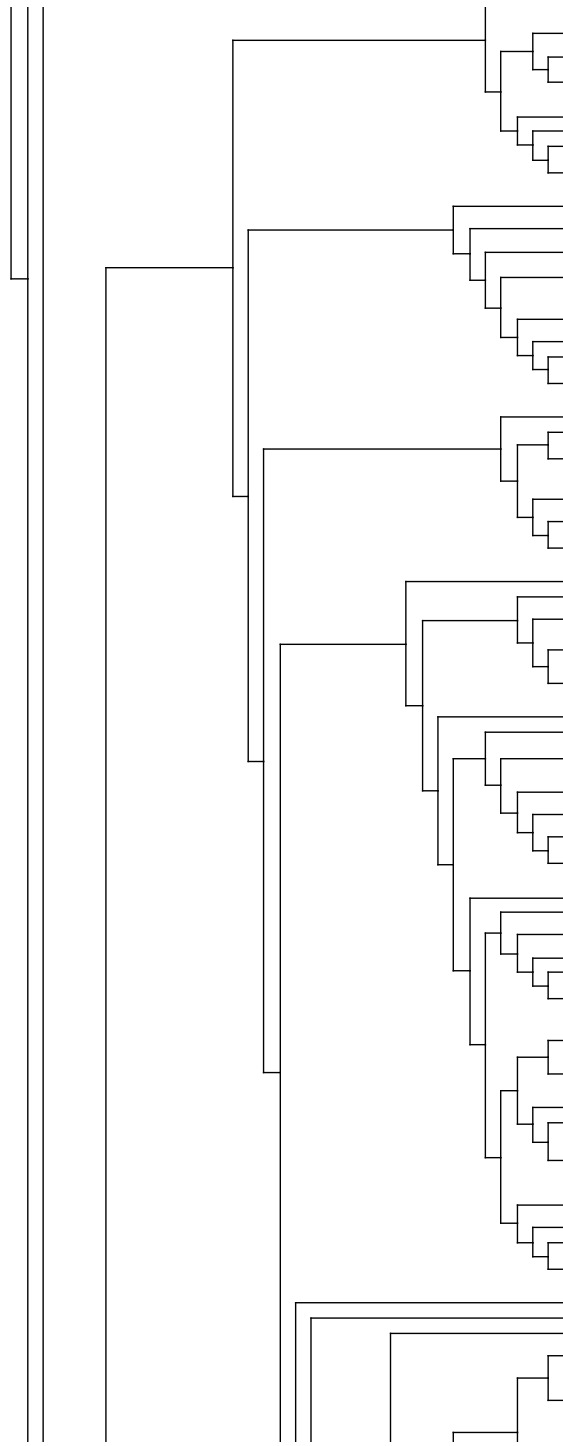
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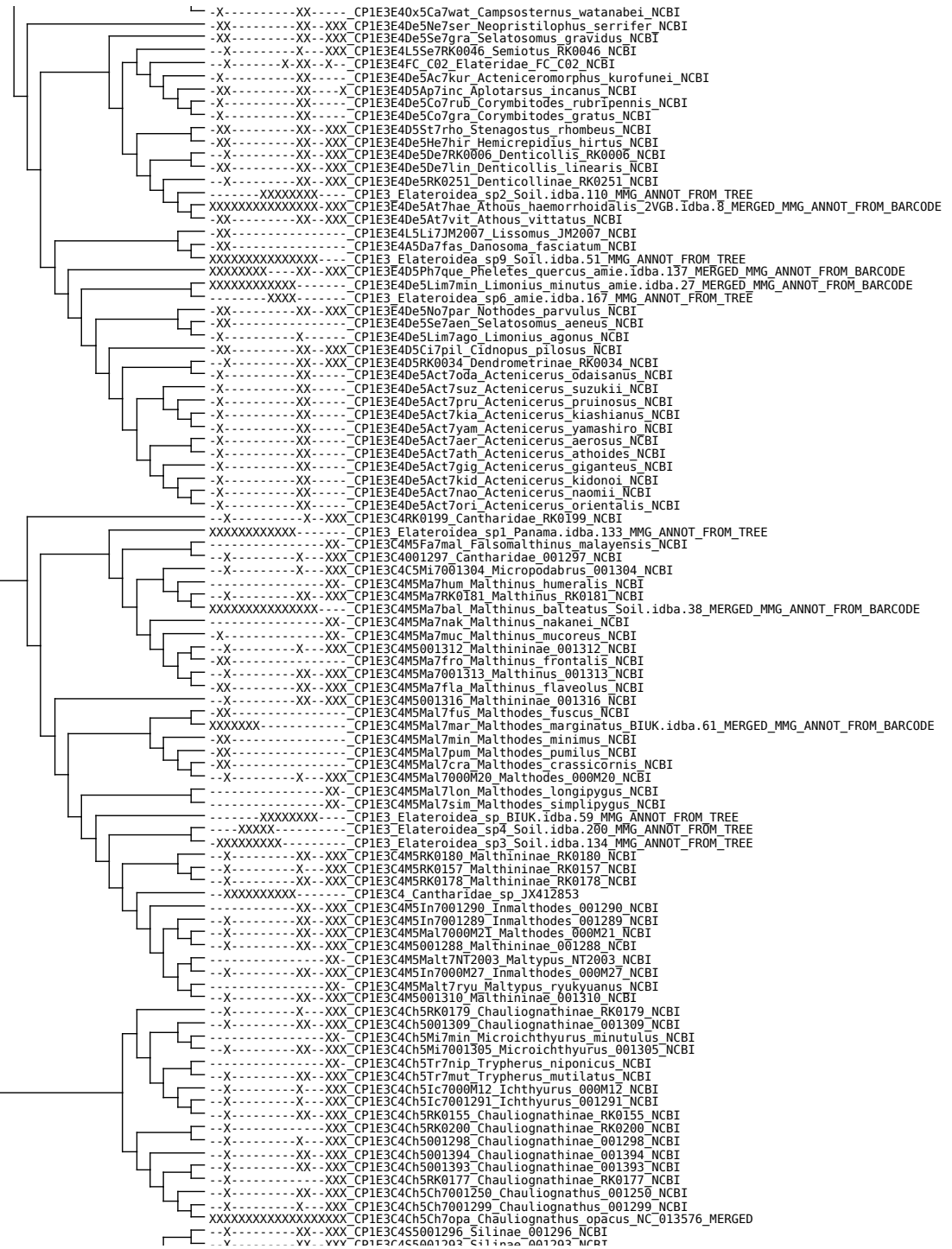
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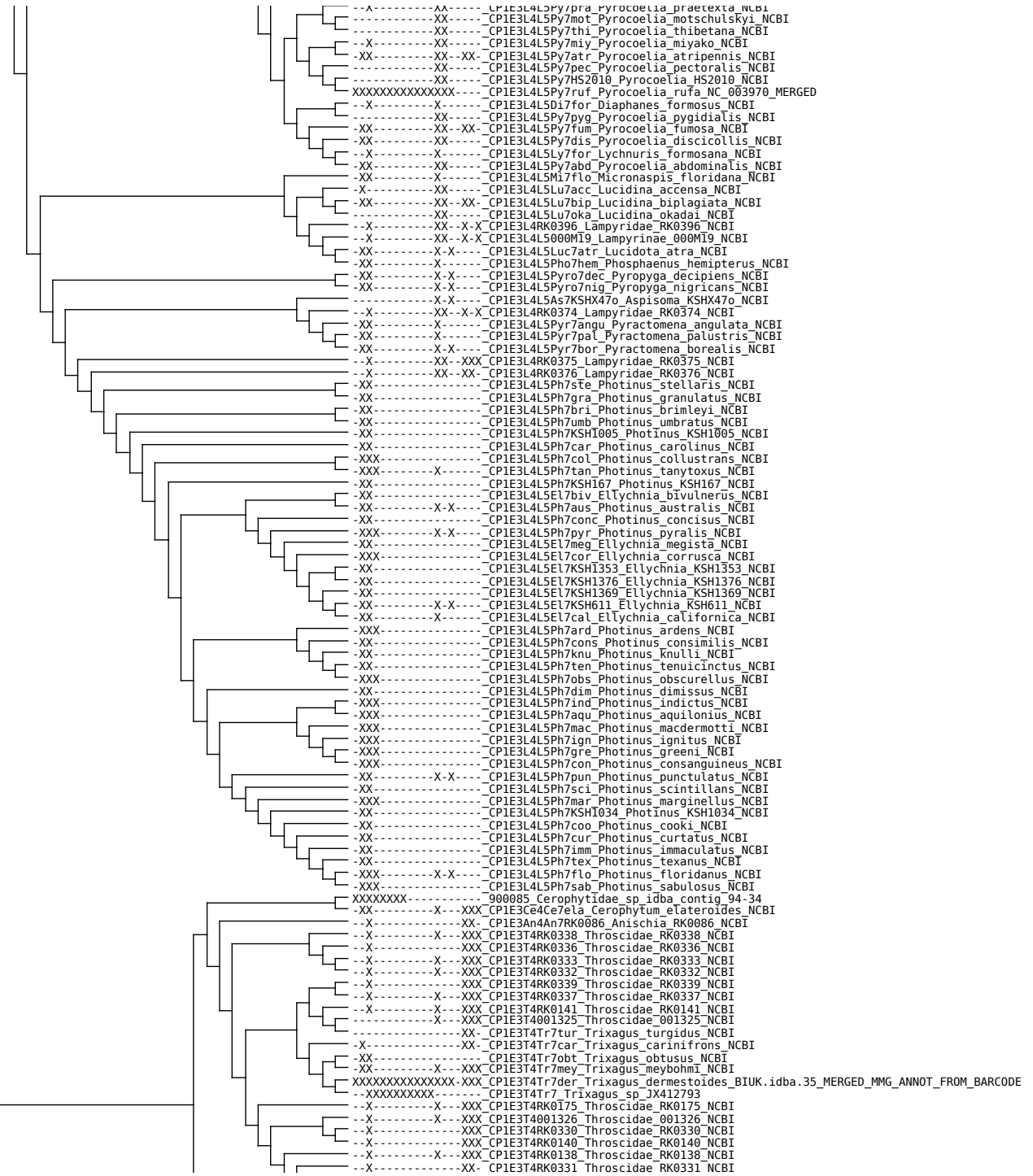


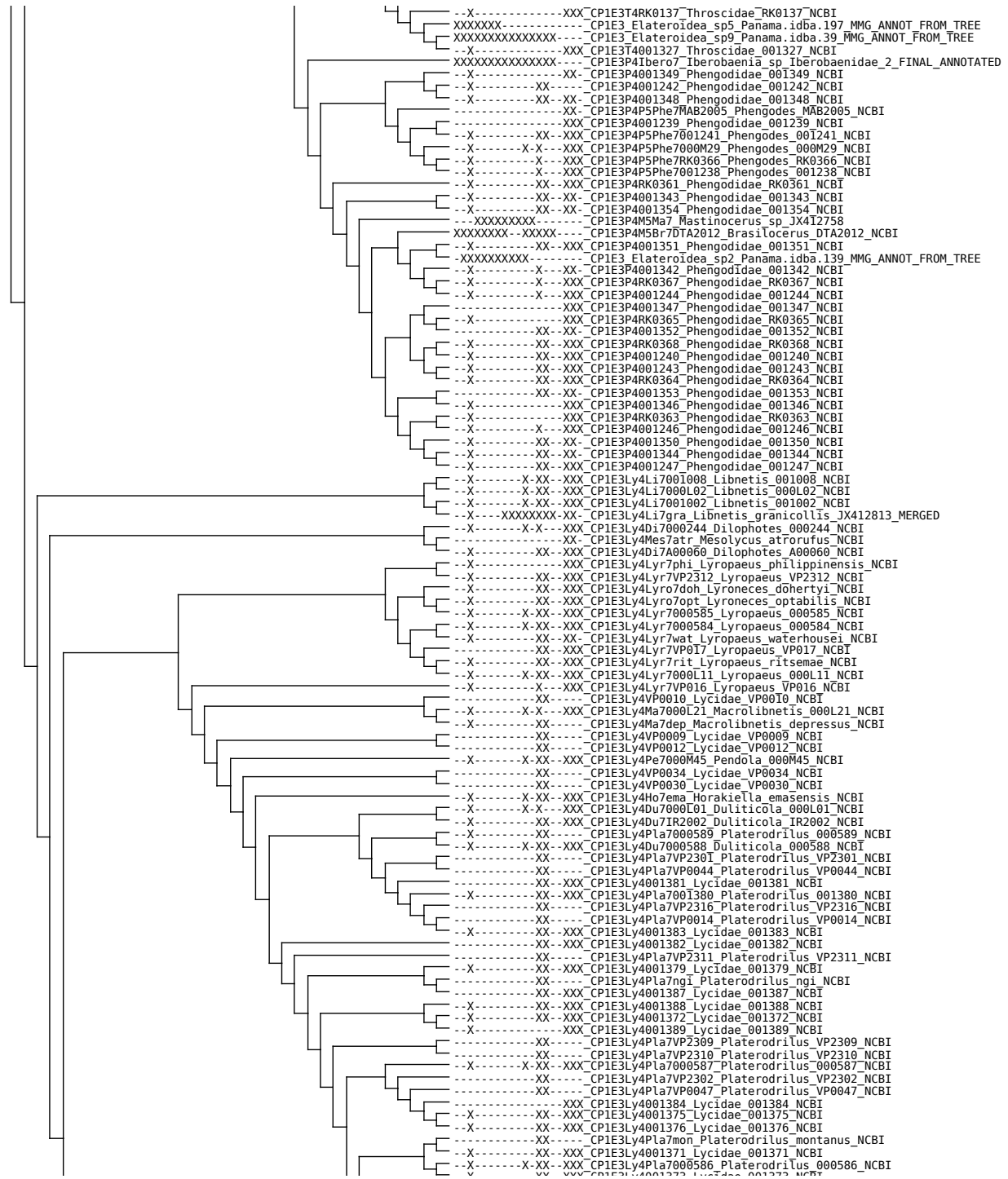
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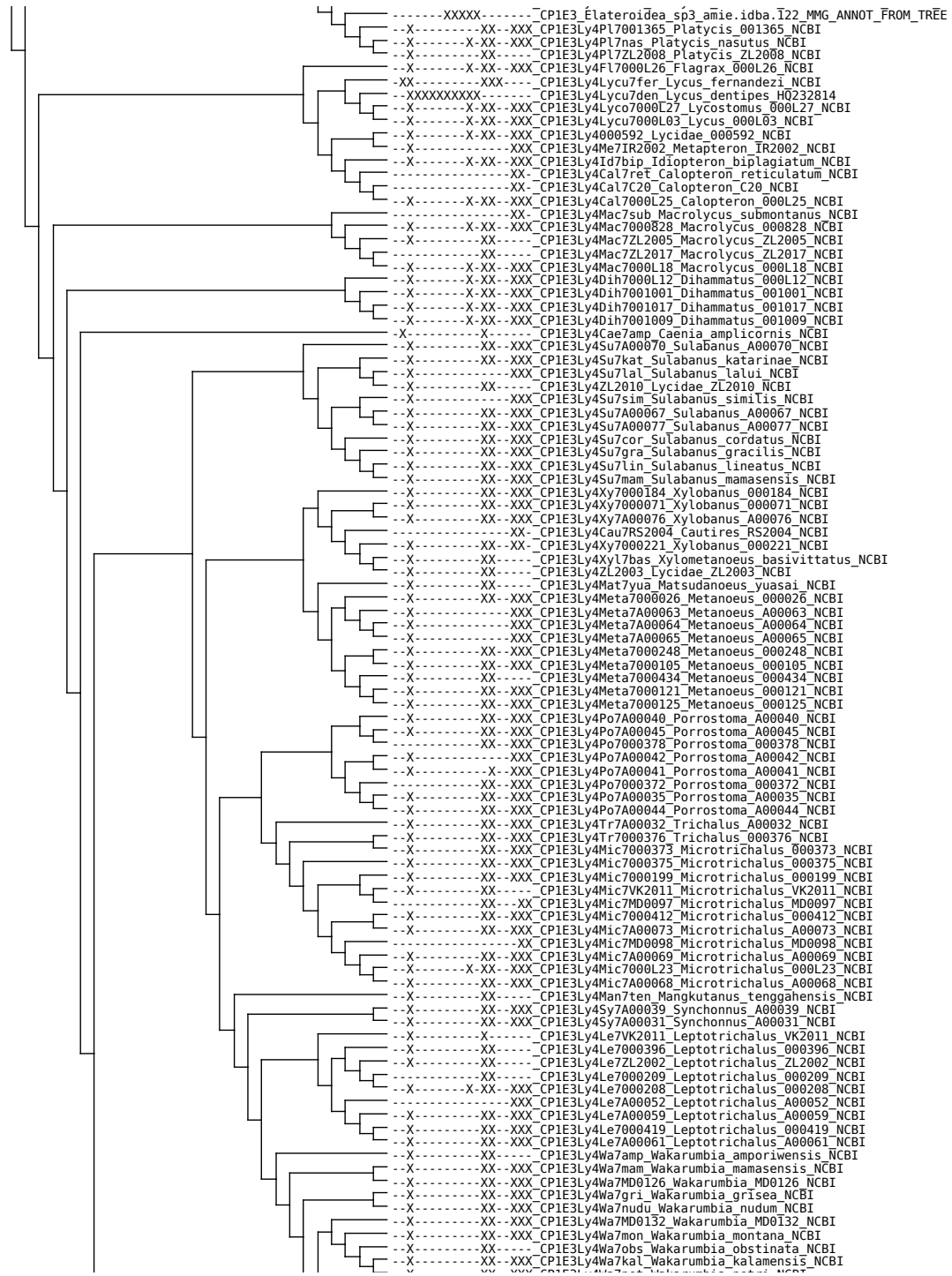
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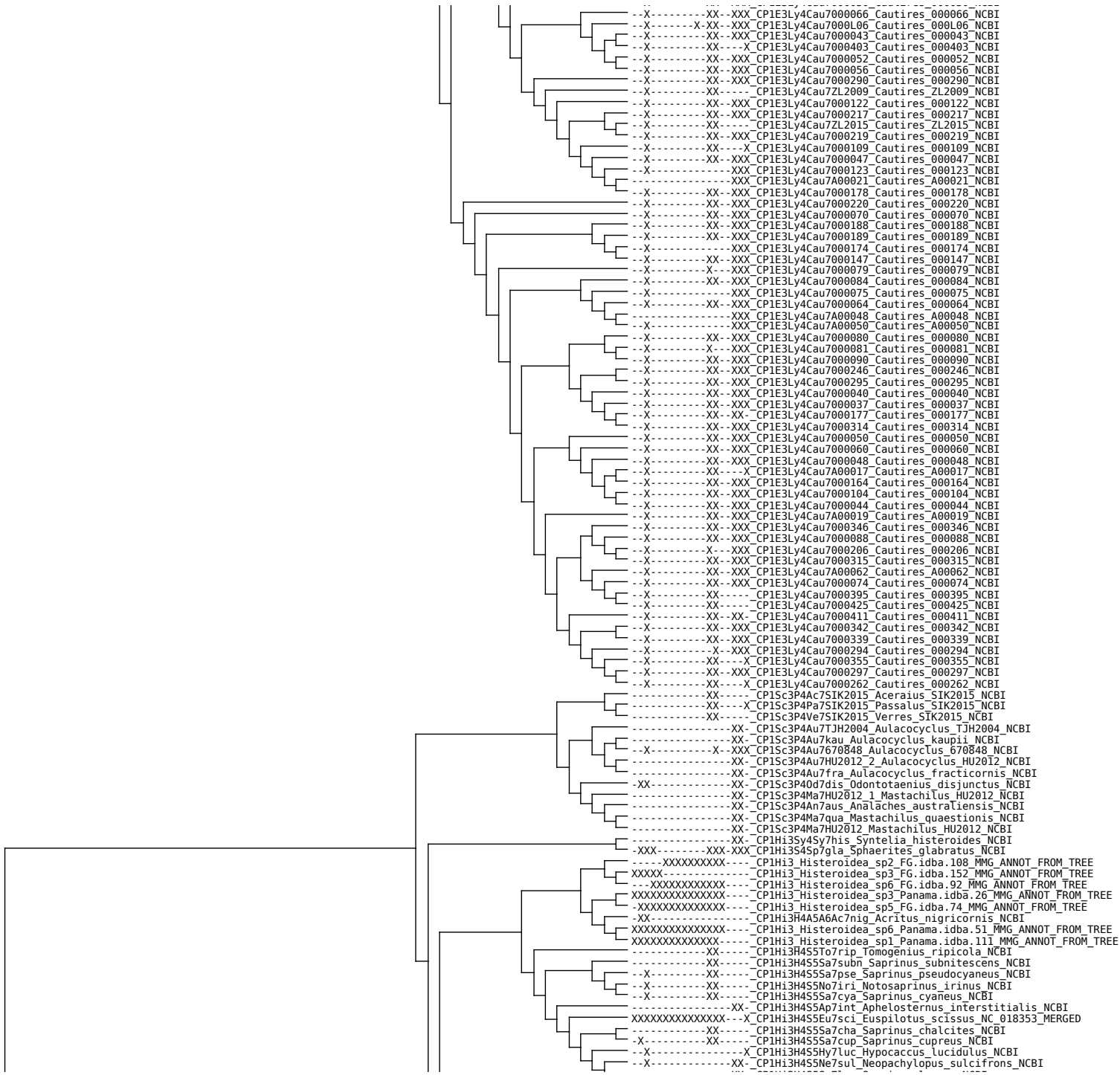


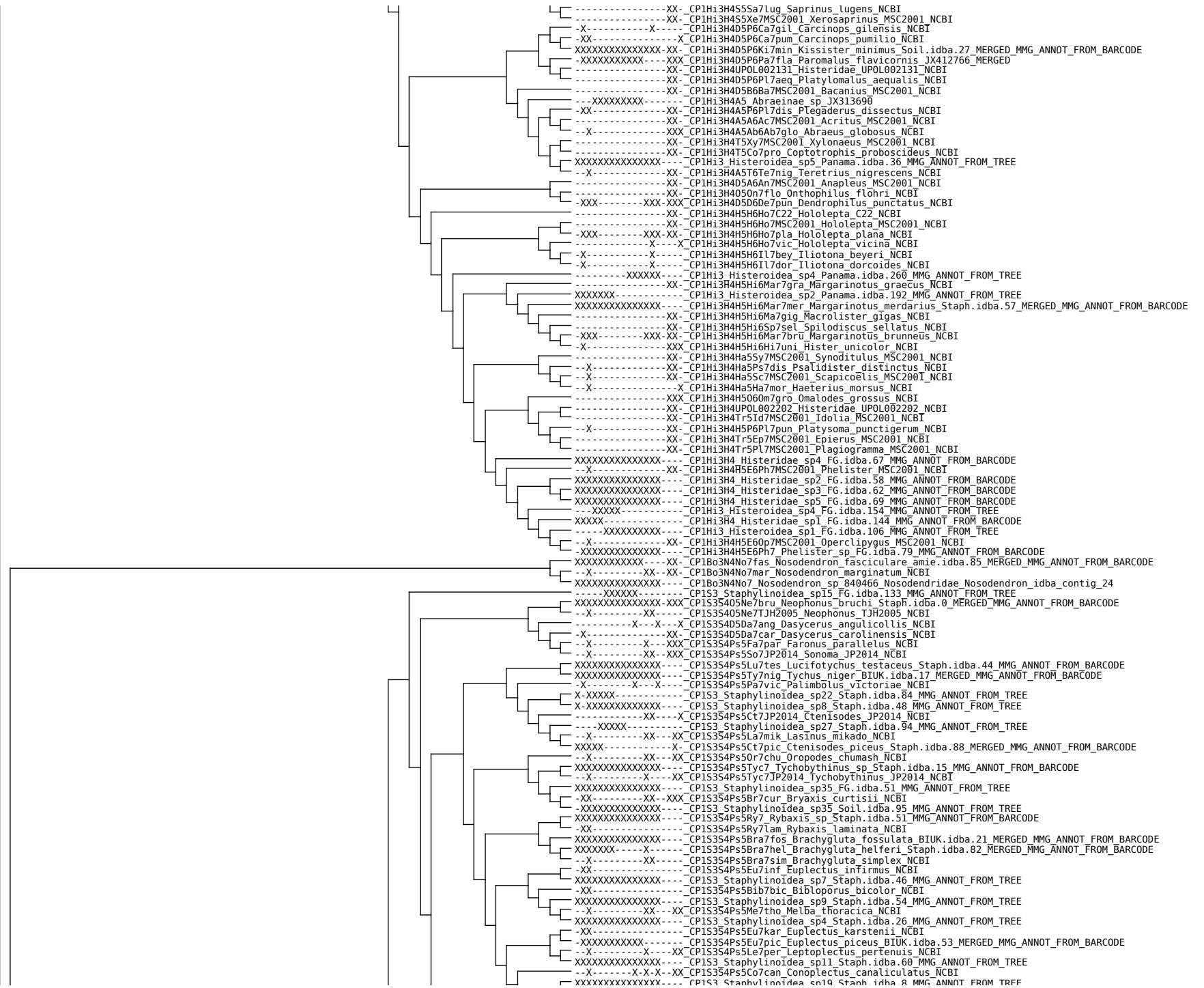






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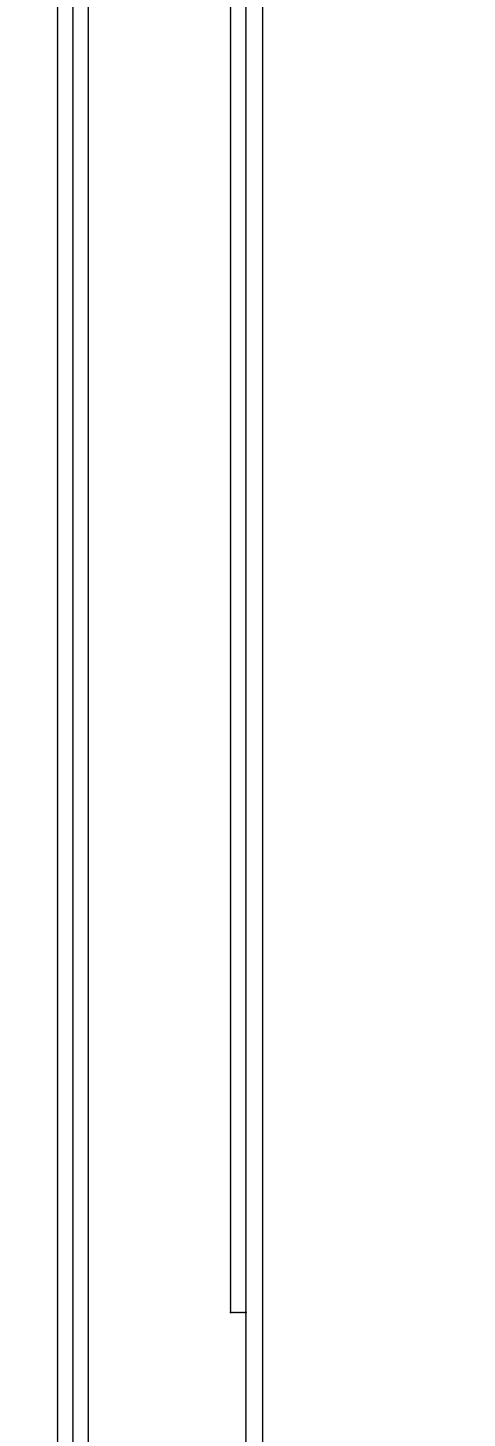
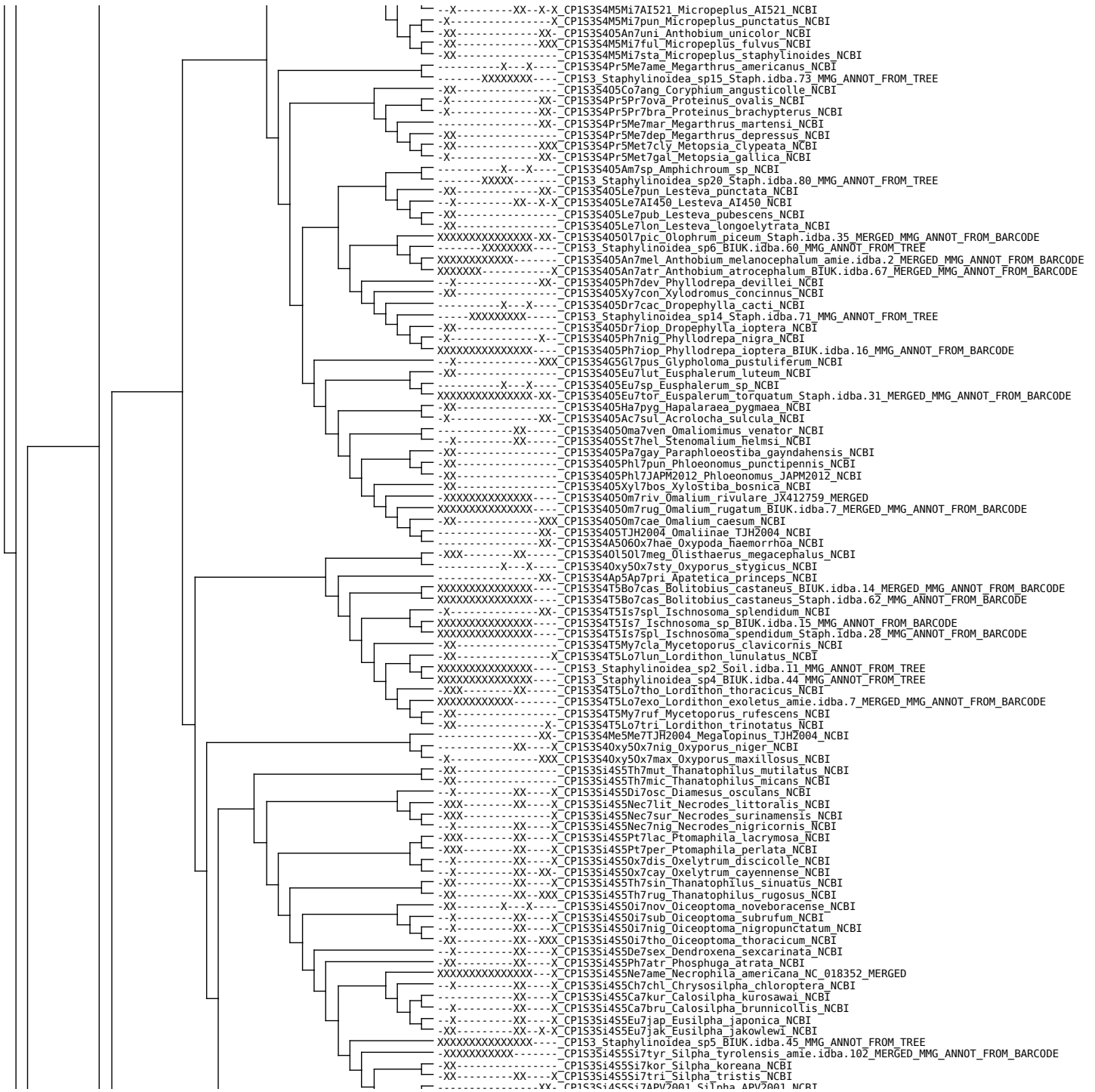


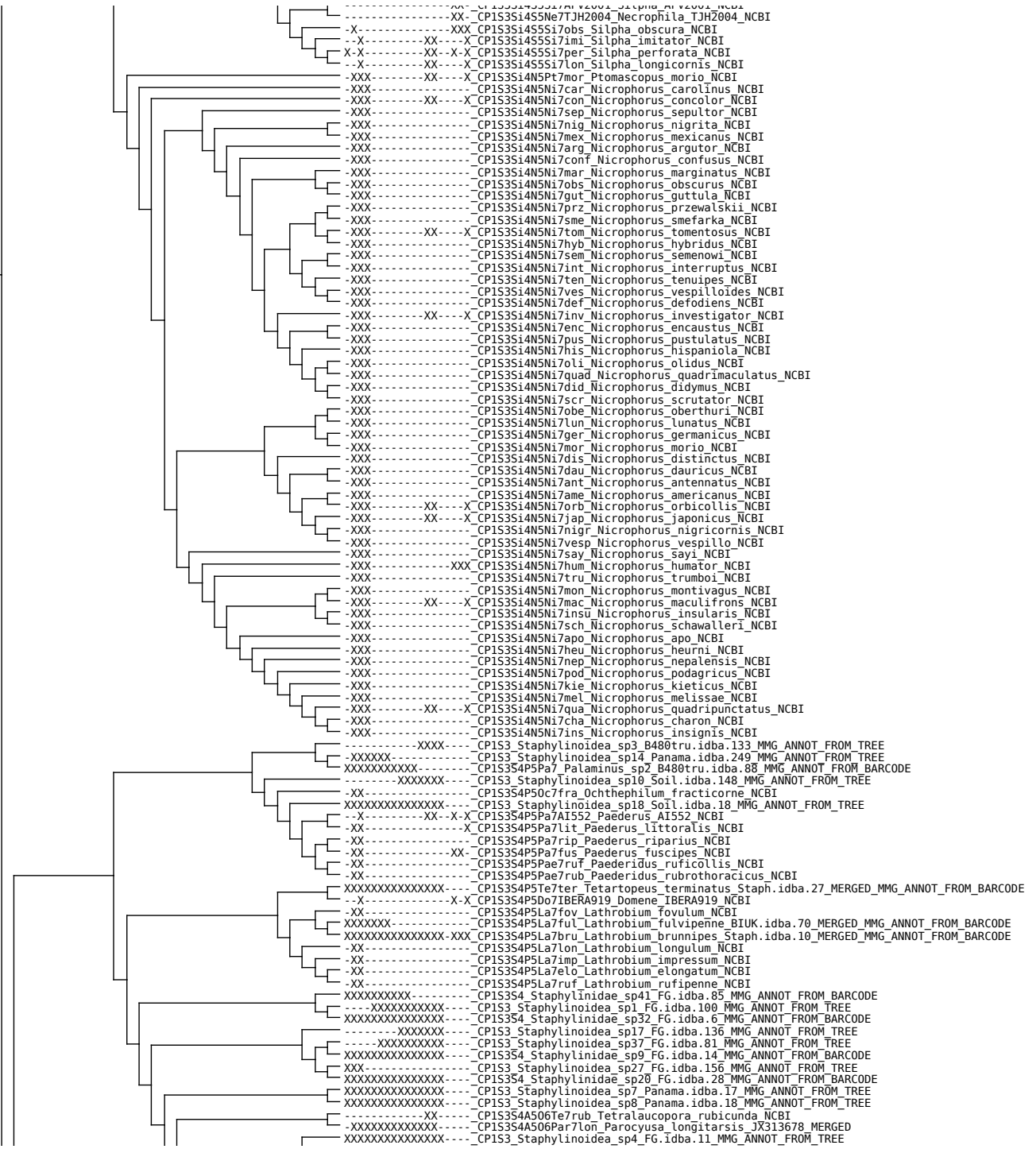


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-X- CP153S4St5T7nit Stenus_nitens_NCBI
-X- CP153S4St5T7can Stenus_canaliculatus_NCBI
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-X- CP153S4St5T7ten Stenus_tenuipes_NCBI
-X- CP153S4St5T7ali Stenus_alienus_NCBI
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-X- CP153S4St5Di7nit Dianous_nitidulus_NCBI
-X- CP153S4St5T7gut Stenus_guttula_NCBI
-X- CP153S4St5T7fos Stenus_fossulatus_NCBI
-X- CP153S4St5Di7fel Dianous_fellowesi_NCBI
-X- CP153S4St5Di7hai Dianous_hainanensis_NCBI
-X- CP153S4St5Di7fen Dianous_fengtingae_NCBI
-X- CP153S4St5Di7obl Dianous_obliquenotatus_NCBI
-X- CP153S4St5Di7alt Dianous_alternans_NCBI
-X- CP153S4St5Di7ele Dianous_elegantulus_NCBI
-X- CP153S4St5Di7pun Dianous_punctiventris_NCBI
-X- CP153S4St5Di7sri Dianous_srivichaii_NCBI
-X- CP153S4St5Di7coe Dianous_coerulescens_NCBI
-X- CP153S4St5Di7oce Dianous_ocellifer_NCBI
-X- CP153S4St5Di7ver Dianous_verticosus_NCBI
-X- CP153S4St5Di7pse Dianous_pseudacutus_NCBI
-X- CP153S4St5Di7and Dianous_andrewesi_NCBI
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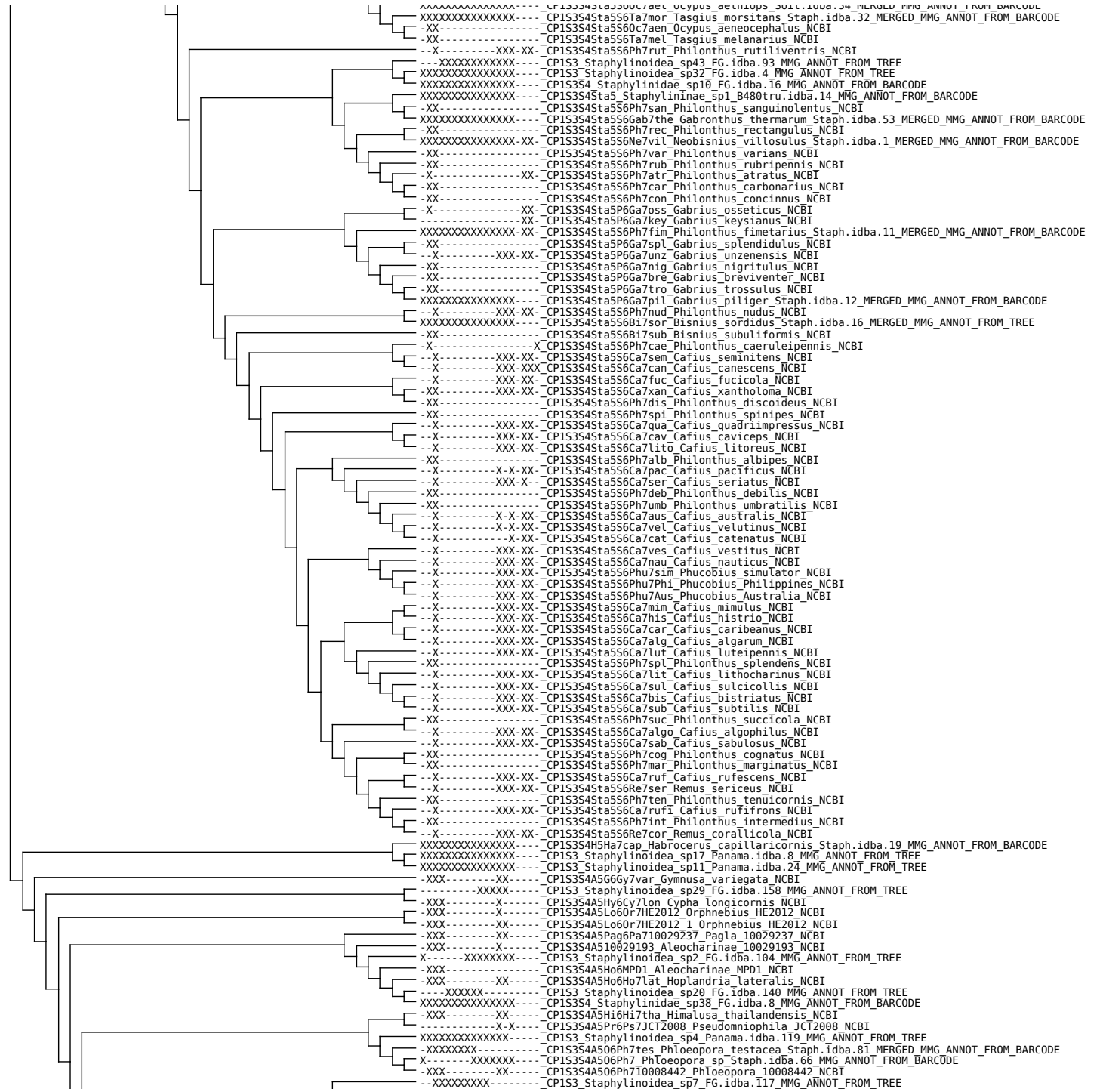


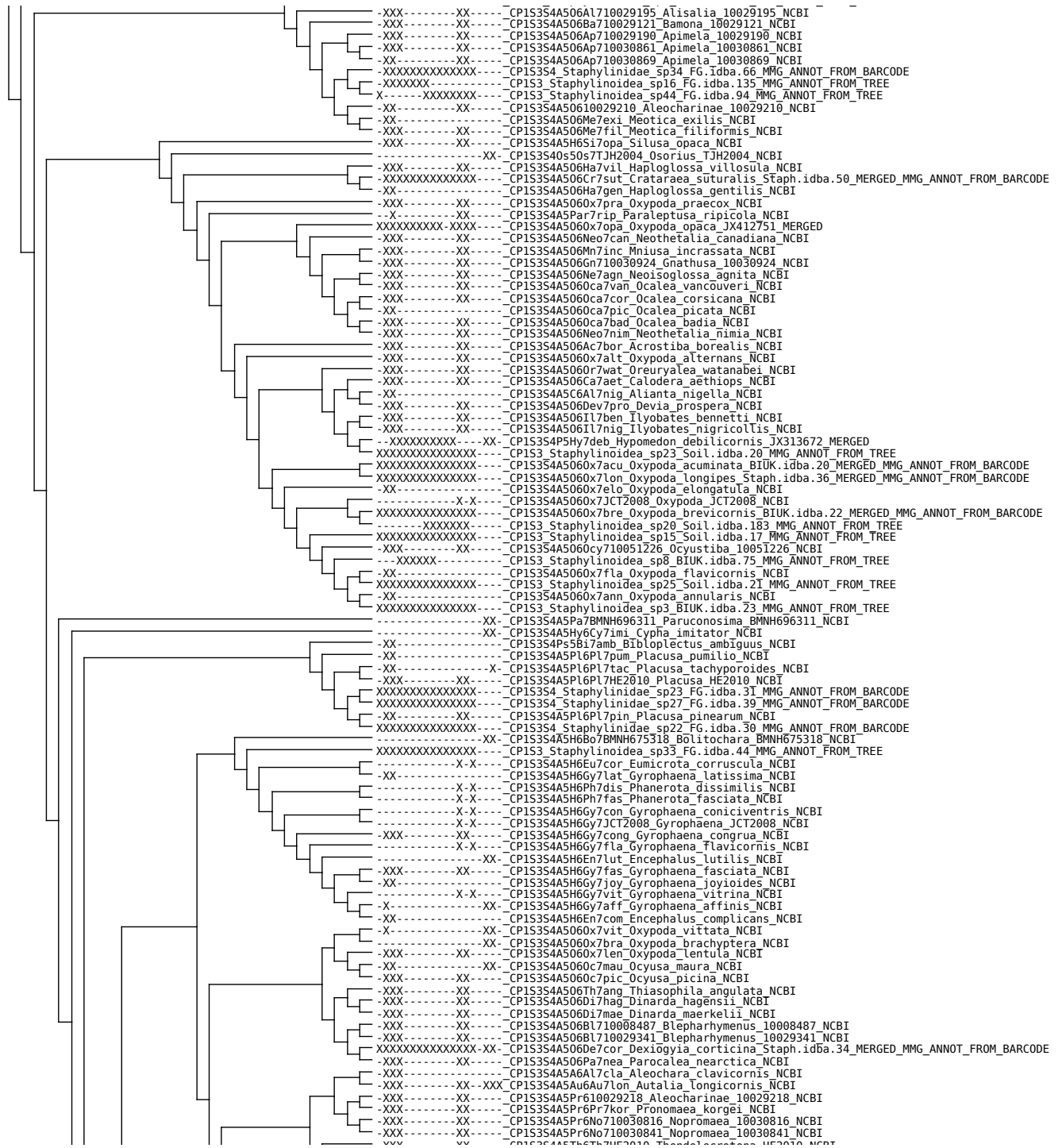






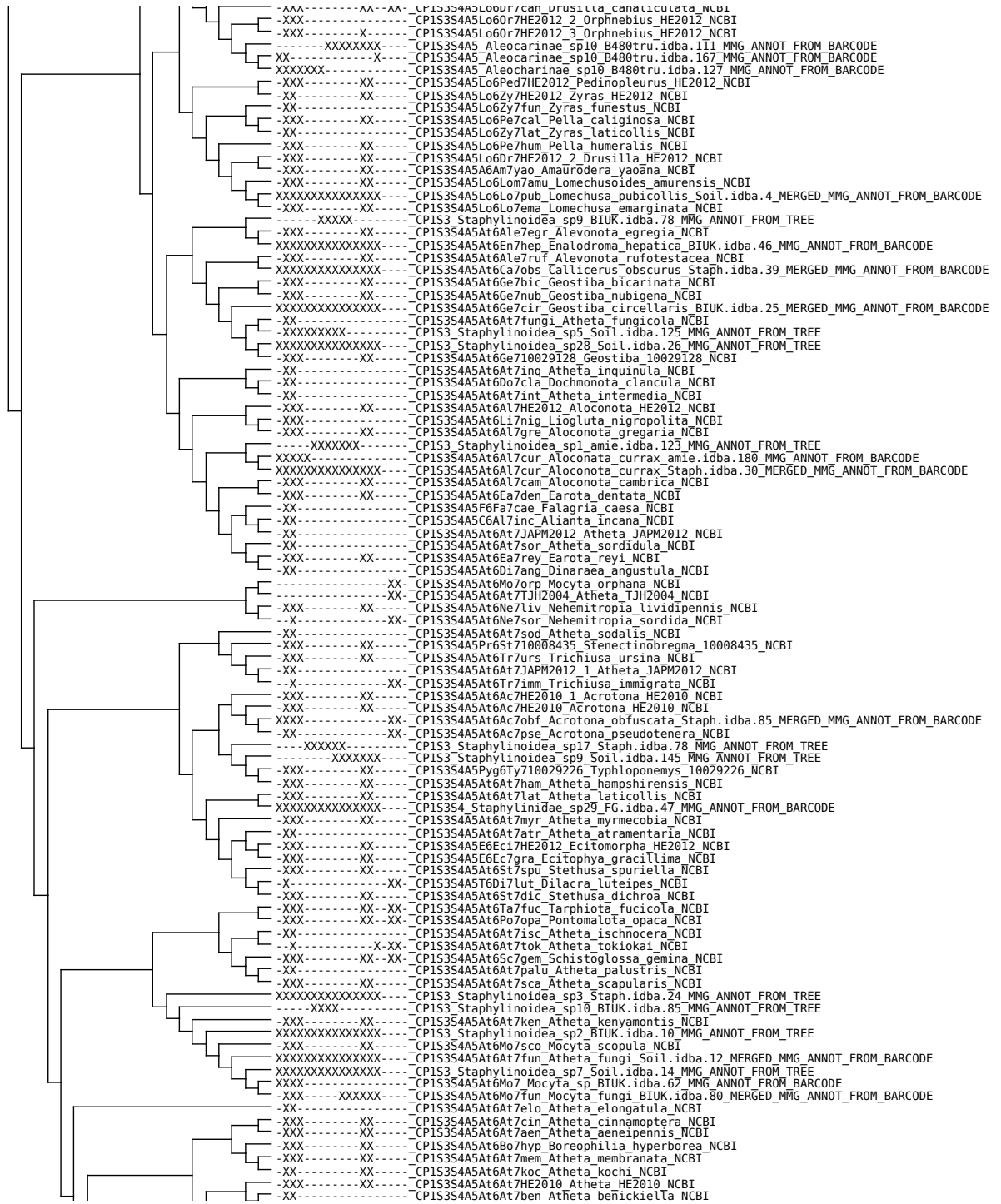
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 -XX----- CP15354P5Me7bru_Medon_brunneus_NCBI
 XXXXXXXXXXXX- CP15354P5Me7pic_Medon_piceus_ame.idba.112_MERGED_MMG_ANNOT_FROM_BARCODE
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 -X-----XX- CAP2009a_Coleoptera_AP2009a_NCBI
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 -XX----- CP15354Sta5S6Ph7JAPM2012_1_Philonthus_JAPM2012_NCBI
 -XX----- CP15354050u7cur_Quedius_curtipennis_NCBI
 -XX----- CP15354050u7mol_Quedius_molochinus_NCBI
 -XX----- CP15354Sta5S6Ph7pol_Philonthus_politus_NCBI
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 -XX-----XX- CP15354050u7inv_Quedius_invreae_NCBI
 -XX-----XX- CP15354050u7mes_Quedius_mesomelinus_NCBI
 -XX----- CP15354050u7sem_Quedius_semaeeneus_NCBI
 -XX----- CP15354050u7aur_Quedius_auricomus_NCBI
 -XX----- CP15354050u7lat_Quedius_lateralis_NCBI
 -XX----- CP15354050u7sut_Quedius_suturalis_NCBI
 -XX----- CP15354050u7pic_Quedius_picipes_NCBI
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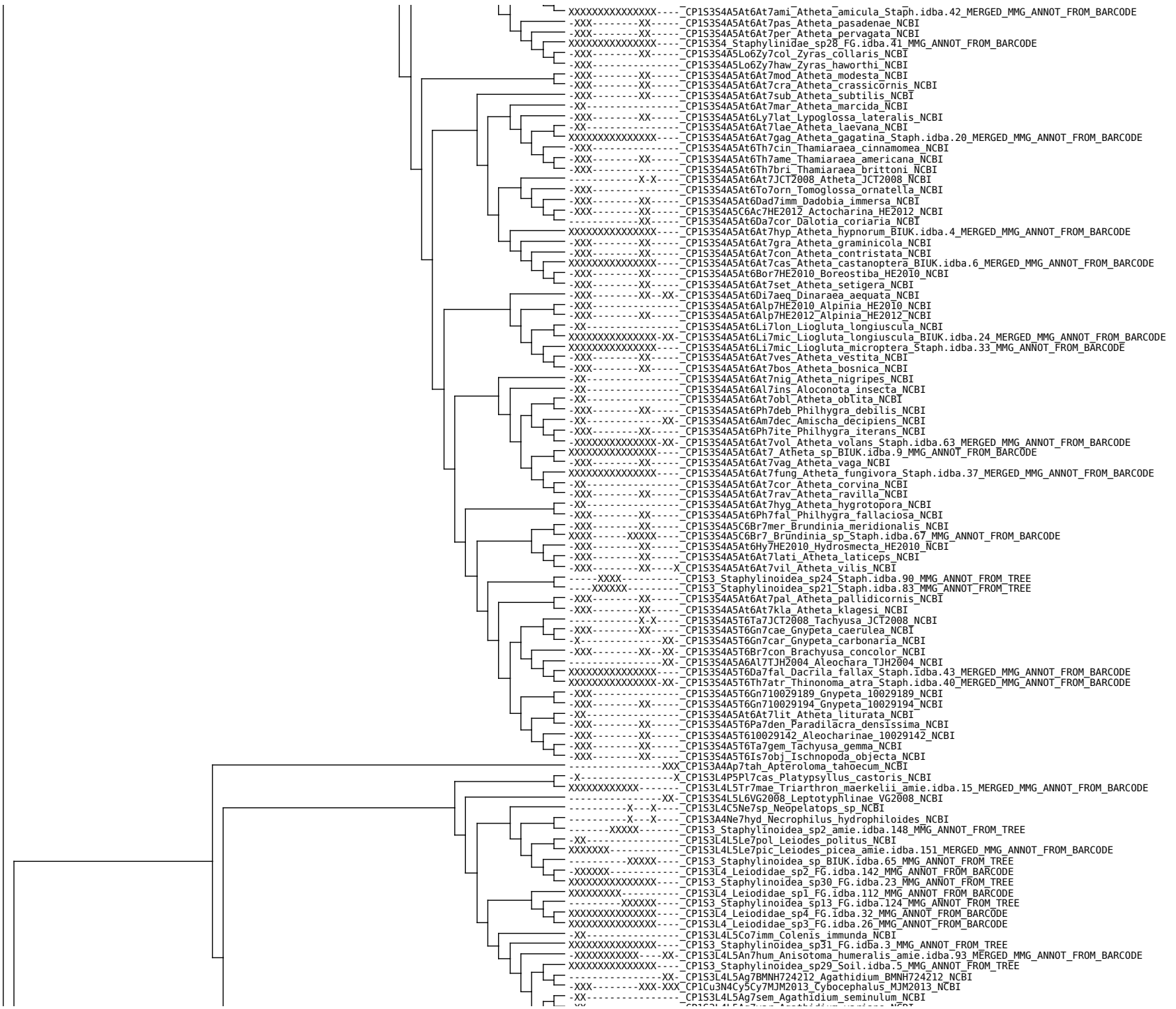


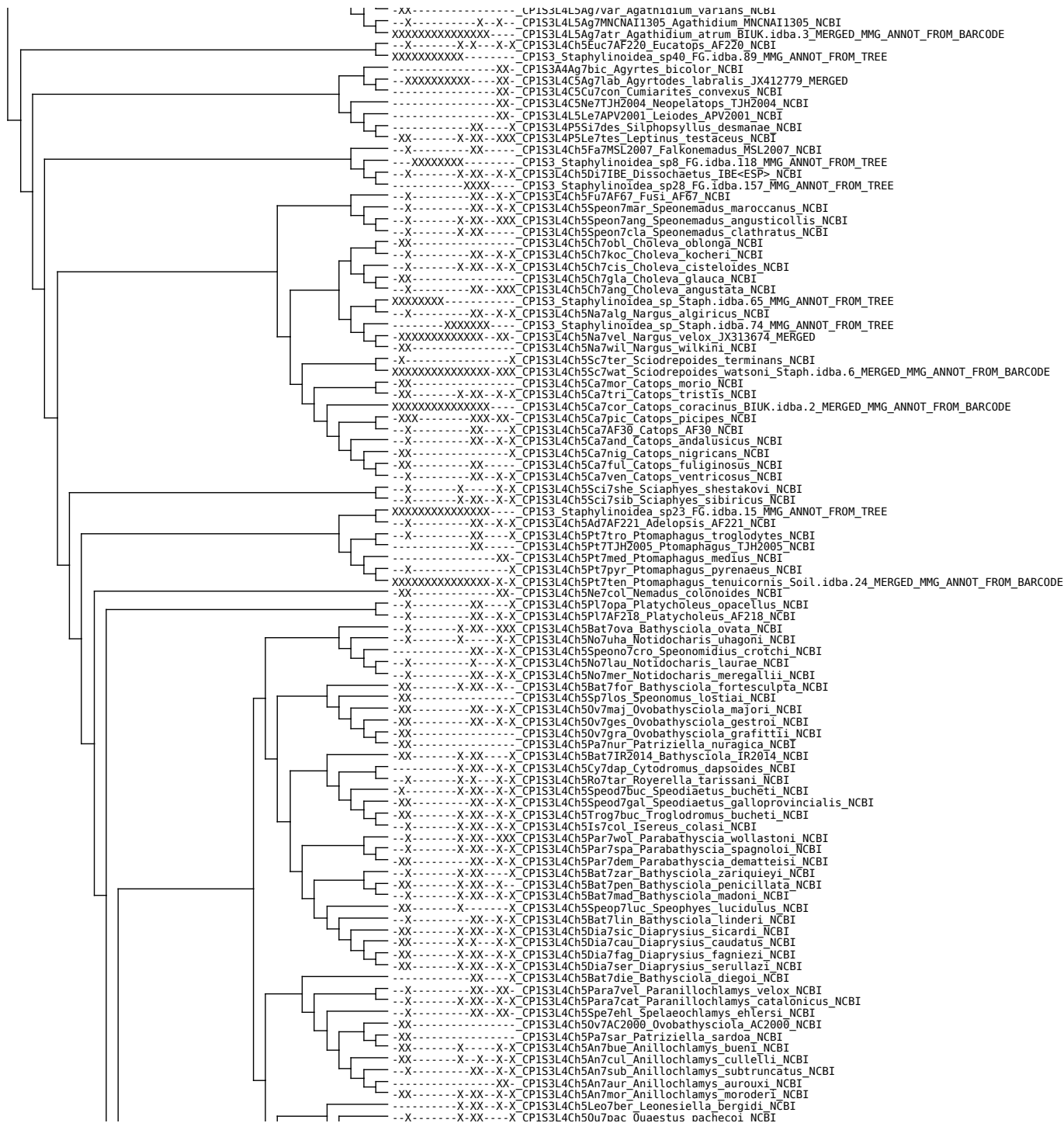


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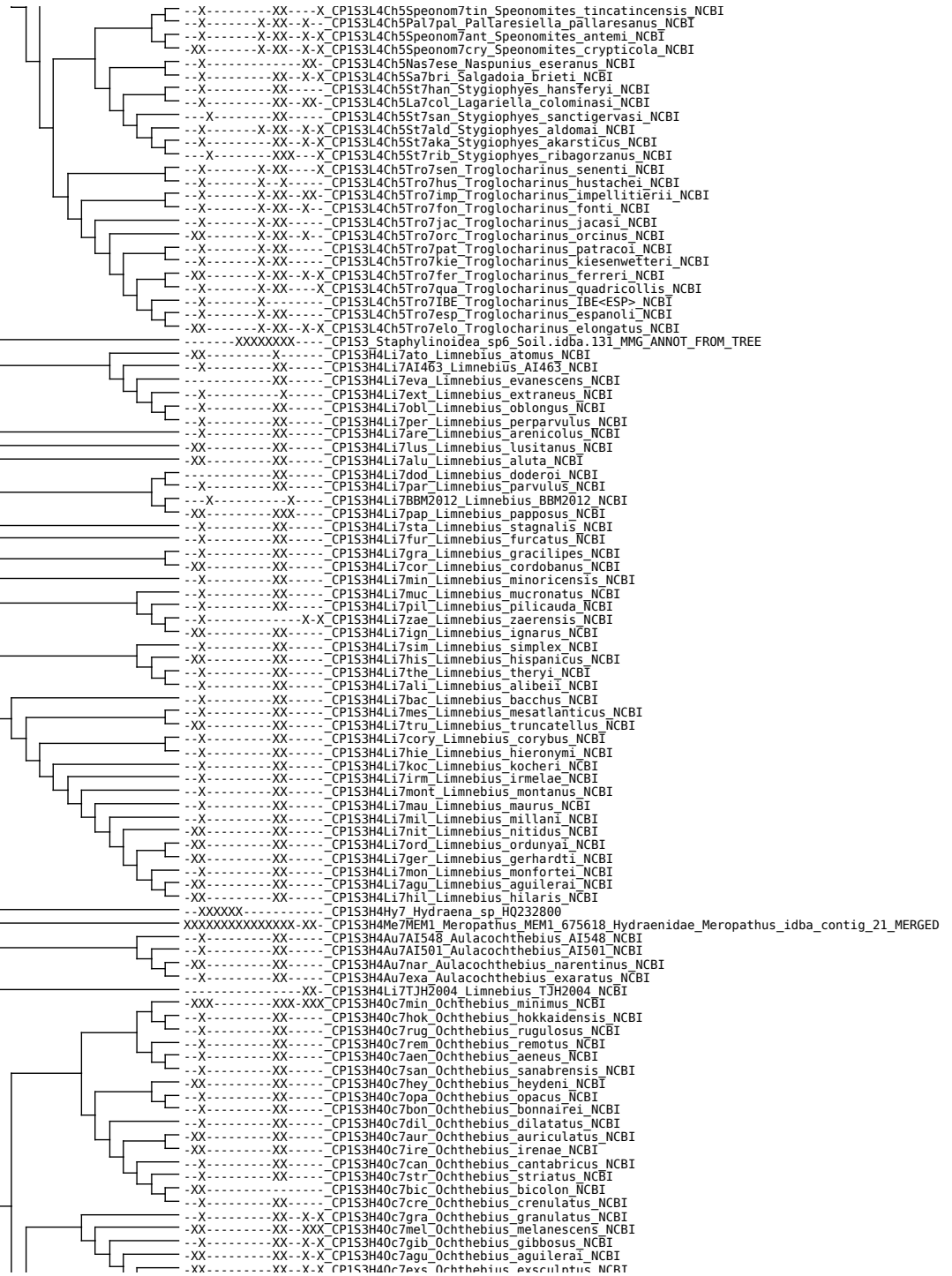




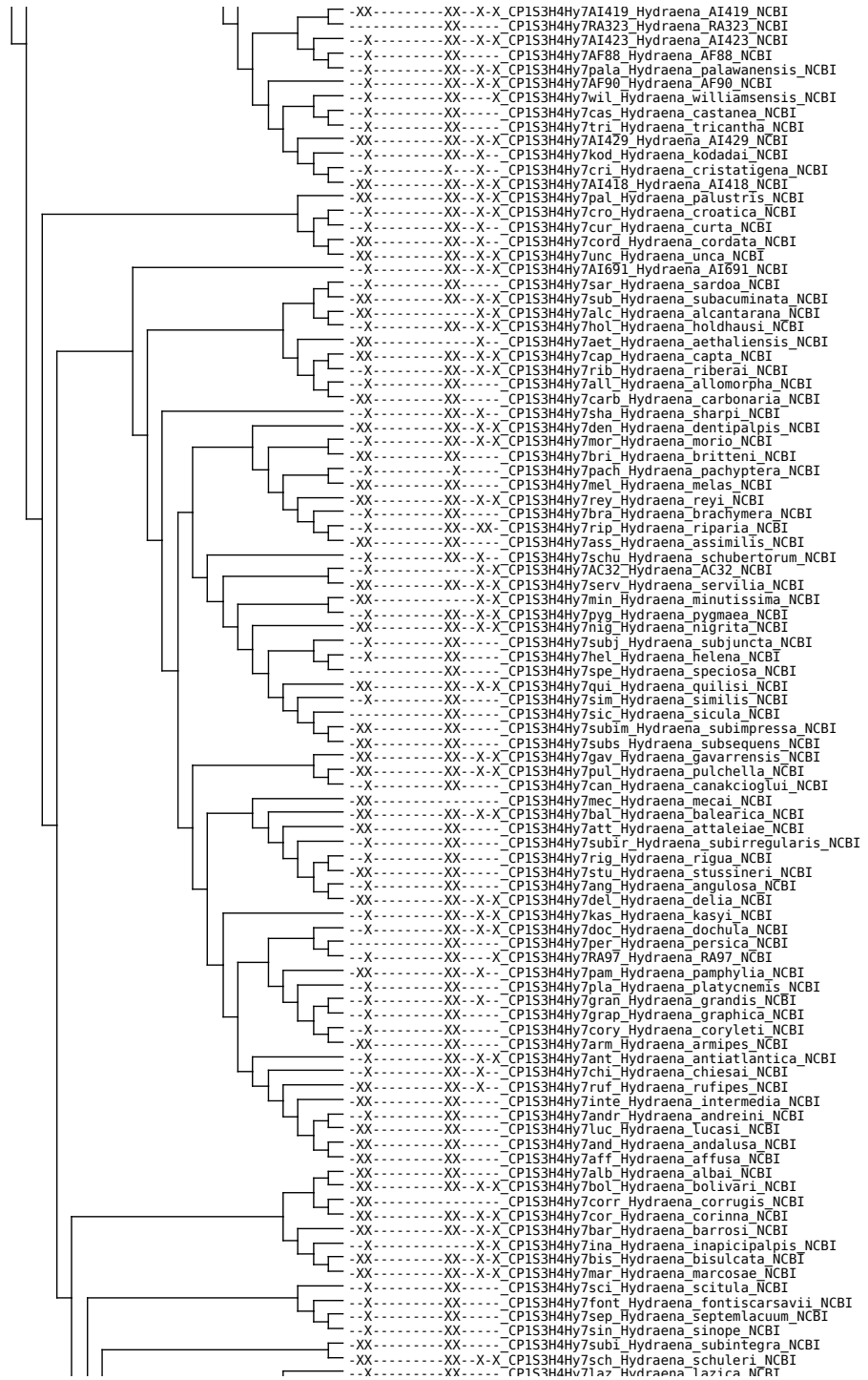


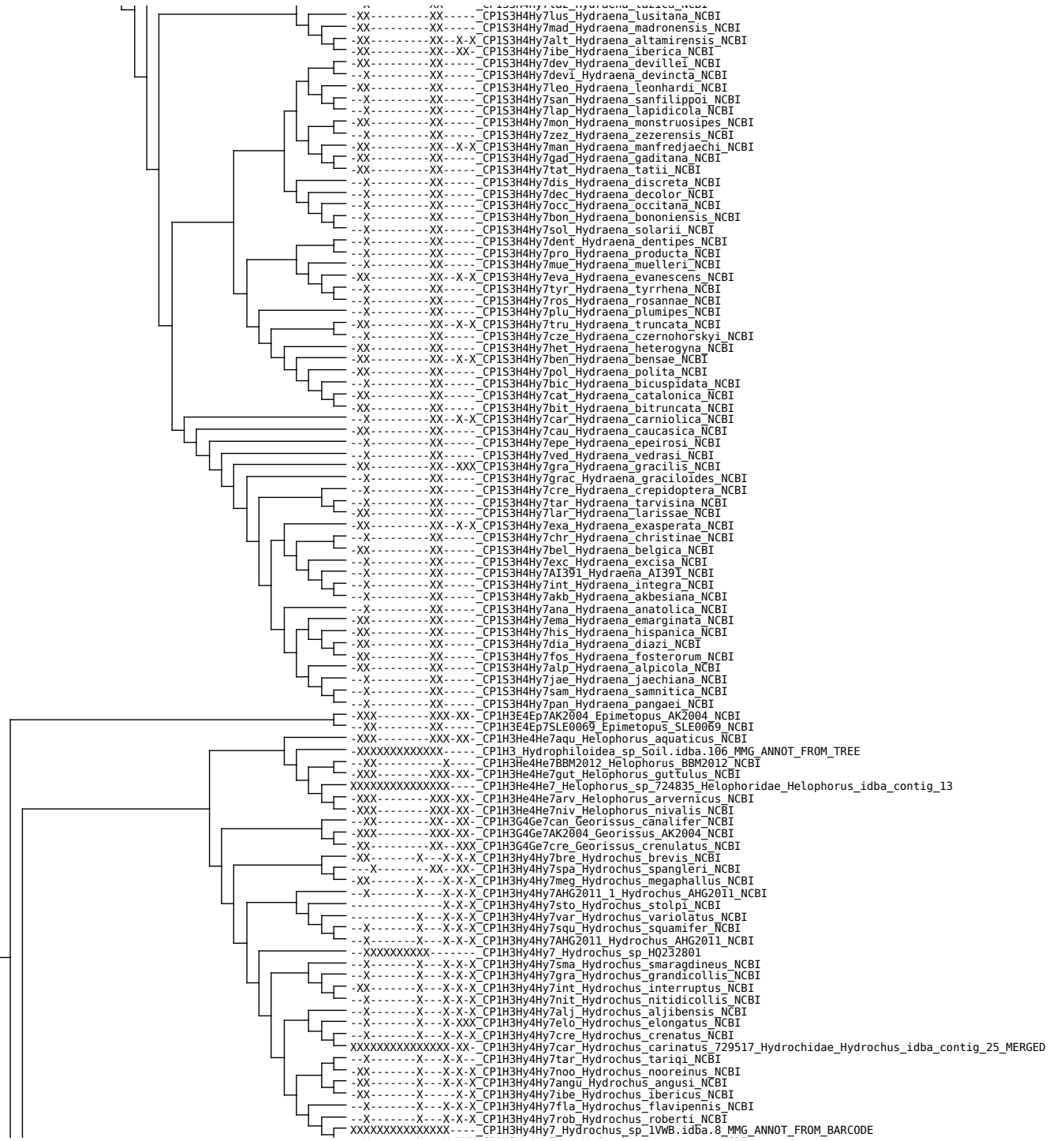


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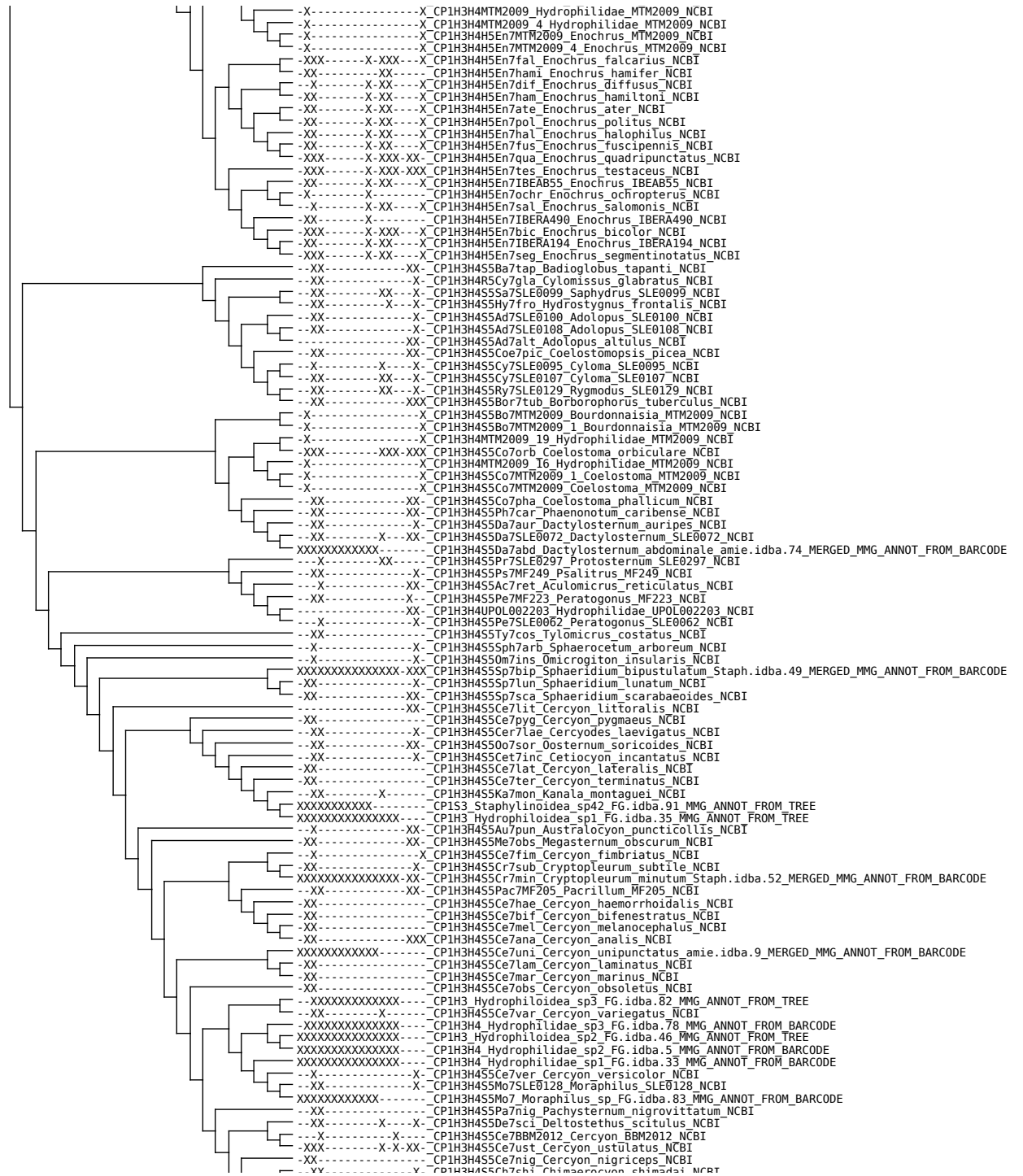
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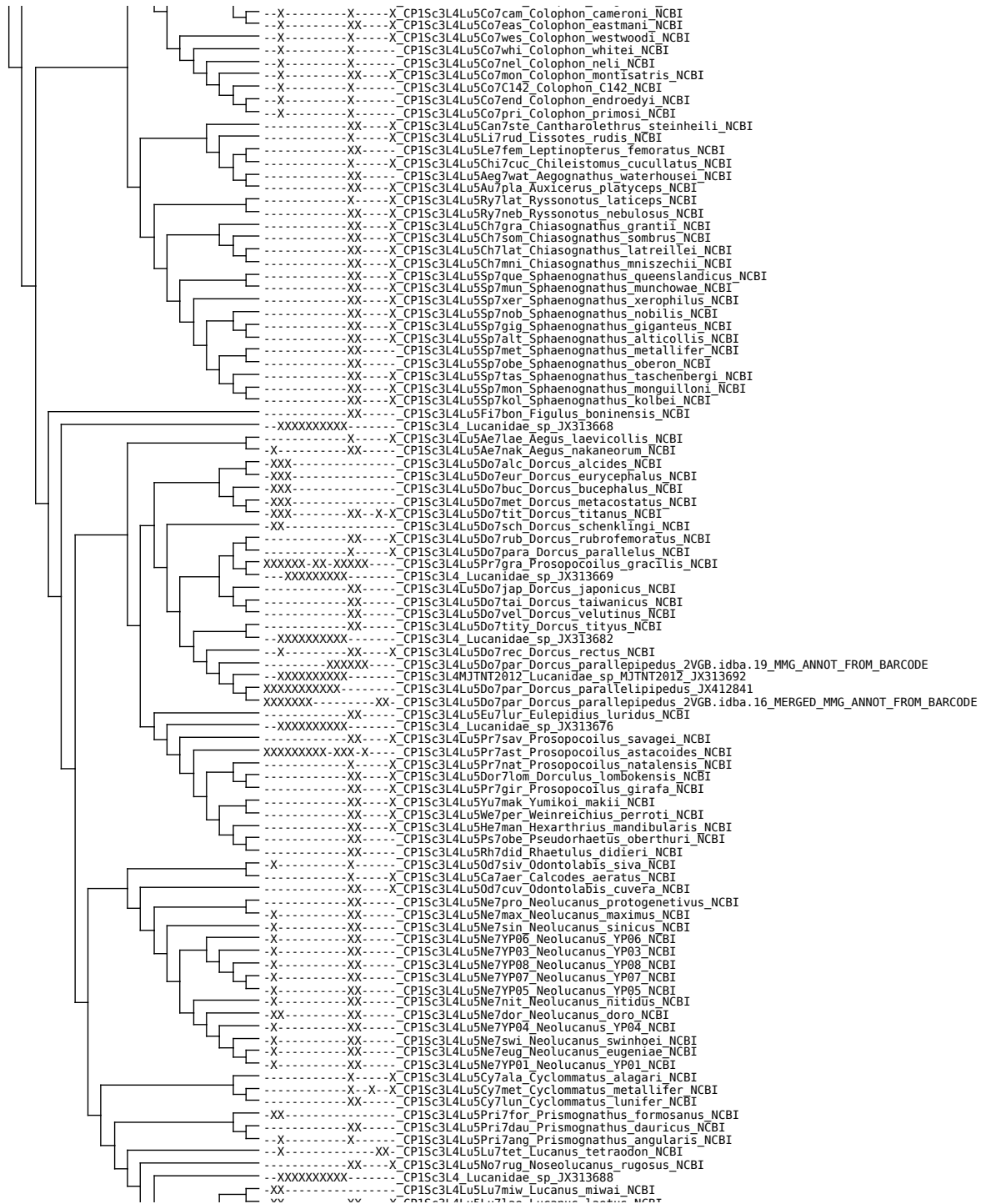


