universität wien

MASTERARBEIT / MASTER'S THESIS

Titel der Masterarbeit / Title of the Master's Thesis

„Testing methods of species delimitation with tiger moth samples from a diverse Neotropical lowland rainforest"

verfasst von / submitted by

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angestrebter akademischer Grad / in partial fulfilment of the requirements for the degree of

Master of Science (MSc)

Wien, 2019 / Vienna 2019

Studienkennzahl lt. Studienblatt / degree programme code as it appears on the student record sheet:	UA 066 833
Studienrichtung lt. Studienblatt / degree programme as it appears on the student record sheet:	Masterstudium Ecology and Ecosystems
Betreut von / Supervisor:	Univ.-Prof. Mag. Dr. Konrad Fiedler

Danksagung

An dieser Stelle möchte ich mich zuallererst bei Prof. Konrad Fiedler, Patrick Strutzenberger und Brigitte Gottsberger für die Möglichkeit, diese Masterarbeit durchzuführen und die großartige Betreuung herzlich bedanken! Ein großer Dank geht auch an Dominik Rabl und Florian Bodner, dass ich eure Falter für diese Arbeit verwenden durfte. In den letzten Monaten konnte ich sehr viel dazulernen und zahlreiche Einblicke in die Arbeitsgruppe nehmen. Ich bin auch sehr dankbar dafür, dass ihr mich alle so herzlich aufgenommen habt und speziell die Mittagessen und unsere Zusammenkünfte auf der Dachterrasse werde ich vermissen.

Weiters möchte ich mich bei meinen Eltern Gernot und Brigitta, meiner Schwester Melanie und meinen Großeltern Adelheid, Klara und Dieter für die unaufhörliche Unterstützung bedanken, ohne euch wäre für mich vieles nicht möglich gewesen. Ein weiterer Dank geht an meine liebe Freundin Micky, ohne dich hätte mein Masterstudium und meine bisherige Zeit in Wien viel weniger Spaß gemacht.

Zu guter Letzt möchte ich mich noch bei meinem Freund Christian bedanken. Danke für deine Geduld, deine wunderbare Familie und alles, was du für mich gemacht hast, ich liebe dich.

Abstract

Lepidoptera are one of the most species-rich insect orders worldwide, and in the tropics their diversity is especially high, yet many species are still unknown to science. Identifying animals traditionally has relied on morphological traits, which can be a challenging procedure. Therefore, molecular methods to facilitate the recognition of species were developed. One of the most popular approaches is called DNA barcoding, where short mitochondrial DNA sequences are analyzed and compared to distinguish between operational taxonomic units (OTUs), a tentative proxy for species. This study focused on the genus *Eucereon* (Erebidae, Arctiinae) with currently more than 150 described species, which are often hard to distinguish by means of external morphology. Their geographic distribution ranges from the southernmost United States of America over Central America to the east coast of Brazil at elevations from sea level to up to more than 2000 m a.s.l. Exploring possible larval food plants revealed a tendency to a narrow food specialization on poisonous and milky sap-containing plants, potentially supplemented by adult pharmacophagy. In total, 138 novel DNA sequences of presumed *Eucereon* specimens collected in Costa Rica, Panama and Ecuador were successfully generated for this study. Several state-of-the-art methods for sequence based species delimitation, namely BIN, 2% threshold clustering, ABGD, GMYC and bPTP, were applied to arrive at hypotheses about species boundaries and their performance was compared. The results indicate a high degree of concordance between morphology-based species delimitation and clustering methods based on DNA sequences. The morphological sorting resulted in 40 morphospecies, while the molecular approach generated between 42 and 45 OTUs; none of the algorithms outperformed all other methods. Furthermore, haplotype networks for nine BINs were created and phylogeographic analyses performed. No consistent pattern was found, as these BINs differ substantially in their intraspecific genetic variance. The genus *Eucereon* never underwent any formal taxonomic revision, therefore the delimitation of the genus was also examined. 89 potential members were recognized among taxa represented in the global BOLD database, based on a combination of wing pattern and molecular data. These results indicate that several moth species that are currently affiliated to eight different nominal genera should be included within *Eucereon*, but further research is needed in order to better support this hypothesis.

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1. Introduction

Lepidoptera, butterflies and moths, are one of the biggest insect orders worldwide with more than 150,000 described species (Van Nieukerken et al., 2011) and an estimated number of up to 500,000 species (Kristensen et al., 2007). Especially in tropical rainforests the diversity of butterflies and moths is high, but many or even most of the species are still unknown to science or at least have not yet been described in taxonomic terms. For example, two studies on Geometridae, a species-rich moth family occurring worldwide, conducted in an Andean rain forest in southern Ecuador found around a third of all sampled species to be undescribed (Brehm et al., 2005) and reported an increase of species richness of 80% in comparison to an earlier study in exactly the same region (Brehm et al., 2016). Brito et al. (2016) even predicted that almost 96% of all species of the leaf-miner moth family Gracillariidae in the Neotropics are still undescribed.

Traditionally, the common method for identifying animals and plants is based on morphology. But describing and identifying species morphologically can be time-consuming and challenging due to a lack of distinct morphological differences, especially in species-rich taxa like insects. Furthermore, an unknown extent of intraspecific phenotypic plasticity, sexual dimorphism, the occurrence of hitherto overlooked cryptic taxa, and the decreasing number of taxonomic specialists often times constrain the chances to correctly identify a species from a field sample (Hebert et al., 2003a). In order to facilitate and accelerate the recognition of species, genetic approaches have been established. These approaches allocate samples to operational taxonomic units (OTUs) by means of sequence similarities. These OTUs then can serve as a tentative proxy for biological species, in much the same way as multivariate measurements of morphological traits have been used to classify samples into “morphospecies” (Oliver & Beattie, 1996; Derraik et al., 2002).

1.1 DNA barcoding

Genetic methods for classifying and identifying microorganisms were first developed more than 40 years ago, focusing on the 16S ribosomal RNA in bacteria (Fox et al., 1977). Within the last two decades similar approaches were established for animals, fungi and plants. One of the most popular approaches nowadays for identifying animals is called DNA barcoding (Hebert et al., 2003a), where ideally each species receives its own “barcode”, with which specimens can be confidently identified based on one diagnostic DNA sequence.

DNA barcoding also allows manifold practical applications, for example it can help determining the diet of animals according to their gut content or even feces (Soininen et al., 2009). Furthermore, it can help detecting illegal trade of animals and parts of them like turtle meat and eggs (Vargas et al., 2009) or shark fins (Abercrombie et al., 2018), or uncover mislabeled seafood sold at commercial markets (Wong & Hanner, 2008). One particularly useful application in ecological research is the matching of morphologically unidentifiable life-cycle stages of organisms, such as eggs, larvae or pupae in case of insects, to their actual species (Gossner & Hausmann, 2009; Strutzenberger et al., 2011; Andric et al., 2014).

1.2 Cytochrome c oxidase subunit I

In animals, usually the gene coding for the enzyme cytochrome c oxidase subunit I (COI) is analyzed for the purpose of DNA barcoding (Hebert et al., 2003a). COI is a mitochondrial (mt) gene with a length of around 1500 base pairs (bp). The part relevant for standard barcoding is 648 bp long (Hebert et al., 2003a). Mitochondrial genes have several advantages for DNA-barcoding, like the lack of introns, limited recombination, haploidy and maternal inheritance (Saccone et al., 1999). Also, in each cell a large number of mitochondria can be found, so even if samples are not well preserved, DNA extraction is often still successful. For example, Hajibabaei et al. (2006b) were still able to generate short COI sequences from up to two decades old museum specimens with a success rate of more than 90%, even though the DNA was already degraded. Strutzenberger et al. (2012) could even generate sequences from more than 100 years old specimens. Furthermore, the evolutionary rate of COI is quite high, which allows a discrimination of closely related species and may even reveal phylogeographic differences within one species (Knowlton & Weigt, 1998; Cox & Hebert, 2001; Wares & Cunningham, 2001). Yet there are also disadvantages of this approach, for example using the gene COI seems to be inadequate to distinguish between recently diverged species (Kaila & Ståhls, 2006; Wiemers & Fiedler, 2007; Van Velzen et al., 2012). Furthermore, *Wolbachia*, a genus of parasitic bacteria, is very common and widespread in arthropods (Werren, 1997) and is known to alter mtDNA of its hosts through introgressions; accordingly, identifying species based on DNA barcoding might fail (Whitworth et al., 2007). Another weakness of this approach is the fact that in bisexual organisms the role of half of the population contributing to gene flow and evolution is simply ignored due to focusing on maternal inheritance alone (Rubinoff et al., 2006).

To obtain COI sequences, DNA is extracted from tissue of a sample, amplified through polymerase chain reaction (PCR) and as last step the amplified DNA fragment is sequenced. The generated sequences can then be compared to sequences already

stored in global databases to assess whether the "new" sample can be allocated to a clade already represented in that very database. One of the biggest databases for DNA barcodes is the Barcode of Life Data Systems (BOLD, http://www.boldsystems.org/) (Ratnasingham & Hebert, 2007). Detailed instructions on the sequencing process and uploading of newly generated sequences to BOLD can be found in Kress & Erickson (2012).

Besides the BOLD database for barcodes, other databases are also available, like GenBank (https://www.ncbi.nlm.nih.gov/genbank/), which is a collection of all publicly available DNA sequences (Benson et al., 2008). With the Basic Local Alignment Search Tool (BLAST, https://blast.ncbi.nlm.nih.gov/Blast.cgi/) focal sequences can be compared to all sequences stored in GenBank.

1.3 Species delimitation

For describing the biodiversity of a certain area, usually the number of species is used as an important community attribute. Yet one obstacle regarding biodiversity estimates in general is the fact that there is no universally accepted definition of the term "species", as lots of different, varying species concepts exist (Mallet, 2006). In ecology and zoology mostly the biological species concept is applied (Mayr, 1942). It states that only individuals within a species can produce viable and fertile offspring, while this is not possible between members of different species. However, the biospecies concepts needs to be adjusted in cases of introgression between gene pools or where hybridization is even a regular means of speciation (reticulate evolution (Pérez et al., 2010)). DNA barcoding provides a different, more phenetic approach for species delimitation.

1.3.1 Species delimitation using barcodes

The basic idea of species delimitation or identification through DNA barcoding is that, while within and among species some differences in the sequences of the marker gene may occur, usually intraspecific divergences are substantially lower than interspecific differences (Hebert et al., 2003a). This results in the so-called "barcoding gap", which can be used to discriminate species, though its existence is not yet universally confirmed (Wiemers & Fiedler, 2007), as often an overlap of intra- and interspecific differences can be observed (Meyer & Paulay, 2005). Furthermore, it is not possible to define a universal threshold distance applicable to all taxa (Hebert et al., 2003b; Candek & Kuntner, 2015). For example, Puillandre et al. (2012) found a 3% divergence threshold for birds and Sphingidae (a family of moths), more than 8% in Cladocera (an order of Crustacea), and even more than 10% in Amphibians, using the Kimura-2-parameter-distance model

(K2P) (Kimura, 1980). A threshold of 2% divergence (K2P) has frequently found to be practicable to indicate species boundaries in Lepidoptera (Hausmann et al., 2011; Mutanen et al., 2012; Simonsen et al., 2019). Detecting the "correct" threshold is therefore crucial, as a lower threshold can lead to an oversplitting of species/OTUs, whereas a too high threshold can lead to a merging of lineages that are in "reality" distinct from another (Ratnasingham & Hebert, 2013). Hence, finding the "optimal" threshold is essential to control for the rate of false positives (oversplitting) as well as false negatives (viz. overlooking cryptic biodiversity).

By use of DNA-barcodes, Hebert et al. (2004) detected that the Neotropical skipper butterfly *Astraptes fulgerator*, formerly considered as one species based on morphological traits of adult stages, is actually a complex of up to ten species. This complex seems to comprise several cryptic species, where only the larvae differ in morphology and in their food plants. But this study has subsequently been challenged and probably the complex consists of no more than six or seven species (Brower, 2006, 2010). On the other hand, Mutanen et al. (2015) showed that a complex of eight putative "species" in the moth genus *Elachista* actually represents just one single, phenotypically variable species.

Traditionally, distance-based clustering methods are used for species delimitation based on barcodes, like neighbor-joining trees (Saitou & Nei, 1987) or the Unweighted Pair Group Method with Arithmetic means (UPGMA) (Sokal & Michener, 1958). But there are also many alternative methods available to recognize species boundaries based on barcode data, for example elaborating in the concepts of maximum likelihood or maximum parsimony. Some of these approaches are briefly described below.

1.3.2 Barcode Index Number

Based on the nucleotide sequence variation of the COI gene, the Barcode Index Number (BIN) system was developed and implemented in BOLD (Ratnasingham & Hebert, 2013). The BIN system contains an algorithm to assign individuals to presumptive "species", or rather OTUs, where each OTU receives its own unique BIN-code in the BOLD database. The assignment occurs after several steps, first through single linkage clustering initial OTU boundaries are generated and afterwards a refinement of these boundaries using Markov clustering takes place. Detailed information on the algorithm, the BIN implementation in BOLD, the BIN web pages and the quality checks of the uploaded sequences to BOLD were described by Ratnasingham & Hebert (2013).

1.3.3 Automatic Barcode Gap Discovery

The Automatic Barcode Gap Discovery (ABGD) is an algorithm using pairwise distances to automatically calculate and identify the barcode gap (Puillandre et al., 2012). It sorts the DNA sequences of a sample into groups (OTUs) by partitioning the data set based on ranked pairwise distances. It computes an initial partition, based on a function of the population mutation rate, which is estimated from the data set by the algorithm, and a threshold P, the prior maximum intraspecific divergence. P is by default a value within the range of 0.001 to 0.1. Then the calculations are recursively applied to the OTUs of the initial partition, until no further splitting of the groups occurs. To calculate the pairwise distances between sequences either K2P or the Jukes-Cantor model (JC69) (Jukes & Cantor, 1969) can be chosen. As result, several partitions for the range of priors and the corresponding OTUs are calculated. Overall, ABGD is an easy to use and efficient algorithm, even big datasets are processed within a few minutes. However, the choice of the best calculated partition, and therefore P, can be problematic. In case P is too high, fewer OTUs are detected, while a too low P value leads to oversplitting (Puillandre et al., 2012). A web version and a command line program are available at https://bioinfo.mnhn.fr/abi/public/abgd/.

1.3.4 Generalized Mixed Yule Coalescent

The Generalized Mixed Yule Coalescent (GMYC) approach uses ultrametric phylogenetic trees to delimitate species (Pons et al., 2006; Fujisawa & Barraclough, 2013). The GMYC algorithm is based on the prediction that due to evolution species appear within genetic clusters, separated by longer tree branches. It combines divergences between and within species, the former is quantified using a Yule model (Yule, 1925; Nee et al., 1994), the latter a neutral coalescent model (Hudson, 1990). One of the big advantages is, while similar methods require prior groupings of (putative) species, GMYC does not rely on such information. A disadvantage is the complex calculation procedure, which consists of several time-consuming steps, including the calculation of an ultrametric tree. Furthermore, the results may vary significantly, depending on the method for calculating the tree (Talavera et al., 2013). At https://species.h-its.org/gmyc/ the web interface for calculating the GMYC model can be found, but it requires an already existing tree as input. Calculating it on a computer requires several programs.

1.3.5 Bayesian Poisson Tree Processes

The Bayesian Poisson Tree Processes (bPTP) is a model based on a rooted phylogenetic tree with added Bayesian support values (Zhang et al., 2013). As an input tree it mostly uses a Randomized Axelerated Maximum Likelihood (RAxML) tree (Stamatakis, 2014). For grouping the samples into OTUs, the Bayesian support values are added to the nodes

of the tree. A high value indicates a high probability that the descendants of a node belong to one species. This model is working quite fast, a web server using an already existing phylogenetic tree as input and a Python program are available at https://species.h-its.org/ptp/.

As the results of the different methods described above can vary substantially, it is advisable to use several methods for analyzing barcode data to arrive at robust hypotheses about species boundaries. For example, Kekkonen & Hebert (2014) used the three algorithms ABGD, BIN and GMYC for delimitating Hypertrophinae species, a subfamily of moths in Australia, and 80% of the OTUs were recognized by all three algorithms. The study from Lavinia et al. (2017) on Lepidoptera in Argentina showed more than 90% matches of all used methods (ABGD, BIN, RESL and TCS). On the other hand, the same methods (ABGD, BIN, GMYC, TCS) with the same parameters can produce either high-quality or poor results, depending on the studied taxon, as described by Kekkonen et al. (2015). Kekkonen & Hebert (2014) even proposed a protocol on how to deal with the OTUs, which were recognized by just one or two of the used algorithms: these OTUs should be evaluated against diagnostic characters, monophyly and sympatry.

1.4 Studied organisms

Eucereon (family Erebidae, subfamily Arctiinae) is a widespread and species-rich genus of tiger moths with more than 150 described species occurring in Central and South America. Their geographic distribution ranges from the southernmost United States of America (states of Arizona and Texas) over Mexico, Costa Rica, Panama, Ecuador, Peru and French Guiana to the east coast of Brazil (Donahue, 1993; Pinheiro & Duarte, 2013; Pinheiro, 2016) (Figure 1) and they appear at elevations between sea level and 1,700 m a.s.l. (Donahue, 1993; Pinheiro, 2016), some individuals used for this study were caught at around 2,000 m a.s.l. (Appendix 1) and searching the BOLD database, one specimen (process ID ARCTB297-08) was even captured at 2,460 m a.s.l.

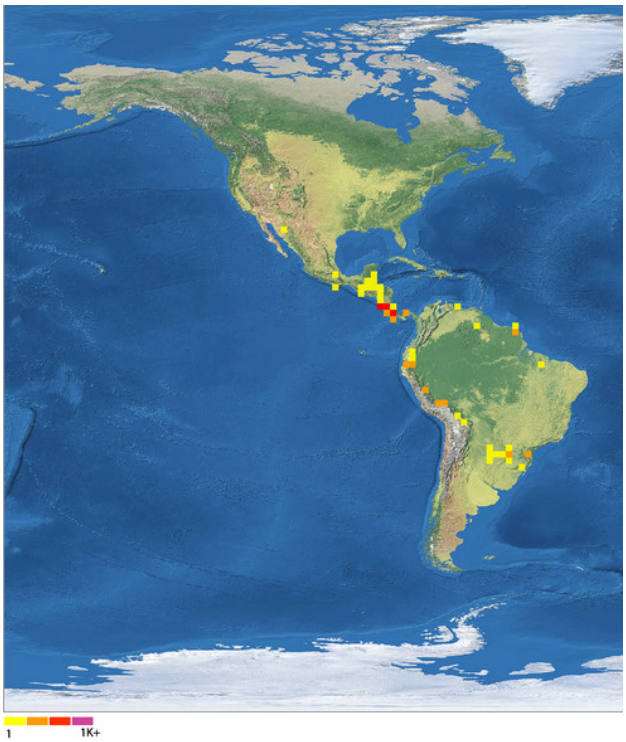


Figure 1: Map displaying the distribution of *Eucereon* samples based on sequences stored on BOLD under this genus name. Downloaded from the taxonomy browser of BOLD, created with OpenStreetMap.

Eucereon moths in ecological samples are notoriously difficult to identify on a species level, because of challenges posed by intraspecific variation in wing patterns. There is very little literature about this genus available and just few taxonomists have ever worked with this taxon. Accordingly, there is also very little information on the food plants of the larval stages available. Mainly the database of Daniel H. Janzen on Lepidoptera at the Área de Conservación Guanacaste (ACG) in the north-west of Costa Rica (Janzen & Hallwachs, 2009) gives some insights about possible food plants. According to this database, most *Eucereon* larvae sampled thus far fed on several *Erythrina* (family Fabaceae) or *Ficus* species (family Moraceae), respectively.

However, moths of the genus *Eucereon* may contribute a sizeable fraction to local Arctiinae ensembles in Neotropical forests. For example, in a study on lowland forest types in south-west Costa Rica, Rabl et al. (2019) observed 288 specimens of *Eucereon*, sorted into 15 putative species, amongst 3480 Arctiinae specimens and 172 Arctiinae species in total. Similarly, in a study on tiger moths in the Ecuadorean Andes, Süßenbach (2003) observed 253 individuals of 28 *Eucereon* species, thereby accounting for almost 22% of all Arctiinae (former Arctiidae) specimens observed.

Type species of the genus is *Eucereon archias* (Stoll, 1790), originally found in Suriname and described as *Sphinx archias* by Caspar Stoll (Figure 2), but the genus, described by Hübner (1816), never underwent any formal taxonomic revision (Donahue, 1993). Often it is difficult to identify *Eucereon* species due to a lack of morphological keys, as many

historical descriptions are very vague and only imprecise drawings and paintings exist. Also, for example the type material of *E. archias* seems to be lost (Pinheiro, 2016). Hence, the genus itself and many of its species reveal a long history of misidentification (Donahue, 1993; Pinheiro, 2016).

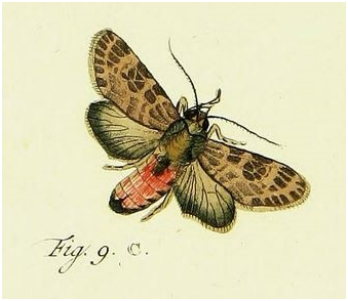


Figure 2: Type species of the genus *Eucereon, E. archias*, drawn by Stoll (1790). Picture extracted from the work of Stoll.

In part due to these misidentifications, quite a few synonyms on genus level are known for *Eucereon*. Some of these synonyms are *Erithales*, *Acridopsis* and several misspelled versions like *Eucereeon* or *Euceron* (Donahue, 1993). Furthermore, some genus names formerly treated as subjective synonyms have later been resurrected, including *Theages*, *Galethalea* and *Nelphe* (Donahue, 1993). To date it is still unclear whether *Eucereon* in its current circumscription is a monophyletic group and also its phylogenetic position within the subfamily Arctiinae is uncertain (Pinheiro & Duarte, 2013). As an example, a recent study from Grados et al. (2018) includes the species *Eucereon alba* (Druce, 1894) within the newly proposed genus *Gloora*. On the other hand, there are quite a lot of species currently placed within other Arctiinae genera which are to some extent morphologically very similar and apparently closely related to *Eucereon*. Some examples are species today included in genera such as *Heliura*, *Cercopimorpha*, *Hyaleucerea*, *Ptychotrichos*, *Euceriodes*, *Telioneura* and *Delphyre*.

1.5 Research questions

The initial starting point of this work was to assign 142 specimens of the genus *Eucereon* and of closely related genera sampled in Costa Rica, Panama and Ecuador into species through DNA barcoding. To achieve that goal, different delimitation algorithms were used and the results compared with each other. A broader second aim was to obtain a better overview of the genus *Eucereon* and its associated species at a larger spatial and taxonomic scale.

In pursuit of these goals, the present study aims to answer the following specific research questions:

1) How many species/operational taxonomic units (OTUs) can be recognized through a DNA-barcoding approach, applying different delimitation algorithms to the 142 studied specimens?
2) Does the barcoding approach lead to different results in species identifications compared to morphological species sorting? If yes, what are the consequences for estimates of local species richness in the target region?
3) Often times the distinction of Lepidopteran species is defined at a threshold of around 2% divergence of the COI sequences. Does this threshold also deliver reasonable results in our samples? If not, which threshold value could be more appropriate instead?
4) Is *Eucereon* monophyletic? Among the many sequences of Neotropical Arctiinae available on the BOLD database, are there additional samples that in fact belong to *Eucereon*, but are currently stored under wrong/outdated names? As a corollary, are there sequences on BOLD that are wrongly named as *Eucereon* and should rather be affiliated with alternative genus names?
5) Which phylogeographic patterns can be recognized with regard to species richness and species distributions of moths in the genus *Eucereon*, once all these uncertainties and errors associated with the data to be retrieved from BOLD have been corrected?

2. Material

For this study, 142 adult Arctiinae specimens from three different countries in the Neotropical region were analyzed to generate DNA barcode sequences (Figure 3, Appendix 1). Additionally, 1677 COI sequences were downloaded from the public data portal of the BOLD repository (Appendix 2), in order to reconstruct the phylogeny of *Eucereon* and to place the newly generated sequences into an appropriate context.

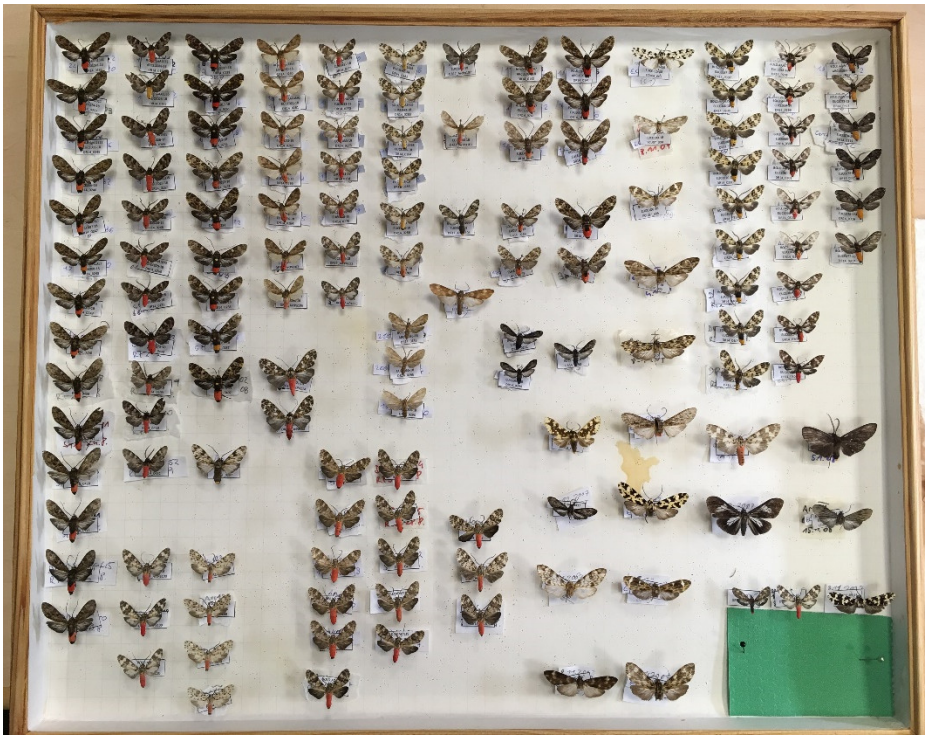


Figure 3: Picture of all 142 adult Arctiinae specimens newly sequenced for this study.

2.1 Lepidoptera from Costa Rica

In the course of an earlier study (Rabl et al., 2019), moths were collected between July and October 2014 in lowland rain forest around the Tropical Research Station La Gamba in south-west Costa Rica (N 8°42.61', W 83°12.97', 78 m a.s.l., Figure 4) in the province Puntarenas. Automatic funnel traps emitting weak fluorescent light (Brehm & Axmacher, 2006) were used to perform all-night sampling at 16 different sites at altitudes between 106 and 279 m a.s.l. The specimens were segregated into morphospecies by means of wing patterns. More than 12% of the caught Arctiinae moths were allocated to the genera *Eucereon, Heliura* and *Cercopimorpha*, 108 of them (examples are displayed in Figure 5a-l, the complete list can be found in Appendix 1) were used for the present study. The voucher specimens are all stored at the Division of Tropical Ecology and Animal Biodiversity at the University of Vienna.

2.2 Lepidoptera from Panama

15 adult moths (examples are displayed in Figure 5m-o) were collected by Dominik Rabl in the province Colón in Panama at two different locations: Gamboa rain forest and San Lorenzo Protected Forest (Figure 4) in January and February 2017 (Appendix 1). In Gamboa the moths were collected manually with the help of light towers, in San Lorenzo automatic light funnel traps were used (Brehm & Axmacher, 2006). The specimens were segregated into morphospecies by means of external morphology (Appendix 1). Voucher specimens are stored at the Division of Tropical Ecology and Animal Biodiversity at the University of Vienna.

2.3 Lepidoptera from Ecuador

19 adult moths (examples are displayed in Figure 5p-r) were collected by Daniela Vázquez and Florian Bodner around the Estación Científica San Francisco in the south of Ecuador (S 3°58.37' W 79°4.87, Figure 4) at 10 different sites at altitudes between 1904 and 2010 m a.s.l in November 2007, January 2008 and November 2012 (Appendix 1). The moths were collected manually with the help of light towers. The moths were segregated into morphospecies based on their wing patterns (Appendix 1). Voucher specimens are stored at the Division of Tropical Ecology and Animal Biodiversity at the University of Vienna.

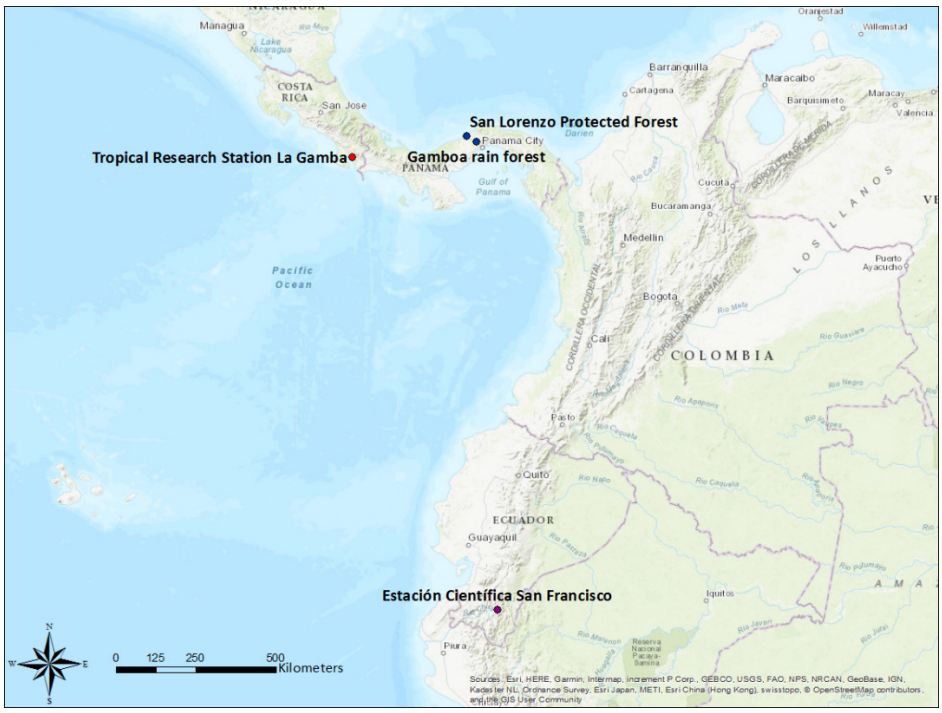


Figure 4: Map of the collection sites for newly sequenced Arctiinae samples: Tropical Research Station La Gamba in Costa Rica, San Lorenzo Protected Forest and Gamboa rain forest in Panama, and Estación Científica San Francisco in Ecuador. Map created in ArcGIS v10.2.2 for Desktop, ESRI.

Figure 5: Examples of the specimens from Costa Rica: a) *Eucereon* nr. *varium*, b) *E. maia*, c) *Eucereon* sp., d) *E. rosinum*, e) *E. punctatum*, f) *E. aoris*, g) *E. atrigutta*, h) *E. obscurum*, i) *Eucereon* sp., j) *Heliura rhodophila*, k) *H. thysbodes*, l) *Cercopimorpha sylva*; from Panama: m) – o) and Ecuador: p) – r), *Eucereon* is the presumed genus of the samples from Panama and Ecuador. Black scale bar: 1 cm. Photographs of samples from Costa Rica by courtesy of Dominik Rabl.