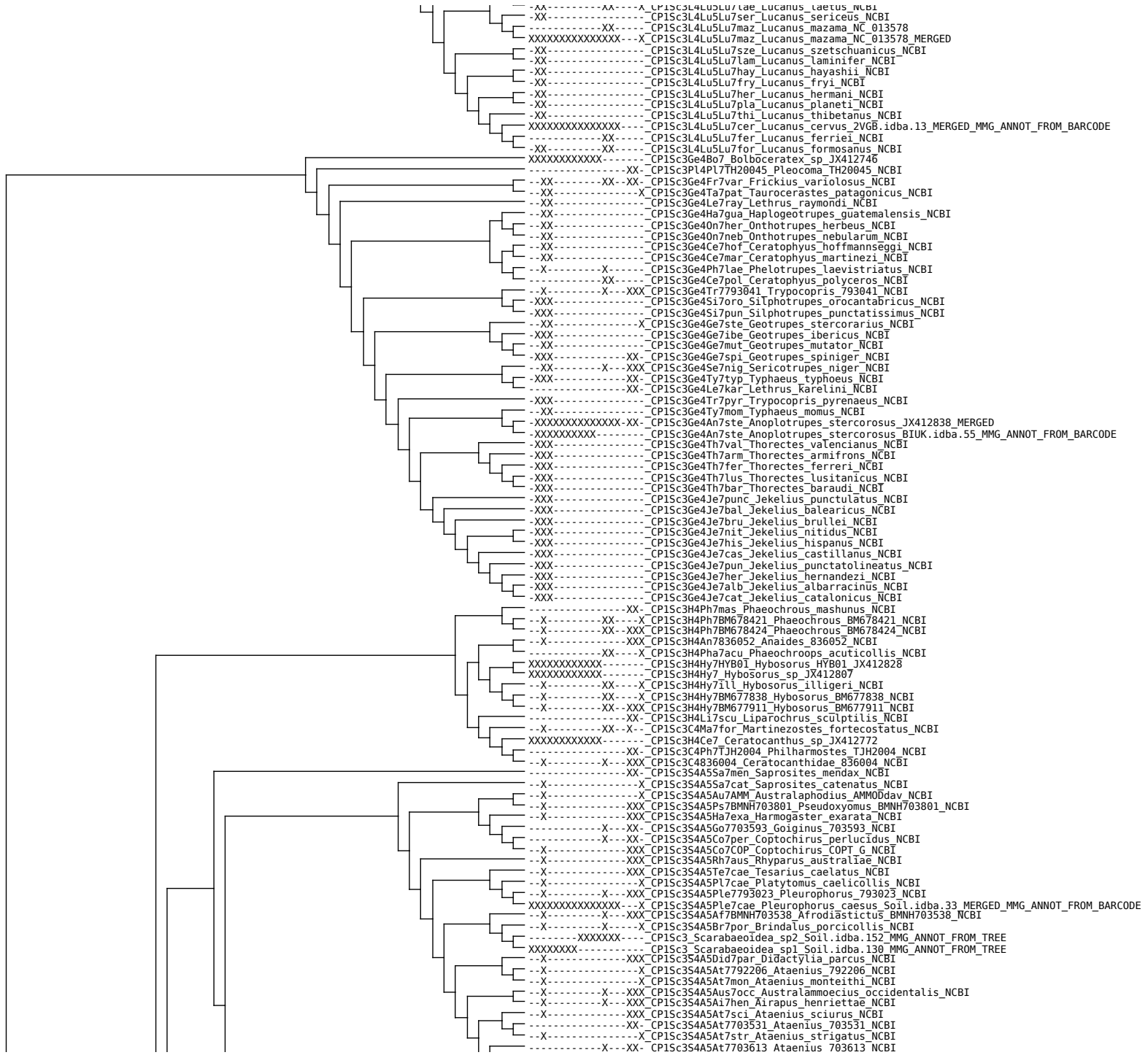
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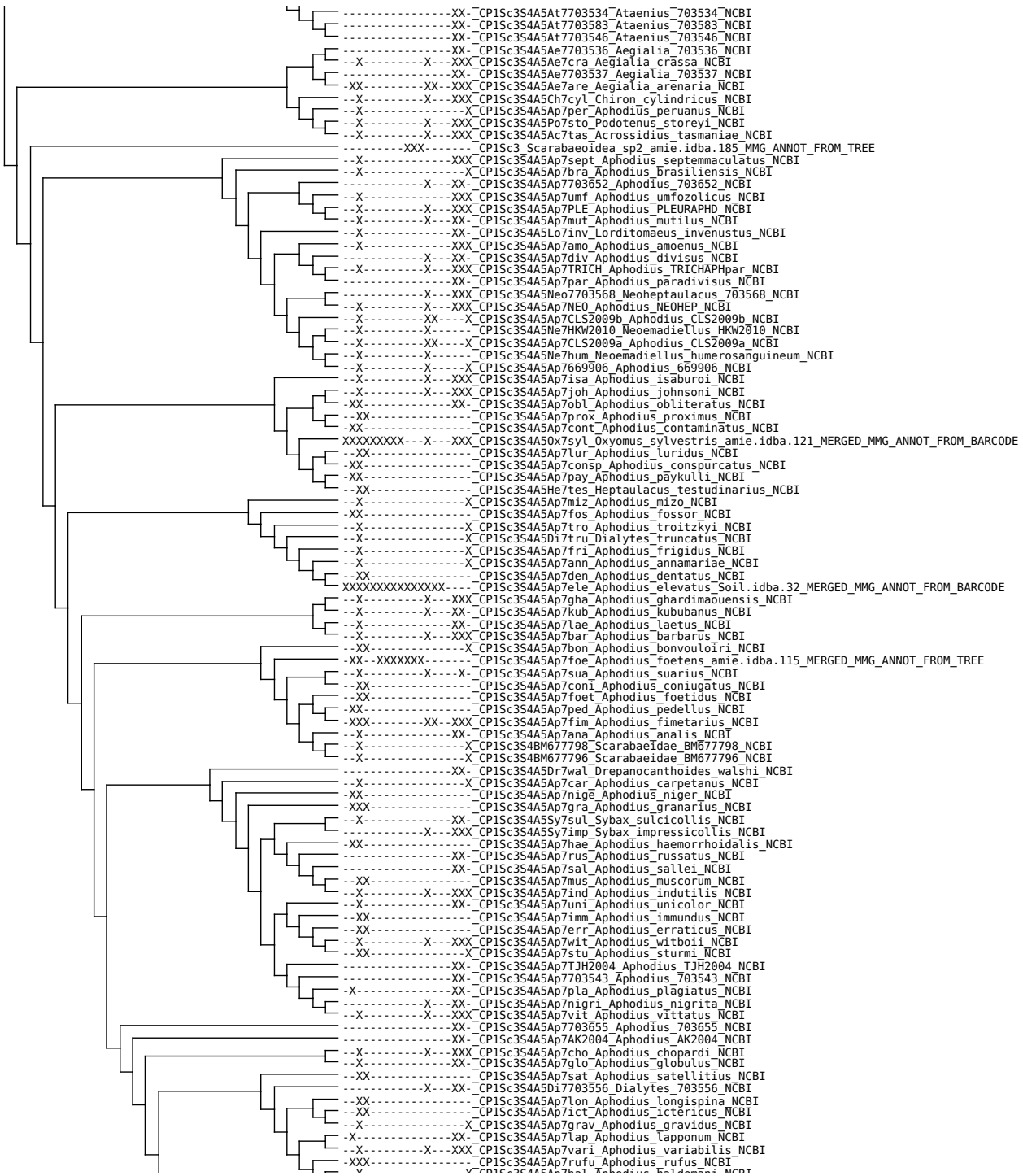
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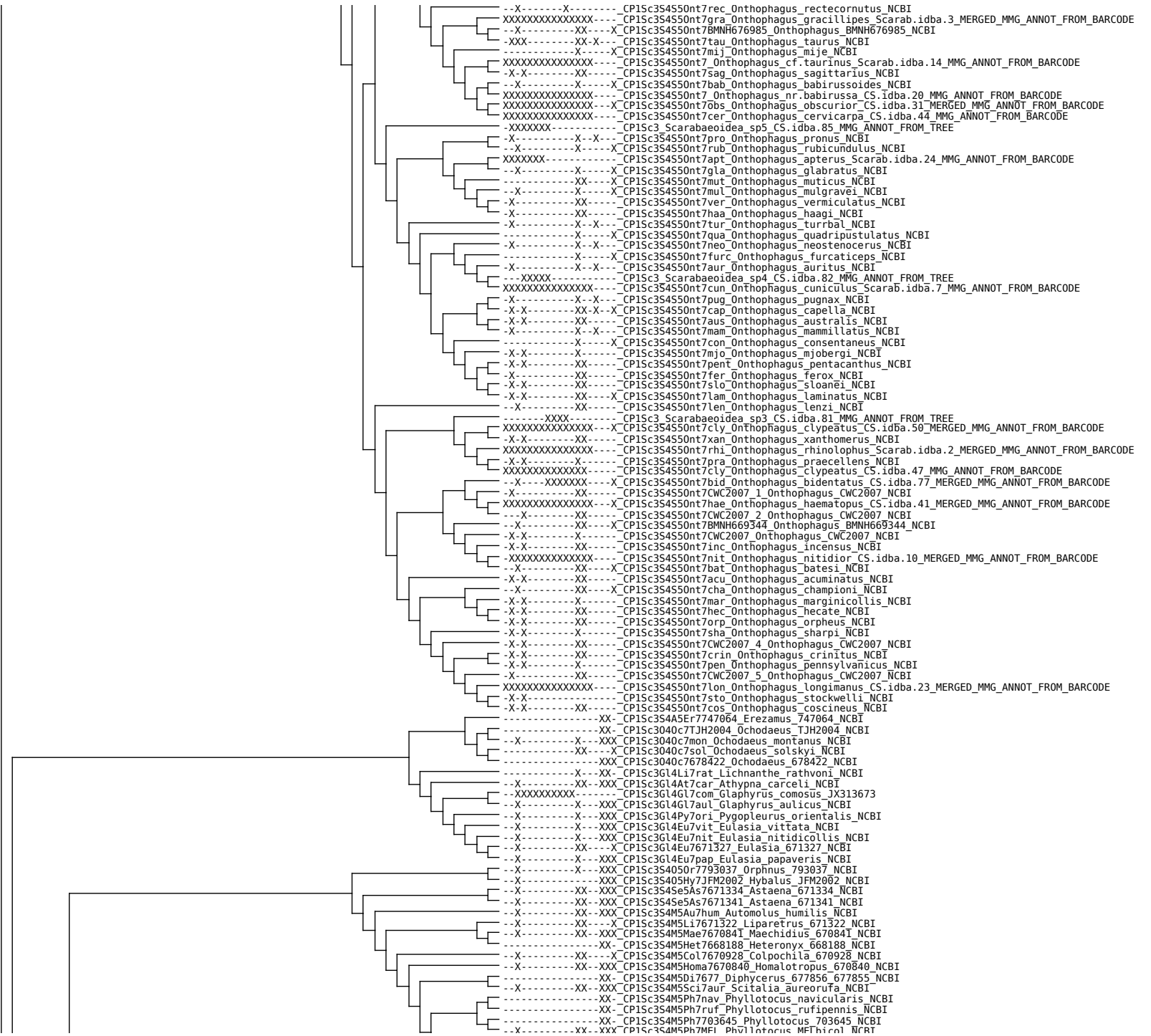
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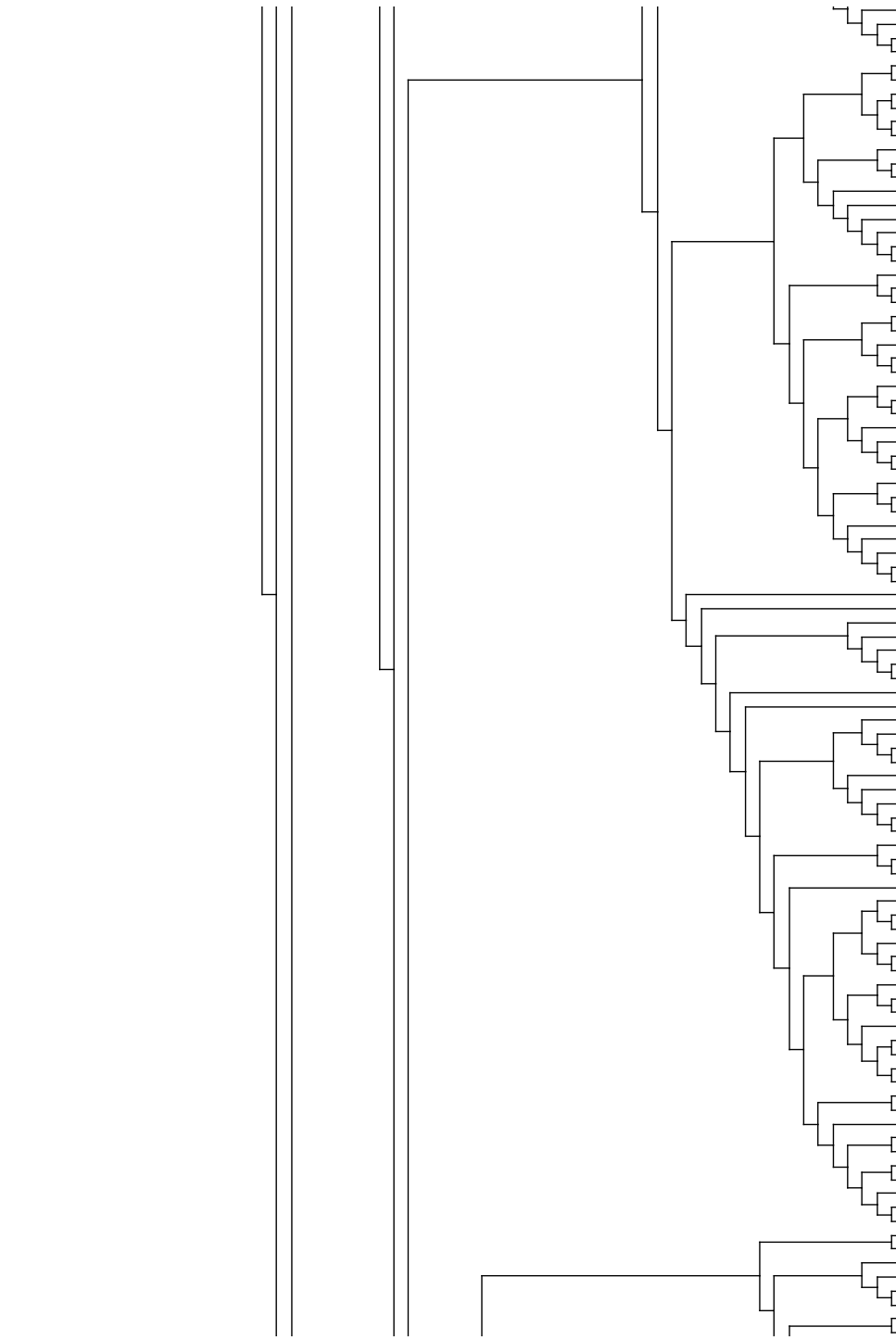


Phylogenetic tree showing relationships between various species, primarily Helictopleurus and Onthophagus. The tree is rooted on the left and branches out to the right. Species names are listed on the right side of the tree, often followed by accession numbers and database identifiers (e.g., NCBI, CS.idba). Some species names are followed by "MERGED_MMG_ANNOT_FROM_BARCODE" or "MMG_ANNOT_FROM_TREE". The tree shows a clear division between Helictopleurus and Onthophagus, with Helictopleurus species generally clustered together and Onthophagus species forming a large, diverse clade. The Onthophagus clade includes many species from the Scarabaeidae family, such as Onthophagus, Scarabaeidae, and related genera. The tree is a complex network of lines representing evolutionary relationships, with some species having multiple accessions or being part of larger clades. The overall structure is a typical phylogenetic tree with a clear hierarchy and branching pattern.



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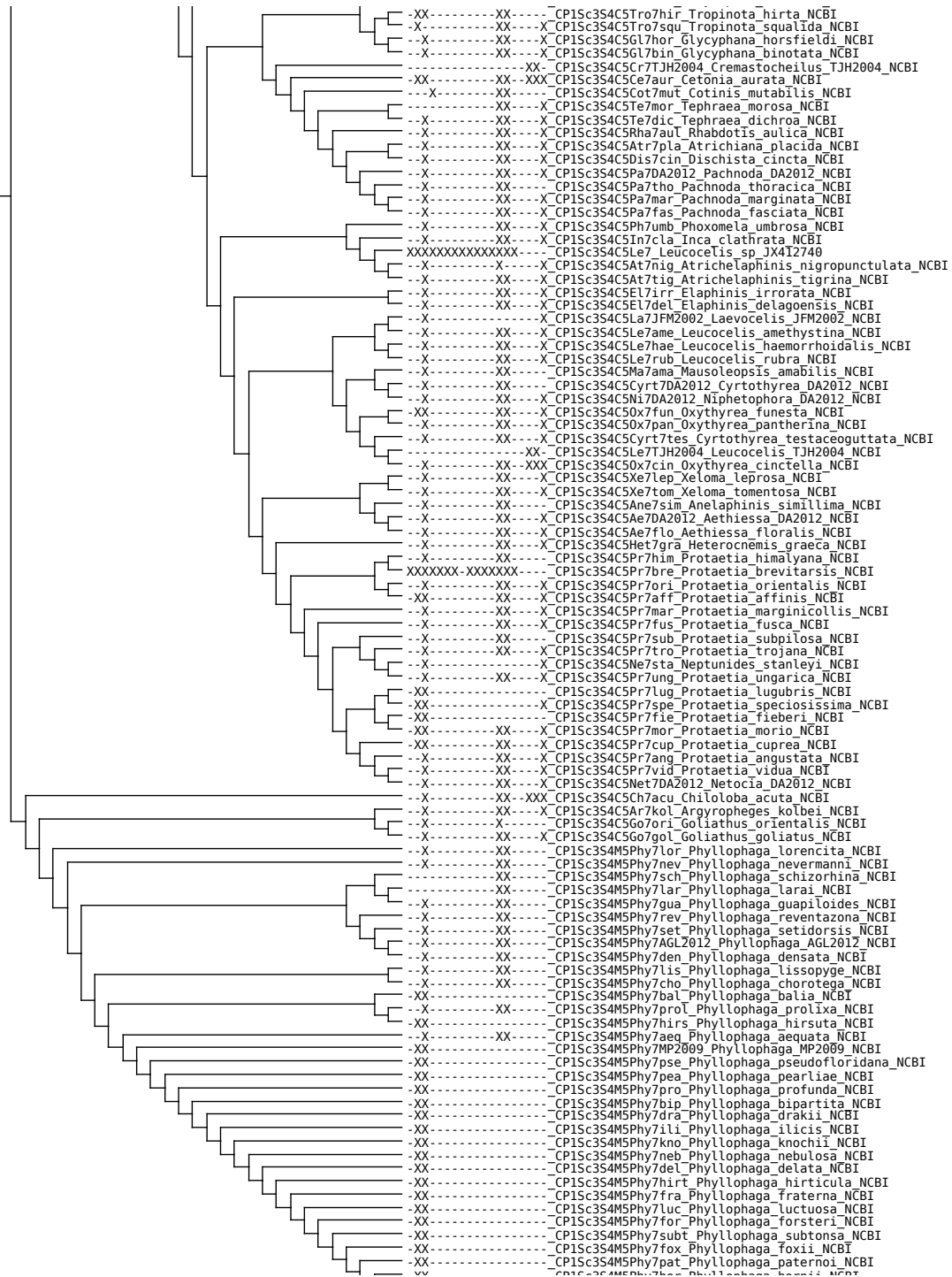
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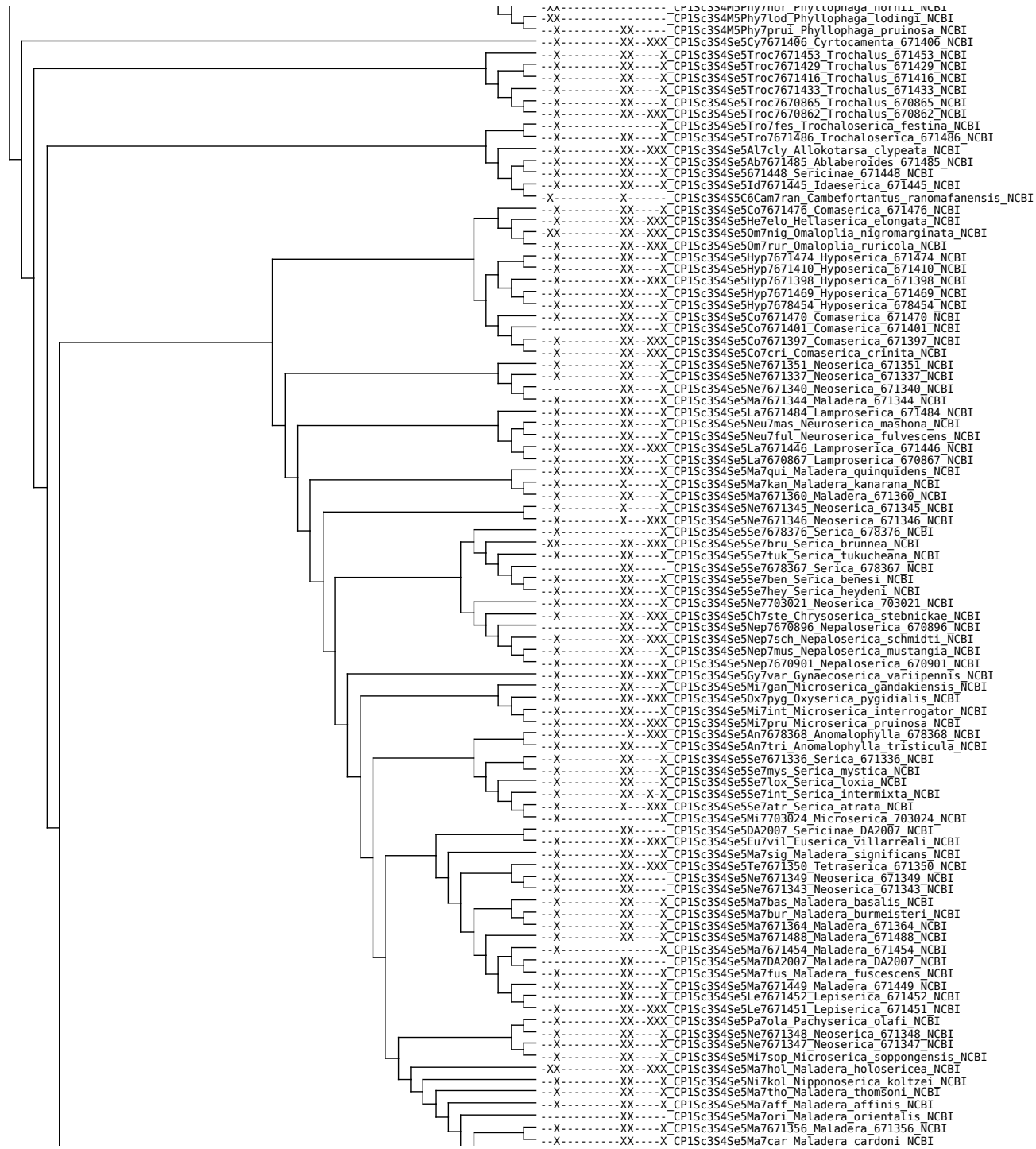


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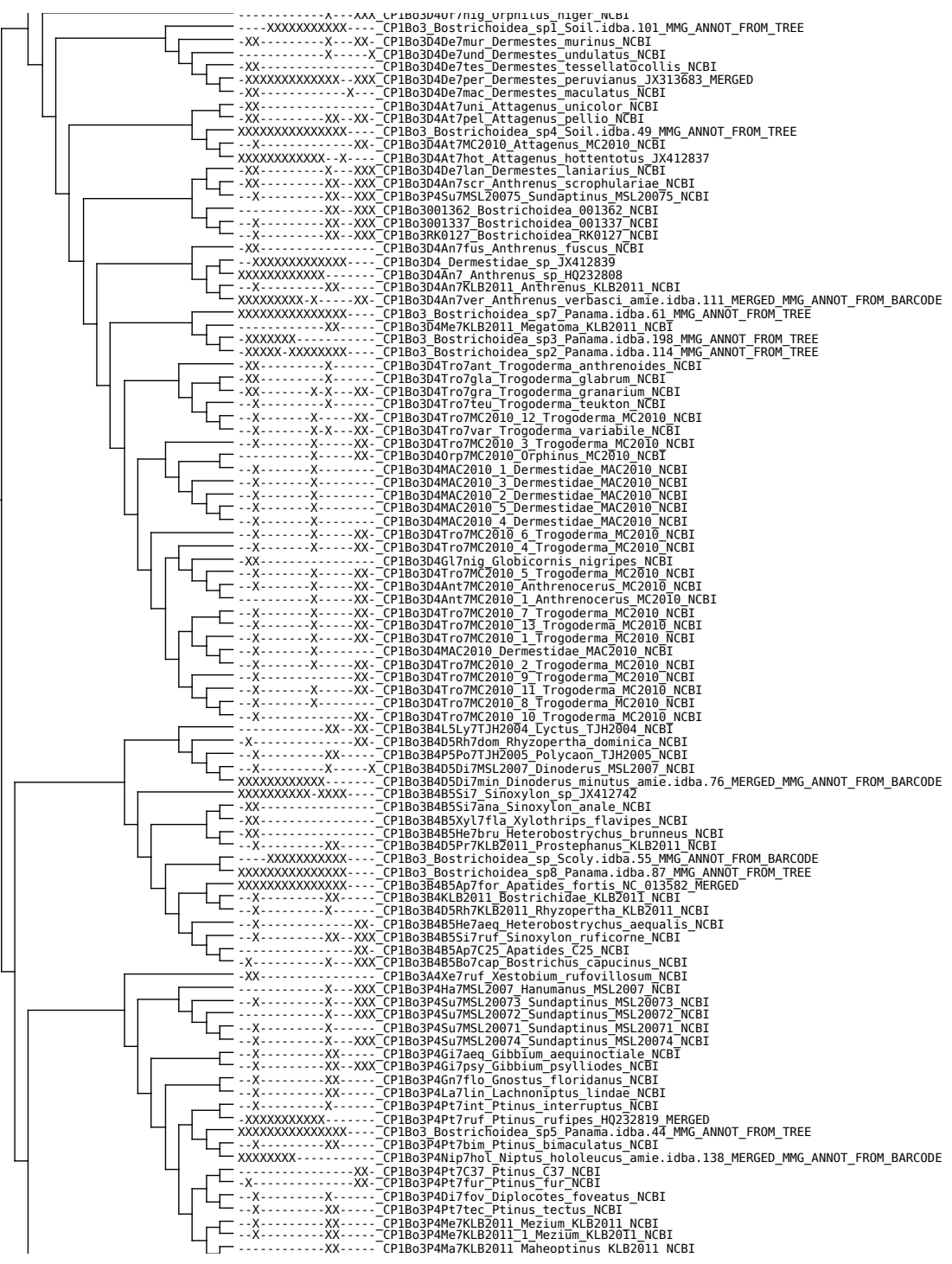
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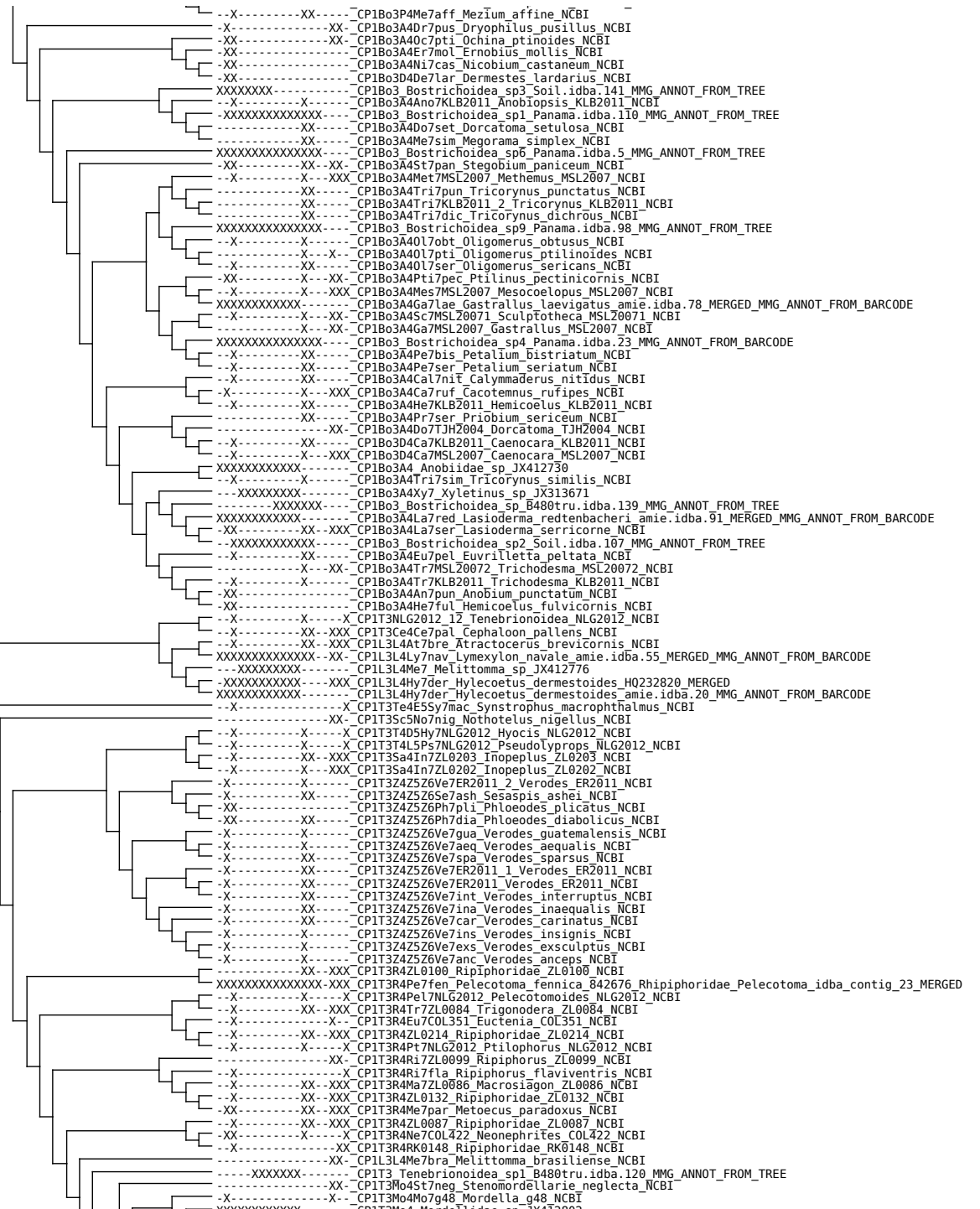












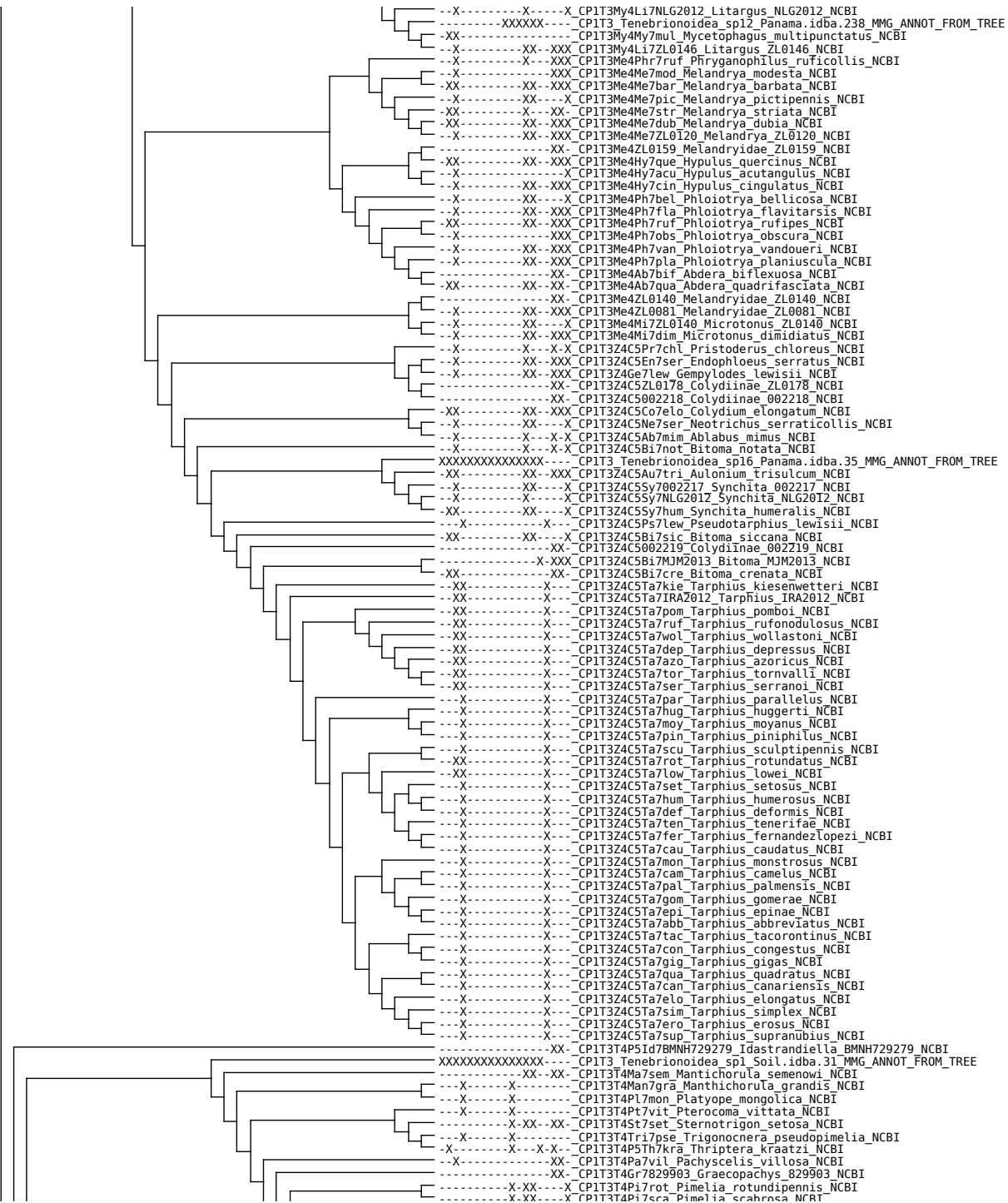








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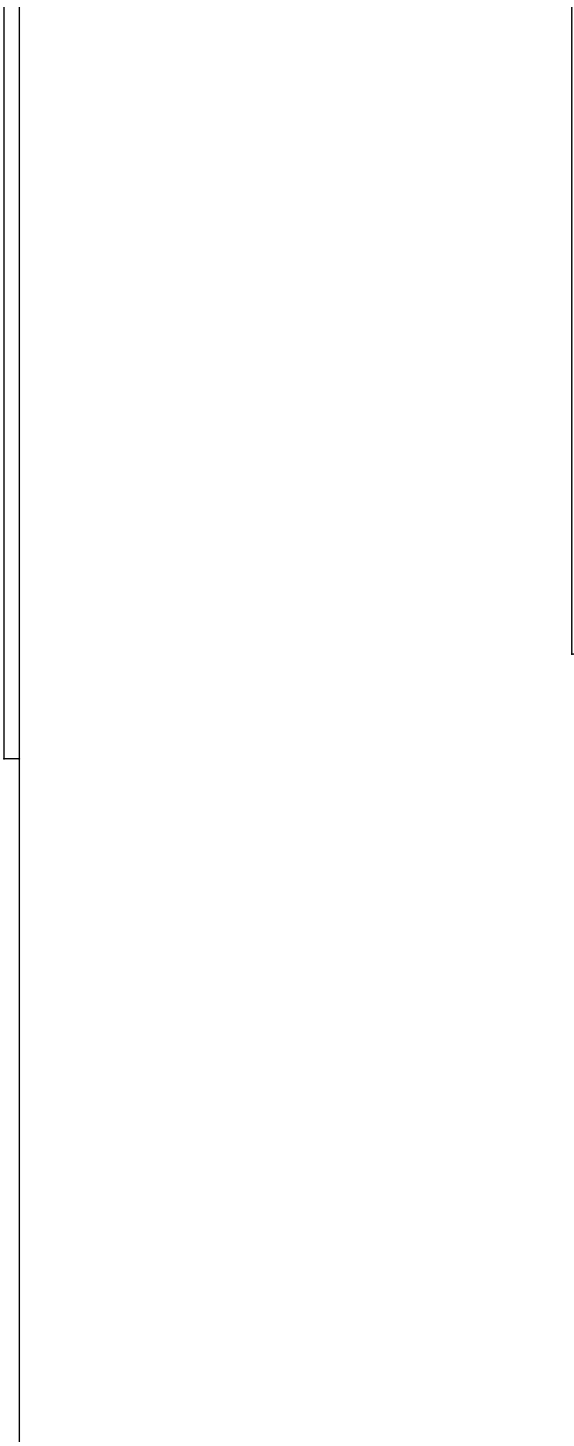
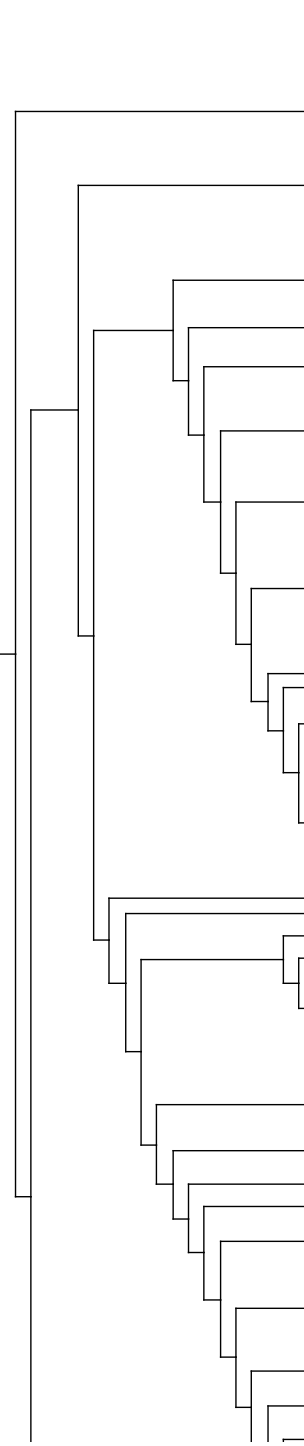






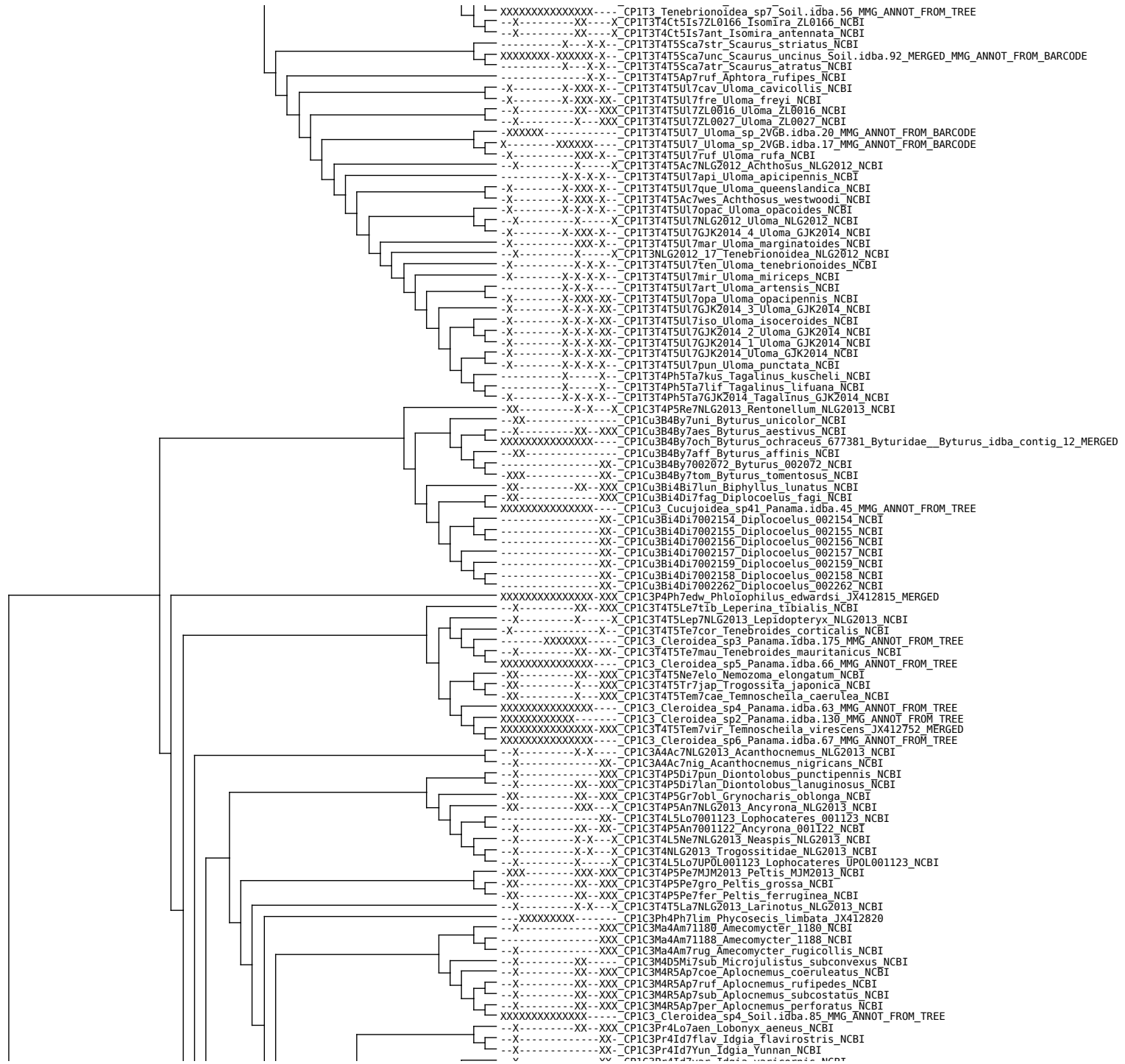


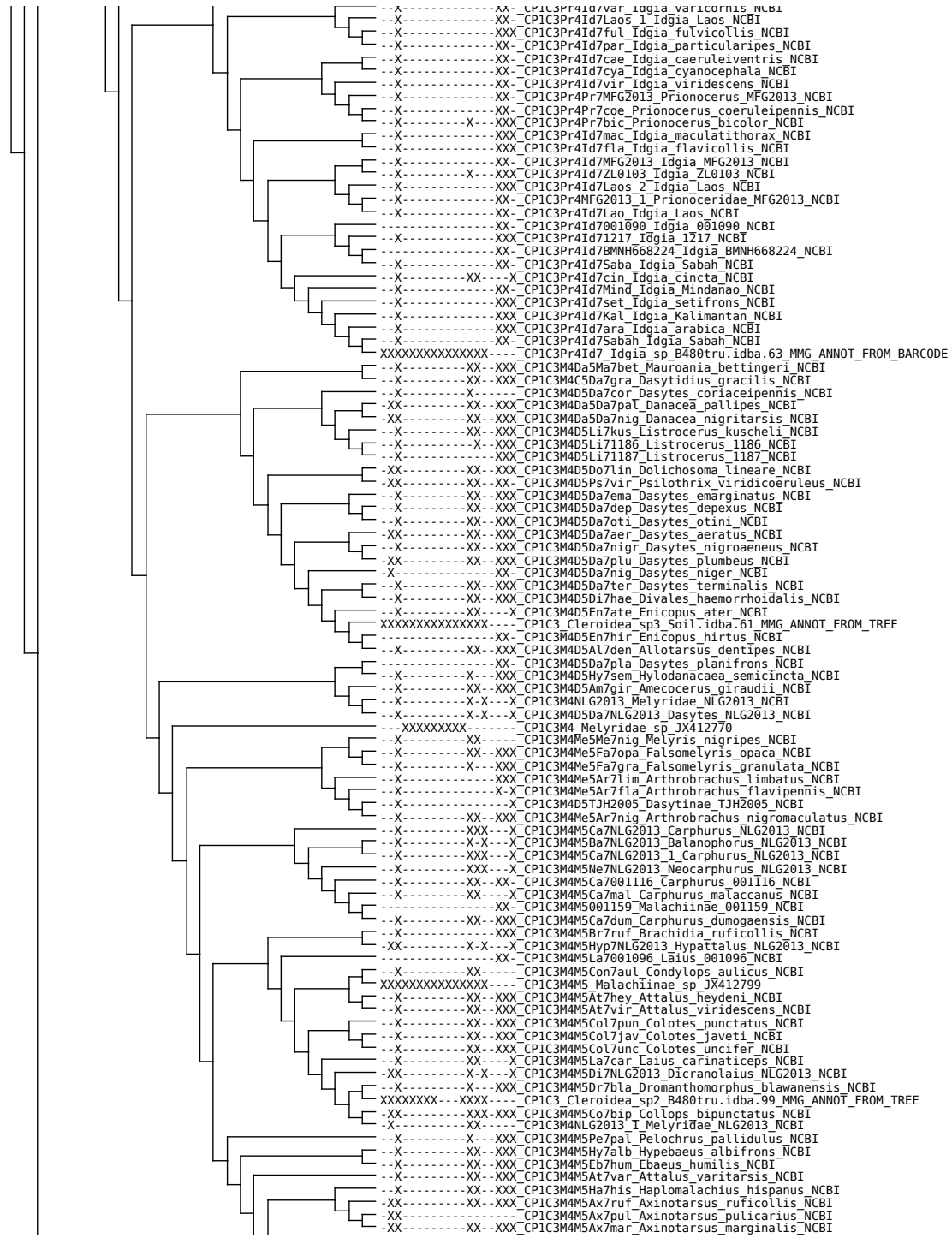
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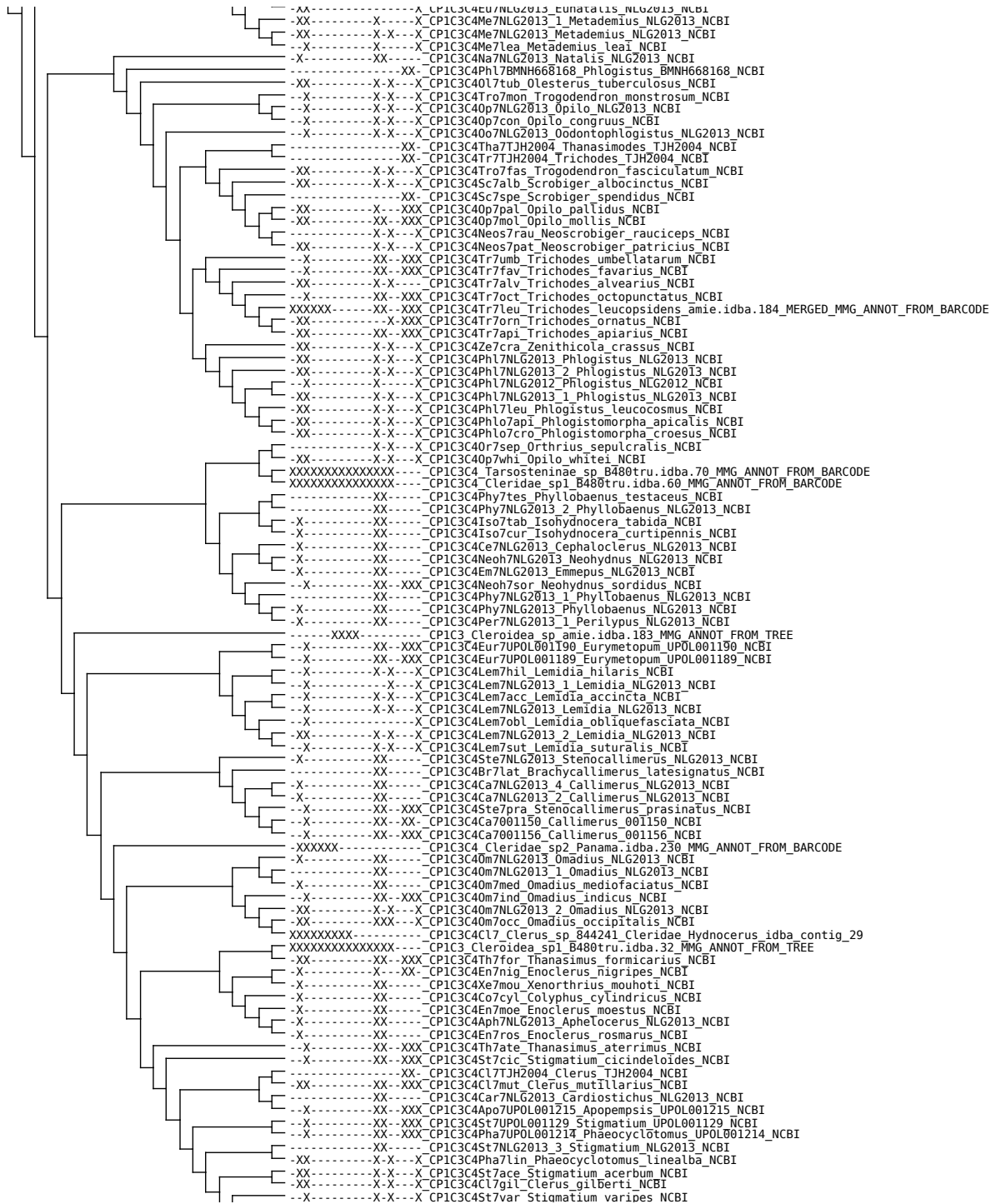


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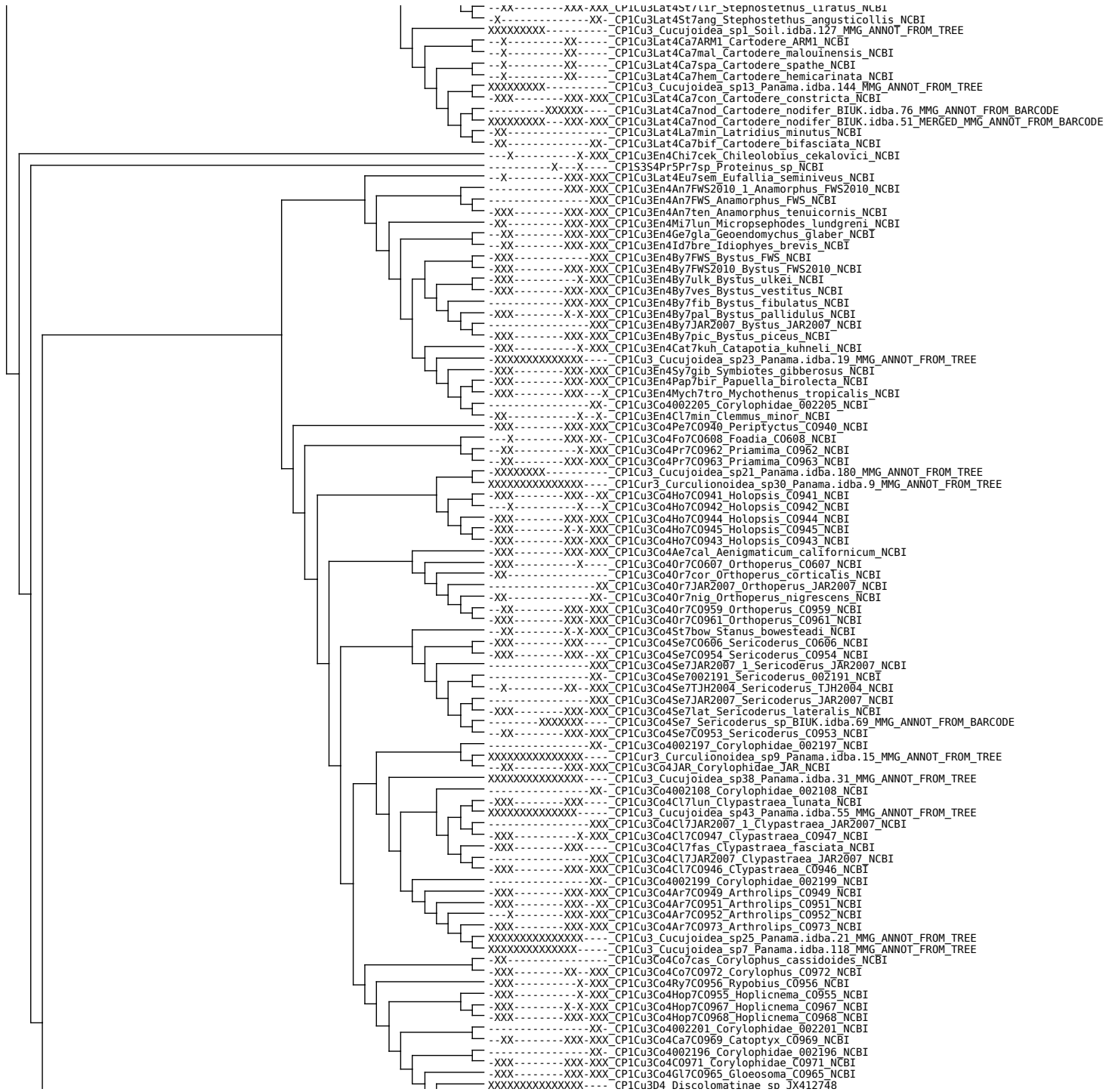


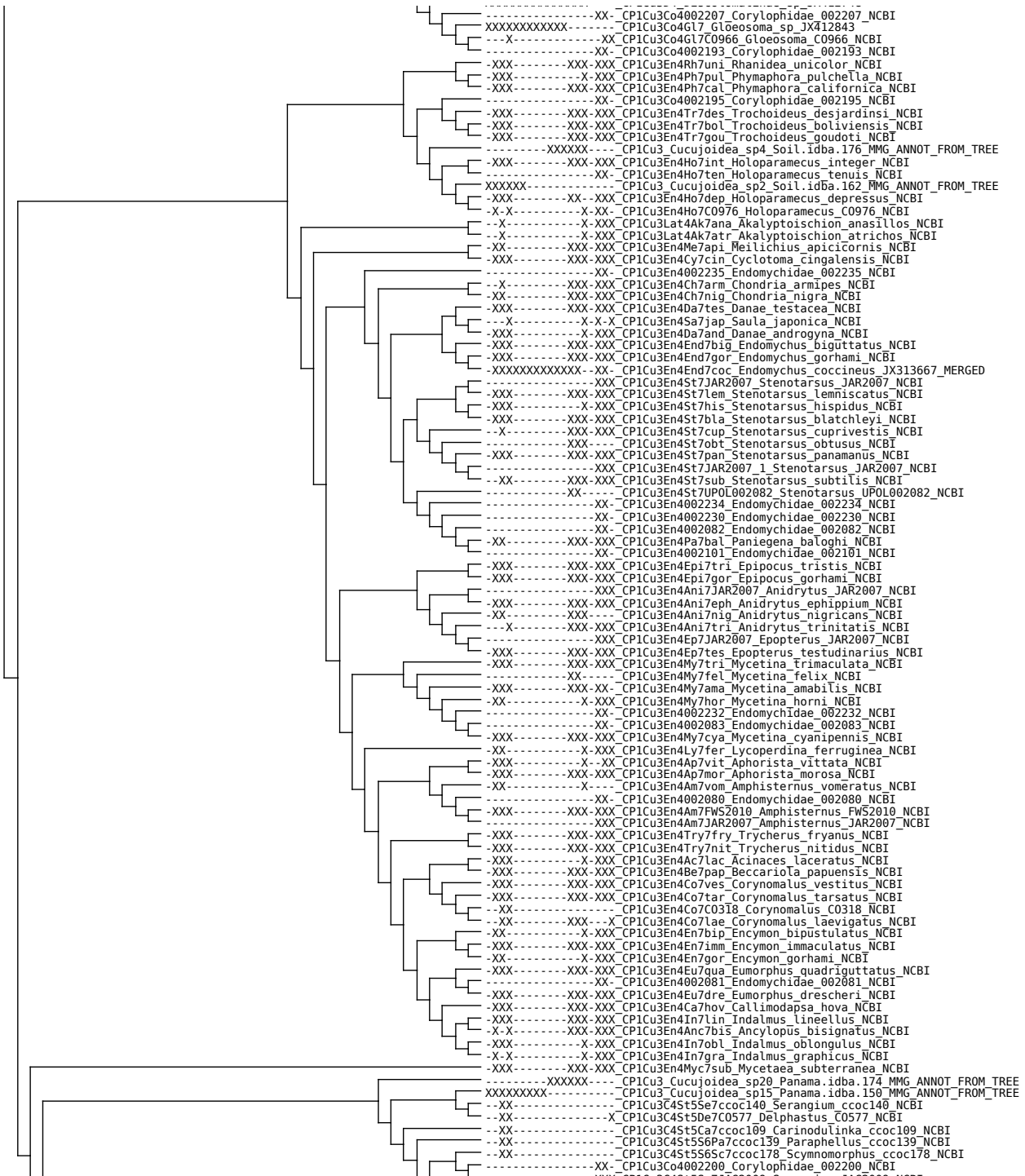


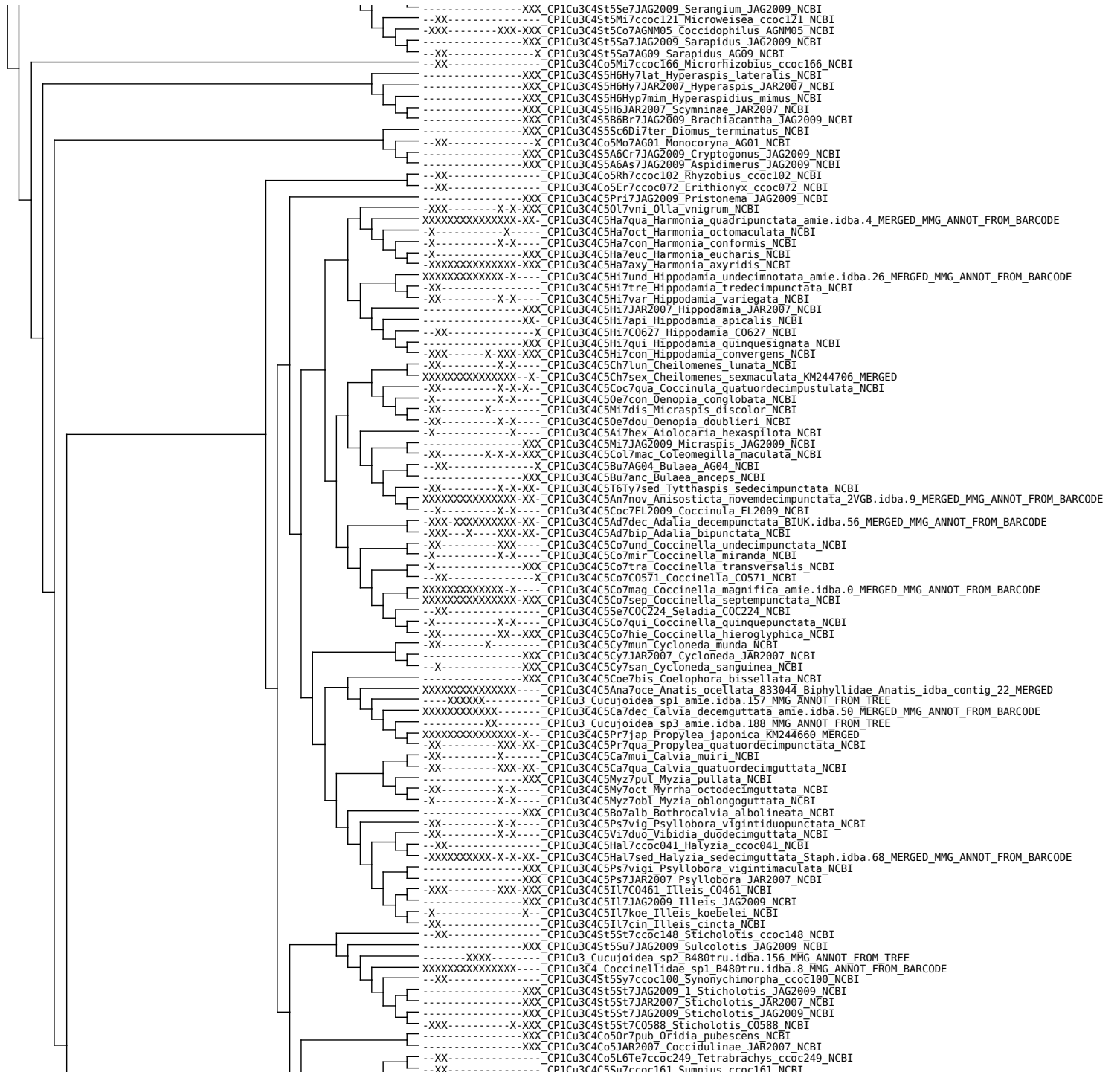


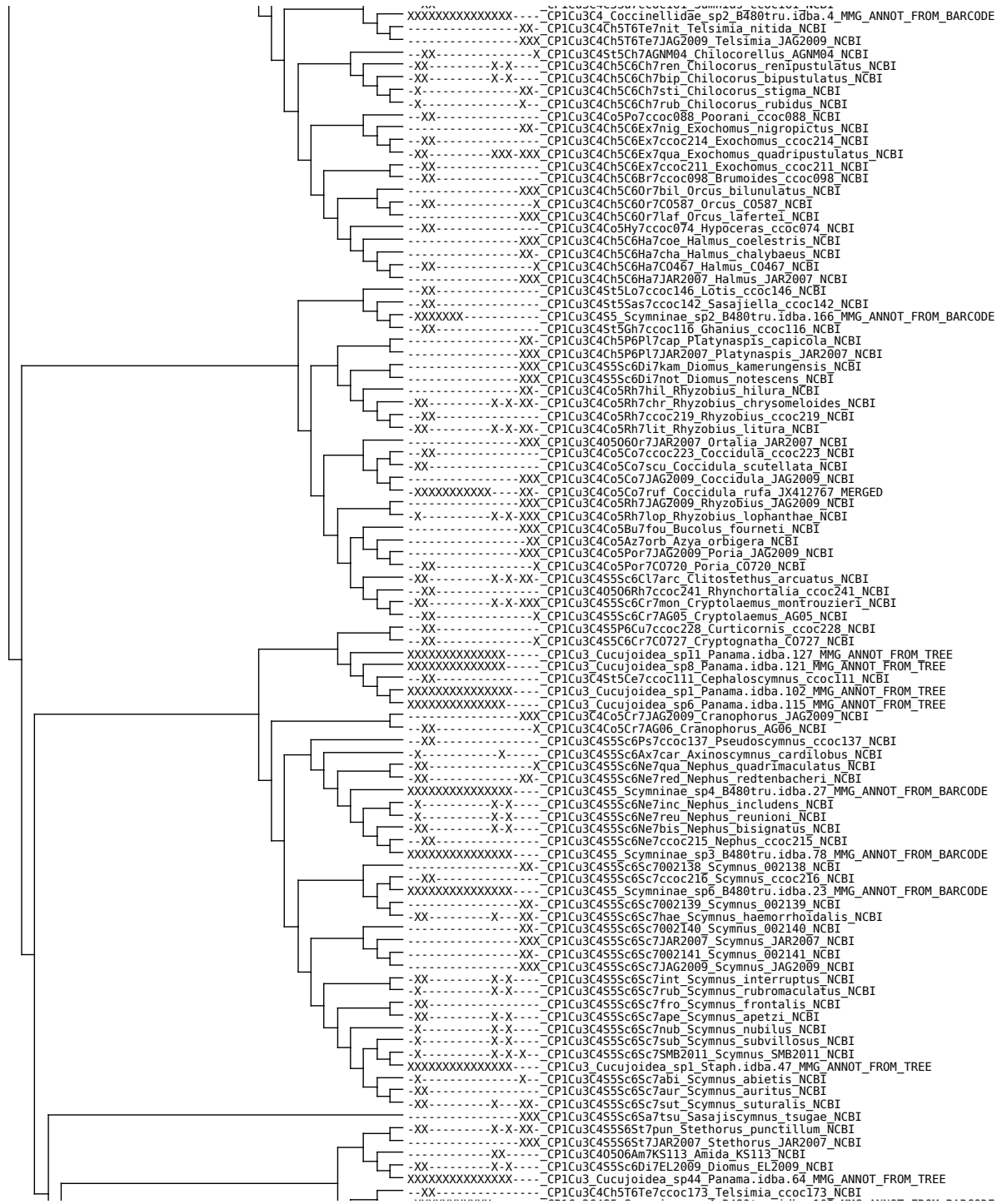




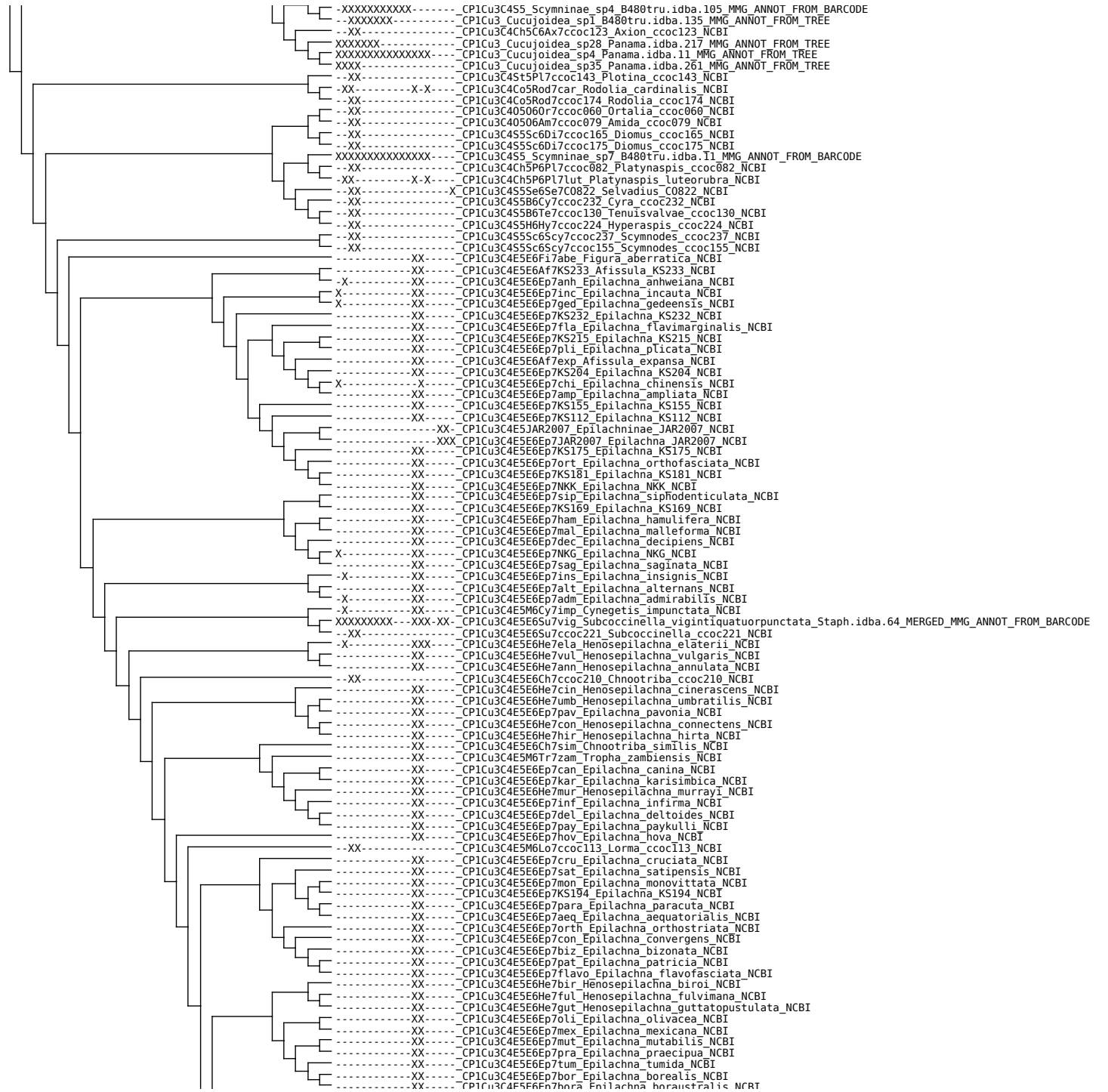






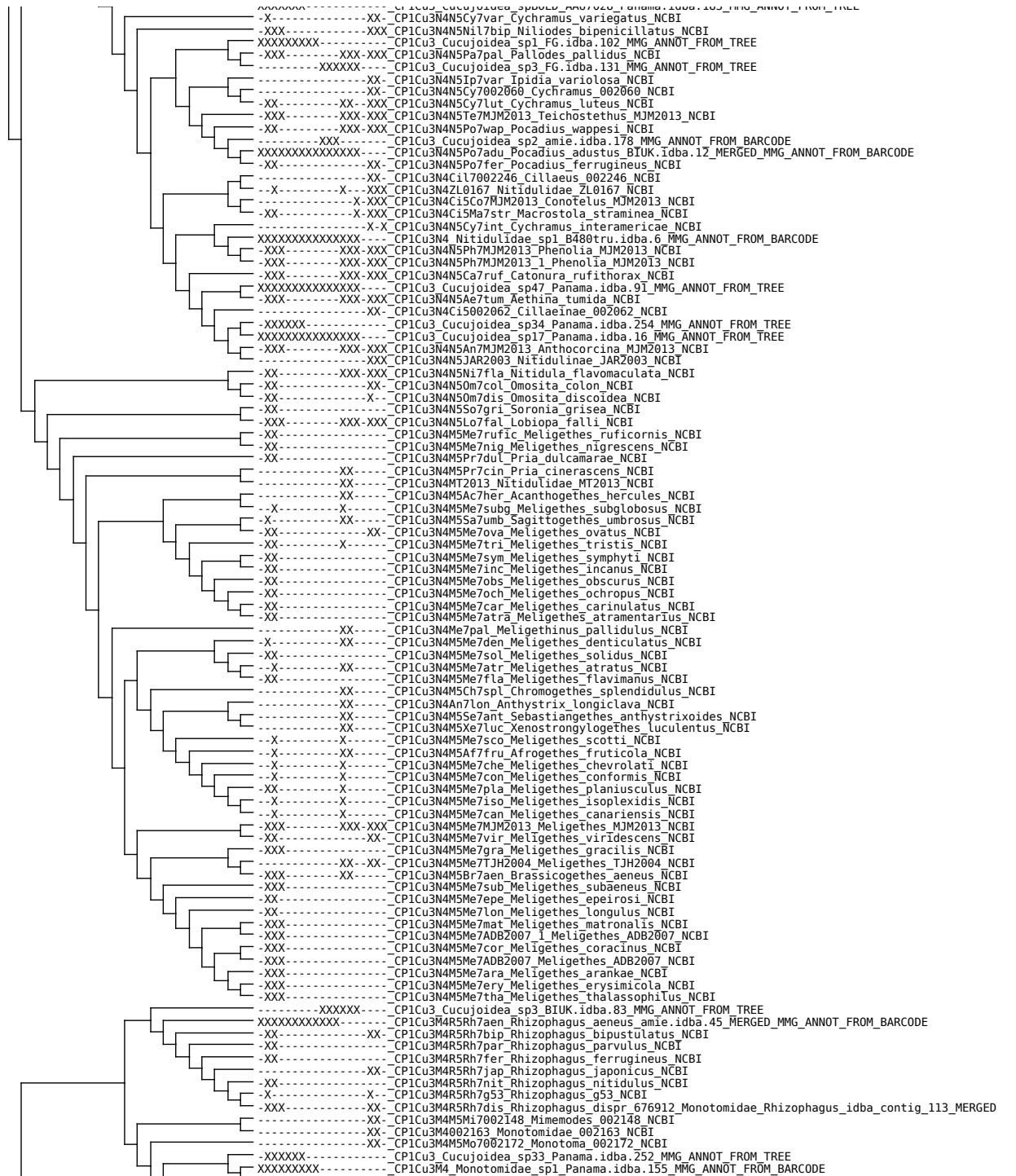


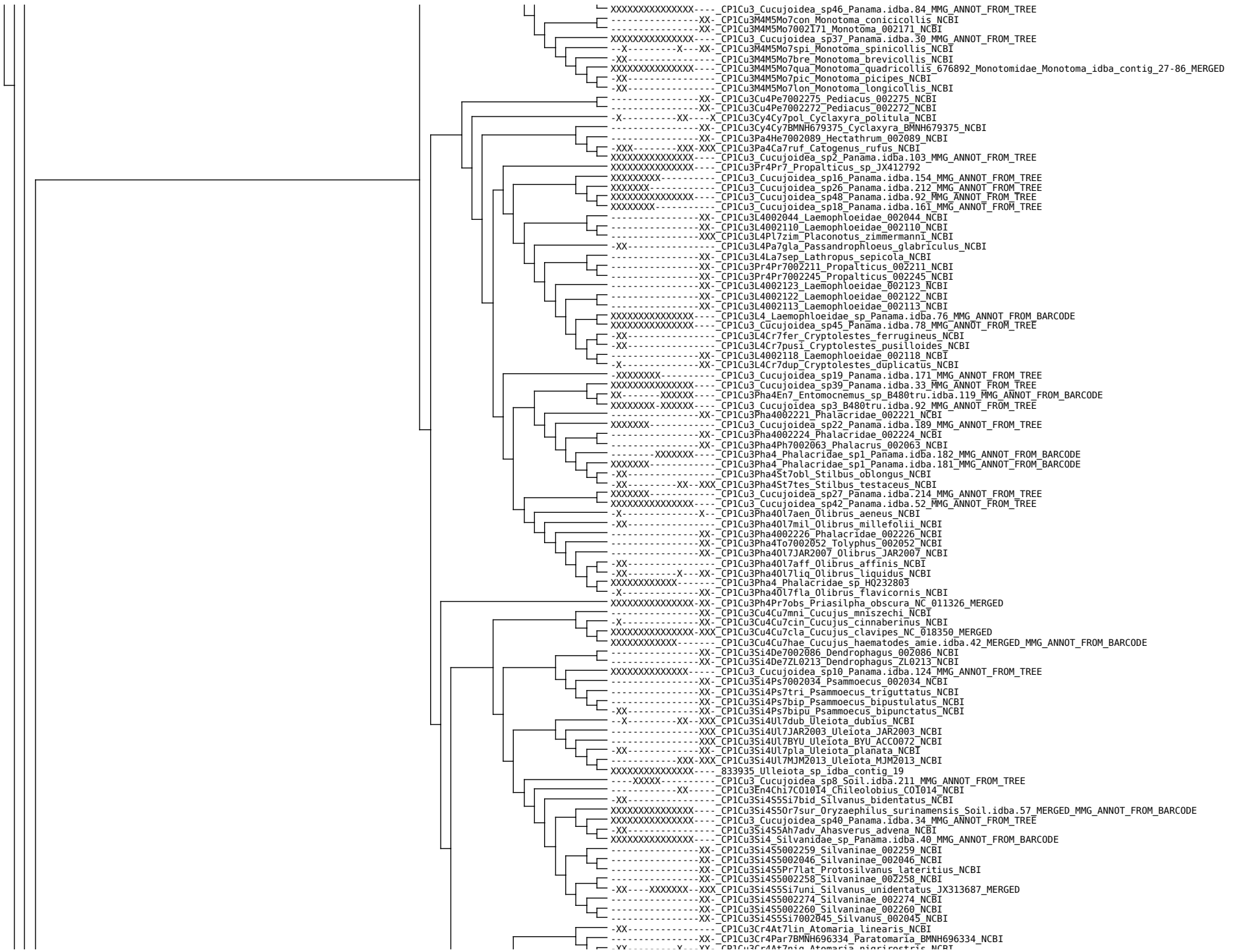
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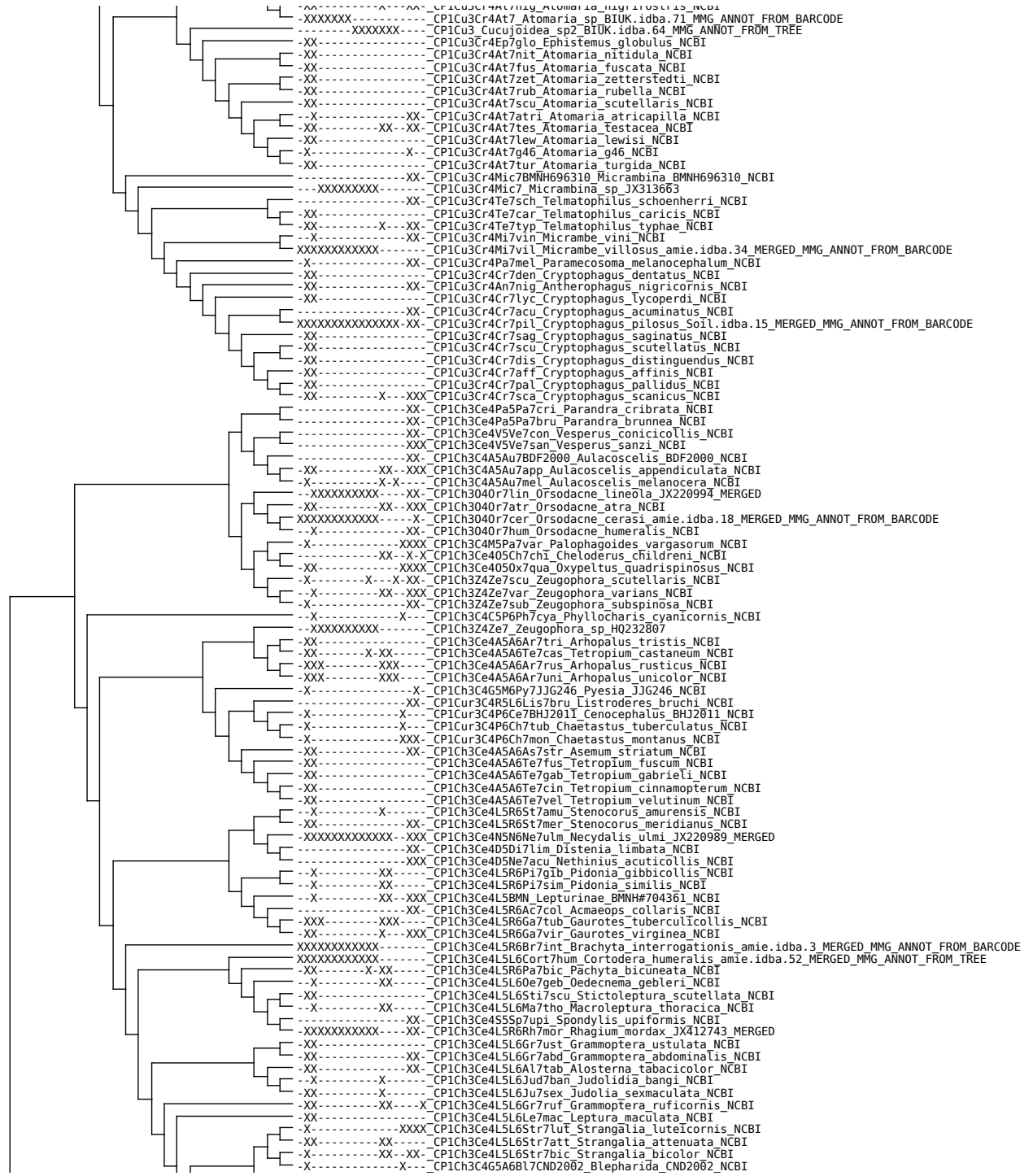