2.4 Sequences from BOLD

In total, 1677 sequences were downloaded from the public data portal on BOLD, representing 487 haplotypes of *Eucereon* and related genera (Appendix 2). Further details on these processes, including the strategy of taxon selection, are explained below in the methods section. GPS data were available for 1543 sequences (Figure 6).

Figure 6: GPS data from 1543 sequences of *Eucereon* and putatively related Neotropical Arctiinae downloaded from BOLD. Map created in ArcGIS v10.2.2 for Desktop, ESRI.

3. Methods

3.1 Laboratory work

3.1.1 DNA extraction

For isolating the DNA of each specimen the innuPREP DNA Micro Kit (Analytik Jena AG) was used, following the protocol for DNA isolation from small tissue samples (Appendix 3). The first step was extracting the whole DNA from a leg of each moth. Next, around seven 1.4 mm ceramic beads were added to homogenize the leg with a Precellys 24 tissue homogenizer, in order to release the DNA from the cells. Afterwards the lysis solution and Proteinase K were added, the mixture was incubated for 60-120 min (or overnight in case of total abdomens) and subsequently the protocol for extracting DNA was followed. RNA was not removed and as last step 100 µl Elution Buffer were used.
In case the DNA extraction from a leg was still not successful after a second attempt, the extraction was repeated with the corresponding total abdomen, following a protocol described by Knölke et al. (2004) and adapted by Strutzenberger et al. (2012). The extraction protocol was slightly changed in these cases (Appendix 4).

3.1.2 DNA sequencing

In order to obtain the 658 bp long COI barcoding sequence, the fragment first had to be amplified through PCR. Therefore, a master mix with the Thermo Scientific PCR system (Table 1) was created, using the two primers LepF (5'-TTCAACCAATCATAAAGATATTGG-3') and LepR (5'-AACTTCTGGATGTCCAAAAAATCA-3') (Hajibabaei et al., 2006a), 2 µl of the extracted DNA from the previous step were added and the PCR program (Table 2) was started. Two additional microprimers were used for those samples where the DNA was extracted from the abdomen, to generate shorter fragments: MLepF1 (5'-GCTTTCCCACGAATAAATAATA-3') in combination with LepR, and MLepR1 (5'-CCTGTTCCAGCTCCATTTTC-3') in combination with LepF (Hajibabaei et al., 2006a).

After the PCR an agarose gel electrophoresis was performed according to the GelRed™ Nucleic Acid Gel Stain (Biotium, Inc.) protocol (Appendix 5) to test whether the PCR had been successful. The next step was the purification of the PCR product in order to degrade the nucleotides (dephosphorylation). For this purpose 8 µl of the PCR sample and 1 µl of an exonuclease I & FastAP thermosensitive alkaline phosphatase mix (ratio 1:2) were used.

Table 1: Master mix for the PCR for each sample.

PCR-Master mix	[µl]
ddH2O	5.2
10x$(NH_4)_2SO_4$ PCR buffer	1.0
$MgCl_2$ 25 mM/L	1.0
dNTP-mix (10 mM/µl)	0.2
LepF (10 pg/µl) Primer	0.2
LepR (10 pg/µl) Primer	0.2
BSA	0.1
Taq-DNA Polymerase	0.1
DNA	2.0
Total	**10.0**

Table 2: PCR program.

Temperature [°C]	Time [min]	Cycles
94	04:00	1x
94	01:00	5x
44	01:30	
72	01:30	
94	01:00	35x
49	01:15	
72	01:15	
72	07:00	1x

The last step was sequencing the samples with the Sanger method (Sanger & Coulson, 1975). Therefore, a mix of all the required ingredients was prepared (Table 3) and 2 µl of the purified DNA were added. The products were filtered on Sephadex™ columns and sequenced with the ABI PRISM 3730 Genetic Analyzer of the Department of Botany and Biodiversity Research at the University of Vienna, which performs a capillary electrophoresis.

Table 3: Sequencing mix for each sample.

Sequencing mix	[µl]
ddH_2O	3.3
Trehalose	2.0
Seq Buffer	1.8
LepF or LepR Primer	0.4
BigDye™ 3.1 (Applied Biosystems™)	0.5
DNA	2.0
Total	**10.0**

3.2 Bioinformatic analyses

3.2.1 Programs used for further analyses

For the following analyses and calculations several standalone programs and (online) tools were used:

- **SeqMan** Pro (v7.1.0, DNASTAR Lasergene)
- **BioEdit**, v7.0.5.3 (Hall, 1999)
- Molecular Evolutionary Genetics Analysis, v7.0.26 (**MEGA7**) (Kumar et al., 2016)

- **R**, v3.5.1 (RCoreTeam, 2018), with RStudio, v1.1.463 (RStudioTeam, 2016); packages "ape" (Paradis et al., 2004), "spider" (Brown et al., 2012), "splits" (Fujisawa & Barraclough, 2013; Ezard et al., 2017), "rncl" (Michonneau et al., 2018) and all their associated dependencies
- ALignment Transformation EnviRonment (**ALTER**, http://www.sing-group.org/ALTER/) (Glez-Peña et al., 2010)
- Python, v2.7.13, program **PartitionFinder**, v1.1.1 (Lanfear et al., 2012)
- Bayesian evolutionary analysis by sampling trees, **BEAST2 package**, consisting of several programs (Bouckaert et al., 2014):
  Bayesian Evolutionary Analysis Utility, v2.5.1 (**BEAUti2**)
  Bayesian Evolutionary Analysis by Sampling Trees, v2.5.1 (**BEAST2**)
  TreeAnnotator, v2.5.1
- Broad-platform Evolutionary Analysis General Likelihood Evaluator, v3.1.0 (**BEAGLE**) (Ayres et al., 2011)
- **Tracer**, v1.7.1 (Rambaut et al., 2018)
- **FigTree**, v1.4.3 (http://tree.bio.ed.ac.uk/software/figtree/)
- Multiple alignment program for amino acid or nucleotide sequences, v7 (**MAFFT**, https://mafft.cbrc.jp/alignment/server/) (Katoh et al., 2017)
- Population Analysis with Reticulate Trees, v1.7 (**PopART**) (Leigh & Bryant, 2015)

3.2.2 Evaluation of the raw sequences

The sequencer delivered a chromatogram for each primer of each sample. With the program SeqMan the raw sequences based on the chromatograms were assembled and edited. The resulting contig, which is the overlapping DNA read (Figure 7), was checked for conflicts, gaps and stop-codons in the reading frame. Finally, the primers at the corresponding ends were removed and the resulting sequence was exported as a file in FASTA-format. This procedure was repeated for each sample. In BioEdit the obtained sequences were then aligned.

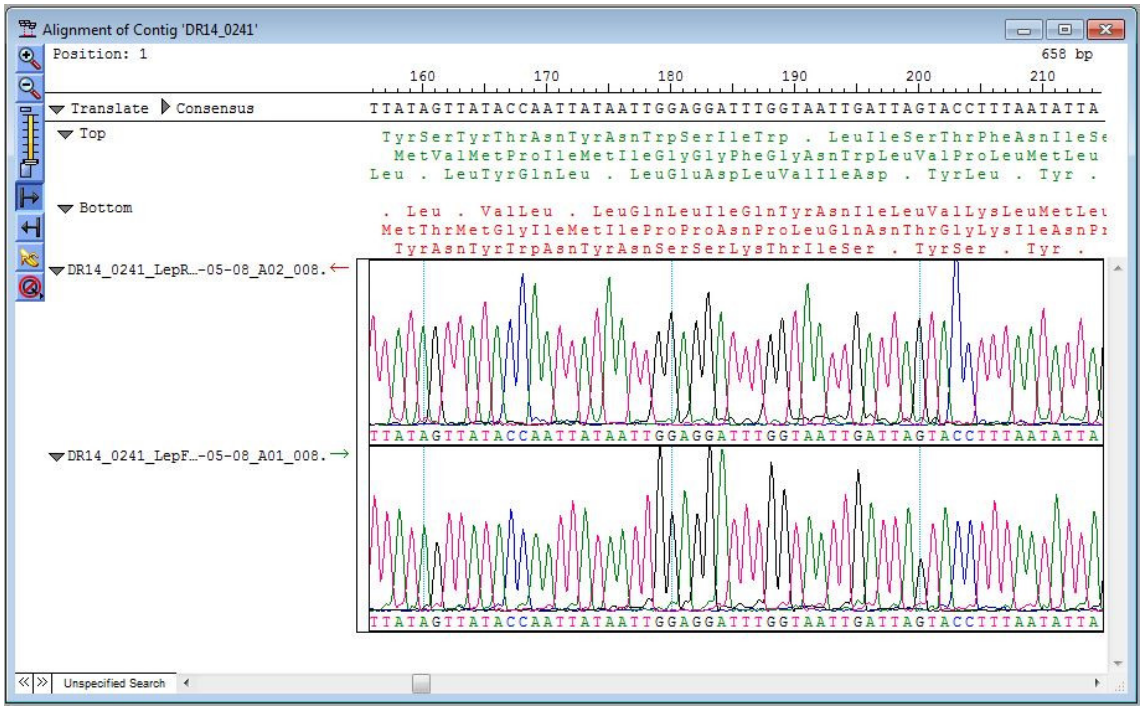


Figure 7: Contig of a sample, displaying the consensus sequence, the reading frames and the chromatograms of both primers LepR and LepF, using the program SeqMan.

3.2.3 Upload to BOLD

On BOLD a new project was created, called "*Eucereon* Costa Rica" (code: EUCE) and all available data of the specimens were uploaded: preliminary taxonomic identity, collection date, country, coordinates, elevation, pictures and finally the sequences and the corresponding trace files (chromatograms). After a few weeks the algorithm integrated in the BOLD repository allocated the sequences to BINs (Ratnasingham & Hebert, 2013).

3.2.4 Analyses of newly generated sequences

To get a quick overview of the newly generated sequences, and to find possible, obvious mistakes, a neighbor-joining tree in MEGA7 using the K2P model was calculated. The next step was testing for the existence of a barcoding gap within the 142 sequence dataset. Therefore, a distance matrix based on the BIN assignment as a surrogate for species boundaries and two histograms for the intra- and interspecific pairwise distances were generated. A potential barcoding gap would be indicated by separated histograms, meaning there is no overlap of intra- and interspecific distances. For this purpose, the packages "ape" and "spider" were used. First, the distance matrix had to be calculated, the package "ape" uses by default the K2P model:

```
# read the fasta-file
dna <- read.FASTA(file="euce.fas")

# split the names by the character "|" and create a vector with the
first part of the name (BIN code)
dna.names <- data.frame(do.call('rbind',
      strsplit(as.character(names(dna)), '|', fixed=TRUE)))
sppVector <- as.vector(dna.names[,1])

# calculate a matrix of pairwise distances with K2P
distMatrix <- dist.dna(dna, pairwise.deletion = TRUE)

# this code was provided by Patrick Strutzenberger
```

Next, a histogram to display the intra- and interspecific differences was created:

```
# separate the distance matrix into its inter- and intra-specific
components
final <- sppDist(distMatrix, sppVector)

# settings for a transparent blue color
transBlue <-rgb(0,0,1, 0.5)

# histograms for inter- and intraspecific differences, based on the
pairwise distance matrix
hist(final$inter, freq = F, col="pink", ylim=c(0,200), xlim=c(0,0.20),
      breaks=40, main = "Intra- and interspecific differences", xlab =
      "Pairwise distance", ylab = "Frequency")
hist(final$intra, freq = F, col=transBlue, add=TRUE, ylim=c(0,200),
      xlim=c(0,0.20), breaks=5)

# this code was provided by Patrick Strutzenberger
```

Besides the BIN algorithm implemented in BOLD, four other methods for sorting the sequences into operational taxonomic units (OTUs) were used:

1) Threshold calculation

The R package "spider" provides a command to calculate the number of OTUs based on a predefined threshold value. Frequently a 2% threshold has been found to deliver useful taxonomic resolution in the Lepidoptera (Hausmann et al., 2011; Mutanen et al., 2012; Simonsen et al., 2019), this value was therefore used for this study. First, a distance matrix was calculated with the R package "ape", which uses the K2P model by default:

```
# read the fasta-file
dna <- read.FASTA(file="euce.fas")

# create distance matrix
distMatrix <- dist.dna(dna, pairwise.deletion = TRUE)
```

```
# calculate number of OTUs using a 2% threshold
tclust(distMatrix, threshold = 0.02)
```

2) Automatic Barcode Gap Discovery

The web server at https://bioinfo.mnhn.fr/abi/public/abgd/abgdweb.html (Puillandre et al., 2012) was used to run the ABGD algorithm with the default settings. Therefore, the aligned FASTA-file was uploaded and again K2P as distance model was chosen.

3) Generalized Mixed Yule Coalescent

The GMYC algorithm is very complex, several steps are therefore needed before running this procedure. A possible problem might be the inclusion of identical sequences. Fujisawa & Barraclough (2013) highlighted that zero-length terminal branches in the phylogenetic tree, which derive from identical sequences, can be problematic; therefore, they recommend collapsing all identical sequences to represent different haplotypes only. On the other hand, Talavera et al. (2013) did not observe considerable differences when using haplotypes or including identical sequences, but using fewer sequences reduces the computing time drastically. To collapse the sequences into distinct haplotypes, the online tool ALTER was used.

To check which scheme fits the data best, the Python program PartitionFinder was used. First, the FASTA-file was converted to a PHYLIP-file, a different sequence format required by PartitionFinder, in R using the package “ape” and the following code:

```
# read the fasta-file
dna <- read.FASTA(file="euce.fas")

# convert the fasta-file to a phylip-file
write.dna(dna, file="euce.phy", colw = 750, format = "interleaved")
```

In PartitionFinder the following settings were used:

```
## ALIGNMENT FILE ##
alignment = euce.phy;

## BRANCHLENGTHS: linked | unlinked ##
branchlengths = linked;

## MODELS OF EVOLUTION for PartitionFinder: all | raxml | mrbayes |
beast | <list> ##
##              for PartitionFinderProtein: all_protein | <list> ##
models = beast;

# MODEL SELECCTION: AIC | AICc | BIC #
model_selection = BIC;

## DATA BLOCKS: see manual for how to define ##
[data_blocks]
```

```
COI_pos1 = 1-658\3;
COI_pos2 = 2-658\3;
COI_pos3 = 3-658\3;

## SCHEMES, search: all | greedy | rcluster | hcluster | user ##
[schemes]
search = greedy;
```

With the calculated schemes, an XML-file was created in BEAUti2. First, the aligned FASTA-file was imported. Then the alignment was split into three partitions according to the three codon positions and the Clock Models and Trees of all partitions were linked. As Site Models the calculated best schemes from PartitionFinder were chosen. As Clock Model the Relaxed Clock Log Normal (Drummond et al., 2006) was used. In the Markov Chain Monte Carlo (MCMC) Model the settings for the Chain Length was changed to 110 million and every 10,000th tree was logged. The generated XML-file was then used to start the analysis in BEAST2, with activated BEAGLE in order to accelerate the calculations. With the program Tracer the quality of the BEAST2 analysis was checked, the effective sample size (ESS) had to be higher than 200 (Drummond et al., 2006). BEAST2 created a tree sample consisting of 11,000 trees. Using the program TreeAnnotator, this tree sample was summarized onto one single tree. As burnin percentage 10% were used, the target tree type was set to Maximum clade credibility tree, the Node heights were set to Common Ancestor, the input file was the tree sample from BEAST2 and the output file will be a nexus-tree-file (NEX). Based on this tree the GMYC algorithm using the packages “rncl” and “splits” was calculated. Some parts for applying the GMYC algorithm were extracted from Talavera et al. (2013) and the tutorial created by Michonneau (2016).

```
# relaxed clock log normal model
# read the nexus-tree-file
euce_relaxed_tr <- read_nexus_phylo("euce.nex")

# perform the gmyc analysis using the single-threshold method
euce_relaxed_gmyc <- gmyc(euce_relaxed_tr, method = “single”)
summary(euce_relaxed_gmyc)

# create a list of the OTUs and write a csv-file with the results
spec.list(euce_relaxed_gmyc)
write.csv(spec.list(euce_relaxed_gmyc), file = "euce.csv")
```

The command “gmyc” offers both the single- and multiple-threshold method. The latter is a more complex algorithm, which is still in development (Monaghan et al., 2009; Fujisawa & Barraclough, 2013).

4) Bayesian Poisson Tree Processes

For the bPTP algorithm a maximum likelihood tree had to be created first, which was calculated at the Cyberinfrastructure for Phylogenetic Research server (CIPRES, http://www.phylo.org/) (Miller et al., 2010), using the RAxML-HPC2 on XSEDE tool: Phylogenetic tree inference using maximum likelihood/rapid bootstrapping run on XSEDE (Stamatakis, 2014). For this purpose the aligned FASTA-file was uploaded and the tool was run with the default settings. The following partitioning scheme was added:

```
DNA, p1 = 1-658\3
DNA, p2 = 2-658\3
DNA, p3 = 3-658\3
```

Following this, the calculated phylogenetic tree was uploaded to the bPTP web server at https://species.h-its.org/ptp/ (Zhang et al., 2013).

3.2.5 *Eucereon* on BOLD

When searching for *Eucereon* in the taxonomy browser of the BOLD database (http://www.boldsystems.org/index.php/TaxBrowser_Home), currently more than 1600 sequences allocated to the genus *Eucereon* from eight countries in Central America and northern South America are recorded, more than 70% of which were collected in Costa Rica. 816 of the stored sequences are publicly available, consisting of 74 named "species" and forming 73 BINs (as of April 4, 2019). However, this search result is based on tentative species names, which includes informal name codes like "*Eucereon* BioLep03", "*Eucereon* sp. 8YB" etc. At the same time, it is not guaranteed that these affiliations with the genus-level taxon *Eucereon* are really correct in all cases, since by no means all of these entries have been cross-checked with taxonomic experts. Furthermore, this search does not retrieve all available samples of the corresponding BINs, as many sequences are stored under wrong or different genus names or even just as representatives of Arctiinae or Lepidoptera. All found BINs through the search for public *Eucereon* sequences and the BINs of the newly generated sequences were used to search for the members of all these BINs and all sequences with additional information on the samples were downloaded from the public data portal of BOLD. The same procedure was applied for some genus names that currently are considered to be synonyms of *Eucereon*, such as *Theages*, *Galethalea* and *Nelphe* and for the genera *Heliura*, *Cercopimorpha*, *Hyaleucerea*, *Euceriodes*, *Telioneura* and *Delphyre*, which all are considered to be closely related to *Eucereon*. In total, following this strategy, 1678 sequences were collated from BOLD representing 139 BINs of Arctiinae moths. The downloaded sequences were aligned with the online tool MAFFT and the sequences were analyzed with help of the program BioEdit. Several samples had almost the full COI gene sequenced, these were cut to 658 bp in BioEdit, in order to have the same length

in all sequences. One sequence was deleted (process ID BLPDA132-09) because it was shorter than 500 bp. 520 of these 1677 sequences (31%) are named just “Lepidoptera” without any genus or family, and five (0.3%) are named “Arctiinae” (Appendix 2). The 138 newly generated sequences were added, which resulted in a FASTA-file with in total 1815 samples containing the BIN, process ID, species name (if available), country of origin and the sequence of each sample. As the GMYC algorithm performs better without identical sequences, the replicate sequences were collapsed to haplotypes using the tool ALTER (see Appendix 2 for the used haplotypes).

3.2.6 Exploring the boundaries of *Eucereon*

In order to investigate the boundaries of *Eucereon*, the COI sequences alone are not sufficient. In a recent large-scale phylogeny study on Neotropical Arctiinae (Zenker et al., 2017) the genus *Eucereon* was not included, but the authors published PopSets on GenBank, which included two *Eucereon* samples. These PopSets were downloaded and used for this approach (Appendix 6). A PopSet is a set of several DNA sequences to analyze the relationships within a population, which does not necessarily consist of just one species or genus. In this particular case, the PopSet consisted of the genes cytochrome c oxidase subunit I (COI), elongation factor 1 alpha (EF-1α), glyceraldhyde-3-phosphate dehydrogenase (GAPDH), cytosolic malate dehydrogenase (MDH), ribosomal protein S5 (RpS5) and wingless (wgl) of in total 60 different species of Arctiinae. Not every gene included sequences from every species. Then one COI sequence per BIN of the newly generated and also of all downloaded sequences was added. The program PartitionFinder was executed using the following settings:

```
## ALIGNMENT FILE ##
alignment = theages.phy;

## BRANCHLENGTHS: linked | unlinked ##
branchlengths = linked;

## MODELS OF EVOLUTION for PartitionFinder: all | raxml | mrbayes |
beast | <list> ##
##              for PartitionFinderProtein: all_protein | <list> ##
models = beast;

# MODEL SELECTION: AIC | AICc | BIC #
model_selection = BIC;

## DATA BLOCKS: see manual for how to define ##
[data_blocks]
COI_pos1 = 1-1475\3;
COI_pos2 = 2-1475\3;
COI_pos3 = 3-1475\3;
EF1a_pos1 = 1476-2678\3
EF1a_pos2 = 1477-2678\3
EF1a_pos3 = 1478-2678\3
GAPDH_pos1 = 2679-3155\3
```

```
GAPDH_pos2 = 2680-3155\3
GAPDH_pos3 = 2681-3155\3
MDH_pos1 = 3156-3556/3
MDH_pos2 = 3157-3556/3
MDH_pos3 = 3158-3556/3
RpS5_pos1 = 3557-4156/3
RpS5_pos2 = 3558-4156/3
RpS5_pos3 = 3559-4156/3
wgl_pos1 = 4157-4514/3
wgl_pos2 = 4158-4514/3
wgl_pos3 = 4159-4514/3

## SCHEMES, search: all | greedy | rcluster | hcluster | user ##
[schemes]
search = greedy;
```

Afterwards a phylogenetic tree was calculated with BEAST2, using the same settings as previously described, adapted to the new schemes calculated by PartitionFinder.

3.2.7 Phylogeographic analyses

In order to analyze possible biogeographic patterns TCS networks (Clement et al., 2002) were calculated for in total nine BINs using the program PopART, each BIN contained more than 14 specimens. The 402 specimens were sampled in 13 countries, which are Costa Rica, Guatemala, Honduras, Mexico, Nicaragua and Panama in Central America, and Argentina, Brazil, Bolivia, Ecuador, French Guiana, Paraguay and Peru in South America, and included 32 of the moths studied in this work (Appendix 8). As more than 70% of the sequences downloaded from BOLD were from samples collected in Costa Rica, they were separated by their geographic location, which are the three provinces Cartago, Heredia and Puntarenas, and the Área de Conservación Guanacaste (ACG). The provinces Cartago and Heredia are located in the center, Puntarenas in the south-west and ACG in the north-west of Costa Rica. The sampling locations of several specimens were not available, the origin of these specimens was therefore labelled as “unknown”.

4. Results

4.1 Newly generated sequences

In total, 138 new sequences (97% of attempted individuals) were successfully generated, only one sample from Costa Rica, two samples from Panama and one sample from Ecuador could not be sequenced even after the DNA extraction was repeated. After the manual check in SeqMan the reading frames of the new sequences did not contain any gaps or stop-codons. 135 of the 138 sequences had the full length of 658 bp, three samples from Costa Rica had shorter sequences with 596, 613 and 644 bp, respectively. A quick search in the BOLD Identification Engine (http://www.boldsystems.org/index.php/IDS_OpenIdEngine) assigned all sequences to Lepidoptera, so DNA contaminations of other organisms could be excluded. The neighbor-joining tree did not show any obvious mistakes. The BOLD repository offers several additional analyses, like a neighbor-joining tree or the sequence composition. The mean nucleotide frequency distribution was 14.55% (SE 0.02%) for guanine, 15.87% (SE 0.05%) for cytosine, 30.74% (SE 0.06%) and 38.84% (SE 0.08%) for thymine. The mean guanine-cytosine content was 30.42% (SE 0.06%).

4.2 Species numbers according to various delimitation algorithms applied to COI barcode sequences

4.2.1 Allocation into BINs

After uploading the new COI barcode sequences to BOLD, the integrated algorithm generated 42 BINs (Appendix 1). The six BINs BOLD:ADL0434 (*Eucereon* sp. 02), BOLD:ADL1208 (*Eucereon pseudarchias*), BOLD:ADM7139 (*Eucereon punctatum*), BOLD:ADM7491 (*Eucereon* sp. 06), BOLD:ADN4389 (*Eucereon* sp. 11) and BOLD:ADP0759 (*Eucereon* sp. 24) are unique BINs, so they were newly generated and contain so far solely the respective samples. 36 BINs are not unique, viz. the respective samples were included into already existing BINs.

Testing for a barcoding gap revealed a gap between the intra- and interspecific distances at around 2% in the histogram in Figure 8.

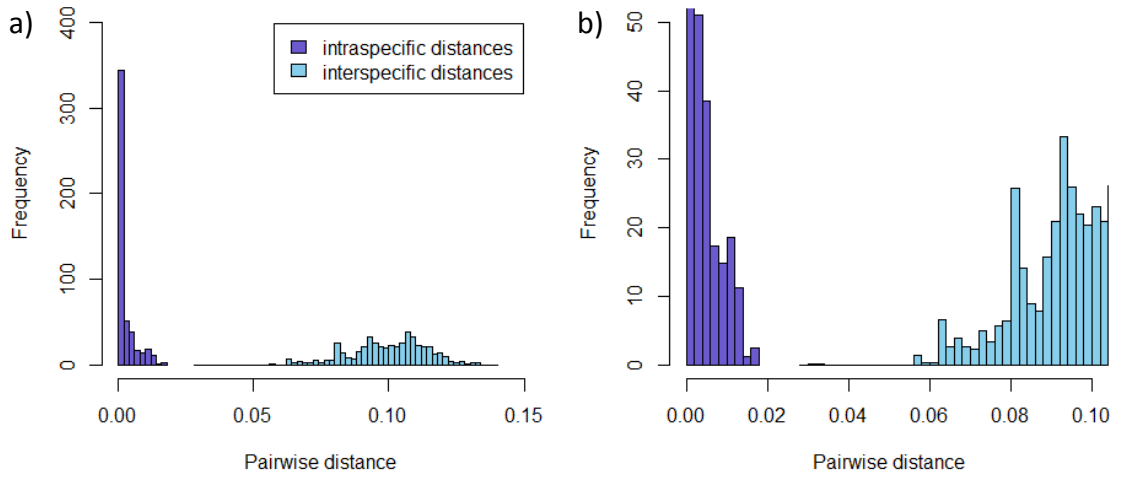


Figure 8: Histogram of the intra- and interspecific pairwise distances (K2P) of all 138 samples, using BINs as criterion for species delimitation. Figure a) displays the overall distribution, b) shows the distribution between 0 and 10% divergence.

The 107 samples from Costa Rica were allocated to 20 BINs, the 13 samples from Panama were allocated to eight BINs and the 18 samples from Ecuador were allocated to 17 BINs (Appendix 1). Specimens of the three BINs BOLD:AAE4592 (*Eucereon maia*), BOLD:AAN0729 (*Eucereon rosinum*) and BOLD:ACC9448 (*Eucereon punctatum*) were collected both in Costa Rica and in Panama, while the BINs of the samples collected in Ecuador differed completely from those from Costa Rica and Panama.

Prior to the molecular approach, all samples had been sorted into 40 morphospecies (Appendix 1), and this sorting mostly matched with the BIN assignment. Just the two morphospecies *Eucereon obscurum* and *Eucereon punctatum* split into two BINs each, *E. obscurum* into BOLD:AAD0077 and BOLD:AAF1123 (6% K2P distance), and *E. punctatum* into BOLD:ACC9448 and BOLD:ADM7139 (7.5% K2P distance), which resulted in a total of 42 *Eucereon* BINs (Appendix 1). In the neighbor-joining tree these groups were separated, but still sister groups to each other (Figure 9).

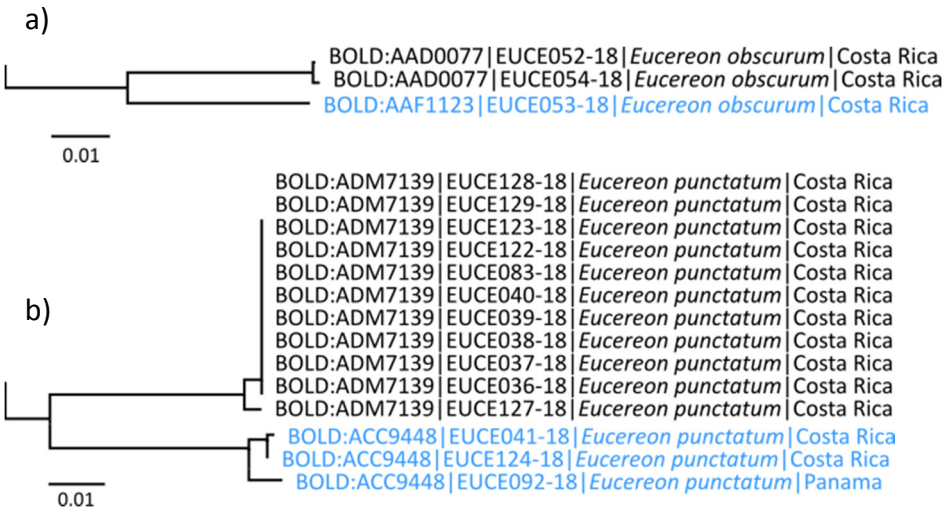


Figure 9: Neighbor-joining tree displaying the samples of the morphospecies a) *E. obscurum* and b) *E. punctatum*. Both clusters split into each two BINs each, indicated by the samples marked in blue.

4.2.2 Application of a 2% threshold

Assigning the sequences to clusters produced again 42 different OTUs, when setting the threshold to 2%. These OTUs were identical to the BIN assignments (Appendix 7). Changing the threshold to 1% or 3% led to 43 or 41 OTUs, respectively. In the first case the morphospecies *Eucereon* nr. *varium* (BIN BOLD:AAJ0944) was further split into two OTUs, the two samples "EUCE013-18" and "EUCE014-18" each forming a distinct OTU (Figure 10a). In the latter case, *Eucereon maia* (BIN BOLD:AAE4592) and *Eucereon* sp. 04 (BIN BOLD:AAG6289) were merged (Figure 10b).

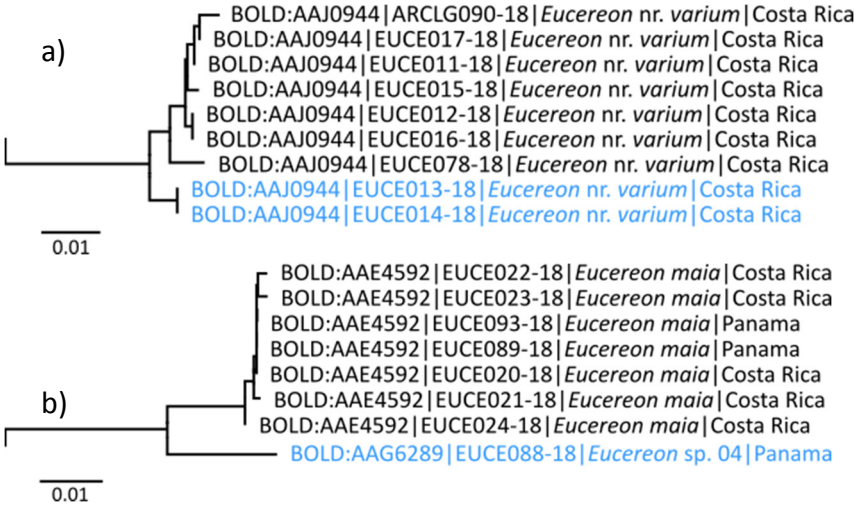


Figure 10: Neighbor-joining tree displaying a) the morphospecies *Eucereon* nr. *varium* (BIN BOLD:AAJ0944), which was split into two OTUs when applying a 1% threshold (the two samples marked in blue then formed a distinct group) and b) the merger of the morphospecies *Eucereon maia* (BIN BOLD:AAE4592) with *Eucereon* sp. 04 (BIN BOLD:AAG6289), when applying a 3% threshold; here, the merged sample is marked in blue.