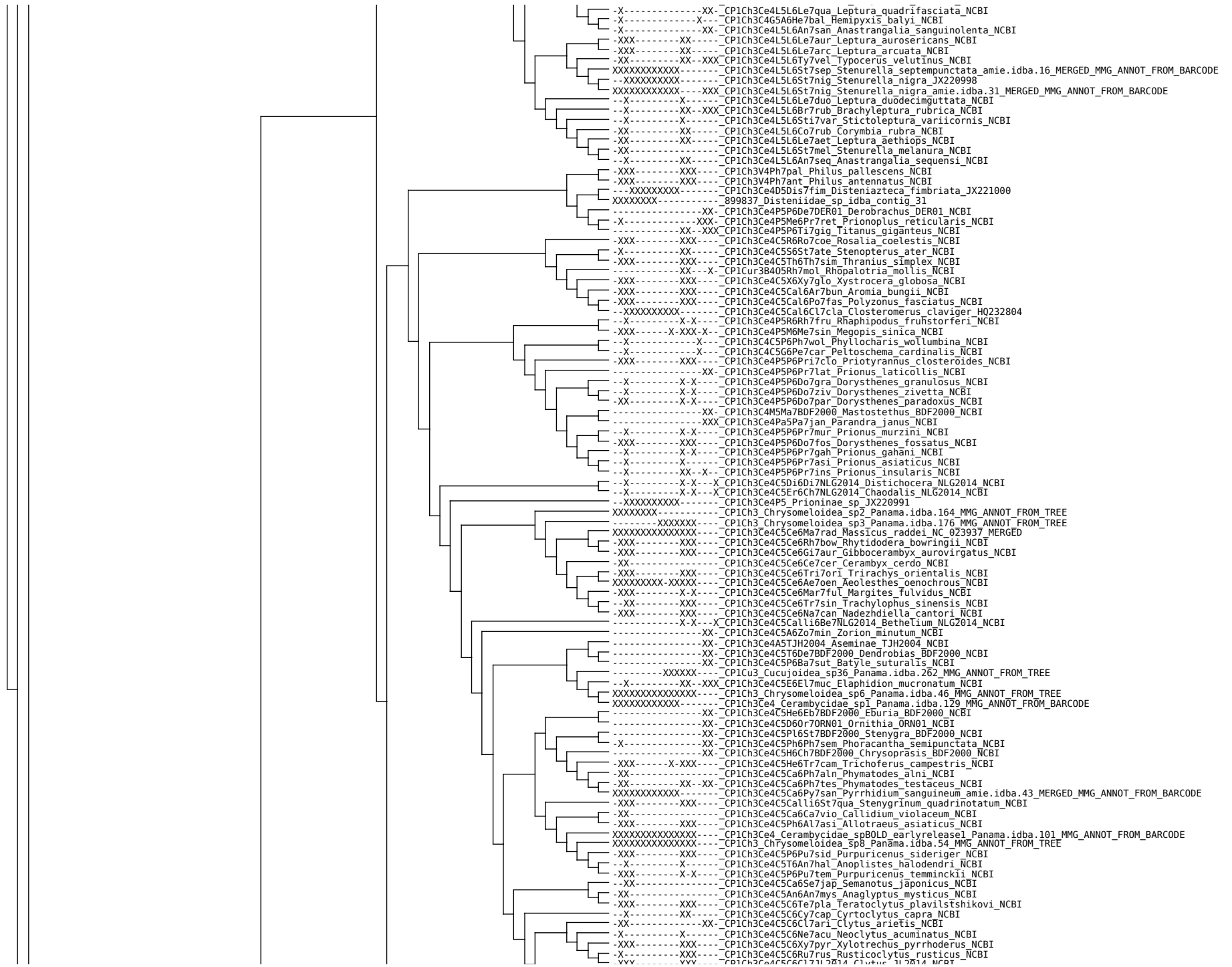




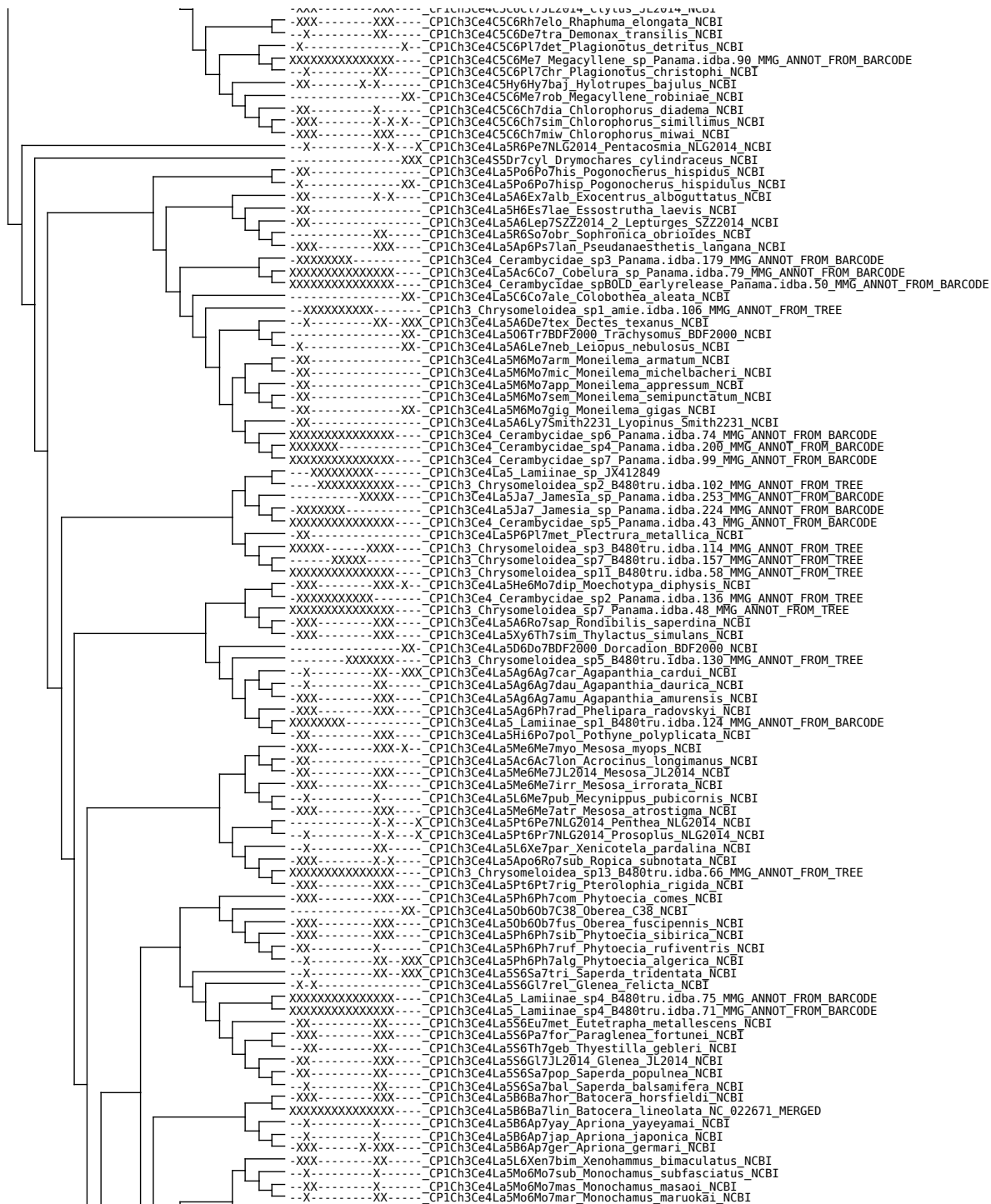




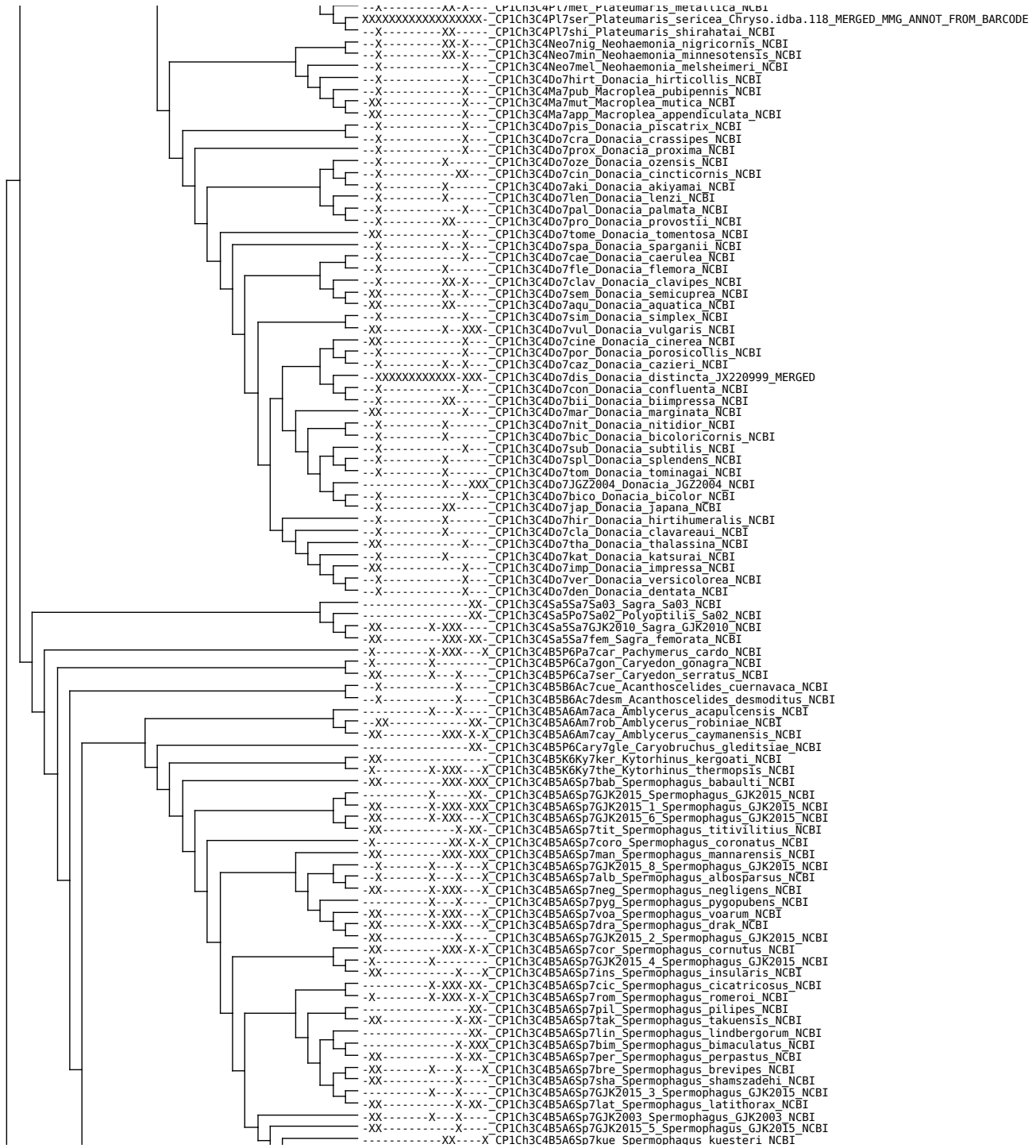


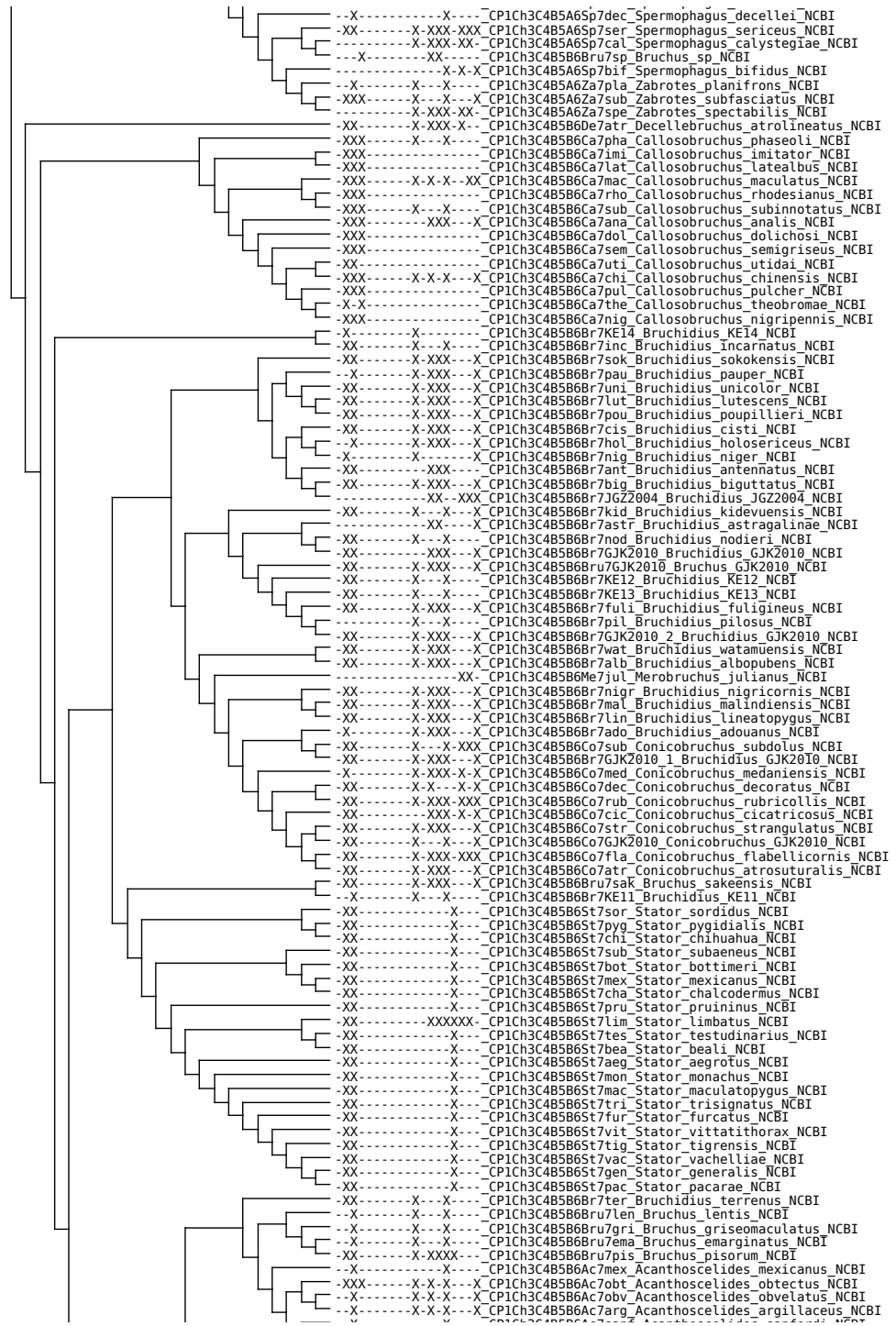


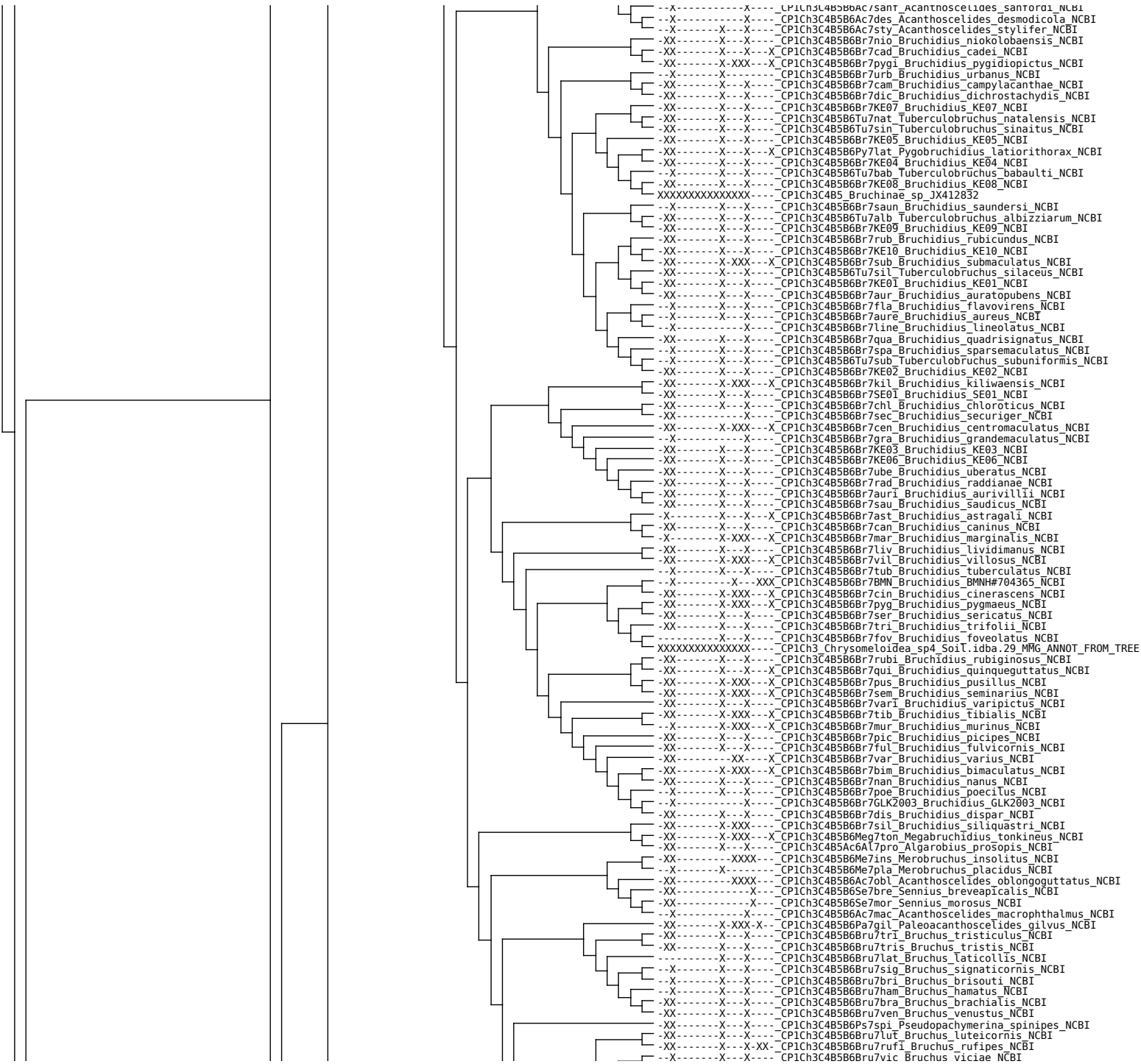
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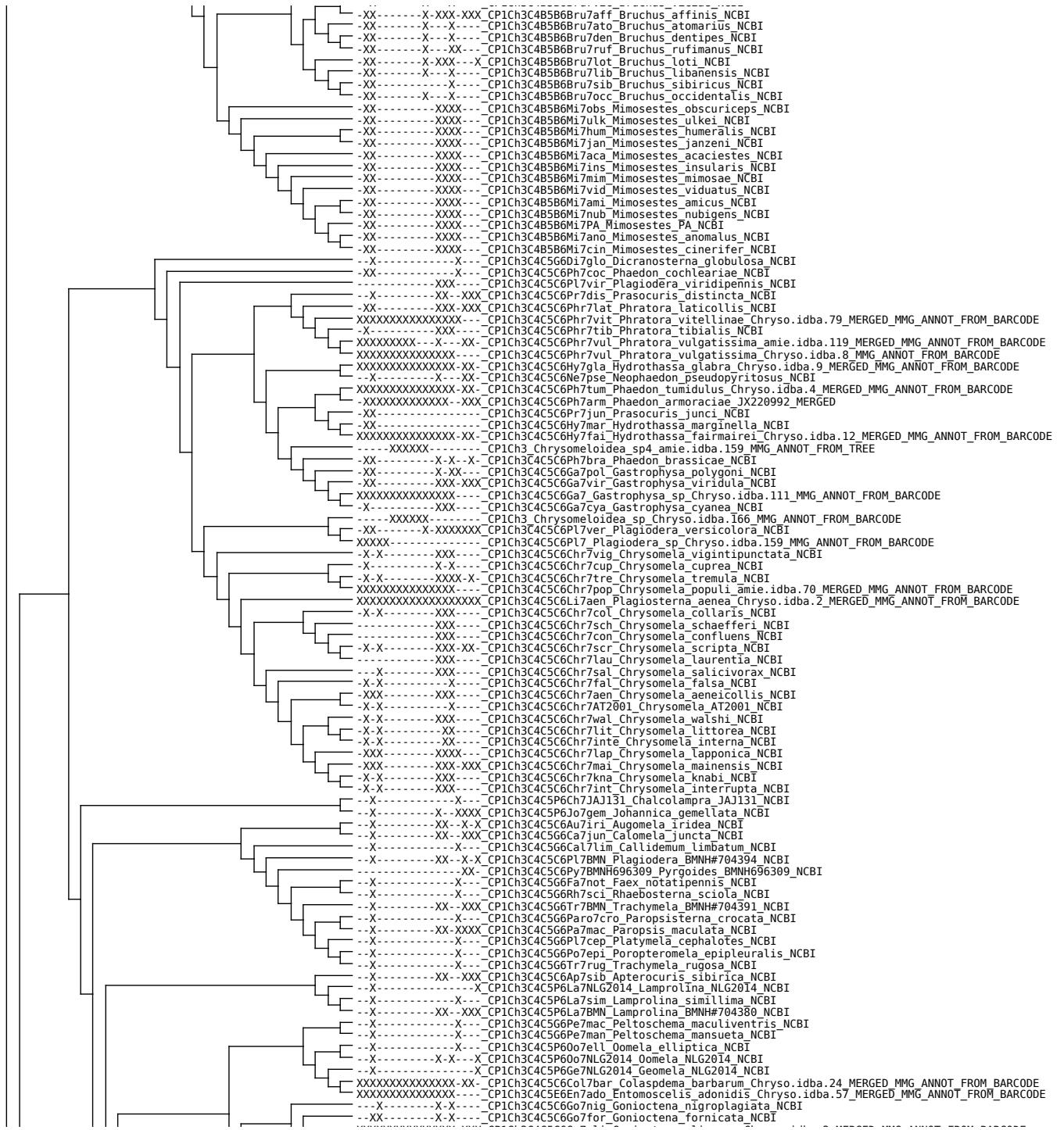




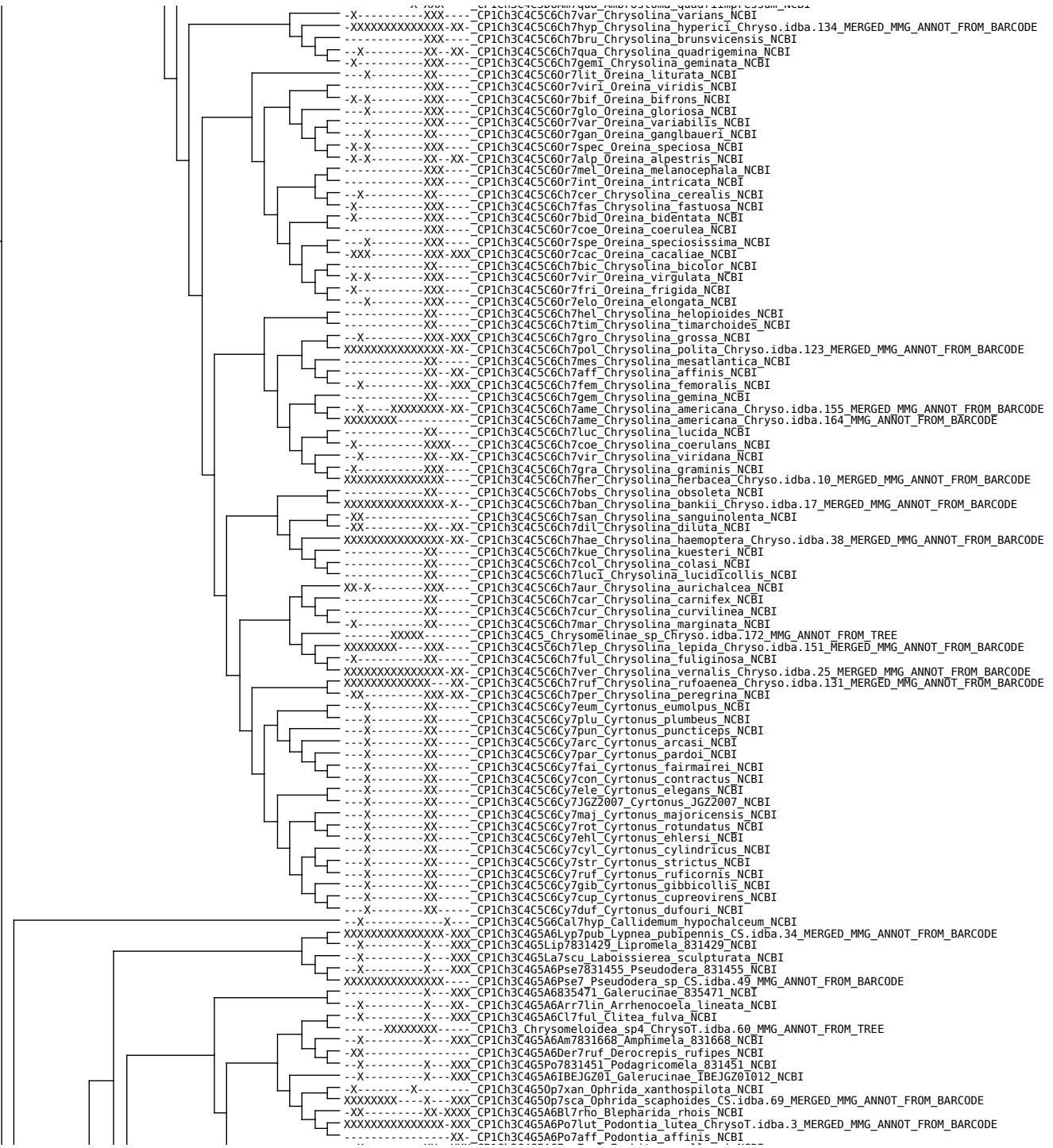




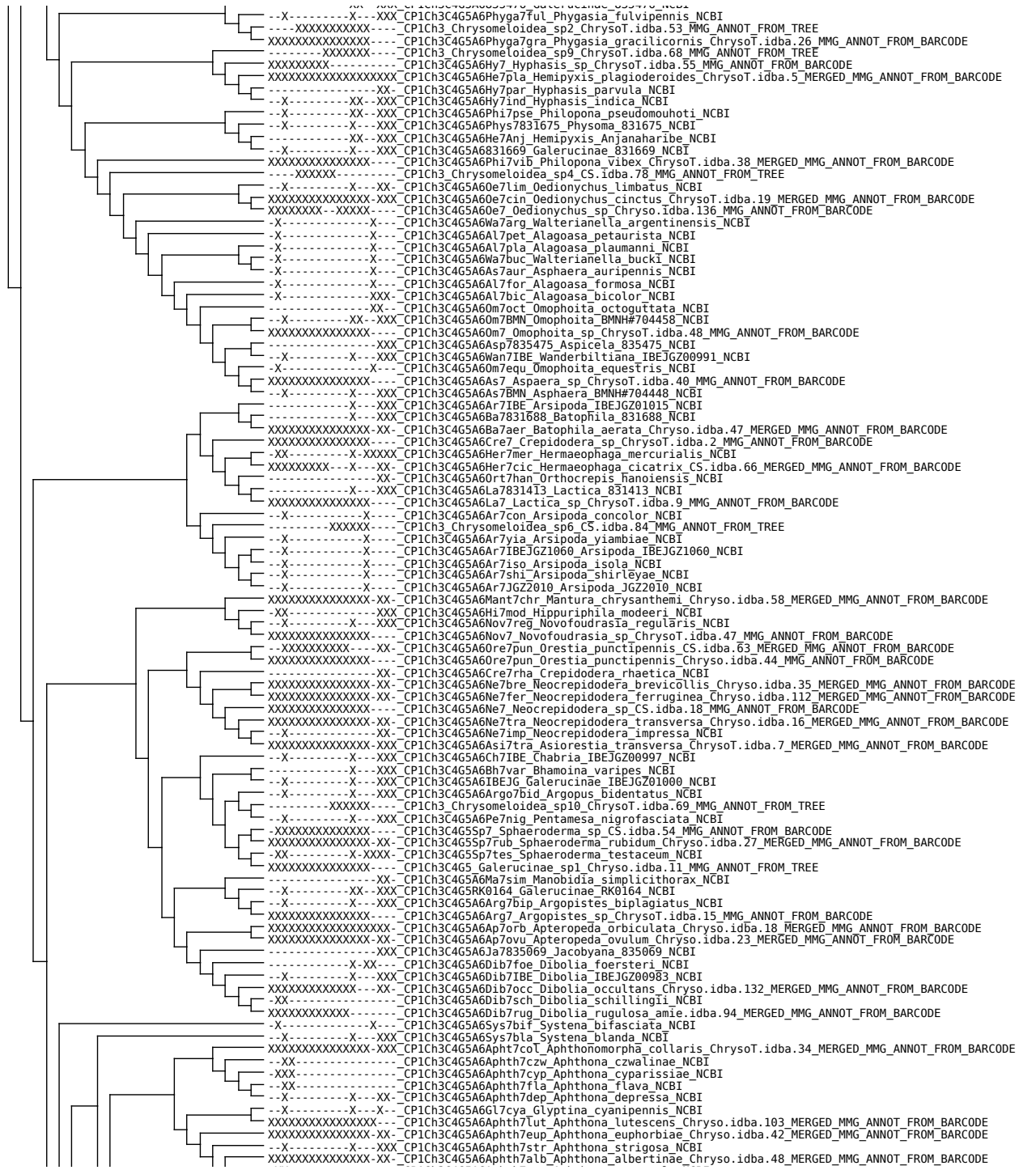








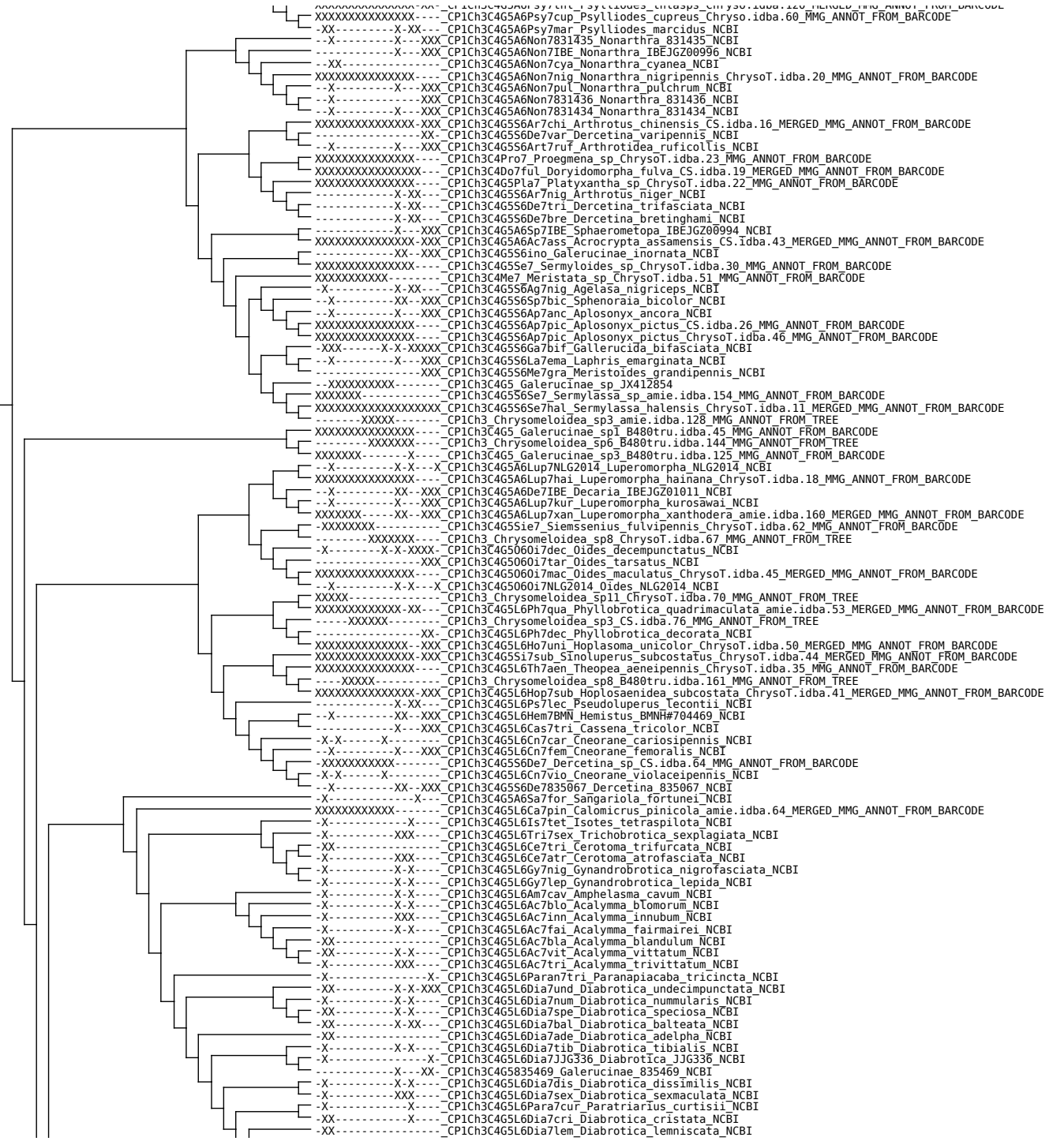
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--X-----XX- CP1Ch3C4G5A6Al7RJ2013_1 Altica_RJ2013 NCBI
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--X-----XX- CP1Ch3C4G5A6Phy7nod Phyllotreta_nodicornis NCBI
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--X-----XX- CP1Ch3C4G5A6Phy7exc Phyllotreta_exclamationis NCBI
--X-----XX- CP1Ch3C4G5A6Phy7vit Phyllotreta_vittula NCBI
--X-----XX- CP1Ch3C4G5A6Phy7atr Phyllotreta_atra NCBI
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--X-----XX-XXX CP1Ch3C4G5A6R35476 Galerucinae_R35476 NCBI



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--XXXXXXXXXXXXXXXX-CP1Ch3C4G5Sp7_Sphaeroderma_sp_CS.idba.54_MMG_ANNOT_FROM_BARCODE
--XXXXXXXXXXXXXXXX-XX-CP1Ch3C4G5Sp7rub_Sphaeroderma_rubidum_ChrysoT.idba.27_MERGED_MMG_ANNOT_FROM_BARCODE
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Phylogenetic tree showing relationships between various species, primarily from the order Hymenoptera. The tree is rooted on the left and branches out to the right. Species names are listed on the right side of the tree, often followed by accession numbers or identifiers. The tree is annotated with 'XX' characters, likely indicating specific clades or groups of interest. The species names include:

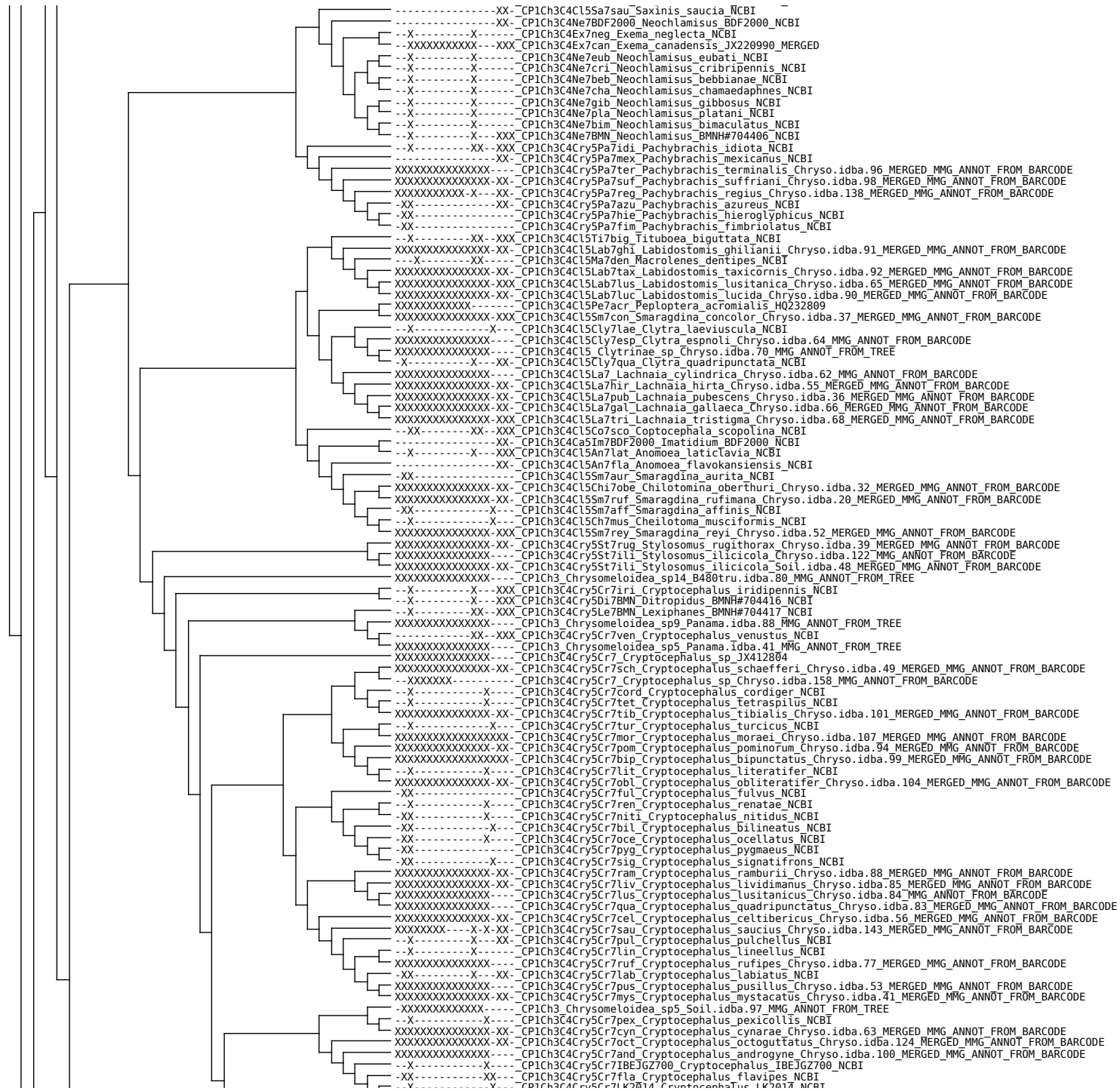
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- CP1Ch3C4G5A6Apth7non *Aphthona nonstriata* NCBI
- CP1Ch3C4G5A6Apth7mel *Aphthona melancholica* Chryso.idba.71_MERGED_MMG_ANNOT_FROM_BARCODE
- CP1Ch3C4G5A6Lo7niger *Longitarsus niger* NCBI
- CP1Ch3C4G5 Galerucinae sp2 Chryso.idba.34_MMG_ANNOT_FROM_TREE
- CP1Ch3C4G5A6Lo7pla *Longitarsus plantagomafittinus* NCBI
- CP1Ch3C4G5A6Lo7mel *Longitarsus melanocephalus* Chryso.idba.26_MERGED_MMG_ANNOT_FROM_BARCODE
- CP1Ch3C4G5A6Lo7aen *Longitarsus aeneus* Chryso.Idba.115_MERGED_MMG_ANNOT_FROM_BARCODE
- CP1Ch3C4G5A6Lo7mem *Longitarsus membranaceus* Chryso.idba.45_MERGED_MMG_ANNOT_FROM_BARCODE
- CP1Ch3C4G5A6Lo7fer *Longitarsus ferruginipennis* NCBI
- CP1Ch3C4G5A6Lo7min *Longitarsus minusculus* NCBI
- CP1Ch3C4G5A6Lo7sen *Longitarsus sencieri* NCBI
- CP1Ch3C4G5A6Lo7can *Longitarsus candidulus* Chryso.idba.73_MMG_ANNOT_FROM_BARCODE
- CP1Ch3C4G5A6Lo7bal *Longitarsus ballotae* NCBI
- CP1Ch3C4G5A6Lo7rei *Longitarsus reichei* NCBI
- CP1Ch3C4G5A6Lo7sal *Longitarsus salviae* NCBI
- CP1Ch3C4G5A6Lo7tab *Longitarsus tabidus* Chryso.idba.86_MERGED_MMG_ANNOT_FROM_BARCODE
- CP1Ch3C4G5A6Lo7rut *Longitarsus rutilus* Chryso.idba.61_MERGED_MMG_ANNOT_FROM_BARCODE
- CP1Ch3C4G5A6Lo7nigr *Longitarsus nigrofasciatus* NCBI
- CP1Ch3C4G5A6Lo7nig *Longitarsus nigrofasciatus* Chryso.idba.89_MERGED_MMG_ANNOT_FROM_BARCODE
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- CP1Ch3C4G5A6Lo7NLG2014 *Longitarsus NLG2014* NCBI
- CP1Ch3C4G5A6Lo7cur *Longitarsus curtus* Chryso.idba.74_MMG_ANNOT_FROM_BARCODE
- CP1Ch3C4G5A6Lo7exys *Longitarsus exoleus* Chryso.idba.102_MERGED_MMG_ANNOT_FROM_BARCODE
- CP1Ch3C4G5A6Lo7cer *Longitarsus cernithes* Chryso.idba.59_MERGED_MMG_ANNOT_FROM_BARCODE
- CP1Ch3C4G5 Galerucinae sp2 Chryso.idba.141_MMG_ANNOT_FROM_TREE
- CP1Ch3C4G5A6Lo7ord *Longitarsus ordinatus* Chryso.idba.106_MERGED_MMG_ANNOT_FROM_BARCODE
- CP1Ch3C4G5A6Lo7pra *Longitarsus pratensis* Chryso.idba.127_MERGED_MMG_ANNOT_FROM_BARCODE
- CP1Ch3C4G5A6Lo7par *Longitarsus parvulus* Chryso.idba.145_MERGED_MMG_ANNOT_FROM_BARCODE
- CP1Ch3C4G5 Galerucinae sp0 Chryso.idba.169_MMG_ANNOT_FROM_TREE
- CP1Ch3C4G5A6Lo7lur *Longitarsus luridus* Chryso.idba.72_MERGED_MMG_ANNOT_FROM_BARCODE
- CP1Ch3 Chrysomeloidea sp1 BIUK.idba.41_MMG_ANNOT_FROM_TREE
- CP1Ch3C4G5A6Lo7bru *Longitarsus brunneus* NCBI
- CP1Ch3C4G5A6Lo7dor *Longitarsus dorsalis* Chryso.idba.108_MERGED_MMG_ANNOT_FROM_BARCODE
- CP1Ch3C4G5A6Lo7suc *Longitarsus succineus* NCBI
- CP1Ch3C4G5A6Lo7atr *Longitarsus atricillus* Chryso.idba.40_MERGED_MMG_ANNOT_FROM_BARCODE
- CP1Ch3C4G5A6Lo7bed *Longitarsus bedeli* NCBI
- CP1Ch3C4G5A6Lo7ibe *Longitarsus ibericus* Chryso.idba.67_MERGED_MMG_ANNOT_FROM_BARCODE
- CP1Ch3C4G5A6Lo7anc *Longitarsus anchusae* NCBI
- CP1Ch3C4G5A6Lo7nig *Longitarsus nigrocillus* Chryso.idba.14_MMG_ANNOT_FROM_BARCODE
- CP1Ch3C4Xut7 *Xuthea yunnanensis* ChrysoT.idba.0_MMG_ANNOT_FROM_BARCODE
- CP1Ch3 Chrysomeloidea sp2 BIUK.idba.77_MMG_ANNOT_FROM_TREE
- CP1Ch3C4G5A6Cre7aureo *Crepidodera aureola* NCBI
- CP1Ch3C4G5A6Cre7ful *Chalcoides fulvicornis* Chryso.idba.98_MERGED_MMG_ANNOT_FROM_BARCODE
- CP1Ch3C4G5A6Chal7aur *Crepidodera aurata* NCBI
- CP1Ch3C4G5A6Cre7 *Crepidodera sp* Chryso.idba.174_MMG_ANNOT_FROM_BARCODE
- CP1Ch3 Chrysomeloidea sp Chryso.idba.156_MMG_ANNOT_FROM_BARCODE
- CP1Ch3C4G5A6Chal7ful *Chalcoides fulvicornis* Chryso.idba.153_MERGED_MMG_ANNOT_FROM_BARCODE
- CP1Ch3C4G5A6Cre7aure *Crepidodera aurea* NCBI
- CP1Ch3C4G5A6Chal7aur *Chalcoides aurea* BIUK.idba.63_MMG_ANNOT_FROM_BARCODE
- CP1Ch3C4G5A6Chae7con *Chaetocnema concinna* NCBI
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- CP1Ch3C4G5A6Chae7chl *Chaetocnema chlorophana* NCBI
- CP1Ch3C4G5A6Chae7pel *Chaetocnema pelagica* Chryso.idba.21_MERGED_MMG_ANNOT_FROM_BARCODE
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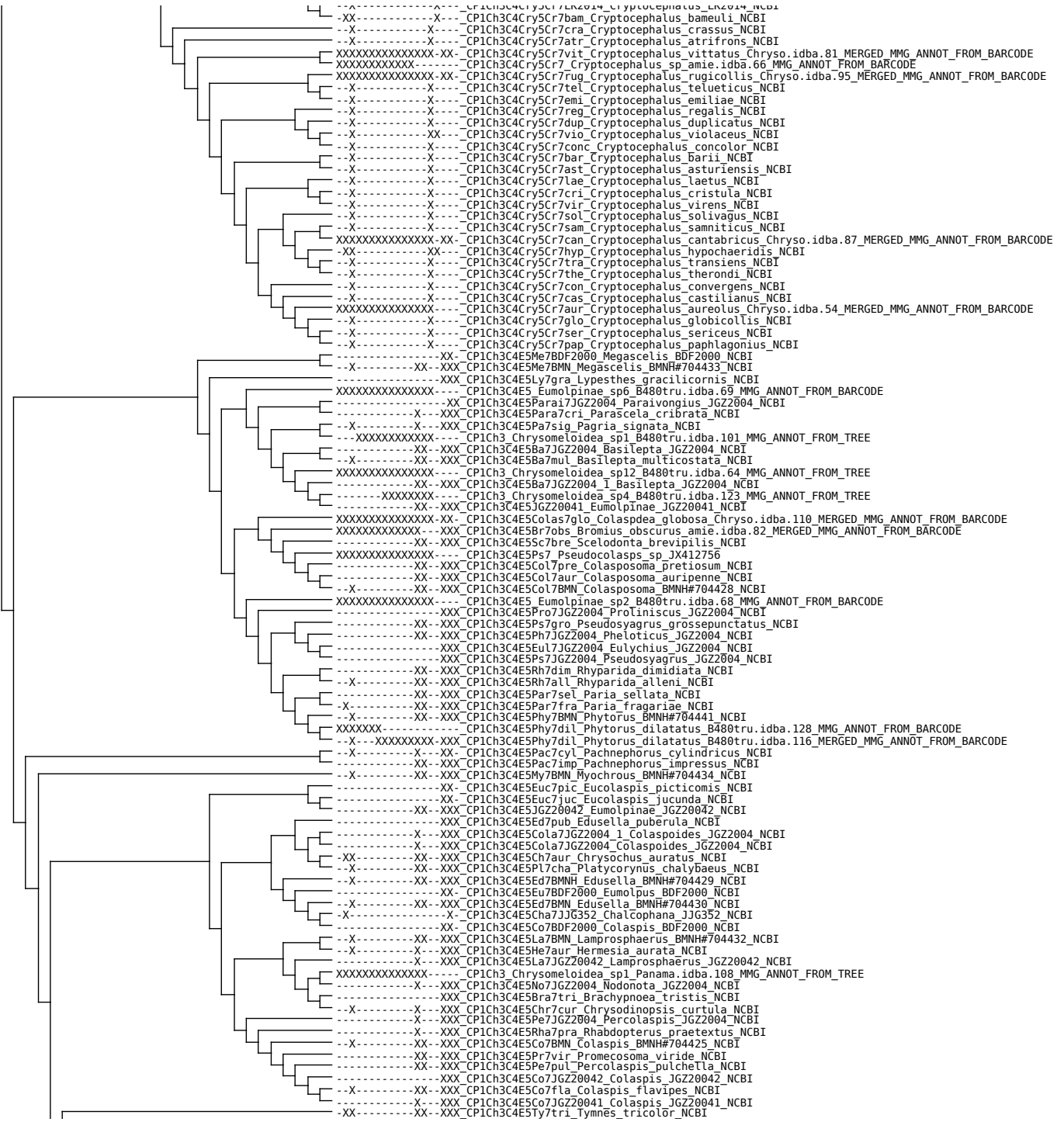




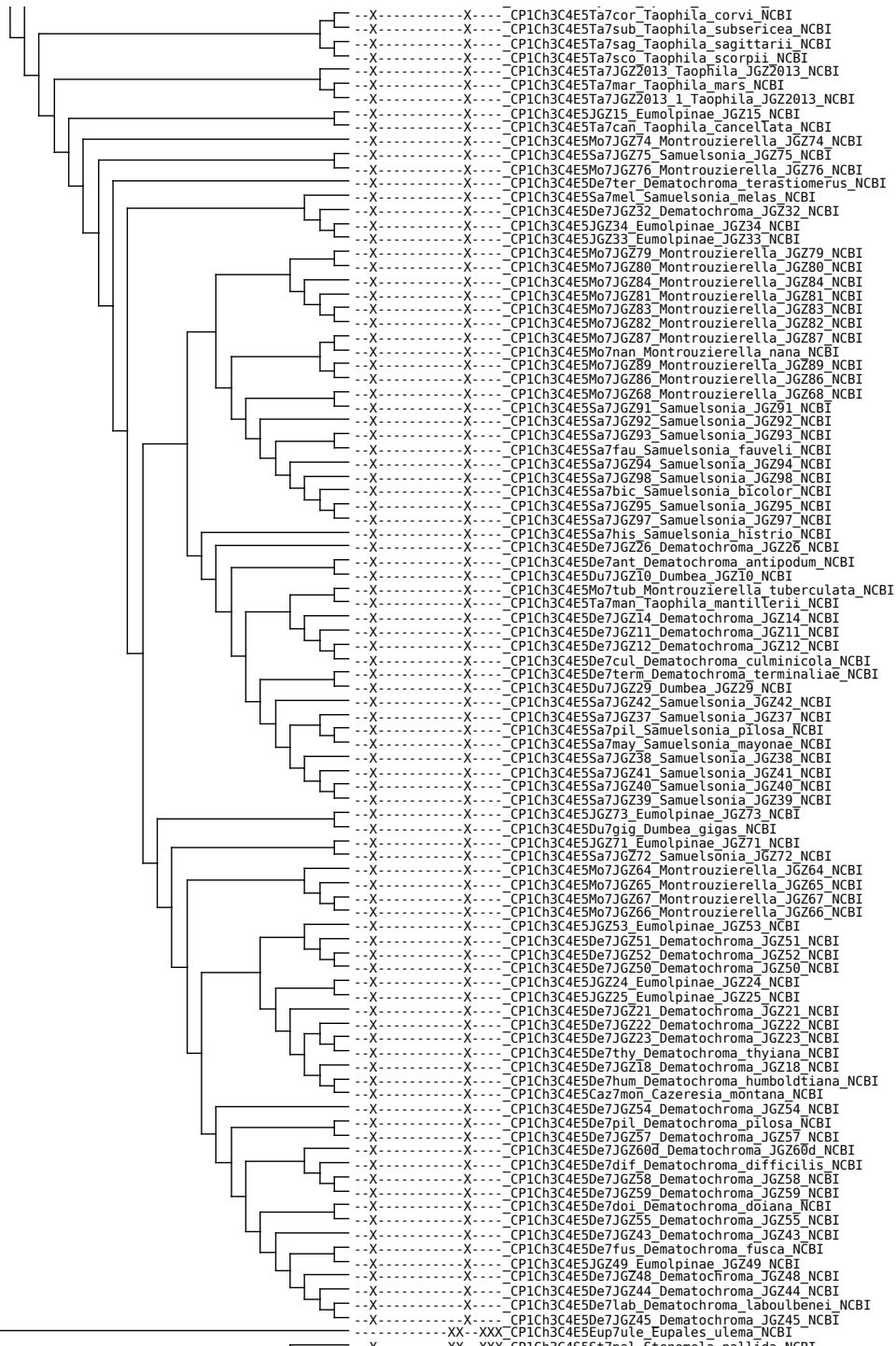
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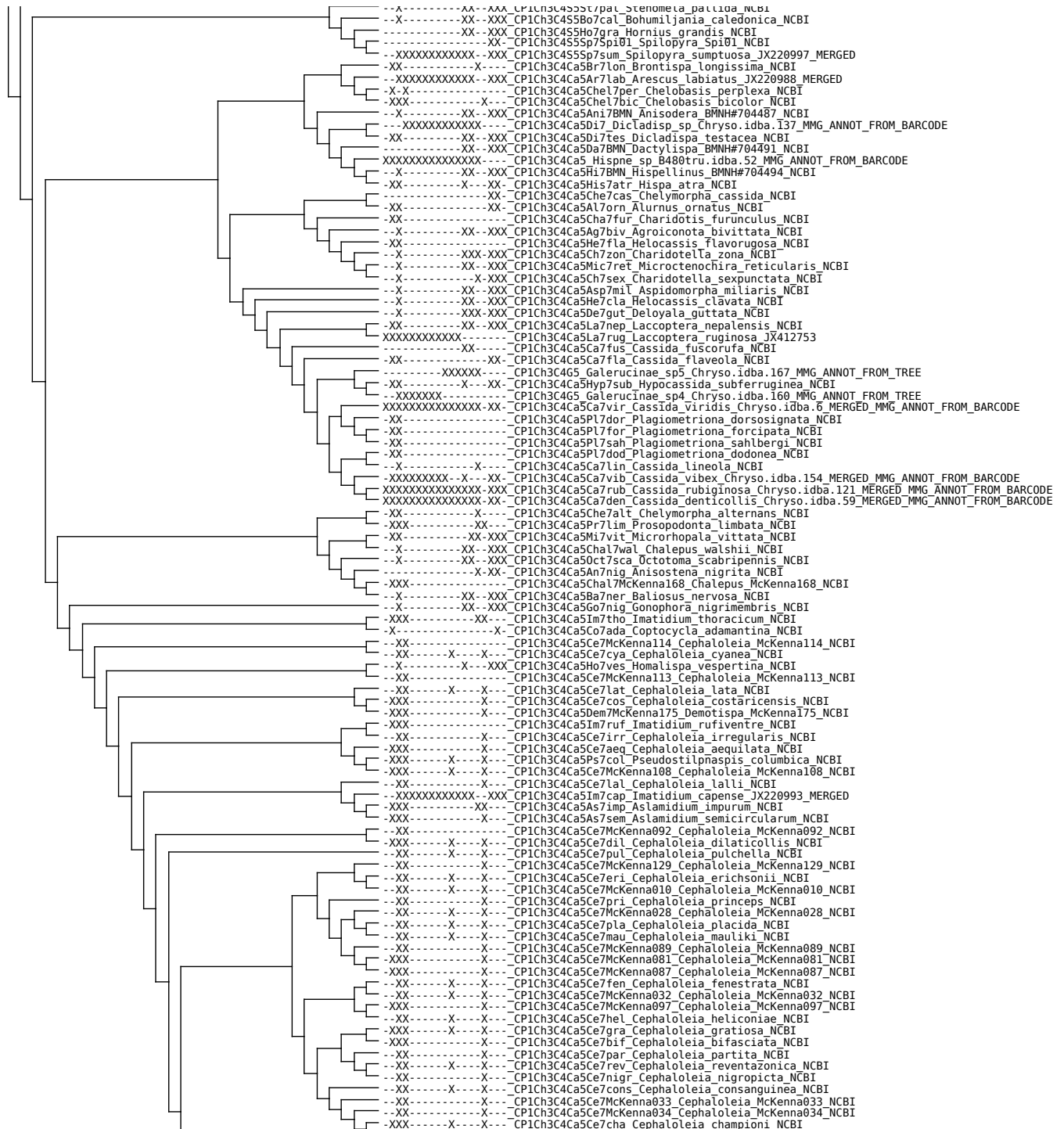


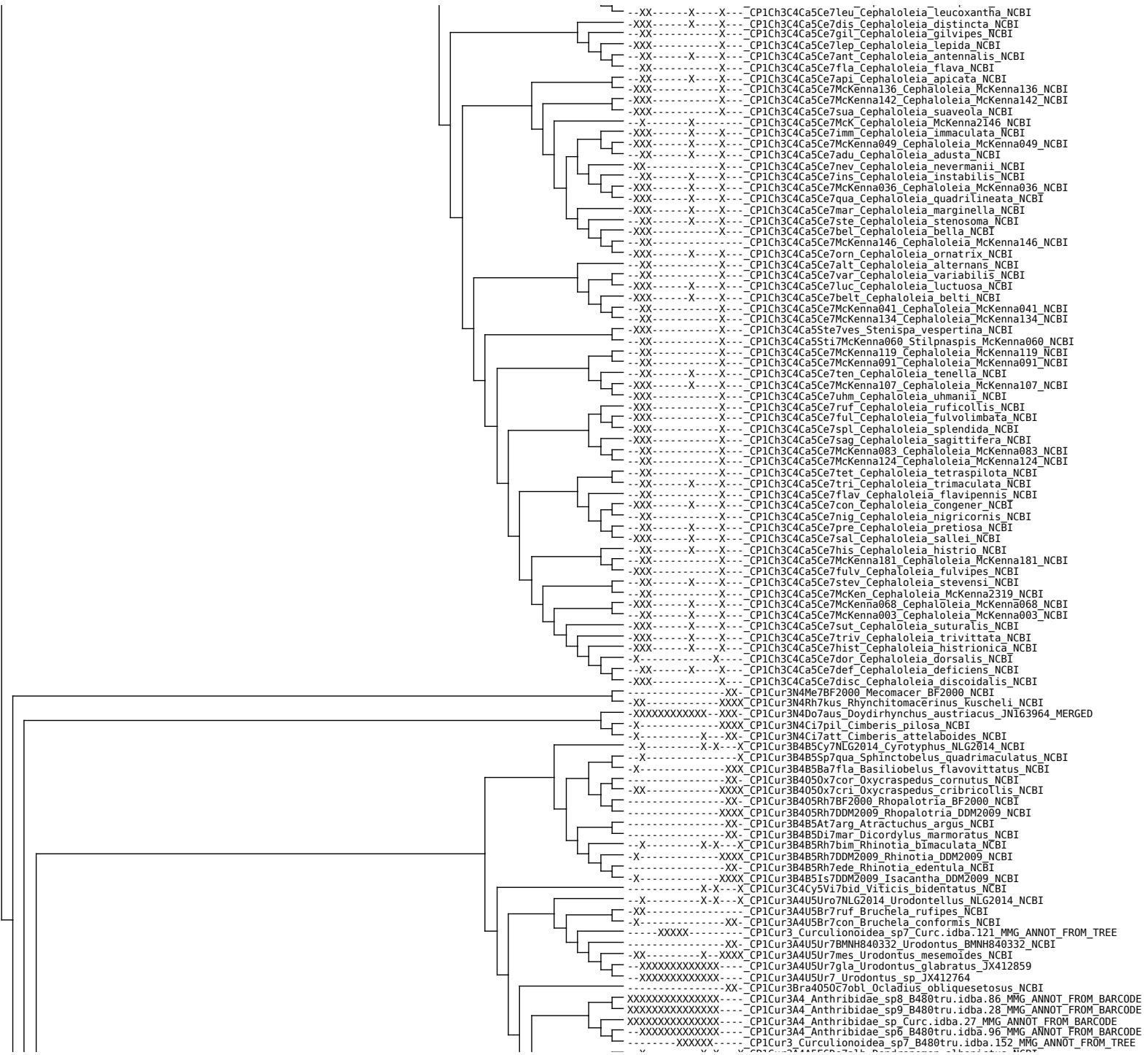




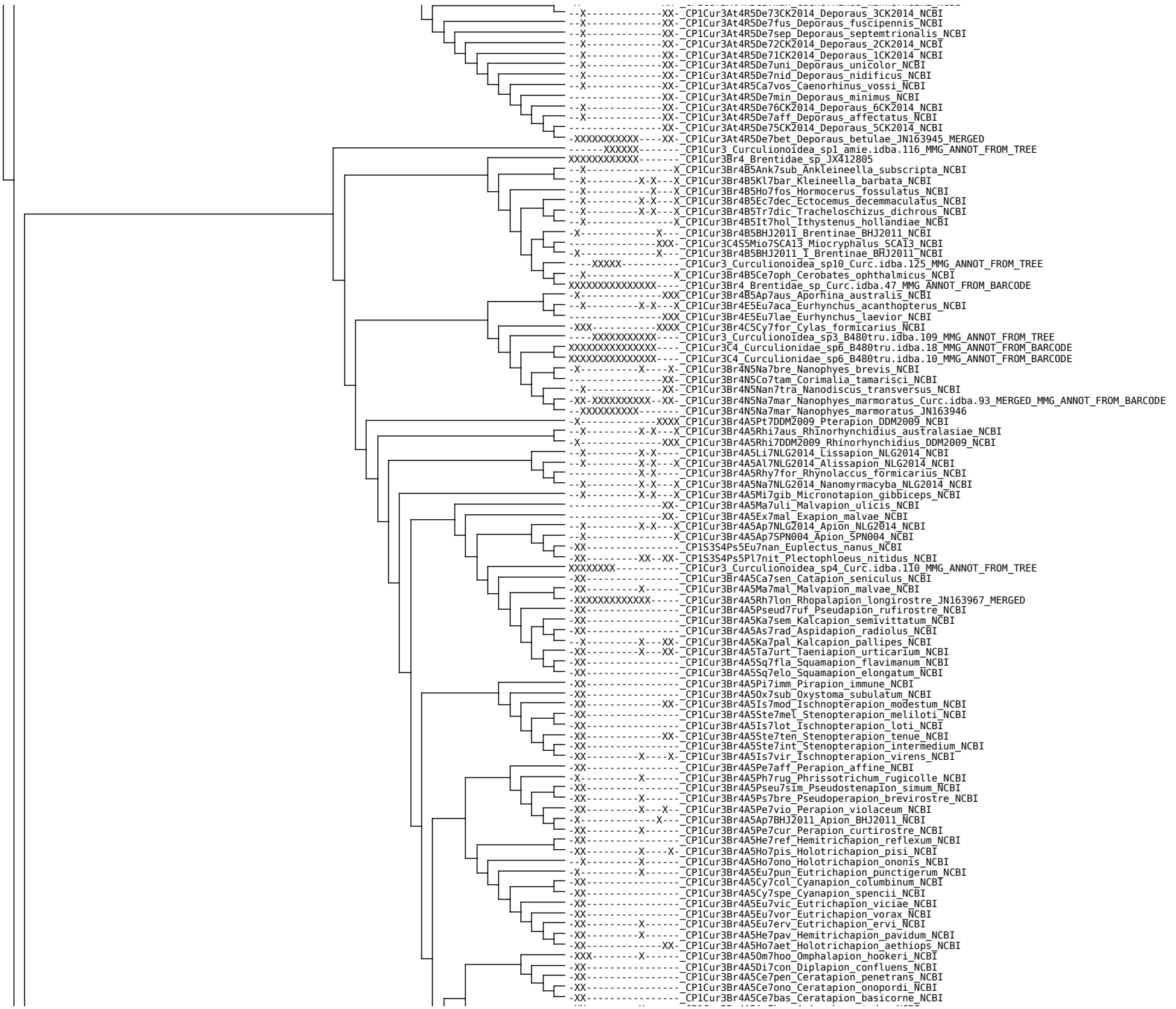
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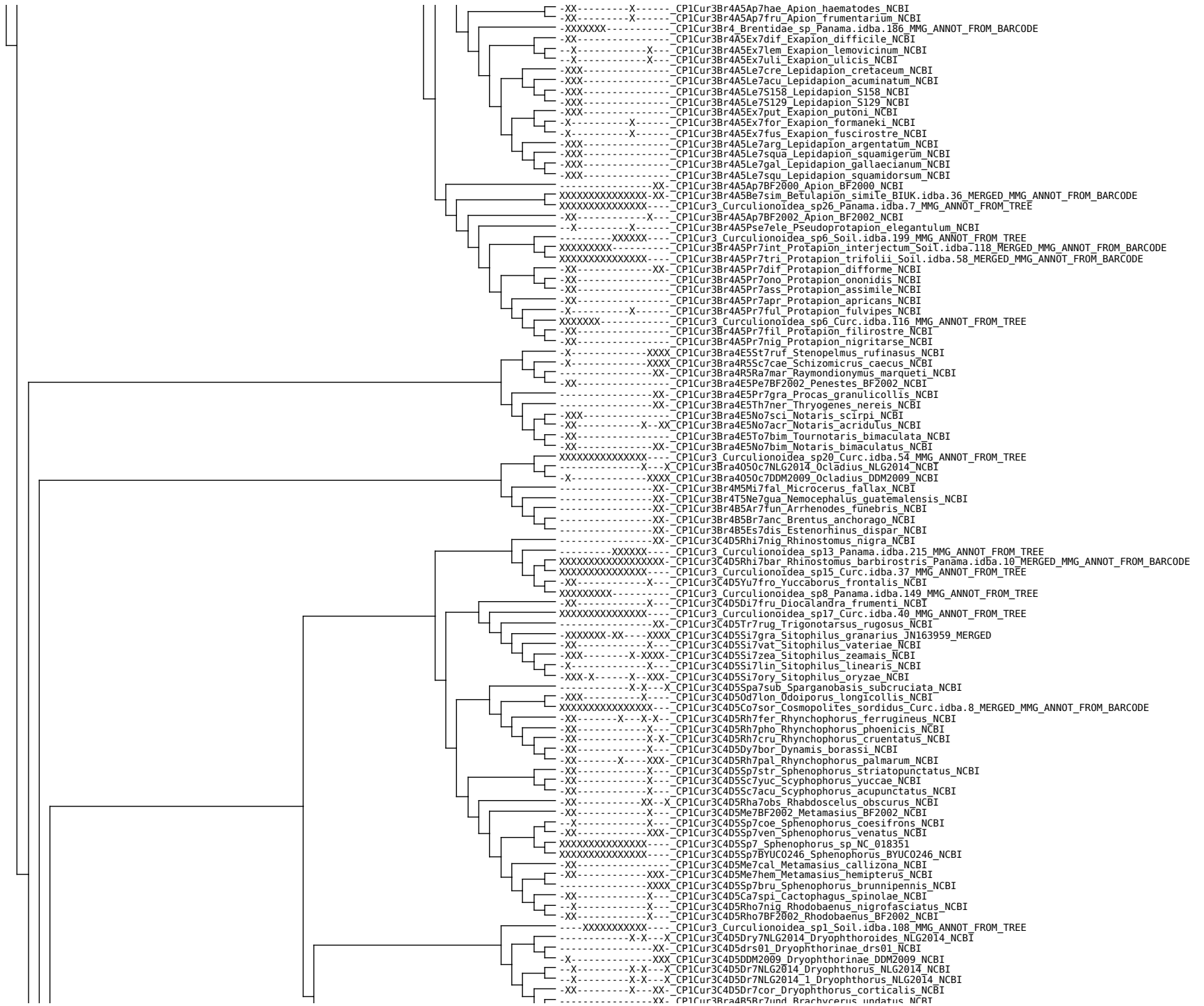