Using one sequence per haplotype instead of all identical sequences did not reveal any differences in the OTU allocation.

4.2.3 Automatic Barcode Gap Discovery

The number of different OTUs recognized by the ABGD algorithm using all 138 newly generated sequences varied between 60 and 39, depending on the selected prior (Figure 11). The initial partition consisted of 39 OTUs.

Using one sequence per haplotype instead of all sequences revealed several differences in the number (and distribution) of OTUs, the priors P=0.1%, P=0.17% and P=0.28% resulted in 41 OTUs each, the priors P= 0.46%, P=0.77%, P=1.29% and P=2.15% resulted in 40 OTUs each and the prior P=3.59% resulted in 39 OTUs; no results were returned for P=5.99%.

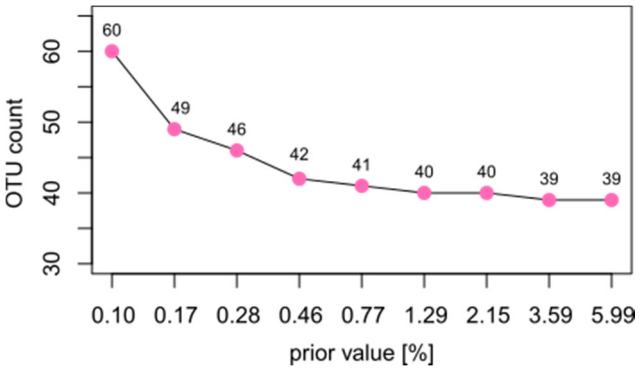


Figure 11: Number of recognized OTUs using the ABGD web interface and all identical sequences, as a function of the selected prior values.

4.2.4 Generalized Mixed Yule Coalescent Method

The program PartitionFinder delivered two different models for the three partitions, using one sequence per haplotype (Table 4).

Table 4: Partitioning schemes for the newly generated sequences. Calculated with PartitionFinder

Best partitioning scheme			
Number of sites:		658	
Number of subsets:		3	
Subset	**Best Model**	**Subset Partitions**	**Subset Sites**
1	TrN+G	COI position 2	1-658\3
2	TrN+G	COI position 3	2-658\3
3	HKY+I	COI position 1	3-658\3

TrN+G represents the Tamura-Nei model (Tamura & Nei, 1993) with a gamma distribution of rate variation, HKY+I represents the Hasegawa-Kishino-Yano model (Hasegawa et al., 1985) with the proportion of invariant sites estimated.

The program Tracer showed a good quality of the resulting tree sample, as the effective sample size (ESS) of all values was higher than 200 and the amplitudes of the posterior graph were evenly distributed (Figure 12).

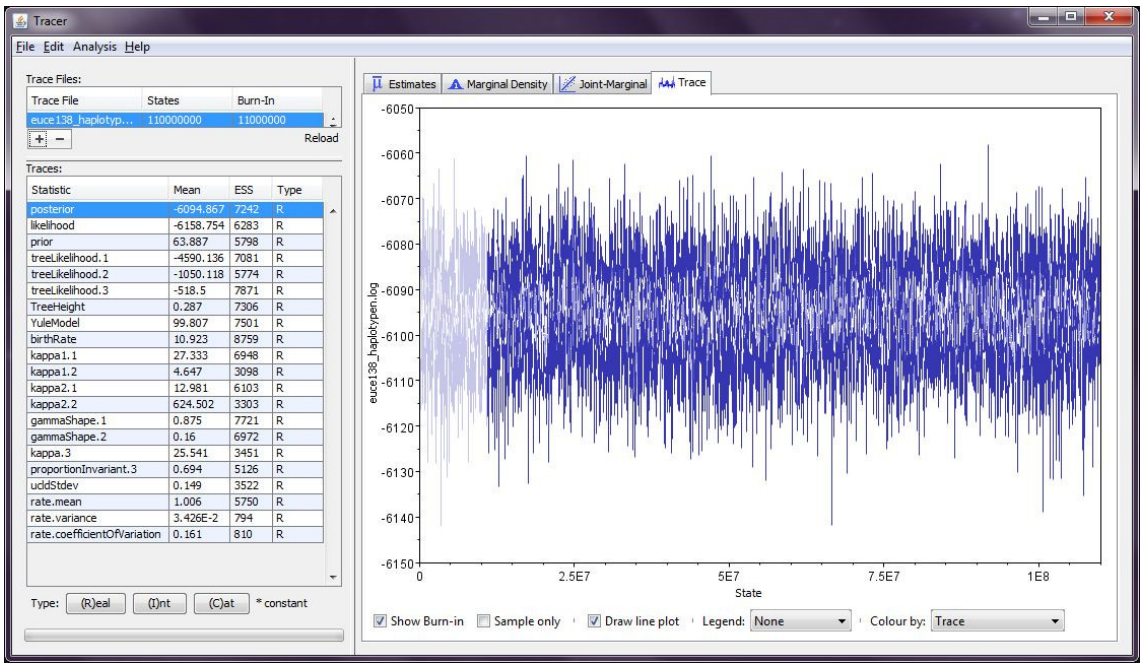


Figure 12: Summary statistics and scatterplot of the posterior probabilities of the BEAST2 analysis using the haplotypes of the newly generated sequences, displayed in the program Tracer. The effective sample sizes (ESS) of all values are greater than 200 and the graph of the posterior probabilities does not reveal a visible trend.

The GMYC algorithm finally retrieved 42 OTUs, using the single-threshold method. The resulting OTUs were the same as with the BIN assignments and the application of the 2% threshold (Appendix 7).

Executing the multiple-threshold method, 45 OTUs were found (Appendix 7). Specifically, the morphospecies *Eucereon* nr. *varium* (BIN BOLD:AAJ0944) was split into three OTUs (Figure 13a), and *Eucereon atrigutta* (BIN BOLD:AAE1486) was split into two OTUs (Figure 13b).

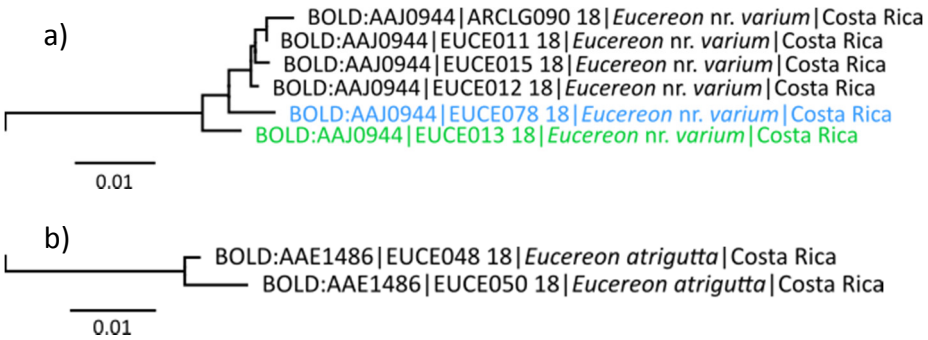


Figure 13: Neighbor-joining tree showing a) *Eucereon* nr. *varium* (BIN BOLD:AAJ0944), which was split into three OTUs, the samples marked in blue and green indicate the formation of two additional OTUs; b) the two samples of *Eucereon atrigutta* (BIN BOLD:AAE1486) which form two distinct OTUs. Both results are based on using the haplotypes and the multiple-threshold method of the GMYC algorithm.

Using all identical sequences instead of the haplotypes and the single-threshold method, the results changed. The ESS of five values of the tree sample were lower than 200 and therefore marked in orange and the posterior graph was undulating (Figure 14), both

factors indicate non-convergence of the chain. Based on the maximum clade credibility tree obtained from TreeAnnotator, the GMYC algorithm produced 45 OTUs. Many BINs were merged, in one case an OTU consisted of five BINs.

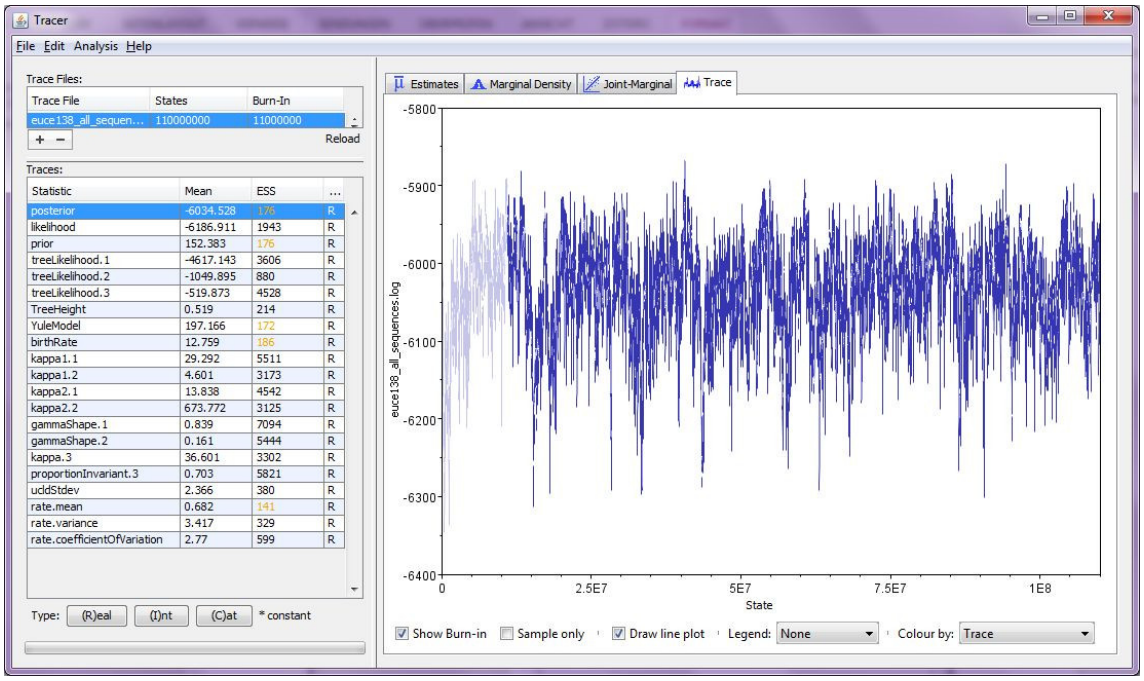


Figure 14: Summary statistics and scatterplot of the posterior BEAST2 analysis using all newly generated sequences, displayed in the program Tracer. The effective sample sizes (ESS) of five values were now lower than 200 and are marked in orange, the displayed posterior graph is undulating.

4.2.5 Bayesian Poisson Tree Processes

The bPTP algorithm assigned the 138 sequences to 43 OTUs (Appendix 7). The results are almost identical with the BIN assignment, just the morphospecies *Eucereon atrigutta* (BIN BOLD:AAE1486) was split into two OTUs (Figure 15), each comprising two samples with identical sequences.

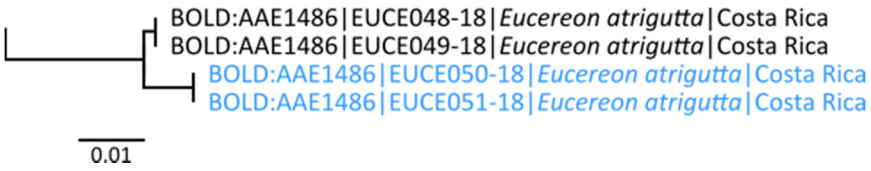


Figure 15: The morphospecies *Eucereon atrigutta* (BIN BOLD:AAE1486) was split into two OTUs applying the bPTP algorithm. The two samples forming a distinct OTU are highlighted in blue.

Using one sequence per haplotype instead of all identical sequences did not produce any differences in the OTU allocation.

4.2.6 Summary of the various delimitation methods

Figure 16 displays a summary of the OTU allocations by the different delimitation methods. The neighbor-joining tree shows the morphospecies and the OTU allocation

of the algorithms BIN, 2% threshold, ABGD (P=0.46%), GMYC single-threshold and bPTP. Differences to the BIN assignment are indicated by a color gradient. For this dataset, the morphological sorting by Rabl et al. (2019) proved to be very successful, as it mostly corresponded with the molecular approach of this present study. Likewise, the allocation to BINs, choosing a threshold at 2% divergence (K2P) of the COI sequences and GMYC single-threshold were highly efficient.

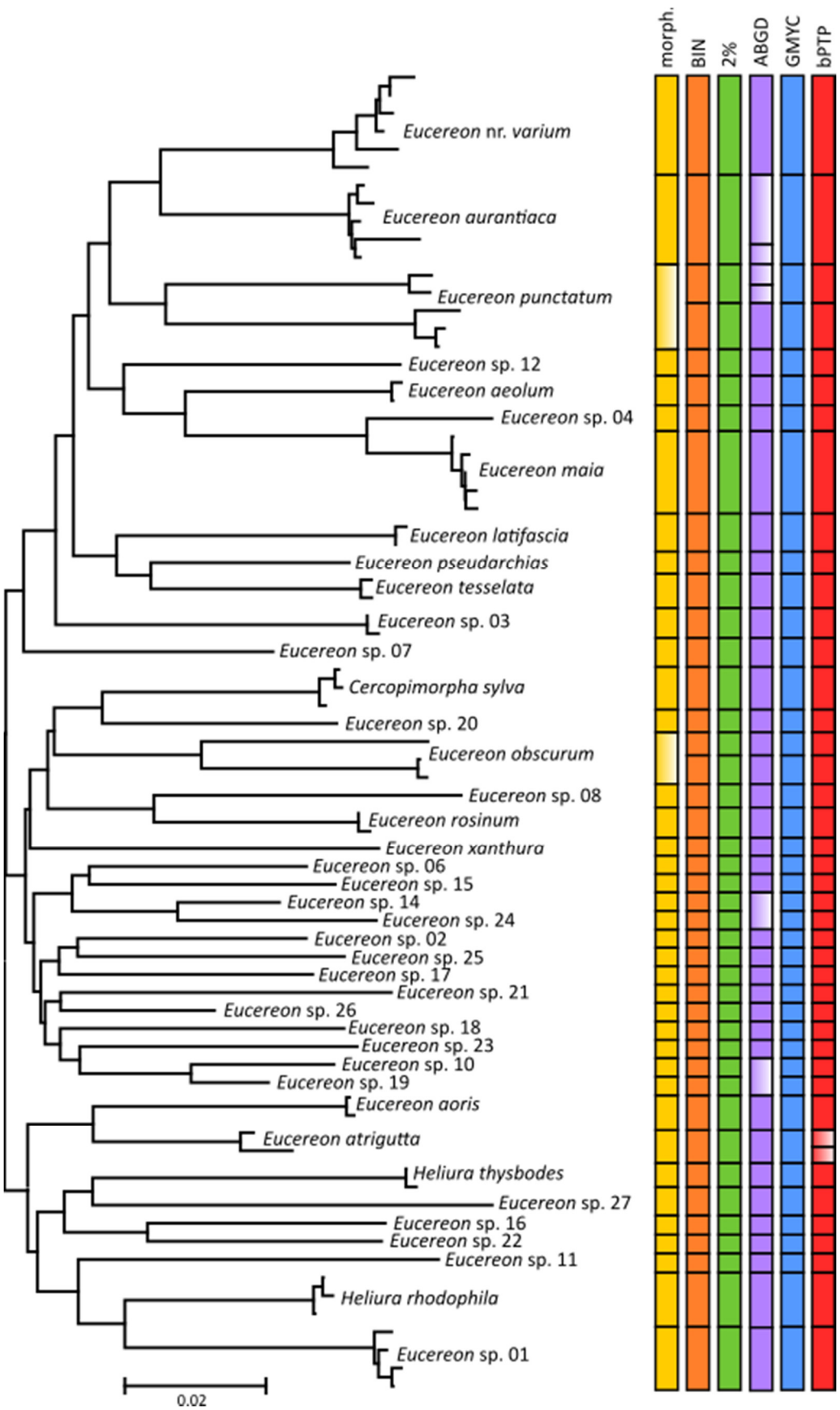


Figure 16: Neighbor-joining tree of all 138 newly generated sequences displaying the morphospecies and OTU allocations of the algorithms BIN, 2% threshold, ABGD (P=0.46%), GMYC single-threshold using haplotypes only, and bPTP. Differences to the BIN allocation are highlighted with a color gradient.

4.3 Boundaries of the genus *Eucereon*

In order to place the moth genus *Eucereon* into a broader context, a larger number of mitochondrial and nuclear markers was used and the selection of target taxa was extended to 156 species of Neotropical Arctiinae. The program PartitionFinder calculated six subsets and their best models (Table 5).

Table 5: Partitioning schemes for the genes cytochrome c oxidase subunit I (COI), elongation factor 1 alpha (EF-1α), glyceraldhyde-3-phosphate dehydrogenase (GAPDH), cytosolic malate dehydrogenase (MDH), ribosomal protein S5 (RpS5) and wingless (wgl) of 156 Neotropical Arctiinae species/BINs. Calculated with PartitionFinder.

Best partitioning scheme			
Number of sites:		4514	
Number of subsets:		6	
Subset	**Best Model**	**Subset Partitions**	**Subset Sites**
1	GTR+G	COI position 2	1-1475\3
2	TrN+I+G	COI position 3	2-1475\3
3	HKY+I+G	COI position 1	3-1475\3
4	TrN+I+G	EF1a position 1	1476-2678\3
		GAPDH position 1	2679-3155\3
		MDH position 1	3157-3556\3
		RPS5 position 1	3559-4156\3
		WGL position 1	4158-4514\3
		WGL position 2	4159-4514\3
5	HKY+I	EF1a position 2	1477-2678\3
		GAPDH position 2	2680-3155\3
		MDH position 2	3158-3556\3
		RPS5 position 2	3557-4156\3
6	GTR+G	EF1a position 3	1478-2678\3
		GAPDH position 3	2681-3155\3
		MDH position 3	3156-3556\3
		RPS5 position 3	3558-4156\3
		WGL position 3	4157-4514\3

GTR stands for the general time reversible model (Tavaré, 1986), TrN represents the Tamura-Nei model (Tamura & Nei, 1993) and HKY represents the Hasegawa-Kishino-Yano model (Hasegawa et al., 1985). G stands for a gamma distribution of rate variation and I represents the proportion of invariant sites estimated.

The results of the BEAST2 analysis were examined with the program Tracer (Figure 17). The ESS of around half of the values (53%) were below 200, most of them were even lower than 100 and therefore marked in orange and red, respectively. The posterior graph is quite uneven, both factors indicate a poor quality of the tree sample.

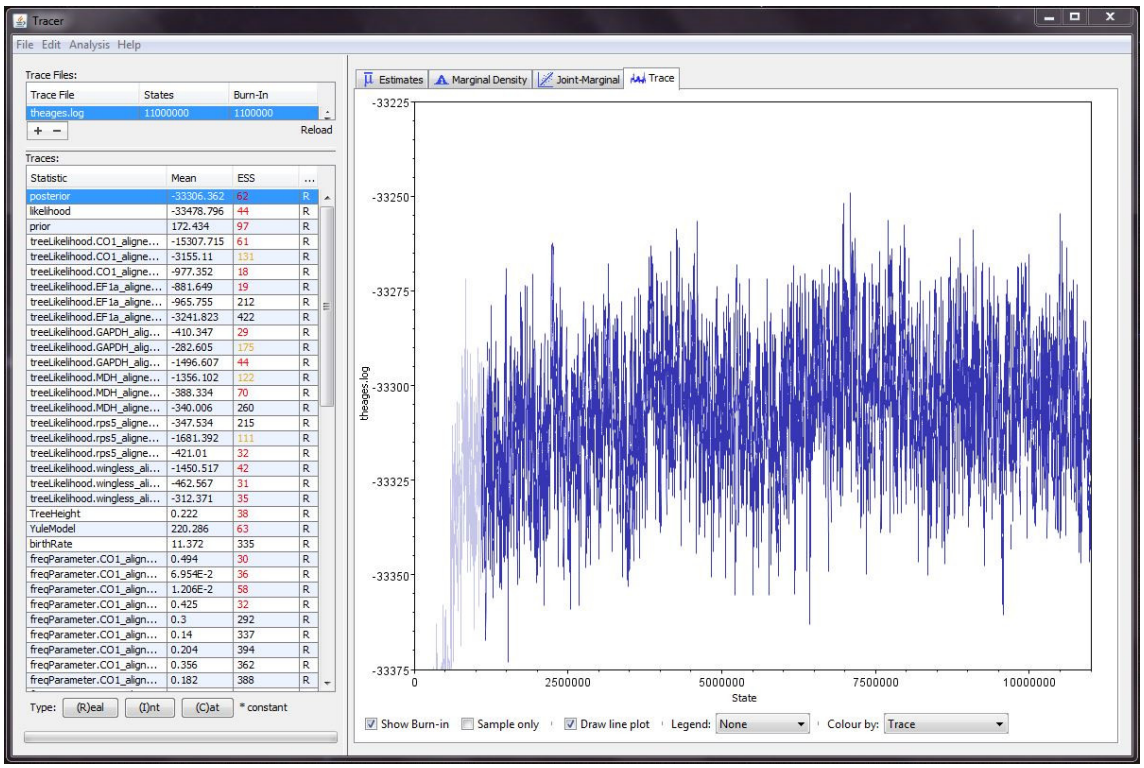


Figure 17: Statistical and graphical evaluation of the BEAST2 analysis of the dataset consisting of six different genes from Zenker et al. (2017), seven of the newly generated COI sequences and 121 COI sequences downloaded from BOLD, displayed in the program Tracer. The effective sample sizes (ESS) of around half of the values are lower than 200, marked in orange and red.

In FigTree the annotated tree consisting of 156 sequences was then analyzed (Figure 18a). Based on a combination of the molecular data and the wing pattern of the samples, 89 BINs were tentatively assigned to the genus *Eucereon*. Some examples are given in Figure 18d and f-h. The list of those species assumed to represent "true" *Eucereon* BINs is provided in Appendix 9. This proposed list includes several species that are currently assigned to the genera *Delphyre*, *Galethalea*, *Theages*, *Euceriodes*, *Heliura*, *Hyaleucerea* and *Nelphe*, but not *Cercopimorpha or Telioneura*. In total, 66 BINs already include samples named *Eucereon*, 18 BINs consist of other genera and five are of the newly generated unique BINs which do not contain other sequences. In contrast, 67 BINs were excluded from the genus *Eucereon*, examples are provided in Figure 18b, c and e, 16 of which are listed as *Eucereon*. Many BINs that appear to belong to *Eucereon* sensu stricto have multiple species names stored in the BOLD database, for example BIN BOLD:AAE1486 contains samples named *Eucereon atrigutta* and *Eucereon quadricolor*, while several sequence sets listed in BOLD under common species names are divided into multiple BINs, for example *Eucereon aoris* can be found within the two BINs BOLD:AAA1365 and BOLD:AAU5391. One sample of the BIN BOLD:AAM6364 is named "*Trichromia* sp." (process ID: LEMMZ437-11) in BOLD, but compared to the other members of this BIN, which are named "*Eucereon punctatum*" or just "Lepidoptera" in the same database, the picture and therefore the identification of this specimen seem to be wrong.

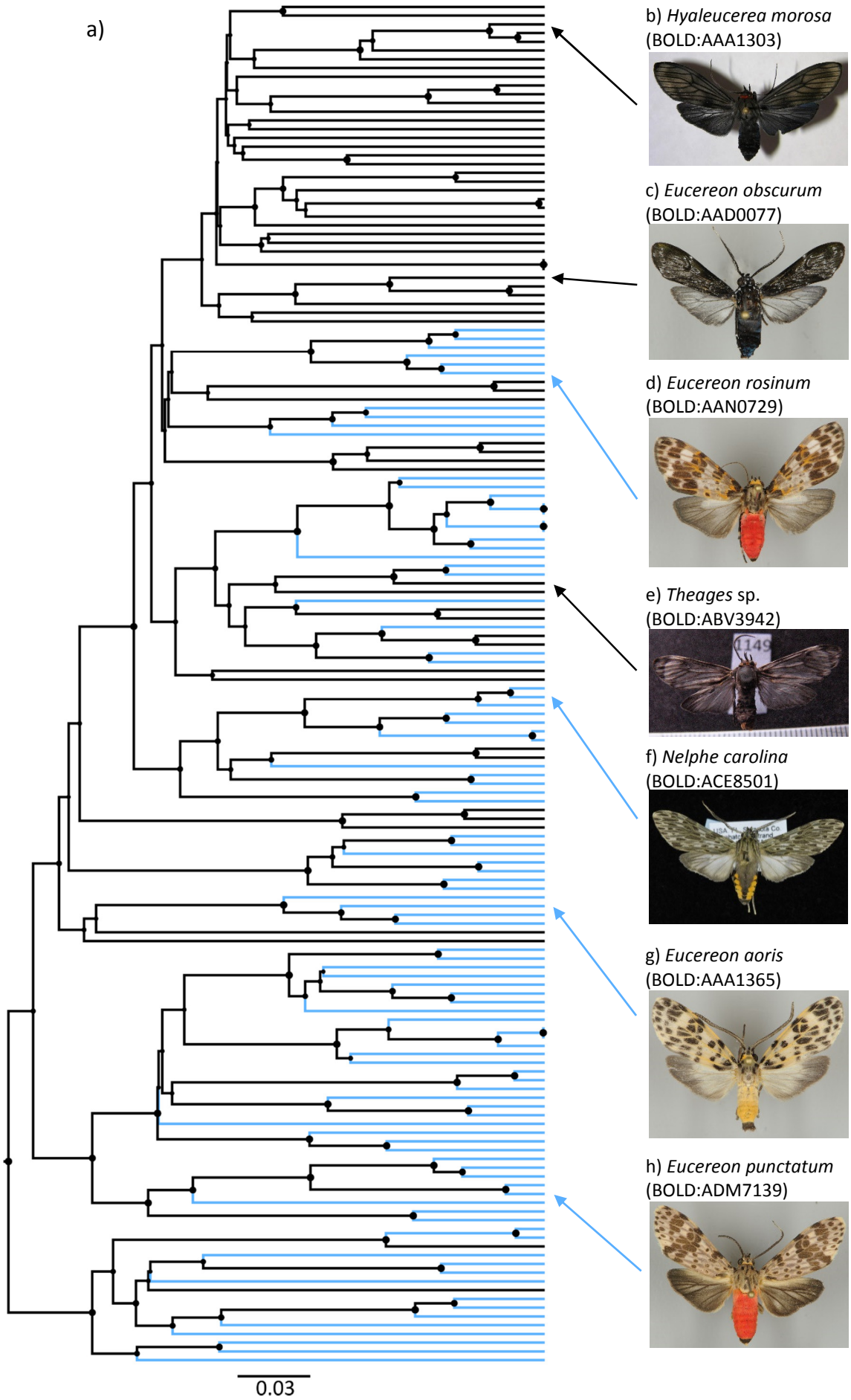
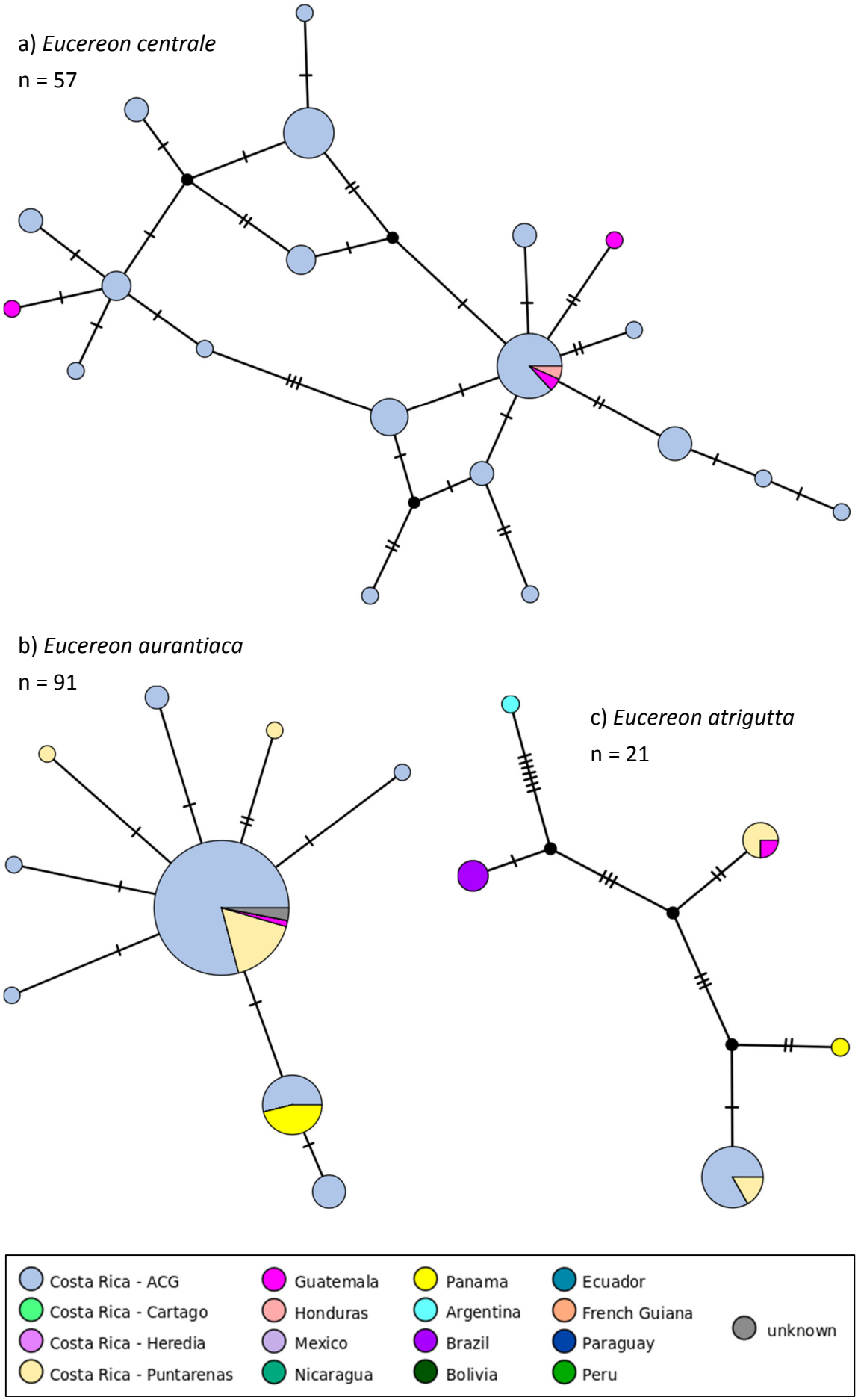

a)
b) *Hyaleucerea morosa* (BOLD:AAA1303)
c) *Eucereon obscurum* (BOLD:AAD0077)
d) *Eucereon rosinum* (BOLD:AAN0729)
e) *Theages* sp. (BOLD:ABV3942)
f) *Nelphe carolina* (BOLD:ACE8501)
g) *Eucereon aoris* (BOLD:AAA1365)
h) *Eucereon punctatum* (BOLD:ADM7139)
0.03

Figure 18, previous page: a) Bayesian phylogenetic tree calculated with BEAST2 and displayed in FigTree. Size of node shapes denotes the respective posterior probability values. Turquoise branch tips show the proposed *Eucereon* members with pictures d) and f)-h) as examples. Black branch tips show moths which are most probably not *Eucereon*, examples are pictures b), c) and e). Copyrights: c), d), g) and h) by courtesy of Dominik Rabl, b) CC BY-NC-SA 3.0 (2007), Daniel H. Janzen, BOLD process ID: MHMXL613-07, e) CC BY-NC 3.0 (2012), Mauricio M. Zenker, BOLD process ID: LEMMZ1164-12, f) CC BY-NC-SA 3.0 (2013), BIO Photography Group/CNC, BOLD process ID: RDNML303-13.