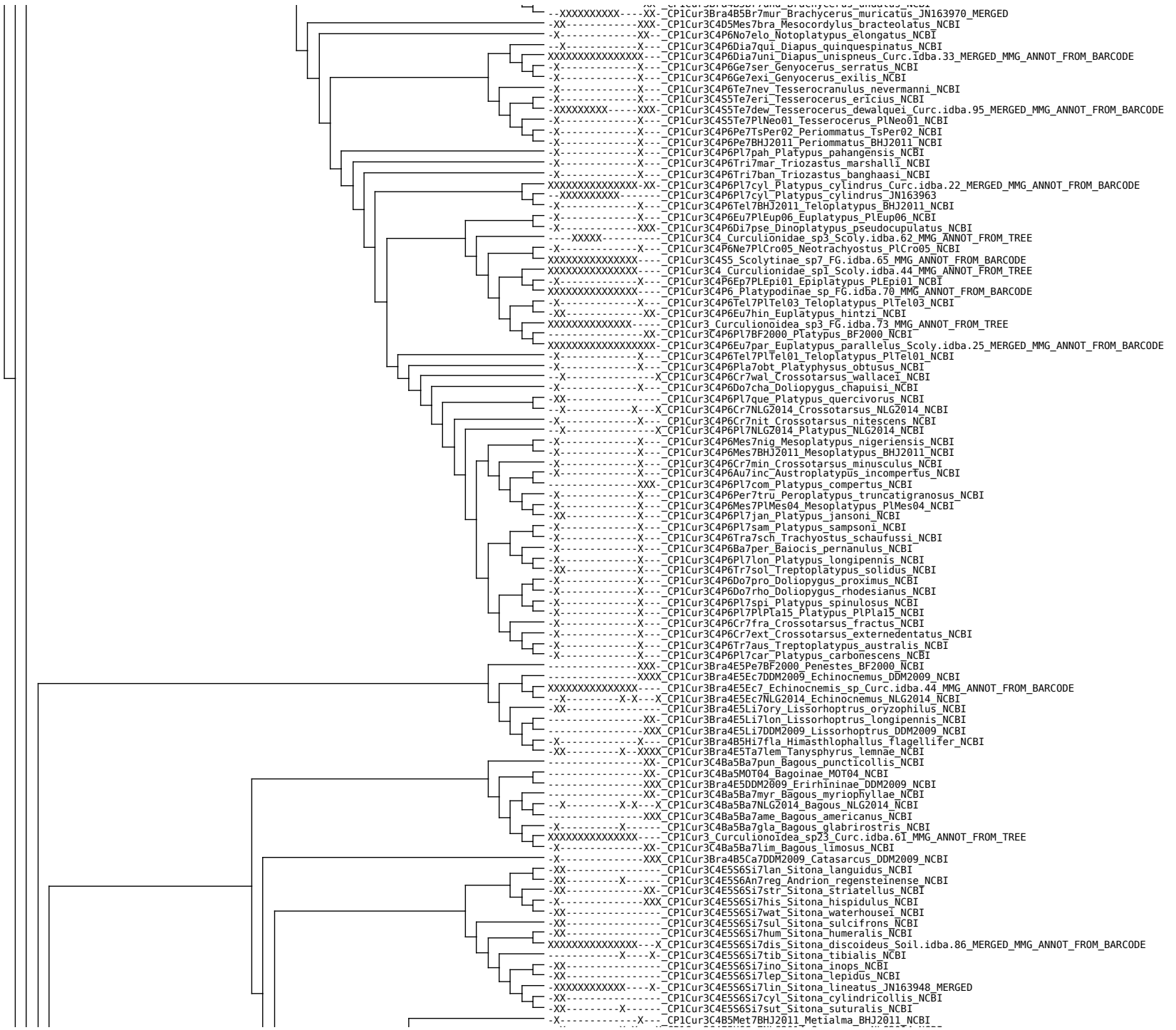




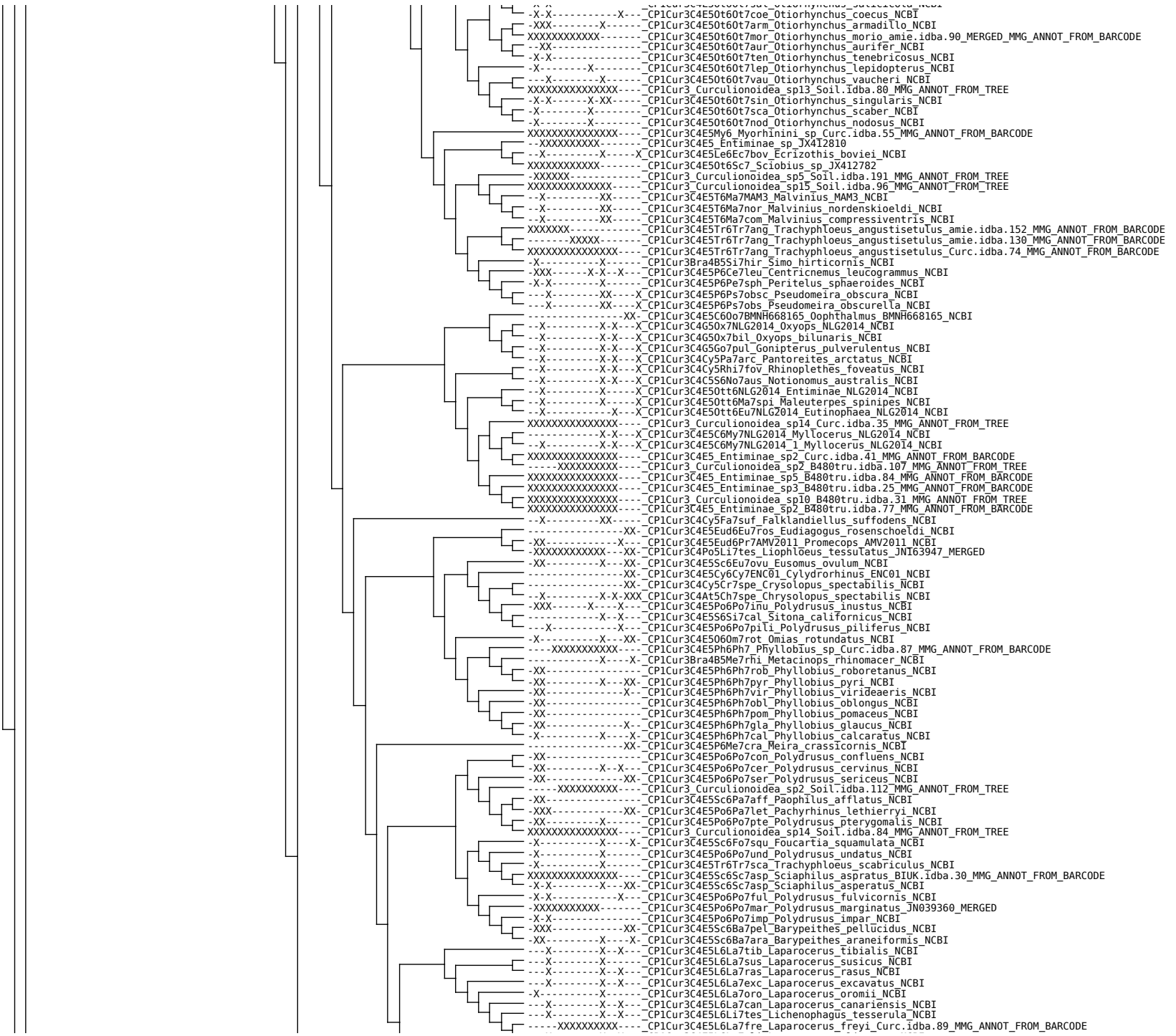


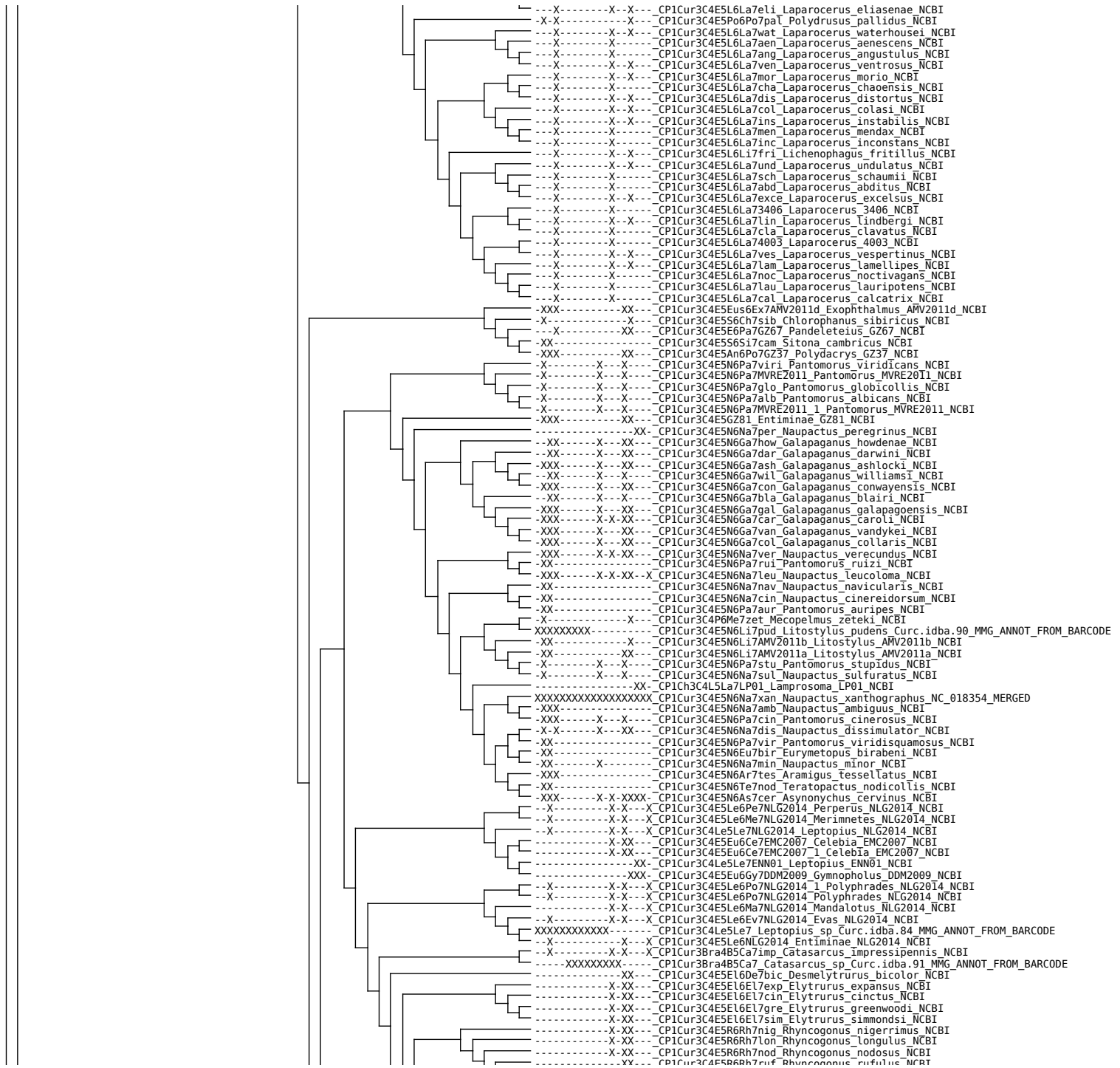




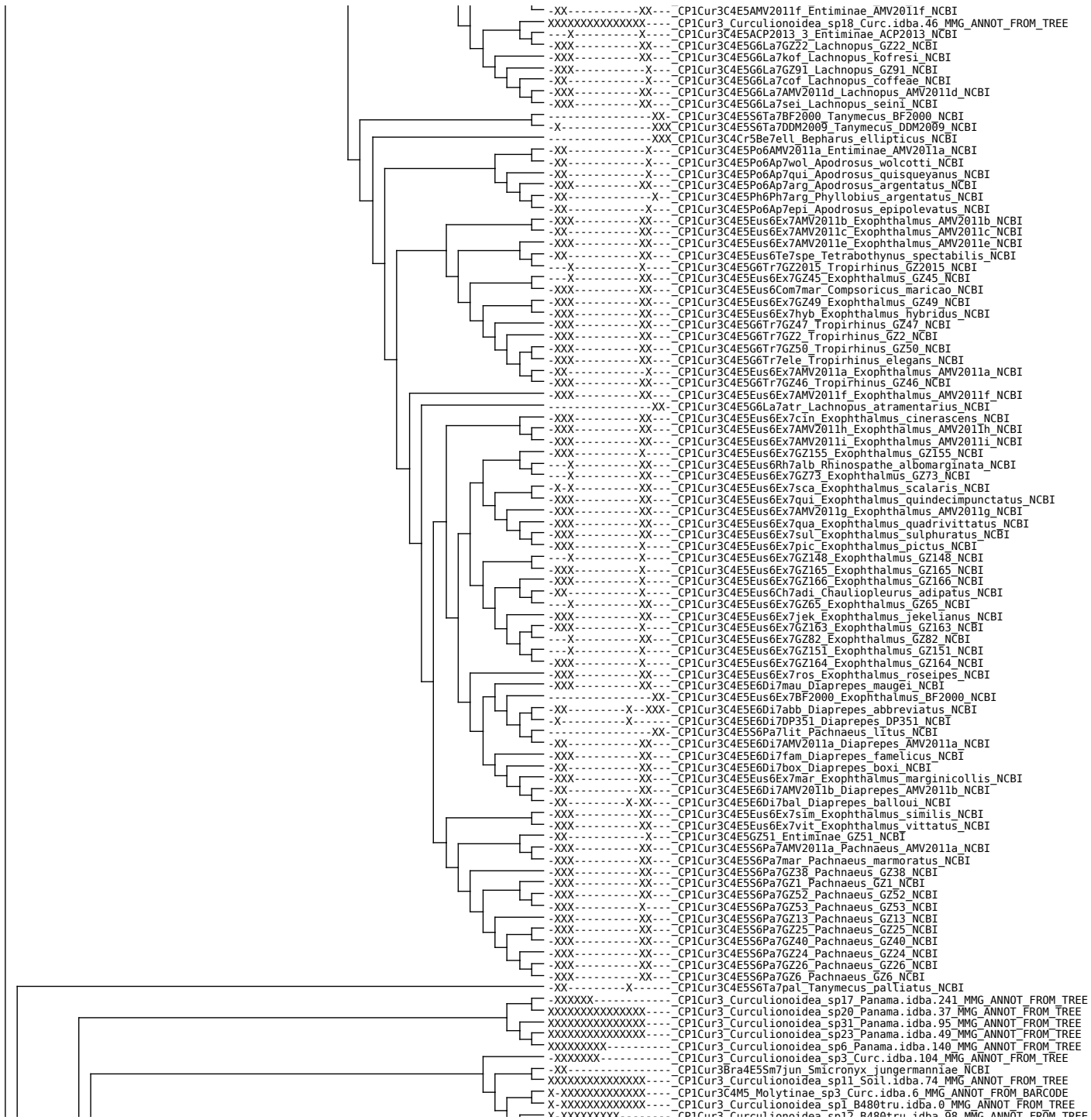


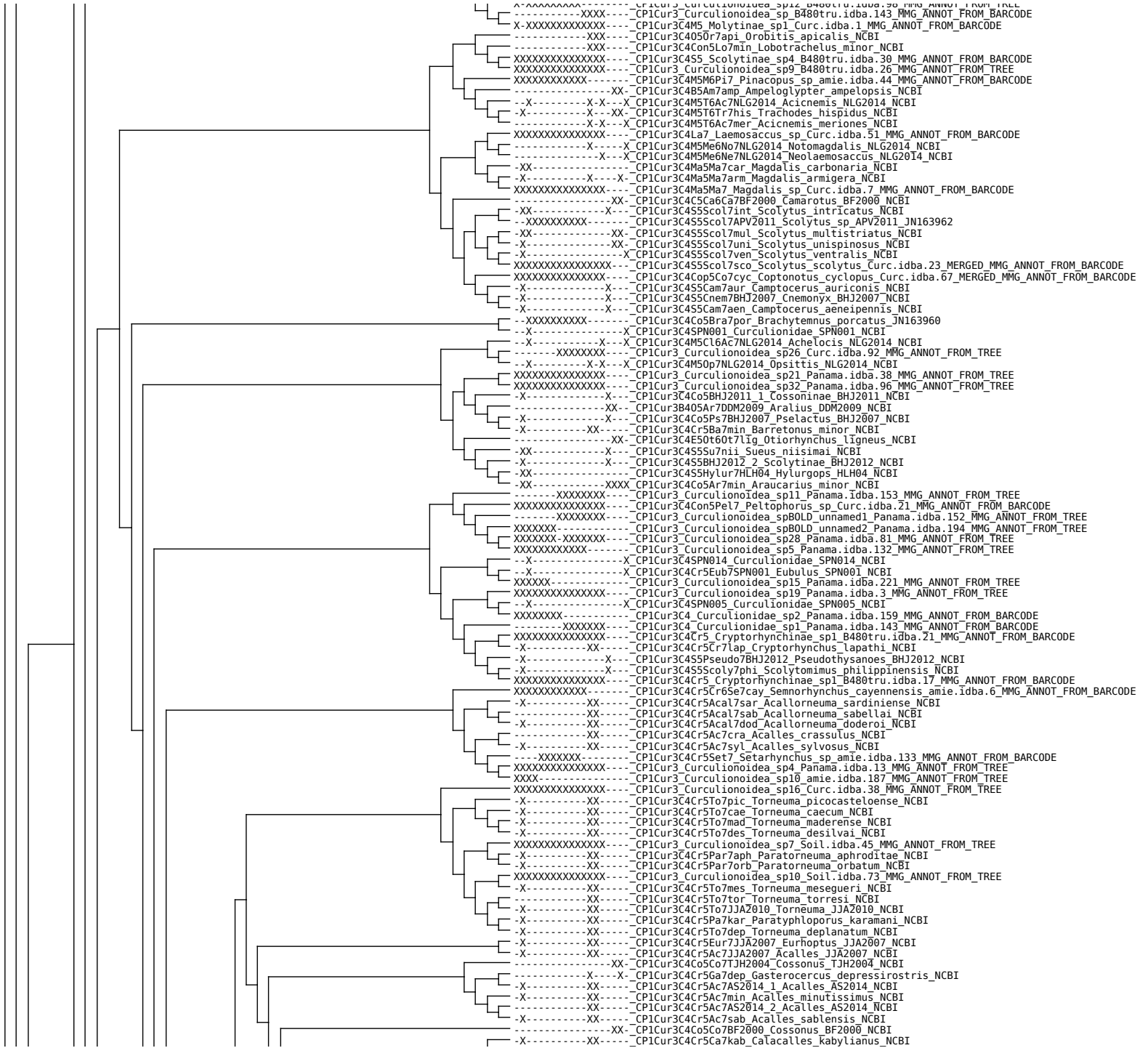


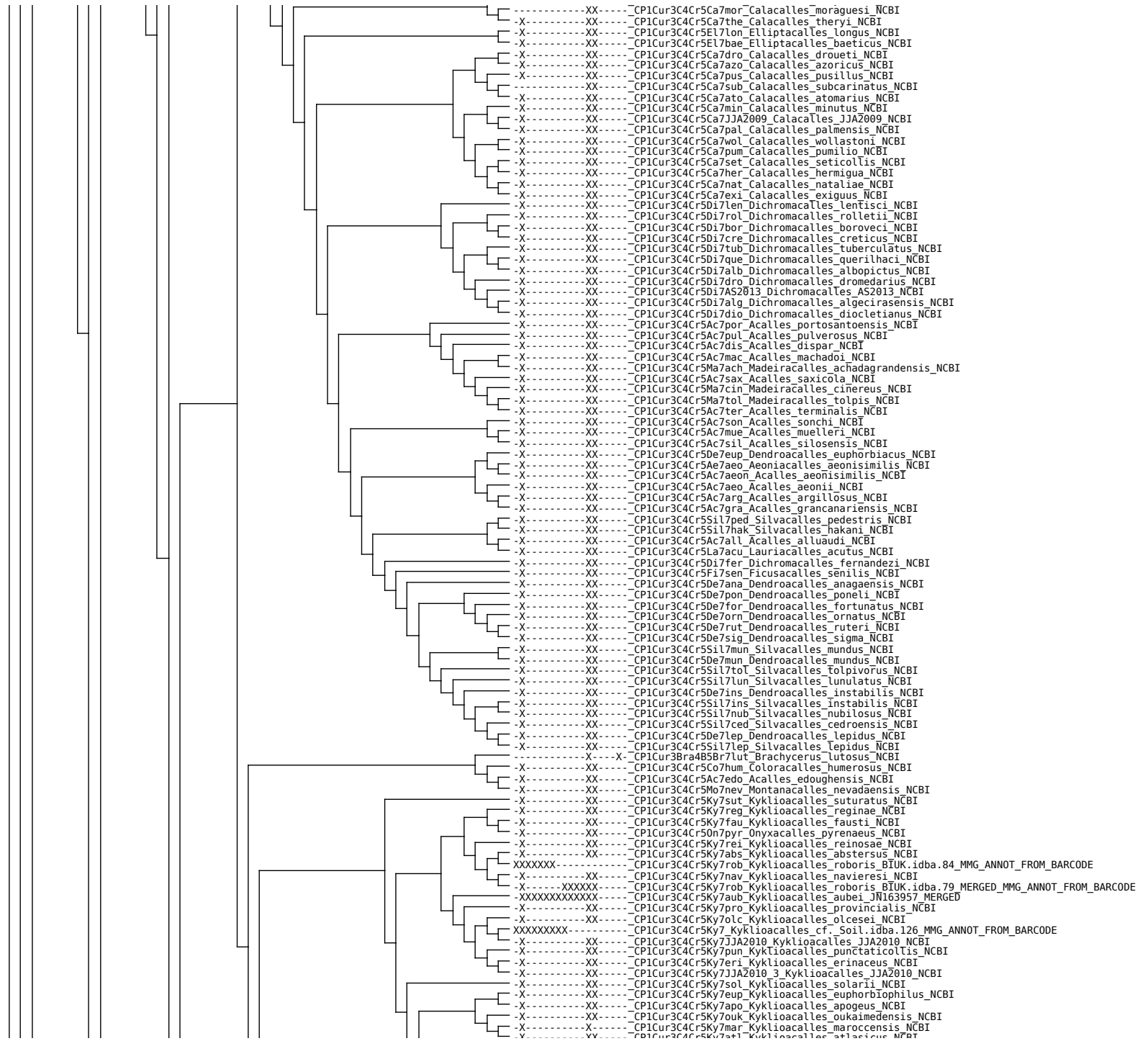


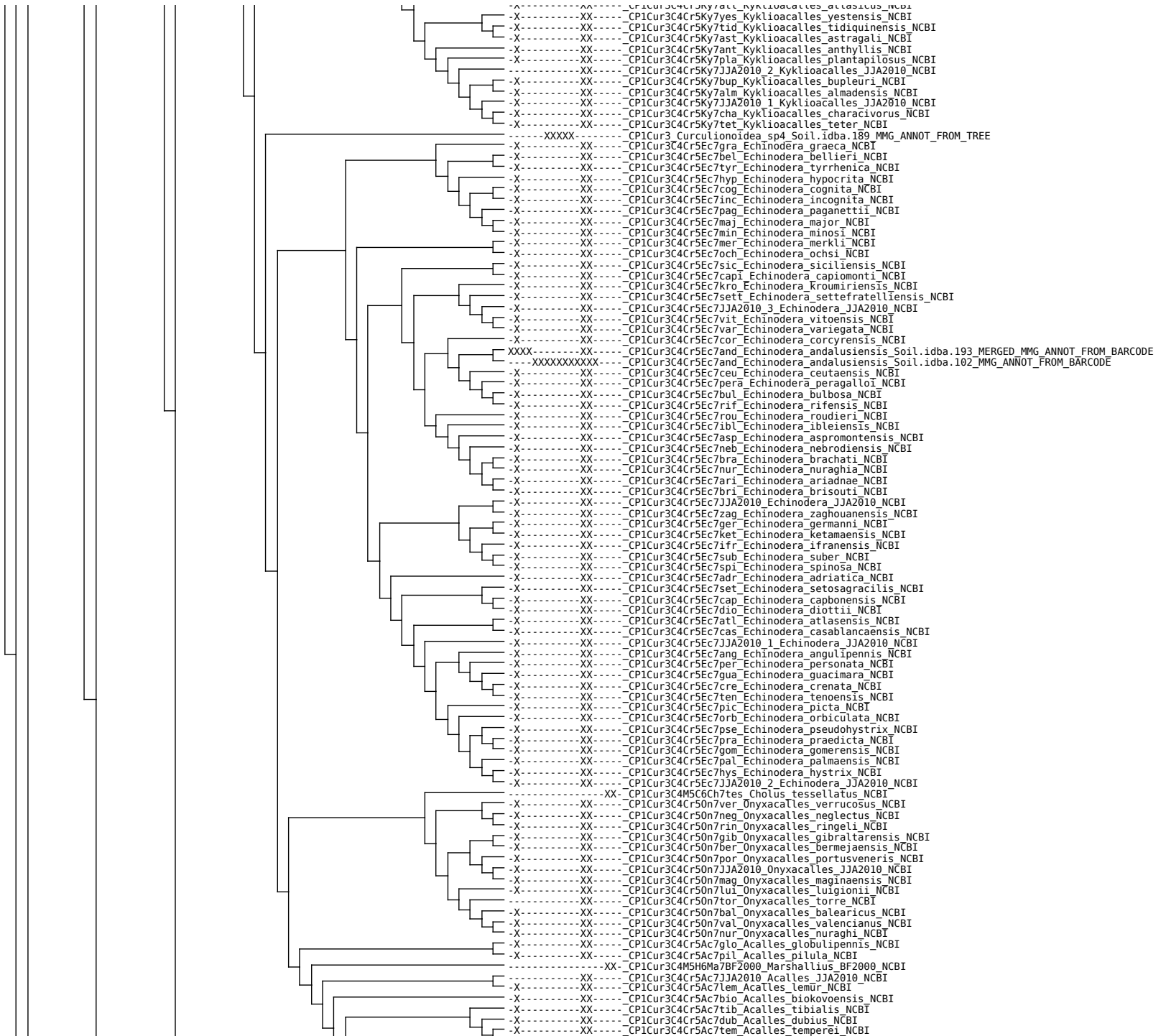


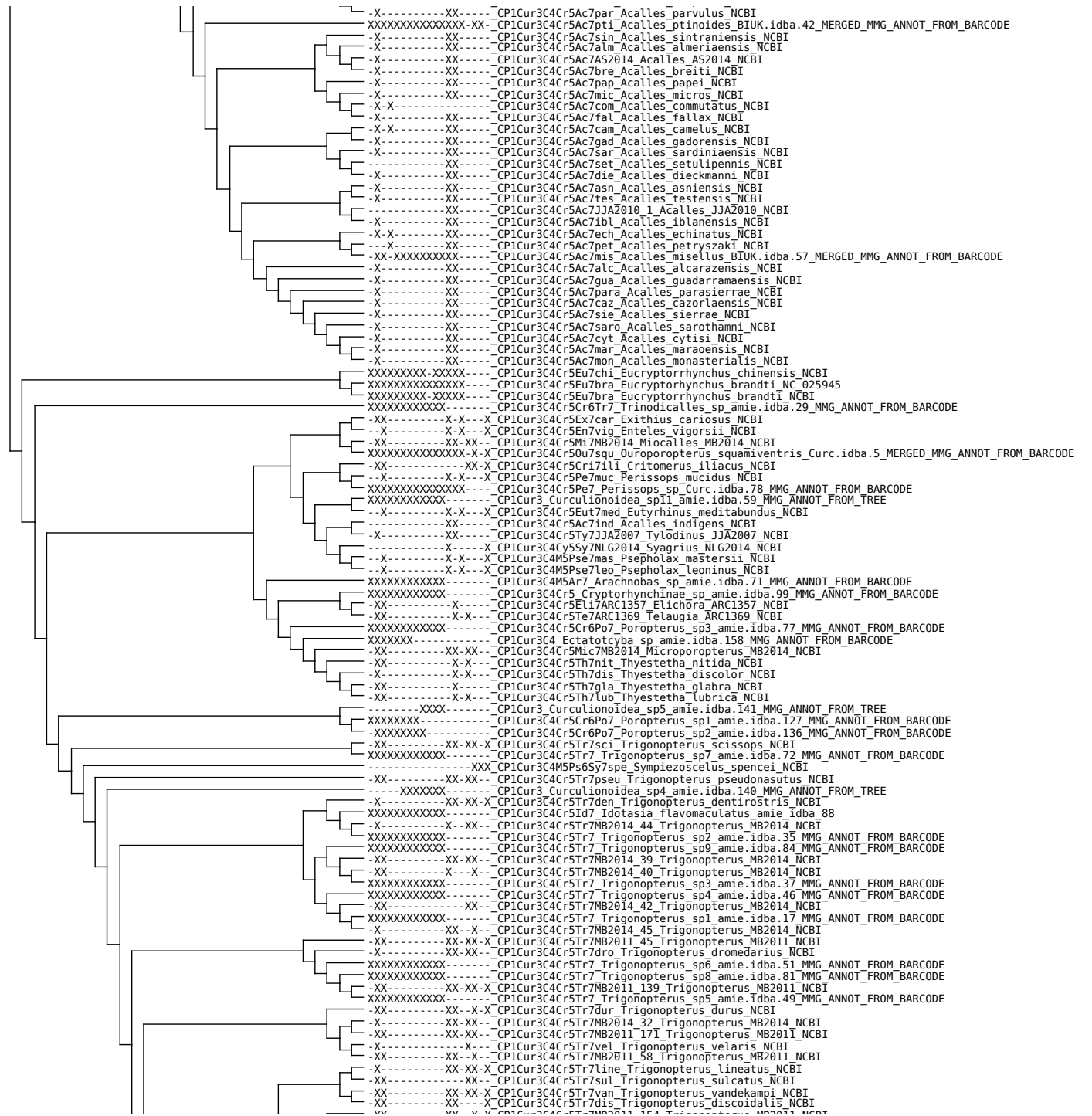






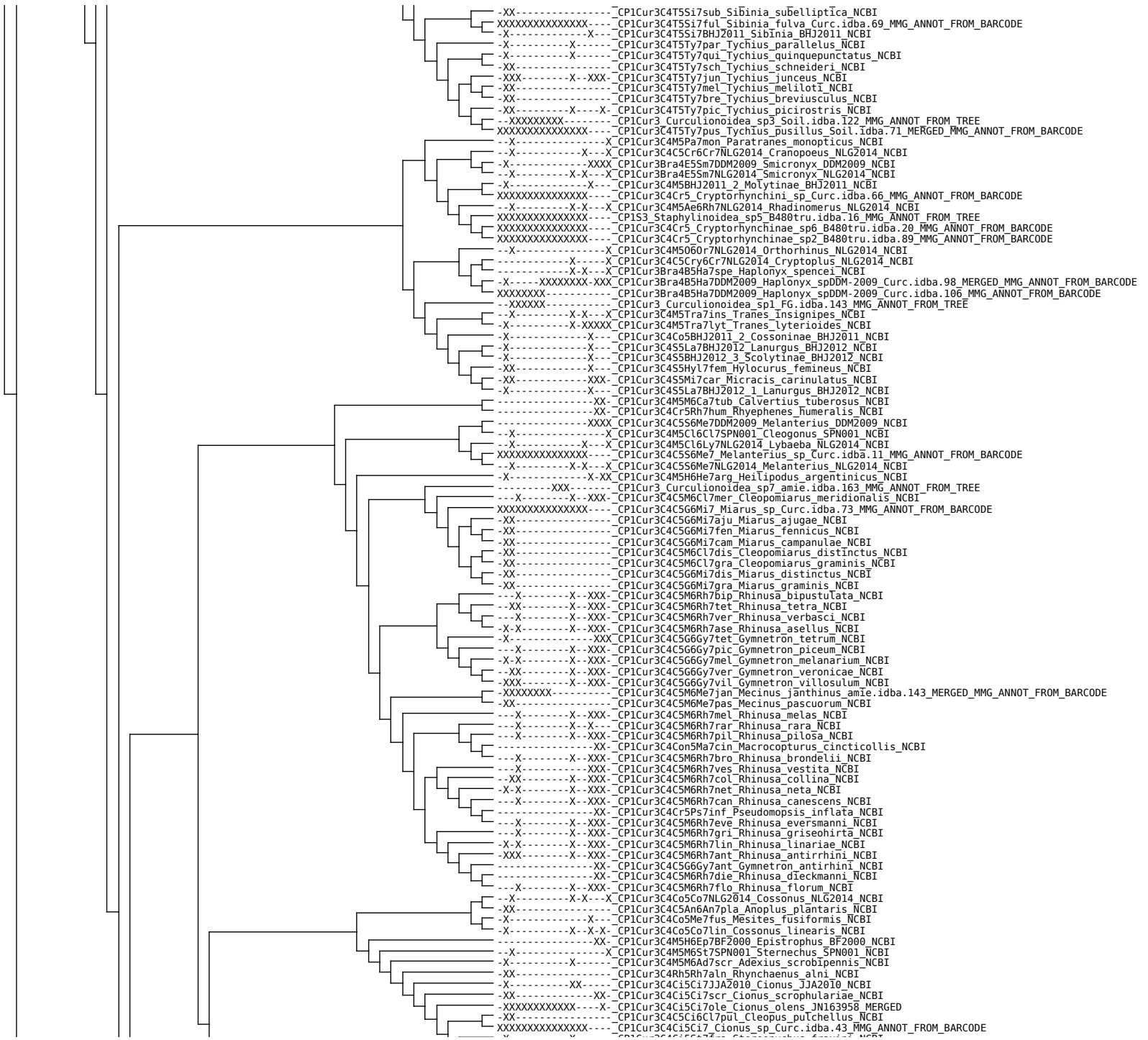


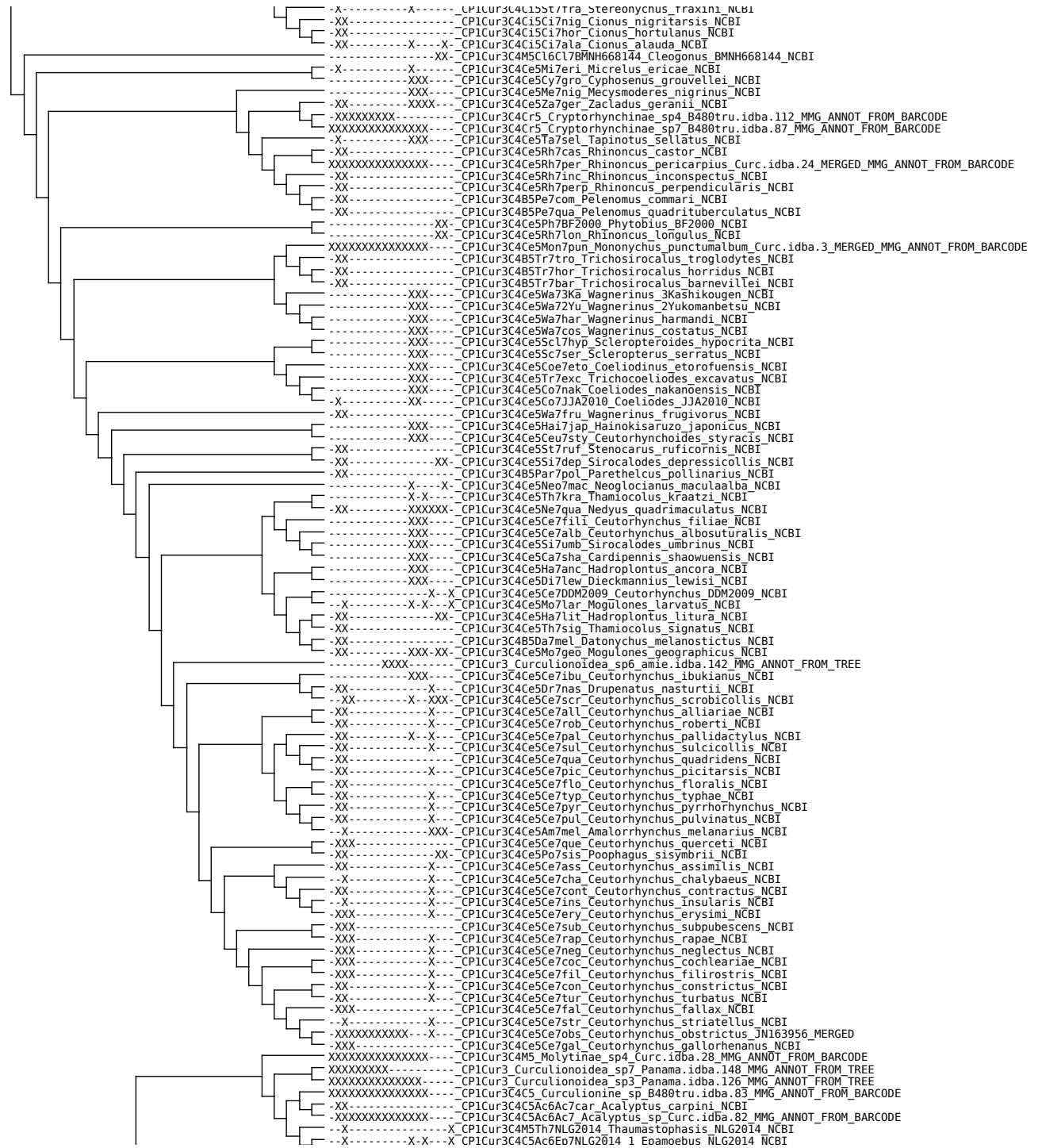


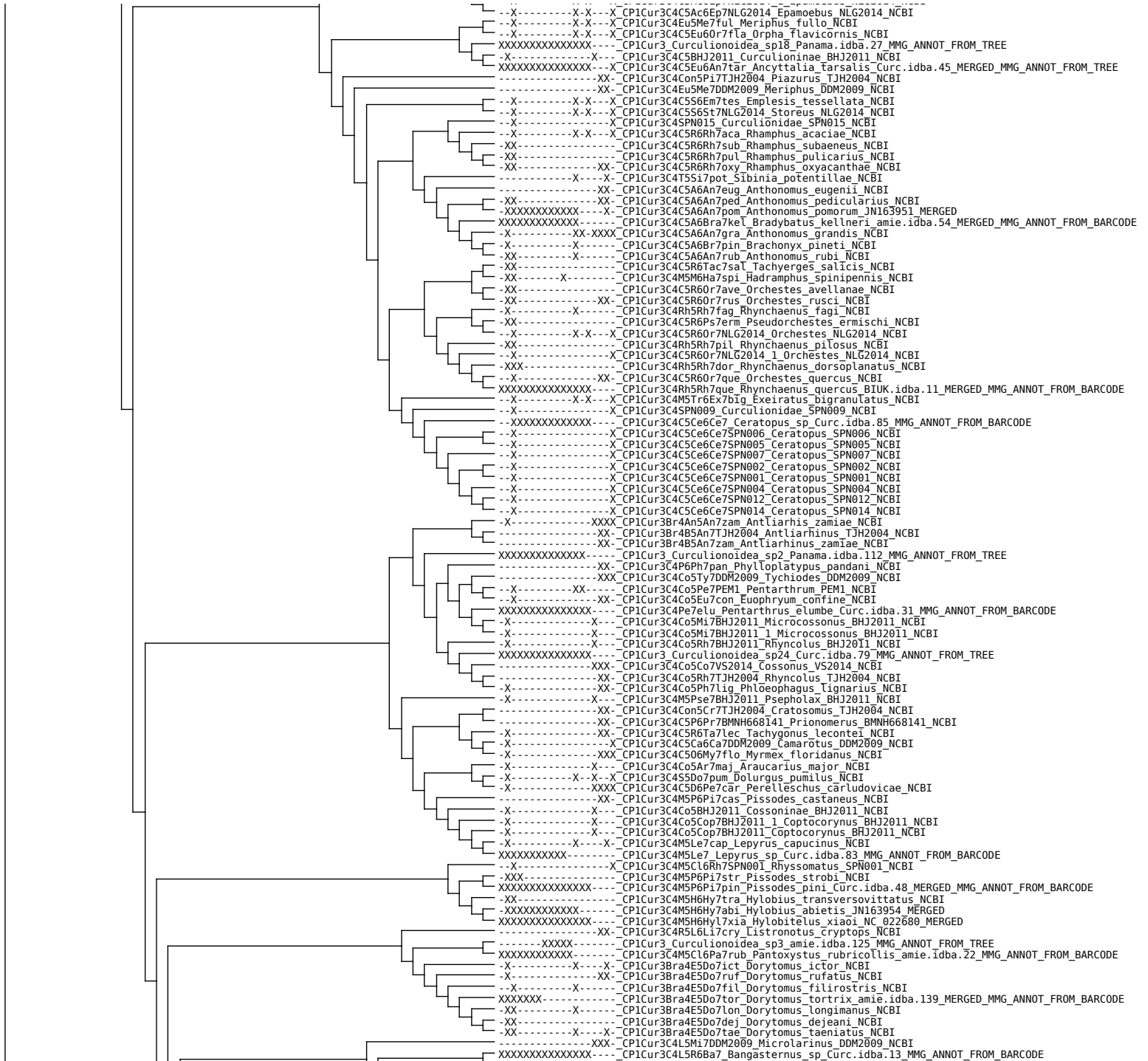


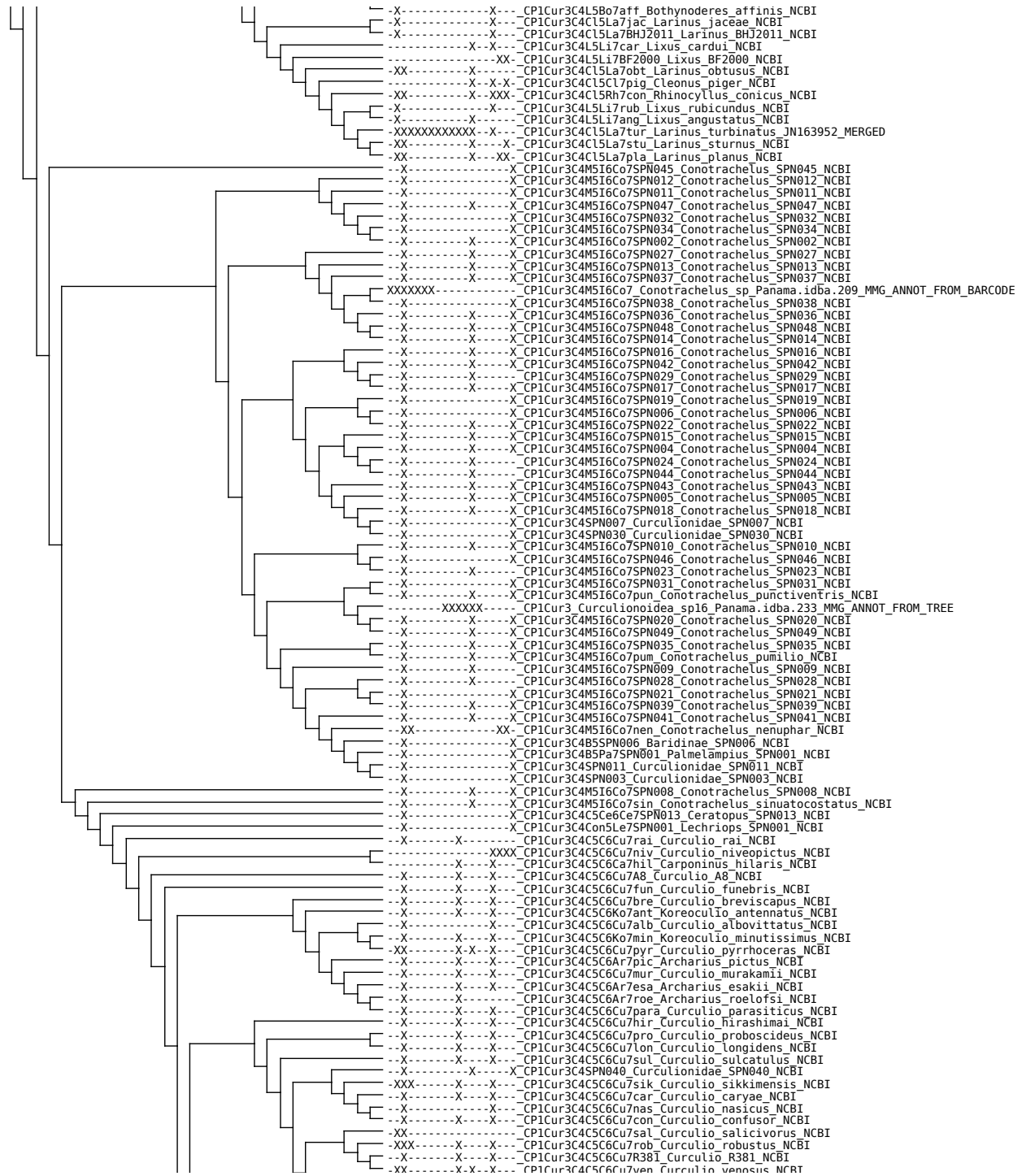


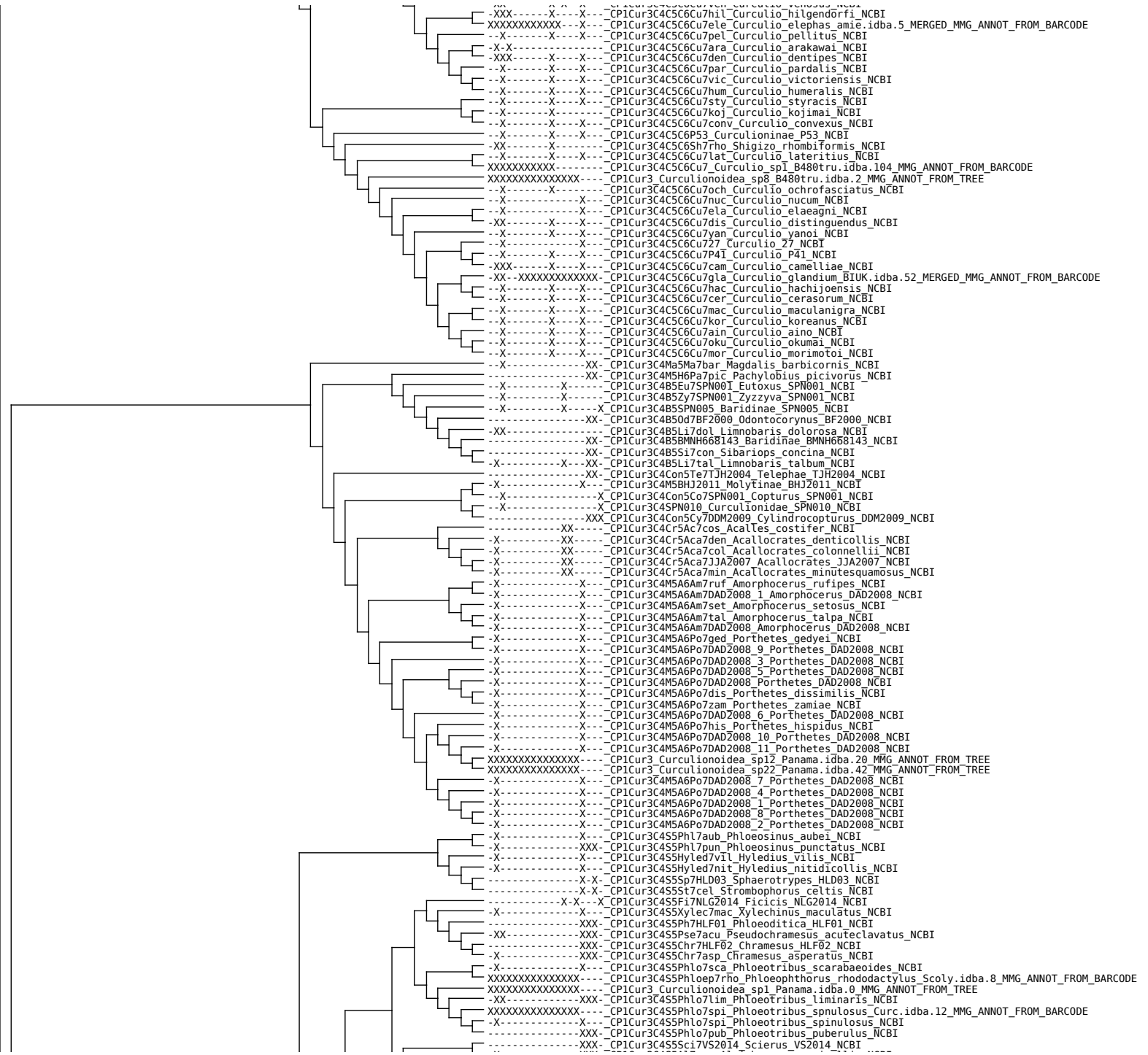
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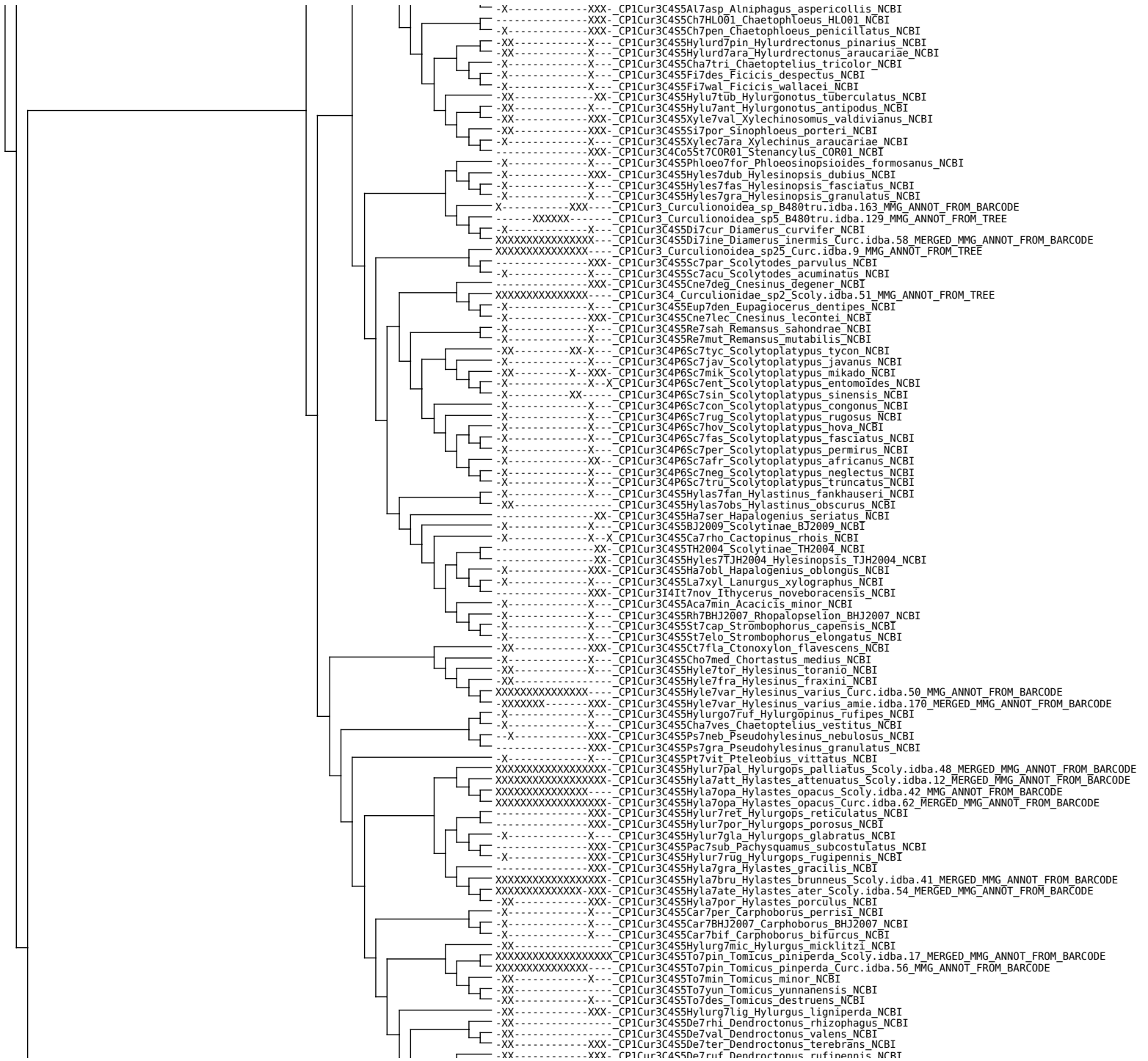


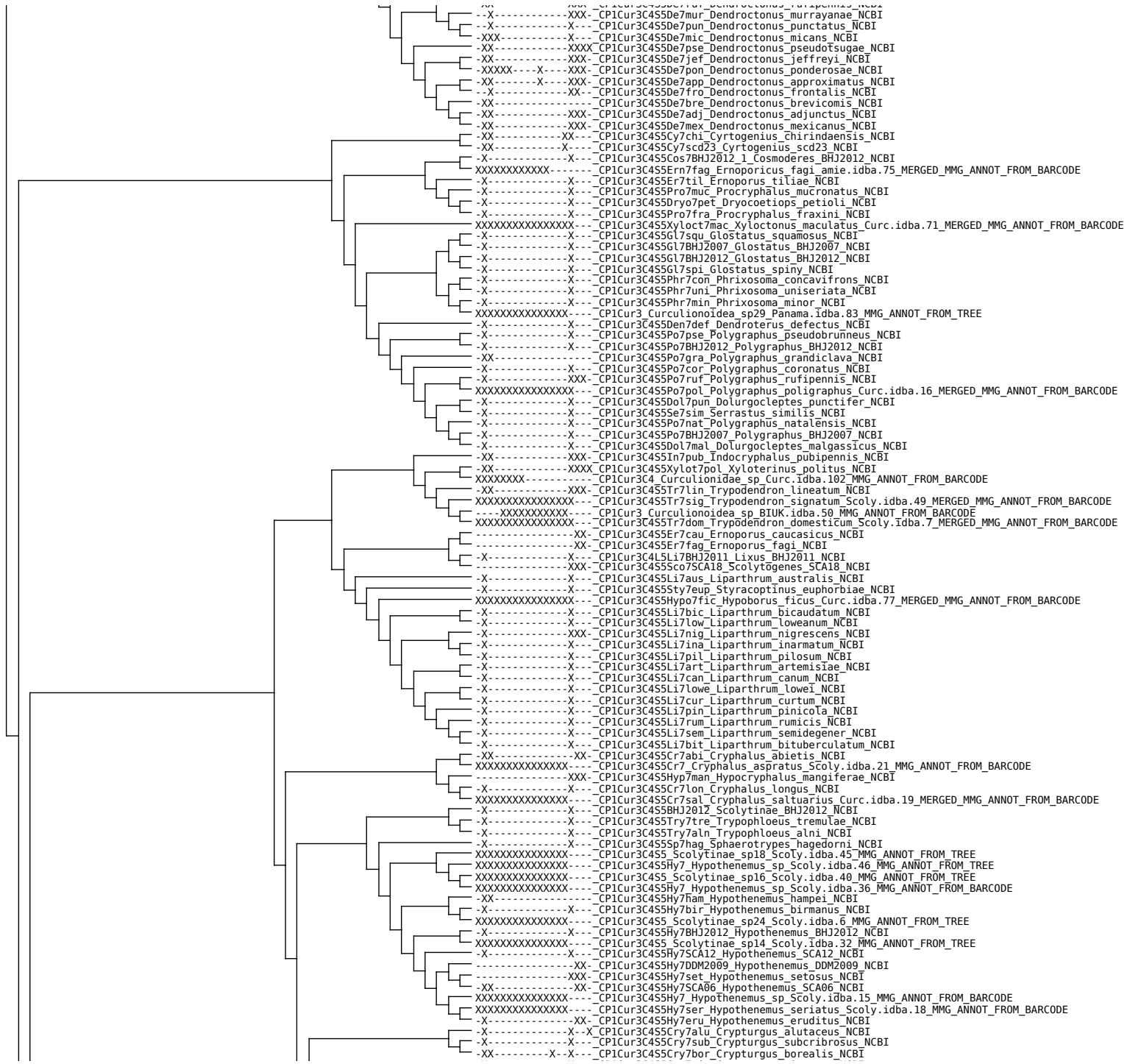


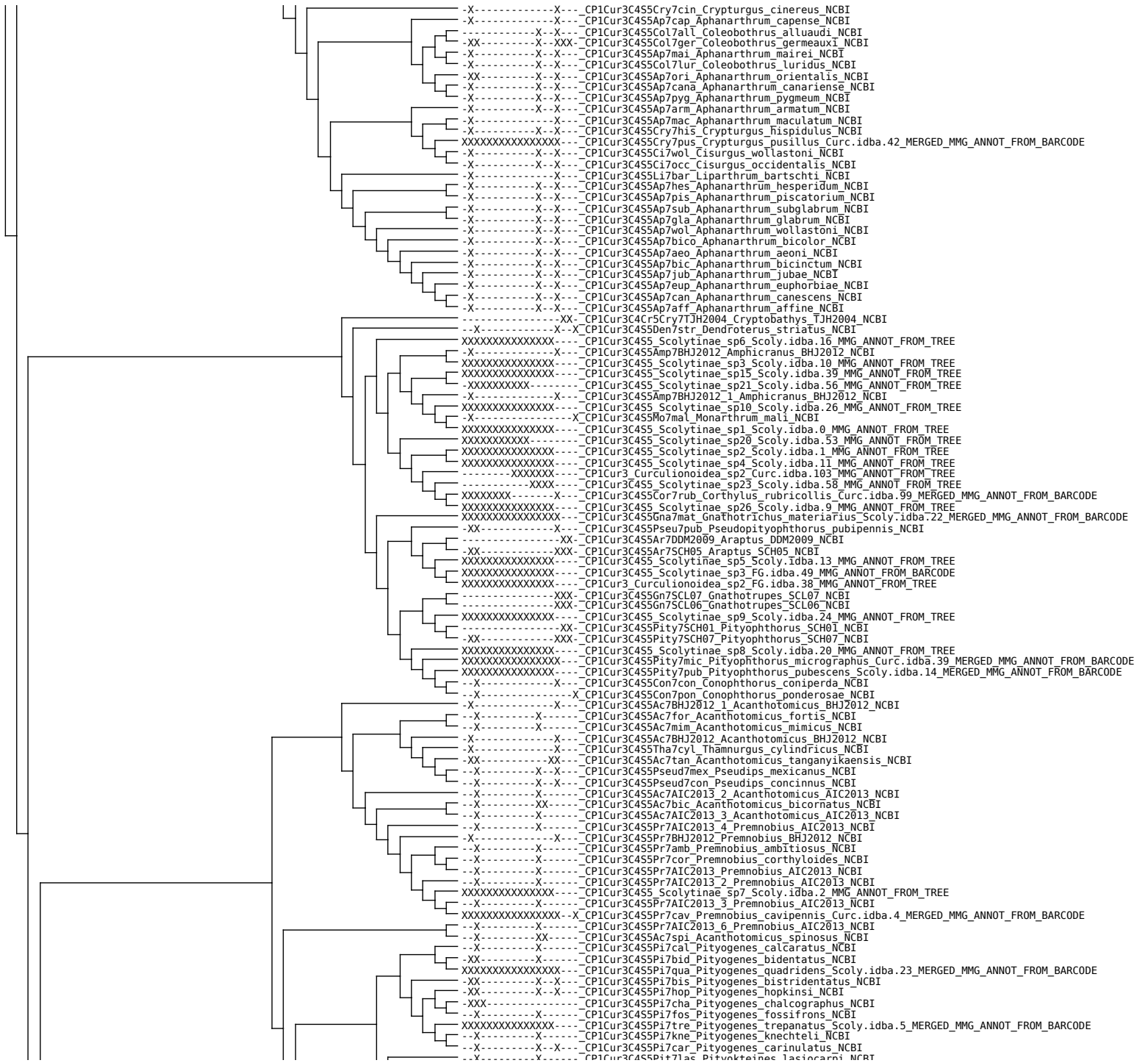


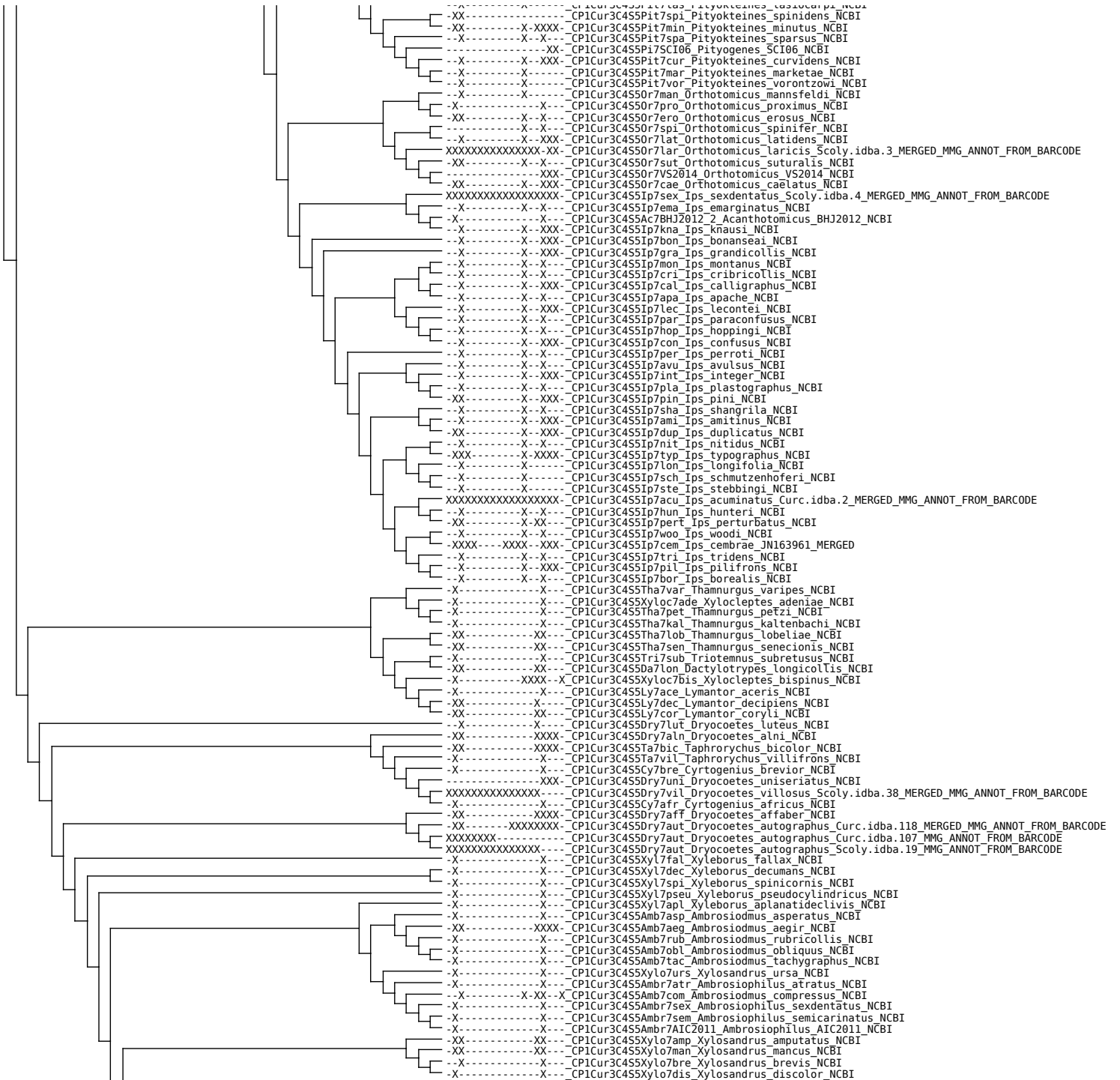


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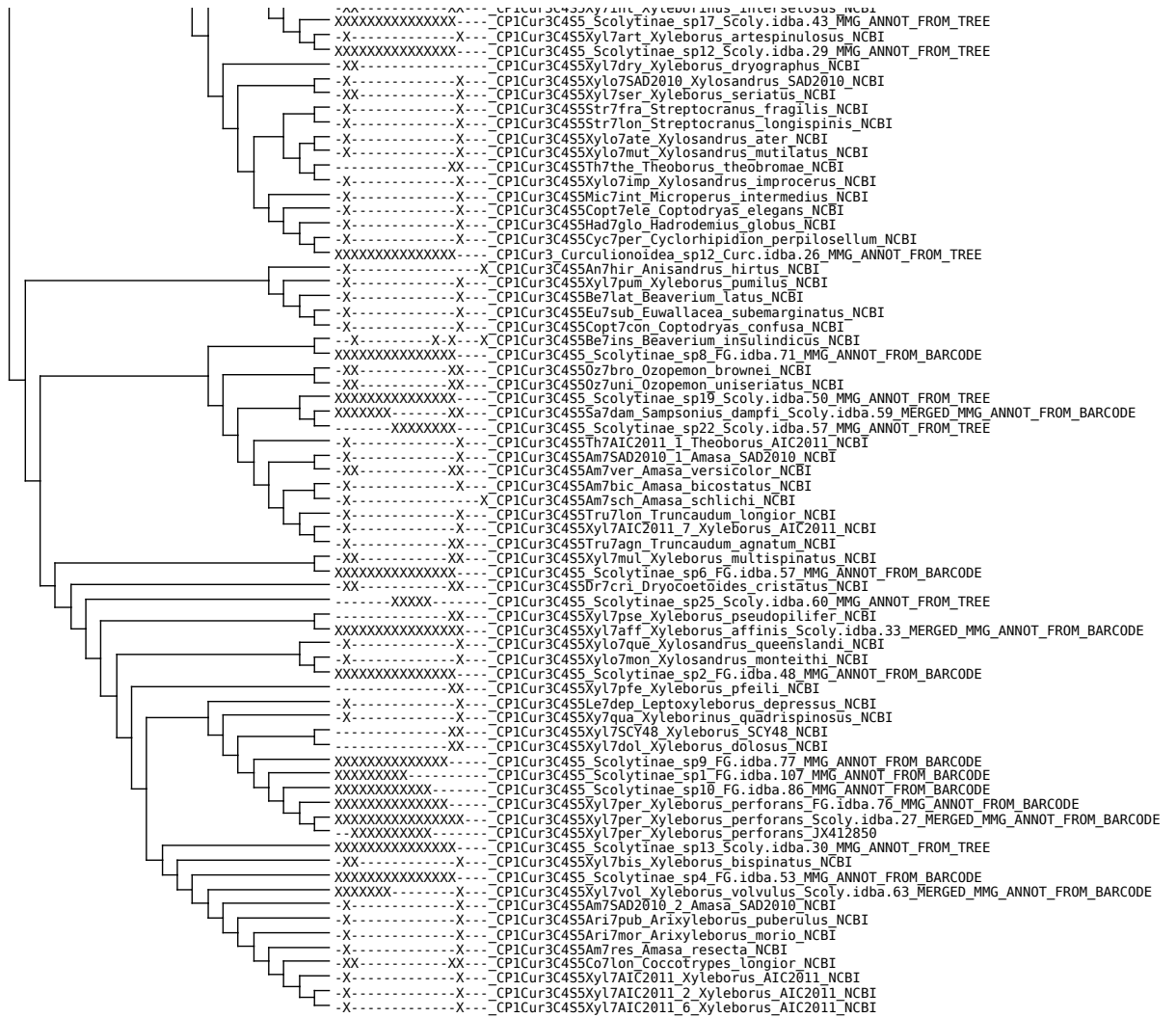


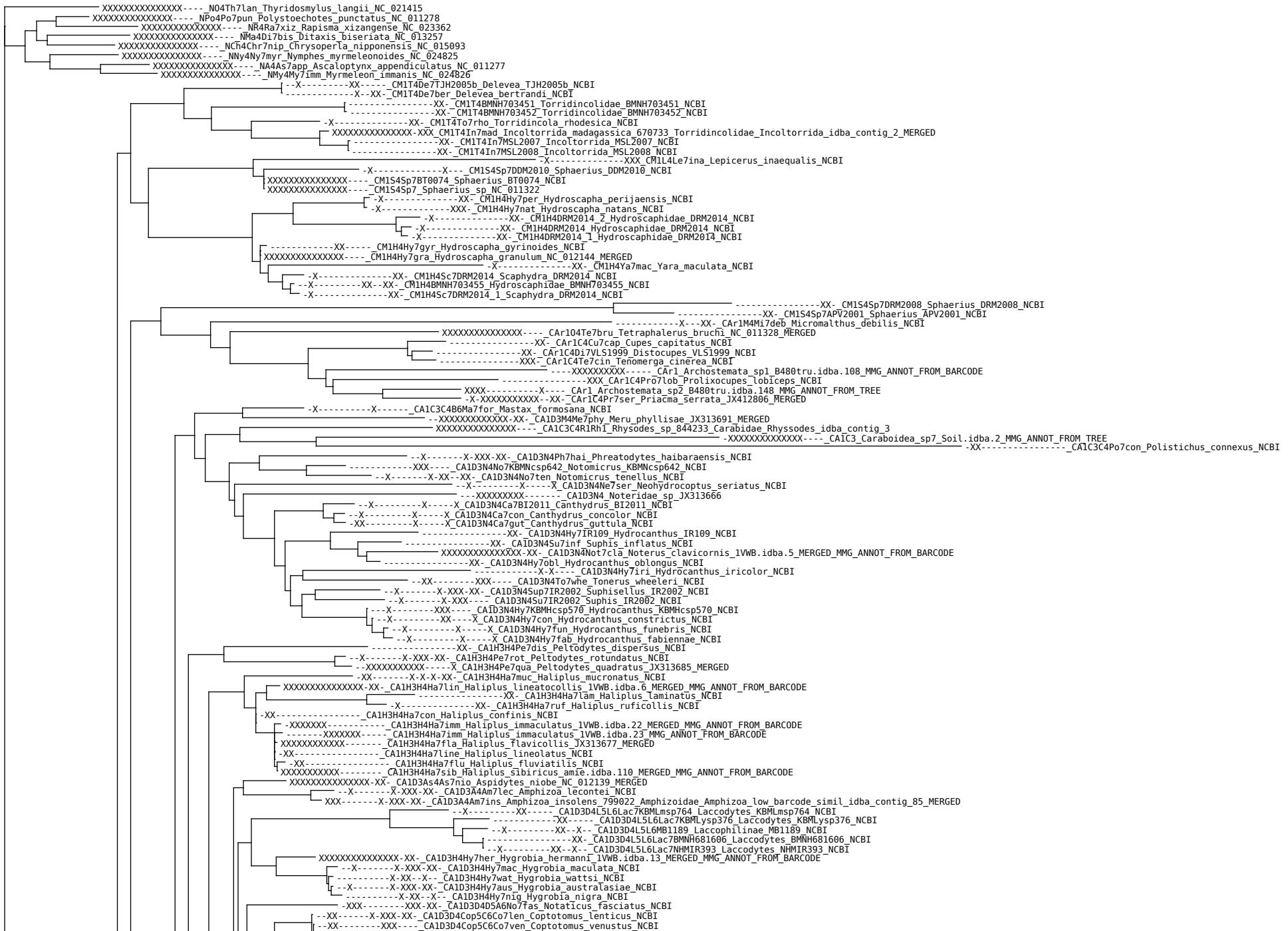












Phylogenetic tree showing relationships between various species, primarily from the genus *Ilybius* and related genera like *Platambus*, *Agabus*, and *Lancetes*. The tree is rooted on the left and branches out to the right. Each terminal node is labeled with a species name and its NCBI accession number. The labels are preceded by a series of 'X' characters indicating the taxonomic classification path (e.g., -X-XX- for Phylum, Class, Order, and Family levels). The tree shows a high degree of species diversity within the *Ilybius* genus, with many species having multiple 'X' characters, suggesting they are well-represented in the dataset. The tree is a cladogram, with branches representing evolutionary relationships and nodes representing common ancestors. The overall structure shows a large clade of *Ilybius* species, with several smaller clades of related genera branching off. The species names are listed in a single column on the right side of the tree, with their corresponding NCBI accession numbers. The 'X' characters are used to denote the taxonomic hierarchy, with 'X' representing a taxonomic rank and '-' representing a missing or unknown rank. The tree is a complex network of lines representing evolutionary relationships, with the root at the top left and the tips of the branches at the bottom right. The species names are listed in a single column on the right side of the tree, with their corresponding NCBI accession numbers. The 'X' characters are used to denote the taxonomic hierarchy, with 'X' representing a taxonomic rank and '-' representing a missing or unknown rank. The tree is a cladogram, with branches representing evolutionary relationships and nodes representing common ancestors. The overall structure shows a large clade of *Ilybius* species, with several smaller clades of related genera branching off. The species names are listed in a single column on the right side of the tree, with their corresponding NCBI accession numbers. The 'X' characters are used to denote the taxonomic hierarchy, with 'X' representing a taxonomic rank and '-' representing a missing or unknown rank.