4.4 Some phylogeographic considerations

In total, haplotype networks for nine BINs were created, all of these BINs contained more than 14 sequences (Figure 19). The haplotype network of *Eucereon centrale* (BIN BOLD:AAA1310, Figure 19a) shows a high intraspecific variation of the sampled 57 individuals with no noticeable differences between countries. Figure 19b shows *Eucereon aurantiaca* (BIN BOLD:AAA1311) with one very dominant haplotype and very few mutations, even though it contains the most sequences (n = 91, from three countries, Guatemala, Costa Rica and Panama) compared to the other networks. The third haplotype network (Figure 19c) shows quite some variation within *Eucereon atrigutta* (BIN BOLD:AAE1486), with separated clusters of the specimens from Central America and South America. A similar picture of phylogeographic structuring can be seen in Figure 19d (*Eucereon xanthura*, BIN BOLD:AAA1337) and Figure 19e (*Eucereon setosum*, BIN BOLD:AAN5487). In contrast, such a tendency is not visible for *Eucereon aeolum* (BIN BOLD:AAA8661, Figure 19f), where the same haplotype occurs in Brazil, Panama and Costa Rica (ACG). In Figure 19g the two sequences from Argentina differ by eight mutations from each other, which is almost the maximum variation within this BIN (BOLD:AAD0077, *Eucereon obscurum*). One of the sequences from Argentina is more similar to samples from Brazil and French Guiana, while the second one is more similar to samples from Ecuador, Costa Rica and Panama. In contrast, Figure 19h (*Nelphe relegatum*, BIN BOLD:AAA9439) shows very little intraspecific variation with one major node, containing samples from five countries. Despite the big geographic distance, the sequences within this species just differ slightly. The last exemplar haplotype network (Figure 19i, *Eucereon* nr. *varium*, BIN BOLD:AAJ0944) again shows high intraspecific variation with eleven haplotypes found among just 16 sequences from two countries, Panama and Costa Rica.


a) *Eucereon centrale*
n = 57
b) *Eucereon aurantiaca*
n = 91
c) *Eucereon atrigutta*
n = 21
Costa Rica - ACG
Costa Rica - Cartago
Costa Rica - Heredia
Costa Rica - Puntarenas
Guatemala
Honduras
Mexico
Nicaragua
Panama
Argentina
Brazil
Bolivia
Ecuador
French Guiana
Paraguay
Peru
unknown

d) *Eucereon xanthura*

n = 51

e) *Eucereon setosum*

n = 14

f) *Eucereon aeolum*

n = 66

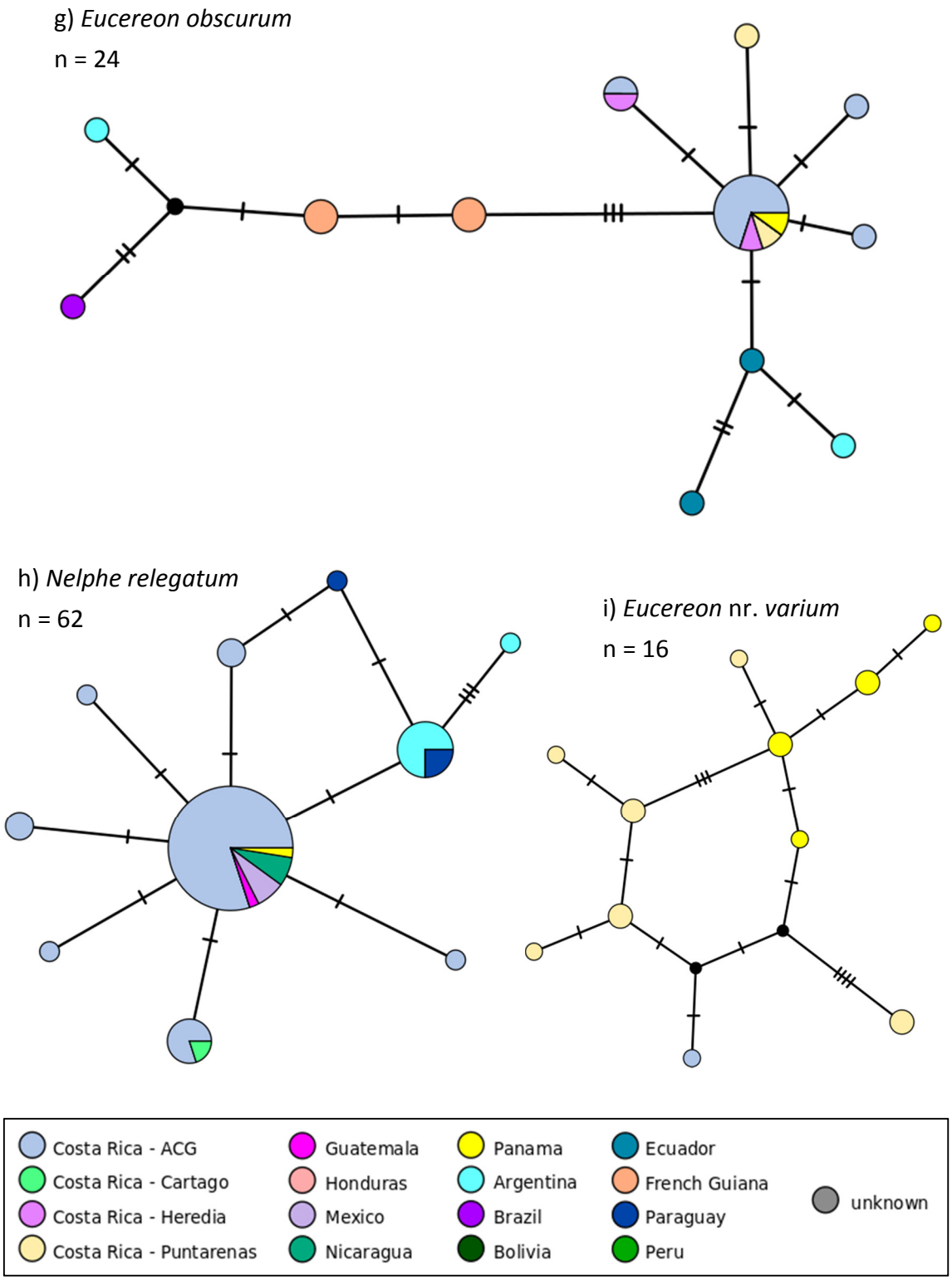


Figure 19: Haplotype networks of the BINs a) *Eucereon centrale* (BOLD:AAA1310, n = 57), b) *Eucereon aurantiaca* (BOLD:AAA1311, n = 91), c) *Eucereon atrigutta* (BOLD:AAE1486, n = 21), d) *Eucereon xanthura* (BOLD:AAA1337, n = 51), e) *Eucereon setosum* (BOLD:AAN5487, n = 14), f) *Eucereon aeolum* (BOLD:AAA8661, n = 66), g) *Eucereon obscurum* (BOLD:AAD0077, n = 24), h) *Nelphe relegatum* (BOLD:AAA9439, n = 62) and i) *Eucereon* nr. *varium* (BOLD:AAJ0944, n = 16). Each color represents a different country, except of Costa Rica, which is divided into four regions, namely the three provinces Cartago, Heredia and Puntarenas, and the Área de Conservación Guanacaste (ACG). Mutations are indicated by hatch marks. Created in PopArt.

5. Discussion

5.1 Newly generated sequences

The DNA extraction and sequencing procedure was very successful, as only four samples did not deliver a suitable mtDNA sequence. Also, no obvious contaminations with DNA from other organisms had occurred. Extracting DNA from two of the missing samples (both collected in Panama, Appendix 1) could be repeated with the abdomen instead of a leg to increase the chance of a successful extraction. As expected, the primers LepF and LepR proved to be appropriate to extract the targeted COI sequence of the present samples.

The prior sorting to morphospecies proved to be very stable in the light of new sequence data, as 40 morphospecies were found, while the various delimitation algorithms retrieved between 42 and 45 OTUs for the samples from Costa Rica, Panama and Ecuador. The two morphospecies that were split according to the BIN algorithm in this study (*Eucereon punctatum* and *Eucereon obscurum*) were also separated by all other methods (Figure 16), so it is very likely that these are cryptic species, as the respective individuals could thus far not be differentiated by means of external morphology. In comparison, in a recent study, Zhou et al. (2019) found a much higher cryptic diversity in Orthoptera in China, as they identified 131 morphospecies, but received 196 BINs, which is an increase of almost 50%. Brehm et al. (2016) even detected 80% more putative Geometrid moth species in the southern Ecuador Andes through DNA barcoding, and Strutzenberger et al. (2011) found in their study on *Eois* moths (Geometridae) in southern Ecuador 31 morphospecies (30%) to be closely related and might have not been detected by morphological discrimination alone. Anyway, the results suggest that not much undetected cryptic biodiversity of moths in the genus *Eucereon* and its nearest relatives awaits discovery in the study region. Rather, the available sampling and careful species sorting using “conventional” wing pattern characters were sufficient to uncover most of the species diversity in the region. This lends further credibility to earlier moth biodiversity analyses from the same region that were based on morphospecies sorting alone (Alonso-Rodríguez et al., 2017; Rabl et al., 2019).

5.2 Comparison of the delimitation algorithms

The different delimitation algorithms delivered mostly very similar results (Figure 20). The BIN algorithm, the 2% threshold and the GMYC single-threshold method all detected identical OTUs, while 1% and 3% threshold, ABGD, GMYC multiple-threshold method and bPTP model show slight differences (Appendix 7).

The **BIN** algorithm implemented in BOLD is a very convenient way to delimit species/OTUs, as it is working automatically in the background. The biggest advantage is certainly the assignment of unique BIN-codes and the provided storage of these on the platform BOLD, so samples/sequences can easily be compared globally. Also, future samples can easily be compared to existing ones. However, BINs can only be calculated after uploading sequences to the BOLD repository, and it might take several weeks or even months, until samples are allocated to BIN-codes. Furthermore, there are countless non-public sequences, which are contributing to the BIN calculations, but these cannot be downloaded, inspected or used for other analyses.

The **2% threshold** method is a fast way to delimit OTUs, but previous knowledge of the best threshold value for the organisms in question is necessary. As no universal threshold valid for all organisms exists (Hebert et al., 2003b; Candek & Kuntner, 2015), taxon-dependent thresholds have to be investigated, in case no or few studies for the relevant organisms are available. Several studies on Lepidoptera found a threshold of 2% divergence of COI sequences (K2P) suitable for this order, for example Hausmann et al. (2011), Mutanen et al. (2012) and Simonsen et al. (2019). For the specimens studied in this work the initially hypothesized threshold of 2% seems to be appropriate as well, as the results tightly match with the other tested models.

The choice of the correct prior value (P) is crucial for determining the number of OTUs calculated by the **ABGD** model, because when selecting a too low P, an oversplitting will occur, while a too high P value results in a lumping of distinct OTUs. In comparison with the other algorithms, the prior value P=0.46% resulting in 42 OTUs seemed to be the most suitable prior for these particular samples, this prior was therefore used for further evaluations. Other studies used this particular prior value as well, for example Puillandre et al. (2012) and Lavinia et al. (2017), which also included two additional priors. On the other hand, Kekkonen et al. (2015) found lower (P=0.28% and 0.17%) and higher priors (P=2.15%) to be more suitable for two moth subfamilies Elachistinae and Gelechiinae, respectively. This dependency of the ABGD model on a priori parameter selections slightly devalues this approach, especially when dealing with under-explored biota such as species-rich tropical insects.
Although the ABGD model (P=0.46%) found the same amount of OTUs as the BIN algorithm, the 2% threshold and the GMYC model, each two BINs were split and merged. Lavinia et al. (2017) also found several splits and merges, compared to the BIN algorithm. In this case there were no differences between using the K2P or JC69 distances, but in other studies the results also varied in regard to the distance metric employed (Kekkonen & Hebert, 2014). The biggest advantage of ABGD is definitively the very short computing time, as within a few seconds it delivers the results, which is ideal for getting

a quick overview of the amount of OTUs in your samples. However, the results varied when using all identical sequences or just the haplotypes. In general, fewer OTUs were retrieved with the haplotypes only, especially for the lower prior values. As this algorithm uses the intra- and interspecific distances in order to estimate the barcoding gap, using all available identical sequences should be preferred.

As the **GMYC** method is heavily dependent on tree reconstruction (Talavera et al., 2013), the various results differed considerable also with the target sequences. First of all, as already mentioned, the multiple-threshold method is still in development, and given the present results and those from other studies (Fujisawa & Barraclough, 2013; Kekkonen & Hebert, 2014; Kekkonen et al., 2015; Zhou et al., 2019), this method shows a tendency to oversplit. Additionally, the computing time is notably higher and therefore it should not be used to discriminate species/OTUs, at least not in the current version. The second, maybe even more important factor is not using identical sequences, because obviously the GMYC method cannot handle this well and (randomly?) merges samples. Most of the studies used haplotypes only, while Talavera et al. (2013) found just slight differences when using all sequences instead of one sequence per haplotype. However, the results presented in this study were not identical, so using haplotypes should be preferred. A big advantage of using the haplotypes only is also the reduced computing time. In total, the GMYC algorithm using the BEAST2 tree and applying the single-threshold method is time-consuming, especially for bigger datasets, but it seems to be quite robust and the quality of the results can easily be monitored.

The **bPTP** model also delivered very similar results compared to the previously described methods; it just split one BIN into two OTUs. The sequences of these two OTUs differ by approximately 1% (Figure 15) and were recognized as a single OTU by all the other methods, except of the GMYC multiple-threshold model. Interestingly, it did not split other morphospecies/BINs with similar intraspecific differences, like *Eucereon aurantiaca* (BOLD:AAA1311) or *Eucereon* nr. *varium* (BOLD:AAJ0944), which were split by other delimitation methods. However, this model can cause long computation times when working with big datasets; smaller datasets, like the present one, are usually processed within a few hours.

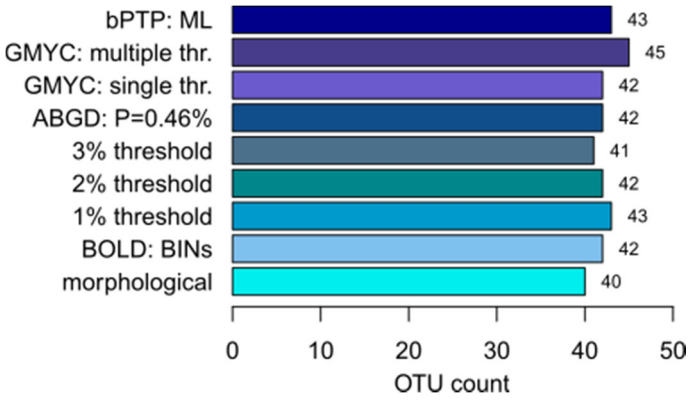


Figure 20: Summary of the results of the morphological species sorting and the delimitation algorithms BIN, 1% 2% and 3% threshold, ABGD (P=0.46%), GMYC single- and multiple-threshold using one sequence per haplotype, and bPTP.

5.3 Boundaries of the genus *Eucereon*

In combination with wing patterns, the phylogenetic tree (Figure 18a) gives a first tentative overview of the possible members of the genus *Eucereon* (samples marked with turquoise branch tips; Appendix 9). While the upper part of the tree contains mostly moths with dark brown to black wings (for examples see Figure 5h and l, and Figure 18b and c), the lower part, indicated by the turquoise branches, consists of moths with similar wing patterns like the type species in Figure 2, which is (brighter-) colored and with numerous spots on the forewing (for examples see Figure 5a, d, g, o and Figure 18d, f-h). However, there are several samples placed within the *Eucereon* clade by means of their sequence data, which show different wing patterns (for an example see Figure 18e, sample is stored in BOLD as "*Theages* sp."). Furthermore, seven species of the downloaded PubSets from GenBank appear within the *Eucereon* cluster, and they are clearly not closely related to *Eucereon*, these species are *Lymire strigivenia*, *Calonotos acutipennis*, *Metaloba argante*, *Chrysocale regalis*, *Belemnia ochriplaga*, *Isia alcumena* and *Sciopsyche tropica*. Unfortunately, there are no pictures of these individuals stored in BOLD and in the study of Zenker et al. (2017) only *Isia alcumena* is displayed (Figure 21). The reason for this could be the quite poor quality of the tree sample, an insufficient resolution of the COI gene, or the genus shows a high morphological variation and some species/OTUs actually belong to *Eucereon*. Furthermore, the pictures stored in the BOLD repository are in several cases of (very) bad quality and therefore it can be difficult to compare the wing patterns.

Figure 21: *Isia alcumena*, extracted from Zenker et al. (2017).

Nevertheless, these results have to be handled with care and further research is needed in order to better support this theory on the boundaries of the genus *Eucereon*. For example, additional genes like EF-1α and/or wingless of one individual per BIN of the present study should be sequenced and included in the analyses, in order to improve the quality and resolution of the phylogenetic tree. In any case, it seems that some current genera, or at least some species within these genera, should be included in a prospective monophyletic genus *Eucereon*, due to their close relationship. As the name "*Eucereon*" is the oldest available name for this genus, it should be maintained, cf. *Eucereon* (Hübner, 1816), *Delphyre* (Walker, 1854), *Theages* (Walker, 1855), *Nelphe* (Herrich-Schäffer, 1858), *Hyaleucerea* (Butler, 1875), *Heliura* and *Galethalea* (Butler, 1876).

5.4 Sequences stored in BOLD

While searching for *Eucereon*-related sequences stored in the BOLD repository, two major issues were noticed. First, there are only few *Eucereon* sequences from outside of Costa Rica available, and the sequences from Costa Rica stem mostly from the north-west (ACG region, 72%, Figure 22). It is therefore difficult to say, whether individual species really only occur in the respective countries or were simply not yet caught and sequenced from localities elsewhere. Furthermore, just three of these 1677 downloaded sequences are from specimens sampled in the southern Puntarenas province, where all the samples from this study from Costa Rica were collected.

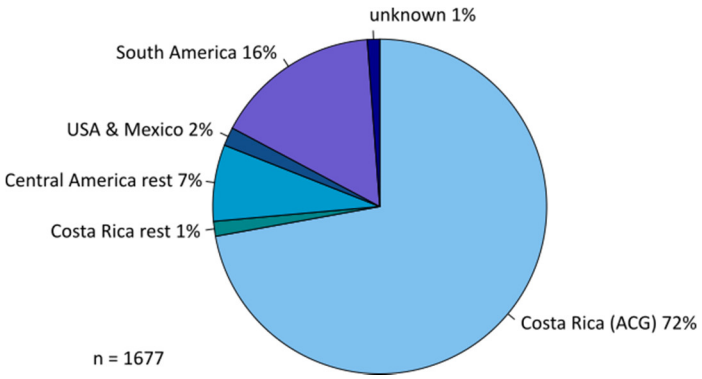


Figure 22: Countries of origin of all 1677 samples downloaded from BOLD. Costa Rica is divided into the Área de Conservación Guanacaste (ACG) and the rest of Costa Rica, which are the provinces Cartago, Heredia and Puntarenas.

Second, a high number of sequences are simply named "Lepidoptera" or "Arctiinae". In total, 525 of 1677 sequences (31%) are not assigned to any genus. Analyzing the BINs included in the proposed list of *Eucereon* (1295 sequences), 58% of the sequences are already assigned to the genus *Eucereon*, while 13% are stored under different genera like *Heliura* or *Nelphe*, and 29% are without genus (Figure 23). Samples named "Lepidoptera" can only be found, when their BIN codes are known and directly searched

for. There might be numerous other BINs which should also be included in the genus *Eucereon*, but cannot be detected due to missing or wrong taxonomic assignments.

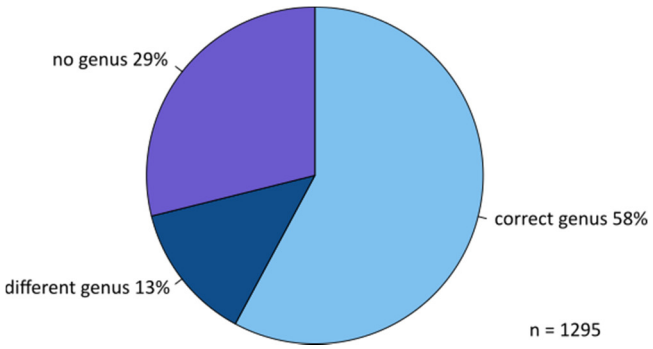


Figure 23: Taxonomic assignment of the 1295 sequences from BOLD assumed to belong to *Eucereon*. Samples listed as "correct genus" are already stored as *Eucereon*, "different genus" are samples assigned to different genera like *Nelphe* or *Heliura*, but should actually be included in *Eucereon*, and "no genus" are samples stored as Lepidoptera.

5.5 Some considerations on food plants

There are few known food plants for members of the *Eucereon*-complex, but in the database of Daniel H. Janzen (http://janzen.sas.upenn.edu/caterpillars/database.lasso) some possible food plants for the genus *Eucereon* can be found, for example species of the families Moraceae, Apocynaceae and Fabaceae. Noticeable is the fact, that several listed plants (e.g. within the families Loganiaceae, Apocynaceae, and Fabaceae/*Erythrina*) are known to be poisonous when ingested, as they contain alkaloids, and Moraceae often contain milky sap (latex), which is usually a challenge to digest for herbivores. Searching the database for the species included in the proposed list of "true" *Eucereon*, similar results can be found. For example, there are 192 food plant records for three *Heliura* species, *H. aurorina*, *H. tetragramma* and *H. banoca*, 191 of which fed on three *Strychnos* species (family Loganiaceae), a genus known for its highly toxic alkaloids strychnine and curare. Six individuals of "*Hyaleucerea* Janzen01" (BIN BOLD:AAA1450) fed on *Forsteronia spicata* (family Apocynaceae). 32 *Nelphe relegatum* samples were found to feed on several species of the families Apocynaceae and Moraceae. Another food plant is "*Cynanchum palustre*", recorded for *Nelphe carolina* (Heppner, 2003). The currently valid name for this plant is *Seutera angustifolia* (family Apocynaceae), which occurs around the Gulf of Mexico and is primarily a salt marsh and beach plant (Fishbein & Stevens, 2005). In total, twelve species fed on the family Moraceae only, seven on Apocynaceae only, four on Fabaceae only, three on Loganiaceae only, *Eucereon aurantiaca* fed on Moraceae and Fabaceae, and *Nelphe relegatum* fed on Apocynaceae and Moraceae. Hence, most species seem to feed on just one plant family or even just one plant genus, which indicates a narrow food specialization. This is in accordance with the study of Schulze (2003), who achieved an

oviposition of three *Eucereon* species in captivity in southern Ecuador, but the emerged caterpillars did not accept any of the offered plants. In contrast, many European Arctiinae are known to be generalists and use a wide variety of food plants (for examples, refer to the database at https://www.leps.it/).

However, several insects are known to use alkaloids for their own defense against predators through pharmacophagy, the nutrition-independent active uptake of secondary plant substances, for example pyrrolizidine alkaloids (Brown Jr, 1984; Lindigkeit et al., 1997). Häuser & Boppré (1997) revealed pharmacophagy in adult Neotropical moths in their study on pyrrolizidine alkaloids, 63 of the collected specimens in Costa Rica were even assigned to the genus *Eucereon*. Many of such pharmacophagous moths also show an aposematic (warning) coloration (Brown Jr, 1984; Häuser & Boppré, 1997), which is often a red or yellow coloring of the abdomen or parts of it – many of the newly sequenced specimens and members of the proposed "true" *Eucereon* also show such a coloration of the abdomen. The findings of these studies and the information on the food plants therefore suggest that at least some members of the genus *Eucereon* might defend themselves against predators through pharmacophagy at larval and/or adult life stages.

5.6 Phylogeographic analyses

The analysis of the haplotype networks yielded no consistent pattern. Some BINs show a high intraspecific variance (Figure 19a, c, d, f, g, i), some have only little variation (Figure 19b), others show no or little sequence differences between countries (Figure 19f, h), and again others show substantial differentiation between Central America and South America (Figure 19c, e). Some BINs were able to spread over thousands of kilometers, while others apparently stayed within a few hundred kilometers, i.e. the respective species are likely quite narrow endemics. In most cases there were no or just very minor sequence differences between the samples from different regions in Costa Rica, at least in the samples that were analyzed further here. Specifically, no case of substantial sequence differentiation in *Eucereon* moths could be detected between the seasonally very dry Guanacaste region (from where the vast majority of Daniel H. Janzens many records are derived, that make up a sizeable fraction of entries in the BOLD database as well as in the host plant database http://janzen.sas.upenn.edu/caterpillars/database.lasso) and the highly humid Golfo Dulce region in southwest Costa Rica (the location of the study by Rabl et al. (2019)).

A high intraspecific variability, as in *Eucereon centrale* (BOLD:AAA1310, Figure 19a) and *Eucereon* nr. *varium* (BIN BOLD:AAJ0944, Figure 19i), could possibly be linked with a local habitat specialization (Maresova et al., 2019). In both cases, the individuals available for analysis stemmed from a comparatively small area. This might indicate that they

possibly require certain food plants, which most probably only occur in Central America. In the database of Daniel H. Janzen one food plant, *Forsteronia spicata* (family Apocynaceae), is recorded for 20 *Eucereon centrale* specimens, its distribution ranges from Mexico to Colombia. Therefore, this moth species could be present in all these countries, where this plant occurs, provided all other required conditions like climate etc. are fulfilled. Another possibility could be a splitting of the particular species, which is currently ongoing or just about to start, but due to the lack of evidence this remains a theory. Unfortunately, there are no food plant records available for *Eucereon* nr. *varium* (or *E. varia*/*varium*). In contrast, a low genetic diversity, as in *Eucereon aurantiaca* (BIN BOLD:AAA1311, Figure 19b), could indicate a relatively young species or population (Maresova et al., 2019), or a successful genotype, which could spread easily. The food plant database contains 117 records for *Eucereon aurantiaca* and most of the collected caterpillars fed on various *Ficus* species (family Moraceae, worldwide distribution), a very common tree genus in the Neotropics. Species specialized on this particular tree genus could therefore find their niches almost anywhere, as long as there is tropical forest. To evaluate whether this applies for *Eucereon aurantiaca*, more samples from additional countries are needed.

Very interesting is BIN BOLD:AAD0077 of the *Eucereon obscurum* cluster (Figure 19g), as the two samples from Argentina originate from the same region in the very north-east of the country and were sampled only 27 km apart. Yet the sequences of these two samples differ substantially, as one sample is more similar to individuals from Brazil and French Guiana, and the other sample is more similar to individuals from Ecuador, Panama and Costa Rica. An explanation could be that ancestors of these moths migrated from Costa Rica to Argentina, some in the north-west of South America via Venezuela, French Guiana and Brazil, and some others via Colombia, Ecuador, Peru and Bolivia alongside the Andes. This would fit well to the dispersal scenario described by Blandin & Purser (2013), but the origin of these possible ancestors is unknown. In any case, the members of this OTU seem to be highly mobile, as the north-west of Costa Rica and the north-east of Argentina are more than 6000 km apart and they had to cross the Andes, one of the world's highest mountain ranges. There is just one food plant recorded for one single specimen in the Janzen-database, which is *Acalypha apodanthes* (family Euphorbiaceae). This plant species is endemic to Nicaragua and northern Costa Rica (https://www.gbif.org/species/3057381). Due to the geographic distribution of *Eucereon obscurum* it is possible that these moths are specialized on the plant genus *Acalypha*, which consists of hundreds of species and is distributed worldwide. Furthermore, *Eucereon obscurum* is able to colonize habitats between sea level and 1000 m a.s.l. and possibly at even higher elevations. As previously mentioned, the morphospecies *Eucereon obscurum* split into two BINs/OTUs, BOLD:AAD0077 and

BOLD:AAF1123. For the second BIN there are only four sequences available at BOLD, all from north-western Costa Rica (ACG, Appendix 2) and one sequence that was newly generated in the course of this work from the Golfo Dulce region (Appendix 1). Hence, it is unfortunately not possible to draw comparisons between these two BINs regarding distribution and mobility. However, according to the analyses from the previous section, these individuals might not belong to the genus *Eucereon*, as the abdomen and wings are mainly black. Interestingly, parts of the abdomen are shiny blue, which might be iridescent under ultraviolet light, which could be an aposematic color and visible for many birds, but not for the human eye.

Another interesting case is the morphospecies *Eucereon atrigutta* (BIN BOLD:AAE1486, Figure 19c, also Figure 13b and Figure 15). The samples from South America are quite separated from those collected in Central America with regard to their COI haplotypes. It seems, the members of this BIN are also highly dispersive and they also occur at elevations between sea level and more than 1100 m a.s.l. There are six mutations between the two haplotypes occurring in Puntarenas, four sequences were newly generated for this study. This could explain why two of the previously described delimitation algorithms (GMYC multiple-threshold and bPTP) found two distinct OTUs, in contrast to the other models which found just one (Appendix 7). When using all the 1815 sequences (see chapter 3.2.5) and running the different algorithms again, similar results can be found. The GMYC single-threshold model resulted in one OTU for this morphospecies, just like the BIN algorithm, but the ABGD method retrieved five different OTUs (P=0.46%), where each haplotype represents one OTU, and the bPTP algorithm (using haplotypes to decrease computing time) found three OTUs, viz. the haplotypes from Argentina, those from Brazil and all combined haplotypes from Central America. A similar picture can be seen in *Eucereon* sp. 10 (BIN BOLD:AAN5487, stored as *Eucereon setosum* in BOLD, Figure 19e), as the GMYC single-threshold method and the bPTP model both arrived at one OTU, but the ABGD algorithm found two OTUs, one containing the samples from Central America and the other one comprising the samples from South America. But this does not apply for *Eucereon centrale* (BIN BOLD:AAA1310, Figure 19a), which consists of far more haplotypes and mutations, but all algorithms arrived at just one single OTU. It is unclear, why the various algorithms found such different and conflicting results, but the haplotype networks in Figure 19c and 19e help visualizing the issue referring to these specific species/BINs.