-X-----XX----CA1D3D4A5A6Ag7IR2001 Agabus IR2001 NCBI
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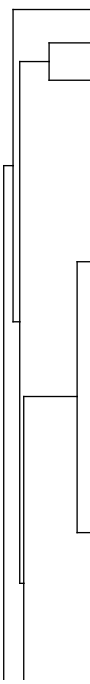
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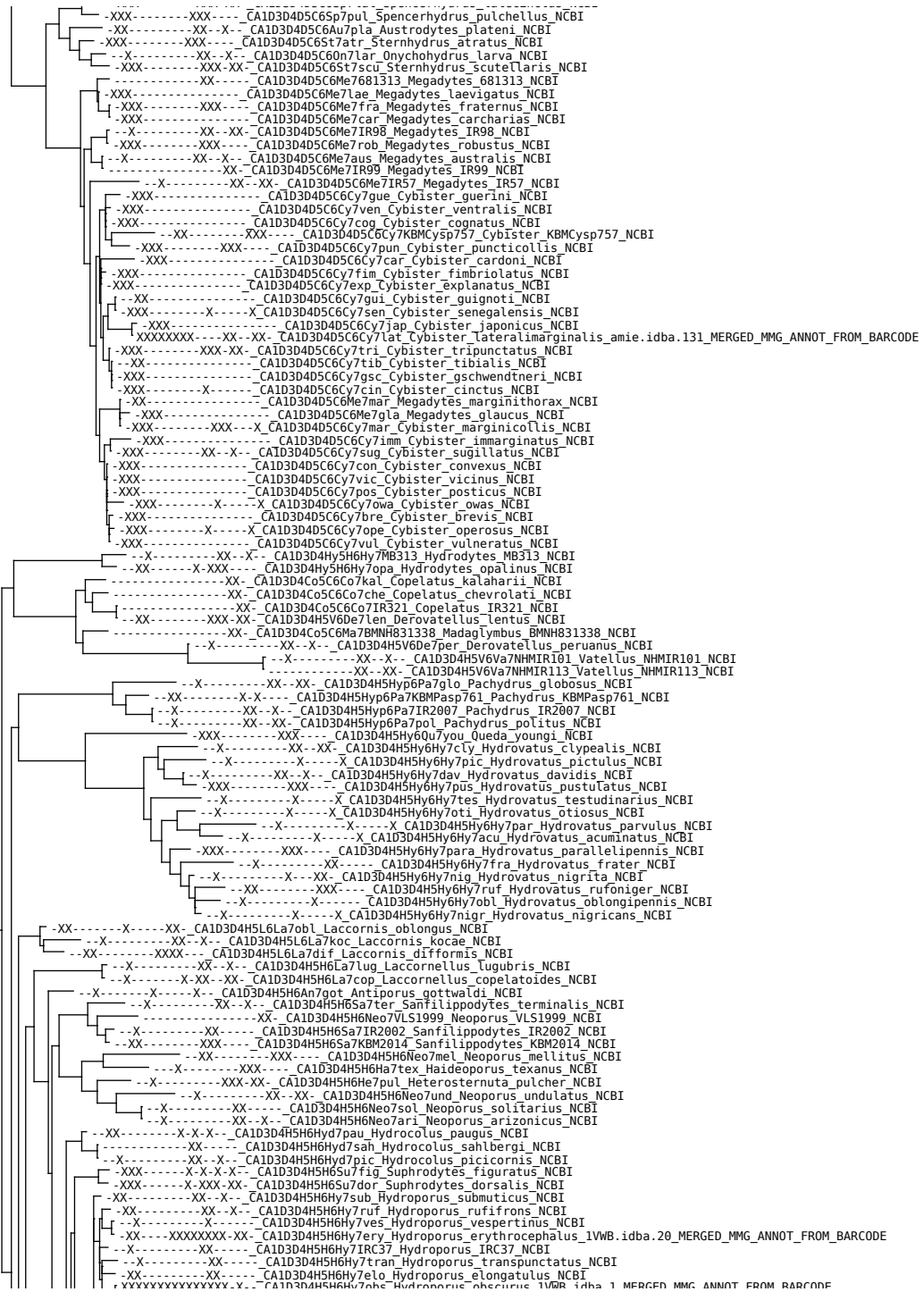
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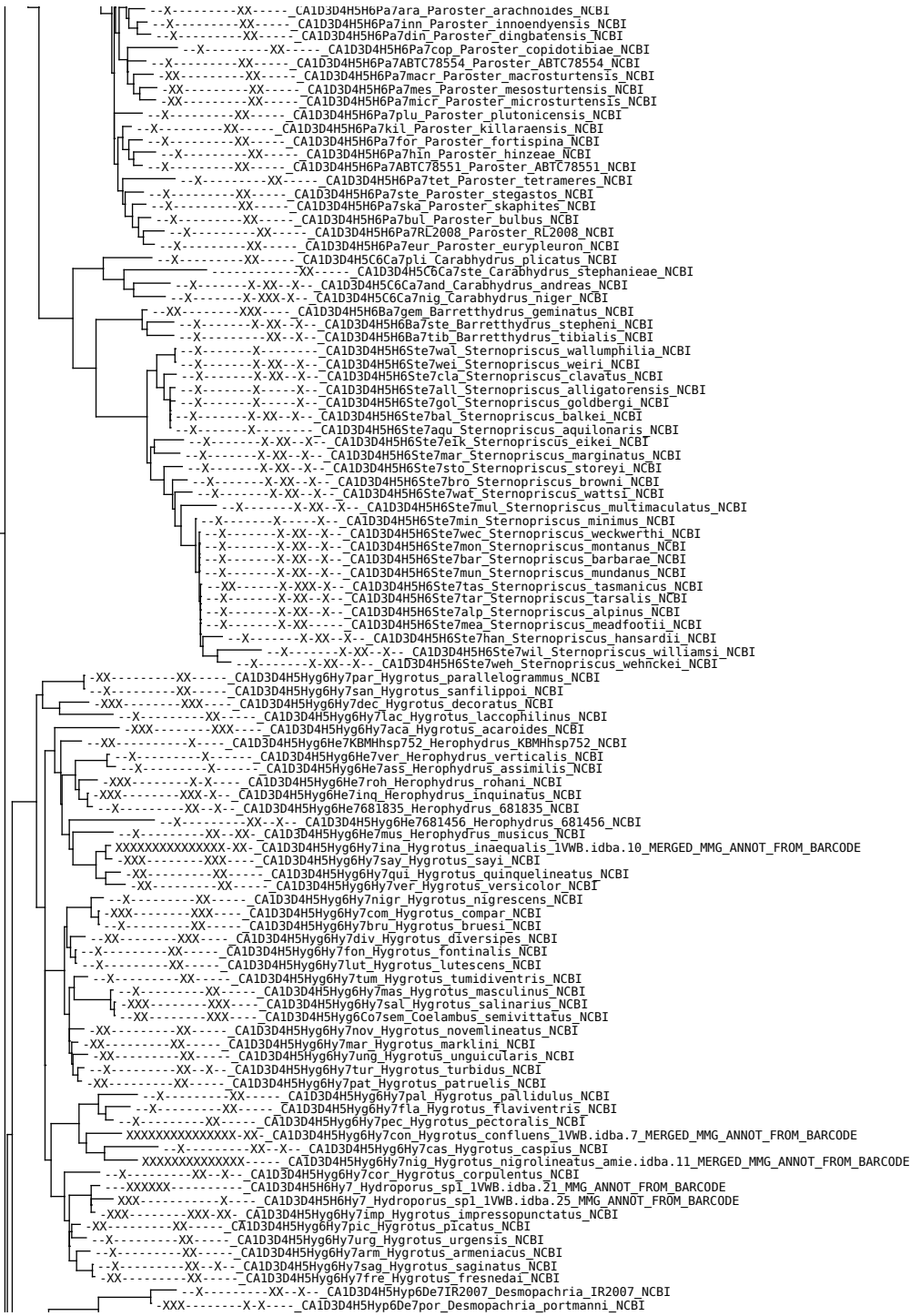


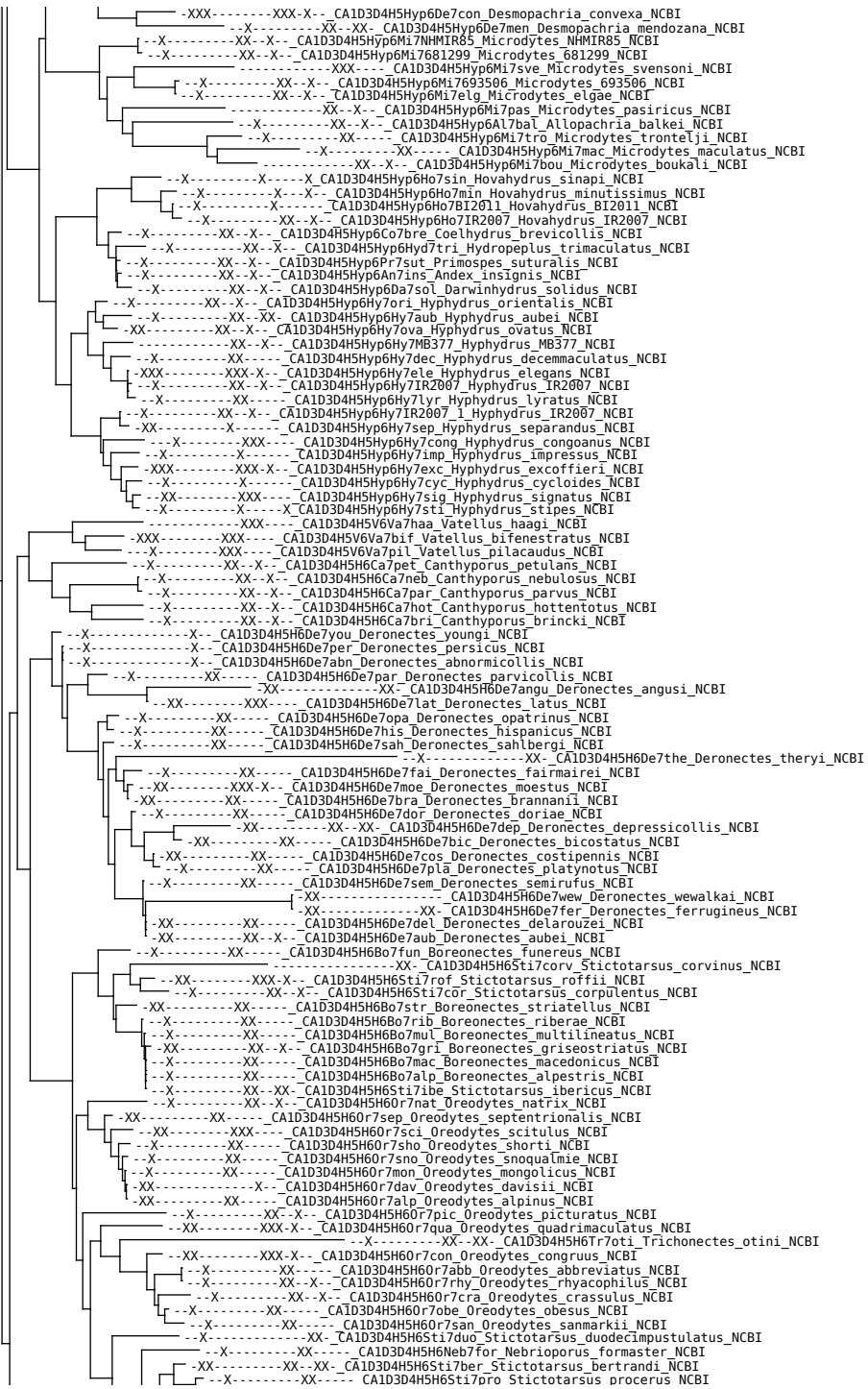


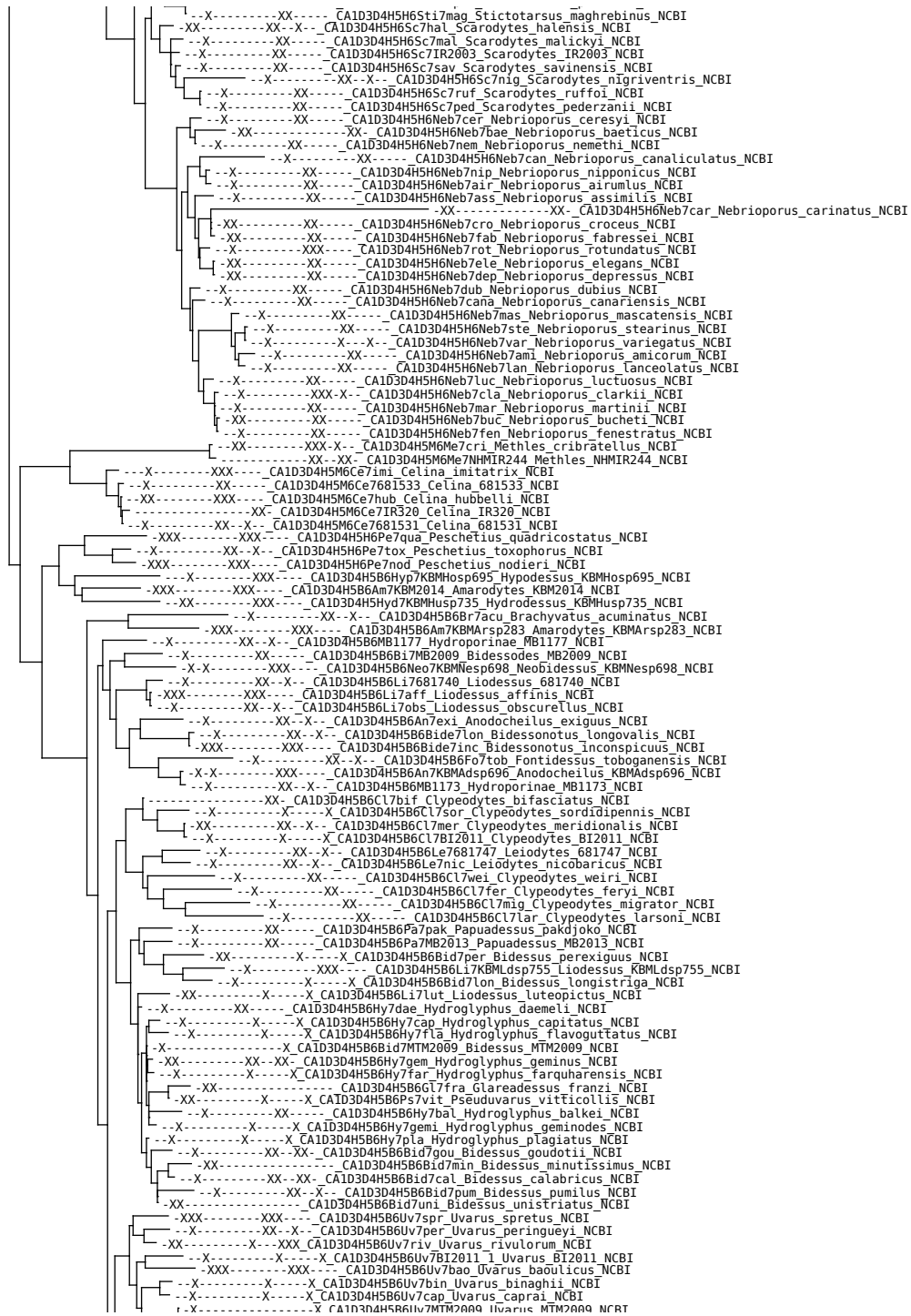
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CA1D3D4H5H6Hy7com_Hydroporus_compunctus_NCB1
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CA1D3D4H5H6Rh7sex_Rhithrodytes_sexguttatus_NCB1
CA1D3D4H5H6Rh7num_Rhithrodytes_numidicus_NCB1
CA1D3D4H5H6Rh7cru_Rhithrodytes_cruceus_NCB1
CA1D3D4H5H6Rh7bim_Rhithrodytes_bimaculatus_NCB1

Phylogenetic tree showing relationships among various species, primarily from the genus *Paroster* and related genera. The tree is rooted on the left and branches out to the right. Each terminal node is labeled with a species name and a corresponding accession number (e.g., CA1D3D4H5H6Pa7byp). The labels are preceded by a series of dashes (e.g., -X-), indicating the taxonomic classification or support values for each node. The species names include:

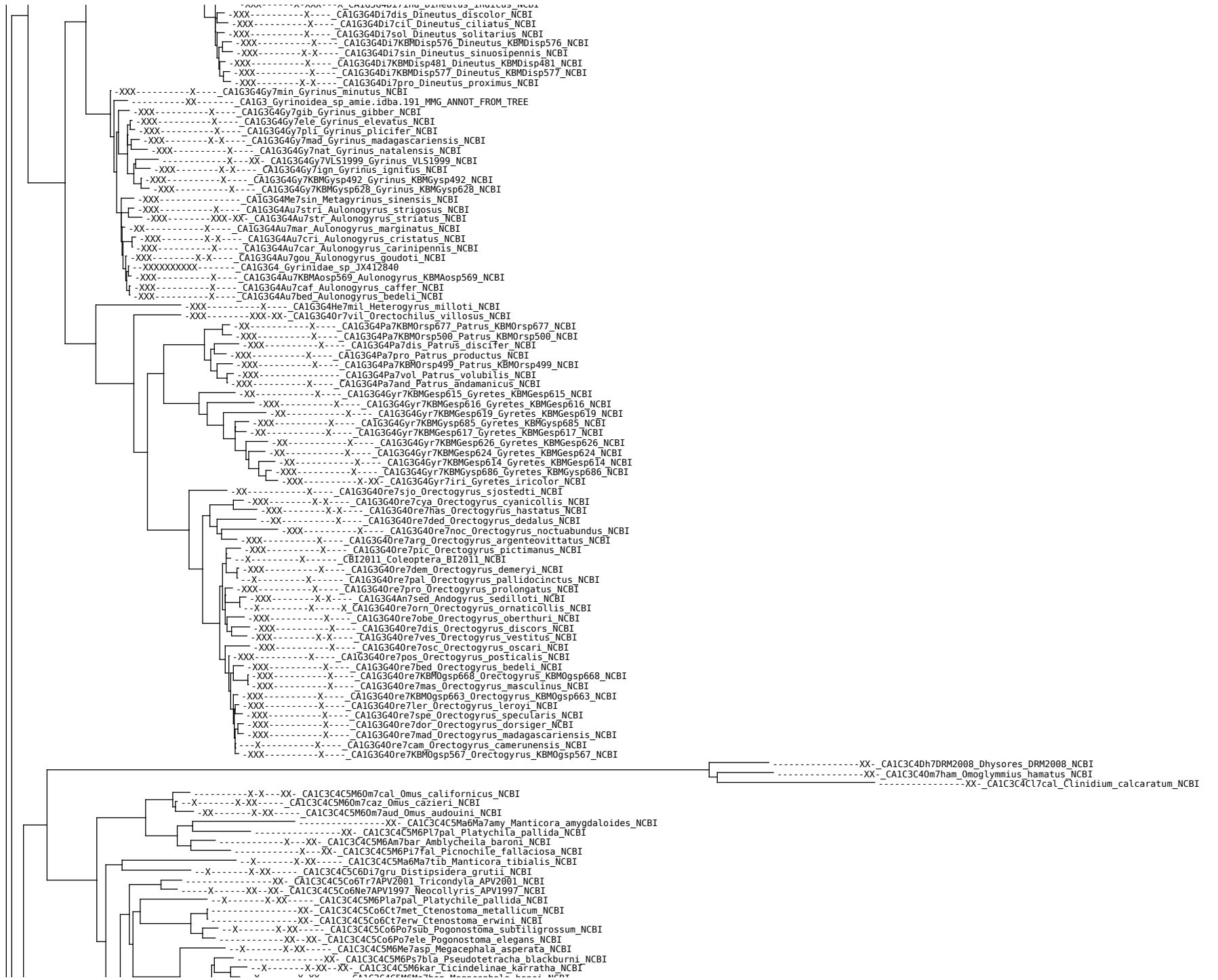
- agnus* NCBI
- Cermerius* NCBI
- Porhydrus lineatus* NCBI
- Porhydrus genei* NCBI
- Porhydrus vicinus* NCBI
- Stictonectes lepidus* NCBI
- Stictonectes escheri* NCBI
- Stictonectes PA313* NCBI
- Stictonectes PA312* NCBI
- Stictonectes rufulus* NCBI
- Stictonectes samai* NCBI
- Stictonectes canariensis* NCBI
- Stictonectes optatus* NCBI
- Stictonectes azruensis* NCBI
- Stictonectes epipleuricus* NCBI
- Stictonectes MNCNAH72* NCBI
- Stictonectes occidentalis* NCBI
- Ereboporus naturaconservatus* NCBI
- Metaporus meridionalis* NCBI
- Porhydrus KBMPosp754* NCBI
- Graptodytes flavipes* NCBI
- Graptodytes veteri* NCBI
- Graptodytes bilineatus* NCBI
- Graptodytes sedilloti* NCBI
- Graptodytes granularis* NCBI
- Graptodytes pictus* NCBI
- Graptodytes aequalis* NCBI
- Graptodytes castilianus* NCBI
- Graptodytes siculus* NCBI
- Graptodytes pietrii* NCBI
- Graptodytes atlantis* NCBI
- Graptodytes eremitus* NCBI
- Graptodytes delectus* NCBI
- Graptodytes kuchtai* NCBI
- Graptodytes varius* NCBI
- Graptodytes fractus* NCBI
- Graptodytes ignotus* NCBI
- Sekaliporus kriegi* NCBI
- Tiporus tambreyi* NCBI
- Tiporus centralis* NCBI
- Tiporus josepheni* NCBI
- Tiporus lachlani* NCBI
- Tiporus undecimmaculatus* NCBI
- Antiporus jenniferae* NCBI
- Antiporus collaris* NCBI
- Antiporus hollingsworthi* NCBI
- Antiporus wilsoni* NCBI
- Antiporus bakewellii* NCBI
- Antiporus blakeii* NCBI
- Antiporus femoralis* NCBI
- Antiporus MB1421* NCBI
- Antiporus interrogatioris* NCBI
- Antiporus strigosulus* NCBI
- Antiporus gilbertii* NCBI
- Chostonectes johnsoni* NCBI
- Chostonectes nebulosus* NCBI
- Chostonectes sharpi* NCBI
- Chostonectes gigas* NCBI
- Megaporus wilsoni* NCBI
- Megaporus natvigi* NCBI
- Megaporus rufipes* NCBI
- Megaporus ruficeps* NCBI
- Megaporus solidus* NCBI
- Megaporus howittii* NCBI
- Megaporus gardneri* NCBI
- Megaporus hamatus* NCBI
- Necterosoma susanna* NCBI
- Necterosoma regulare* NCBI
- Necterosoma penicillatum* NCBI
- Necterosoma dispar* NCBI
- Necterosoma undecimlineatum* NCBI
- Necterosoma darwini* NCBI
- Necterosoma aphroditae* NCBI
- Necterosoma schmetzi* NCBI
- Paroster couagesi* NCBI
- Paroster michaelsoni* NCBI
- Paroster nigroadumbratus* NCBI
- Paroster melroseensis* NCBI
- Paroster darlotensis* NCBI
- Paroster RL2008_1* NCBI
- Paroster insculptilis* NCBI
- Paroster niger* NCBI
- Paroster pallescens* NCBI
- Paroster baylyi* NCBI
- Paroster peiisensis* NCBI
- Paroster pentameris* NCBI
- Paroster gibbi* NCBI
- Paroster napperbyensis* NCBI
- Paroster macrocephalus* NCBI
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- Paroster megamacrocephalus* NCBI
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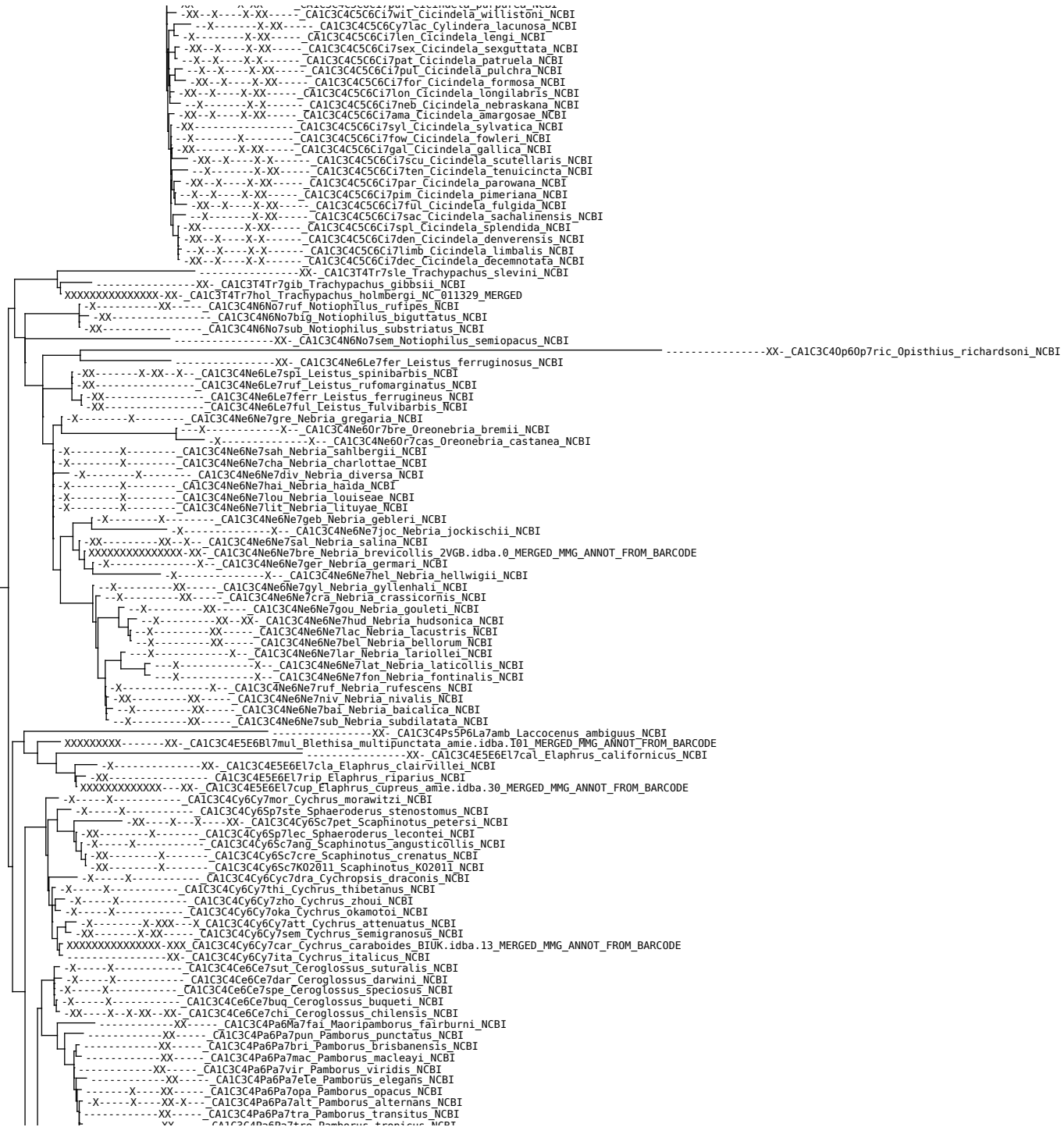


Phylogenetic tree showing relationships among various species, primarily from the genus *Cicindela* and related genera. The tree is rooted on the left and branches out to the right. Each terminal node is labeled with a taxon name and a source code (e.g., NCBI). The labels include accession numbers (e.g., CA13C4C5M6Me7bos) and species names (e.g., *Megacephala bostockii*, *Cicindela regalis*, *Zecicindela hamiltoni*). The tree shows a complex branching pattern, indicating evolutionary relationships and clades within the group.

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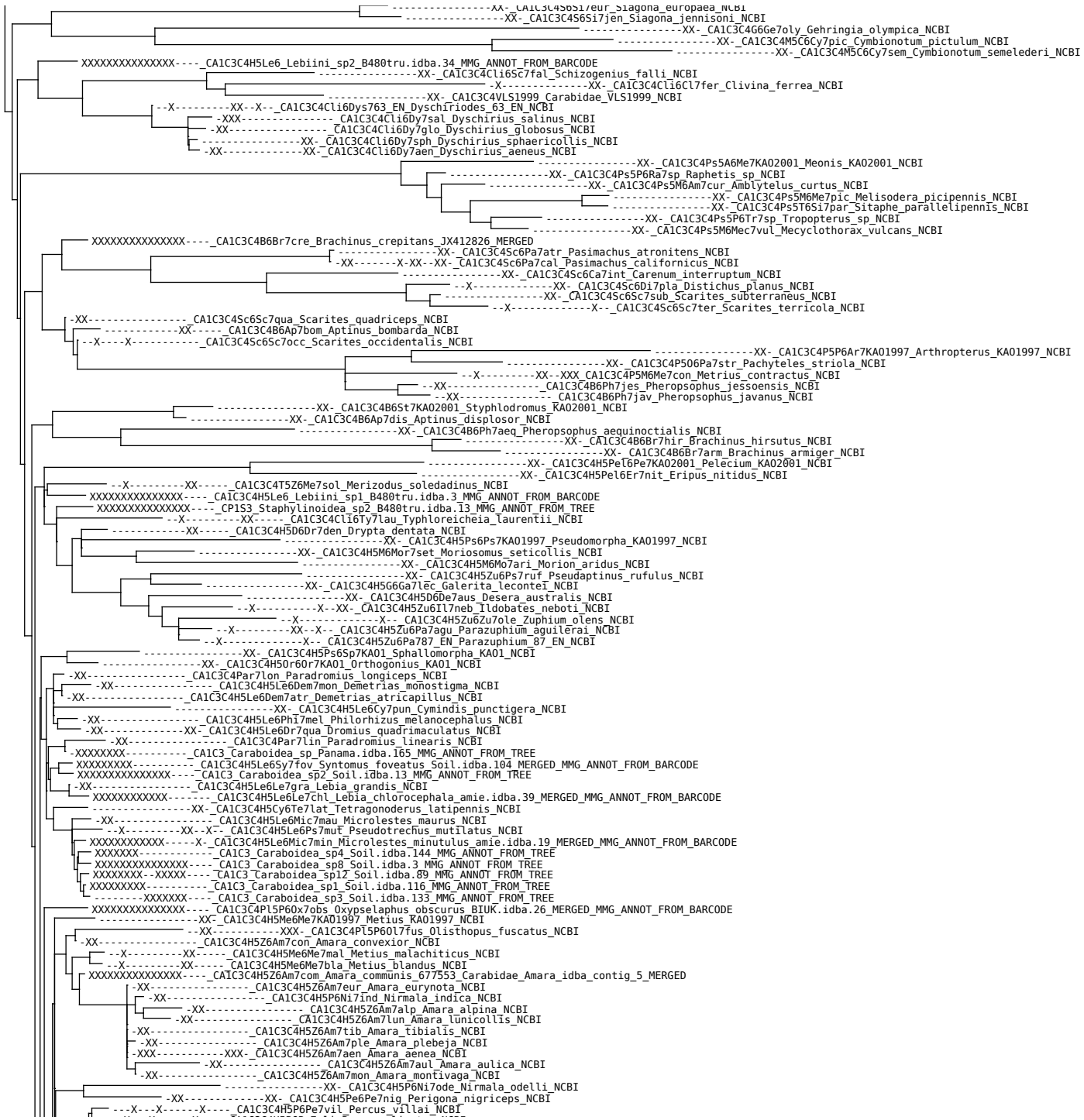


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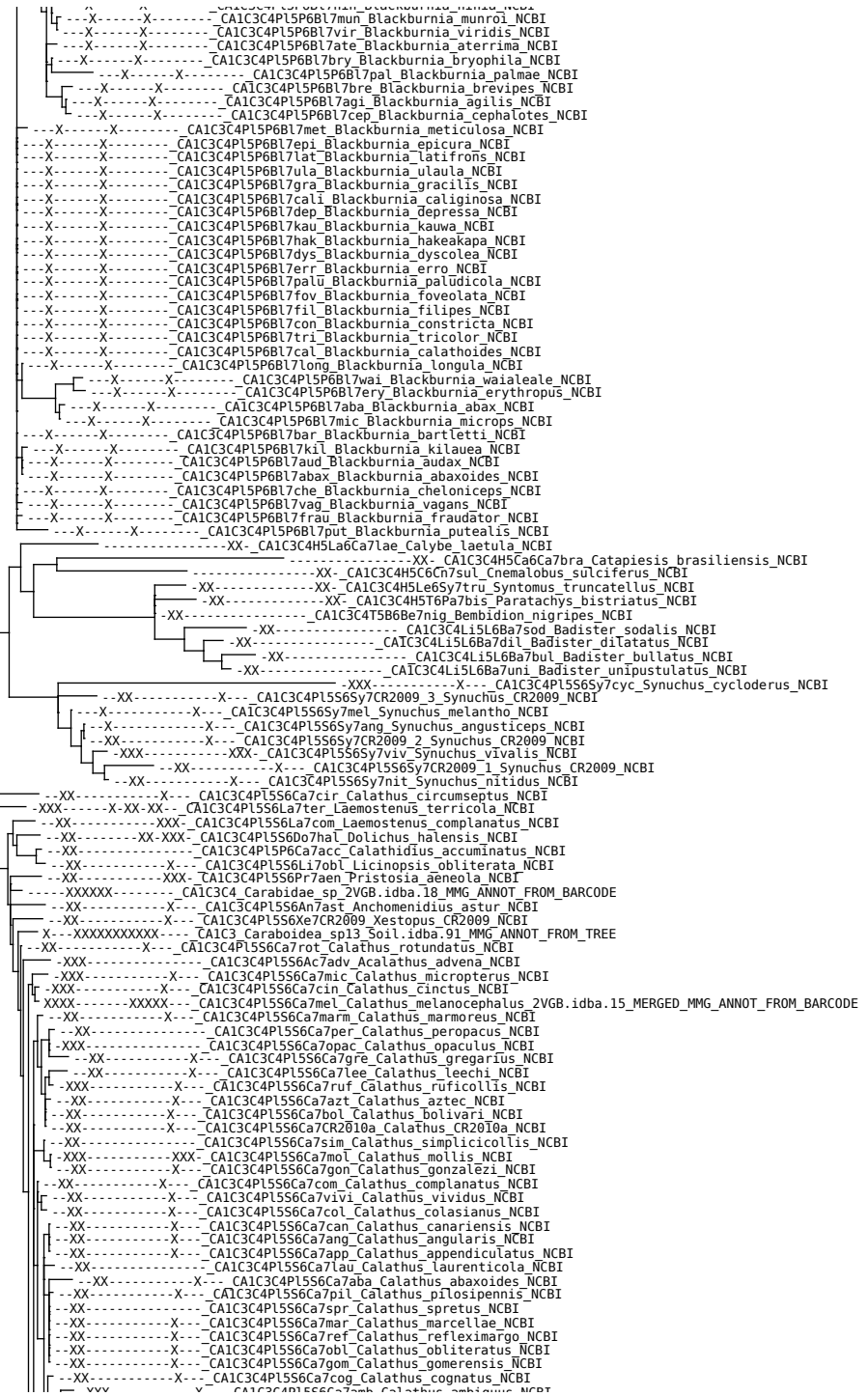
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-X-----CA1C3C4H5P6Pt7ado_Pterostichus_adoxus_NCBI
-XXX-----CA1C3C4H5P6Pt7tri_Pterostichus_trinitensis_NCBI
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-XX-----CA1C3C4H5P6Pt7eca_Pterostichus_eccarinatus_NCBI
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-XX-----CA1C3C4H5P6Pt7fas_Pterostichus_fasciatopunctatus_NCBI
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-X-----CA1C3C4H5P6Pt7scu_Pterostichus_scurra_NCBI
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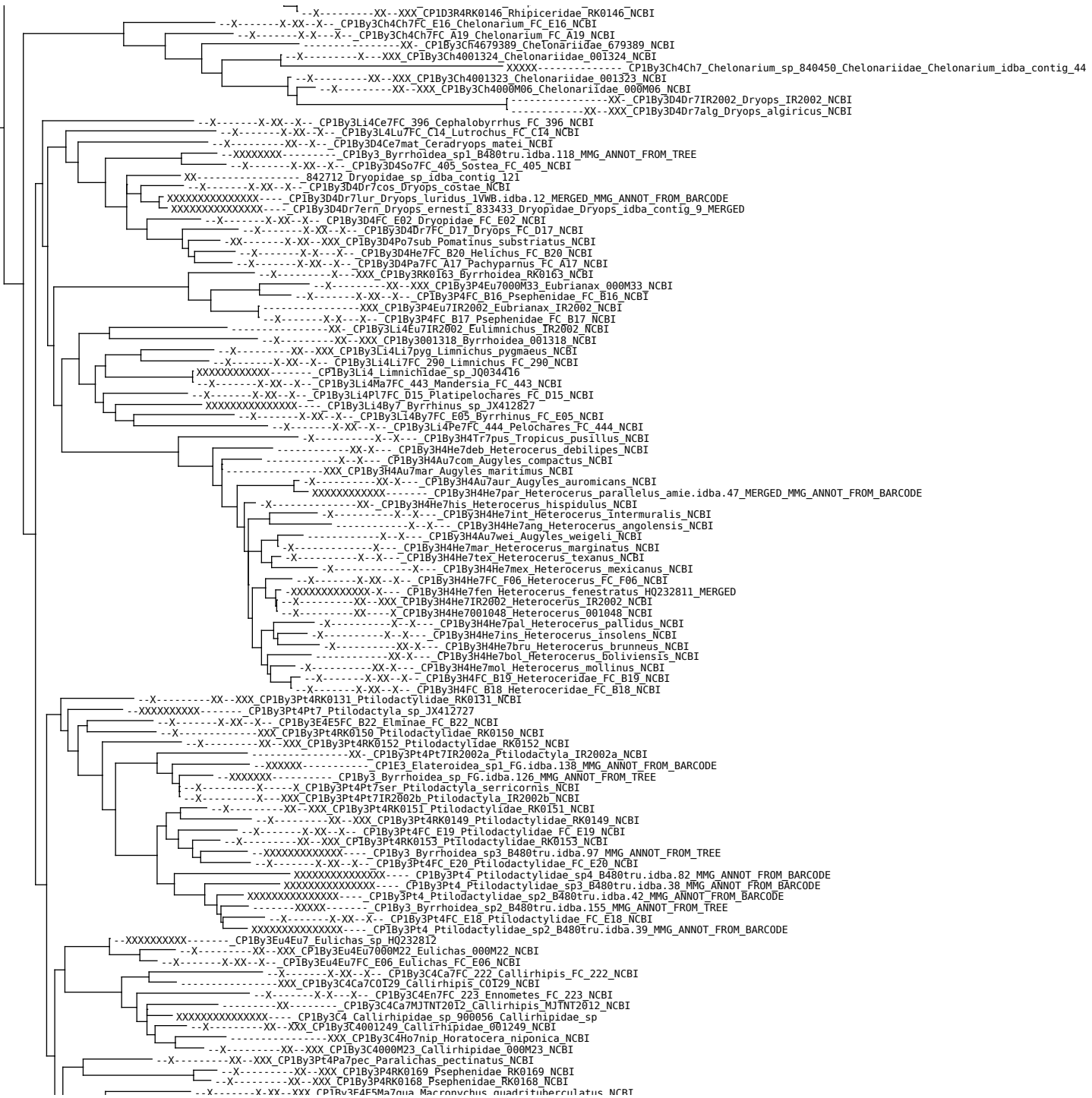


Phylogenetic tree showing relationships between various species, primarily in the order Scirtida. The tree is rooted on the left and branches out to the right. Species names are listed on the right side of the tree, often followed by their NCBI accession number. The tree is annotated with 'X' and 'XX' characters, likely indicating specific characteristics or data points for each species. The species names include:

- CP1Sci354RK0162 Scirtidae RK0162 NCBI
- CP1Sci354RK0165 Scirtidae RK0165 NCBI
- CP1Sci354RK0159 Scirtidae RK0159 NCBI
- CP1Sci354Sc7pin Scirtes pinjarraensis NCBI
- CP1Sci3540r7flo Ora floccosa NCBI
- CP1Sci354Sc7ex0 Scirtes exoletus NCBI
- CP1Sci354Sc7mic Scirtes microrotundus NCBI
- CP1Sci354Sc7int Scirtes interstinctus NCBI
- CP1Sci354Sc7bri Scirtes brisbanensis NCBI
- CP1Sci354Ex7ruf Exochomoscirtes ruforotundus NCBI
- CP1Sci354Ps7cin Pseudomicrocara cincta NCBI
- CP1Sci354Ps7New Pseudomicrocara NewenMP NCBI
- CP1Sci354Ps7han Pseudomicrocara hangayi NCBI
- CP1Sci354Ps7par Pseudomicrocara parva NCBI
- CP1Sci354Ps7CW227 Pseudomicrocara CW227 NCBI
- CP1Sci354Ps7vari Pseudomicrocara variegata NCBI
- CP1Sci354Ps7CW231 Pseudomicrocara CW231 NCBI
- CP1Sci354Ma7cra Macrohelodes crassus NCBI
- CP1Sci354Pr7dis Prionocyphon discoideus NCBI
- CP1Sci354Pr7sex Prionocyphon sexmaculatus NCBI
- CP1Sci354Ps7dav Pseudomicrocara davidsoni NCBI
- CP1Sci354Ps7des Pseudomicrocara desraeae NCBI
- CP1Sci354Ps7ori Pseudomicrocara orientalis NCBI
- CP1Sci354Ps7str Pseudomicrocara Strathblane NCBI
- CP1Sci354Ps7spi Pseudomicrocara spilita NCBI
- CP1Sci354Ps7ant Pseudomicrocara anthophilia NCBI
- CP1Sci354Pr7ser Prionocyphon serricornis NCBI
- CP1Sci354 Scirtidae sp. JX412728
- CP1Sci354Het7aus Heterocyphon australis NCBI
- CP1Sci354Ma7thu Macrohelodes thunguttiensis NCBI
- CP1Sci354Ma7spi Macrohelodes spinapennis NCBI
- CP1Sci354Ma7luc Macrohelodes lucidis NCBI
- CP1Sci354Pe7CW400 Peneveronatus CW400 NCBI
- CP1Sci354Pe7mac Peneveronatus macedonensis NCBI
- CP1Sci354Ps7ang Pseudomicrocara angulata NCBI
- CP1Sci354Het7mon Heterocyphon montanus NCBI
- CP1Sci354Het7dec Heterocyphon decussatus NCBI
- CP1Sci354Het7tri Heterocyphon triangularis NCBI
- CP1Sci354Het7kei Heterocyphon keiraensis NCBI
- CP1Sci354Het7elo Heterocyphon elongatus NCBI
- CP1Sci354He7obs Herthania obscurata NCBI
- CP1Sci354Ps7min Pseudomicrocara minor NCBI
- CP1Sci354Ac7mac Accolabass maculatus NCBI
- CP1Sci354Ac7vic Accolabass victoriensis NCBI
- CP1Sci354Het7spe Heterocyphon spencei NCBI
- CP1Sci354Ps7ruf Pseudomicrocara rufusensis NCBI
- CP1Sci354Ac7par Accolabass parvus NCBI
- CP1Sci354Ps7atk Pseudomicrocara atkinsoni NCBI
- CP1Sci354Ps7oc Pseudomicrocara occidentalis NCBI
- CP1Sci354JH2010 Scirtidae JH2010 NCBI
- CP1Sci354Ps7pic Pseudomicrocara picta NCBI
- CP1Sci354RK0166 Scirtidae RK0166 NCBI
- CP1Sci354Ps7Sty Pseudomicrocara StyxForest NCBI
- CP1Sci354Ps7var Pseudomicrocara variabilis NCBI
- CP1Sci354Ps7unc Pseudomicrocara uncata NCBI
- CP1Sci354Co7BMNH696331 Contacyphon BMNH696331 NCBI
- CP1Sci354RK0161 Scirtidae RK0161 NCBI
- CP1Sci354Co7cam Contacyphon camp NCBI
- CP1Sci354Co7Neu Contacyphon Neusiedlersee NCBI
- CP1Sci354Co7lae Contacyphon laevipennis NCBI
- CP1Sci354Cy7var Cyphon variabilis 2VGB.idba.12_MMG_ANNOT_FROM_BARCODE
- CP1Sci354Cy7 Cyphon sp. NC_011320
- CP1Sci354Co7BT0012 Contacyphon BT0012 NCBI
- CP1Sci354Co7hil Contacyphon hilaris NCBI
- CP1Sci354Co7pub Contacyphon pubescens NCBI
- CP1Sci354Co7var Contacyphon variabilis NCBI
- CP1Sci354Co7pad Contacyphon padi NCBI
- CP1Sci354Co7phr Contacyphon phragmiteticola NCBI
- CP1Sci354Ps7hyl Pseudomicrocara hylaios NCBI
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- CP1Sci354Mac7sca Macroscyllus scalaris NCBI
- CP1Sci354Pr7ins Prionocyphon insolitus NCBI
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- CP1Sci354Pr7mac Prionocyphon macroflavidus NCBI
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- CP1Sci354Au7fur Austrocyphon furcatus NCBI
- CP1Sci354Au7tri Austrocyphon tribulator NCBI
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- CP1Sci354Au7fen Austrocyphon fenestratus NCBI
- CP1Sci354Au7wat Austrocyphon watisi NCBI
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- CP1Sci354Eu7 Eucinetus sp. 2mie.idba.97_MMG_ANNOT_FROM_BARCODE
- CP1Sci354Eu7 Eucinetus sp. 155_MMG_ANNOT_FROM_BARCODE
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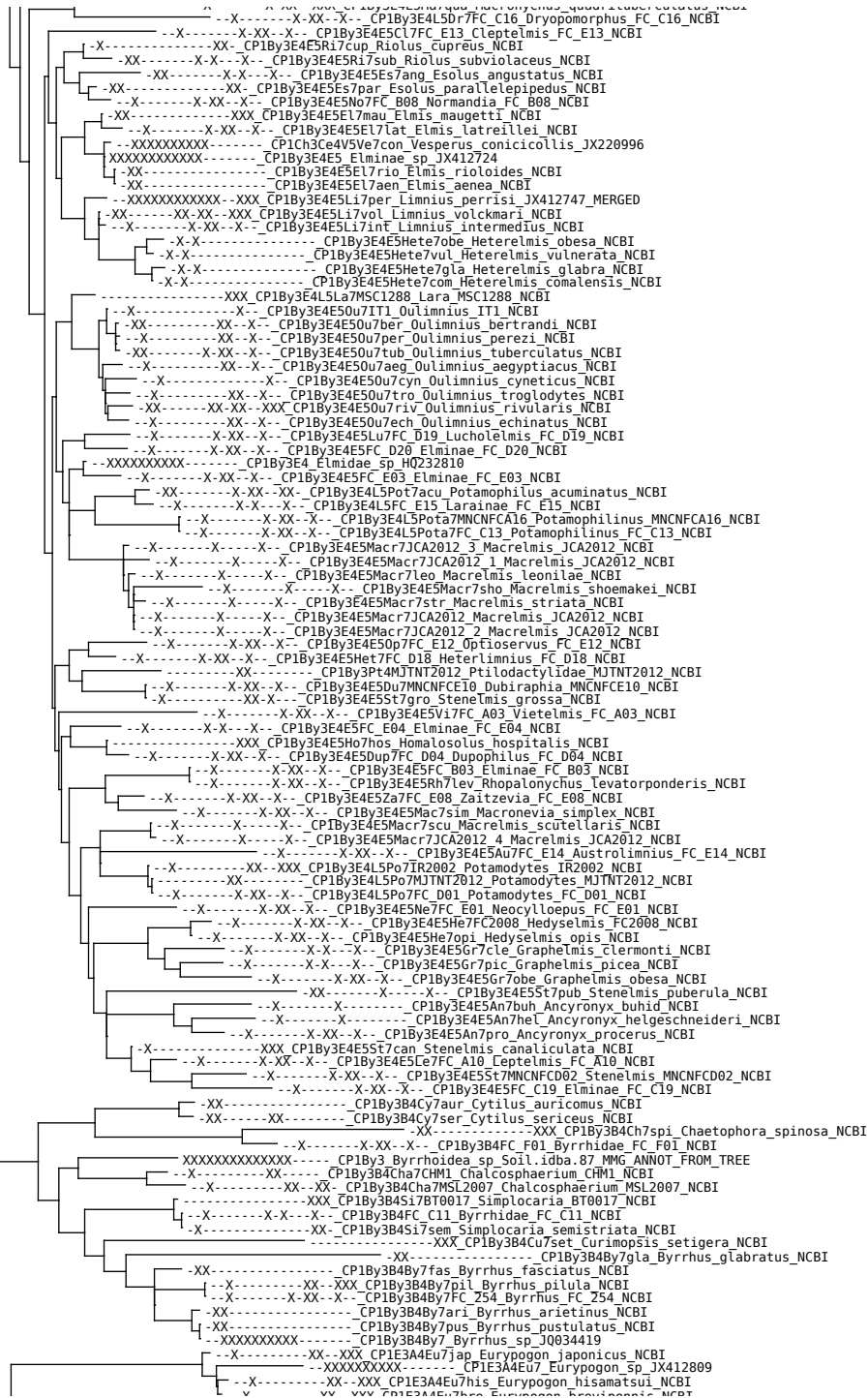
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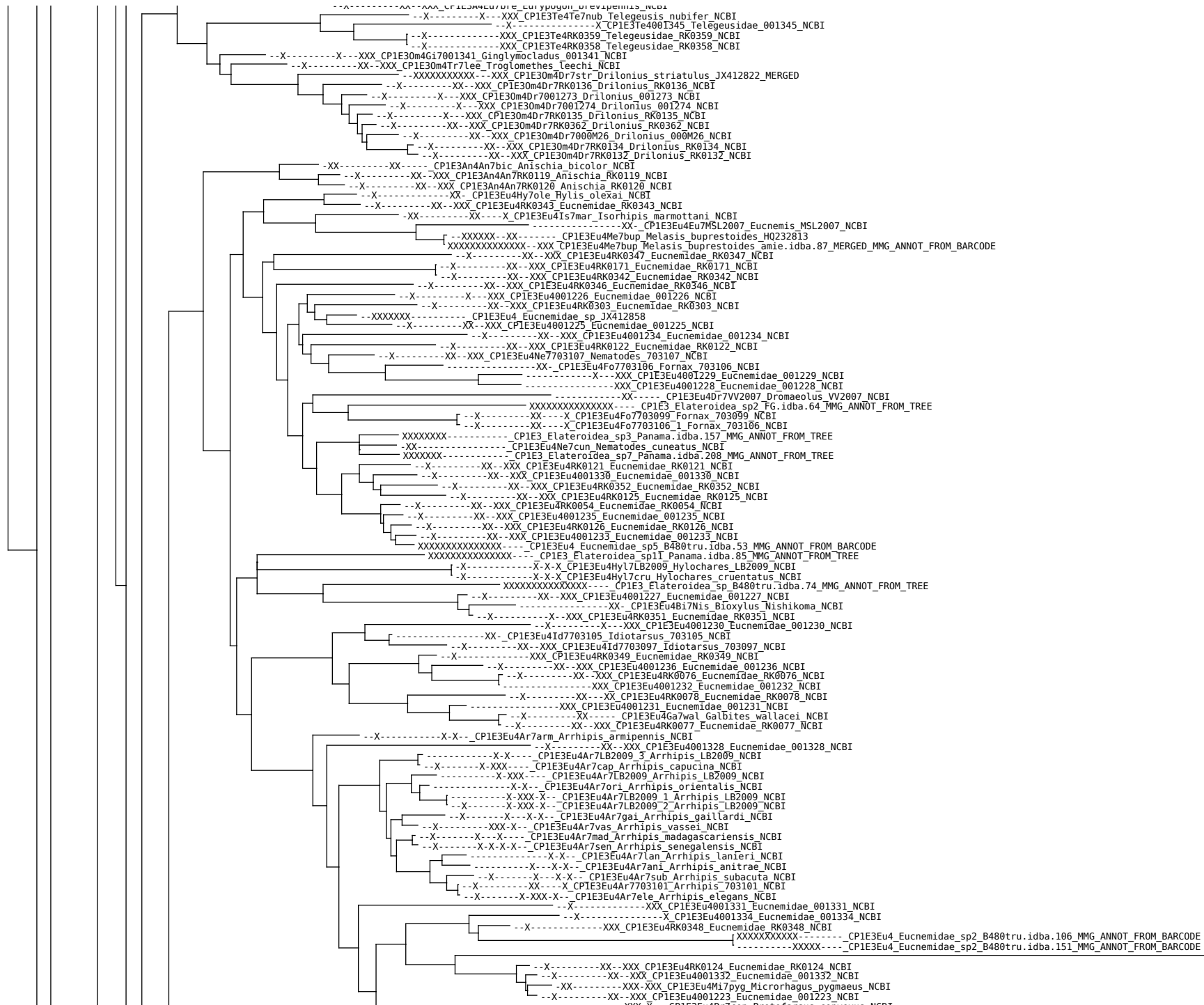
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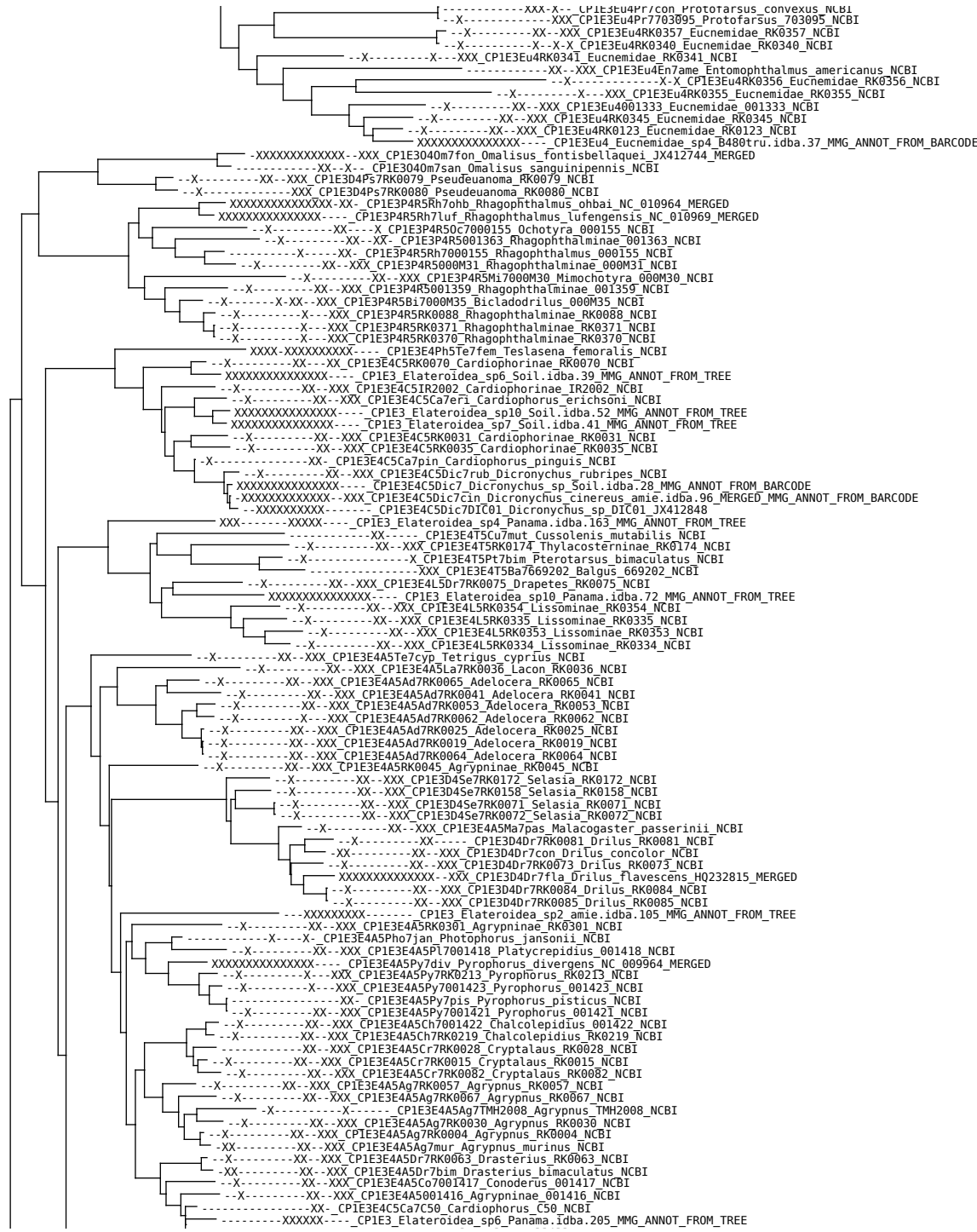
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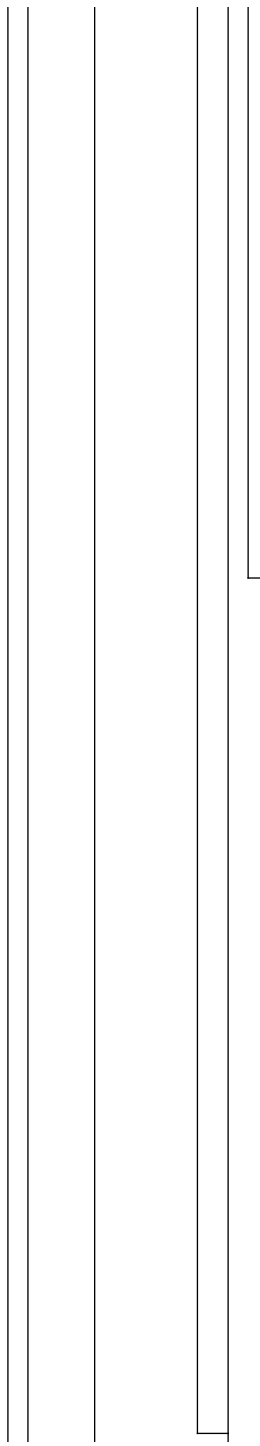
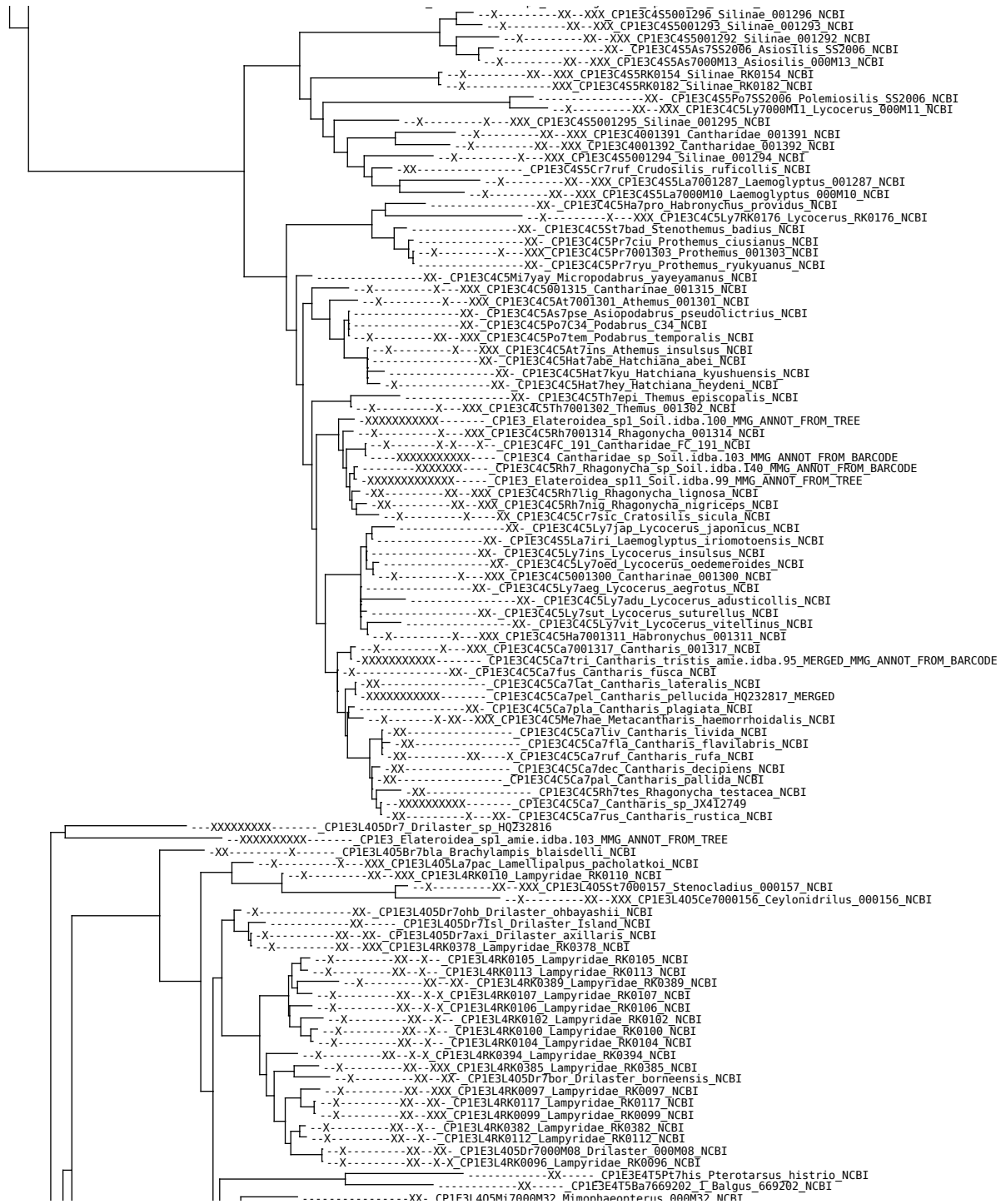




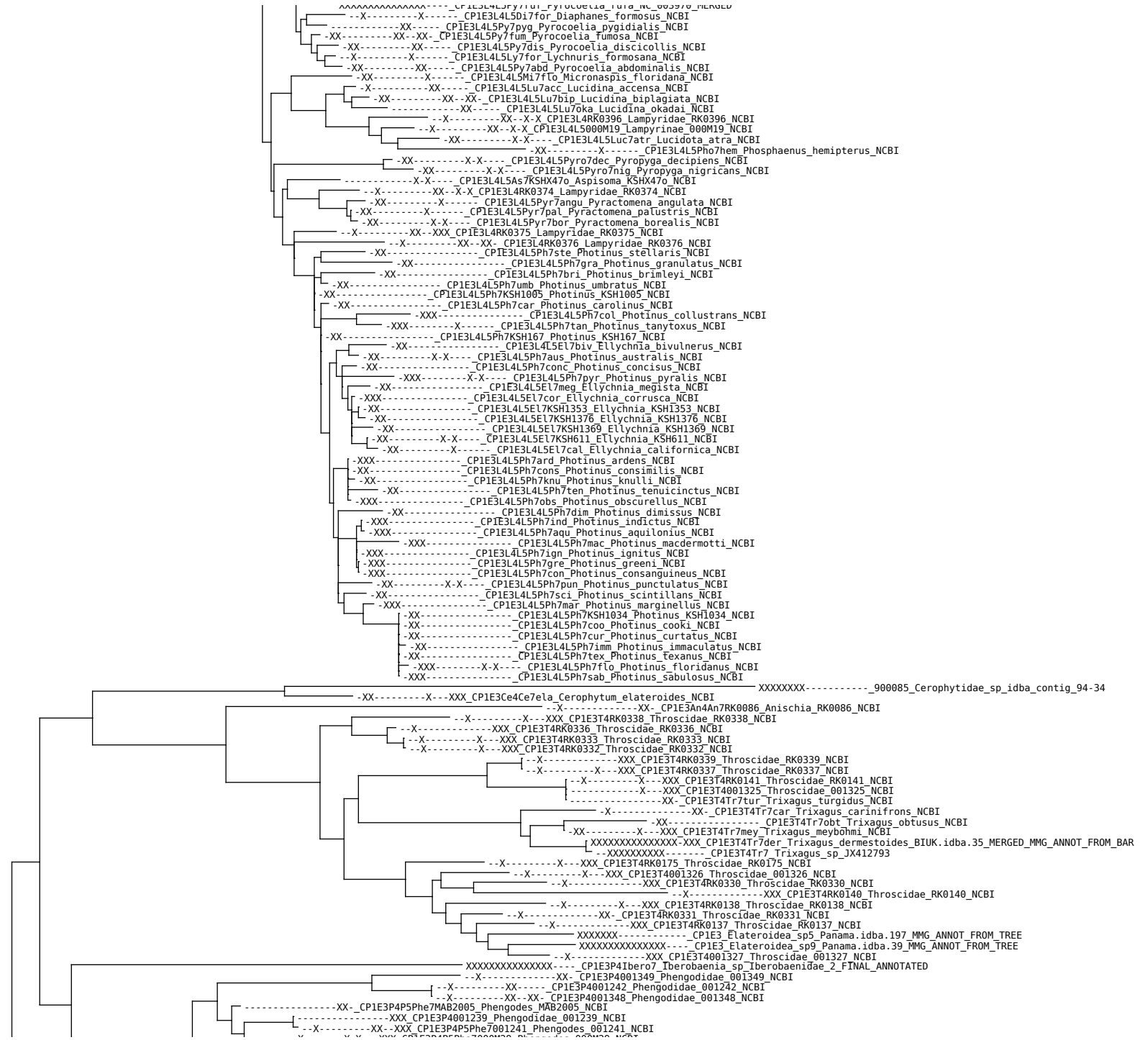


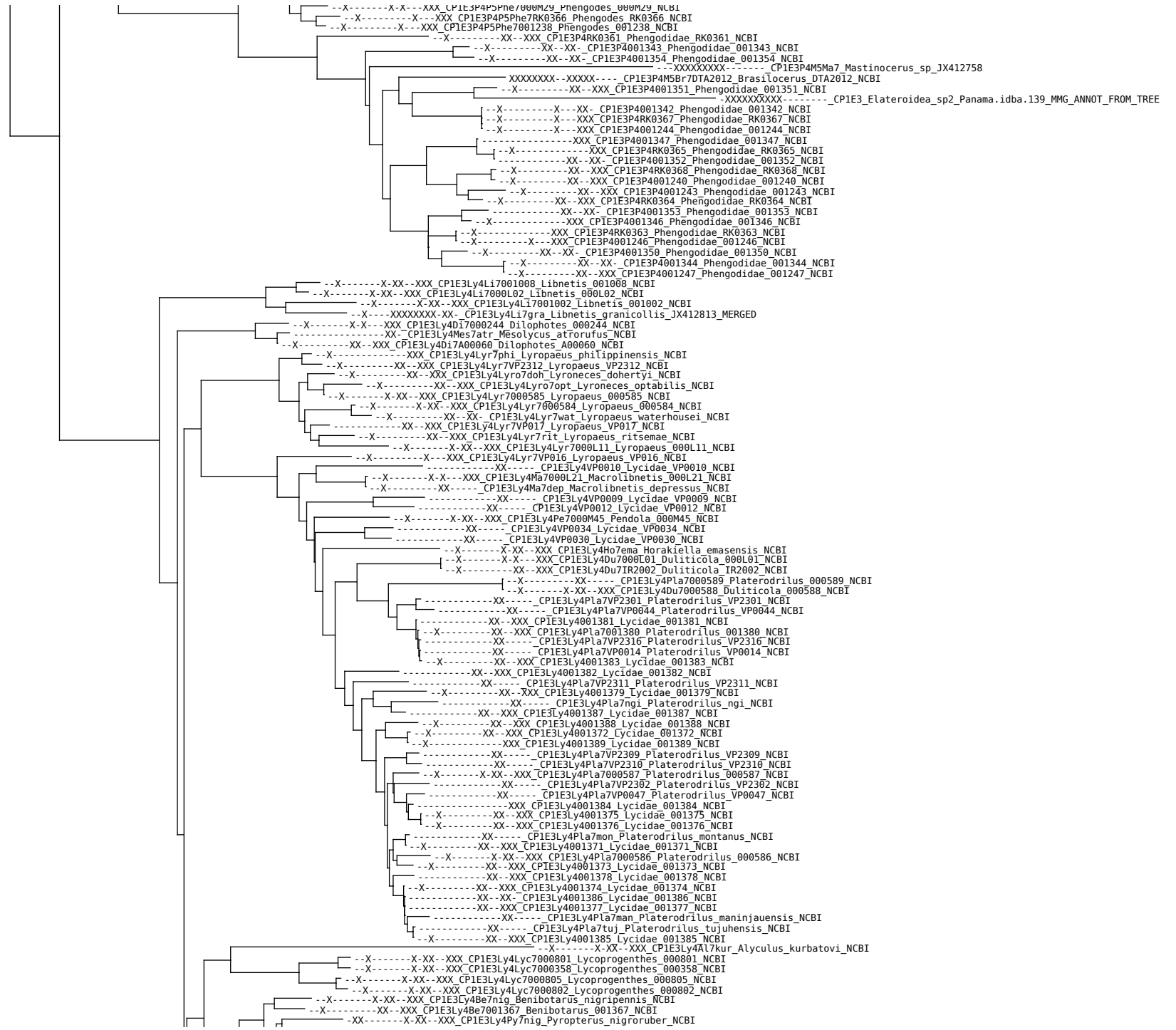
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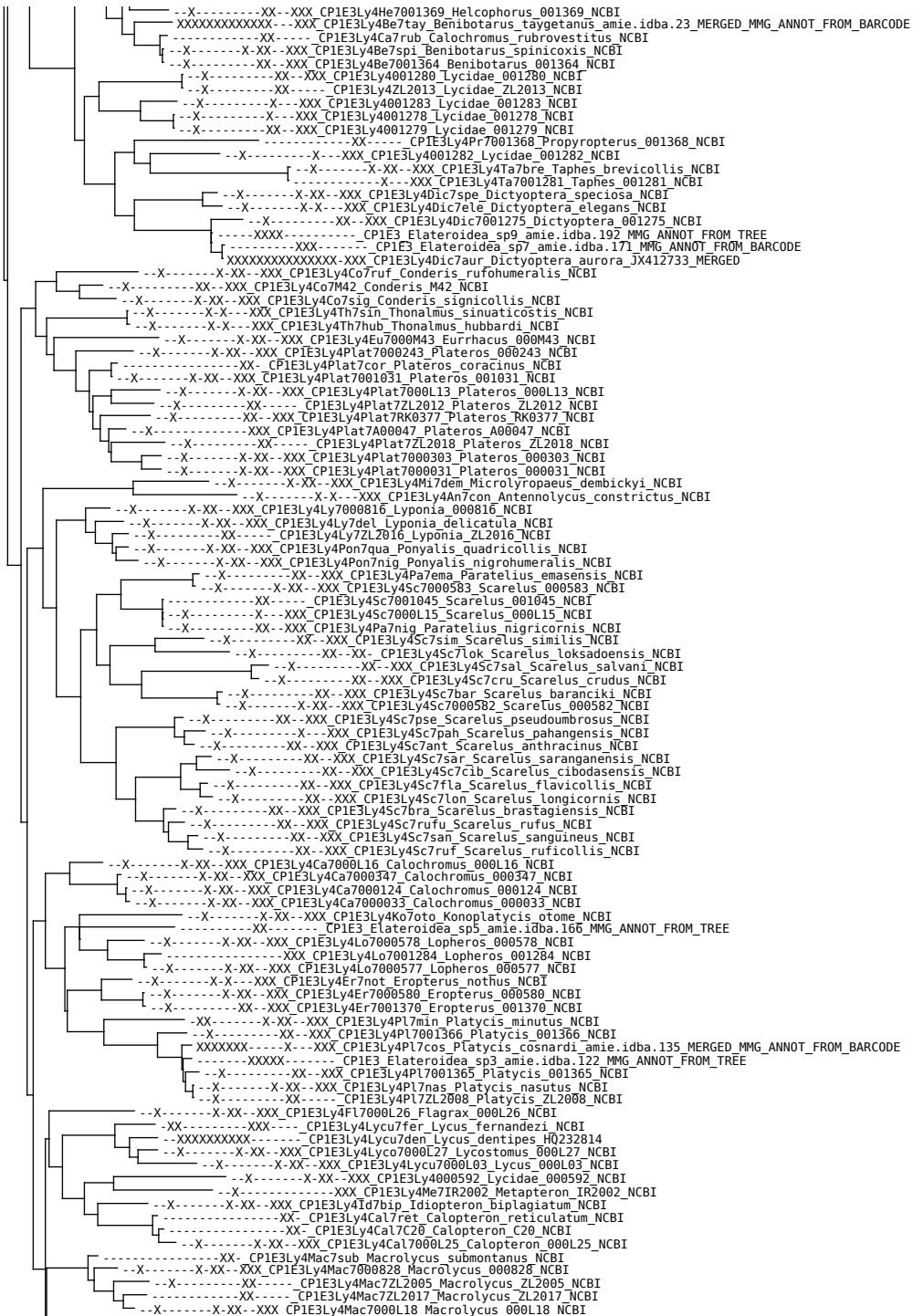