6. Conclusions

In total, 138 novel COI barcode sequences were successfully generated from 142 *Eucereon* specimens collected in Costa Rica, Panama and Ecuador. The five delimitation algorithms all resulted in a similar number of OTUs (42-45). As none of the tested algorithms outperformed all others, I recommend to use the BIN algorithm implemented in the global database BOLD for these (and similar) organisms. GMYC single-threshold also performed very well, achieved the same results and is independent from the online repository BOLD. A 2% divergence (K2P) threshold of the COI sequences worked well with the studied moths, as these results were similar or identical to other delimitation algorithms. Changing the threshold to 1 or 3% led to oversplitting or merging of OTUs, respectively. Results from these barcoding approaches mostly agree with the 40 recognized morphospecies. This indicates a rather low level of cryptic diversity in these organisms and therefore merely minor consequences for estimates of local species richness based on morphological sorting can be expected. However, the genus *Eucereon* in its current use is most probably not monophyletic. There are numerous species from currently eight other genera which should be considered part of *Eucereon*, while several species included in *Eucereon* at present might in fact be better associated with other genera to reflect phylogeny. These results are based on a combination of a phylogeny using COI barcodes and published sequences of five more genes (EF-1α, GAPDH, MDH, RpS5 and wgl). To rigorously test this hypothesis, however, multi-gene analyses with denser taxon sampling are required.

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Appendix

Appendix 1: List of all 142 Arctiinae specimens newly sequenced in this study.

Sample ID	Process ID	Identification	BIN	Collection date	Country	Site	Lat.	Long.	Alt. (m)	Collector
DR14_0136	ARCLG088-18	*Eucereon* sp. 01	BOLD:AAA1335	04-Aug-2014	Costa Rica	La Gamba	8.6977	-83.2022	154	Dominik Rabl
DR14_0137	ARCLG089-18	*Cercopimorpha sylva*	BOLD:ABW7183	20-Jul-2014	Costa Rica	La Gamba	8.70445	-83.2061	190	Dominik Rabl
DR14_0138	ARCLG090-18	*Eucereon* nr. *varium*	BOLD:AAJ0944	30-Jul-2014	Costa Rica	La Gamba	8.69537	-83.2072	184	Dominik Rabl
DR14_0139	ARCLG091-18	*Eucereon aurantiaca*	BOLD:AAA1311	16-Aug-2014	Costa Rica	La Gamba	8.69875	-83.2092	233	Dominik Rabl
DR14_0140	ARCLG092-18	*Eucereon latifascia*	BOLD:ACF0957	27-Aug-2014	Costa Rica	La Gamba	8.69195	-83.2066	279	Dominik Rabl
DR14_0141	ARCLG093-18	*Eucereon pseudarchias*	BOLD:ADL1208	19-Aug-2014	Costa Rica	La Gamba	8.70188	-83.2076	212	Dominik Rabl
DR14_0142	ARCLG094-18	*Eucereon tesselata*	BOLD:AAJ0947	26-Aug-2014	Costa Rica	La Gamba	8.70213	-83.2104	161	Dominik Rabl
DR14_0143	ARCLG095-18	*Eucereon* sp. 02	BOLD:ADL0434	31-Aug-2014	Costa Rica	La Gamba	8.69997	-83.206	141	Dominik Rabl
DR14_0227	ARCLG174-18	*Eucereon aurantiaca*	BOLD:AAA1311	20-Sep-2014	Costa Rica	La Gamba	8.70445	-83.2061	190	Dominik Rabl
DR14_0235	ARCLG182-18	*Eucereon pseudarchias*	BOLD:ADL1208	31-Aug-2014	Costa Rica	La Gamba	8.69947	-83.2076	210	Dominik Rabl
DR14_0241	EUCE001-18	*Eucereon tesselata*	BOLD:AAJ0947	18-Sep-2014	Costa Rica	La Gamba	8.69875	-83.2092	233	Dominik Rabl
DR14_0242	EUCE002-18	*Eucereon tesselata*	BOLD:AAJ0947	01-Aug-2014	Costa Rica	La Gamba	8.69947	-83.2076	210	Dominik Rabl
DR14_0243	EUCE003-18	*Eucereon latifascia*	BOLD:ACF0957	19-Aug-2014	Costa Rica	La Gamba	8.69947	-83.2076	210	Dominik Rabl
DR14_0244	EUCE004-18	*Eucereon latifascia*	BOLD:ACF0957	27-Aug-2014	Costa Rica	La Gamba	8.69847	-83.2029	137	Dominik Rabl
DR14_0245	EUCE005-18	*Eucereon aurantiaca*	BOLD:AAA1311	01-Aug-2014	Costa Rica	La Gamba	8.70188	-83.2076	212	Dominik Rabl
DR14_0246	EUCE006-18	*Eucereon aurantiaca*	BOLD:AAA1311	02-Aug-2014	Costa Rica	La Gamba	8.70213	-83.2104	161	Dominik Rabl
DR14_0247	EUCE007-18	*Eucereon aurantiaca*	BOLD:AAA1311	19-Aug-2014	Costa Rica	La Gamba	8.69947	-83.2076	210	Dominik Rabl
DR14_0248	EUCE008-18	*Eucereon aurantiaca*	BOLD:AAA1311	22-Aug-2014	Costa Rica	La Gamba	8.6977	-83.2022	154	Dominik Rabl
DR14_0249	EUCE009-18	*Eucereon aurantiaca*	BOLD:AAA1311	16-Sep-2014	Costa Rica	La Gamba	8.69847	-83.2029	137	Dominik Rabl
DR14_0250	EUCE010-18	*Eucereon aurantiaca*	BOLD:AAA1311	29-Jul-2014	Costa Rica	La Gamba	8.6977	-83.2022	154	Dominik Rabl
DR14_0251	EUCE011-18	*Eucereon* nr. *varium*	BOLD:AAJ0944	24-Aug-2014	Costa Rica	La Gamba	8.70208	-83.2045	151	Dominik Rabl
DR14_0252	EUCE012-18	*Eucereon* nr. *varium*	BOLD:AAJ0944	30-Jul-2014	Costa Rica	La Gamba	8.69537	-83.2072	184	Dominik Rabl
DR14_0253	EUCE013-18	*Eucereon* nr. *varium*	BOLD:AAJ0944	31-Jul-2014	Costa Rica	La Gamba	8.69875	-83.2092	233	Dominik Rabl
DR14_0254	EUCE014-18	*Eucereon* nr. *varium*	BOLD:AAJ0944	18-Sep-2014	Costa Rica	La Gamba	8.69875	-83.2092	233	Dominik Rabl
DR14_0255	EUCE015-18	*Eucereon* nr. *varium*	BOLD:AAJ0944	05-Aug-2014	Costa Rica	La Gamba	8.69537	-83.2072	184	Dominik Rabl

Sample ID	Process ID	Identification	BIN	Collection date	Country	Site	Lat.	Long.	Alt. (m)	Collector
DR14_0256	EUCE016-18	*Eucereon* nr. *varium*	BOLD:AAJ0944	30-Jul-2014	Costa Rica	La Gamba	8.69537	-83.2072	184	Dominik Rabl
DR14_0257	EUCE017-18	*Eucereon* nr. *varium*	BOLD:AAJ0944	30-Jul-2014	Costa Rica	La Gamba	8.69537	-83.2072	184	Dominik Rabl
DR14_0258	EUCE018-18	*Eucereon aeolum*	BOLD:AAA8661	18-Aug-2014	Costa Rica	La Gamba	8.70408	-83.2035	106	Dominik Rabl
DR14_0259	EUCE019-18	*Eucereon aeolum*	BOLD:AAA8661	26-Aug-2014	Costa Rica	La Gamba	8.70213	-83.2104	161	Dominik Rabl
DR14_0260	EUCE020-18	*Eucereon maia*	BOLD:AAE4592	21-Aug-2014	Costa Rica	La Gamba	8.69847	-83.2029	137	Dominik Rabl
DR14_0261	EUCE021-18	*Eucereon maia*	BOLD:AAE4592	22-Aug-2014	Costa Rica	La Gamba	8.69537	-83.2072	184	Dominik Rabl
DR14_0262	EUCE022-18	*Eucereon maia*	BOLD:AAE4592	20-Aug-2014	Costa Rica	La Gamba	8.70445	-83.2061	190	Dominik Rabl
DR14_0263	EUCE023-18	*Eucereon maia*	BOLD:AAE4592	24-Aug-2014	Costa Rica	La Gamba	8.69997	-83.206	141	Dominik Rabl
DR14_0264	EUCE024-18	*Eucereon maia*	BOLD:AAE4592	26-Aug-2014	Costa Rica	La Gamba	8.70445	-83.2061	190	Dominik Rabl
DR14_0265	EUCE025-18	*Eucereon* sp. 01	BOLD:AAA1335	22-Aug-2014	Costa Rica	La Gamba	8.69537	-83.2072	184	Dominik Rabl
DR14_0266	EUCE026-18	*Eucereon* sp. 01	BOLD:AAA1335	21-Sep-2014	Costa Rica	La Gamba	8.70153	-83.213	113	Dominik Rabl
DR14_0267	EUCE027-18	*Eucereon* sp. 01	BOLD:AAA1335	25-Aug-2014	Costa Rica	La Gamba	8.70408	-83.2035	106	Dominik Rabl
DR14_0268	EUCE028-18	*Eucereon* sp. 01	BOLD:AAA1335	02-Aug-2014	Costa Rica	La Gamba	8.69997	-83.206	141	Dominik Rabl
DR14_0269	EUCE029-18	*Eucereon* sp. 01	BOLD:AAA1335	01-Aug-2014	Costa Rica	La Gamba	8.69845	-83.2074	203	Dominik Rabl
DR14_0270	EUCE030-18	*Eucereon* sp. 01	BOLD:AAA1335	01-Aug-2014	Costa Rica	La Gamba	8.69845	-83.2074	203	Dominik Rabl
DR14_0271	EUCE031-18	*Eucereon rosinum*	BOLD:AAN0729	28-Aug-2014	Costa Rica	La Gamba	8.69847	-83.2029	137	Dominik Rabl
DR14_0272	EUCE032-18	*Eucereon rosinum*	BOLD:AAN0729	26-Jul-2014	Costa Rica	La Gamba	8.70188	-83.2076	212	Dominik Rabl
DR14_0273	EUCE033-18	*Eucereon rosinum*	BOLD:AAN0729	27-Aug-2014	Costa Rica	La Gamba	8.69195	-83.2066	279	Dominik Rabl
DR14_0274	EUCE034-18	*Eucereon rosinum*	BOLD:AAN0729	27-Aug-2014	Costa Rica	La Gamba	8.69195	-83.2066	279	Dominik Rabl
DR14_0275	EUCE035-18	*Eucereon rosinum*	BOLD:AAN0729	19-Aug-2014	Costa Rica	La Gamba	8.69947	-83.2076	210	Dominik Rabl
DR14_0276	EUCE036-18	*Eucereon punctatum*	BOLD:ADM7139	31-Jul-2014	Costa Rica	La Gamba	8.69803	-83.2083	185	Dominik Rabl
DR14_0277	EUCE037-18	*Eucereon punctatum*	BOLD:ADM7139	30-Jul-2014	Costa Rica	La Gamba	8.69537	-83.2072	184	Dominik Rabl
DR14_0278	EUCE038-18	*Eucereon punctatum*	BOLD:ADM7139	20-Sep-2014	Costa Rica	La Gamba	8.69845	-83.2074	203	Dominik Rabl
DR14_0279	EUCE039-18	*Eucereon punctatum*	BOLD:ADM7139	16-Sep-2014	Costa Rica	La Gamba	8.69537	-83.2072	184	Dominik Rabl
DR14_0280	EUCE040-18	*Eucereon punctatum*	BOLD:ADM7139	19-Aug-2014	Costa Rica	La Gamba	8.69947	-83.2076	210	Dominik Rabl
DR14_0281	EUCE041-18	*Eucereon punctatum*	BOLD:ACC9448	16-Aug-2014	Costa Rica	La Gamba	8.69713	-83.2062	150	Dominik Rabl
DR14_0282	EUCE042-18	*Eucereon aoris*	BOLD:AAA1365	05-Aug-2014	Costa Rica	La Gamba	8.69847	-83.2029	137	Dominik Rabl
DR14_0283	EUCE043-18	*Eucereon aoris*	BOLD:AAA1365	20-Sep-2014	Costa Rica	La Gamba	8.69845	-83.2074	203	Dominik Rabl
DR14_0284	EUCE044-18	*Eucereon aoris*	BOLD:AAA1365	19-Aug-2014	Costa Rica	La Gamba	8.70188	-83.2076	212	Dominik Rabl
DR14_0285	EUCE045-18	*Eucereon aoris*		31-Aug-2014	Costa Rica	La Gamba	8.69947	-83.2076	210	Dominik Rabl
DR14_0286	EUCE046-18	*Eucereon aoris*	BOLD:AAA1365	27-Jul-2014	Costa Rica	La Gamba	8.70445	-83.2061	190	Dominik Rabl

Sample ID	Process ID	Identification	BIN	Collection date	Country	Site	Lat.	Long.	Alt. (m)	Collector
DR14_0287	EUCE047-18	*Eucereon aoris*	BOLD:AAA1365	23-Aug-2014	Costa Rica	La Gamba	8.69875	-83.2092	233	Dominik Rabl
DR14_0288	EUCE048-18	*Eucereon atrigutta*	BOLD:AAE1486	19-Aug-2014	Costa Rica	La Gamba	8.70188	-83.2076	212	Dominik Rabl
DR14_0289	EUCE049-18	*Eucereon atrigutta*	BOLD:AAE1486	25-Jul-2014	Costa Rica	La Gamba	8.69947	-83.2076	210	Dominik Rabl
DR14_0290	EUCE050-18	*Eucereon atrigutta*	BOLD:AAE1486	22-Jul-2014	Costa Rica	La Gamba	8.69195	-83.2066	279	Dominik Rabl
DR14_0291	EUCE051-18	*Eucereon atrigutta*	BOLD:AAE1486	02-Sep-2014	Costa Rica	La Gamba	8.70213	-83.2104	161	Dominik Rabl
DR14_0292	EUCE052-18	*Eucereon obscurum*	BOLD:AAD0077	22-Jul-2014	Costa Rica	La Gamba	8.6977	-83.2022	154	Dominik Rabl
DR14_0293	EUCE053-18	*Eucereon obscurum*	BOLD:AAF1123	25-Jul-2014	Costa Rica	La Gamba	8.69947	-83.2076	210	Dominik Rabl
DR14_0294	EUCE054-18	*Eucereon obscurum*	BOLD:AAD0077	19-Sep-2014	Costa Rica	La Gamba	8.69947	-83.2076	210	Dominik Rabl
DR14_0295	EUCE055-18	*Eucereon* sp. 02	BOLD:ADL0434	31-Aug-2014	Costa Rica	La Gamba	8.69997	-83.206	141	Dominik Rabl
DR14_0296	EUCE056-18	*Eucereon* sp. 02	BOLD:ADL0434	04-Aug-2014	Costa Rica	La Gamba	8.6977	-83.2022	154	Dominik Rabl
DR14_0297	EUCE057-18	*Eucereon xanthura*	BOLD:AAA1337	25-Jul-2014	Costa Rica	La Gamba	8.69875	-83.2092	233	Dominik Rabl
DR14_0298	EUCE058-18	*Heliura rhodophila*	BOLD:AAI6726	20-Sep-2014	Costa Rica	La Gamba	8.70188	-83.2076	212	Dominik Rabl
DR14_0299	EUCE059-18	*Heliura rhodophila*	BOLD:AAI6726	17-Jul-2014	Costa Rica	La Gamba	8.69537	-83.2072	184	Dominik Rabl
DR14_0300	EUCE060-18	*Heliura rhodophila*	BOLD:AAI6726	16-Jul-2014	Costa Rica	La Gamba	8.69875	-83.2092	233	Dominik Rabl
DR14_0301	EUCE061-18	*Heliura rhodophila*	BOLD:AAI6726	15-Jul-2014	Costa Rica	La Gamba	8.69847	-83.2029	137	Dominik Rabl
DR14_0302	EUCE062-18	*Heliura rhodophila*	BOLD:AAI6726	22-Jul-2014	Costa Rica	La Gamba	8.69195	-83.2066	279	Dominik Rabl
DR14_0303	EUCE063-18	*Heliura rhodophila*	BOLD:AAI6726	29-Jul-2014	Costa Rica	La Gamba	8.69195	-83.2066	279	Dominik Rabl
DR14_0304	EUCE064-18	*Heliura rhodophila*	BOLD:AAI6726	22-Jul-2014	Costa Rica	La Gamba	8.69195	-83.2066	279	Dominik Rabl
DR14_0305	EUCE065-18	*Heliura rhodophila*	BOLD:AAI6726	20-Sep-2014	Costa Rica	La Gamba	8.70188	-83.2076	212	Dominik Rabl
DR14_0306	EUCE066-18	*Heliura rhodophila*	BOLD:AAI6726	26-Jul-2014	Costa Rica	La Gamba	8.69845	-83.2074	203	Dominik Rabl
DR14_0307	EUCE067-18	*Heliura thysbodes*	BOLD:AAM3522	18-Aug-2014	Costa Rica	La Gamba	8.70408	-83.2035	106	Dominik Rabl
DR14_0308	EUCE068-18	*Heliura thysbodes*	BOLD:AAM3522	03-Aug-2014	Costa Rica	La Gamba	8.70445	-83.2061	190	Dominik Rabl
DR14_0309	EUCE069-18	*Heliura thysbodes*	BOLD:AAM3522	16-Sep-2014	Costa Rica	La Gamba	8.69847	-83.2029	137	Dominik Rabl
DR14_0310	EUCE070-18	*Heliura thysbodes*	BOLD:AAM3522	03-Aug-2014	Costa Rica	La Gamba	8.70445	-83.2061	190	Dominik Rabl
DR14_0311	EUCE071-18	*Heliura thysbodes*	BOLD:AAM3522	02-Aug-2014	Costa Rica	La Gamba	8.69997	-83.206	141	Dominik Rabl
DR14_0312	EUCE072-18	*Heliura thysbodes*	BOLD:AAM3522	02-Aug-2014	Costa Rica	La Gamba	8.70213	-83.2104	161	Dominik Rabl
DR14_0313	EUCE073-18	*Cercopimorpha sylva*	BOLD:ABW7183	18-Sep-2014	Costa Rica	La Gamba	8.69875	-83.2092	233	Dominik Rabl
DR14_0314	EUCE074-18	*Cercopimorpha sylva*	BOLD:ABW7183	02-Aug-2014	Costa Rica	La Gamba	8.70213	-83.2104	161	Dominik Rabl
DR14_0315	EUCE075-18	*Cercopimorpha sylva*	BOLD:ABW7183	03-Aug-2014	Costa Rica	La Gamba	8.70445	-83.2061	190	Dominik Rabl
DR14_0316	EUCE076-18	*Cercopimorpha sylva*	BOLD:ABW7183	21-Sep-2014	Costa Rica	La Gamba	8.70445	-83.2061	190	Dominik Rabl
DR14_0317	EUCE077-18	*Cercopimorpha sylva*	BOLD:ABW7183	18-Sep-2014	Costa Rica	La Gamba	8.69875	-83.2092	233	Dominik Rabl

Sample ID	Process ID	Identification	BIN	Collection date	Country	Site	Lat.	Long.	Alt. (m)	Collector
DR14_0402	EUCE078-18	*Eucereon* nr. *varium*	BOLD:AAJ0944	25-Aug-2014	Costa Rica	La Gamba	8.698	-83.207	203	Dominik Rabl
DR14_0403	EUCE079-18	*Eucereon* sp. 01	BOLD:AAA1335	21-Sep-2014	Costa Rica	La Gamba	8.704	-83.206	190	Dominik Rabl
DR14_0404	EUCE080-18	*Heliura thysbodes*	BOLD:AAM3522	21-Sep-2014	Costa Rica	La Gamba	8.704	-83.206	190	Dominik Rabl
DR14_0405	EUCE081-18	*Heliura thysbodes*	BOLD:AAM3522	21-Sep-2014	Costa Rica	La Gamba	8.704	-83.206	190	Dominik Rabl
DR14_0406	EUCE082-18	*Heliura thysbodes*	BOLD:AAM3522	26-Aug-2014	Costa Rica	La Gamba	8.704	-83.206	190	Dominik Rabl
DR14_0407	EUCE083-18	*Eucereon punctatum*	BOLD:ADM7139	26-Aug-2014	Costa Rica	La Gamba	8.704	-83.206	190	Dominik Rabl
DR14_0408	EUCE084-18	*Eucereon aurantiaca*	BOLD:AAA1311	26-Aug-2014	Costa Rica	La Gamba	8.704	-83.206	190	Dominik Rabl
DR14_0409	EUCE085-18	*Eucereon* sp. 01	BOLD:AAA1335	26-Aug-2014	Costa Rica	La Gamba	8.704	-83.206	190	Dominik Rabl
DR14_0410	EUCE086-18	*Eucereon* sp. 01	BOLD:AAA1335	26-Aug-2014	Costa Rica	La Gamba	8.704	-83.206	190	Dominik Rabl
DR17_ArcPa100	EUCE087-18	*Eucereon* sp. 03	BOLD:ACC9481	21-Feb-2017	Panama	Gamboa	9.13064	-79.7242	62	Dominik Rabl
DR17_ArcPa101	EUCE088-18	*Eucereon* sp. 04	BOLD:AAG6289	22-Feb-2017	Panama	Gamboa	9.12417	-79.6944	71	Dominik Rabl
DR17_ArcPa102	EUCE089-18	*Eucereon maia*	BOLD:AAE4592	07-Feb-2017	Panama	Gamboa	9.12828	-79.6981	46	Dominik Rabl
DR17_ArcPa103	EUCE090-18	*Eucereon* sp. 05		07-Feb-2017	Panama	Gamboa	9.12828	-79.6981	46	Dominik Rabl
DR17_ArcPa104	EUCE091-18	*Eucereon* sp. 06	BOLD:ADM7491	23-Feb-2017	Panama	Gamboa	9.12103	-79.7086	62	Dominik Rabl
DR17_ArcPa105	EUCE092-18	*Eucereon punctatum*	BOLD:ACC9448	27-Jan-2017	Panama	San Lorenzo	9.22028	-80.0072	60	Dominik Rabl
DR17_ArcPa106	EUCE093-18	*Eucereon maia*	BOLD:AAE4592	24-Feb-2017	Panama	San Lorenzo	9.22028	-80.0072	60	Dominik Rabl
DR17_ArcPa107	EUCE094-18	*Eucereon* sp. 07	BOLD:AAX7986	29-Jan-2017	Panama	San Lorenzo	9.28017	-79.9754	177	Dominik Rabl
DR17_ArcPa108	EUCE095-18	*Eucereon* sp. 08	BOLD:ABU7628	08-Feb-2017	Panama	Gamboa	9.11986	-79.6948	59	Dominik Rabl
DR17_ArcPa109	EUCE096-18	*Eucereon* sp. 03	BOLD:ACC9481	12-Jan-2017	Panama	Gamboa	9.12103	-79.7086	62	Dominik Rabl
DR17_ArcPa110	EUCE097-18	*Eucereon* sp. 03	BOLD:ACC9481	12-Jan-2017	Panama	Gamboa	9.12103	-79.7086	62	Dominik Rabl
DR17_ArcPa111	EUCE098-18	*Eucereon rosinum*	BOLD:AAN0729	22-Feb-2017	Panama	Gamboa	9.12417	-79.6944	71	Dominik Rabl
DR17_ArcPa112	EUCE099-18	*Eucereon* sp. 09		16-Feb-2017	Panama	Gamboa	9.12103	-79.7086	62	Dominik Rabl
DR17_ArcPa113	EUCE100-18	*Eucereon rosinum*	BOLD:AAN0729	26-Feb-2017	Panama	Gamboa	9.12103	-79.7086	62	Dominik Rabl
DR17_ArcPa114	EUCE101-18	*Eucereon* sp. 08	BOLD:ABU7628	26-Feb-2017	Panama	Gamboa	9.12103	-79.7086	62	Dominik Rabl
ECU07_001	EUCE102-18	*Eucereon* sp. 10	BOLD:AAN5487	01-Nov-2007	Ecuador	ECSF	-3.975	-79.0703	1958	Daniela Vázquez
ECU07_002	EUCE103-18	*Eucereon* sp. 11	BOLD:ADN4389	01-Nov-2007	Ecuador	ECSF	-3.975	-79.0703	1958	Daniela Vázquez
ECU07_003	EUCE104-18	*Eucereon* sp. 12	BOLD:AAM6996	01-Nov-2007	Ecuador	ECSF	-3.975	-79.0703	1958	Daniela Vázquez
ECU07_004	EUCE105-18	*Eucereon* sp. 13		08-Nov-2007	Ecuador	ECSF	-3.97367	-79.077	1904	Daniela Vázquez
ECU07_005	EUCE106-18	*Eucereon* sp. 14	BOLD:AAY6238	02-Nov-2007	Ecuador	ECSF	-3.9745	-79.0733	1999	Daniela Vázquez
ECU07_006	EUCE107-18	*Eucereon* sp. 15	BOLD:AAG0918	01-Nov-2007	Ecuador	ECSF	-3.975	-79.0703	1958	Daniela Vázquez
ECU07_007	EUCE108-18	*Eucereon* sp. 16	BOLD:ADO2209	11-Dec-2007	Ecuador	ECSF	-3.97367	-79.077	1904	Daniela Vázquez

Sample ID	Process ID	Identification	BIN	Collection date	Country	Site	Lat.	Long.	Alt. (m)	Collector
ECU07_008	EUCE109-18	*Eucereon* sp. 17	BOLD:ADF5649	08-Nov-2007	Ecuador	ECSF	-3.9745	-79.0733	1999	Daniela Vázquez
ECU07_009	EUCE110-18	*Eucereon* sp. 18	BOLD:AAI4929	04-Nov-2007	Ecuador	ECSF	-3.9755	-79.0703	1983	Daniela Vázquez
ECU07_010	EUCE111-18	*Eucereon* sp. 19	BOLD:AAG6327	08-Nov-2007	Ecuador	ECSF	-3.9745	-79.0733	1999	Daniela Vázquez
ECU07_011	EUCE112-18	*Eucereon* sp. 20	BOLD:AAH3437	08-Dec-2007	Ecuador	ECSF	-3.97367	-79.077	1904	Daniela Vázquez
ECU07_012	EUCE113-18	*Eucereon* sp. 21	BOLD:ACJ8067	08-Nov-2007	Ecuador	ECSF	-3.97367	-79.077	1904	Daniela Vázquez
ECU08_001	EUCE114-18	*Eucereon* sp. 22	BOLD:AAF5831	05-Jan-2008	Ecuador	ECSF	-3.975	-79.0763	1949	Daniela Vázquez
ECU08_002	EUCE115-18	*Eucereon* sp. 23	BOLD:AAH3436	28-Jan-2008	Ecuador	ECSF	-3.97383	-79.0703	1911	Daniela Vázquez
ECU08_003	EUCE116-18	*Eucereon* sp. 24	BOLD:ADP0759	26-Jan-2008	Ecuador	ECSF	-3.97333	-79.0727	1908	Daniela Vázquez
ECU08_004	EUCE117-18	*Eucereon* sp. 21	BOLD:ACJ8067	05-Jan-2008	Ecuador	ECSF	-3.975	-79.0763	1949	Daniela Vázquez
ECU08_005	EUCE118-18	*Eucereon* sp. 25	BOLD:AAG9205	15-Jan-2008	Ecuador	ECSF	-3.97567	-79.076	2010	Daniela Vázquez
ECU12_001	EUCE119-18	*Eucereon* sp. 26	BOLD:ACJ8876	16-Nov-2012	Ecuador	ECSF	-3.97289	-79.0811	1900	Florian Bodner
ECU12_002	EUCE120-18	*Eucereon* sp. 27	BOLD:AAX0615	16-Nov-2012	Ecuador	ECSF	-3.97289	-79.0811	1900	Florian Bodner
DR14_0411	EUCE121-18	*Eucereon aurantiaca*	BOLD:AAA1311	24-Aug-2014	Costa Rica	La Gamba	8.69997	-83.206	141	Dominik Rabl
DR14_0414	EUCE122-18	*Eucereon punctatum*	BOLD:ADM7139	28-Aug-2014	Costa Rica	La Gamba	8.69947	-83.2076	210	Dominik Rabl
DR14_0415	EUCE123-18	*Eucereon punctatum*	BOLD:ADM7139	28-Aug-2014	Costa Rica	La Gamba	8.69947	-83.2076	210	Dominik Rabl
DR14_0416	EUCE124-18	*Eucereon punctatum*	BOLD:ACC9448	27-Aug-2014	Costa Rica	La Gamba	8.69195	-83.2066	279	Dominik Rabl
DR14_0420	EUCE125-18	*Eucereon aurantiaca*	BOLD:AAA1311	28-Aug-2014	Costa Rica	La Gamba	8.69847	-83.2029	137	Dominik Rabl
DR14_0421	EUCE126-18	*Eucereon aurantiaca*	BOLD:AAA1311	27-Jul-2014	Costa Rica	La Gamba	8.69537	-83.2072	184	Dominik Rabl
DR14_0422	EUCE127-18	*Eucereon punctatum*	BOLD:ADM7139	17-Jul-2014	Costa Rica	La Gamba	8.69537	-83.2072	184	Dominik Rabl
DR14_0424	EUCE128-18	*Eucereon punctatum*	BOLD:ADM7139	17-Jul-2014	Costa Rica	La Gamba	8.69537	-83.2072	184	Dominik Rabl
DR14_0436	EUCE129-18	*Eucereon punctatum*	BOLD:ADM7139	28-Jul-2014	Costa Rica	La Gamba	8.70213	-83.2104	161	Dominik Rabl
DR14_0445	EUCE130-18	*Eucereon aurantiaca*	BOLD:AAA1311	26-Aug-2014	Costa Rica	La Gamba	8.70213	-83.2104	161	Dominik Rabl
DR14_0450	EUCE131-18	*Eucereon aurantiaca*	BOLD:AAA1311	20-Aug-2014	Costa Rica	La Gamba	8.70213	-83.2104	161	Dominik Rabl
DR14_0452	EUCE132-18	*Eucereon* sp. 01	BOLD:AAA1335	20-Sep-2014	Costa Rica	La Gamba	8.70188	-83.2076	212	Dominik Rabl

Appendix 2: Information on the 1677 downloaded sequences of Neotropical Arctiinae moths related to *Eucereon* from the public data portal on BOLD. 487 of them were used for the calculations collapsed to haplotypes, indicated by the column "Haplotype". "Identification denotes the (often informal, non-taxonomic) name under which the respective sequence is stored in BOLD.