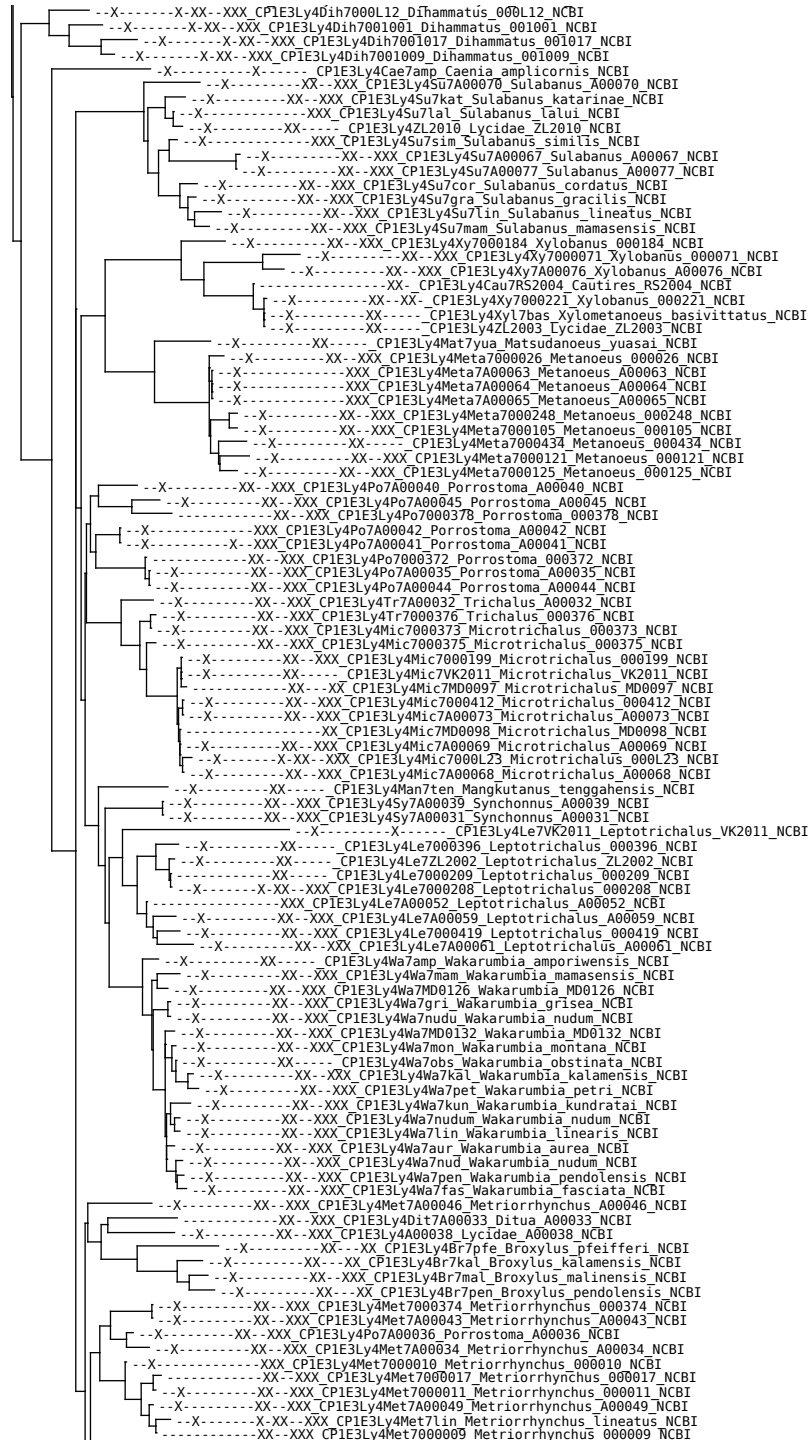


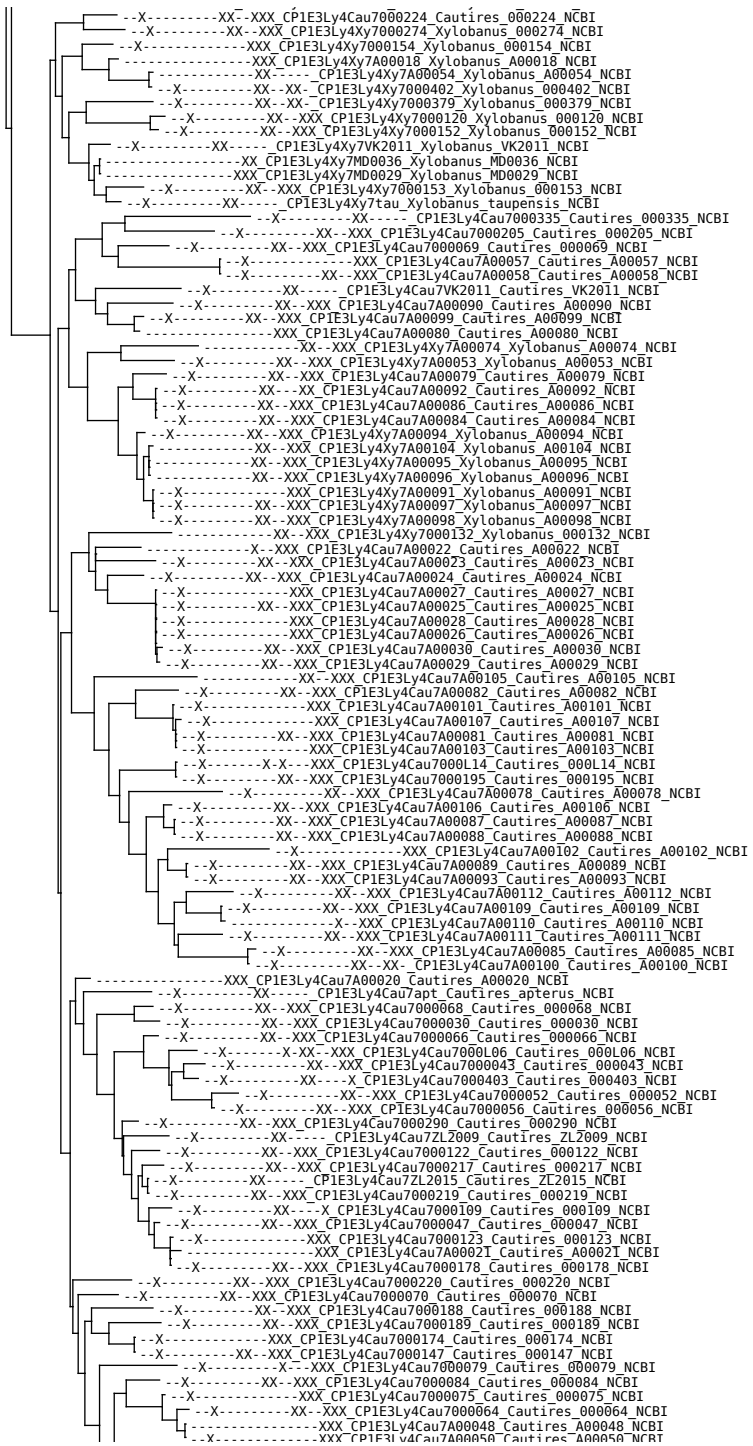


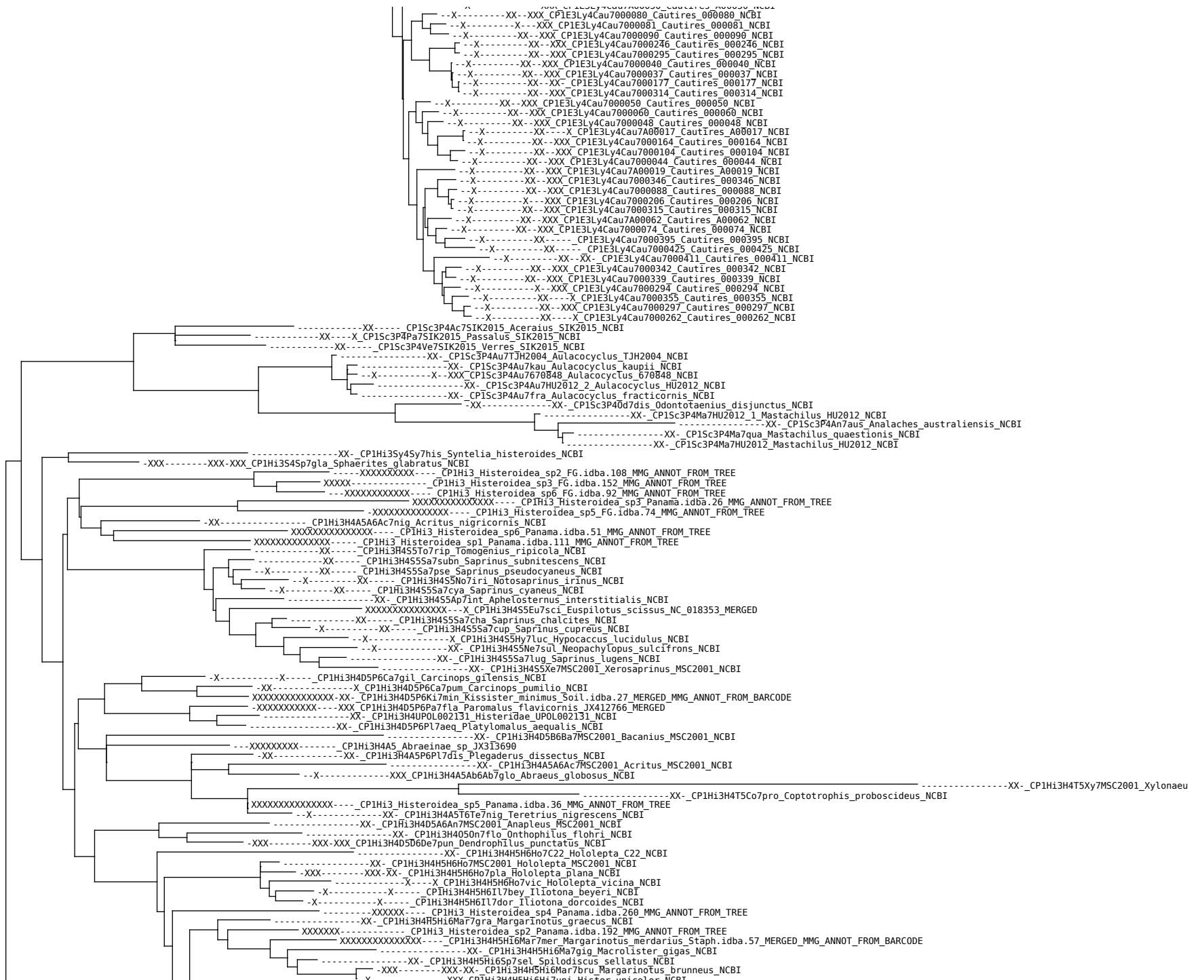


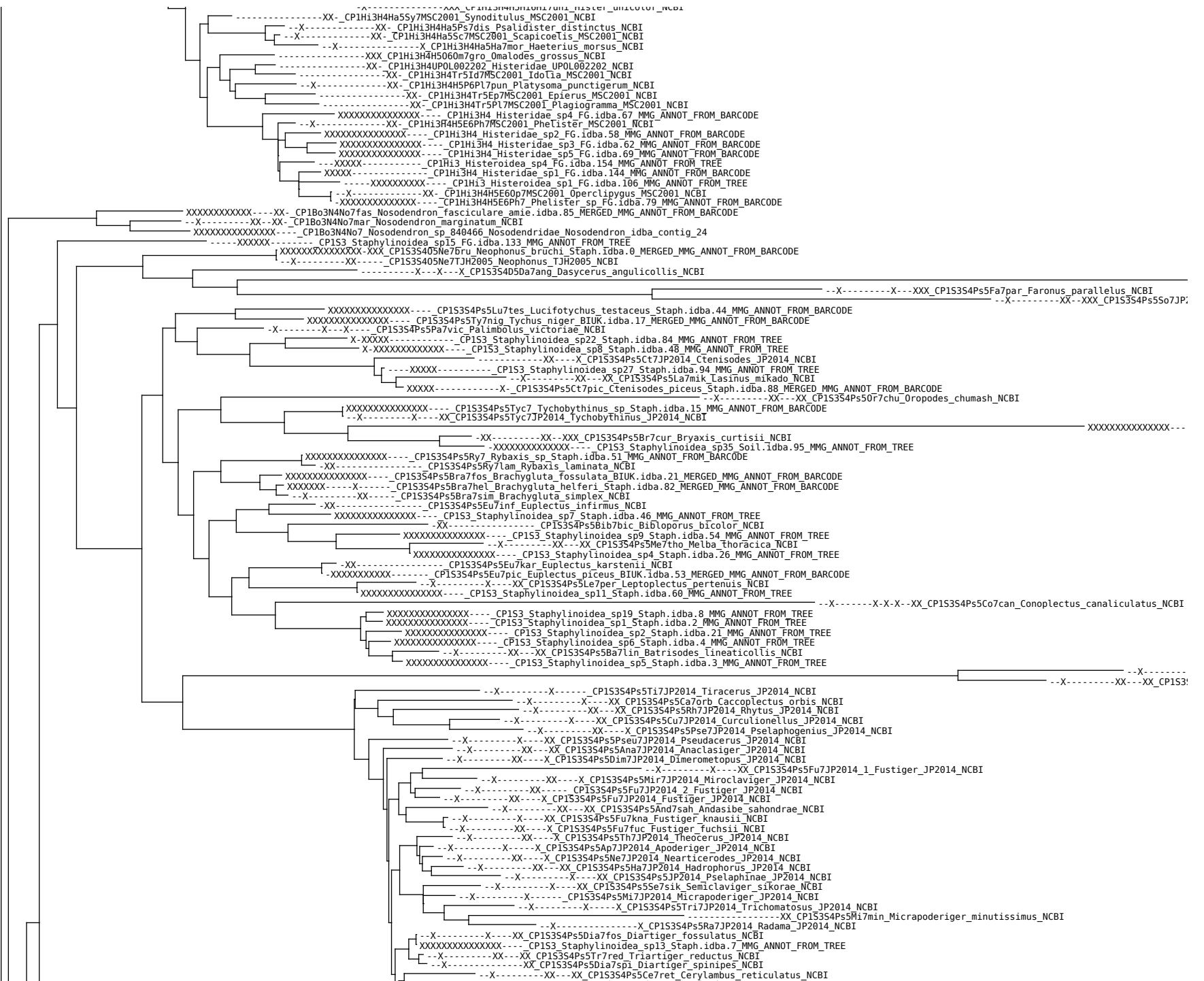


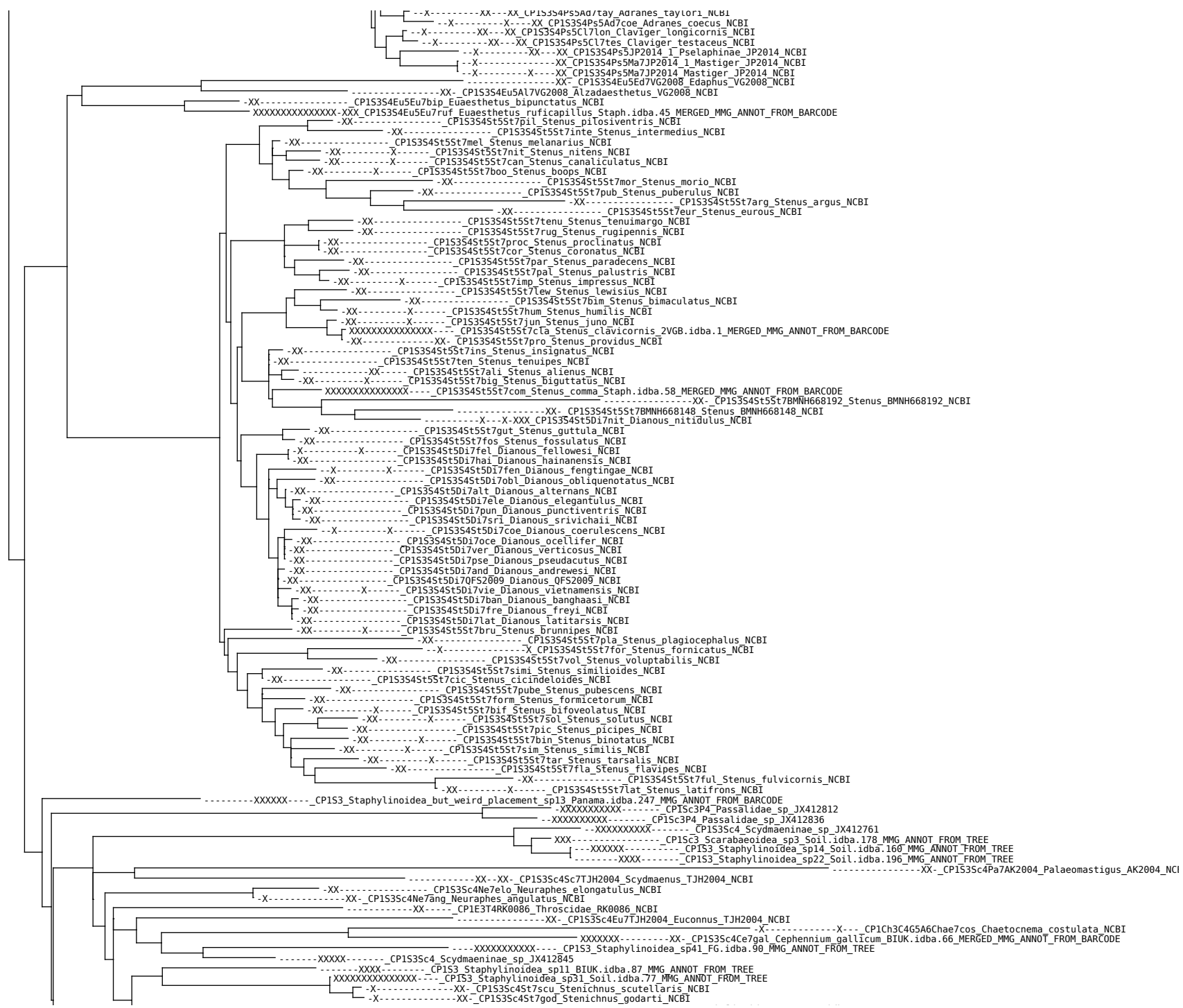












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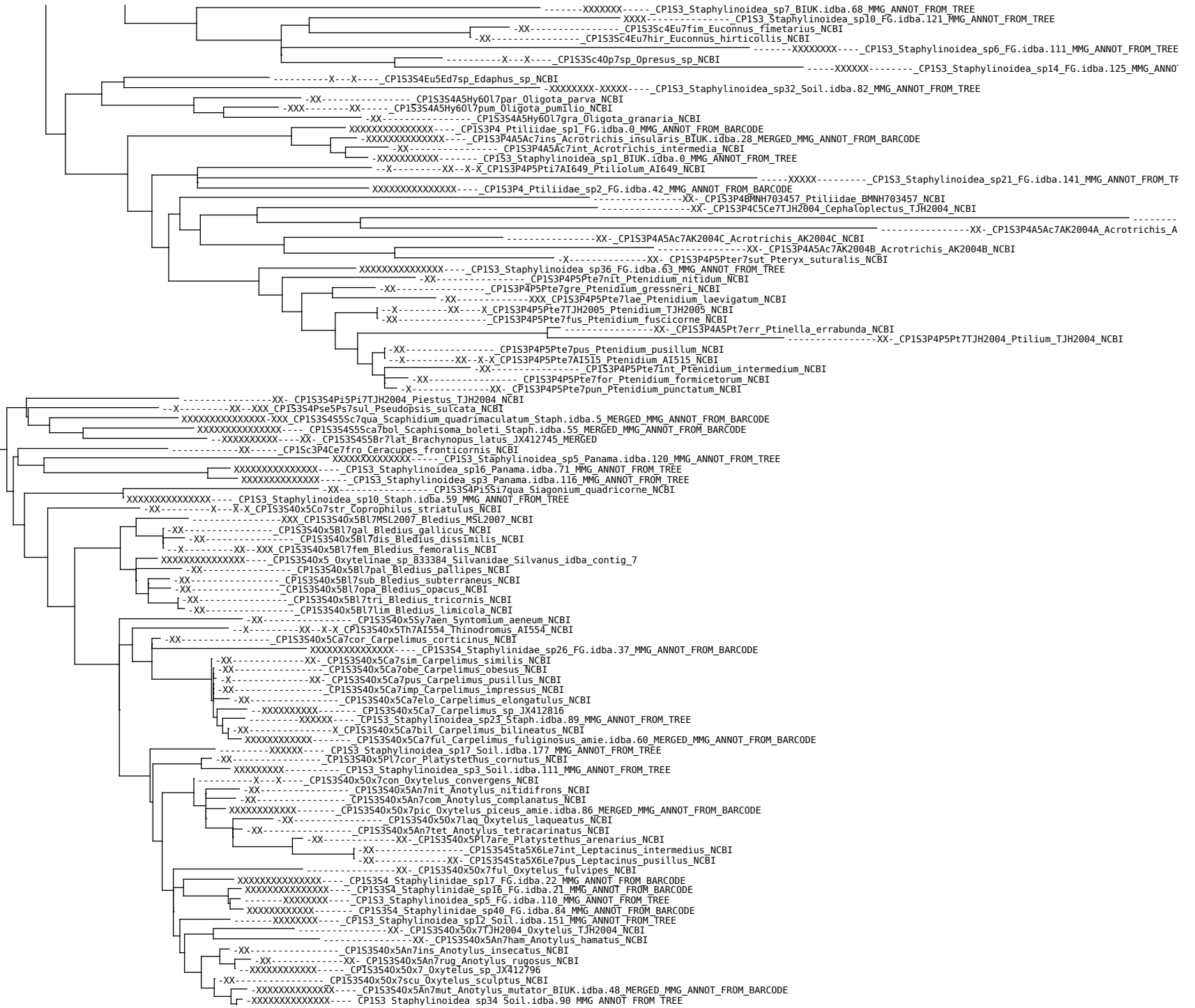
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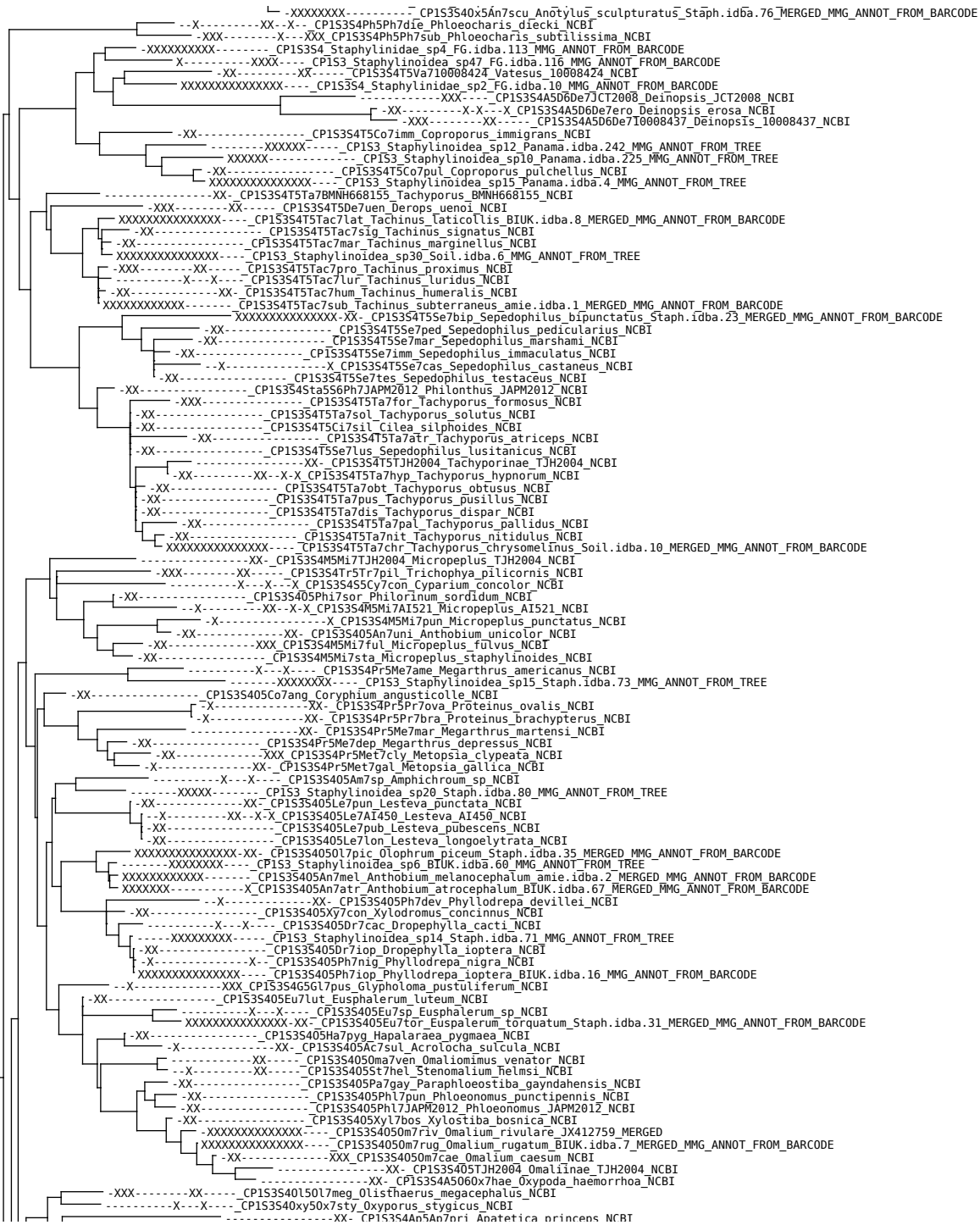
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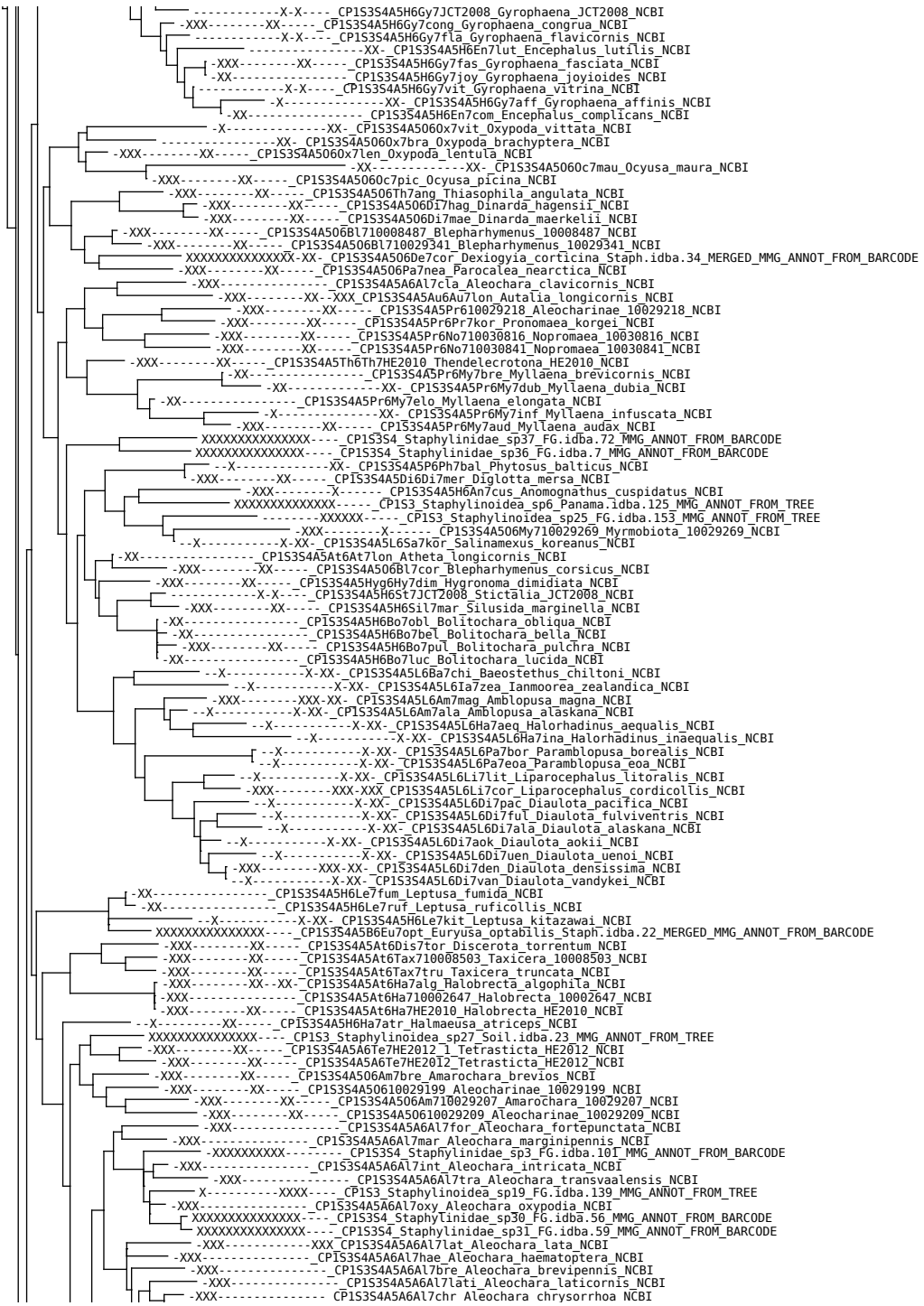




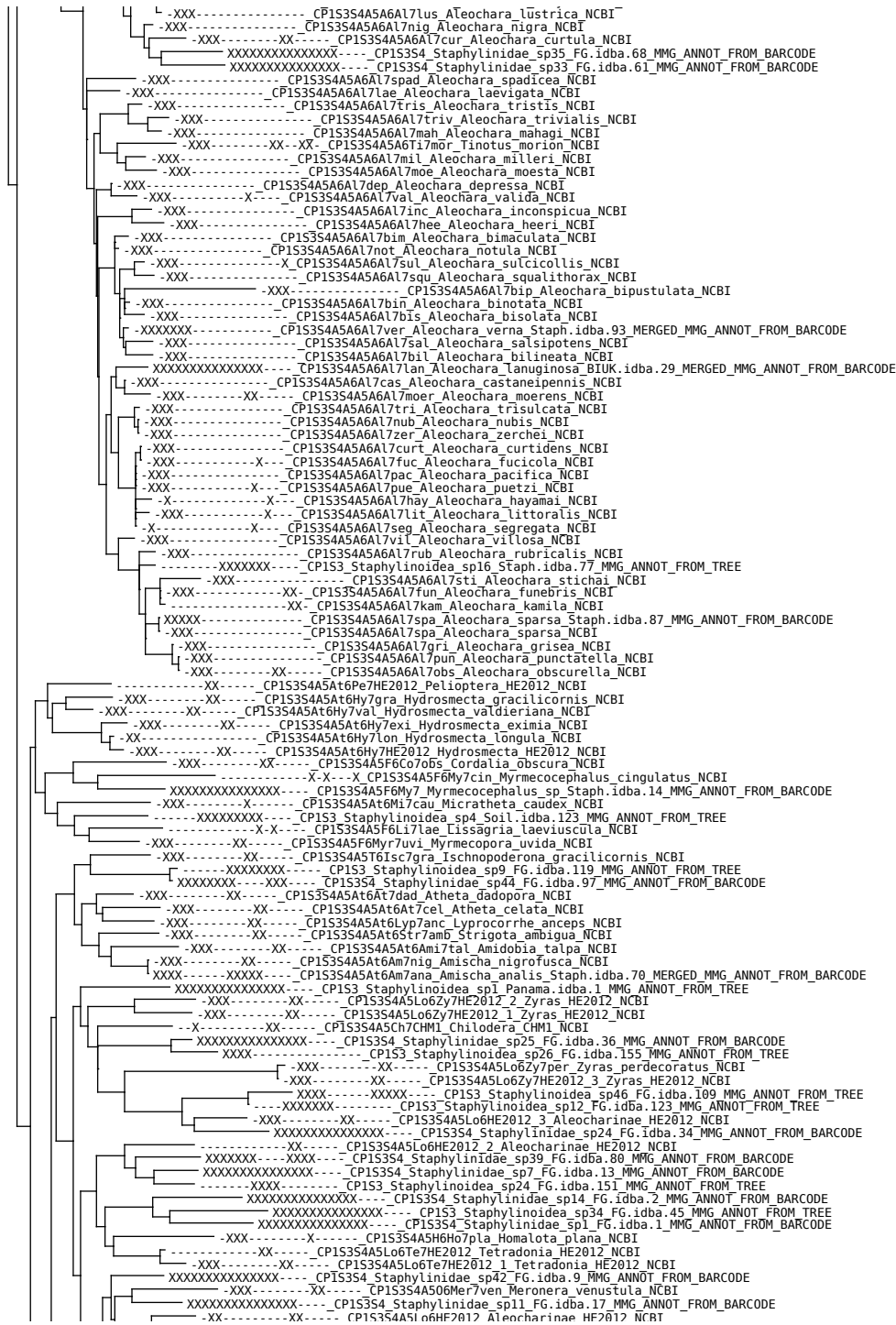






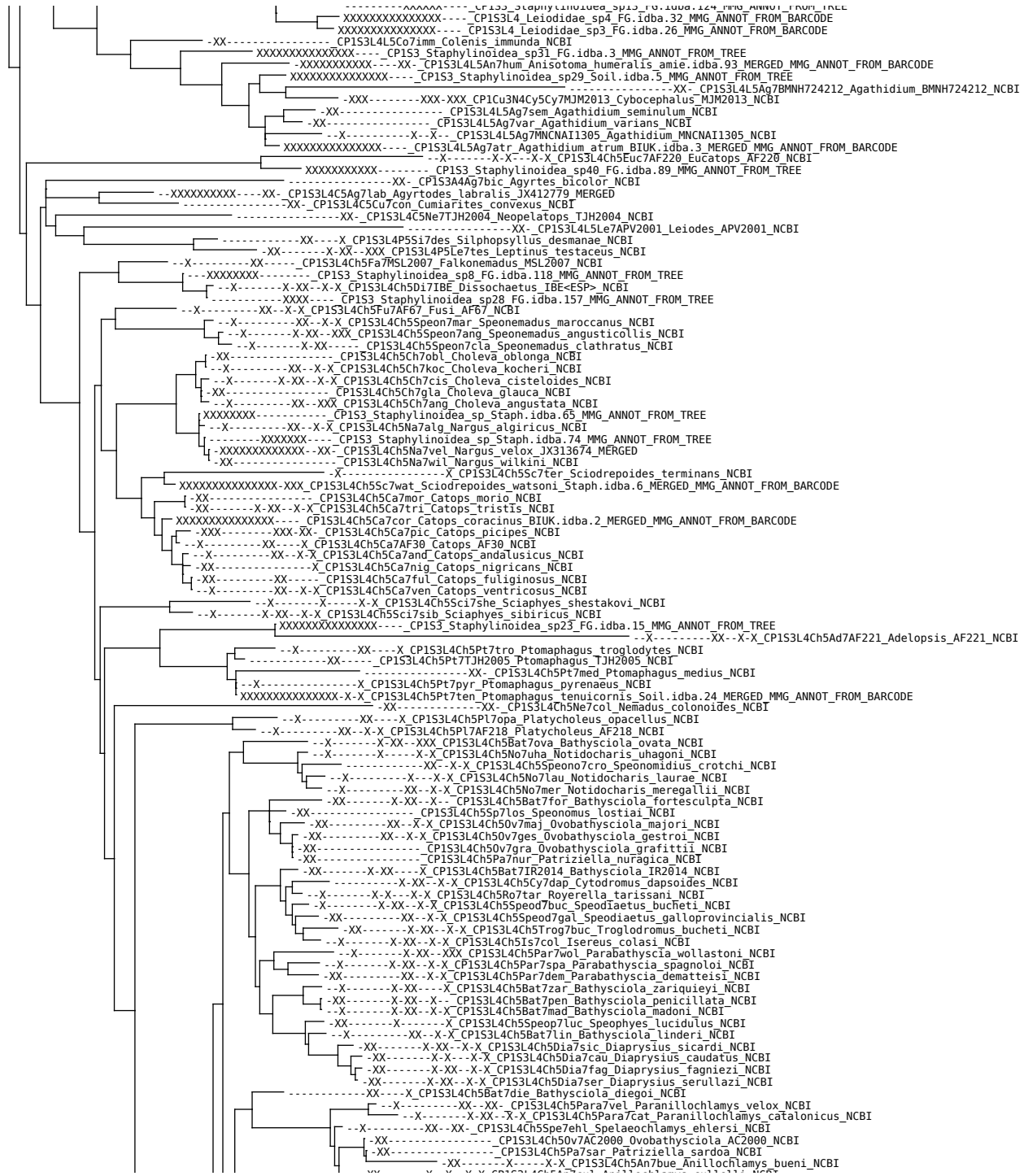


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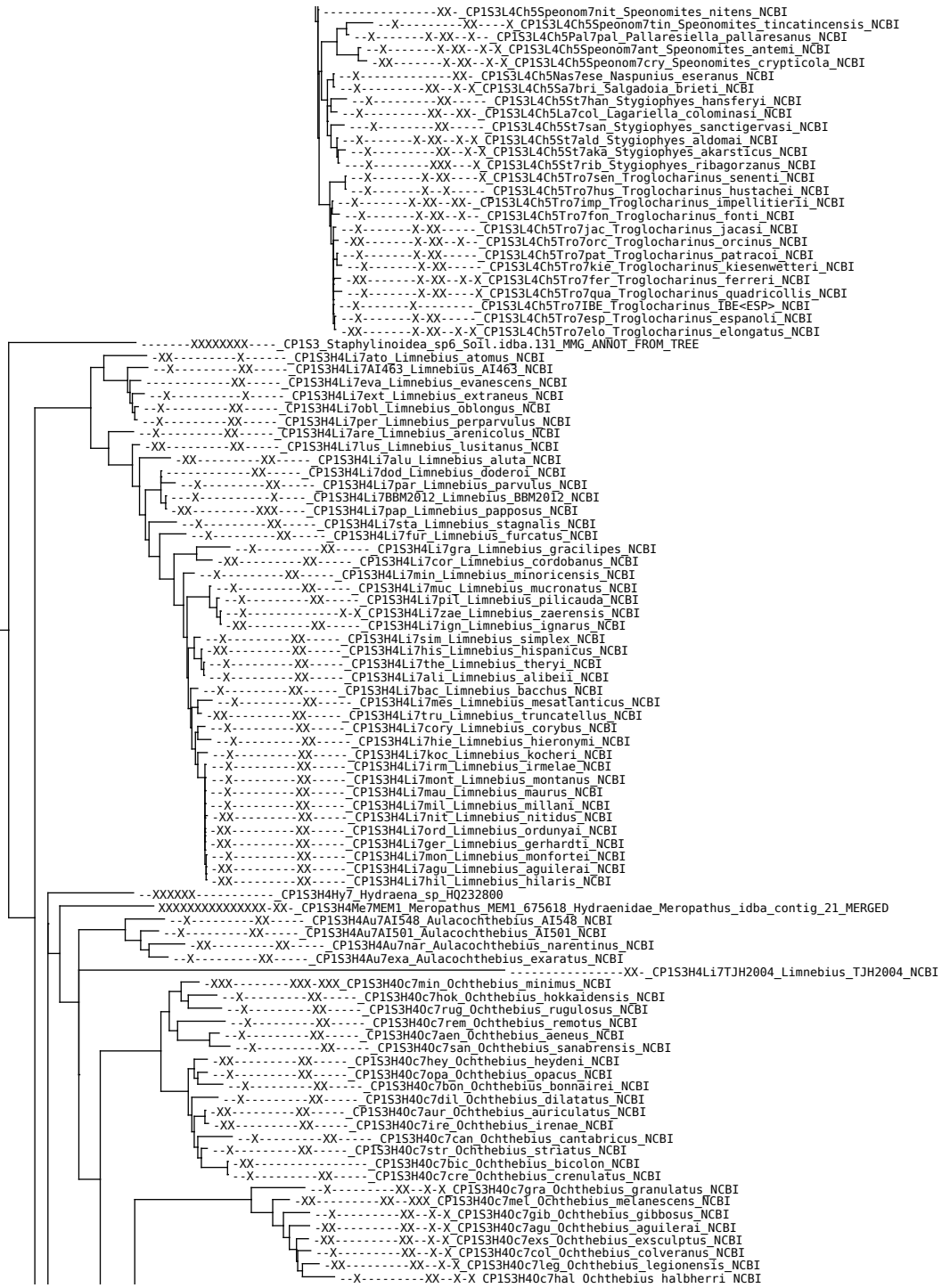


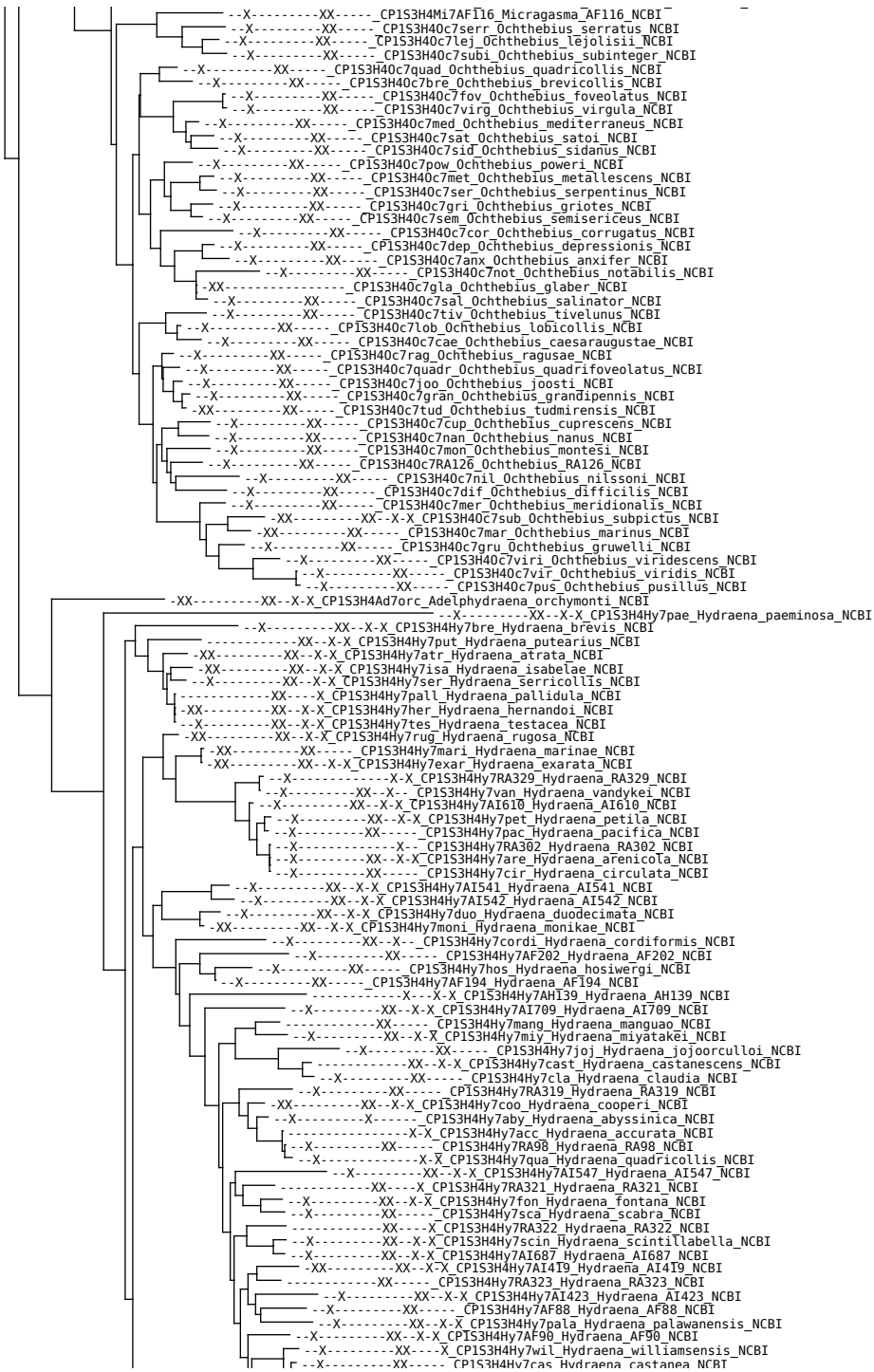
Phylogenetic tree showing relationships between various species, with labels such as CP153545Lo6HE2012_1_Aleocharinae_HE2012_NCBI, CP15354 Staphylinidae_sp15_FG.idba.19_MMG_ANNOT_FROM_BARCODE, and CP153545Lo6Eci7HE2012_Ecitopora_HE2012_NCBI. The tree is rooted on the left and branches out to the right, with species names listed next to the branches. Some labels include accession numbers and identifiers like 'HE2012' or 'JAPM2012'. The tree is a cladogram with bootstrap values indicated by 'X' marks at the nodes.

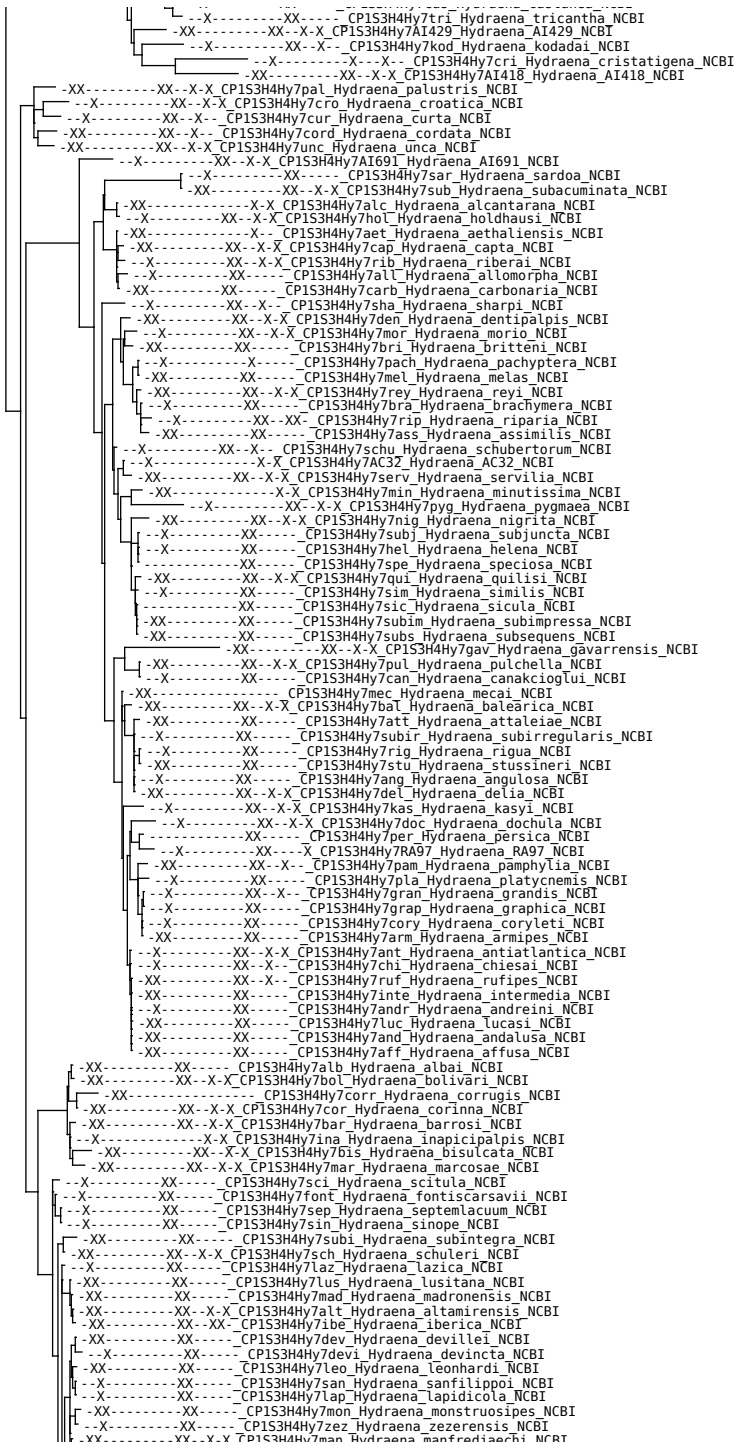
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-X-XX- CP153S4A5T6Gn7car Gnypeta carbonaria NCBI
-XXX-XX- CP153S4A5T6Br7con Brachyusa concolor NCBI
-XX- CP153S4A5A6Al7JH2004 Aleochara JH2004 NCBI
XXXXXXXXXXXXXXXXX CP153S4A5T6Da7fal Dacri-la fallax Staph.idba.43 MERGED_MMG_ANNOT_FROM_BARCODE
XXXXXXXXXXXXXXXXX CP153S4A5T6Th7atr Thinonoma atra Staph.idba.40 MERGED_MMG_ANNOT_FROM_BARCODE
-XXX-XX- CP153S4A5T6Gn7I0029189 Gnypeta_10029189 NCBI
-XXX-XX- CP153S4A5T6Gn7I0029194 Gnypeta_10029194 NCBI
-XX-XX- CP153S4A5At6At7lit Atheta liturata NCBI
-XXX-XX- CP153S4A5T6Pa7den Paradilacra densissima NCBI
-XXX-XX- CP153S4A5T6I0029142 Aleocharinae_10029142 NCBI
-XXX-XX- CP153S4A5T6Ta7gem Tachyusa gemma NCBI
-XXX-XX- CP153S4A5T6Is7obj Ischnopoda objecta NCBI
-X-XXXXXXXX- CP153A4Ap7tah Apteroloma tahoecum NCBI
XXXXXXXXXXXXXXXX- CP153L4L5Tr7mae Triarthron maerkelii amie.idba.15 MERGED_MMG_ANNOT_FROM_BARCODE
-X-XX- CP153L4C5Ne7sp Neopelatosp_sp NCBI
-X-XX- CP153A4Ne7hyd Necrophilus hydrophiloides NCBI
-XXX- CP153 Staphyloidea_sp2 amie.idba.148 MMG_ANNOT_FROM_TREE
-XX- CP153L4L5Le7pol Leiodes politus NCBI
-XXX- CP153L4L5Le7pic Leiodes picea amie.idba.151 MERGED_MMG_ANNOT_FROM_BARCODE
-XXXX- CP153 Staphyloidea_sp BIUK.idba.65 MMG_ANNOT_FROM_TREE
-XXXX- CP153L4 Leiodesidae_sp2 FG.idba.142 MMG_ANNOT_FROM_BARCODE
-XXXX- CP153 Staphyloidea_sp30 FG.idba.23 MMG_ANNOT_FROM_TREE
-XXXX- CP153L4 Leiodesidae_sp1 FG.idba.112 MMG_ANNOT_FROM_BARCODE
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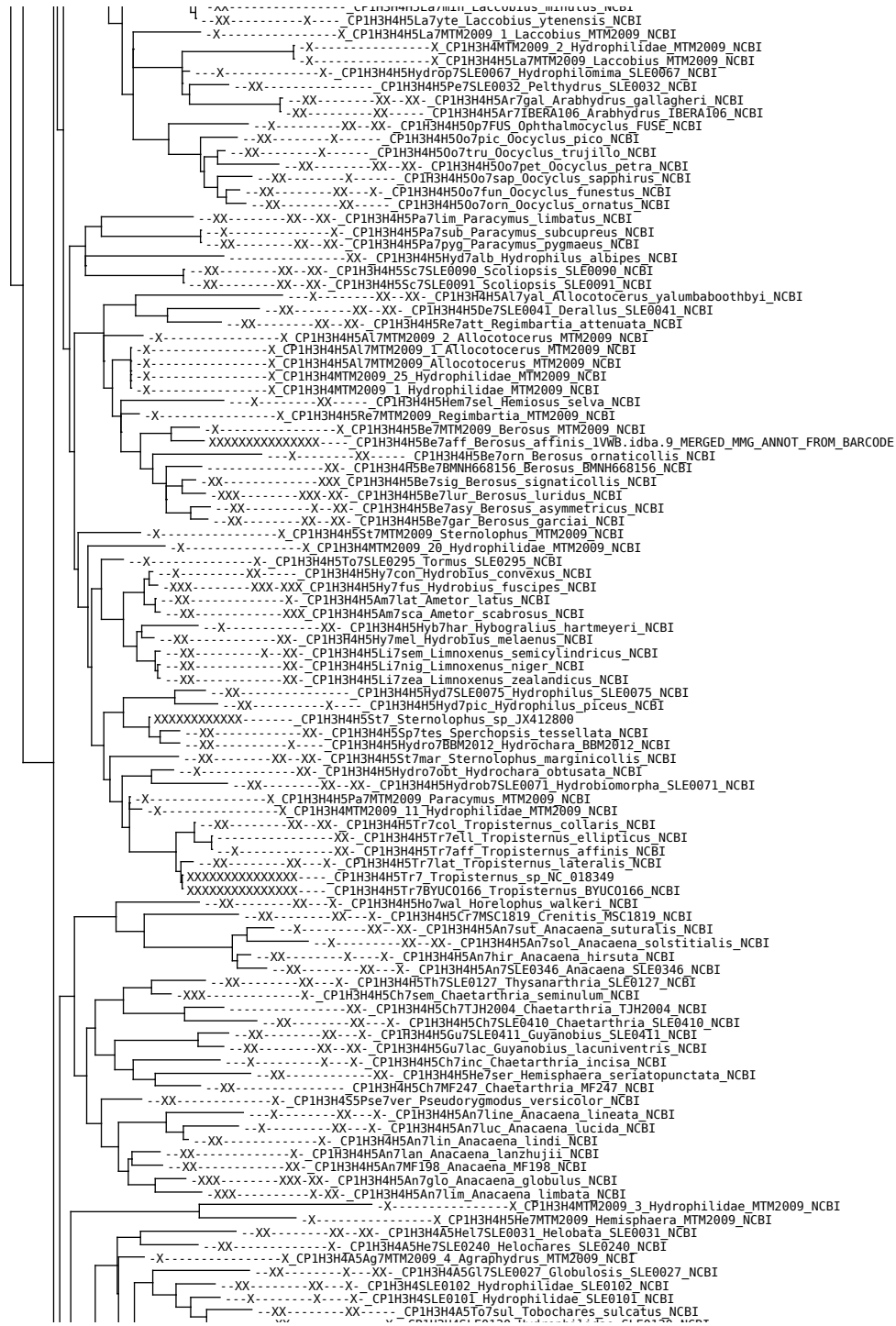
Phylogenetic tree showing relationships among various species, with bootstrap values indicated by 'X' marks. The tree is rooted on the left and branches out to the right. Species names are listed on the right side of the tree, often followed by their NCBI accession number. Bootstrap values are represented by 'X' marks at the nodes. Some nodes are marked with 'XXXXXX' or 'XXXXXXXXXXXXXXXXXX', indicating high support. The tree is divided into several major clades, including Anillochlamys, Quaeustus, Bathysciola, Speonomus, and Phacomorphus. The species names are often followed by their NCBI accession number, such as CP153L4Ch5An7cul, CP153L4Ch5An7sub, etc. The tree is rooted on the left and branches out to the right. Species names are listed on the right side of the tree, often followed by their NCBI accession number. Bootstrap values are represented by 'X' marks at the nodes. Some nodes are marked with 'XXXXXX' or 'XXXXXXXXXXXXXXXXXX', indicating high support. The tree is divided into several major clades, including Anillochlamys, Quaeustus, Bathysciola, Speonomus, and Phacomorphus. The species names are often followed by their NCBI accession number, such as CP153L4Ch5An7cul, CP153L4Ch5An7sub, etc.







XX-----XX-----CP153H4Hy7gad_Hydraena_gaditana_NCB1
XX-----XX-----CP153H4Hy7tat_Hydraena_tatii_NCB1
-X-----XX-----CP153H4Hy7dis_Hydraena_discreta_NCB1
-X-----XX-----CP153H4Hy7dec_Hydraena_decolor_NCB1
-X-----XX-----CP153H4Hy7occ_Hydraena_occitana_NCB1
-X-----XX-----CP153H4Hy7bon_Hydraena_bononiensis_NCB1
-X-----XX-----CP153H4Hy7sol_Hydraena_solaris_NCB1
-X-----XX-----CP153H4Hy7dent_Hydraena_dentipes_NCB1
-X-----XX-----CP153H4Hy7pro_Hydraena_producta_NCB1
-X-----XX-----CP153H4Hy7mue_Hydraena_muelleri_NCB1
XX-----XX-X-X-CP153H4Hy7eva_Hydraena_evanesens_NCB1
-X-----XX-----CP153H4Hy7tyr_Hydraena_tyrrhena_NCB1
-X-----XX-----CP153H4Hy7ros_Hydraena_rosannae_NCB1
-X-----XX-----CP153H4Hy7plu_Hydraena_plumipes_NCB1
XX-----XX-X-X-CP153H4Hy7tru_Hydraena_truncata_NCB1
-X-----XX-----CP153H4Hy7cze_Hydraena_czernohorskyi_NCB1
XX-----XX-----CP153H4Hy7het_Hydraena_heterogyna_NCB1
-X-----XX-X-X-CP153H4Hy7ben_Hydraena_bensae_NCB1
-X-----XX-----CP153H4Hy7pol_Hydraena_pollta_NCB1
-X-----XX-----CP153H4Hy7bic_Hydraena_bicuspidata_NCB1
-X-----XX-----CP153H4Hy7cat_Hydraena_catalonica_NCB1
-X-----XX-----CP153H4Hy7bit_Hydraena_bitruncata_NCB1
-X-----XX-X-X-CP153H4Hy7car_Hydraena_Carniolica_NCB1
XX-----XX-----CP153H4Hy7cau_Hydraena_caucasica_NCB1
-X-----XX-----CP153H4Hy7epe_Hydraena_epeirosi_NCB1
-X-----XX-----CP153H4Hy7ved_Hydraena_vedraei_NCB1
XX-----XX-XXX-CP153H4Hy7gra_Hydraena_gracilis_NCB1
-X-----XX-----CP153H4Hy7grac_Hydraena_graciloides_NCB1
-X-----XX-X-X-CP153H4Hy7cre_Hydraena_Crepidoptera_NCB1
-X-----XX-----CP153H4Hy7tar_Hydraena_tarvisina_NCB1
-X-----XX-----CP153H4Hy7lar_Hydraena_larissae_NCB1
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-X-----XX-----CP153H4Hy7exc_Hydraena_excisa_NCB1
-X-----XX-----CP153H4Hy7AI391_Hydraena_AI391_NCB1
-X-----XX-----CP153H4Hy7int_Hydraena_integra_NCB1
-X-----XX-----CP153H4Hy7akb_Hydraena_akbesiana_NCB1
-X-----XX-----CP153H4Hy7ana_Hydraena_anatolica_NCB1
-X-----XX-X-X-CP153H4Hy7ema_Hydraena_emarginata_NCB1
-X-----XX-----CP153H4Hy7his_Hydraena_hispanica_NCB1
-X-----XX-----CP153H4Hy7dia_Hydraena_diazi_NCB1
XX-----XX-----CP153H4Hy7fos_Hydraena_fosterorum_NCB1
XX-----XX-----CP153H4Hy7alp_Hydraena_alpicola_NCB1
-X-----XX-----CP153H4Hy7jae_Hydraena_jaechiana_NCB1
-X-----XX-----CP153H4Hy7sam_Hydraena_samnitica_NCB1
-X-----XX-----CP153H4Hy7pan_Hydraena_pangaei_NCB1
-XXX-----XXX-XX-CP1H3E4Ep7AK2004_Epimetopus_AK2004_NCB1
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-XXX-----XXX-XX-CP1H3He4He7_Helophorus_aquaticus_NCB1
-XXXXXXXXXXXXXXXX-CP1H3_Hydrophiloides_sp_5011_idba_106_MMG_ANNOT_FROM_TREE
-XX-----X-----CP1H3He4He7BBM2012_Helophorus_BBM2012_NCB1
-XXX-----XXX-XX-CP1H3He4He7gut_Helophorus_guttulus_NCB1
XXXXXXXXXXXXXXXX-CP1H3He4He7_Helophorus_sp_724835_Helophoridae_Helophorus_idba_contig_13
-XXX-----XXX-XX-CP1H3He4He7arv_Helophorus_arvensis_NCB1
-XXX-----XXX-XX-CP1H3He4He7niv_Helophorus_nivalis_NCB1
-X-----XX-X-X-CP1H3G4Ge7can_Georissus_canalifer_NCB1
-XXX-----XXX-XX-CP1H3G4Ge7AK2004_Georissus_AK2004_NCB1
-X-----XX-XXX-CP1H3G4Ge7cre_Georissus_crenulatus_NCB1
-XX-----X-X-X-CP1H3H4Hy7bre_Hydrochus_brevis_NCB1
-X-----X-X-X-CP1H3H4Hy7spa_Hydrochus_spangleri_NCB1
-XX-----X-X-X-CP1H3H4Hy7meg_Hydrochus_megaphallus_NCB1
-X-----X-X-X-CP1H3H4Hy7AHG2011_I_Hydrochus_AHG2011_NCB1
-X-----X-X-X-CP1H3H4Hy7sto_Hydrochus_stolpi_NCB1
-X-----X-X-X-CP1H3H4Hy7var_Hydrochus_variolatus_NCB1
-X-----X-X-X-CP1H3H4Hy7squ_Hydrochus_squamifer_NCB1
-X-----X-X-X-CP1H3H4Hy7AHG2011_Hydrochus_AHG2011_NCB1
XXXXXXXXXXXX-CP1H3H4Hy7_Hydrochus_sp_H0232801
-X-----X-X-X-CP1H3H4Hy7sma_Hydrochus_smaragdineus_NCB1
-X-----X-X-X-CP1H3H4Hy7gra_Hydrochus_grandicollis_NCB1
-XX-----X-X-X-CP1H3H4Hy7int_Hydrochus_interruptus_NCB1
-X-----X-X-X-CP1H3H4Hy7nit_Hydrochus_nitidicollis_NCB1
-X-----X-X-X-CP1H3H4Hy7alj_Hydrochus_aljibensis_NCB1
-X-----X-X-XXX-CP1H3H4Hy7eto_Hydrochus_elongatus_NCB1
-X-----X-X-X-CP1H3H4Hy7cre_Hydrochus_crenatus_NCB1
XXXXXXXXXXXXXXXX-CP1H3H4Hy7car_Hydrochus_carinatus_729517_Hydrochidae_Hydrochus_idba_contig_25_MERGED
-X-----X-X-X-CP1H3H4Hy7tar_Hydrochus_tariqi_NCB1
XX-----X-X-X-CP1H3H4Hy7noo_Hydrochus_nooreinus_NCB1
XX-----X-X-X-CP1H3H4Hy7angu_Hydrochus_angusi_NCB1
XX-----X-X-X-CP1H3H4Hy7ibe_Hydrochus_ibericus_NCB1
-X-----X-X-X-CP1H3H4Hy7fTa_Hydrochus_flavipennis_NCB1
-X-----X-X-X-CP1H3H4Hy7rob_Hydrochus_roberti_NCB1
XXXXXXXXXXXXXXXX-CP1H3H4Hy7_Hydrochus_sp_11WB_idba_8_MMG_ANNOT_FROM_BARCODE
-X-----X-X-XXX-CP1H3H4Hy7ang_Hydrochus_angustatus_NCB1
-XXX-----XXX-XXX-CP1H3S4Sp7ema_Spercheus_emarginatus_NCB1
-X-----XX-CP1H3H4H5An7par_Anacaena_parvula_NCB1
XXXXXXXXXXXXXXXX-CP1H3H4H5Amp7glo_Amphips_globus_JX412726
-X-----XX-X-CP1H3H4H5Amp7SLE0408_Amphips_SLE0408_NCB1
XX-----XX-----CP1H3H4H5Amp7mat_Amphips_mater_NCB1
XX-----XX-----CMG2011_Coleoptera_MG2011_NCB1
XX-----XX-X-CP1H3H4H5Amp7SLE0407_Amphips_SLE0407_NCB1
XX-----XX-CP1H3H4H507mad_Oocyclus_madidus_NCB1
XX-----XX-CP1H3H4H507SLE0086_Oocyclus_SLE0086_NCB1
XX-----XX-CP1H3H4H507SLE0085_Oocyclus_SLE0085_NCB1
-XX-----XX-XX-CP1H3H4H5La7ref_Laccobius_reflexipennis_NCB1
-XXX-----X-----CP1H3H4H5La7bip_Laccobius_bipunctatus_NCB1
-XX-----XX-----CP1H3H4H5La7sin_Laccobius_sinuatus_NCB1
XX-----XX-CP1H3H4H5La7ser_Laccobius_serratus_NCB1
-XXX-----X-----CP1H3H4H5La7str_Laccobius_striatus_NCB1
-XX-----XX-----CP1H3H4H5La7ser_Laccobius_serratus_NCB1

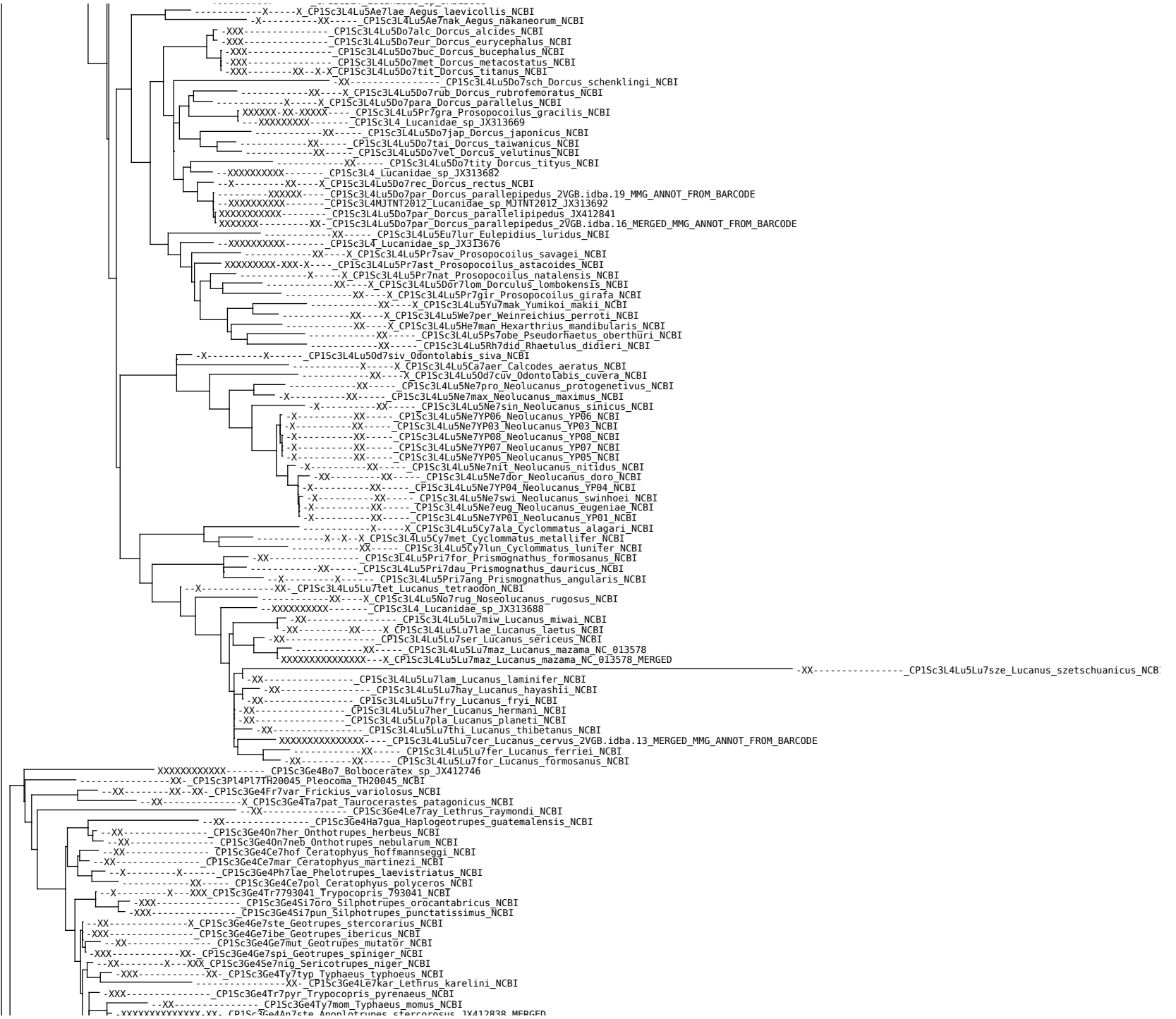


Phylogenetic tree showing relationships between various species, primarily from the Hydrophilidae and Enochrus genera. The tree is rooted on the left and branches out to the right. Species names are listed on the right side of the tree, often followed by their NCBI accession numbers. The tree is annotated with 'X' and 'XX' symbols, likely indicating specific characteristics or data points for each species. The species names include:

- CP1H3H4A5Lew159 Hydrophilidae SLE0159 NCBI
- CP1H3H4A5Ch7SLE0080 Chasmogenus SLE0080 NCBI
- CP1H3H4A5Ch7SLE0077 Chasmogenus SLE0077 NCBI
- CP1H3H4A5Ch7SLE0078 Chasmogenus SLE0078 NCBI
- CP1H3H4A5Ch7rui Chasmogenus ruidus NCBI
- CP1H3H4MTM2009_23 Hydrophilidae MTM2009 NCBI
- CP1H3H4A5H67han Horelophopsis hanseni NCBI
- CP1H3H4A5Ag7SLE0252 Agraphydrus SLE0252 NCBI
- CP1H3H4MTM2009_21 Hydrophilidae MTM2009 NCBI
- CP1H3H4MTM2009_22 Hydrophilidae MTM2009 NCBI
- CP1H3H4A5Ag7MTM2009_2 Agraphydrus MTM2009 NCBI
- CP1H3H4A5Ag7MTM2009 Agraphydrus MTM2009 NCBI
- CP1H3H4A5Ag7MTM2009_1 Agraphydrus MTM2009 NCBI
- CP1H3H4H5An7lut Anaecaena lutescens NCBI
- CP1H3H4H5min Helophorus minutus NCBI
- CP1H3H4H5bre Helophorus brevipalpis NCBI
- CP1H3H4A5He7SLE0034 Helochares SLE0034 NCBI
- CP1H3H4A5He7MTM2009_3 Helochares MTM2009 NCBI
- CP1H3H4A5He7MTM2009_2 Helochares MTM2009 NCBI
- CP1H3H4A5He7MTM2009_1 Helochares MTM2009 NCBI
- CP1H3H4MTM2009_24 Hydrophilidae MTM2009 NCBI
- CP1H3H4H5Ob5 Helochares obscurus NCBI
- CP1H3H4A5He7 Helochares sp. lVNB.idba.18 MMG_ANNOT_FROM_BARCODE
- CP1H3H4A5He7liv Helochares lividus NCBI
- CP1H3H4A5He7MTM2009_4 Helochares MTM2009 NCBI
- CP1H3H4A5He7MTM2009_6 Helochares MTM2009 NCBI
- CP1H3H4MTM2009_5 Hydrophilidae MTM2009 NCBI
- CP1H3H4A5He7MTM2009_5 Helochares MTM2009 NCBI
- CP1H3H4MTM2009_18 Hydrophilidae MTM2009 NCBI
- CP1H3H4MTM2009_17 Hydrophilidae MTM2009 NCBI
- CP1H3H4MTM2009_14 Hydrophilidae MTM2009 NCBI
- CP1H3H4MTM2009_10 Hydrophilidae MTM2009 NCBI
- CP1H3H4H5An7MTM2009_5 Anacaena MTM2009 NCBI
- CP1H3H4MTM2009_6 Hydrophilidae MTM2009 NCBI
- CP1H3H4H5An7MTM2009 Anacaena MTM2009 NCBI
- CP1H3H4MTM2009_7 Hydrophilidae MTM2009 NCBI
- CP1H3H4MTM2009_15 Hydrophilidae MTM2009 NCBI
- CP1H3H4H5An7MTM2009_4 Anacaena MTM2009 NCBI
- CP1H3H4H5An7MTM2009_7 Anacaena MTM2009 NCBI
- CP1H3H4H5An7MTM2009_8 Anacaena MTM2009 NCBI
- CP1H3H4H5An7MTM2009_1 Anacaena MTM2009 NCBI
- CP1H3H4H5An7MTM2009_3 Anacaena MTM2009 NCBI
- CP1H3H4MTM2009_9 Hydrophilidae MTM2009 NCBI
- CP1H3H4MTM2009_12 Hydrophilidae MTM2009 NCBI
- CP1H3H4MTM2009_8 Hydrophilidae MTM2009 NCBI
- CP1H3H4H5An7MTM2009_2 Anacaena MTM2009 NCBI
- CP1H3H4H5An7MTM2009_6 Anacaena MTM2009 NCBI
- CP1H3H4MTM2009_13 Hydrophilidae MTM2009 NCBI
- CP1H3H4H5C7mar Cymbiodyta margineola amie.idba.89_MERGED_MMG_ANNOT_FROM_BARCODE
- CP1H3H4H5No7lip Notionotus liparus NCBI
- CP1H3H4H5Hel7bif Helocombus bifidus NCBI
- CP1H3H4H5No7SLE0092 Notionotus SLE0092 NCBI
- CP1H3H4H5En7IBEA887 Enochrus IBEA887 NCBI
- CP1H3H4H5En7mas Enochrus mastersii NCBI
- CP1H3H4H5C7sem Cymbiodyta semistrata NCBI
- CP1H3H4H5En7IBEA895 Enochrus IBEA895 NCBI
- CP1H3H4H5En7SLE0241 Enochrus SLE0241 NCBI
- CP1H3H4H5En7tal Enochrus talamanca NCBI
- CP1H3H4H5En7IBEA326 Enochrus IBEA326 NCBI
- CP1H3H4H5En7IBEA889 Enochrus IBEA889 NCBI
- CP1H3H4H5En7IBEA888 Enochrus IBEA888 NCBI
- CP1H3H4H5En7fim Enochrus fimbriatus NCBI
- CP1H3H4H5En7mor Enochrus morenae NCBI
- CP1H3H4H5En7cin Enochrus cinctus NCBI
- CP1H3H4H5En7IBEA884 Enochrus IBEA884 NCBI
- CP1H3H4H5En7pic Enochrus piceus NCBI
- CP1H3H4H5En7nat Enochrus natalensis NCBI
- CP1H3H4H5En7IBEA310 Enochrus IBEA310 NCBI
- CP1H3H4H5En7coa Enochrus coarctatus NCBI
- CP1H3H4H5En7och Enochrus ochraceus NCBI
- CP1H3H4H5En7aff Enochrus affinis NCBI
- CP1H3H4H5En7nig Enochrus nigrinus NCBI
- CP1H3H4H5En7MTM2009_3 Enochrus MTM2009 NCBI
- CP1H3H4H5En7MTM2009_2 Enochrus MTM2009 NCBI
- CP1H3H4H5En7MTM2009_1 Enochrus MTM2009 NCBI
- CP1H3H4MTM2009 Hydrophilidae MTM2009 NCBI
- CP1H3H4MTM2009_4 Hydrophilidae MTM2009 NCBI
- CP1H3H4H5En7MTM2009_4 Enochrus MTM2009 NCBI
- CP1H3H4H5En7fal Enochrus falcarius NCBI
- CP1H3H4H5En7hami Enochrus hamifer NCBI
- CP1H3H4H5En7dif Enochrus diffusus NCBI
- CP1H3H4H5En7ham Enochrus hamiltoni NCBI
- CP1H3H4H5En7ate Enochrus ater NCBI
- CP1H3H4H5En7pol Enochrus politus NCBI
- CP1H3H4H5En7hal Enochrus halophilus NCBI
- CP1H3H4H5En7fus Enochrus fuscipennis NCBI
- CP1H3H4H5En7qua Enochrus quadripunctatus NCBI
- CP1H3H4H5En7tes Enochrus testaceus NCBI
- CP1H3H4H5En7IBEA55 Enochrus IBEA55 NCBI
- CP1H3H4H5En7ochr Enochrus ochropterus NCBI
- CP1H3H4H5En7sal Enochrus salomonis NCBI
- CP1H3H4H5En7IBERA490 Enochrus IBERA490 NCBI
- CP1H3H4H5En7bic Enochrus bicolor NCBI
- CP1H3H4H5En7IBERA194 Enochrus IBERA194 NCBI
- CP1H3H4H5En7seg Enochrus segmentinotatus NCBI
- CP1H3H4H5Bentap Badiolobus tapanti NCBI
- CP1H3H4H5Cy7gla Cylomissus glabratus NCBI
- CP1H3H4H5S5a7SLE0099 Saphydrus SLE0099 NCBI
- CP1H3H4H5Hy7fro Hydrostygnus frontalis NCBI









Phylogenetic tree showing relationships between various species, with labels such as CP1Sc354A5D17tru, CP1Sc354A5A7fri, and CP1Sc354A5A7ann. The tree is rooted on the left and branches out to the right. Species names are listed next to their corresponding branches, often preceded by a series of dashes (e.g., -X- or -XX-) indicating support or specific characteristics. Some labels include accession numbers and database identifiers like 'Soil.idba.32_MERGED_MMG_ANNOT_FROM_BARCODE' or 'Soil.idba.115_MERGED_MMG_ANNOT_FROM_TREE'. The tree shows a complex branching pattern, with many species having very similar labels, indicating close relationships. The labels are arranged in a roughly vertical column on the right side of the tree, with some species names appearing multiple times for different branches. The tree is a cladogram, with the root at the top left and branches extending downwards and to the right. The labels are aligned with the tips of the branches. The tree is a cladogram, with the root at the top left and branches extending downwards and to the right. The labels are aligned with the tips of the branches. The tree is a cladogram, with the root at the top left and branches extending downwards and to the right. The labels are aligned with the tips of the branches.