Process ID	Identification	BIN	Country	Haplotype
BLPDH841-09	*Hyaleucerea* morosaDHJ01	BOLD:AAA1303	Costa Rica	yes
MHMXL613-07	*Hyaleucerea* morosaDHJ01	BOLD:AAA1303	Costa Rica	yes
GMHJL082-15	*Eucereon*	BOLD:AAA1310	Honduras	
BLPAC647-06	*Eucereon centrale*	BOLD:AAA1310	Costa Rica	yes
BLPAG477-07	*Eucereon centrale*	BOLD:AAA1310	Costa Rica	
BLPBD538-07	*Eucereon centrale*	BOLD:AAA1310	Costa Rica	yes
BLPCD170-08	*Eucereon centrale*	BOLD:AAA1310	Costa Rica	
BLPCD171-08	*Eucereon centrale*	BOLD:AAA1310	Costa Rica	
BLPCD172-08	*Eucereon centrale*	BOLD:AAA1310	Costa Rica	
BLPCD173-08	*Eucereon centrale*	BOLD:AAA1310	Costa Rica	
BLPCN289-08	*Eucereon centrale*	BOLD:AAA1310	Costa Rica	
BLPCO081-08	*Eucereon centrale*	BOLD:AAA1310	Costa Rica	
BLPCOI76-08	*Eucereon centrale*	BOLD:AAA1310	Costa Rica	yes
BLPDC858-09	*Eucereon centrale*	BOLD:AAA1310	Costa Rica	yes
BLPDK1278-09	*Eucereon centrale*	BOLD:AAA1310	Costa Rica	yes
BLPDK1839-09	*Eucereon centrale*	BOLD:AAA1310	Costa Rica	yes
BLPDK465-09	*Eucereon centrale*	BOLD:AAA1310	Costa Rica	yes
BLPDK626-09	*Eucereon centrale*	BOLD:AAA1310	Costa Rica	yes
BLPDM1522-10	*Eucereon centrale*	BOLD:AAA1310	Costa Rica	yes
BLPDT1591-10	*Eucereon centrale*	BOLD:AAA1310	Costa Rica	yes
BLPDU376-11	*Eucereon centrale*	BOLD:AAA1310	Costa Rica	yes
BLPDU377-11	*Eucereon centrale*	BOLD:AAA1310	Costa Rica	yes
BLPDU723-11	*Eucereon centrale*	BOLD:AAA1310	Costa Rica	yes
BLPDV259-11	*Eucereon centrale*	BOLD:AAA1310	Costa Rica	
BLPDV785-11	*Eucereon centrale*	BOLD:AAA1310	Costa Rica	yes
BLPDV786-11	*Eucereon centrale*	BOLD:AAA1310	Costa Rica	
BLPDX496-11	*Eucereon centrale*	BOLD:AAA1310	Costa Rica	yes
BLPED860-11	*Eucereon centrale*	BOLD:AAA1310	Costa Rica	
MHARB641-06	*Eucereon centrale*	BOLD:AAA1310	Costa Rica	yes
MHARB642-06	*Eucereon centrale*	BOLD:AAA1310	Costa Rica	
MHARB643-06	*Eucereon centrale*	BOLD:AAA1310	Costa Rica	yes
MHARB644-06	*Eucereon centrale*	BOLD:AAA1310	Costa Rica	
MHARB645-06	*Eucereon centrale*	BOLD:AAA1310	Costa Rica	
MHARB646-06	*Eucereon centrale*	BOLD:AAA1310	Costa Rica	yes
MHARB647-06	*Eucereon centrale*	BOLD:AAA1310	Costa Rica	
MHARB648-06	*Eucereon centrale*	BOLD:AAA1310	Costa Rica	yes
MHMXC772-06	*Eucereon centrale*	BOLD:AAA1310	Costa Rica	
MHMYC618-09	*Eucereon centrale*	BOLD:AAA1310	Costa Rica	
MHMYC619-09	*Eucereon centrale*	BOLD:AAA1310	Costa Rica	
MHMYC620-09	*Eucereon centrale*	BOLD:AAA1310	Costa Rica	
XAA563-04	*Eucereon centrale*	BOLD:AAA1310	Costa Rica	yes
ARCTB276-08	*Eucereon formosa*	BOLD:AAA1310	Guatemala	yes
ARCTB285-08	*Eucereon formosa*	BOLD:AAA1310	Guatemala	
ARCTB294-08	*Eucereon formosa*	BOLD:AAA1310	Guatemala	yes
BLPDW072-11	Lepidoptera	BOLD:AAA1310	Costa Rica	
BLPEE1651-12	Lepidoptera	BOLD:AAA1310	Costa Rica	

Process ID	Identification	BIN	Country	Haplotype
BLPEE2161-12	Lepidoptera	BOLD:AAA1310	Costa Rica	yes
BLPEE3345-14	Lepidoptera	BOLD:AAA1310	Costa Rica	yes
BLPEE3683-14	Lepidoptera	BOLD:AAA1310	Costa Rica	
BLPEE3684-14	Lepidoptera	BOLD:AAA1310	Costa Rica	
BLPEF1363-12	Lepidoptera	BOLD:AAA1310	Costa Rica	
BLPEF156-12	Lepidoptera	BOLD:AAA1310	Costa Rica	
BLPEF2582-13	Lepidoptera	BOLD:AAA1310	Costa Rica	
BLPEF2968-13	Lepidoptera	BOLD:AAA1310	Costa Rica	yes
BLPEF3102-13	Lepidoptera	BOLD:AAA1310	Costa Rica	yes
BLPEF4786-13	Lepidoptera	BOLD:AAA1310	Costa Rica	
MHMYG3098-10	Lepidoptera	BOLD:AAA1310	Costa Rica	yes
MHMYG3099-10	Lepidoptera	BOLD:AAA1310	Costa Rica	yes
MHMYS3309-13	Lepidoptera	BOLD:AAA1310	Costa Rica	
BCIAR070-10	*Eucereon aurantiaca*	BOLD:AAA1311	Panama	
BCIAR081-10	*Eucereon aurantiaca*	BOLD:AAA1311	Panama	
BCIGE719-12	*Eucereon aurantiaca*	BOLD:AAA1311	Panama	
BCIGE749-12	*Eucereon aurantiaca*	BOLD:AAA1311	Panama	yes
BCIGE750-12	*Eucereon aurantiaca*	BOLD:AAA1311	Panama	
BCIGE753-12	*Eucereon aurantiaca*	BOLD:AAA1311	Panama	
BLPAA731-06	*Eucereon aurantiaca*	BOLD:AAA1311	Costa Rica	
BLPAB720-06	*Eucereon aurantiaca*	BOLD:AAA1311	Costa Rica	yes
BLPAG480-07	*Eucereon aurantiaca*	BOLD:AAA1311	Costa Rica	
BLPBB908-07	*Eucereon aurantiaca*	BOLD:AAA1311	Costa Rica	
BLPBC208-07	*Eucereon aurantiaca*	BOLD:AAA1311	Costa Rica	
BLPBH160-07	*Eucereon aurantiaca*	BOLD:AAA1311	Costa Rica	
BLPCB570-08	*Eucereon aurantiaca*	BOLD:AAA1311	Costa Rica	yes
BLPCF062-08	*Eucereon aurantiaca*	BOLD:AAA1311	Costa Rica	
BLPCL416-08	*Eucereon aurantiaca*	BOLD:AAA1311	Costa Rica	
BLPCM194-08	*Eucereon aurantiaca*	BOLD:AAA1311	Costa Rica	yes
BLPCM768-08	*Eucereon aurantiaca*	BOLD:AAA1311	Costa Rica	
BLPCM769-08	*Eucereon aurantiaca*	BOLD:AAA1311	Costa Rica	yes
BLPCN274-08	*Eucereon aurantiaca*	BOLD:AAA1311	Costa Rica	
BLPCN811-08	*Eucereon aurantiaca*	BOLD:AAA1311	Costa Rica	
BLPCO744-08	*Eucereon aurantiaca*	BOLD:AAA1311	Costa Rica	yes
BLPDA651-09	*Eucereon aurantiaca*	BOLD:AAA1311	Costa Rica	
BLPDC075-09	*Eucereon aurantiaca*	BOLD:AAA1311	Costa Rica	
BLPDK1279-09	*Eucereon aurantiaca*	BOLD:AAA1311	Costa Rica	yes
BLPDU732-11	*Eucereon aurantiaca*	BOLD:AAA1311	Costa Rica	
MHARB584-06	*Eucereon aurantiaca*	BOLD:AAA1311	Costa Rica	
MHARB585-06	*Eucereon aurantiaca*	BOLD:AAA1311	Costa Rica	
MHARB586-06	*Eucereon aurantiaca*	BOLD:AAA1311	Costa Rica	
MHARB587-06	*Eucereon aurantiaca*	BOLD:AAA1311	Costa Rica	
MHARB613-06	*Eucereon aurantiaca*	BOLD:AAA1311	Costa Rica	yes
MHARB614-06	*Eucereon aurantiaca*	BOLD:AAA1311	Costa Rica	yes
MHARB615-06	*Eucereon aurantiaca*	BOLD:AAA1311	Costa Rica	
MHARB616-06	*Eucereon aurantiaca*	BOLD:AAA1311	Costa Rica	
MHARB617-06	*Eucereon aurantiaca*	BOLD:AAA1311	Costa Rica	yes
MHARB618-06	*Eucereon aurantiaca*	BOLD:AAA1311	Costa Rica	
MHARB619-06	*Eucereon aurantiaca*	BOLD:AAA1311	Costa Rica	
MHARB838-06	*Eucereon aurantiaca*	BOLD:AAA1311	Costa Rica	
MHARB897-06	*Eucereon aurantiaca*	BOLD:AAA1311	Costa Rica	
MHARB898-06	*Eucereon aurantiaca*	BOLD:AAA1311	Costa Rica	
MHARB899-06	*Eucereon aurantiaca*	BOLD:AAA1311	Costa Rica	
MHARB900-06	*Eucereon aurantiaca*	BOLD:AAA1311	unknown	

Process ID	Identification	BIN	Country	Haplotype
MHARB901-06	*Eucereon aurantiaca*	BOLD:AAA1311	Costa Rica	
MHMXC771-06	*Eucereon aurantiaca*	BOLD:AAA1311	Costa Rica	
MHMXH366-07	*Eucereon aurantiaca*	BOLD:AAA1311	Costa Rica	
MHMXL611-07	*Eucereon aurantiaca*	BOLD:AAA1311	Costa Rica	
MHMXO056-08	*Eucereon aurantiaca*	BOLD:AAA1311	Costa Rica	
MHMXO057-08	*Eucereon aurantiaca*	BOLD:AAA1311	Costa Rica	
MHMXT595-08	*Eucereon aurantiaca*	BOLD:AAA1311	unknown	
MHMYC050-09	*Eucereon aurantiaca*	BOLD:AAA1311	Costa Rica	
MHMYC613-09	*Eucereon aurantiaca*	BOLD:AAA1311	Costa Rica	
MHMYC614-09	*Eucereon aurantiaca*	BOLD:AAA1311	Costa Rica	yes
MHMYF288-10	*Eucereon aurantiaca*	BOLD:AAA1311	Costa Rica	
MHMYF289-10	*Eucereon aurantiaca*	BOLD:AAA1311	Costa Rica	
MHMYF290-10	*Eucereon aurantiaca*	BOLD:AAA1311	Costa Rica	
MHMYF291-10	*Eucereon aurantiaca*	BOLD:AAA1311	Costa Rica	
MHMYF292-10	*Eucereon aurantiaca*	BOLD:AAA1311	Costa Rica	yes
MHMYF293-10	*Eucereon aurantiaca*	BOLD:AAA1311	Costa Rica	
MHMYF294-10	*Eucereon aurantiaca*	BOLD:AAA1311	Costa Rica	
MHMYF295-10	*Eucereon aurantiaca*	BOLD:AAA1311	Costa Rica	
MHMYF296-10	*Eucereon aurantiaca*	BOLD:AAA1311	Costa Rica	
MHMYF297-10	*Eucereon aurantiaca*	BOLD:AAA1311	Costa Rica	
XAA555-04	*Eucereon aurantiaca*	BOLD:AAA1311	Costa Rica	yes
XAA556-04	*Eucereon aurantiaca*	BOLD:AAA1311	Costa Rica	
XAA557-04	*Eucereon aurantiaca*	BOLD:AAA1311	Costa Rica	
XAA558-04	*Eucereon aurantiaca*	BOLD:AAA1311	Costa Rica	
XAA559-04	*Eucereon aurantiaca*	BOLD:AAA1311	Costa Rica	
ARCTB262-08	*Eucereon pseudarchias*	BOLD:AAA1311	Guatemala	
BLPDW050-11	Lepidoptera	BOLD:AAA1311	Costa Rica	
BLPEF2763-13	Lepidoptera	BOLD:AAA1311	Costa Rica	
MHMYG3100-10	Lepidoptera	BOLD:AAA1311	Costa Rica	yes
MHMYG3101-10	Lepidoptera	BOLD:AAA1311	Costa Rica	
MHMYK3421-15	Lepidoptera	BOLD:AAA1311	Costa Rica	
MHMYK3422-15	Lepidoptera	BOLD:AAA1311	Costa Rica	
MHMYK3423-15	Lepidoptera	BOLD:AAA1311	Costa Rica	yes
MHMYK3424-15	Lepidoptera	BOLD:AAA1311	Costa Rica	
MHMYL2357-11	Lepidoptera	BOLD:AAA1311	Costa Rica	yes
MHMYL2455-11	Lepidoptera	BOLD:AAA1311	Costa Rica	
MHMYL2456-11	Lepidoptera	BOLD:AAA1311	Costa Rica	
MHMYL2462-11	Lepidoptera	BOLD:AAA1311	Costa Rica	
MHMYL2504-11	Lepidoptera	BOLD:AAA1311	Costa Rica	
MHMYN3333-14	Lepidoptera	BOLD:AAA1311	Costa Rica	
MHMYN3334-14	Lepidoptera	BOLD:AAA1311	Costa Rica	
MHMYN4279-14	Lepidoptera	BOLD:AAA1311	Costa Rica	
MHMYN4280-14	Lepidoptera	BOLD:AAA1311	Costa Rica	
MHMYN4365-14	Lepidoptera	BOLD:AAA1311	Costa Rica	
MHMYP1579-12	Lepidoptera	BOLD:AAA1311	Costa Rica	
MHMYP1580-12	Lepidoptera	BOLD:AAA1311	Costa Rica	
MHMYP1581-12	Lepidoptera	BOLD:AAA1311	Costa Rica	
MHMYP1582-12	Lepidoptera	BOLD:AAA1311	Costa Rica	yes
MHMYS3817-13	Lepidoptera	BOLD:AAA1311	Costa Rica	
GBGL8430-12	*Eucereon dentata*	BOLD:AAA1334	unknown	yes
BLPCF063-08	*Eucereon tripunctatum*	BOLD:AAA1334	Costa Rica	yes
BLPDK1394-09	*Eucereon tripunctatum*	BOLD:AAA1334	Costa Rica	
BLPDK1395-09	*Eucereon tripunctatum*	BOLD:AAA1334	Costa Rica	
BLPDK467-09	*Eucereon tripunctatum*	BOLD:AAA1334	Costa Rica	

Process ID	Identification	BIN	Country	Haplotype
BLPDL1945-10	*Eucereon tripunctatum*	BOLD:AAA1334	Costa Rica	
BLPDM459-10	*Eucereon tripunctatum*	BOLD:AAA1334	Costa Rica	
BLPDT1337-10	*Eucereon tripunctatum*	BOLD:AAA1334	Costa Rica	
BLPDT1588-10	*Eucereon tripunctatum*	BOLD:AAA1334	Costa Rica	
BLPDT1589-10	*Eucereon tripunctatum*	BOLD:AAA1334	Costa Rica	
BLPDT1995-10	*Eucereon tripunctatum*	BOLD:AAA1334	Costa Rica	yes
BLPDV744-11	*Eucereon tripunctatum*	BOLD:AAA1334	Costa Rica	
BLPDV745-11	*Eucereon tripunctatum*	BOLD:AAA1334	Costa Rica	
BLPDW690-11	*Eucereon tripunctatum*	BOLD:AAA1334	Costa Rica	
BLPDX708-11	*Eucereon tripunctatum*	BOLD:AAA1334	Costa Rica	
BLPEE1914-12	Lepidoptera	BOLD:AAA1334	Costa Rica	
BLPEE2070-12	Lepidoptera	BOLD:AAA1334	Costa Rica	
BLPEF2255-13	Lepidoptera	BOLD:AAA1334	Costa Rica	yes
BLPEF2965-13	Lepidoptera	BOLD:AAA1334	Costa Rica	yes
BLPEF3106-13	Lepidoptera	BOLD:AAA1334	Costa Rica	
MHMYS2925-13	Lepidoptera	BOLD:AAA1334	Costa Rica	
BLPAB724-06	*Eucereon* BioLep03	BOLD:AAA1335	Costa Rica	
BLPAC082-06	*Eucereon* BioLep03	BOLD:AAA1335	Costa Rica	
BLPAC104-06	*Eucereon* BioLep03	BOLD:AAA1335	Costa Rica	
BLPAD012-06	*Eucereon* BioLep03	BOLD:AAA1335	Costa Rica	
BLPBB372-07	*Eucereon* BioLep03	BOLD:AAA1335	Costa Rica	
BLPBB373-07	*Eucereon* BioLep03	BOLD:AAA1335	Costa Rica	
BLPBB375-07	*Eucereon* BioLep03	BOLD:AAA1335	Costa Rica	
BLPBB376-07	*Eucereon* BioLep03	BOLD:AAA1335	Costa Rica	yes
BLPBD555-07	*Eucereon* BioLep03	BOLD:AAA1335	Costa Rica	
BLPBD556-07	*Eucereon* BioLep03	BOLD:AAA1335	Costa Rica	
BLPBD557-07	*Eucereon* BioLep03	BOLD:AAA1335	Costa Rica	yes
BLPBE812-07	*Eucereon* BioLep03	BOLD:AAA1335	Costa Rica	
BLPBE813-07	*Eucereon* BioLep03	BOLD:AAA1335	Costa Rica	
BLPBE814-07	*Eucereon* BioLep03	BOLD:AAA1335	Costa Rica	
BLPBE815-07	*Eucereon* BioLep03	BOLD:AAA1335	Costa Rica	yes
BLPCF253-08	*Eucereon* BioLep03	BOLD:AAA1335	Costa Rica	
BLPCM034-08	*Eucereon* BioLep03	BOLD:AAA1335	Costa Rica	yes
BLPCM035-08	*Eucereon* BioLep03	BOLD:AAA1335	Costa Rica	
BLPDK1397-09	*Eucereon* BioLep03	BOLD:AAA1335	Costa Rica	yes
BLPDK1398-09	*Eucereon* BioLep03	BOLD:AAA1335	Costa Rica	
BLPDT1578-10	*Eucereon* BioLep03	BOLD:AAA1335	Costa Rica	yes
BLPDT1579-10	*Eucereon* BioLep03	BOLD:AAA1335	Costa Rica	
BLPDT1580-10	*Eucereon* BioLep03	BOLD:AAA1335	Costa Rica	
BLPDT1988-10	*Eucereon* BioLep03	BOLD:AAA1335	Costa Rica	
BLPDT1989-10	*Eucereon* BioLep03	BOLD:AAA1335	Costa Rica	
BLPDU400-11	*Eucereon* BioLep03	BOLD:AAA1335	Costa Rica	yes
BLPBB374-07	*Eucereon* Janzen44	BOLD:AAA1335	Costa Rica	
MHMXT597-08	*Eucereon* Janzen44	BOLD:AAA1335	unknown	yes
MHMXT598-08	*Eucereon* Janzen44	BOLD:AAA1335	unknown	
ARCTC828-11	Lepidoptera	BOLD:AAA1335	Costa Rica	
ARCTC829-11	Lepidoptera	BOLD:AAA1335	Costa Rica	yes
BLPEF2258-13	Lepidoptera	BOLD:AAA1335	Costa Rica	
BLPEF726-12	Lepidoptera	BOLD:AAA1335	Costa Rica	yes
MHMYG3103-10	Lepidoptera	BOLD:AAA1335	Costa Rica	
MHMYG3104-10	Lepidoptera	BOLD:AAA1335	Costa Rica	yes
MHMYG3105-10	Lepidoptera	BOLD:AAA1335	Costa Rica	
MHMYK7991-15	Lepidoptera	BOLD:AAA1335	Costa Rica	
MHMYL2355-11	Lepidoptera	BOLD:AAA1335	Costa Rica	

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BLPAB001-06	*Eucereon tarona*	BOLD:AAA1336	Costa Rica	yes
BLPAC083-06	*Eucereon tarona*	BOLD:AAA1336	Costa Rica	
BLPBB909-07	*Eucereon tarona*	BOLD:AAA1336	Costa Rica	
BLPBC471-07	*Eucereon tarona*	BOLD:AAA1336	Costa Rica	
BLPBC473-07	*Eucereon tarona*	BOLD:AAA1336	Costa Rica	
BLPBC474-07	*Eucereon tarona*	BOLD:AAA1336	Costa Rica	yes
BLPBD551-07	*Eucereon tarona*	BOLD:AAA1336	Costa Rica	
BLPBD552-07	*Eucereon tarona*	BOLD:AAA1336	Costa Rica	yes
BLPBE809-07	*Eucereon tarona*	BOLD:AAA1336	Costa Rica	
BLPBE810-07	*Eucereon tarona*	BOLD:AAA1336	Costa Rica	
BLPBE811-07	*Eucereon tarona*	BOLD:AAA1336	Costa Rica	
BLPBF933-07	*Eucereon tarona*	BOLD:AAA1336	Costa Rica	
BLPCL282-08	*Eucereon tarona*	BOLD:AAA1336	Costa Rica	
BLPCM280-08	*Eucereon tarona*	BOLD:AAA1336	Costa Rica	
BLPCM387-08	*Eucereon tarona*	BOLD:AAA1336	Costa Rica	
BLPCN806-08	*Eucereon tarona*	BOLD:AAA1336	Costa Rica	yes
BLPCN807-08	*Eucereon tarona*	BOLD:AAA1336	Costa Rica	
BLPCN808-08	*Eucereon tarona*	BOLD:AAA1336	Costa Rica	
BLPCN809-08	*Eucereon tarona*	BOLD:AAA1336	Costa Rica	
BLPCN810-08	*Eucereon tarona*	BOLD:AAA1336	Costa Rica	
BLPDK1399-09	*Eucereon tarona*	BOLD:AAA1336	Costa Rica	
BLPDK1400-09	*Eucereon tarona*	BOLD:AAA1336	Costa Rica	
BLPDK1401-09	*Eucereon tarona*	BOLD:AAA1336	Costa Rica	
BLPDK1402-09	*Eucereon tarona*	BOLD:AAA1336	Costa Rica	
BLPDK1403-09	*Eucereon tarona*	BOLD:AAA1336	Costa Rica	
BLPDK1404-09	*Eucereon tarona*	BOLD:AAA1336	Costa Rica	
BLPDK466-09	*Eucereon tarona*	BOLD:AAA1336	Costa Rica	
BLPDM779-10	*Eucereon tarona*	BOLD:AAA1336	Costa Rica	
BLPDP063-10	*Eucereon tarona*	BOLD:AAA1336	Costa Rica	
BLPDP064-10	*Eucereon tarona*	BOLD:AAA1336	Costa Rica	
BLPDP065-10	*Eucereon tarona*	BOLD:AAA1336	Costa Rica	
BLPDP066-10	*Eucereon tarona*	BOLD:AAA1336	Costa Rica	
BLPDP198-10	*Eucereon tarona*	BOLD:AAA1336	Costa Rica	yes
BLPDP199-10	*Eucereon tarona*	BOLD:AAA1336	Costa Rica	
BLPDP200-10	*Eucereon tarona*	BOLD:AAA1336	Costa Rica	
BLPDP201-10	*Eucereon tarona*	BOLD:AAA1336	Costa Rica	
BLPDP395-10	*Eucereon tarona*	BOLD:AAA1336	Costa Rica	
BLPDP396-10	*Eucereon tarona*	BOLD:AAA1336	Costa Rica	
BLPDP397-10	*Eucereon tarona*	BOLD:AAA1336	Costa Rica	
BLPDP519-10	*Eucereon tarona*	BOLD:AAA1336	Costa Rica	
BLPDP621-10	*Eucereon tarona*	BOLD:AAA1336	Costa Rica	
BLPDP622-10	*Eucereon tarona*	BOLD:AAA1336	Costa Rica	
BLPDP791-10	*Eucereon tarona*	BOLD:AAA1336	Costa Rica	
BLPDQ046-10	*Eucereon tarona*	BOLD:AAA1336	Costa Rica	
BLPDR474-10	*Eucereon tarona*	BOLD:AAA1336	Costa Rica	
BLPDT1339-10	*Eucereon tarona*	BOLD:AAA1336	Costa Rica	
BLPDT1340-10	*Eucereon tarona*	BOLD:AAA1336	Costa Rica	
BLPDT1581-10	*Eucereon tarona*	BOLD:AAA1336	Costa Rica	
BLPDT1976-10	*Eucereon tarona*	BOLD:AAA1336	Costa Rica	
BLPDT1977-10	*Eucereon tarona*	BOLD:AAA1336	Costa Rica	
BLPDU110-11	*Eucereon tarona*	BOLD:AAA1336	Costa Rica	yes
BLPDU111-11	*Eucereon tarona*	BOLD:AAA1336	Costa Rica	
BLPDU112-11	*Eucereon tarona*	BOLD:AAA1336	Costa Rica	
BLPDV254-11	*Eucereon tarona*	BOLD:AAA1336	Costa Rica	

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BLPDV255-11	*Eucereon tarona*	BOLD:AAA1336	Costa Rica	
BLPDV736-11	*Eucereon tarona*	BOLD:AAA1336	Costa Rica	yes
BLPDW1012-11	*Eucereon tarona*	BOLD:AAA1336	Costa Rica	
BLPDX1028-11	*Eucereon tarona*	BOLD:AAA1336	Costa Rica	
BLPDX1029-11	*Eucereon tarona*	BOLD:AAA1336	Costa Rica	
BLPDX707-11	*Eucereon tarona*	BOLD:AAA1336	Costa Rica	
BLPDY289-11	*Eucereon tarona*	BOLD:AAA1336	Costa Rica	
BLPDY290-11	*Eucereon tarona*	BOLD:AAA1336	Costa Rica	
BLPDY291-11	*Eucereon tarona*	BOLD:AAA1336	Costa Rica	
BLPDZ131-11	*Eucereon tarona*	BOLD:AAA1336	Costa Rica	
BLPDZ665-11	*Eucereon tarona*	BOLD:AAA1336	Costa Rica	
BLPEA326-11	*Eucereon tarona*	BOLD:AAA1336	Costa Rica	
BLPED587-11	*Eucereon tarona*	BOLD:AAA1336	Costa Rica	
BLPED630-11	*Eucereon tarona*	BOLD:AAA1336	Costa Rica	
BLPED692-11	*Eucereon tarona*	BOLD:AAA1336	Costa Rica	
BLPEE1653-12	Lepidoptera	BOLD:AAA1336	Costa Rica	
BLPEE1919-12	Lepidoptera	BOLD:AAA1336	Costa Rica	
BLPEE2071-12	Lepidoptera	BOLD:AAA1336	Costa Rica	yes
BLPEE2162-12	Lepidoptera	BOLD:AAA1336	Costa Rica	
BLPEE2871-14	Lepidoptera	BOLD:AAA1336	Costa Rica	
BLPEE3971-14	Lepidoptera	BOLD:AAA1336	Costa Rica	
BLPEE4719-14	Lepidoptera	BOLD:AAA1336	Costa Rica	
BLPEE4794-14	Lepidoptera	BOLD:AAA1336	Costa Rica	
BLPEF1114-12	Lepidoptera	BOLD:AAA1336	Costa Rica	
BLPEF166-12	Lepidoptera	BOLD:AAA1336	Costa Rica	
BLPEF167-12	Lepidoptera	BOLD:AAA1336	Costa Rica	
BLPEF2257-13	Lepidoptera	BOLD:AAA1336	Costa Rica	
BLPEF2584-13	Lepidoptera	BOLD:AAA1336	Costa Rica	
BLPEF3717-13	Lepidoptera	BOLD:AAA1336	Costa Rica	
BLPEF3880-13	Lepidoptera	BOLD:AAA1336	Costa Rica	
BLPEF4625-13	Lepidoptera	BOLD:AAA1336	Costa Rica	
BLPEF6387-14	Lepidoptera	BOLD:AAA1336	Costa Rica	
BLPEF725-12	Lepidoptera	BOLD:AAA1336	Costa Rica	
BLPEF9181-15	Lepidoptera	BOLD:AAA1336	Costa Rica	
BLPEF922-12	Lepidoptera	BOLD:AAA1336	Costa Rica	
NARCA598-11	Lepidoptera	BOLD:AAA1336	Ecuador	yes
NARCA778-13	Lepidoptera	BOLD:AAA1336	Ecuador	
NARCA899-13	Lepidoptera	BOLD:AAA1336	Ecuador	
BLPBF229-07	*Eucereon xanthura*	BOLD:AAA1337	Costa Rica	
BLPCD211-08	*Eucereon xanthura*	BOLD:AAA1337	Costa Rica	
BLPCE549-08	*Eucereon xanthura*	BOLD:AAA1337	Costa Rica	yes
BLPDK1405-09	*Eucereon xanthura*	BOLD:AAA1337	Costa Rica	
BLPDK1406-09	*Eucereon xanthura*	BOLD:AAA1337	Costa Rica	
BLPDK1853-09	*Eucereon xanthura*	BOLD:AAA1337	Costa Rica	yes
BLPDK625-09	*Eucereon xanthura*	BOLD:AAA1337	Costa Rica	yes
BLPDK796-09	*Eucereon xanthura*	BOLD:AAA1337	Costa Rica	
BLPDU734-11	*Eucereon xanthura*	BOLD:AAA1337	Costa Rica	
BLPDV738-11	*Eucereon xanthura*	BOLD:AAA1337	Costa Rica	
BLPDX251-11	*Eucereon xanthura*	BOLD:AAA1337	Costa Rica	
BLPDX252-11	*Eucereon xanthura*	BOLD:AAA1337	Costa Rica	
BLPDX499-11	*Eucereon xanthura*	BOLD:AAA1337	Costa Rica	
BLPDY623-11	*Eucereon xanthura*	BOLD:AAA1337	Costa Rica	
BLPED631-11	*Eucereon xanthura*	BOLD:AAA1337	Costa Rica	yes
IBOLG019-08	*Eucereon xanthura*	BOLD:AAA1337	Costa Rica	

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MHARB378-05	*Eucereon xanthura*	BOLD:AAA1337	Costa Rica	
MHARB379-05	*Eucereon xanthura*	BOLD:AAA1337	Costa Rica	
MHARB380-05	*Eucereon xanthura*	BOLD:AAA1337	Costa Rica	yes
MHARB381-05	*Eucereon xanthura*	BOLD:AAA1337	Costa Rica	
MHARB382-05	*Eucereon xanthura*	BOLD:AAA1337	Costa Rica	
MHARB392-05	*Eucereon xanthura*	BOLD:AAA1337	Costa Rica	yes
MHARB393-05	*Eucereon xanthura*	BOLD:AAA1337	Costa Rica	
MHARB394-05	*Eucereon xanthura*	BOLD:AAA1337	Costa Rica	
MHARB734-06	*Eucereon xanthura*	BOLD:AAA1337	Costa Rica	
MHARB735-06	*Eucereon xanthura*	BOLD:AAA1337	Costa Rica	yes
MHARB761-06	*Eucereon xanthura*	BOLD:AAA1337	Costa Rica	
MHARB890-06	*Eucereon xanthura*	BOLD:AAA1337	Costa Rica	
MHARB891-06	*Eucereon xanthura*	BOLD:AAA1337	Costa Rica	
MHMXA853-06	*Eucereon xanthura*	BOLD:AAA1337	Costa Rica	
MHMXC769-06	*Eucereon xanthura*	BOLD:AAA1337	Costa Rica	
MHMXJ346-07	*Eucereon xanthura*	BOLD:AAA1337	Costa Rica	
MHMXJ347-07	*Eucereon xanthura*	BOLD:AAA1337	Costa Rica	
MHMXQ145-08	*Eucereon xanthura*	BOLD:AAA1337	Costa Rica	yes
MHMYC012-09	*Eucereon xanthura*	BOLD:AAA1337	Costa Rica	yes
MHMYF284-10	*Eucereon xanthura*	BOLD:AAA1337	Costa Rica	yes
XAA210-04	*Eucereon xanthura*	BOLD:AAA1337	Costa Rica	
XAA211-04	*Eucereon xanthura*	BOLD:AAA1337	Costa Rica	
XAA212-04	*Eucereon xanthura*	BOLD:AAA1337	Costa Rica	
XAA213-04	*Eucereon xanthura*	BOLD:AAA1337	Costa Rica	yes
XAA214-04	*Eucereon xanthura*	BOLD:AAA1337	Costa Rica	
ARCTC847-11	Lepidoptera	BOLD:AAA1337	Guatemala	
BLPDW046-11	Lepidoptera	BOLD:AAA1337	Costa Rica	
BLPEF2561-13	Lepidoptera	BOLD:AAA1337	Costa Rica	
BLPEF2762-13	Lepidoptera	BOLD:AAA1337	Costa Rica	
BLPEF3239-13	Lepidoptera	BOLD:AAA1337	Costa Rica	
BLPEF923-12	Lepidoptera	BOLD:AAA1337	Costa Rica	yes
GWORL150-09	Lepidoptera	BOLD:AAA1337	Peru	yes
MHMYN3330-14	Lepidoptera	BOLD:AAA1337	Costa Rica	yes
MHMYN6281-14	Lepidoptera	BOLD:AAA1337	Costa Rica	
LEMMZ1216-12	*Theages leucophaea* sp. MMZ02	BOLD:AAA1337	Brazil	yes
LEMMZ1218-12	*Theages leucophaea* sp. MMZ02	BOLD:AAA1337	Brazil	yes
BLPAC645-06	*Eucereon* Espinoza01	BOLD:AAA1338	Costa Rica	
BLPAD099-06	*Eucereon* Espinoza01	BOLD:AAA1338	Costa Rica	yes
BLPBC576-07	*Eucereon* Espinoza01	BOLD:AAA1338	Costa Rica	
BLPBD409-07	*Eucereon* Espinoza01	BOLD:AAA1338	Costa Rica	
BLPBD549-07	*Eucereon* Espinoza01	BOLD:AAA1338	Costa Rica	
BLPBD936-07	*Eucereon* Espinoza01	BOLD:AAA1338	Costa Rica	
BLPBG727-07	*Eucereon* Espinoza01	BOLD:AAA1338	Costa Rica	yes
BLPBG728-07	*Eucereon* Espinoza01	BOLD:AAA1338	Costa Rica	
BLPCD209-08	*Eucereon* Espinoza01	BOLD:AAA1338	Costa Rica	
BLPCD210-08	*Eucereon* Espinoza01	BOLD:AAA1338	Costa Rica	
BLPCF107-08	*Eucereon* Espinoza01	BOLD:AAA1338	Costa Rica	yes
BLPCF275-08	*Eucereon* Espinoza01	BOLD:AAA1338	Costa Rica	yes
BLPCM047-08	*Eucereon* Espinoza01	BOLD:AAA1338	Costa Rica	
BLPCN288-08	*Eucereon* Espinoza01	BOLD:AAA1338	Costa Rica	
BLPDK1407-09	*Eucereon* Espinoza01	BOLD:AAA1338	Costa Rica	
BLPDK1408-09	*Eucereon* Espinoza01	BOLD:AAA1338	Costa Rica	
BLPDK1409-09	*Eucereon* Espinoza01	BOLD:AAA1338	Costa Rica	
BLPDK1410-09	*Eucereon* Espinoza01	BOLD:AAA1338	Costa Rica	

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BLPDK155-09	*Eucereon* Espinoza01	BOLD:AAA1338	Costa Rica	yes
BLPDK1852-09	*Eucereon* Espinoza01	BOLD:AAA1338	Costa Rica	
BLPDR469-10	*Eucereon* Espinoza01	BOLD:AAA1338	Costa Rica	
BLPDT468-10	*Eucereon* Espinoza01	BOLD:AAA1338	Costa Rica	
BLPDU1065-11	*Eucereon* Espinoza01	BOLD:AAA1338	Costa Rica	
BLPDU1230-11	*Eucereon* Espinoza01	BOLD:AAA1338	Costa Rica	
BLPDU378-11	*Eucereon* Espinoza01	BOLD:AAA1338	Costa Rica	
BLPDU379-11	*Eucereon* Espinoza01	BOLD:AAA1338	Costa Rica	yes
BLPDU380-11	*Eucereon* Espinoza01	BOLD:AAA1338	Costa Rica	
BLPDU381-11	*Eucereon* Espinoza01	BOLD:AAA1338	Costa Rica	
BLPDU735-11	*Eucereon* Espinoza01	BOLD:AAA1338	Costa Rica	
BLPDV737-11	*Eucereon* Espinoza01	BOLD:AAA1338	Costa Rica	yes
BLPDW412-11	*Eucereon* Espinoza01	BOLD:AAA1338	Costa Rica	
BLPDW679-11	*Eucereon* Espinoza01	BOLD:AAA1338	Costa Rica	
BLPDX1030-11	*Eucereon* Espinoza01	BOLD:AAA1338	Costa Rica	
BLPDY624-11	*Eucereon* Espinoza01	BOLD:AAA1338	Costa Rica	
BLPDZ496-11	*Eucereon* Espinoza01	BOLD:AAA1338	Costa Rica	
BLPEB625-11	*Eucereon* Espinoza01	BOLD:AAA1338	Costa Rica	
BLPEB626-11	*Eucereon* Espinoza01	BOLD:AAA1338	Costa Rica	
BLPEB748-11	*Eucereon* Espinoza01	BOLD:AAA1338	Costa Rica	
BLPED544-11	*Eucereon* Espinoza01	BOLD:AAA1338	Costa Rica	
BLPED632-11	*Eucereon* Espinoza01	BOLD:AAA1338	Costa Rica	
MHARB383-05	*Eucereon* Espinoza01	BOLD:AAA1338	Costa Rica	
MHARB384-05	*Eucereon* Espinoza01	BOLD:AAA1338	Costa Rica	
MHARB385-05	*Eucereon* Espinoza01	BOLD:AAA1338	Costa Rica	
MHARB386-05	*Eucereon* Espinoza01	BOLD:AAA1338	Costa Rica	yes
MHARB395-05	*Eucereon* Espinoza01	BOLD:AAA1338	Costa Rica	
MHARB396-05	*Eucereon* Espinoza01	BOLD:AAA1338	Costa Rica	
MHARB892-06	*Eucereon* Espinoza01	BOLD:AAA1338	Costa Rica	
MHARB945-06	*Eucereon* Espinoza01	BOLD:AAA1338	Costa Rica	
MHARB946-06	*Eucereon* Espinoza01	BOLD:AAA1338	Costa Rica	
MHARB947-06	*Eucereon* Espinoza01	BOLD:AAA1338	Costa Rica	
MHMXH312-07	*Eucereon* Espinoza01	BOLD:AAA1338	Costa Rica	
MHMXH313-07	*Eucereon* Espinoza01	BOLD:AAA1338	Costa Rica	
MHMXH314-07	*Eucereon* Espinoza01	BOLD:AAA1338	Costa Rica	
MHMXH315-07	*Eucereon* Espinoza01	BOLD:AAA1338	Costa Rica	
MHMXJ348-07	*Eucereon* Espinoza01	BOLD:AAA1338	Costa Rica	
MHMXJ349-07	*Eucereon* Espinoza01	BOLD:AAA1338	Costa Rica	
MHMXJ350-07	*Eucereon* Espinoza01	BOLD:AAA1338	Costa Rica	
MHMYC625-09	*Eucereon* Espinoza01	BOLD:AAA1338	Costa Rica	
MHMYC626-09	*Eucereon* Espinoza01	BOLD:AAA1338	Costa Rica	
MHMYC627-09	*Eucereon* Espinoza01	BOLD:AAA1338	Costa Rica	yes
MHMYC628-09	*Eucereon* Espinoza01	BOLD:AAA1338	Costa Rica	
MHMYC629-09	*Eucereon* Espinoza01	BOLD:AAA1338	Costa Rica	
MHMYC630-09	*Eucereon* Espinoza01	BOLD:AAA1338	Costa Rica	
MHMYC631-09	*Eucereon* Espinoza01	BOLD:AAA1338	Costa Rica	
MHMYF285-10	*Eucereon* Espinoza01	BOLD:AAA1338	Costa Rica	
MHMYF286-10	*Eucereon* Espinoza01	BOLD:AAA1338	Costa Rica	
MHMYF287-10	*Eucereon* Espinoza01	BOLD:AAA1338	Costa Rica	
XAA220-04	*Eucereon* Espinoza01	BOLD:AAA1338	Costa Rica	
XAA221-04	*Eucereon* Espinoza01	BOLD:AAA1338	Costa Rica	
BLPDW047-11	Lepidoptera	BOLD:AAA1338	Costa Rica	
BLPEE1734-12	Lepidoptera	BOLD:AAA1338	Costa Rica	
BLPEF2972-13	Lepidoptera	BOLD:AAA1338	Costa Rica	

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BLPEF3110-13	Lepidoptera	BOLD:AAA1338	Costa Rica	
BLPEF4152-13	Lepidoptera	BOLD:AAA1338	Costa Rica	
BLPEF4153-13	Lepidoptera	BOLD:AAA1338	Costa Rica	
BLPEF734-12	Lepidoptera	BOLD:AAA1338	Costa Rica	
BLPEF735-12	Lepidoptera	BOLD:AAA1338	Costa Rica	
MHMYK5854-15	Lepidoptera	BOLD:AAA1338	Costa Rica	
MHMYK5855-15	Lepidoptera	BOLD:AAA1338	Costa Rica	
MHMYK5856-15	Lepidoptera	BOLD:AAA1338	Costa Rica	yes
MHMYK5857-15	Lepidoptera	BOLD:AAA1338	Costa Rica	
MHMYL2463-11	Lepidoptera	BOLD:AAA1338	Costa Rica	yes
MHMYL2508-11	Lepidoptera	BOLD:AAA1338	Costa Rica	
MHMYN3328-14	Lepidoptera	BOLD:AAA1338	Costa Rica	
MHMYN3329-14	Lepidoptera	BOLD:AAA1338	Costa Rica	
NARCA802-13	Lepidoptera	BOLD:AAA1338	Ecuador	yes
NARCB212-10	Lepidoptera	BOLD:AAA1338	Costa Rica	
NARCB213-10	Lepidoptera	BOLD:AAA1338	Costa Rica	yes
BLPAG806-07	*Eucereon patrona*	BOLD:AAA1340	Costa Rica	yes
BLPAG807-07	*Eucereon patrona*	BOLD:AAA1340	Costa Rica	
BLPCD104-08	*Eucereon patrona*	BOLD:AAA1340	Costa Rica	
BLPCN797-08	*Eucereon patrona*	BOLD:AAA1340	Costa Rica	
BLPCO903-08	*Eucereon patrona*	BOLD:AAA1340	Costa Rica	
BLPCO904-08	*Eucereon patrona*	BOLD:AAA1340	Costa Rica	
BLPCP085-08	*Eucereon patrona*	BOLD:AAA1340	Costa Rica	
BLPDK1412-09	*Eucereon patrona*	BOLD:AAA1340	Costa Rica	
BLPDL1930-10	*Eucereon patrona*	BOLD:AAA1340	Costa Rica	
BLPDR475-10	*Eucereon patrona*	BOLD:AAA1340	Costa Rica	
BLPDT1336-10	*Eucereon patrona*	BOLD:AAA1340	Costa Rica	
BLPDW051-11	Lepidoptera	BOLD:AAA1340	Costa Rica	
BLPEE1733-12	Lepidoptera	BOLD:AAA1340	Costa Rica	
BLPEE3969-14	Lepidoptera	BOLD:AAA1340	Costa Rica	
BLPEE5303-14	Lepidoptera	BOLD:AAA1340	Costa Rica	yes
BLPEF2560-13	Lepidoptera	BOLD:AAA1340	Costa Rica	yes
BLPEF924-12	Lepidoptera	BOLD:AAA1340	Costa Rica	
BLPEF925-12	Lepidoptera	BOLD:AAA1340	Costa Rica	
BLPEF926-12	Lepidoptera	BOLD:AAA1340	Costa Rica	
BLPEF927-12	Lepidoptera	BOLD:AAA1340	Costa Rica	
BLPEG1048-14	Lepidoptera	BOLD:AAA1340	Costa Rica	
BLPAF268-07	*Eucereon* latifasciaDHJ01	BOLD:AAA1356	Costa Rica	
BLPBA322-07	*Eucereon* latifasciaDHJ01	BOLD:AAA1356	Costa Rica	
BLPBC567-07	*Eucereon* latifasciaDHJ01	BOLD:AAA1356	Costa Rica	
BLPCC565-08	*Eucereon* latifasciaDHJ01	BOLD:AAA1356	Costa Rica	yes
BLPCD208-08	*Eucereon* latifasciaDHJ01	BOLD:AAA1356	Costa Rica	
BLPCO900-08	*Eucereon* latifasciaDHJ01	BOLD:AAA1356	Costa Rica	
BLPDB266-09	*Eucereon* latifasciaDHJ01	BOLD:AAA1356	Costa Rica	
BLPDL035-10	*Eucereon* latifasciaDHJ01	BOLD:AAA1356	Costa Rica	yes
BLPDM611-10	*Eucereon* latifasciaDHJ01	BOLD:AAA1356	Costa Rica	
BLPDW687-11	*Eucereon* latifasciaDHJ01	BOLD:AAA1356	Costa Rica	yes
MHARB620-06	*Eucereon* latifasciaDHJ01	BOLD:AAA1356	Costa Rica	
MHARB621-06	*Eucereon* latifasciaDHJ01	BOLD:AAA1356	Costa Rica	yes
MHARB622-06	*Eucereon* latifasciaDHJ01	BOLD:AAA1356	Costa Rica	
MHARB623-06	*Eucereon* latifasciaDHJ01	BOLD:AAA1356	Costa Rica	
MHMXQ146-08	*Eucereon* latifasciaDHJ01	BOLD:AAA1356	Costa Rica	
GWOSS538-11	Lepidoptera	BOLD:AAA1356	Honduras	
MHMYL2454-11	Lepidoptera	BOLD:AAA1356	Costa Rica	

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MHMYL2479-11	Lepidoptera	BOLD:AAA1356	Costa Rica	
MHMYS3027-13	Lepidoptera	BOLD:AAA1356	Costa Rica	
MHMYS3028-13	Lepidoptera	BOLD:AAA1356	Costa Rica	
BLPBC470-07	*Eucereon aoris*	BOLD:AAA1365	Costa Rica	
BLPBC568-07	*Eucereon aoris*	BOLD:AAA1365	Costa Rica	yes
BLPBG733-07	*Eucereon aoris*	BOLD:AAA1365	Costa Rica	yes
BLPBG734-07	*Eucereon aoris*	BOLD:AAA1365	Costa Rica	yes
BLPCO745-08	*Eucereon aoris*	BOLD:AAA1365	Costa Rica	
BLPDC561-09	*Eucereon aoris*	BOLD:AAA1365	Costa Rica	yes
BLPDK151-09	*Eucereon aoris*	BOLD:AAA1365	Costa Rica	
BLPDL078-10	*Eucereon aoris*	BOLD:AAA1365	Costa Rica	
BLPEC657-11	*Eucereon aoris*	BOLD:AAA1365	Costa Rica	
MHMYF281-10	*Eucereon aoris*	BOLD:AAA1365	Costa Rica	yes
BLPEF3564-13	Lepidoptera	BOLD:AAA1365	Costa Rica	
BLPDL666-10	*Hyaleucerea vulnerata*	BOLD:AAA1380	Costa Rica	yes
LEMMZ241-10	*Hyaleucerea vulnerata*	BOLD:AAA1380	Brazil	
LEMMZ242-10	*Hyaleucerea vulnerata*	BOLD:AAA1380	Brazil	
LEMMZ243-10	*Hyaleucerea vulnerata*	BOLD:AAA1380	Brazil	yes
LEMMZ244-10	*Hyaleucerea vulnerata*	BOLD:AAA1380	Brazil	
LEMMZ756-11	*Hyaleucerea vulnerata*	BOLD:AAA1380	Brazil	yes
ARMOT420-12	Lepidoptera	BOLD:AAA1380	Argentina	yes
ARMOT423-12	Lepidoptera	BOLD:AAA1380	Argentina	yes
ARMOT430-12	Lepidoptera	BOLD:AAA1380	Argentina	
ARMOT452-12	Lepidoptera	BOLD:AAA1380	Argentina	
BLPEF7397-15	Lepidoptera	BOLD:AAA1380	Costa Rica	yes
LEPPA491-12	Lepidoptera	BOLD:AAA1380	Argentina	
MOTAR424-12	Lepidoptera	BOLD:AAA1380	Argentina	
BLPBC439-07	*Eucereon* argutumDHJ01	BOLD:AAA1407	Costa Rica	
BLPDL1400-10	*Eucereon* argutumDHJ01	BOLD:AAA1407	Costa Rica	yes
BLPEF8681-15	Lepidoptera	BOLD:AAA1407	Costa Rica	
BLPAH510-07	*Eucereon baleris*	BOLD:AAA1419	Costa Rica	
BLPAH511-07	*Eucereon baleris*	BOLD:AAA1419	Costa Rica	
BLPBB006-07	*Eucereon baleris*	BOLD:AAA1419	Costa Rica	yes
BLPCC120-08	*Eucereon baleris*	BOLD:AAA1419	Costa Rica	
BLPCD206-08	*Eucereon baleris*	BOLD:AAA1419	Costa Rica	yes
BLPCE356-08	*Eucereon baleris*	BOLD:AAA1419	Costa Rica	
BLPCL288-08	*Eucereon baleris*	BOLD:AAA1419	Costa Rica	
BLPDL1946-10	*Eucereon baleris*	BOLD:AAA1419	Costa Rica	
BLPDT1582-10	*Eucereon baleris*	BOLD:AAA1419	Costa Rica	
BLPDT1583-10	*Eucereon baleris*	BOLD:AAA1419	Costa Rica	
BLPDU401-11	*Eucereon baleris*	BOLD:AAA1419	Costa Rica	yes
MHMYC013-09	*Eucereon baleris*	BOLD:AAA1419	Costa Rica	yes
BLPEE2368-14	Lepidoptera	BOLD:AAA1419	Costa Rica	
BLPEF6679-14	Lepidoptera	BOLD:AAA1419	Costa Rica	
BLPEF6680-14	Lepidoptera	BOLD:AAA1419	Costa Rica	
BLPEF6770-14	Lepidoptera	BOLD:AAA1419	Costa Rica	yes
BLPEF9874-15	Lepidoptera	BOLD:AAA1419	Costa Rica	
MHMYK10130-15	Lepidoptera	BOLD:AAA1419	Costa Rica	
MHMYS3191-13	Lepidoptera	BOLD:AAA1419	Costa Rica	
BCIAR093-10	*Heliura banoca*	BOLD:AAA1423	Panama	yes
BCIAR730-13	*Heliura banoca*	BOLD:AAA1423	Panama	
BCIGE699-12	*Heliura banoca*	BOLD:AAA1423	Panama	
BCIGE747-12	*Heliura banoca*	BOLD:AAA1423	Panama	yes
BLPAG736-07	*Heliura banoca*	BOLD:AAA1423	Costa Rica	

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BLPCE332-08	*Heliura banoca*	BOLD:AAA1423	Costa Rica	
BLPCE333-08	*Heliura banoca*	BOLD:AAA1423	Costa Rica	
BLPDM068-10	*Heliura banoca*	BOLD:AAA1423	Costa Rica	
BLPDX1025-11	*Heliura banoca*	BOLD:AAA1423	Costa Rica	
XAA311-04	*Heliura banoca*	BOLD:AAA1423	Costa Rica	yes
XAA312-04	*Heliura banoca*	BOLD:AAA1423	Costa Rica	
LEMMZ1070-12	*Heliura subplena*	BOLD:AAA1423	Brazil	yes
LEMMZ1161-12	*Heliura subplena*	BOLD:AAA1423	Brazil	yes
LEMMZ1162-12	*Heliura subplena*	BOLD:AAA1423	Brazil	yes
LEMMZ1163-12	*Heliura subplena*	BOLD:AAA1423	Brazil	
BLPEE2876-14	Lepidoptera	BOLD:AAA1423	Costa Rica	yes
BLPEE3669-14	Lepidoptera	BOLD:AAA1423	Costa Rica	
BLPEE3967-14	Lepidoptera	BOLD:AAA1423	Costa Rica	yes
BLPEE4161-14	Lepidoptera	BOLD:AAA1423	Costa Rica	
BLPEE4162-14	Lepidoptera	BOLD:AAA1423	Costa Rica	yes
BLPEE4163-14	Lepidoptera	BOLD:AAA1423	Costa Rica	
BLPEE4345-14	Lepidoptera	BOLD:AAA1423	Costa Rica	
BLPEE4619-14	Lepidoptera	BOLD:AAA1423	Costa Rica	
BLPEE4795-14	Lepidoptera	BOLD:AAA1423	Costa Rica	
BLPEF1285-12	Lepidoptera	BOLD:AAA1423	Costa Rica	
BLPEF2748-13	Lepidoptera	BOLD:AAA1423	Costa Rica	
BLPEF3232-13	Lepidoptera	BOLD:AAA1423	Costa Rica	
BLPEF8665-15	Lepidoptera	BOLD:AAA1423	Costa Rica	
BLPEF920-12	Lepidoptera	BOLD:AAA1423	Costa Rica	
BLPEG1041-14	Lepidoptera	BOLD:AAA1423	Costa Rica	
GBMIN80299-17	Lepidoptera	BOLD:AAA1423	unknown	
MHMYS3306-13	Lepidoptera	BOLD:AAA1423	Costa Rica	
BLPAG465-07	*Delphyre jansoni*	BOLD:AAA1425	Costa Rica	yes
BLPAG466-07	*Delphyre jansoni*	BOLD:AAA1425	Costa Rica	
BLPBA513-07	*Delphyre jansoni*	BOLD:AAA1425	Costa Rica	
BLPBA534-07	*Delphyre jansoni*	BOLD:AAA1425	Costa Rica	yes
BLPBB381-07	*Delphyre jansoni*	BOLD:AAA1425	Costa Rica	
BLPCC108-08	*Delphyre jansoni*	BOLD:AAA1425	Costa Rica	
BLPCC123-08	*Delphyre jansoni*	BOLD:AAA1425	Costa Rica	yes
BLPCC571-08	*Delphyre jansoni*	BOLD:AAA1425	Costa Rica	
BLPCC572-08	*Delphyre jansoni*	BOLD:AAA1425	Costa Rica	
BLPCD143-08	*Delphyre jansoni*	BOLD:AAA1425	Costa Rica	
BLPCD144-08	*Delphyre jansoni*	BOLD:AAA1425	Costa Rica	
BLPCD145-08	*Delphyre jansoni*	BOLD:AAA1425	Costa Rica	
BLPCD146-08	*Delphyre jansoni*	BOLD:AAA1425	Costa Rica	
BLPCM195-08	*Delphyre jansoni*	BOLD:AAA1425	Costa Rica	
BLPCM282-08	*Delphyre jansoni*	BOLD:AAA1425	Costa Rica	
BLPCN800-08	*Delphyre jansoni*	BOLD:AAA1425	Costa Rica	
BLPCO079-08	*Delphyre jansoni*	BOLD:AAA1425	Costa Rica	
BLPCO080-08	*Delphyre jansoni*	BOLD:AAA1425	Costa Rica	
BLPCP613-08	*Delphyre jansoni*	BOLD:AAA1425	Costa Rica	
BLPDK1666-09	*Delphyre jansoni*	BOLD:AAA1425	Costa Rica	
BLPDK1838-09	*Delphyre jansoni*	BOLD:AAA1425	Costa Rica	
BLPDK463-09	*Delphyre jansoni*	BOLD:AAA1425	Costa Rica	yes
BLPDM310-10	*Delphyre jansoni*	BOLD:AAA1425	Costa Rica	
BLPDM311-10	*Delphyre jansoni*	BOLD:AAA1425	Costa Rica	
BLPDM460-10	*Delphyre jansoni*	BOLD:AAA1425	Costa Rica	
BLPDP623-10	*Delphyre jansoni*	BOLD:AAA1425	Costa Rica	
BLPDT1343-10	*Delphyre jansoni*	BOLD:AAA1425	Costa Rica	

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BLPDT1574-10	*Delphyre jansoni*	BOLD:AAA1425	Costa Rica	
BLPDT1575-10	*Delphyre jansoni*	BOLD:AAA1425	Costa Rica	
BLPDT1576-10	*Delphyre jansoni*	BOLD:AAA1425	Costa Rica	
BLPDU1070-11	*Delphyre jansoni*	BOLD:AAA1425	Costa Rica	
BLPDU1071-11	*Delphyre jansoni*	BOLD:AAA1425	Costa Rica	
BLPDU1072-11	*Delphyre jansoni*	BOLD:AAA1425	Costa Rica	
BLPDU748-11	*Delphyre jansoni*	BOLD:AAA1425	Costa Rica	yes
BLPDV746-11	*Delphyre jansoni*	BOLD:AAA1425	Costa Rica	
BLPDV747-11	*Delphyre jansoni*	BOLD:AAA1425	Costa Rica	
BLPDV748-11	*Delphyre jansoni*	BOLD:AAA1425	Costa Rica	
BLPDV749-11	*Delphyre jansoni*	BOLD:AAA1425	Costa Rica	
BLPDV750-11	*Delphyre jansoni*	BOLD:AAA1425	Costa Rica	
BLPDV751-11	*Delphyre jansoni*	BOLD:AAA1425	Costa Rica	
BLPDX239-11	*Delphyre jansoni*	BOLD:AAA1425	Costa Rica	
BLPDX504-11	*Delphyre jansoni*	BOLD:AAA1425	Costa Rica	
BLPEE1913-12	Lepidoptera	BOLD:AAA1425	Costa Rica	
BLPEF1113-12	Lepidoptera	BOLD:AAA1425	Costa Rica	
BLPEF1370-12	Lepidoptera	BOLD:AAA1425	Costa Rica	yes
BLPEF2072-13	Lepidoptera	BOLD:AAA1425	Costa Rica	yes
BLPEF2073-13	Lepidoptera	BOLD:AAA1425	Costa Rica	
BLPEF2074-13	Lepidoptera	BOLD:AAA1425	Costa Rica	
BLPEF2262-13	Lepidoptera	BOLD:AAA1425	Costa Rica	
BLPEF2491-13	Lepidoptera	BOLD:AAA1425	Costa Rica	yes
BLPEF2586-13	Lepidoptera	BOLD:AAA1425	Costa Rica	
BLPEF2587-13	Lepidoptera	BOLD:AAA1425	Costa Rica	
BLPEF2744-13	Lepidoptera	BOLD:AAA1425	Costa Rica	
BLPEF2745-13	Lepidoptera	BOLD:AAA1425	Costa Rica	
BLPEF2962-13	Lepidoptera	BOLD:AAA1425	Costa Rica	
BLPEF2963-13	Lepidoptera	BOLD:AAA1425	Costa Rica	
BLPEF3241-13	Lepidoptera	BOLD:AAA1425	Costa Rica	
BLPEF6384-14	Lepidoptera	BOLD:AAA1425	Costa Rica	
BLPEF729-12	Lepidoptera	BOLD:AAA1425	Costa Rica	
BLPEF730-12	Lepidoptera	BOLD:AAA1425	Costa Rica	
BLPEF731-12	Lepidoptera	BOLD:AAA1425	Costa Rica	
BLPEF732-12	Lepidoptera	BOLD:AAA1425	Costa Rica	yes
BLPEF826-12	Lepidoptera	BOLD:AAA1425	Costa Rica	
BLPEF928-12	Lepidoptera	BOLD:AAA1425	Costa Rica	
BLPEF929-12	Lepidoptera	BOLD:AAA1425	Costa Rica	
BLPEF930-12	Lepidoptera	BOLD:AAA1425	Costa Rica	
BLPEF931-12	Lepidoptera	BOLD:AAA1425	Costa Rica	
BLPEG1522-14	Lepidoptera	BOLD:AAA1425	Costa Rica	
MHMYS3192-13	Lepidoptera	BOLD:AAA1425	Costa Rica	
BLPAG493-07	*Eucereon rosadora* xanthodoraDHJ01	BOLD:AAA1441	Costa Rica	
BLPBA743-07	*Eucereon rosadora* xanthodoraDHJ01	BOLD:AAA1441	Costa Rica	
BLPBB873-07	*Eucereon rosadora* xanthodoraDHJ01	BOLD:AAA1441	Costa Rica	
BLPBB887-07	*Eucereon rosadora* xanthodoraDHJ01	BOLD:AAA1441	Costa Rica	
BLPBC218-07	*Eucereon rosadora* xanthodoraDHJ01	BOLD:AAA1441	Costa Rica	
BLPBC219-07	*Eucereon rosadora* xanthodoraDHJ01	BOLD:AAA1441	Costa Rica	