Phylogenetic tree showing relationships between various species, with bootstrap values indicated by 'X' marks. The tree is rooted at the top left and branches downwards. Species names are listed on the right side of the tree, often followed by their source or accession information. The tree shows a complex branching pattern with many nodes supported by bootstrap values. The species names include various genera and species, such as Epactoides, Apotolamprus, Nanos, and Eurysternus. The tree is a cladogram with bootstrap values at the nodes.

Phylogenetic tree showing relationships between various species, with bootstrap values indicated by dashes (e.g., -X, -XX, -XXX, XXXXX). The tree is rooted on the left and branches out to the right. Species names are listed on the right side of the tree, often followed by accession numbers and source information (e.g., NCBI, MMG_ANNOT_FROM_BARCODE, MMG_ANNOT_FROM_TREE). The tree shows a complex branching pattern, with many nodes supported by high bootstrap values (e.g., -XXX, -XXXX, -XXXXXX). The species names include various genera and species, such as *CP1Sc35455C6Me7can_Megathoposoma_candezei*, *CP1Sc35455C6Ha7aff_Hansreia_affinis*, *CP1Sc35455C6Eu7dyt_Eudlinopus_dytiscoides*, *CP1Sc35455C6Ca7ind_Canthon_indigaeus*, *CP1Sc35455C6Ca7vir_Canthon_viridis*, *CP1Sc35455C6Ca7lut_Canthon_luteicollis*, *CP1Sc35455C6Ca7aeq_Canthon_aequinoctalis*, *CP1Sc35455C6Ca7doe_Canthon_doebergi*, *CP1Sc35455C6Ca7lam_Canthon_lamprinus*, *CP1Sc35455C6Ca7pan_Anomolopus_panamensis*, *CP1Sc35455C6Ca7doo_Canthon_doebergi*, *CP1Sc35455C6Ca7BMNH670496_Canthon_BMNH670496*, *CP1Sc35455G6Gy7BMNH676998_Gymnopleurus_BMNH676998*, *CP1Sc35455G6Gy7fla_Gymnopleurus_Flagellatus*, *CP1Sc35455G6Gy7hum_Gymnopleurus_humanus*, *CP1Sc35455G6Gy7mop_Gymnopleurus_mopsus*, *CP1Sc35455G6Gy7vir_Gymnopleurus_virens*, *CP1Sc35455G6A17tha_Allogymnopleurus_thalassinus*, *CP1Sc35455G6G7nit_Garreta_nitens*, *CP1Sc35455G6P7str_Paragymnopleurus_striatus*, *CP1Sc35455G6P7dgi1_Paragymnopleurus_dgii*, *CP1Sc35455G6P7mau_Paragymnopleurus_maurus*, *CP1Sc35455C6D67gib_Deltochilum_gibbosum*, *CP1Sc35455C6D67ama_Deltochilum_amazonicum*, *CP1Sc35455C6D67car_Deltochilum_carinatum*, *CP1Sc35455C6D67bar_Deltochilum_barbipes*, *CP1Sc35455C6D67pse_Deltochilum_pseudoparile*, *CP1Sc35455C6Li7mut_Litocopris_muticus*, *CP1Sc35455C6Co7lun_Copris_lunaris*, *CP1Sc35455C6Co7agn_Copris_agnus*, *CP1Sc35455C6Co7tri_Copris_tripartitus*, *CP1Sc35455C6Co7lug_Copris_lugubris*, *CP1Sc35455C6Co7aen_Copris_aeneus*, *CP1Sc35455C6Co7amy_Copris_amytor*, *CP1Sc35455C6Co7dgi1_Copris_dgii*, *CP1Sc35455Cat7SM2012_Catharsius_SM2012*, *CP1Sc35455C6Co7cor_Copris_cornifrons*, *CP1Sc35455C6Co7his_Copris_hispanicus*, *CP1Sc35455C6Co7con_Copris_confucius*, *CP1Sc35455C6Co7sin_Copris_sinicus*, *CP1Sc35455A6At7dgi1_Ateuchus_dgii*, *CP1Sc35455A6A7aur_Canthidium_aurifex*, *CP1Sc35455A6A7chr_Chrysopyge*, *CP1Sc35455A6At7CWC2007_Ateuchus_CWC2007*, *CP1Sc35455A6At7ecu_Ateuchus_ecuadorensis*, *CP1Sc35455E6En7lob_Ennearabdus_tobocephalus*, *CP1Sc35455E6Eu7ara_Eucranium_arachnoides*, *CP1Sc35455E6G17ste_Glyphoderus_sterquilinus*, *CP1Sc35455E6An7bil_Anomiopsoides_biloba*, *CP1Sc35455E6An7het_Anomiopsoides_heteroclyta*, *CP1Sc35455Pha7sal_Phanaeus_sallei*, *CP1Sc35455Pha7cam_Phanaeus_cambeforti*, *CP1Sc35455D7con_Oxytremus_conspicillatum*, *CP1Sc35455D7mim_Diabroctis_mim*, *CP1Sc35455Pha7dem_Phanaeus_demon*, *CP1Sc35455Pha7CWC2007_Phanaeus_CWC2007*, *CP1Sc35455Cop7lan_Coprophanaeus_lancifer*, *CP1Sc35455Den7bah_Dendropaemon_bahianum*, *CP1Sc35455Pha7end_Phanaeus_endymion*, *CP1Sc35455Cop7tel_Coprophanaeus_telamon*, *CP1Sc35455Cop7dgi1_Coprophanaeus_dgii*, *CP1Sc35455Cop7Coprophanaeus_sp_CS_idba.11*, *CP1Sc35455Gr7aer_Gromphas_aeruginosa*, *CP1Sc35455J7SM2013_Janssensantus_SM2013*, *CP1Sc35455C6Ta7SM2013_Tanzanelus_SM2013*, *CP1Sc35455A6Ca7har_Canthidium_haroldi*, *CP1Sc35455A6Ca7ruf_Canthidium_rufinum*, *CP1Sc35455A6Ca7gua_Canthidium_guanacaste*, *CP1Sc35455A6Ca7tha_Canthidium_thalassinum*, *CP1Sc35455D17sat_Dichotomius_satanas*, *CP1Sc35455D17dgi1_Dichotomius_dgii*, *CP1Sc35455D17bor_Dichotomius_boreus*, *CP1Sc35455D17yuc_Dichotomius_yucatanus*, *CP1Sc35455D17par_Dichotomius_parcepunctatus*, *CP1Ch3485B6Ac7pall_Acanthoscelides_pallidipennis*, *CP1Sc35455D17nis_Dichotomius_nisus*, *CP1Sc35455D17lae_Dichotomius_laevicollis*, *CP1Sc35455D17bos_Dichotomius_bos*, *CP1Sc35455D17sem_Dichotomius_semisquamosus*, *CP1Sc35455D17ser_Dichotomius_sericeus*, *CP1Sc35455D17gem_Dichotomius_geminatus*, *CP1Sc35455C6Ar7mor1_Arachnoides_morio*, *CP1Sc35455C6Ar7cup_Arachnoides_cuparius*, *CP1Sc35455C6Ar7MTM2009_10_Arachnoides_MTM2009*, *CP1Sc35455C6Ar7kel_Arachnoides_kelifelyi*, *CP1Sc35455C6Ar7MTM2009_9_Arachnoides_MTM2009*, *CP1Sc35455C6Ar7HKW2010_Arachnoides_HKW2010*, *CP1Sc35455C6Ar7mah_Arachnoides_mahafalyensis*, *CP1Sc35455C6Ar7sap_Arachnoides_saprinoides*, *CP1Sc35455C6Ar7MTM2009_2_Arachnoides_MTM2009*, *CP1Sc35455C6Ar7MTM2009_5_Arachnoides_MTM2009*, *CP1Sc35455C6Ar7pus_Arachnoides_pusillus*, *CP1Sc35455C6Ar7MTM2009_4_Arachnoides_MTM2009*, *CP1Sc35455C6Ar7and_Arachnoides_andrei*, *CP1Sc35455P57sem_Pseudoarachnoides_semichalceus*

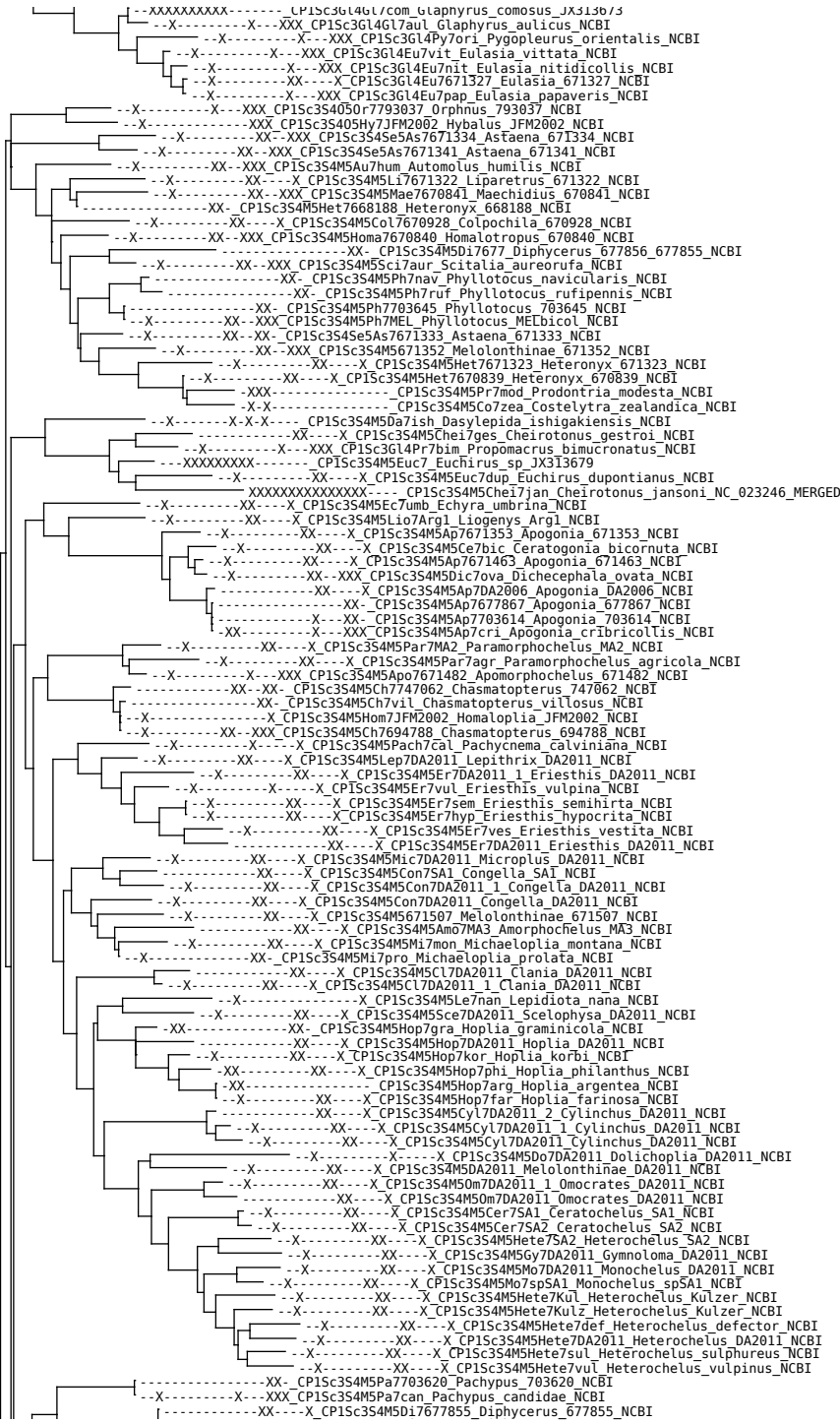
Phylogenetic tree showing relationships among various species, primarily from the order Araneae. The tree is rooted on the left and branches out to the right. Each terminal node is labeled with a species name and a NCBI accession number. The species names are often truncated to the first few characters of the genus and species epithet. The tree shows a complex branching pattern, with many nodes supported by bootstrap values (indicated by 'X' or 'XX'). The species listed include:

- CP1Sc35455C6Ar7MTM2009_3 Arachnoides MTM2009 NCBI
- CP1Sc35455C6Ar7BMNH669969 Arachnoides BMNH669969 NCBI
- CP1Sc35455Ps7han Pseudoarachnoides hansikii NCBI
- CP1Sc35455C6Ar7man Arachnoides manaitrai NCBI
- CP1Sc35455C6Ar7LO2006 Arachnoides LO2006 NCBI
- CP1Sc35455C6Ar7MTM2009_12 Arachnoides MTM2009 NCBI
- CP1Sc35455C6Ar7semi Arachnoides seminitidus NCBI
- CP1Sc35455C6Ar7gen Arachnoides genieri NCBI
- CP1Sc35455C6Ar7MTM2009_8 Arachnoides MTM2009 NCBI
- CP1Sc35455C6Ar7HKW2010_1 Arachnoides HKW2010 NCBI
- CP1Sc35455C6Ar7rut Arachnoides ruteri NCBI
- CP1Sc35455C6Ar7mant Arachnoides mantasooae NCBI
- CP1Sc35455C6Ar7del Arachnoides delphinensis NCBI
- CP1Sc35455C6Ar7MTM2009 Arachnoides MTM2009 NCBI
- CP1Sc35455C6Ar7MTM2009_1 Arachnoides MTM2009 NCBI
- CP1Sc35455C6Ar7MTM2009_6 Arachnoides MTM2009 NCBI
- CP1Sc35455C6Ar7MTM2009_7 Arachnoides MTM2009 NCBI
- CP1Sc35455C6Ar7apo Arachnoides apotolamproides NCBI
- CP1Sc35455C6Ar7ant Arachnoides antoetrae NCBI
- CP1Sc35455C6Ar7gro Arachnoides grossepunctatus NCBI
- CP1Sc35455C6Ar7pra Arachnoides prasinus NCBI
- CP1Sc35455C6Ar7spl Arachnoides splendidus NCBI
- CP1Sc35455C6Ar7mic Arachnoides micheli NCBI
- CP1Sc35455C6Ar7glo Arachnoides globuloides NCBI
- CP1Sc35455C6Ar7emm Arachnoides emmae NCBI
- CP1Sc35455C6Ar7MTM2009_11 Arachnoides MTM2009 NCBI
- CP1Sc35455C6Ar7sic Arachnoides sicardi NCBI
- CP1Sc35455C6Ar7onth7dia Ontherus diabolicus NCBI
- CP1Sc35455C6Gy7pum Gyronotus pumilus NCBI
- CP1Sc35455Tr7dgi1 Trichillum dgi1 NCBI
- CP1Sc35455C6Bo7cor Boletoscapter cornutus NCBI
- CP1Sc35455Pe7dgi1 Pedaria dgi1 NCBI
- CP1Sc35455Pe7CL52009b Pedaria CLS2009b NCBI
- CP1Sc35455Pe7CL52009a Pedaria CLS2009a NCBI
- CP1Sc35455De7int Demarziella interrupta NCBI
- CP1Sc35455C6Ar7tr Amphistomus trispiculatus NCBI
- CP1Sc35455C6Am7com Amphistomus complanatus NCBI
- CP1Sc35455C6Co7hem Coproecus hemisphaericus NCBI
- CP1Sc35455C6Ap7dgi1 Aptenocanthon dgi1 NCBI
- CP1Sc35455C6Di7nig Diorygopyx niger NCBI
- CP1Sc35455C6Di7inc Diorygopyx incomptus NCBI
- CP1Sc35455C6Di7tib Diorygopyx tibialis NCBI
- CP1Sc35455C6Di7sim Diorygopyx simplicilunus NCBI
- CP1Sc35455C6Sa7squ Saphobius squamulosus NCBI
- CP1Sc35455C6Sa7set Saphobius setosus NCBI
- CP1Sc35455C6P7sim Paronthobium simplex NCBI
- CP1Sc35455A7tib Anonthobium tibiale NCBI
- CP1Sc35455C6Pse7dgi1 Pseudonthobium dgi1 NCBI
- CP1Sc35455C6Iq7fas Iqnambia fasciculata NCBI
- CP1Sc35455C6Pse7frra Pseudonthobium fracticolloides NCBI
- CP1Sc35455C6on7dgi1 Onthobium dgi1 NCBI
- CP1Sc35455C6on7coo Onthobium cooki NCBI
- CP1Sc35455C6Ps7BMNH679763 Pseudignambia BMNH679763 NCBI
- CP1Sc35455C6Ps7dgi1 Pseudignambia dgi1 NCBI
- CP1Sc35455C6Ps7dgi2 Pseudignambia dgi2 NCBI
- CP1Sc35455C6Le7bid Lepanus bidentatus NCBI
- CP1Sc35455C6Le7pol Lepanus politus NCBI
- CP1Sc35455C6Le7nit Lepanus nitidus NCBI
- CP1Sc35455C6Le7ust Lepanus ustulatus NCBI
- CP1Sc35455C6Can7cas Canthonosoma castelnaui NCBI
- CP1Sc35455C6Ce7arm Cephalodesmius armiger NCBI
- CP1Sc35455C6Ce7qua Cephalodesmius quadridens NCBI
- CP1Sc35455C6Mo7cur Monoplistes curvipes NCBI
- CP1Sc35455C6Le7gla Lepanus glaber NCBI
- CP1Sc35455C6Te7lae Temnoplectron laeve NCBI
- CP1Sc35455C6Te7bor Temnoplectron bornemisszai NCBI
- CP1Sc35455C6Te7maj Temnoplectron major NCBI
- CP1Sc35455C6Te7bou Temnoplectron boucomonti NCBI
- CP1Sc35455C6Te7fin Temnoplectron finnigani NCBI
- CP1Sc35455C6Te7mon Temnoplectron monteithi NCBI
- CP1Sc35455C6Te7inv Temnoplectron involucre NCBI
- CP1Sc35455C6Te7sub Temnoplectron subvolitans NCBI
- CP1Sc35455C6Te7coo Temnoplectron cooki NCBI
- CP1Sc35455C6Te7dis Temnoplectron disruptum NCBI
- CP1Sc35455C6Te7pol Temnoplectron politulum NCBI
- CP1Sc35455C6Te7aen Temnoplectron aeneopiceum NCBI
- CP1Sc35455C6C17bac Cirrrellium bacchus NCBI
- CP1Sc35455C6H7and Helioopsis andersoni NCBI
- CP1Sc35455C6H7ham Helioopsis hamdryas NCBI
- CP1Sc35455S6Sc7dgi1 Scarabaeus dgi1 NCBI
- CP1Sc35455Pa7dgi1 Pachysoma dgi1 NCBI
- CP1Sc35455Pa7aes Pachysoma aesculapius NCBI
- CP1Sc35455Pa7ben Pachysoma benigneni NCBI
- CP1Sc35455Pa7end Pachysoma endroeydi NCBI
- CP1Sc35455Pa7gle Pachysoma glentoni NCBI
- CP1Sc35455Pa7hip Pachysoma hippocrates NCBI
- CP1Sc35455Pa7gar Pachysoma gariepini NCBI
- CP1Sc35455Pa7den Pachysoma denticollis NCBI
- CP1Sc35455Pa7fit Pachysoma fitzsimonsi NCBI
- CP1Sc35455Pa7sch Pachysoma schinzi NCBI
- CP1Sc35455Pa7str Pachysoma striatus NCBI
- CP1Sc35455S6Kh7sub Kheper subaeneus NCBI
- CP1Sc35455S6Kh7bon Kheper bonellii NCBI
- CP1Sc35455S6Kh7nig Kheper nigroaeneus NCBI
- CP1Sc35455S6Sc7rad Scarabaeus radama NCBI
- CP1Sc35455S6Sc7gor Scarabaeus goryi NCBI
- CP1Sc35455S6Sc7vie Scarabaeus viettei NCBI
- CP1Sc35455S6Sc7sat Scarabaeus satyrus NCBI
- CP1Sc35455S6Sc7zam Scarabaeus zambeziensis NCBI

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-XX-----CP1Sc35455Pa7rot_Pachysoma_rotundigenus_NCBI
-XX-----CP1Sc35455Pa7rod_Pachysoma_rodriguesi_NCBI
-XX-----X-----CP1Sc35455S6Sc7wes_Scarabaeus_westwoodi_NCBI
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-XX-----X-----CP1Sc35455S6Sc7rug_Scarabaeus_rugosus_NCBI
-XX-----X-----X-----CP1Sc35455S6Sc7Sik2015_Scarabaeus_Sik2015_NCBI
-XX-----X-----X-----CP1Sc35455S6Sc7gal_Scarabaeus_galenus_NCBI
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-XX-----X-----CP1Sc35455S6Sc7fla_Scarabaeus_flavicornis_NCBI
-X-----X-----CP1Sc35455S6Sc7SM2012_Scarabaeus_SM2012_NCBI
-XX-----X-----CP1Sc35455S6Sc7rub_Scarabaeus_rubrhipennis_NCBI
-X-----X-----XXX CP1Sc35455S6Dr7cos_Drepanopodus_costatus_NCBI
-XX-----X-----CP1Sc35455S6Dr7pro_Drepanopodus_proximus_NCBI
-XX-----X-----CP1Sc35455Pa7val_Pachysoma_valeflorae_NCBI
-XX-----X-----XXX CP1Sc35455S6Pa7fem_Pachylomerus_femoralis_NCBI
-XX-----X-----CP1Sc35455S6S7ada_Scarabaeus_adamastor_NCBI
-XX-----X-----X-----CP1Sc35455S6Sc7thp_Scarabaeus_hippias_NCBI
-XX-----X-----CP1Sc35455S6Sc7cic_Scarabaeus_cicatricosus_NCBI
-XXX-----CP1Sc35455S6Sc7sac_Scarabaeus_sacer_NCBI
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-X-----X-----CP1Sc35455S6Sc7SM2012_1_Scarabaeus_SM2012_NCBI
-XX-----X-----XXX CP1Sc35455S6Sc7bri_Scarabaeus_brittoni_NCBI
-X-----X-----CP1Sc35455Anon7fre_Anonychonitis_freyi_NCBI
-XX-----X-----CP1Sc35455Ch7hun_Cheironitis_hungaricus_NCBI
-X-----X-----X-----CP1Sc35455Ch7sca_Cheironitis_scabrosus_NCBI
-X-----X-----X-----CP1Sc35455Ch7on_Cheironitis_hoplosternus_NCBI
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-XX-----X-----CP1Sc35455On7bel_Onitis_belialii_NCBI
-X-----X-----CP1Sc35455On7sub_Onitis_subopacus_NCBI
XXXXXXXXXXXXXXXXX X CP1Sc35455On7fal_Onitis_falcatus_CS.idba.22_MERGED_MMG_ANNOT_FROM_BARCODE
-XXXX-----CP1Sc3_Scarabaeoidea_sp7_CS.idba.87_MMG_ANNOT_FROM_TREE
XXXXXXXXXXXXXXXXX X CP1Sc35455On7ale_Onitis_alexis_Scarab.idba.9_MMG_ANNOT_FROM_BARCODE
XXXXXXXXXXXXXXXXX X CP1Sc35455On7ale_Onitis_alexis_CS.idba.60_MERGED_MMG_ANNOT_FROM_BARCODE
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XXXXXXXXXXXXXXXXX X CP1Sc35455Bu7bis_Bubas_bison_CS.idba.2_MERGED_MMG_ANNOT_FROM_BARCODE
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XXXXXXXXXXXXXXXXX X CP1Sc35455On7SM2012_Onitis_SM2012_NCBI
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-X-----X-----X-----CP1Sc35455S16S17sem_Sisyphus_seminulus_NCBI
-X-----X-----X-----CP1Sc35455S16Ne7mir_Neosisyphus_mirabilis_NCBI
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-X-----X-----X-----CP1Sc35455S16S17cri_Sisyphus_crispatus_NCBI
-X-----X-----XXX CP1Sc35455S16S17fac_Sisyphus_faciculatus_NCBI
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XXXXXXXXXXXXXXXXX X CP1Sc35455D17gaz_Digitonthophagus_gazella_Scarab.idba.8_MERGED_MMG_ANNOT_FROM_BARCODE
XXXXXXXXXXXXXXXXX CP1Sc35455On7bon_Onthophagus_bonatus_CS.idba.4_MMG_ANNOT_FROM_BARCODE
XXXXXXXXXXXXXXXXX CP1Sc35455Ph7sma_Phalops_smaragdinus_CS.idba.38_MMG_ANNOT_FROM_BARCODE
-X-----X-----CP1Sc35455Pr7sap_Proagoderus_sappharinus_NCBI
XXXXXXXXXXXXXXXXX XXX CP1Sc35455Ph7ard_Phalops_ardea_CS.idba.8_MERGED_MMG_ANNOT_FROM_BARCODE
XXXXXXXXXXXX CP1Sc35455Ph7bar_Phalops_barbicornis_Scarab.idba.21_MMG_ANNOT_FROM_BARCODE
-X-----X-----CP1Sc35455Ph7ruf_Phalops_rufosignatus_NCBI
-X-----X-----X-----CP1Sc35455On7ran_Onthophagus_rangifer_NCBI
-X-----X-----CP1Sc35455On7pla_Onititellus_planatus_NCBI
-XXXXXXXXXXXXXXXXX CP1Sc35455On7lat_Onthophagus_laticollis_Scarab.idba.13_MERGED_MMG_ANNOT_FROM_BARCODE
XXXXXXXXXXXXXXXXX XXX CP1Sc35455Pr7bic_Proagoderus_bicallosus_CS.idba.3_MERGED_MMG_ANNOT_FROM_BARCODE
XXXXXXXXXXXXXXXXX X CP1Sc35455Pr7sch_Proagoderus_schwani CS.idba.12_MERGED_MMG_ANNOT_FROM_BARCODE
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-XX-----CP1Sc35455On7lan_Onthophagus_lanista_NCBI
-X-----X-----CP1Sc35455On7ter_Onthophagus_tersidorsis_NCBI
XXXXXXXXXXXXXXXXX CP1Sc35455On7apu_Onthophagus_aputnksinus_Scarab.idba.5_MMG_ANNOT_FROM_BARCODE
-X-----X-----CP1Sc35455On7ele_Onthophagus_elegans_NCBI
XXXXXXXXXXXXXXXXX XXX CP1Sc35455D17dia_Onthophagus_diabolicus_Scarab.idba.18_MERGED_MMG_ANNOT_FROM_BARCODE
XXXXXXXXXXXXXXXXX CP1Sc3_Scarabaeoidea_sp1_CS.idba.30_MMG_ANNOT_FROM_TREE
XXXXXXXXXXXXXXXXX CP1Sc35455On7yuk_Onthophagus_yukae_Scarab.idba.12_MMG_ANNOT_FROM_BARCODE
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-X-----X-----CP1Sc35455Se7sen_Serrophorus_seniculus_NCBI
-XXXX-----CP1Sc3_Scarabaeoidea_sp6_CS.idba.86_MMG_ANNOT_FROM_TREE
XXXXXXXXXXXXXXXXX XXX CP1Sc35455T17sar_Tinotellus_sarawacus_CS.idba.21_MERGED_MMG_ANNOT_FROM_BARCODE
-X-----X-----CP1Sc35455Euo7tri_Euonititellus_trianulatus_NCBI
-X-----X-----XXX CP1Sc35455Euo7ful_Euonititellus_fulvus_Scarab.idba.0_MERGED_MMG_ANNOT_FROM_BARCODE
-X-----X-----CP1Sc35455Euo7afr_Euonititellus_africanus_NCBI
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Phylogenetic tree showing relationships between various species, primarily from the genus *Onthophagus*. The tree is rooted on the left and branches out to the right. Each node and branch is labeled with a species name and its corresponding accession number (e.g., CP1Sc354550nt7pul, CP1Sc354550nt7lem). The labels are arranged in a columnar format, with some species names truncated for brevity. The tree structure is complex, with many internal nodes and branches, indicating a large number of species being compared. The labels include various identifiers such as 'MMG_ANNOT_FROM_BARCODE', 'MMG_ANNOT_FROM_TREE', and 'MERGED_MMG_ANNOT_FROM_BARCODE', suggesting that the tree is based on multiple data sources or analyses. The species names are listed in a specific order, likely corresponding to the order of the tips in the tree. The tree shows a high degree of genetic differentiation among the species, with many distinct clusters and lineages. The overall structure is a dense, bushy tree with many small branches, typical of a large-scale phylogenetic analysis. The labels are in a monospaced font, and the tree is drawn with simple lines and dots to represent nodes and branches. The tree is oriented vertically, with the root at the top and the tips at the bottom. The labels are aligned to the right of the tree, with some overlapping. The tree is a clear representation of the evolutionary relationships between the species, showing how they are related to each other and to their common ancestor. The tree is a valuable tool for understanding the diversity and evolution of the genus *Onthophagus*.

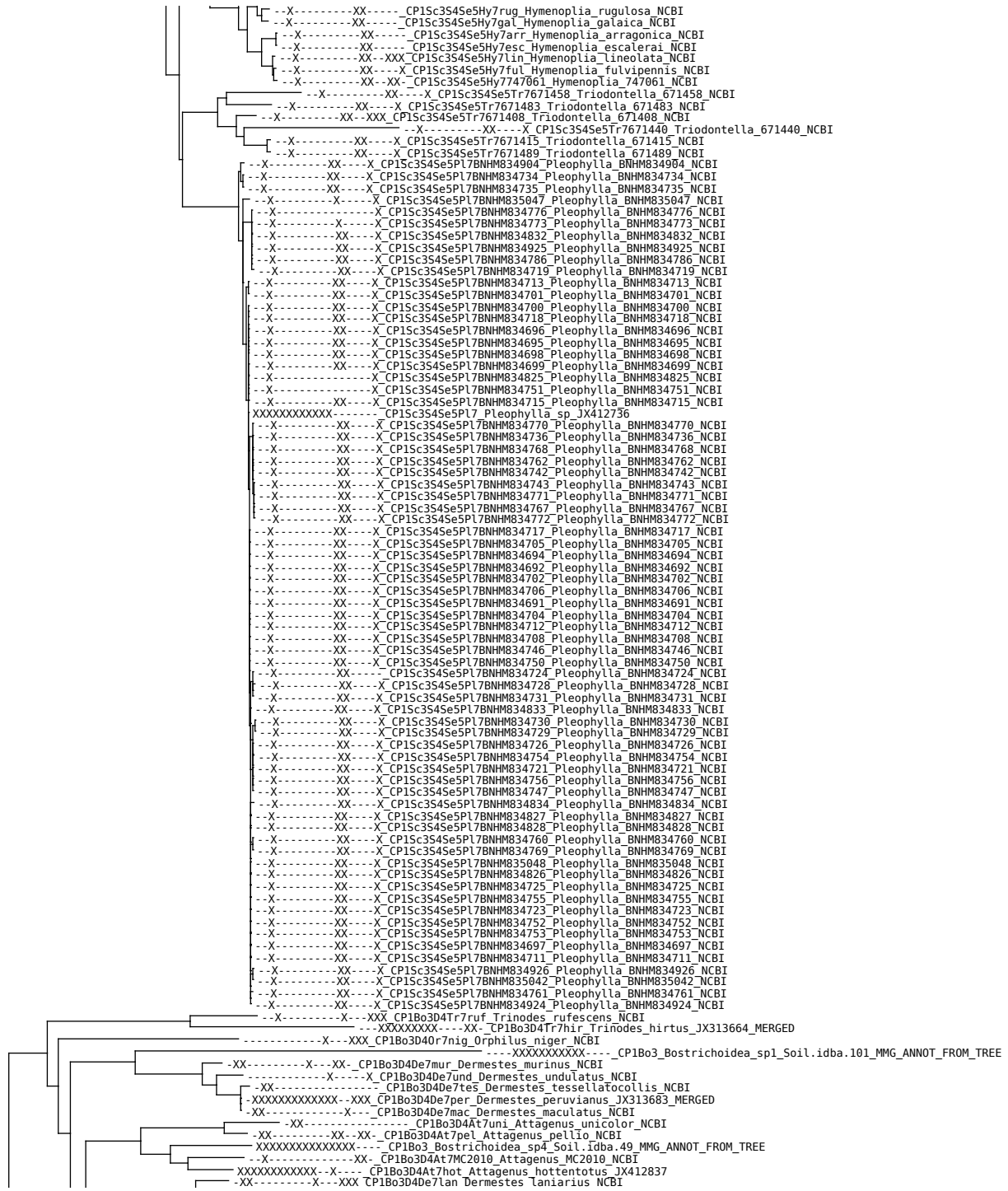


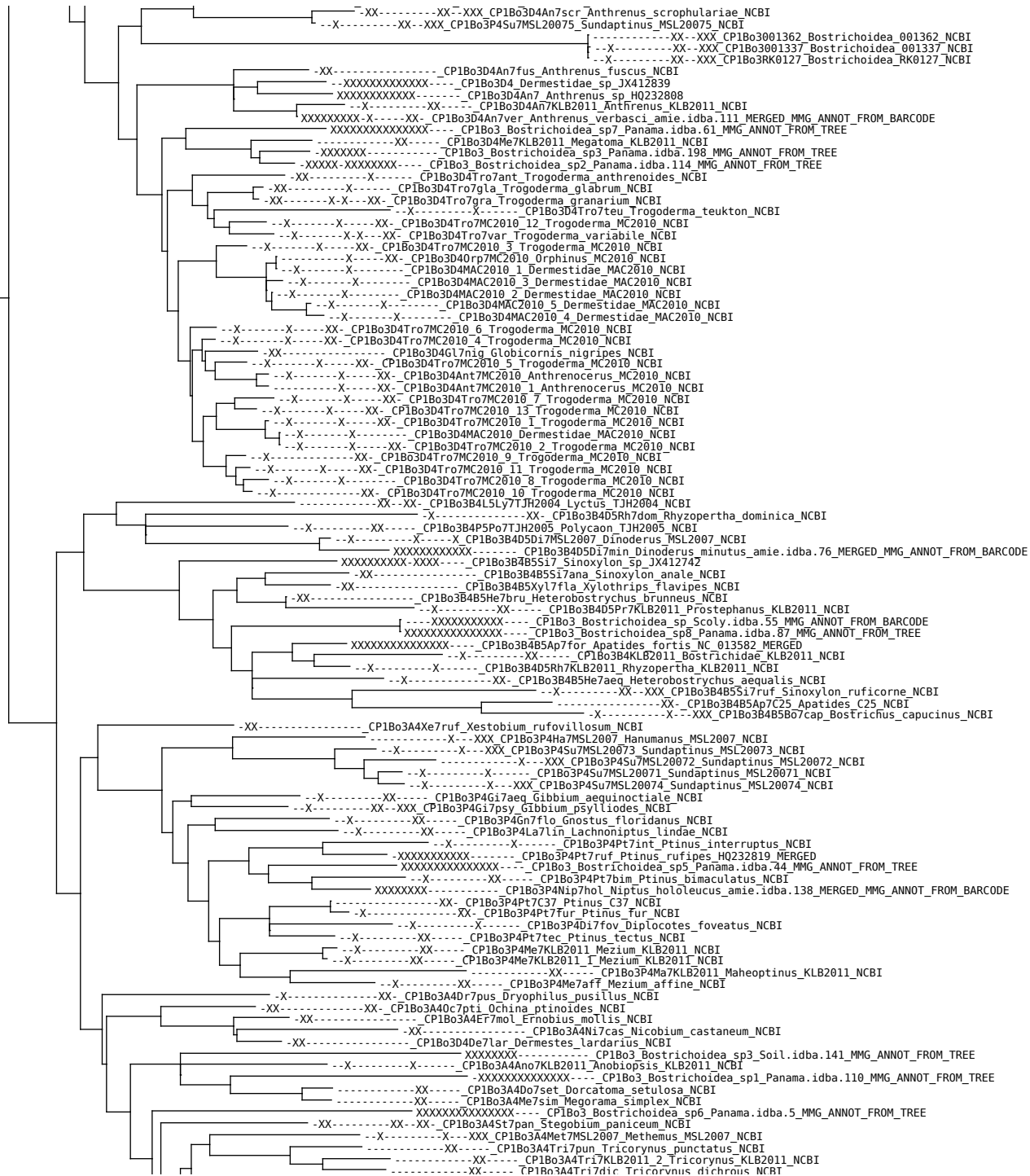


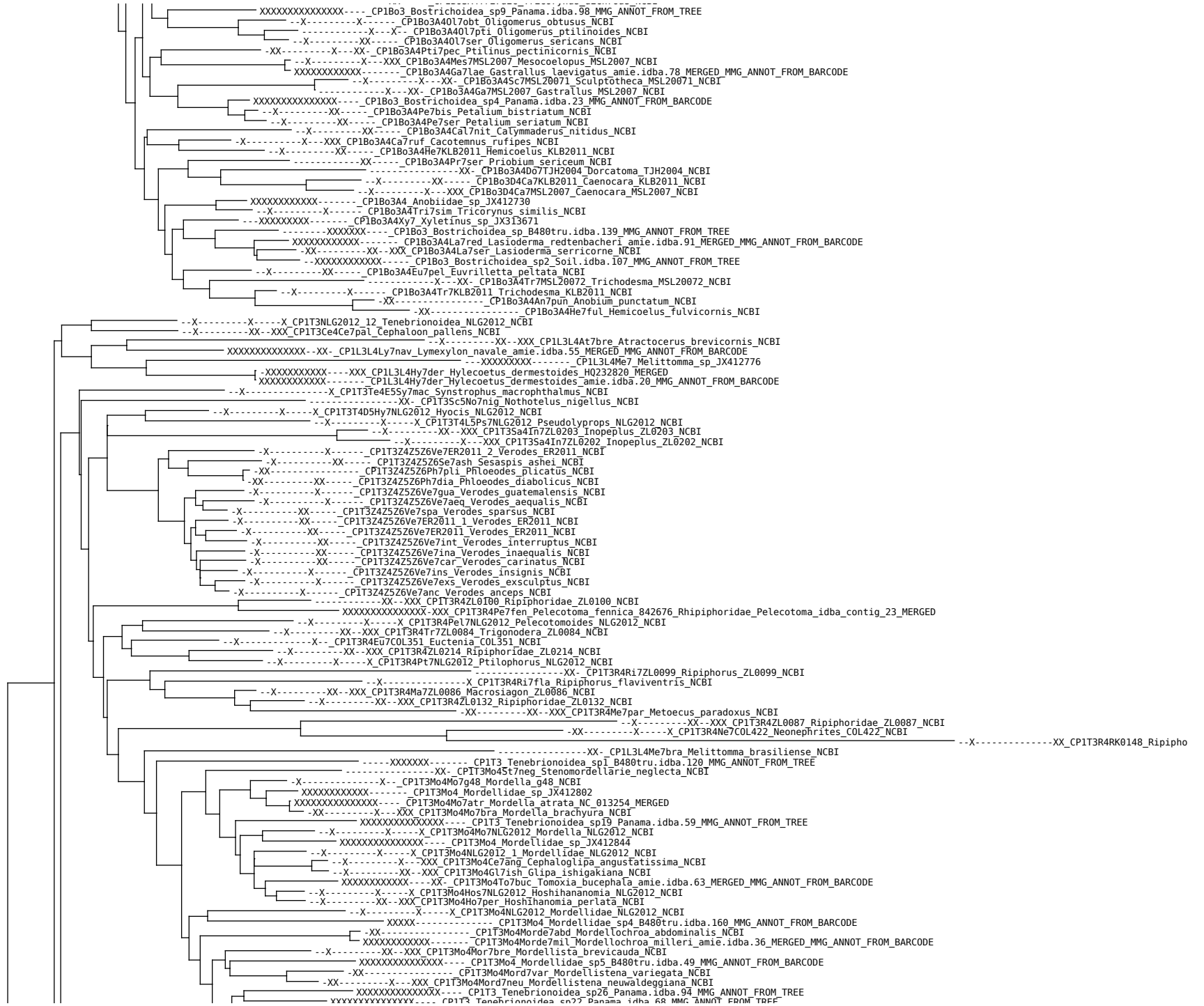




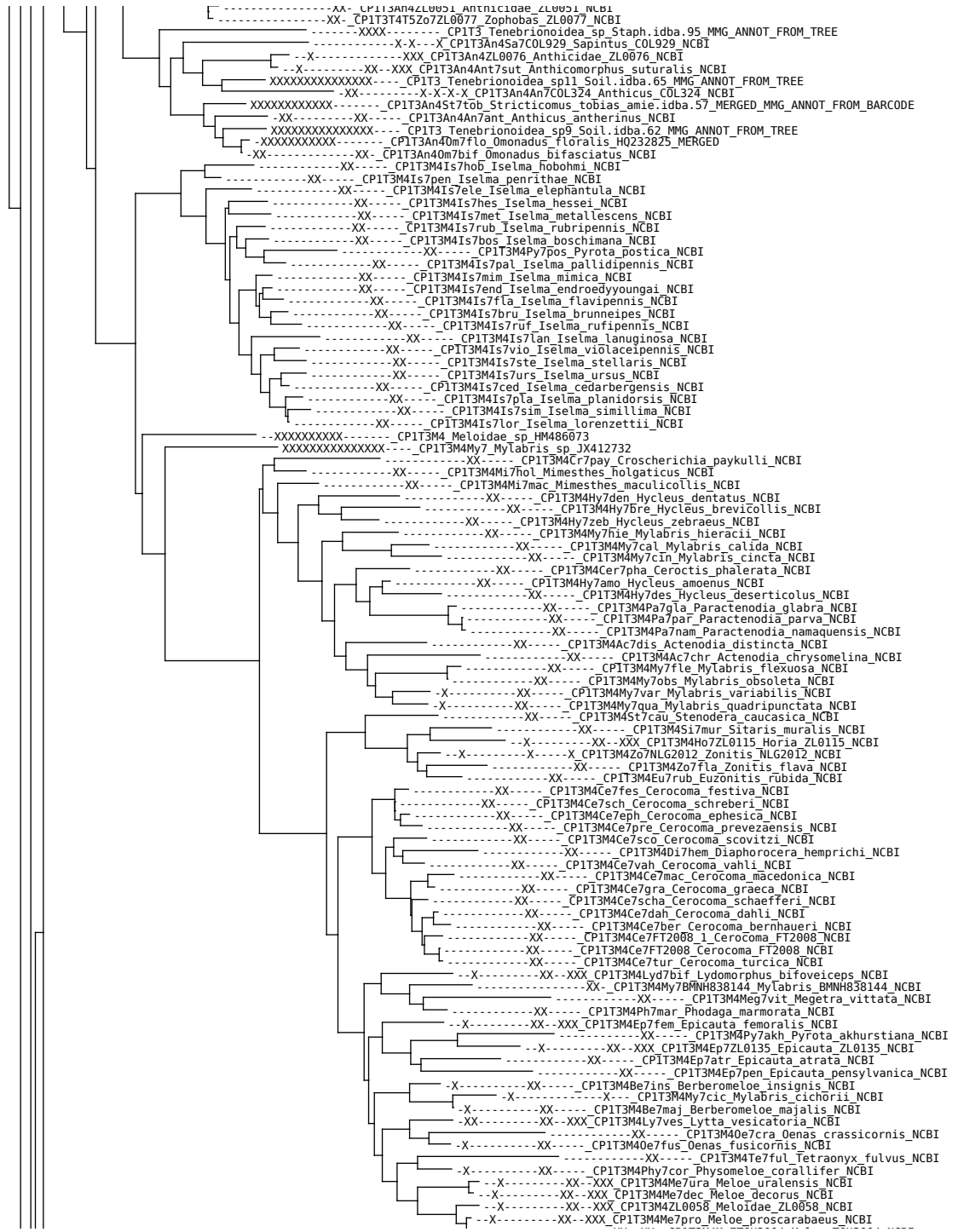
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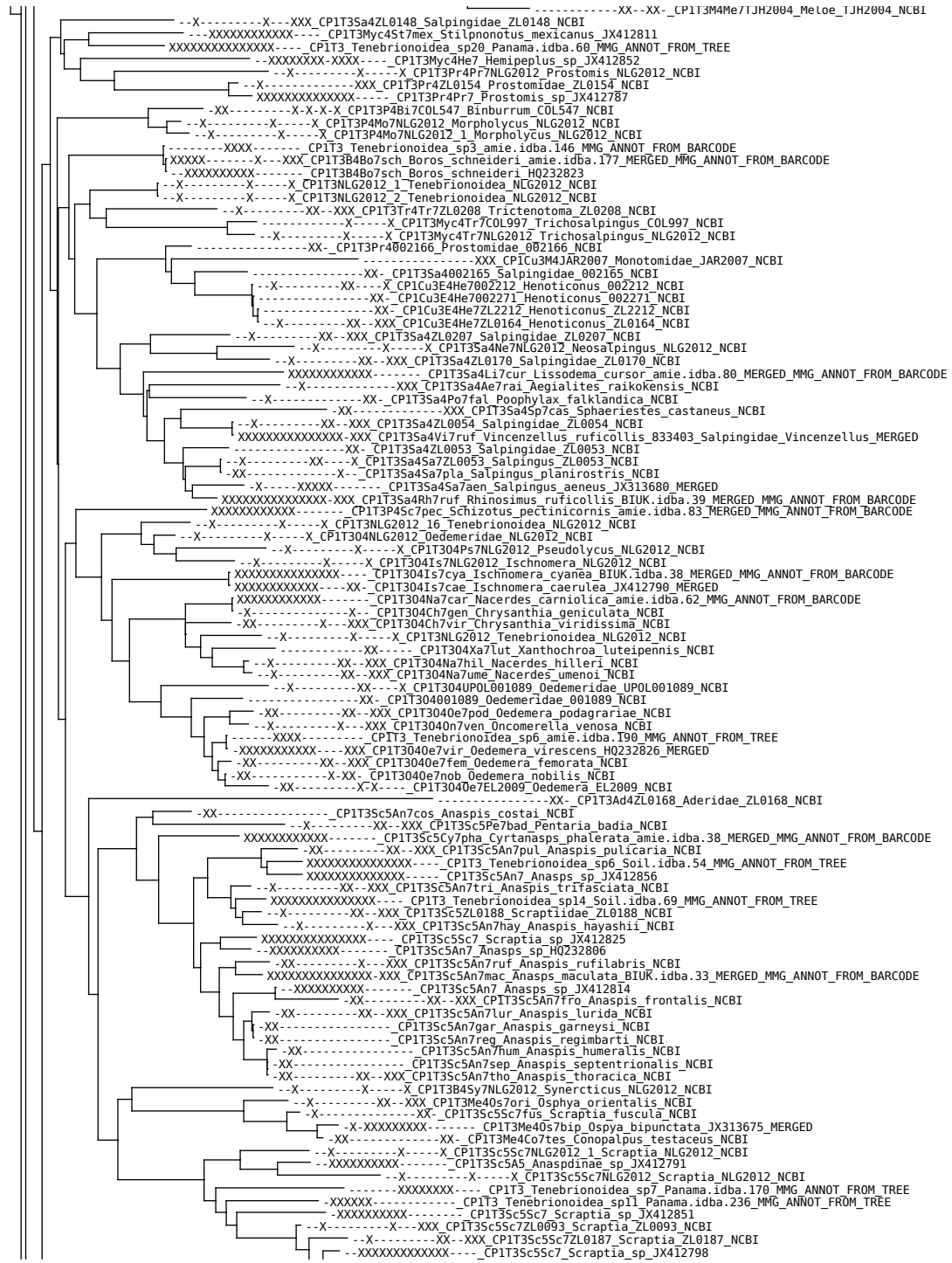


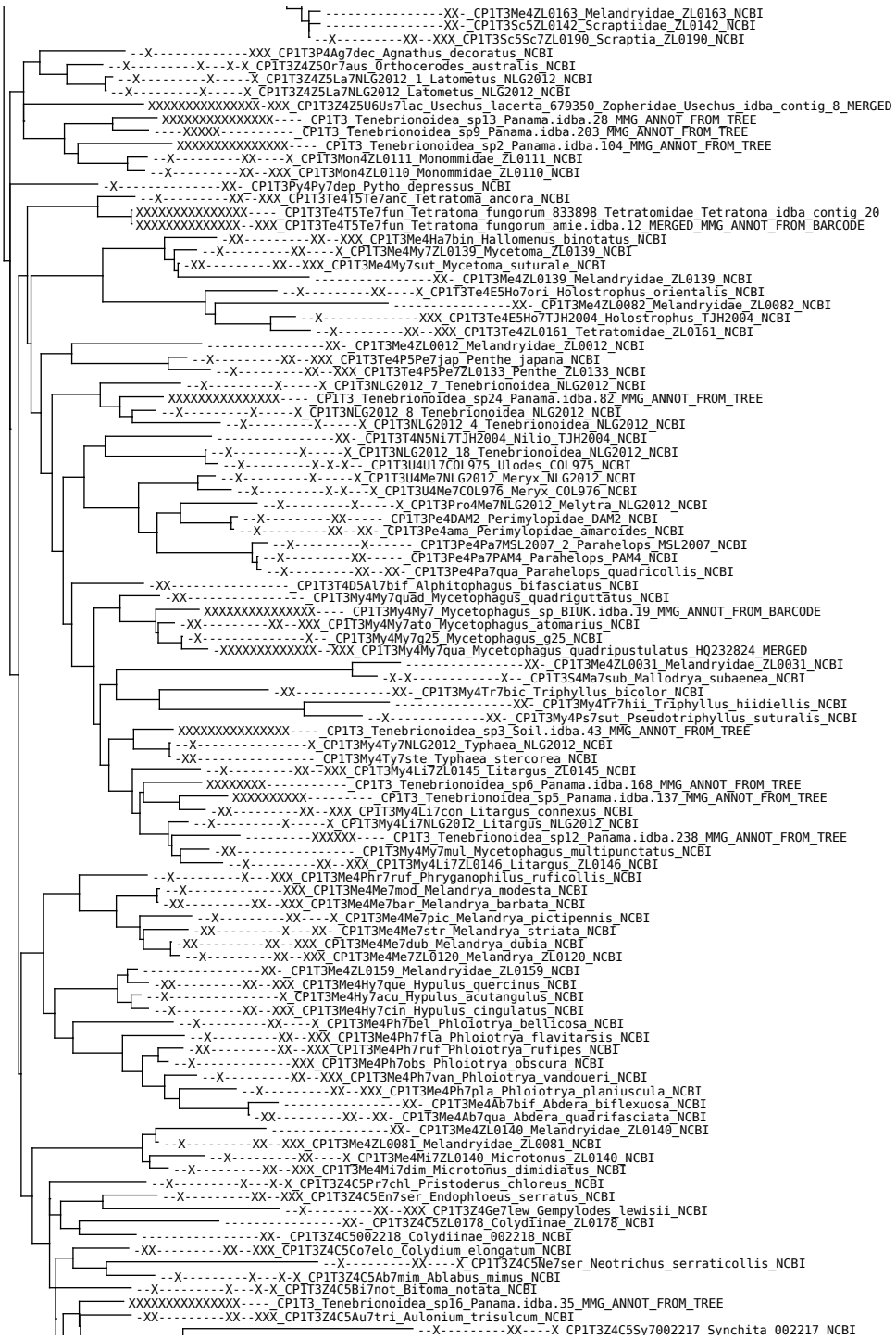






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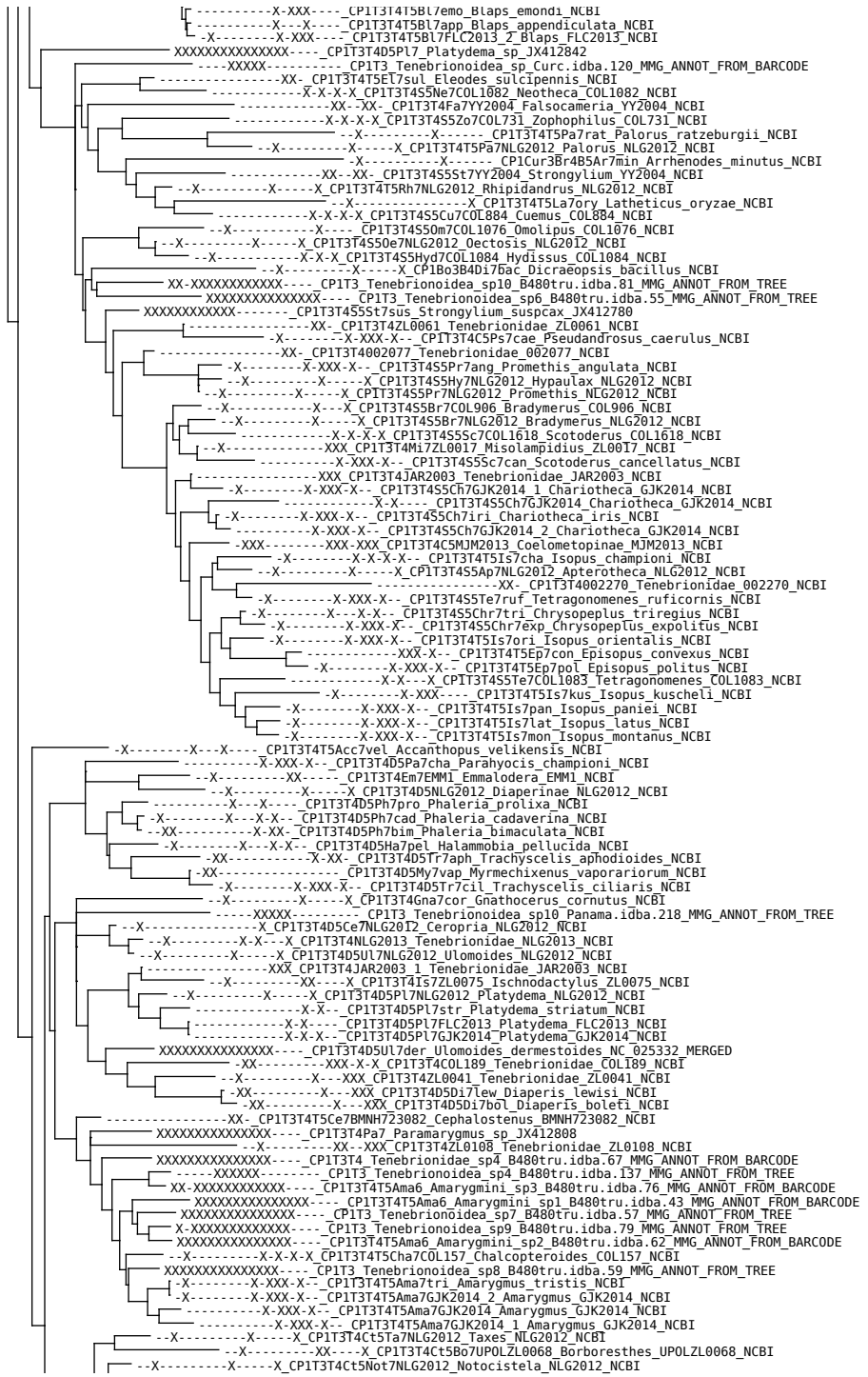


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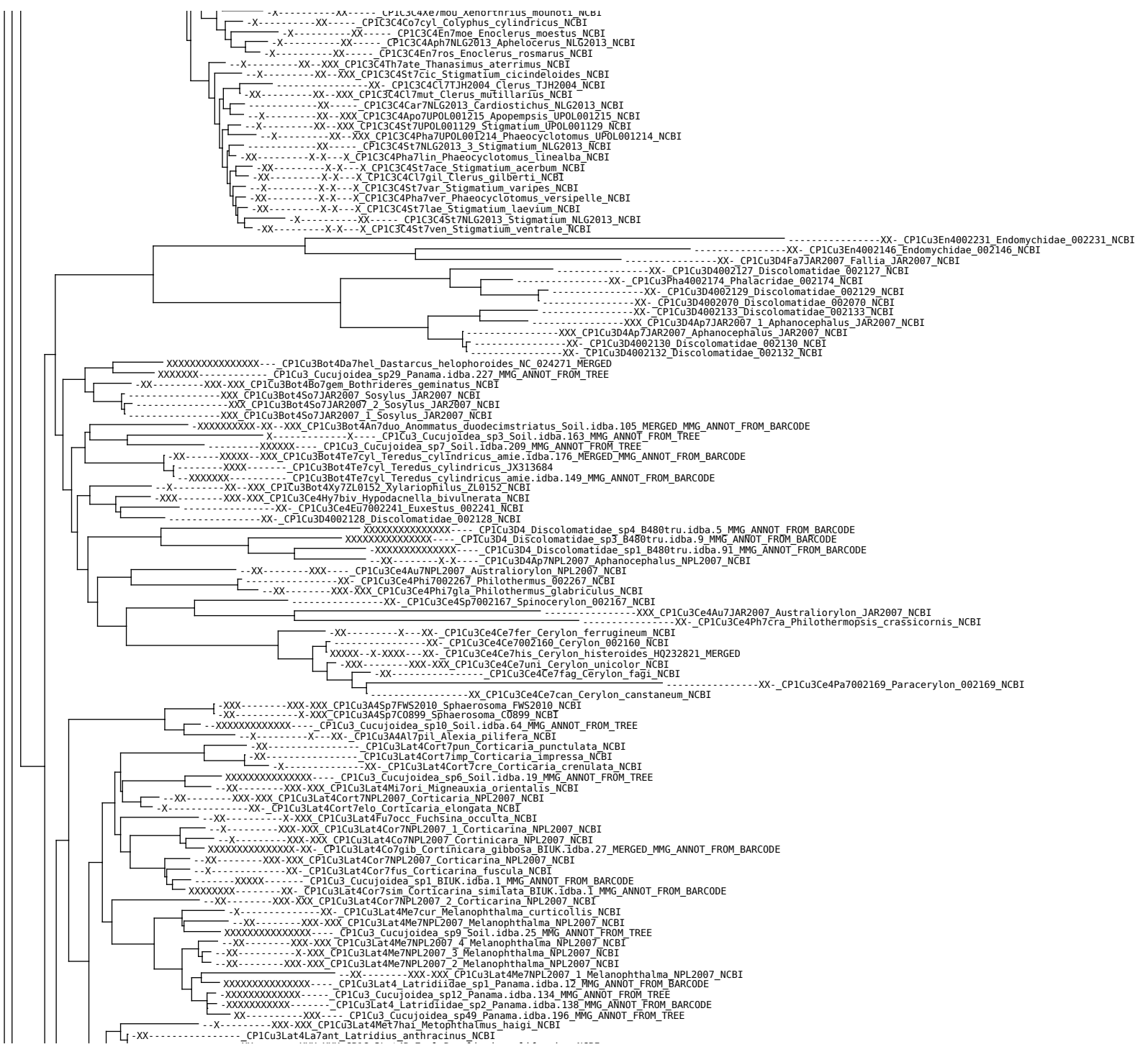
Phylogenetic tree showing relationships between various species, with labels such as CP1T3T4T5Lea7NLG2012_1, CP1T3T4T5Lea7NLG2012_2, and CP1T3T4T5Lea7NLG2012_3. The tree is rooted on the left and branches out to the right. Species names are listed on the right side of the tree, often followed by their NCBI accession numbers. The tree is annotated with 'X' marks, indicating specific clades or relationships. The tree is rooted on the left and branches out to the right. Species names are listed on the right side of the tree, often followed by their NCBI accession numbers. The tree is annotated with 'X' marks, indicating specific clades or relationships.



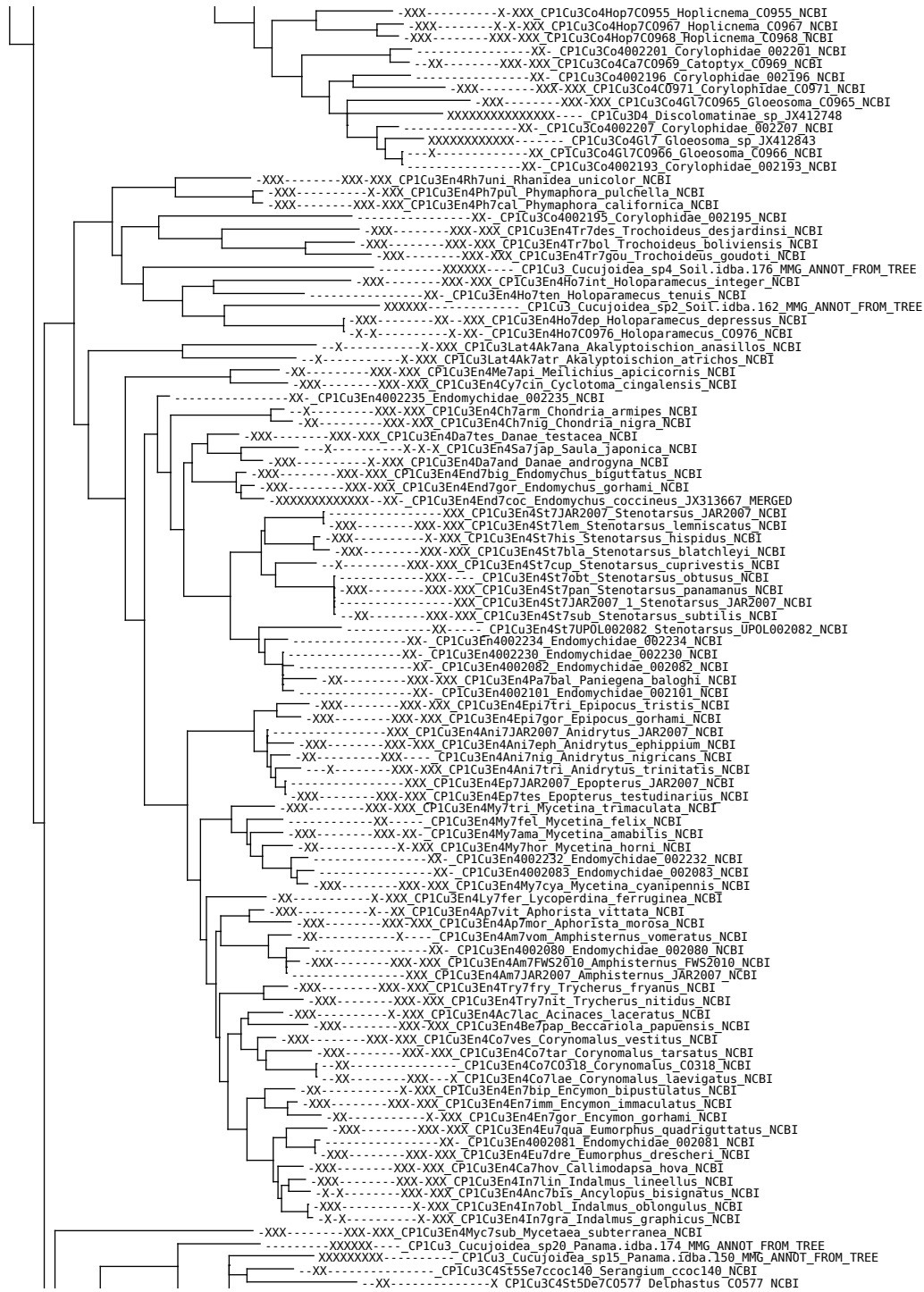






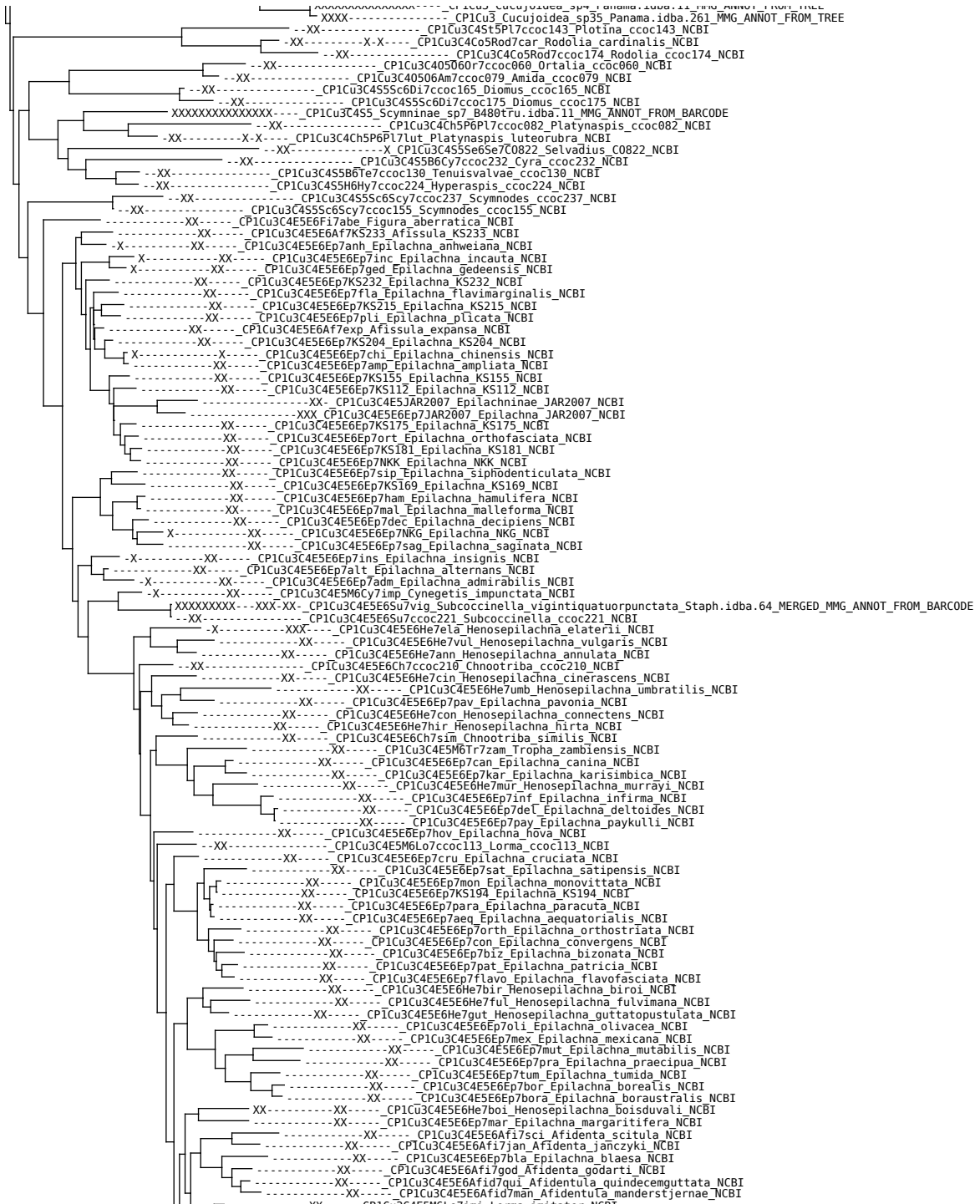


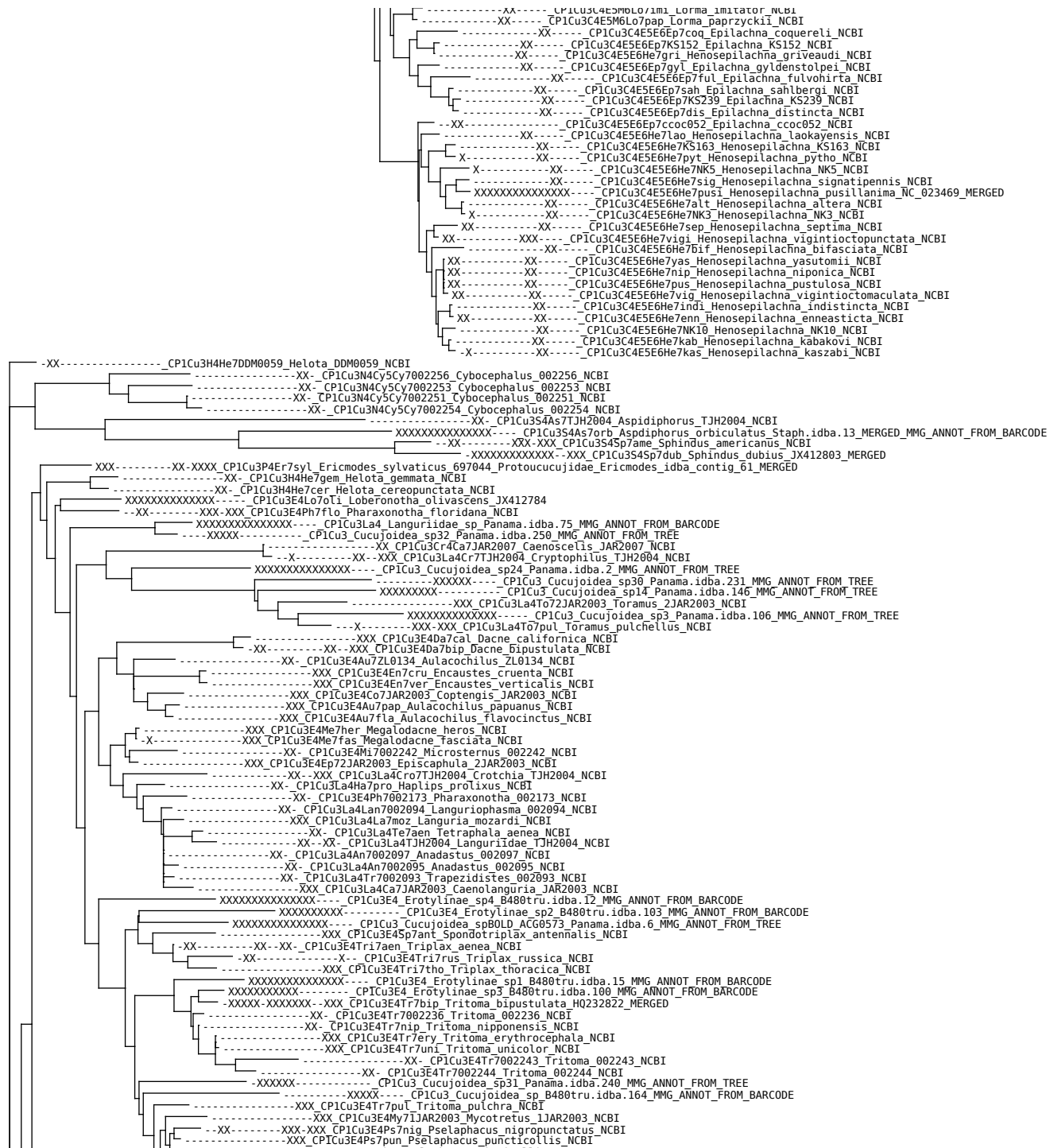




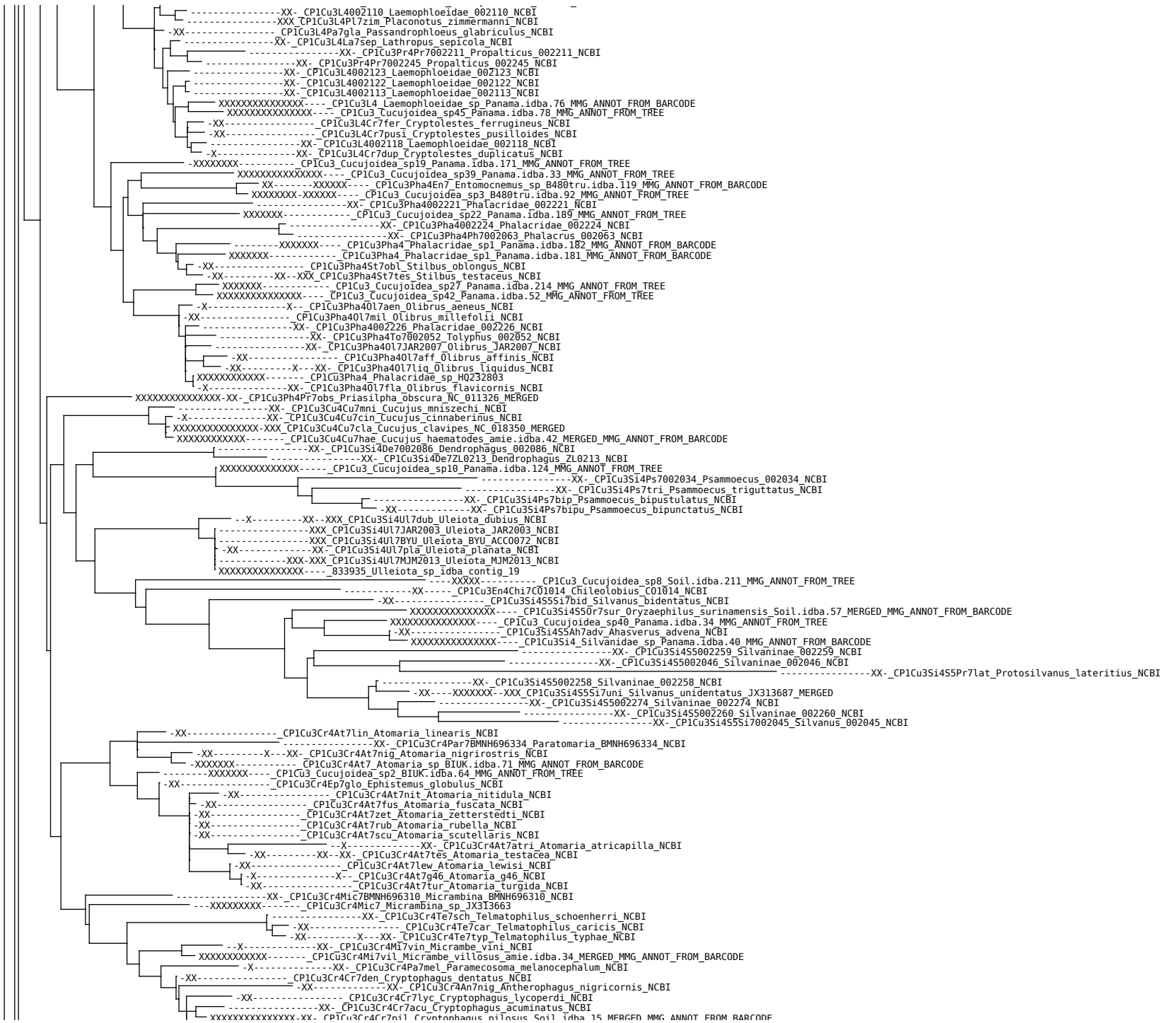








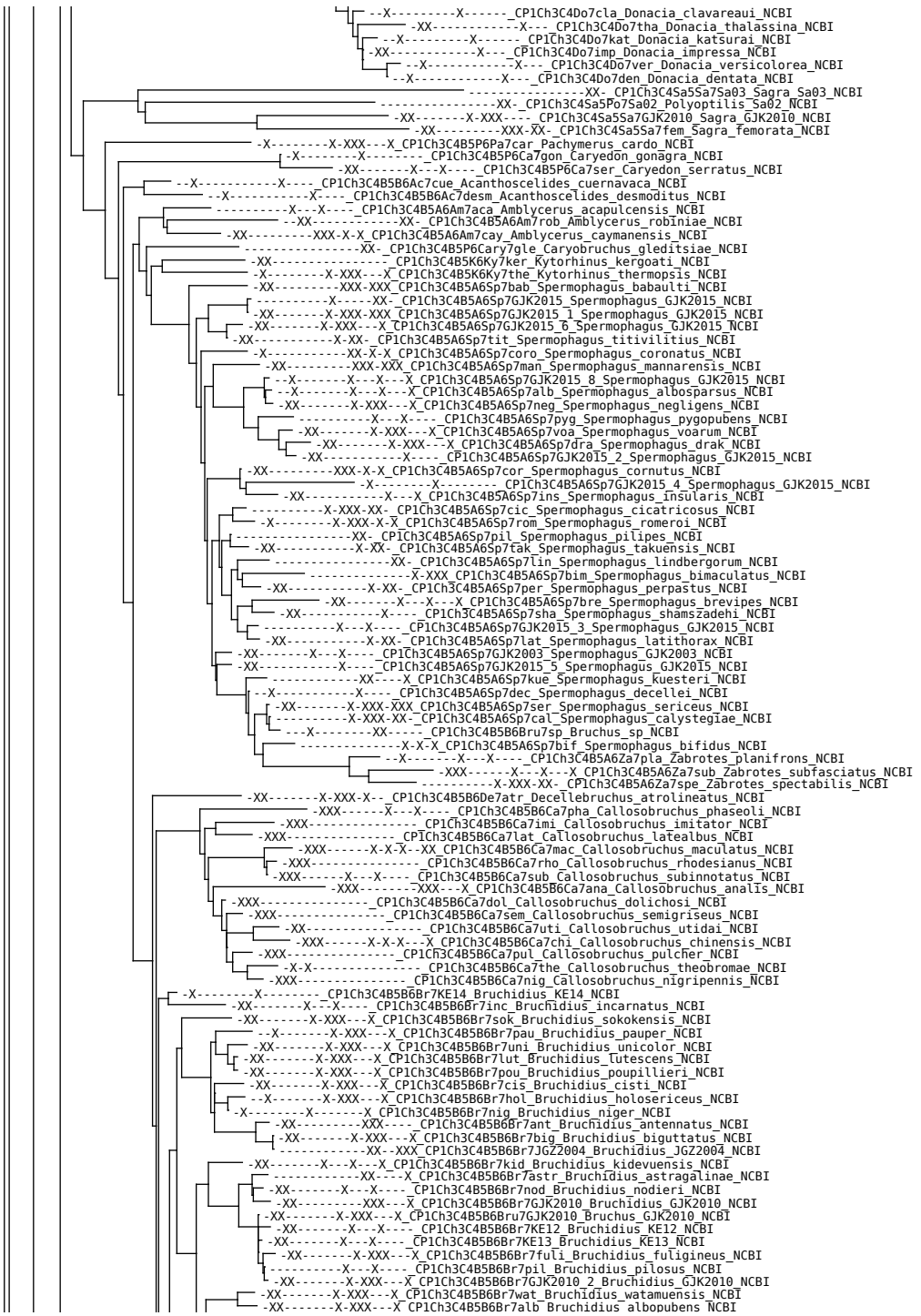






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XX CP1Ch3Ce4La5T6Te7umb Tetraopes umbonatus NCBI
XX CP1Ch3Ce4La5T6Ph7mir Phaea mirabilis NCBI





Phylogenetic tree showing relationships between various species, with accession numbers and species names listed on the right side of the branches. The tree is rooted on the left and branches out to the right. Species names include *Merobruchus julianus*, *Bruchidius nigricornis*, *Bruchidius malindiensis*, *Bruchidius lineatopygus*, *Bruchidius adouanus*, *Conicobruchus subdolosus*, *Bruchidius GJK2010*, *Conicobruchus medaniensis*, *Conicobruchus decoratus*, *Conicobruchus rubricollis*, *Conicobruchus cicatricosus*, *Conicobruchus strangulatus*, *Conicobruchus GJK2010*, *Conicobruchus flabellicornis*, *Conicobruchus atrosuturalis*, *Bruchus sakeensis*, *Bruchidius KELL*, *Stator sordidus*, *Stator pygidialis*, *Stator chihuahua*, *Stator subaeneus*, *Stator bottimeri*, *Stator mexicanus*, *Stator chalcodermis*, *Stator pruininus*, *Stator limbatus*, *Stator testularius*, *Stator beali*, *Stator aegrotus*, *Stator monachus*, *Stator maculatus*, *Stator trisignatus*, *Stator furcatus*, *Stator vittathorax*, *Stator tigris*, *Stator vachelliae*, *Stator generalis*, *Stator parvae*, *Bruchidius terrenus*, *Bruchus lentis*, *Bruchus griseomaculatus*, *Bruchus emarginatus*, *Bruchus pisorum*, *Acanthoscelides mexicanus*, *Acanthoscelides obtectus*, *Acanthoscelides obvelatus*, *Acanthoscelides argillaceus*, *Acanthoscelides sanfordi*, *Acanthoscelides desmodicola*, *Stylinus styliifer*, *Bruchidius niokotobaensis*, *Bruchidius cadei*, *Bruchidius pygidiopictus*, *Bruchidius urbanus*, *Bruchidius campylacanthae*, *Bruchidius dichrostachydis*, *Bruchidius KE07*, *Tuberculobruchus natalensis*, *Tuberculobruchus sinicus*, *Bruchidius KE05*, *Pygobruchidius latiorithorax*, *Bruchidius KE04*, *Tuberculobruchus babaulti*, *Bruchidius KE08*, *Bruchinae sp. JX412832*, *Bruchidius saundersi*, *Tuberculobruchus albizziarum*, *Bruchidius KE09*, *Bruchidius rubicundus*, *Bruchidius KE10*, *Bruchidius submaculatus*, *Tuberculobruchus silaceus*, *Bruchidius KE01*, *Bruchidius auratopubens*, *Bruchidius flavovirens*, *Bruchidius aureus*, *Bruchidius lineolatus*, *Bruchidius quadrisignatus*, *Bruchidius sparsamaculatus*, *Tuberculobruchus subuniformis*, *Bruchidius KE02*, *Bruchidius Kiliwaensis*, *Bruchidius SE01*, *Bruchidius chloroticus*, *Bruchidius securiger*, *Bruchidius centromaculatus*, *Bruchidius grandemaculatus*, *Bruchidius KE03*, *Bruchidius KE06*, *Bruchidius uberatus*, *Bruchidius raddianae*, *Bruchidius aurivillii*, *Bruchidius saudicus*, *Bruchidius astragali*, *Bruchidius caninus*, *Bruchidius marginalis*, *Bruchidius lividimanus*, *Bruchidius villosus*, *Bruchidius tuberculatus*, and *Bruchidius RMNH#704365*.





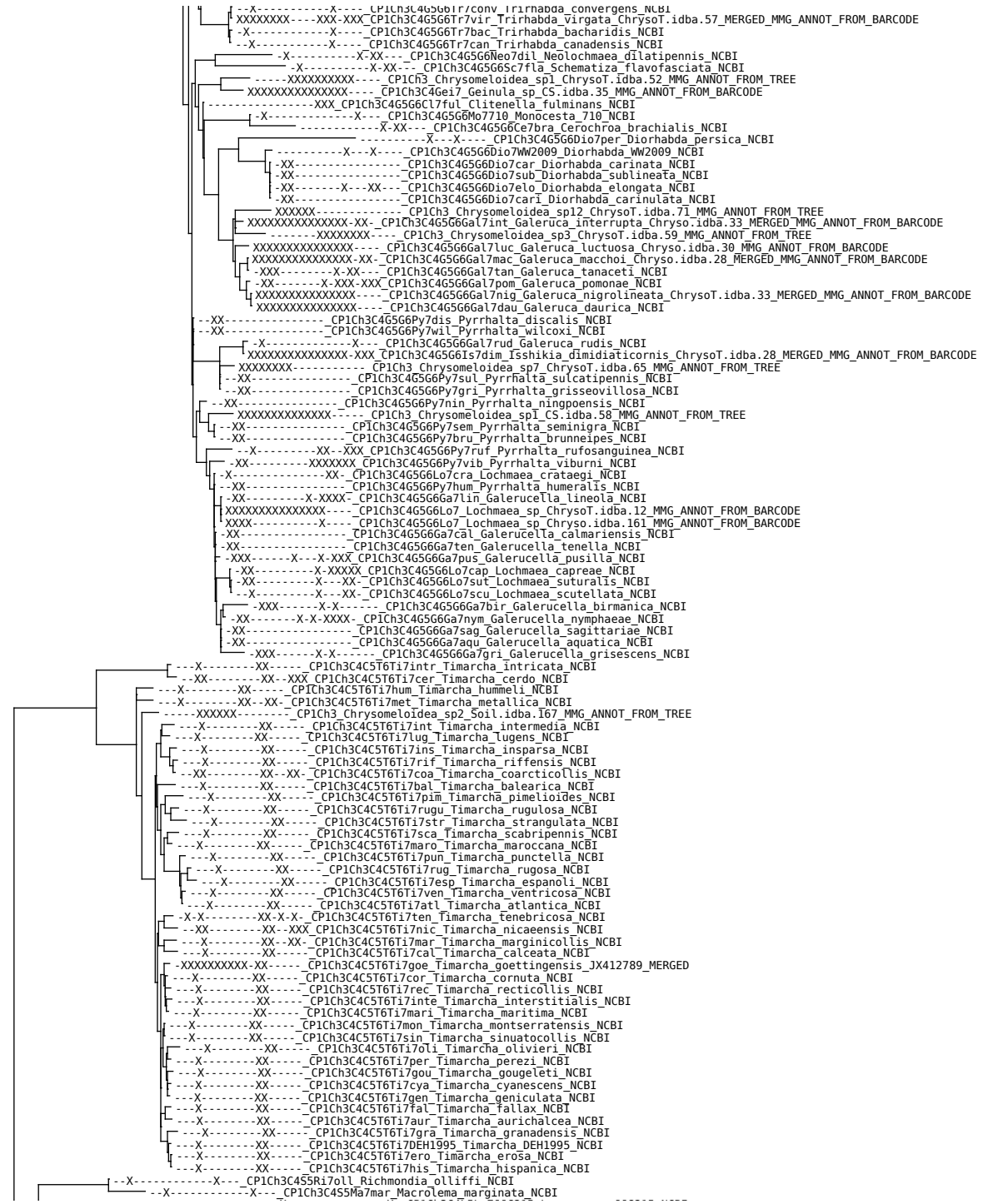
Phylogenetic tree showing relationships between various species, primarily focusing on the Chrysolinidae and Cyrtonus genera. The tree is rooted on the left and branches out to the right. Each terminal node is labeled with a species name and its corresponding NCBI accession number. The labels are preceded by a series of 'X' characters indicating the support or inclusion of that node in the analysis. The species listed include:

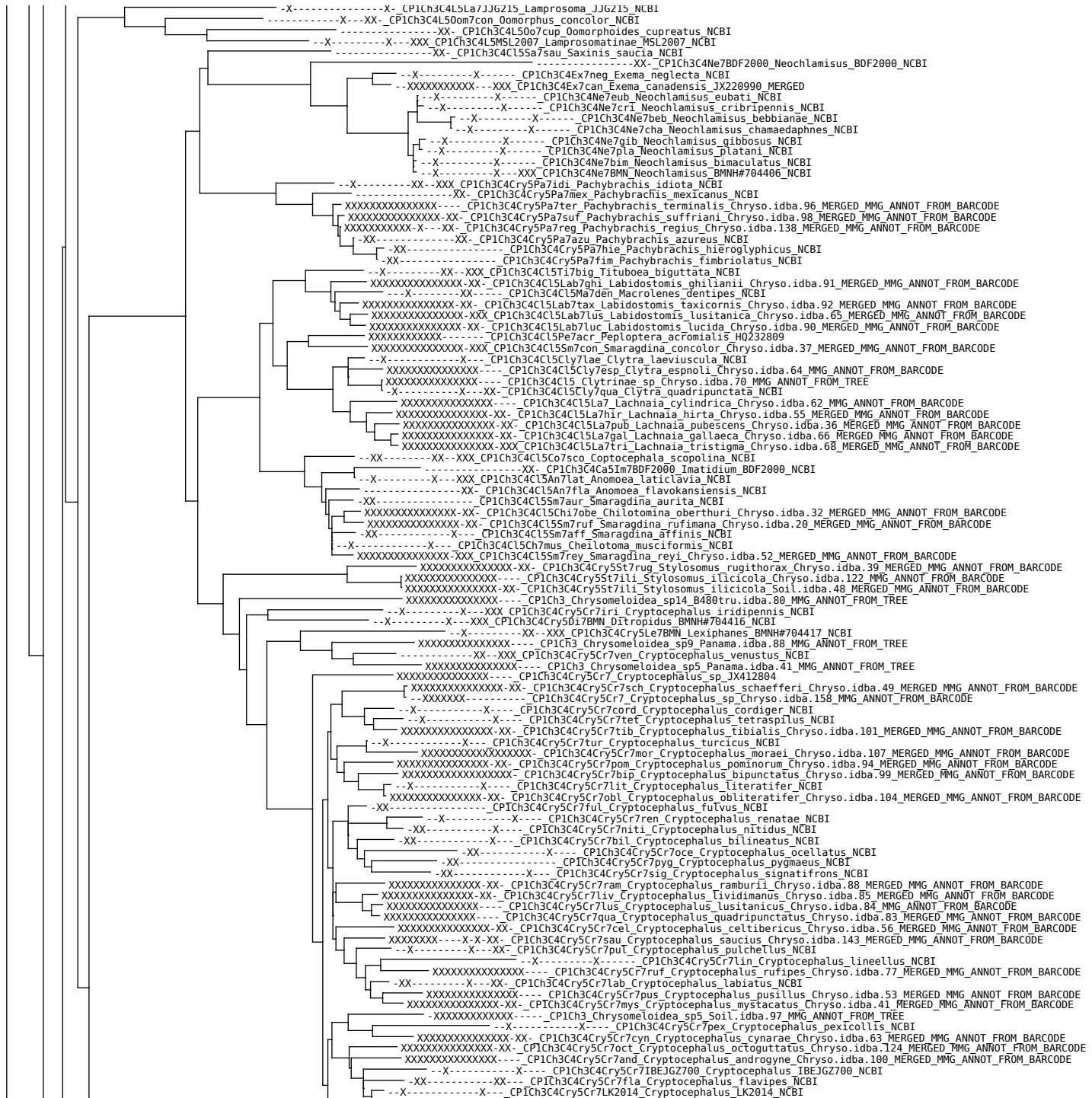
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- Chrysomelinae* BMNH#704396 NCBI
- Chrysomelidae* sp. JX412783
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- Platyphora kollari* NCBI
- Platyphora albivirens* NCBI
- Platyphora heliogenae* NCBI
- Platyphora arangoi* NCBI
- Platyphora bella* NCBI
- Platyphora haefoldi* NCBI
- Platyphora panamensis* NCBI
- Platyphora petulans* NCBI
- Platyphora boucardi* NCBI
- Platyphora spectabilis* NCBI
- Platyphora ligata* NCBI
- Platyphora opima* NCBI
- Platyphora eucosma* NCBI
- Platyphora decorata* NCBI
- Platyphora AT2001* NCBI
- Platyphora sphaerica* NCBI
- Platyphora amabilis* NCBI
- Platyphora micropsina* NCBI
- Platyphora salvigny* NCBI
- Desmogramma lunghi* NCBI
- Doryphora* BMNH#704376 NCBI
- Proseicela bivittata* NCBI
- Leptinotarsa cacica* NCBI
- Labidomera clivicollis* NCBI
- Leptinotarsa haldemani* NCBI
- Leptinotarsa decemlineata* NCBI
- Sphaerasterix* BMNH#704390 NCBI
- Ambrostoma quadrimpressum* NCBI
- Chrysolina varians* NCBI
- Chrysolina hyperici* Chryso.idba.134_MERGED_MMG_ANNOT_FROM_BARCODE
- Chrysolina brunsvicensis* NCBI
- Chrysolina quadrigemina* NCBI
- Chrysolina geminata* NCBI
- Oreina liturata* NCBI
- Oreina viridis* NCBI
- Oreina bifrons* NCBI
- Oreina gloriosa* NCBI
- Oreina variabilis* NCBI
- Oreina ganglbaueri* NCBI
- Oreina speciosa* NCBI
- Oreina alpestris* NCBI
- Oreina melanocephala* NCBI
- Oreina intricata* NCBI
- Chrysolina cerealis* NCBI
- Chrysolina fastuosa* NCBI
- Oreina bidentata* NCBI
- Oreina coerulea* NCBI
- Oreina speciosissima* NCBI
- Oreina cacaliae* NCBI
- Chrysolina bicolor* NCBI
- Oreina virgulata* NCBI
- Oreina frigida* NCBI
- Oreina elongata* NCBI
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- Chrysolina timarchoides* NCBI
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- Chrysolina coeruleans* NCBI
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- Chrysolina sanguinolenta* NCBI
- Chrysolina diluta* NCBI
- Chrysolina haemoptera* Chryso.idba.38_MERGED_MMG_ANNOT_FROM_BARCODE
- Chrysolina kuesteri* NCBI
- Chrysolina colasi* NCBI
- Chrysolina lucidicollis* NCBI
- Chrysolina aurichalcea* NCBI
- Chrysolina carnifex* NCBI
- Chrysolina curvilinea* NCBI
- Chrysolina marginata* NCBI
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- Chrysolina vernalis* Chryso.idba.25_MERGED_MMG_ANNOT_FROM_BARCODE
- Chrysolina rufoaenea* Chryso.idba.131_MERGED_MMG_ANNOT_FROM_BARCODE
- Chrysolina peregrina* NCBI
- Cyrtonus eumolpus* NCBI
- Cyrtonus plumbeus* NCBI
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- Cyrtonus fairmairei* NCBI
- Cyrtonus contractus* NCBI

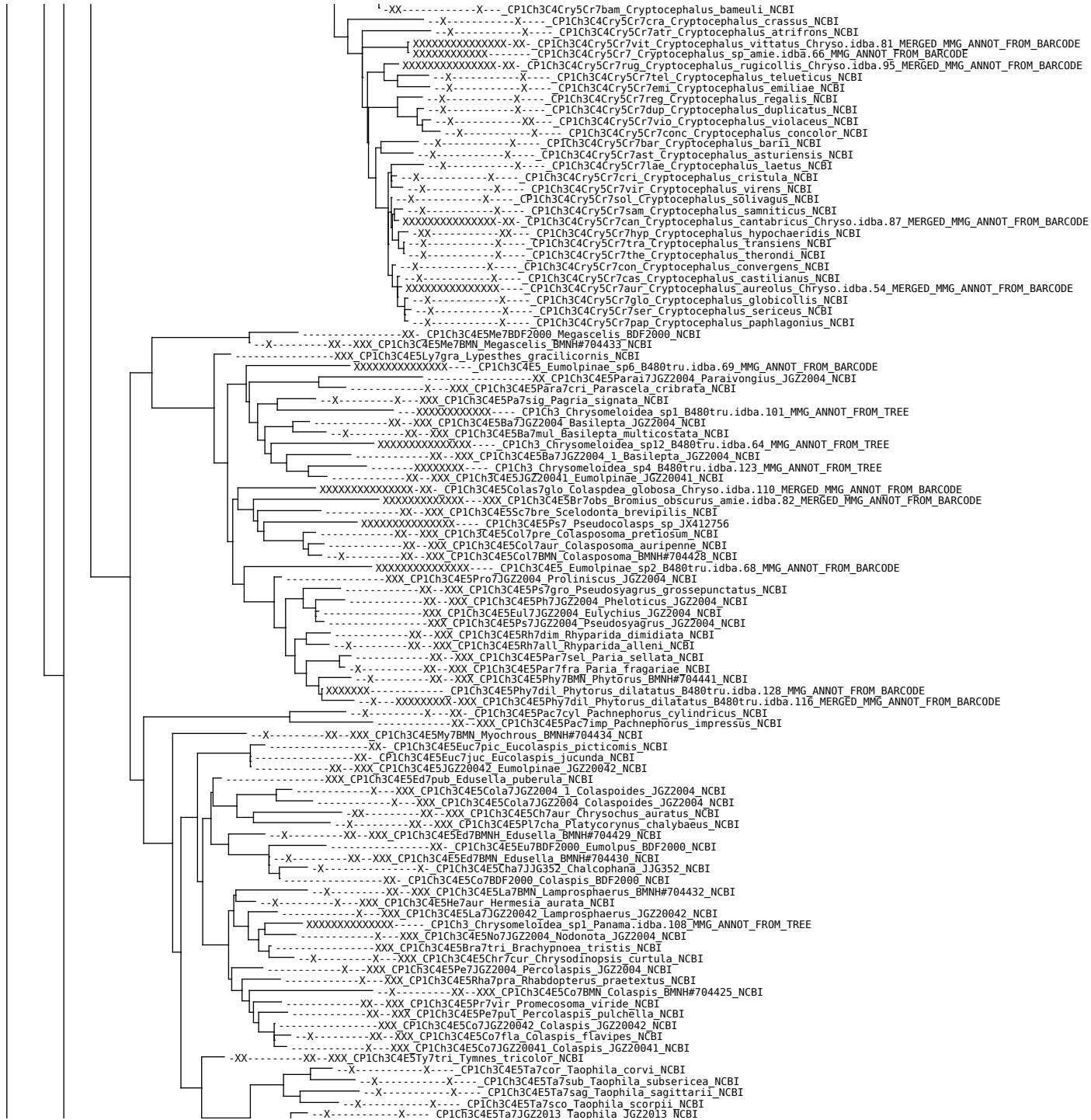
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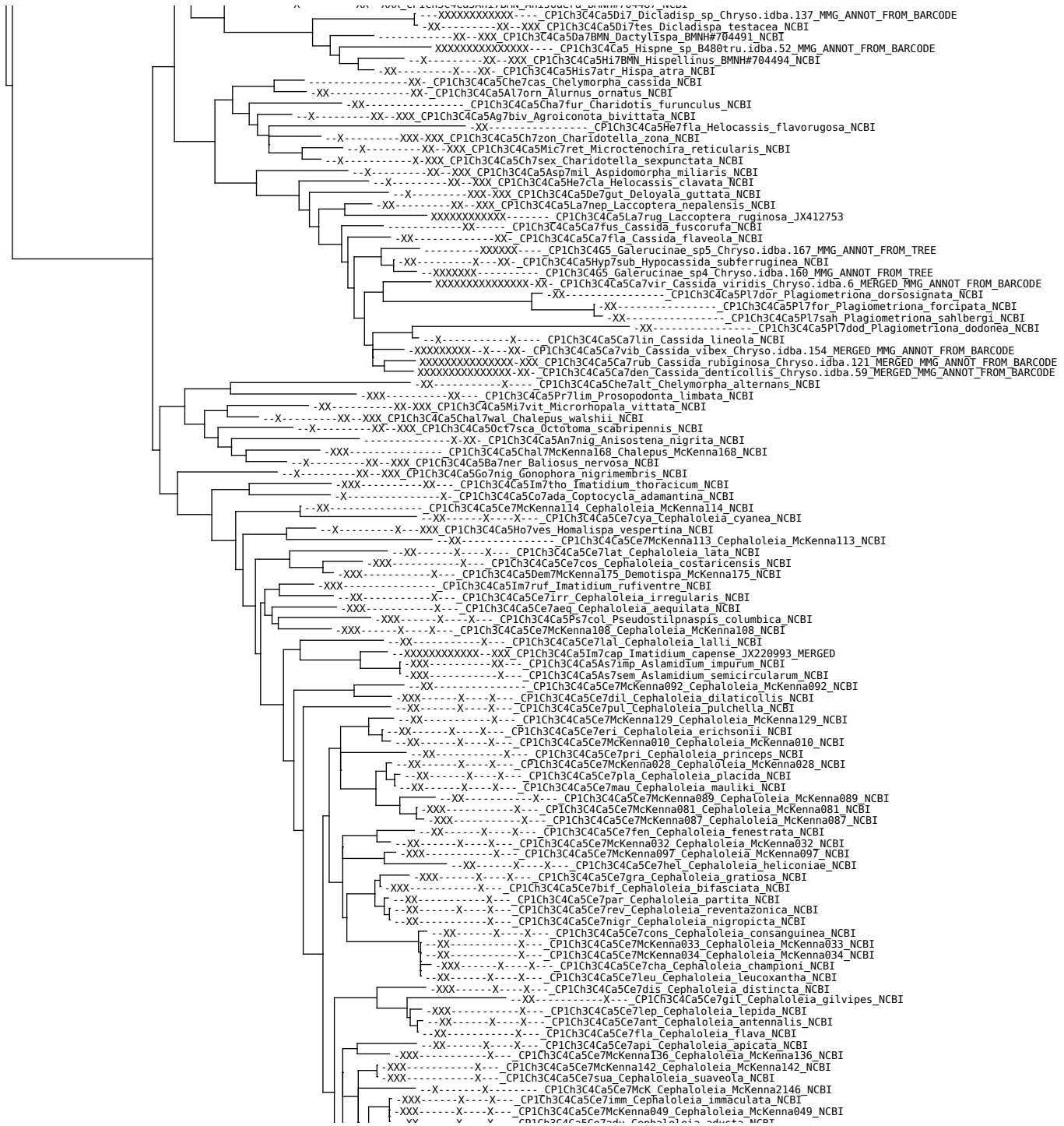
Phylogenetic tree showing relationships between various species, primarily in the order Chrysomeloidea. The tree is rooted on the left and branches out to the right. Species names are listed next to their corresponding branches, often followed by accession numbers and database identifiers. The tree is annotated with 'X' and 'XX' characters, likely indicating specific characteristics or data points for each species. The species names include various genera and species, such as Diabrotica, Galerucinae, Chrysomeloidea, and others. The tree is highly detailed, showing many sub-clades and individual species within those clades.

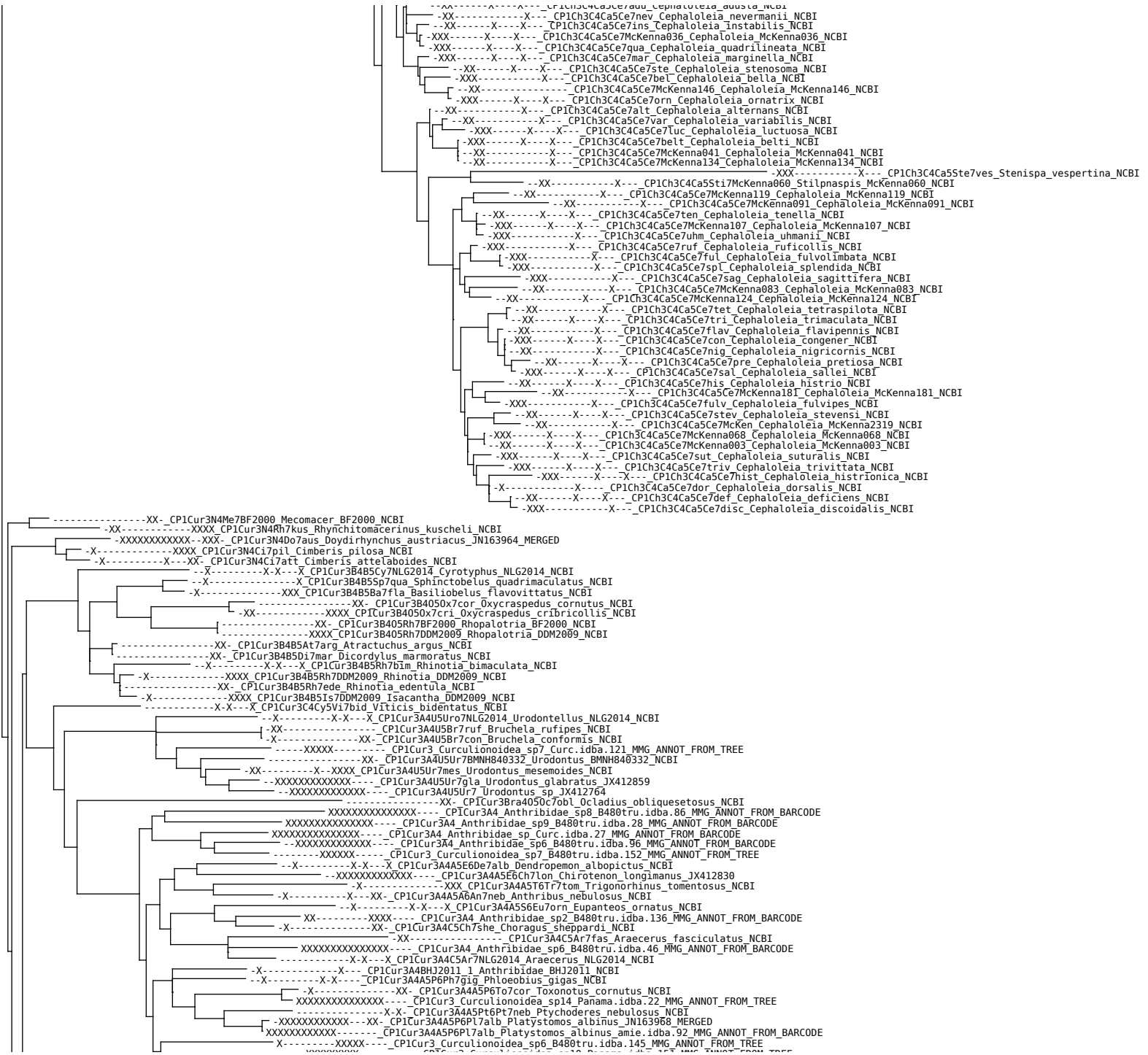






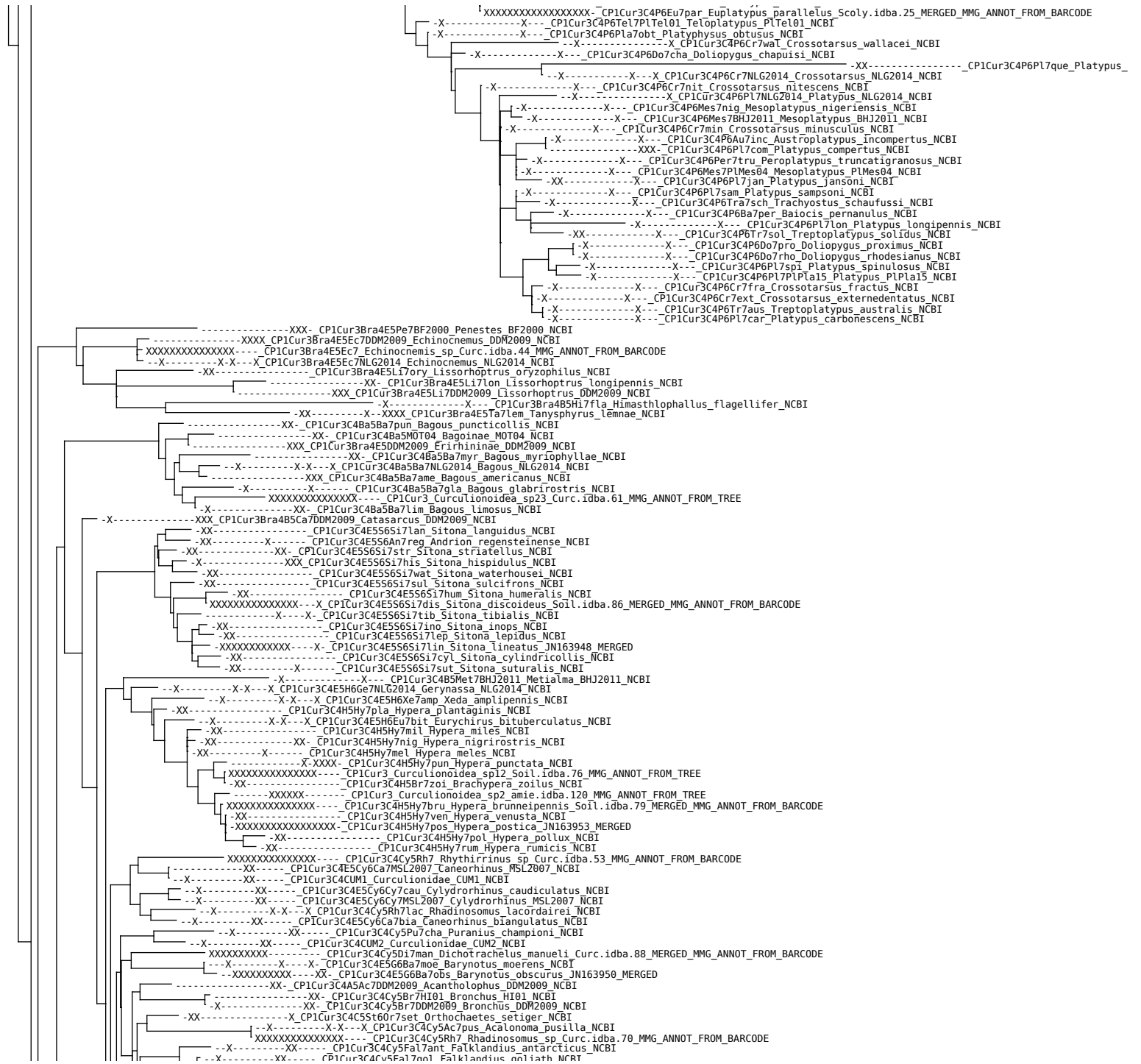




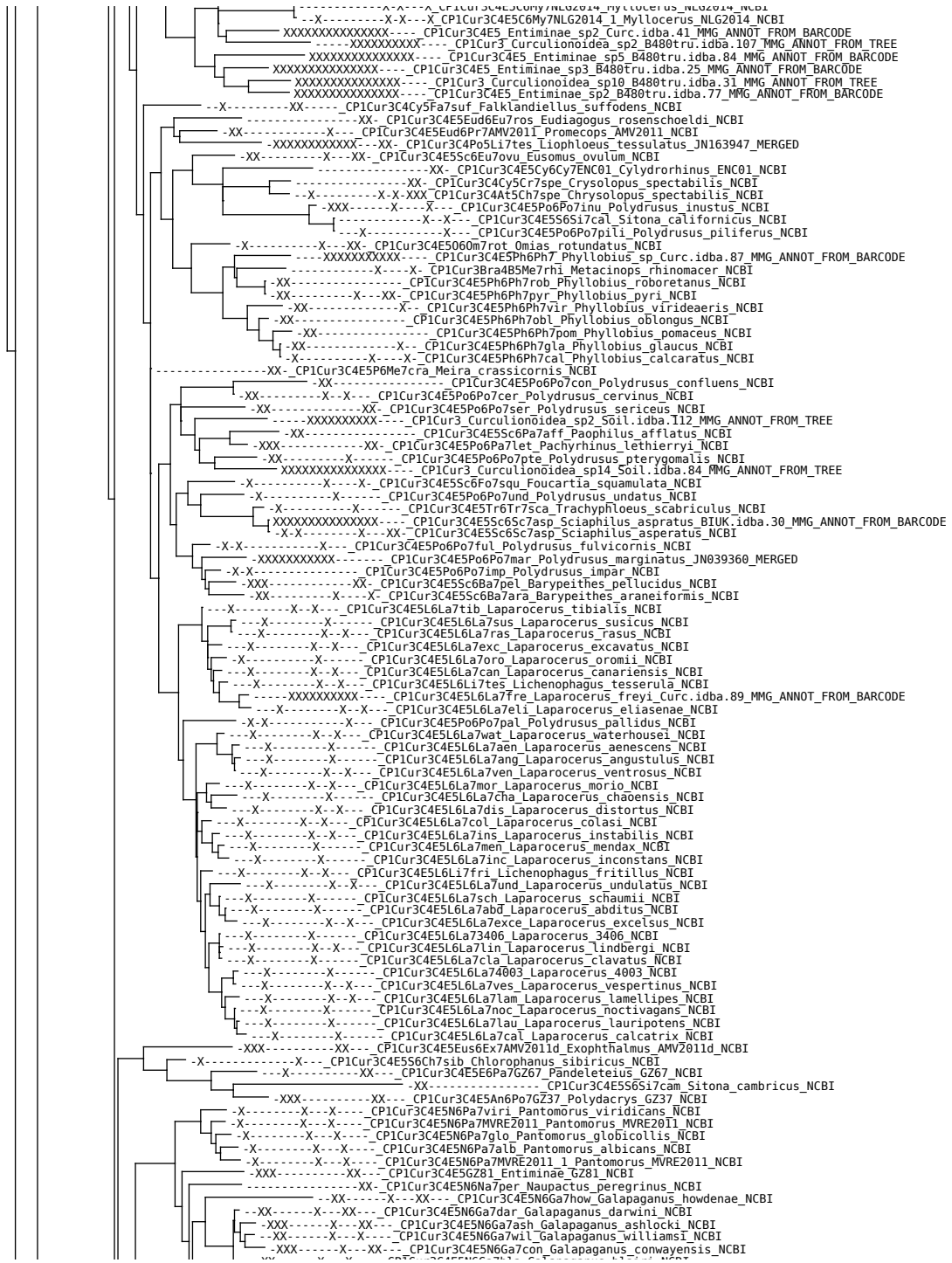




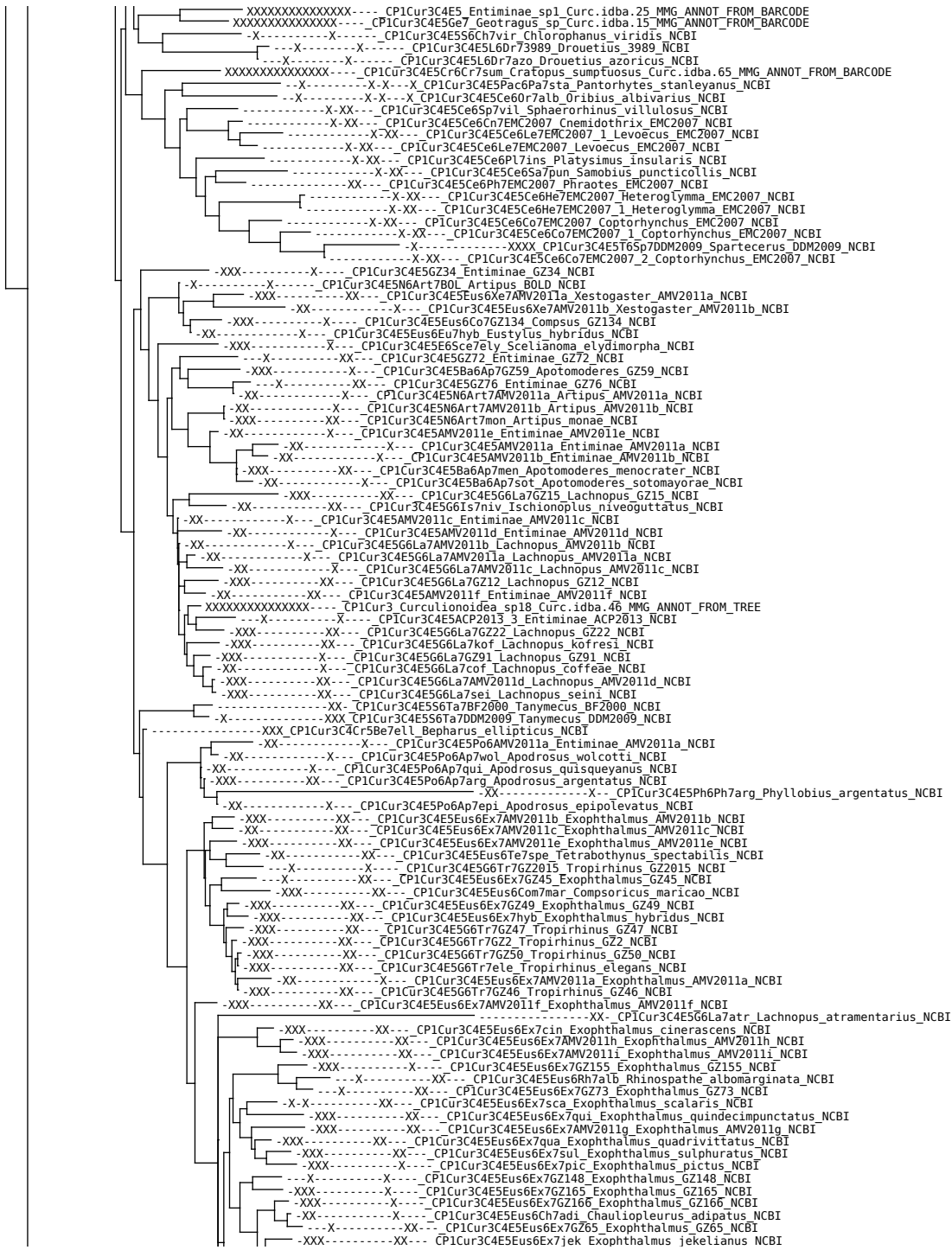




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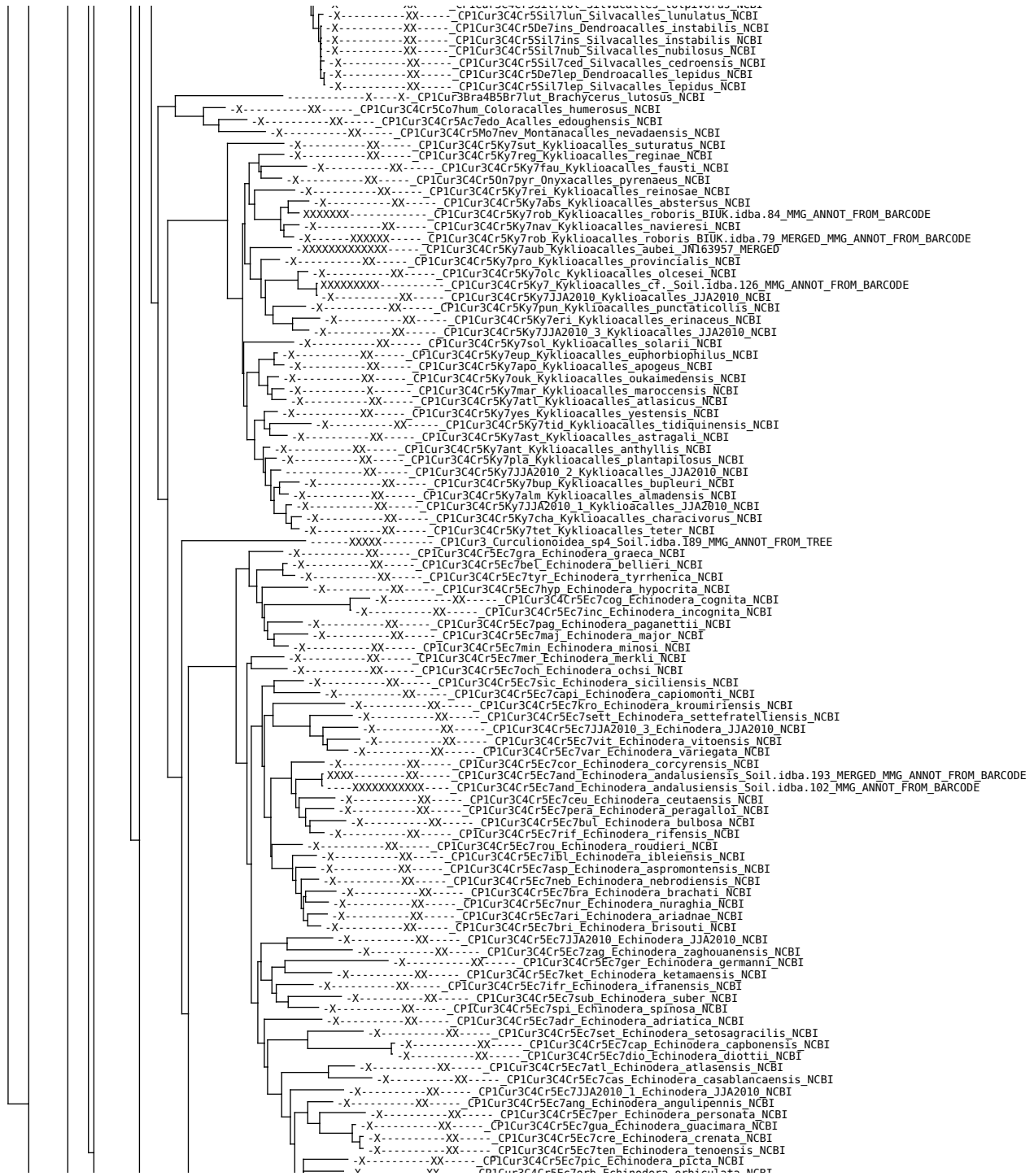


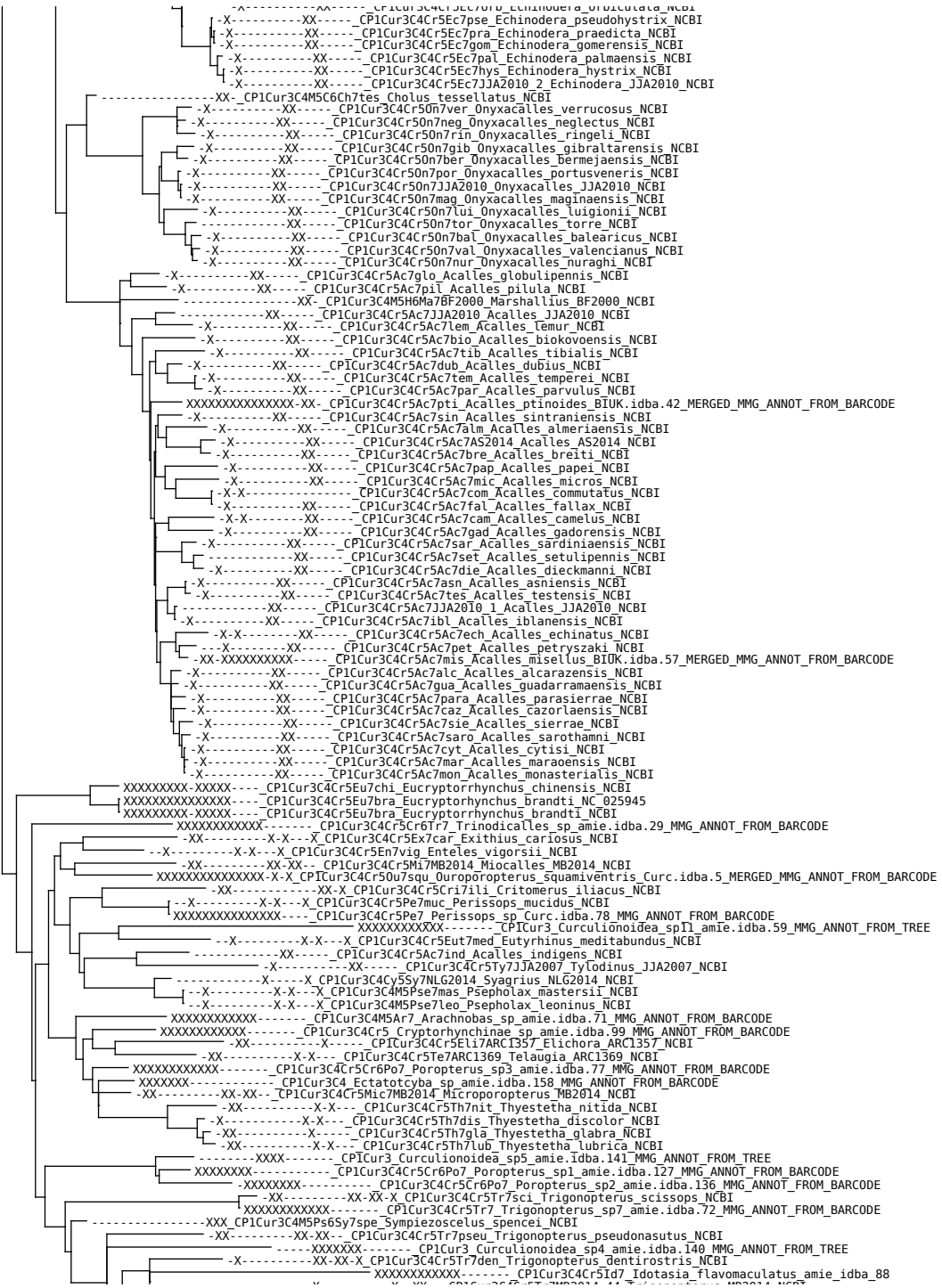
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-X-XX-----X-XX--_CP1Cur3C4E5R6Rh7opa Rhyncogonus_opacipennis_NCB1
-X-XX-----X-XX--_CP1Cur3C4E5R6Rh7cau Rhyncogonus_caudatus_NCB1
-X-XX-----X-XX--_CP1Cur3C4E5R6Rh7pec Rhyncogonus_pectoralis_NCB1
-X-XX-----X-XX--_CP1Cur3C4E5R6Rh7tube Rhyncogonus_tuberosus_NCB1
-X-XX-----X-XX--_CP1Cur3C4E5R6Rh7tub Rhyncogonus_tuberculatus_NCB1
-X-XX-----X-XX--_CP1Cur3C4E5R6Rh7ric Rhyncogonus_ricei_NCB1
-X-XX-----X-XX--_CP1Cur3C4E5R6Rh7squ Rhyncogonus_squamiger_NCB1
-X-XX-----X-XX--_CP1Cur3C4E5R6Rh7kah Rhyncogonus_kahili_NCB1
-X-----X-X-XX--_CP1Cur3C4E5R6Rh7ste Rhyncogonus_stellaris_NCB1
-X-XX-----X-XX--_CP1Cur3C4E5R6Rh7sal Rhyncogonus_saltus_NCB1
-X-XX-----X-XX--_CP1Cur3C4E5R6Rh7lah Rhyncogonus_lahaina_NCB1
-X-XX-----X-XX--_CP1Cur3C4E5R6Rh7gra Rhyncogonus_gracilis_NCB1
-X-XX-----X-XX--_CP1Cur3C4E5R6Rh7oth Rhyncogonus_othello_NCB1
-X-XX-----X-XX--_CP1Cur3C4E5R6Rh7ere Rhyncogonus_erebus_NCB1
-X-XX-----X-XX--_CP1Cur3C4E5R6Rh7ang Rhyncogonus_angustus_NCB1
-X-XX-----X-XX--_CP1Cur3C4E5R6Rh7ple Rhyncogonus_pleuralis_NCB1
-X-XX-----X-XX--_CP1Cur3C4E5R6Rh7vir Rhyncogonus_viridescens_NCB1
-X-XX-----X-XX--_CP1Cur3C4E5R6Rh7int Rhyncogonus_interstitialis_NCB1
-X-XX-----X-XX--_CP1Cur3C4E5R6Rh7alb Rhyncogonus_albipilis_NCB1
-X-XX-----X-XX--_CP1Cur3C4E5R6Rh7bre Rhyncogonus_brevis_NCB1
-X-XX-----X-XX--_CP1Cur3C4E5R6Rh7nav Rhyncogonus_navicularis_NCB1
-X-XX-----X-XX--_CP1Cur3C4E5R6Rh7oti Rhyncogonus_otiorhynchoides_NCB1
-X-XX-----X-XX--_CP1Cur3C4E5R6Rh7corv Rhyncogonus_corvus_NCB1
-X-XX-----X-XX--_CP1Cur3C4E5R6Rh7exi Rhyncogonus_aximius_NCB1
-X-XX-----X-XX--_CP1Cur3C4E5R6Rh7lat Rhyncogonus_lateralis_NCB1
-X-XX-----X-XX--_CP1Cur3C4E5R6Rh7pla Rhyncogonus_planatus_NCB1
-X-XX-----X-XX--_CP1Cur3C4E5R6Rh7ada Rhyncogonus_adamsoni_NCB1
-X-XX-----X-XX--_CP1Cur3C4E5R6Rh7mum Rhyncogonus_mumfordi_NCB1
-X-XX-----X-XX--_CP1Cur3C4E5R6Rh7och Rhyncogonus_ochraceus_NCB1
-X-XX-----X-XX--_CP1Cur3C4E5R6Rh7dup Rhyncogonus_duplex_NCB1
XXXXXXXXX-----CP1Cur3C4E5Op60p7 Ophryastes_sp_Curc.idba.114_MMG_ANNOT_FROM_BARCODE
-X-----X-CP1Cur3C4M5Ph6C17NLG2014 Cisolea_NLG2014_NCB1
XXXXXXXXXXXXX-----CP1Cur3C4E5Op60p7 Ophryastes_sp_Curc.idba.97_MMG_ANNOT_FROM_BARCODE
-X-XX-----X-XX--_CP1Cur3C4E5T6D7EMC2007_Dyslobus_EMC2007_NCB1
-X-XX-----X-XX--_CP1Cur3C4E5T6Dy7EMC2007_Dyslobus_EMC2007_NCB1
-XXX-----XX--_CP1Cur3C4E5E6Pa7AMV2011a Pandeleteius_AMV2011a_NCB1
-XX-----X---X---_CP1Cur3C4E5E6Pa7nod Pandeleteius_nodifer_NCB1











Phylogenetic tree showing relationships among various species, primarily Trigonopterus. The tree is rooted at the top left and branches downwards. Species names are listed on the right side of the tree, often followed by their NCBI accession numbers. The tree is annotated with 'X' and '-' symbols, likely indicating specific characters or states. The species names include:

- CP1Cur3C4Cr5Tr7 MB2014 44 Trigonopterus MB2014 NCBI
- CP1Cur3C4Cr5Tr7 Trigonopterus sp2 amie.idba.35 MMG_ANNOT_FROM_BARCODE
- CP1Cur3C4Cr5Tr7 Trigonopterus sp9 amie.idba.84 MMG_ANNOT_FROM_BARCODE
- CP1Cur3C4Cr5Tr7 MB2014 39 Trigonopterus MB2014 NCBI
- CP1Cur3C4Cr5Tr7 MB2014 40 Trigonopterus MB2014 NCBI
- CP1Cur3C4Cr5Tr7 Trigonopterus sp3 amie.idba.37 MMG_ANNOT_FROM_BARCODE
- CP1Cur3C4Cr5Tr7 Trigonopterus sp4 amie.idba.46 MMG_ANNOT_FROM_BARCODE
- CP1Cur3C4Cr5Tr7 MB2014 42 Trigonopterus MB2014 NCBI
- CP1Cur3C4Cr5Tr7 Trigonopterus sp1 amie.idba.17 MMG_ANNOT_FROM_BARCODE
- CP1Cur3C4Cr5Tr7 MB2014 45 Trigonopterus MB2014 NCBI
- CP1Cur3C4Cr5Tr7 MB2011 45 Trigonopterus MB2011 NCBI
- CP1Cur3C4Cr5Tr7 dro Trigonopterus dromedarius NCBI
- CP1Cur3C4Cr5Tr7 Trigonopterus sp6 amie.idba.51 MMG_ANNOT_FROM_BARCODE
- CP1Cur3C4Cr5Tr7 Trigonopterus sp8 amie.idba.81 MMG_ANNOT_FROM_BARCODE
- CP1Cur3C4Cr5Tr7 MB2011 139 Trigonopterus MB2011 NCBI
- CP1Cur3C4Cr5Tr7 Trigonopterus sp5 amie.idba.49 MMG_ANNOT_FROM_BARCODE
- CP1Cur3C4Cr5Tr7 dur Trigonopterus durus NCBI
- CP1Cur3C4Cr5Tr7 MB2014 32 Trigonopterus MB2014 NCBI
- CP1Cur3C4Cr5Tr7 MB2011 171 Trigonopterus MB2011 NCBI
- CP1Cur3C4Cr5Tr7 vel Trigonopterus velaris NCBI
- CP1Cur3C4Cr5Tr7 MB2011 58 Trigonopterus MB2011 NCBI
- CP1Cur3C4Cr5Tr7 line Trigonopterus lineatus NCBI
- CP1Cur3C4Cr5Tr7 sul Trigonopterus sulcatus NCBI
- CP1Cur3C4Cr5Tr7 van Trigonopterus vandekampi NCBI
- CP1Cur3C4Cr5Tr7 dis Trigonopterus discoidalis NCBI
- CP1Cur3C4Cr5Tr7 MB2011 154 Trigonopterus MB2011 NCBI
- CP1Cur3C4Cr5Tr7 sch Trigonopterus scharfi NCBI
- CP1Cur3C4Cr5Tr7 MB2014 50 Trigonopterus MB2014 NCBI
- CP1Cur3C4Cr5Tr7 zyg Trigonopterus zygops NCBI
- CP1Cur3C4Cr5Tr7 ere Trigonopterus eremitus NCBI
- CP1Cur3C4Cr5Tr7 MB2011 3 Trigonopterus MB2011 NCBI
- CP1Cur3C4Cr5Tr7 MB2011 1 Trigonopterus MB2011 NCBI
- CP1Cur3C4Cr5Tr7 MB2011 4 Trigonopterus MB2011 NCBI
- CP1Cur3C4Cr5Tr7 MB2011 5 Trigonopterus MB2011 NCBI
- CP1Cur3C4Cr5Tr7 MB2011 2 Trigonopterus MB2011 NCBI
- CP1Cur3C4Cr5Tr7 gra Trigonopterus granum NCBI
- CP1Cur3C4Cr5Tr7 lin Trigonopterus lineellus NCBI
- CP1Cur3C4Cr5Tr7 MB2014 37 Trigonopterus MB2014 NCBI
- CP1Cur3C4Cr5Tr7 fer Trigonopterus ferrugineus NCBI
- CP1Cur3C4Cr5Tr7 rhi Trigonopterus rhinoceros NCBI
- CP1Cur3C4Cr5Tr7 kur Trigonopterus kurulu NCBI
- CP1Cur3C4Cr5Tr7 MB2011 20 Trigonopterus MB2011 NCBI
- CP1Cur3C4Cr5Tr7 tri Trigonopterus tridentatus NCBI
- CP1Cur3C4Cr5Tr7 tib Trigonopterus tibialis NCBI
- CP1Cur3C4Cr5Tr7 MB2014 51 Trigonopterus MB2014 NCBI
- CP1Cur3C4Cr5Tr7 MB2011 118 Trigonopterus MB2011 NCBI
- CP1Cur3C4Cr5Tr7 inf Trigonopterus inflatus NCBI
- CP1Cur3C4Cr5Tr7 aene Trigonopterus aeneipennis NCBI
- CP1Cur3C4Cr5Tr7 MB2014 43 Trigonopterus MB2014 NCBI
- CP1Cur3C4Cr5Tr7 MB2014 38 Trigonopterus MB2014 NCBI
- CP1Cur3C4Cr5Tr7 MB2014 22 Trigonopterus MB2014 NCBI
- CP1Cur3C4Cr5Tr7 MB2014 53 Trigonopterus MB2014 NCBI
- CP1Cur3C4Cr5Tr7 MB2014 21 Trigonopterus MB2014 NCBI
- CP1Cur3C4Cr5Tr7 MB2014 16 Trigonopterus MB2014 NCBI
- CP1Cur3C4Cr5Tr7 MB2014 14 Trigonopterus MB2014 NCBI
- CP1Cur3C4Cr5Tr7 MB2014 26 Trigonopterus MB2014 NCBI
- CP1Cur3C4Cr5Tr7 MB2014 28 Trigonopterus MB2014 NCBI
- CP1Cur3C4Cr5Tr7 MB2014 23 Trigonopterus MB2014 NCBI
- CP1Cur3C4Cr5Tr7 MB2014 52 Trigonopterus MB2014 NCBI
- CP1Cur3C4Cr5Tr7 MB2014 41 Trigonopterus MB2014 NCBI
- CP1Cur3C4Cr5Tr7 MB2014 24 Trigonopterus MB2014 NCBI
- CP1Cur3C4Cr5Tr7 MB2014 20 Trigonopterus MB2014 NCBI
- CP1Cur3C4Cr5Tr7 MB2014 49 Trigonopterus MB2014 NCBI
- CP1Cur3C4Cr5Tr7 MB2014 19 Trigonopterus MB2014 NCBI
- CP1Cur3C4Cr5Tr7 MB2014 18 Trigonopterus MB2014 NCBI
- CP1Cur3C4Cr5Tr7 MB2014 47 Trigonopterus MB2014 NCBI
- CP1Cur3C4Cr5Tr7 MB2014 17 Trigonopterus MB2014 NCBI
- CP1Cur3C4Cr5Tr7 MB2014 46 Trigonopterus MB2014 NCBI
- CP1Cur3C4Cr5Tr7 MB2014 48 Trigonopterus MB2014 NCBI
- CP1Cur3C4Cr5Tr7 MB2014 33 Trigonopterus MB2014 NCBI
- CP1Cur3C4Cr5Tr7 MB2014 31 Trigonopterus MB2014 NCBI
- CP1Cur3C4Cr5Tr7 MB2014 9 Trigonopterus MB2014 NCBI
- CP1Cur3C4Cr5Tr7 MB2014 10 Trigonopterus MB2014 NCBI
- CP1Cur3C4Cr5Tr7 MB2014 12 Trigonopterus MB2014 NCBI
- CP1Cur3C4Cr5Tr7 MB2014 15 Trigonopterus MB2014 NCBI
- CP1Cur3C4Cr5Tr7 MB2014 27 Trigonopterus MB2014 NCBI
- CP1Cur3C4Cr5Tr7 MB2014 Trigonopterus MB2014 NCBI
- CP1Cur3C4Cr5Tr7 MB2014 36 Trigonopterus MB2014 NCBI
- CP1Cur3C4Cr5Tr7 MB2014 2 Trigonopterus MB2014 NCBI
- CP1Cur3C4Cr5Tr7 MB2014 1 Trigonopterus MB2014 NCBI
- CP1Cur3C4Cr5Tr7 MB2014 13 Trigonopterus MB2014 NCBI
- CP1Cur3C4Cr5Tr7 MB2014 25 Trigonopterus MB2014 NCBI
- CP1Cur3C4Cr5Tr7 MB2014 7 Trigonopterus MB2014 NCBI
- CP1Cur3C4Cr5Tr7 MB2014 3 Trigonopterus MB2014 NCBI
- CP1Cur3C4Cr5Tr7 MB2014 11 Trigonopterus MB2014 NCBI
- CP1Cur3C4Cr5Tr7 MB2014 6 Trigonopterus MB2014 NCBI
- CP1Cur3C4Cr5Tr7 MB2014 5 Trigonopterus MB2014 NCBI
- CP1Cur3C4Cr5Tr7 MB2014 35 Trigonopterus MB2014 NCBI
- CP1Cur3C4Cr5Tr7 MB2014 34 Trigonopterus MB2014 NCBI
- CP1Cur3C4Cr5Tr7 MB2014 8 Trigonopterus MB2014 NCBI
- CP1Cur3C4Cr5Tr7 MB2014 4 Trigonopterus MB2014 NCBI
- CP1Cur3C4M5 Molytinae sp2 Curc.idba.76 MMG_ANNOT_FROM_BARCODE
- CP1Cur3C4M5L16Se7 Seleuca sp amie.idba.25 MMG_ANNOT_FROM_BARCODE
- CP1Cur3C4S5Micr7BHJ2011 Microborus BHJ2011 NCBI
- CP1Cur3C4B5BHJ2011 2 Baridinae BHJ2011 NCBI
- CP1Cur3C4B5 LobotracheLnl1 sp1 Curc.idba.68 MMG_ANNOT_FROM_BARCODE
- CP1Cur3C4B5 CurcLobotracheLnl1 sp1 Curc.idba.122 MMG_ANNOT_FROM_TREE
- CP1Cur3C4B5BHJ2011 1 Baridinae BHJ2011 NCBI
- CP1Cur3C4B5Ho7BHJ2011 Homoeometamelus BHJ2011 NCBI
- CP1Cur3C4Cr5 Cryptorhynchinae sp8 B480tru.idba.138 MMG_ANNOT_FROM_BARCODE