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BLPBE500-07	*Eucereon rosadora* xanthodoraDHJ01	BOLD:AAA1441	Costa Rica	
BLPCF244-08	*Eucereon rosadora* xanthodoraDHJ01	BOLD:AAA1441	Costa Rica	
BLPCF528-08	*Eucereon rosadora* xanthodoraDHJ01	BOLD:AAA1441	Costa Rica	
BLPCF635-08	*Eucereon rosadora* xanthodoraDHJ01	BOLD:AAA1441	Costa Rica	
BLPCG134-08	*Eucereon rosadora* xanthodoraDHJ01	BOLD:AAA1441	Costa Rica	
BLPCG539-08	*Eucereon rosadora* xanthodoraDHJ01	BOLD:AAA1441	Costa Rica	
BLPCO412-08	*Eucereon rosadora* xanthodoraDHJ01	BOLD:AAA1441	Costa Rica	
BLPCO413-08	*Eucereon rosadora* xanthodoraDHJ01	BOLD:AAA1441	Costa Rica	
BLPCO746-08	*Eucereon rosadora* xanthodoraDHJ01	BOLD:AAA1441	Costa Rica	
BLPCP329-08	*Eucereon rosadora* xanthodoraDHJ01	BOLD:AAA1441	Costa Rica	
BLPCP606-08	*Eucereon rosadora* xanthodoraDHJ01	BOLD:AAA1441	Costa Rica	
BLPDM1029-10	*Eucereon rosadora* xanthodoraDHJ01	BOLD:AAA1441	Costa Rica	
BLPDX1026-11	*Eucereon rosadora* xanthodoraDHJ01	BOLD:AAA1441	Costa Rica	
MHMYK3415-15	Lepidoptera	BOLD:AAA1441	Costa Rica	
MHMYM3268-14	Lepidoptera	BOLD:AAA1441	Costa Rica	
MHMYN3321-14	Lepidoptera	BOLD:AAA1441	Costa Rica	
MHMYN3322-14	Lepidoptera	BOLD:AAA1441	Costa Rica	
MHMYN3323-14	Lepidoptera	BOLD:AAA1441	Costa Rica	
MHMYN3324-14	Lepidoptera	BOLD:AAA1441	Costa Rica	
MHMYN3325-14	Lepidoptera	BOLD:AAA1441	Costa Rica	yes
MHMYN6283-14	Lepidoptera	BOLD:AAA1441	Costa Rica	
BLPAA140-06	*Hyaleucerea* Janzen01	BOLD:AAA1450	Costa Rica	
BLPAA418-06	*Hyaleucerea* Janzen01	BOLD:AAA1450	Costa Rica	
BLPBC220-07	*Hyaleucerea* Janzen01	BOLD:AAA1450	Costa Rica	yes
BLPBC564-07	*Hyaleucerea* Janzen01	BOLD:AAA1450	Costa Rica	
BLPCA745-08	*Hyaleucerea* Janzen01	BOLD:AAA1450	Costa Rica	
BLPCE331-08	*Hyaleucerea* Janzen01	BOLD:AAA1450	Costa Rica	
BLPCH082-08	*Hyaleucerea* Janzen01	BOLD:AAA1450	Costa Rica	
BLPCI310-08	*Hyaleucerea* Janzen01	BOLD:AAA1450	Costa Rica	
BLPCI311-08	*Hyaleucerea* Janzen01	BOLD:AAA1450	Costa Rica	
BLPCI312-08	*Hyaleucerea* Janzen01	BOLD:AAA1450	Costa Rica	yes
BLPCJ108-08	*Hyaleucerea* Janzen01	BOLD:AAA1450	Costa Rica	
BLPCJ109-08	*Hyaleucerea* Janzen01	BOLD:AAA1450	Costa Rica	
BLPCJ110-08	*Hyaleucerea* Janzen01	BOLD:AAA1450	Costa Rica	
BLPDA675-09	*Hyaleucerea* Janzen01	BOLD:AAA1450	Costa Rica	
BLPDD522-09	*Hyaleucerea* Janzen01	BOLD:AAA1450	Costa Rica	yes
BLPDD758-09	*Hyaleucerea* Janzen01	BOLD:AAA1450	Costa Rica	
BLPDD759-09	*Hyaleucerea* Janzen01	BOLD:AAA1450	Costa Rica	yes
BLPDD760-09	*Hyaleucerea* Janzen01	BOLD:AAA1450	Costa Rica	
BLPDD761-09	*Hyaleucerea* Janzen01	BOLD:AAA1450	Costa Rica	
BLPDM1743-10	*Hyaleucerea* Janzen01	BOLD:AAA1450	Costa Rica	yes

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BLPDP991-10	*Hyaleucerea* Janzen01	BOLD:AAA1450	Costa Rica	
BLPED379-11	*Hyaleucerea* Janzen01	BOLD:AAA1450	Costa Rica	
BLPED731-11	*Hyaleucerea* Janzen01	BOLD:AAA1450	Costa Rica	yes
BLPED921-11	*Hyaleucerea* Janzen01	BOLD:AAA1450	Costa Rica	
MHARB100-05	*Hyaleucerea* Janzen01	BOLD:AAA1450	Costa Rica	
MHARB101-05	*Hyaleucerea* Janzen01	BOLD:AAA1450	Costa Rica	yes
MHMXH340-07	*Hyaleucerea* Janzen01	BOLD:AAA1450	Costa Rica	
MHMYC615-09	*Hyaleucerea* Janzen01	BOLD:AAA1450	Costa Rica	
XAA302-04	*Hyaleucerea* Janzen01	BOLD:AAA1450	Costa Rica	yes
XAA303-04	*Hyaleucerea* Janzen01	BOLD:AAA1450	Costa Rica	
XAA304-04	*Hyaleucerea* Janzen01	BOLD:AAA1450	Costa Rica	
BLPED1374-12	Lepidoptera	BOLD:AAA1450	Costa Rica	yes
BLPED1375-12	Lepidoptera	BOLD:AAA1450	Costa Rica	
BLPED1472-12	Lepidoptera	BOLD:AAA1450	Costa Rica	
BLPED1709-12	Lepidoptera	BOLD:AAA1450	Costa Rica	
BLPED1710-12	Lepidoptera	BOLD:AAA1450	Costa Rica	
BLPED1831-12	Lepidoptera	BOLD:AAA1450	Costa Rica	
BLPED2219-12	Lepidoptera	BOLD:AAA1450	Costa Rica	
BLPED2220-12	Lepidoptera	BOLD:AAA1450	Costa Rica	
BLPED2390-12	Lepidoptera	BOLD:AAA1450	Costa Rica	
BLPED2482-12	Lepidoptera	BOLD:AAA1450	Costa Rica	
BLPEE085-12	Lepidoptera	BOLD:AAA1450	Costa Rica	
BLPEE086-12	Lepidoptera	BOLD:AAA1450	Costa Rica	
BLPEE3668-14	Lepidoptera	BOLD:AAA1450	Costa Rica	yes
BLPEE5382-14	Lepidoptera	BOLD:AAA1450	Costa Rica	
BLPEF8664-15	Lepidoptera	BOLD:AAA1450	Costa Rica	
BLPEF8848-15	Lepidoptera	BOLD:AAA1450	Costa Rica	
BLPEF9714-15	Lepidoptera	BOLD:AAA1450	Costa Rica	
BLPEF9715-15	Lepidoptera	BOLD:AAA1450	Costa Rica	
BLPEF9716-15	Lepidoptera	BOLD:AAA1450	Costa Rica	
BLPEF9718-15	Lepidoptera	BOLD:AAA1450	Costa Rica	
BLPEF9875-15	Lepidoptera	BOLD:AAA1450	Costa Rica	
GMCRY794-14	Lepidoptera	BOLD:AAA1450	Costa Rica	
GMCUU027-14	Lepidoptera	BOLD:AAA1450	Costa Rica	
MHMYL2339-11	Lepidoptera	BOLD:AAA1450	Costa Rica	
MHMYL2414-11	Lepidoptera	BOLD:AAA1450	Costa Rica	
BLPBG300-07	*Eucereon* Janzen01DHJ01	BOLD:AAA1457	Costa Rica	
BLPCD086-08	*Eucereon* Janzen01DHJ01	BOLD:AAA1457	Costa Rica	
BLPDK1673-09	*Eucereon* Janzen01DHJ01	BOLD:AAA1457	Costa Rica	
BLPDK1857-09	*Eucereon* Janzen01DHJ01	BOLD:AAA1457	Costa Rica	
BLPDN1645-10	*Eucereon* Janzen01DHJ01	BOLD:AAA1457	Costa Rica	
BLPDN2074-10	*Eucereon* Janzen01DHJ01	BOLD:AAA1457	Costa Rica	
BLPDN2087-10	*Eucereon* Janzen01DHJ01	BOLD:AAA1457	Costa Rica	
BLPDN611-10	*Eucereon* Janzen01DHJ01	BOLD:AAA1457	Costa Rica	yes
BLPDQ712-10	*Eucereon* Janzen01DHJ01	BOLD:AAA1457	Costa Rica	
BLPDT1587-10	*Eucereon* Janzen01DHJ01	BOLD:AAA1457	Costa Rica	
BLPDU403-11	*Eucereon* Janzen01DHJ01	BOLD:AAA1457	Costa Rica	
BLPDU745-11	*Eucereon* Janzen01DHJ01	BOLD:AAA1457	Costa Rica	
BLPDV492-11	*Eucereon* Janzen01DHJ01	BOLD:AAA1457	Costa Rica	
BLPDV493-11	*Eucereon* Janzen01DHJ01	BOLD:AAA1457	Costa Rica	
BLPDV753-11	*Eucereon* Janzen01DHJ01	BOLD:AAA1457	Costa Rica	
BLPDV754-11	*Eucereon* Janzen01DHJ01	BOLD:AAA1457	Costa Rica	
BLPDW1020-11	*Eucereon* Janzen01DHJ01	BOLD:AAA1457	Costa Rica	
BLPDW1021-11	*Eucereon* Janzen01DHJ01	BOLD:AAA1457	Costa Rica	

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BLPDW693-11	*Eucereon* Janzen01DHJ01	BOLD:AAA1457	Costa Rica	yes
BLPDW694-11	*Eucereon* Janzen01DHJ01	BOLD:AAA1457	Costa Rica	
BLPDX1402-11	*Eucereon* Janzen01DHJ01	BOLD:AAA1457	Costa Rica	
BLPDX1403-11	*Eucereon* Janzen01DHJ01	BOLD:AAA1457	Costa Rica	
BLPEA1024-11	*Eucereon* Janzen01DHJ01	BOLD:AAA1457	Costa Rica	
BLPEA1025-11	*Eucereon* Janzen01DHJ01	BOLD:AAA1457	Costa Rica	
BLPEB096-11	*Eucereon* Janzen01DHJ01	BOLD:AAA1457	Costa Rica	
BLPEB734-11	*Eucereon* Janzen01DHJ01	BOLD:AAA1457	Costa Rica	
BLPED548-11	*Eucereon* Janzen01DHJ01	BOLD:AAA1457	Costa Rica	
MHMXQ143-08	*Eucereon* Janzen01DHJ01	BOLD:AAA1457	Costa Rica	
BLPEE3134-14	Lepidoptera	BOLD:AAA1457	Costa Rica	
BLPEF2579-13	Lepidoptera	BOLD:AAA1457	Costa Rica	
BLPEF8991-15	Lepidoptera	BOLD:AAA1457	Costa Rica	
BLPEF937-12	Lepidoptera	BOLD:AAA1457	Costa Rica	
BCIAR060-10	*Eucereon aeolum*	BOLD:AAA8661	Panama	
BCIAR061-10	*Eucereon aeolum*	BOLD:AAA8661	Panama	
BCIAR073-10	*Eucereon aeolum*	BOLD:AAA8661	Panama	
BCIAR080-10	*Eucereon aeolum*	BOLD:AAA8661	Panama	
BCIAR092-10	*Eucereon aeolum*	BOLD:AAA8661	Panama	yes
BCIAR697-13	*Eucereon aeolum*	BOLD:AAA8661	Panama	yes
BCIAR698-13	*Eucereon aeolum*	BOLD:AAA8661	Panama	
BCIAR699-13	*Eucereon aeolum*	BOLD:AAA8661	Panama	
BLPBC469-07	*Eucereon aeolum*	BOLD:AAA8661	Costa Rica	
BLPDT091-10	*Eucereon aeolum*	BOLD:AAA8661	Costa Rica	
BLPDT1592-10	*Eucereon aeolum*	BOLD:AAA8661	Costa Rica	
LEMMZ432-11	*Eucereon aeolum*	BOLD:AAA8661	Brazil	
LEMMZ477-11	*Eucereon aeolum*	BOLD:AAA8661	Brazil	
LEMMZ478-11	*Eucereon aeolum*	BOLD:AAA8661	Brazil	yes
MHARB628-06	*Eucereon aeolum*	BOLD:AAA8661	Costa Rica	yes
MHARB629-06	*Eucereon aeolum*	BOLD:AAA8661	Costa Rica	yes
MHARB630-06	*Eucereon aeolum*	BOLD:AAA8661	Costa Rica	
MHARB631-06	*Eucereon aeolum*	BOLD:AAA8661	Costa Rica	
MHARB632-06	*Eucereon aeolum*	BOLD:AAA8661	Costa Rica	
MHARB633-06	*Eucereon aeolum*	BOLD:AAA8661	Costa Rica	
MHARB634-06	*Eucereon aeolum*	BOLD:AAA8661	Costa Rica	
MHARB896-06	*Eucereon aeolum*	BOLD:AAA8661	Costa Rica	
MHMXC770-06	*Eucereon aeolum*	BOLD:AAA8661	Costa Rica	
MHMXH428-07	*Eucereon aeolum*	BOLD:AAA8661	Costa Rica	
MHMXH429-07	*Eucereon aeolum*	BOLD:AAA8661	Costa Rica	
MHMXH430-07	*Eucereon aeolum*	BOLD:AAA8661	Costa Rica	
MHMXH431-07	*Eucereon aeolum*	BOLD:AAA8661	Costa Rica	
MHMXH432-07	*Eucereon aeolum*	BOLD:AAA8661	Costa Rica	
MHMXH433-07	*Eucereon aeolum*	BOLD:AAA8661	Costa Rica	
MHMXH434-07	*Eucereon aeolum*	BOLD:AAA8661	Costa Rica	
MHMXH435-07	*Eucereon aeolum*	BOLD:AAA8661	Costa Rica	
MHMXH436-07	*Eucereon aeolum*	BOLD:AAA8661	Costa Rica	
MHMXH437-07	*Eucereon aeolum*	BOLD:AAA8661	Costa Rica	
MHMXL612-07	*Eucereon aeolum*	BOLD:AAA8661	Costa Rica	yes
MHMXO050-08	*Eucereon aeolum*	BOLD:AAA8661	Costa Rica	
MHMXO051-08	*Eucereon aeolum*	BOLD:AAA8661	Costa Rica	yes
MHMXO052-08	*Eucereon aeolum*	BOLD:AAA8661	Costa Rica	
MHMXO053-08	*Eucereon aeolum*	BOLD:AAA8661	Costa Rica	
MHMXO054-08	*Eucereon aeolum*	BOLD:AAA8661	Costa Rica	
MHMXO055-08	*Eucereon aeolum*	BOLD:AAA8661	Costa Rica	

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MHMXQ144-08	*Eucereon aeolum*	BOLD:AAA8661	Costa Rica	
MHMXT568-08	*Eucereon aeolum*	BOLD:AAA8661	unknown	
MHMXT569-08	*Eucereon aeolum*	BOLD:AAA8661	unknown	
MHMXT570-08	*Eucereon aeolum*	BOLD:AAA8661	unknown	
MHMXT596-08	*Eucereon aeolum*	BOLD:AAA8661	unknown	
MHMYC621-09	*Eucereon aeolum*	BOLD:AAA8661	Costa Rica	
MHMYC622-09	*Eucereon aeolum*	BOLD:AAA8661	Costa Rica	
MHMYC623-09	*Eucereon aeolum*	BOLD:AAA8661	Costa Rica	
MHMYC624-09	*Eucereon aeolum*	BOLD:AAA8661	Costa Rica	
MHMYF282-10	*Eucereon aeolum*	BOLD:AAA8661	Costa Rica	yes
XAA270-04	*Eucereon aeolum*	BOLD:AAA8661	Costa Rica	
XAA271-04	*Eucereon aeolum*	BOLD:AAA8661	Costa Rica	
XAA272-04	*Eucereon aeolum*	BOLD:AAA8661	Costa Rica	
XAA273-04	*Eucereon aeolum*	BOLD:AAA8661	Costa Rica	yes
BLPED1471-12	Lepidoptera	BOLD:AAA8661	Costa Rica	
BLPEE3556-14	Lepidoptera	BOLD:AAA8661	Costa Rica	yes
BLPEE4461-14	Lepidoptera	BOLD:AAA8661	Costa Rica	
BLPEF1362-12	Lepidoptera	BOLD:AAA8661	Costa Rica	
MHMYG3096-10	Lepidoptera	BOLD:AAA8661	Costa Rica	
MHMYG3097-10	Lepidoptera	BOLD:AAA8661	Costa Rica	
MHMYK3416-15	Lepidoptera	BOLD:AAA8661	Costa Rica	
MHMYK5849-15	Lepidoptera	BOLD:AAA8661	Costa Rica	
MHMYK5850-15	Lepidoptera	BOLD:AAA8661	Costa Rica	
MHMYK5851-15	Lepidoptera	BOLD:AAA8661	Costa Rica	
MHMYK5852-15	Lepidoptera	BOLD:AAA8661	Costa Rica	
MHMYK5853-15	Lepidoptera	BOLD:AAA8661	Costa Rica	
MHMYM2021-11	Lepidoptera	BOLD:AAA8661	Costa Rica	
MHMYM2022-11	Lepidoptera	BOLD:AAA8661	Costa Rica	
MHMYM2023-11	Lepidoptera	BOLD:AAA8661	Costa Rica	
MHMYN3301-14	Lepidoptera	BOLD:AAA8661	Costa Rica	
MHMYN3302-14	Lepidoptera	BOLD:AAA8661	Costa Rica	
MHMYN3303-14	Lepidoptera	BOLD:AAA8661	Costa Rica	
MHMYN3304-14	Lepidoptera	BOLD:AAA8661	Costa Rica	
MHMYN3305-14	Lepidoptera	BOLD:AAA8661	Costa Rica	
MHMYN3306-14	Lepidoptera	BOLD:AAA8661	Costa Rica	
MHMYN3307-14	Lepidoptera	BOLD:AAA8661	Costa Rica	
MHMYN3308-14	Lepidoptera	BOLD:AAA8661	Costa Rica	
MHMYN3309-14	Lepidoptera	BOLD:AAA8661	Costa Rica	
MHMYN3310-14	Lepidoptera	BOLD:AAA8661	Costa Rica	
MHMYN3311-14	Lepidoptera	BOLD:AAA8661	Costa Rica	
MHMYN3312-14	Lepidoptera	BOLD:AAA8661	Costa Rica	
MHMYN3313-14	Lepidoptera	BOLD:AAA8661	Costa Rica	
MHMYN3314-14	Lepidoptera	BOLD:AAA8661	Costa Rica	
MHMYN3315-14	Lepidoptera	BOLD:AAA8661	Costa Rica	
MHMYN3316-14	Lepidoptera	BOLD:AAA8661	Costa Rica	
MHMYN3317-14	Lepidoptera	BOLD:AAA8661	Costa Rica	
MHMYN3318-14	Lepidoptera	BOLD:AAA8661	Costa Rica	
MHMYN3319-14	Lepidoptera	BOLD:AAA8661	Costa Rica	
MHMYN3528-14	Lepidoptera	BOLD:AAA8661	Costa Rica	
MHMYP1578-12	Lepidoptera	BOLD:AAA8661	Costa Rica	
ARCTC759-11	Lepidoptera	BOLD:AAA9439	Paraguay	yes
ARCTC760-11	Lepidoptera	BOLD:AAA9439	Paraguay	
ARCTC761-11	Lepidoptera	BOLD:AAA9439	Paraguay	
ARCTC762-11	Lepidoptera	BOLD:AAA9439	Argentina	

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ARMOT382-12	Lepidoptera	BOLD:AAA9439	Argentina	
ARMOT392-12	Lepidoptera	BOLD:AAA9439	Argentina	yes
ARMOT470-12	Lepidoptera	BOLD:AAA9439	Argentina	yes
ARMOT475-12	Lepidoptera	BOLD:AAA9439	Argentina	
LEPPA483-12	Lepidoptera	BOLD:AAA9439	Argentina	
LEPPA490-12	Lepidoptera	BOLD:AAA9439	Argentina	
MHMYK3426-15	Lepidoptera	BOLD:AAA9439	Costa Rica	
MHMYK5858-15	Lepidoptera	BOLD:AAA9439	Costa Rica	
MHMYK7993-15	Lepidoptera	BOLD:AAA9439	Costa Rica	yes
MHMYK7994-15	Lepidoptera	BOLD:AAA9439	Costa Rica	
MHMYK7995-15	Lepidoptera	BOLD:AAA9439	Costa Rica	
ARCTC766-11	*Nelphe relegatum*	BOLD:AAA9439	Guatemala	
ARCTC780-11	*Nelphe relegatum*	BOLD:AAA9439	Nicaragua	
ARCTC781-11	*Nelphe relegatum*	BOLD:AAA9439	Nicaragua	yes
ARCTC782-11	*Nelphe relegatum*	BOLD:AAA9439	Nicaragua	
ARCTC784-11	*Nelphe relegatum*	BOLD:AAA9439	Costa Rica	
BCIGE758-12	*Nelphe relegatum*	BOLD:AAA9439	Panama	
BLPAA237-06	*Nelphe relegatum*	BOLD:AAA9439	Costa Rica	yes
BLPAA804-06	*Nelphe relegatum*	BOLD:AAA9439	Costa Rica	
BLPAB230-06	*Nelphe relegatum*	BOLD:AAA9439	Costa Rica	
BLPAB723-06	*Nelphe relegatum*	BOLD:AAA9439	Costa Rica	
BLPAD858-06	*Nelphe relegatum*	BOLD:AAA9439	Costa Rica	
BLPAG786-07	*Nelphe relegatum*	BOLD:AAA9439	Costa Rica	
BLPBA323-07	*Nelphe relegatum*	BOLD:AAA9439	Costa Rica	
BLPBD536-07	*Nelphe relegatum*	BOLD:AAA9439	Costa Rica	
BLPBH161-07	*Nelphe relegatum*	BOLD:AAA9439	Costa Rica	yes
BLPCC121-08	*Nelphe relegatum*	BOLD:AAA9439	Costa Rica	
BLPCC122-08	*Nelphe relegatum*	BOLD:AAA9439	Costa Rica	yes
BLPCC567-08	*Nelphe relegatum*	BOLD:AAA9439	Costa Rica	
BLPCC568-08	*Nelphe relegatum*	BOLD:AAA9439	Costa Rica	yes
BLPCC569-08	*Nelphe relegatum*	BOLD:AAA9439	Costa Rica	
BLPCD203-08	*Nelphe relegatum*	BOLD:AAA9439	Costa Rica	
BLPCE348-08	*Nelphe relegatum*	BOLD:AAA9439	Costa Rica	
BLPCE349-08	*Nelphe relegatum*	BOLD:AAA9439	Costa Rica	
BLPCG697-08	*Nelphe relegatum*	BOLD:AAA9439	Costa Rica	yes
BLPCG698-08	*Nelphe relegatum*	BOLD:AAA9439	Costa Rica	
BLPCJ333-08	*Nelphe relegatum*	BOLD:AAA9439	Costa Rica	
BLPDC076-09	*Nelphe relegatum*	BOLD:AAA9439	Costa Rica	
BLPDD315-09	*Nelphe relegatum*	BOLD:AAA9439	Costa Rica	
BLPDD379-09	*Nelphe relegatum*	BOLD:AAA9439	Costa Rica	yes
BLPDH845-09	*Nelphe relegatum*	BOLD:AAA9439	Costa Rica	
BLPDS404-10	*Nelphe relegatum*	BOLD:AAA9439	Costa Rica	
BLPDU1229-11	*Nelphe relegatum*	BOLD:AAA9439	Costa Rica	
BLPED1717-12	*Nelphe relegatum*	BOLD:AAA9439	Costa Rica	
BLPED1718-12	*Nelphe relegatum*	BOLD:AAA9439	Costa Rica	
BLPEE2069-12	*Nelphe relegatum*	BOLD:AAA9439	Costa Rica	
BLPEE2872-14	*Nelphe relegatum*	BOLD:AAA9439	Costa Rica	
BLPEE3970-14	*Nelphe relegatum*	BOLD:AAA9439	Costa Rica	
CNCLB1895-14	*Nelphe relegatum*	BOLD:AAA9439	Mexico	
LPMX279-07	*Nelphe relegatum*	BOLD:AAA9439	Mexico	
LYHES397-09	*Nelphe relegatum*	BOLD:AAA9439	Mexico	
MHARB588-06	*Nelphe relegatum*	BOLD:AAA9439	Costa Rica	
MHARB589-06	*Nelphe relegatum*	BOLD:AAA9439	Costa Rica	
MHARB590-06	*Nelphe relegatum*	BOLD:AAA9439	Costa Rica	yes

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MHARB591-06	*Nelphe relegatum*	BOLD:AAA9439	Costa Rica	yes
MHARB592-06	*Nelphe relegatum*	BOLD:AAA9439	Costa Rica	
MHARB593-06	*Nelphe relegatum*	BOLD:AAA9439	Costa Rica	
MHARB594-06	*Nelphe relegatum*	BOLD:AAA9439	Costa Rica	
MHARB893-06	*Nelphe relegatum*	BOLD:AAA9439	Costa Rica	
MHARB894-06	*Nelphe relegatum*	BOLD:AAA9439	Costa Rica	
MHARB895-06	*Nelphe relegatum*	BOLD:AAA9439	Costa Rica	
MHMYC616-09	*Nelphe relegatum*	BOLD:AAA9439	Costa Rica	
MHMYL2465-11	*Nelphe relegatum*	BOLD:AAA9439	Costa Rica	
MHMYN3326-14	*Nelphe relegatum*	BOLD:AAA9439	Costa Rica	
MHMYN3327-14	*Nelphe relegatum*	BOLD:AAA9439	Costa Rica	
MHMYN6279-14	*Nelphe relegatum*	BOLD:AAA9439	Costa Rica	
MHMYN6280-14	*Nelphe relegatum*	BOLD:AAA9439	Costa Rica	
INCTA350-10	*Delphyre flaviceps*	BOLD:AAB4834	Brazil	yes
INCTA411-10	*Delphyre flaviceps*	BOLD:AAB4834	Brazil	
INCTB014-10	*Delphyre flaviceps*	BOLD:AAB4834	Brazil	yes
LPYPB171-08	*Delphyre rubricincta*	BOLD:AAB4834	Mexico	
ARCTB188-08	*Delphyre testacea*	BOLD:AAB4834	Guatemala	
ARCTB195-08	*Delphyre testacea*	BOLD:AAB4834	Guatemala	yes
BCIAR391-10	*Delphyre testacea*	BOLD:AAB4834	Panama	
BCIAR402-10	*Delphyre testacea*	BOLD:AAB4834	Panama	
BCIAR451-10	*Delphyre testacea*	BOLD:AAB4834	Panama	
BCIAR470-10	*Delphyre testacea*	BOLD:AAB4834	Panama	yes
BCIAR497-12	*Delphyre testacea*	BOLD:AAB4834	Panama	
BCIAR744-13	*Delphyre testacea*	BOLD:AAB4834	Panama	yes
BCIAR747-13	*Delphyre testacea*	BOLD:AAB4834	Panama	
BLPAG472-07	*Delphyre testacea*	BOLD:AAB4834	Costa Rica	
BLPAG473-07	*Delphyre testacea*	BOLD:AAB4834	Costa Rica	
BLPAG794-07	*Delphyre testacea*	BOLD:AAB4834	Costa Rica	
BLPBB345-07	*Delphyre testacea*	BOLD:AAB4834	Costa Rica	
BLPBB346-07	*Delphyre testacea*	BOLD:AAB4834	Costa Rica	
BLPBB347-07	*Delphyre testacea*	BOLD:AAB4834	Costa Rica	yes
BLPBB348-07	*Delphyre testacea*	BOLD:AAB4834	Costa Rica	
BLPBE016-07	*Delphyre testacea*	BOLD:AAB4834	Costa Rica	
BLPBF226-07	*Delphyre testacea*	BOLD:AAB4834	Costa Rica	
BLPCB565-08	*Delphyre testacea*	BOLD:AAB4834	Costa Rica	
BLPCD115-08	*Delphyre testacea*	BOLD:AAB4834	Costa Rica	yes
BLPCD116-08	*Delphyre testacea*	BOLD:AAB4834	Costa Rica	
BLPCD117-08	*Delphyre testacea*	BOLD:AAB4834	Costa Rica	
BLPCD118-08	*Delphyre testacea*	BOLD:AAB4834	Costa Rica	
BLPCF675-08	*Delphyre testacea*	BOLD:AAB4834	Costa Rica	
BLPCG118-08	*Delphyre testacea*	BOLD:AAB4834	Costa Rica	yes
BLPCL040-08	*Delphyre testacea*	BOLD:AAB4834	Costa Rica	
BLPCM771-08	*Delphyre testacea*	BOLD:AAB4834	Costa Rica	
BLPCM772-08	*Delphyre testacea*	BOLD:AAB4834	Costa Rica	
BLPCN290-08	*Delphyre testacea*	BOLD:AAB4834	Costa Rica	
BLPCN291-08	*Delphyre testacea*	BOLD:AAB4834	Costa Rica	
BLPDB700-09	*Delphyre testacea*	BOLD:AAB4834	Costa Rica	
BLPDC077-09	*Delphyre testacea*	BOLD:AAB4834	Costa Rica	
BLPDD535-09	*Delphyre testacea*	BOLD:AAB4834	Costa Rica	
BLPDK2121-09	*Delphyre testacea*	BOLD:AAB4834	Costa Rica	
BLPDX502-11	*Delphyre testacea*	BOLD:AAB4834	Costa Rica	
BLPEE1656-12	Lepidoptera	BOLD:AAB4834	Costa Rica	
BLPEE2558-14	Lepidoptera	BOLD:AAB4834	Costa Rica	

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BLPEE2891-14	Lepidoptera	BOLD:AAB4834	Costa Rica	
BLPEF4785-13	Lepidoptera	BOLD:AAB4834	Costa Rica	
BLPEF7041-15	Lepidoptera	BOLD:AAB4834	Costa Rica	
BLPEF932-12	Lepidoptera	BOLD:AAB4834	Costa Rica	
BLPEF933-12	Lepidoptera	BOLD:AAB4834	Costa Rica	yes
BLPEG3035-14	Lepidoptera	BOLD:AAB4834	Costa Rica	
BLPAG754-07	*Eucereon* dentataDHJ01	BOLD:AAB5395	Costa Rica	
BLPCL281-08	*Eucereon* dentataDHJ01	BOLD:AAB5395	Costa Rica	
BLPCO450-08	*Eucereon* dentataDHJ01	BOLD:AAB5395	Costa Rica	
BLPDB460-09	*Eucereon* dentataDHJ01	BOLD:AAB5395	Costa Rica	yes
BLPDI216-09	*Eucereon* dentataDHJ01	BOLD:AAB5395	Costa Rica	
BLPDT1593-10	*Eucereon* dentataDHJ01	BOLD:AAB5395	Costa Rica	
BLPDX1245-11	*Eucereon* dentataDHJ01	BOLD:AAB5395	Costa Rica	
BLPEC302-11	*Eucereon* dentataDHJ01	BOLD:AAB5395	Costa Rica	
BLPAB715-06	*Eucereon* dentataDHJ02	BOLD:AAB5395	Costa Rica	yes
BLPAD013-06	*Eucereon* dentataDHJ02	BOLD:AAB5395	Costa Rica	
BLPAG751-07	*Eucereon* dentataDHJ02	BOLD:AAB5395	Costa Rica	
BLPAG755-07	*Eucereon* dentataDHJ02	BOLD:AAB5395	Costa Rica	
BLPBA324-07	*Eucereon* dentataDHJ02	BOLD:AAB5395	Costa Rica	
BLPBB872-07	*Eucereon* dentataDHJ02	BOLD:AAB5395	Costa Rica	
BLPCC566-08	*Eucereon* dentataDHJ02	BOLD:AAB5395	Costa Rica	
BLPCE557-08	*Eucereon* dentataDHJ02	BOLD:AAB5395	Costa Rica	
BLPCL280-08	*Eucereon* dentataDHJ02	BOLD:AAB5395	Costa Rica	
BLPCM279-08	*Eucereon* dentataDHJ02	BOLD:AAB5395	Costa Rica	
BLPCN812-08	*Eucereon* dentataDHJ02	BOLD:AAB5395	Costa Rica	yes
BLPCN813-08	*Eucereon* dentataDHJ02	BOLD:AAB5395	Costa Rica	
BLPCN814-08	*Eucereon* dentataDHJ02	BOLD:AAB5395	Costa Rica	
BLPCN815-08	*Eucereon* dentataDHJ02	BOLD:AAB5395	Costa Rica	
BLPCOI75-08	*Eucereon* dentataDHJ02	BOLD:AAB5395	Costa Rica	
BLPCO451-08	*Eucereon* dentataDHJ02	BOLD:AAB5395	Costa Rica	
BLPCP608-08	*Eucereon* dentataDHJ02	BOLD:AAB5395	Costa Rica	
BLPDH848-09	*Eucereon* dentataDHJ02	BOLD:AAB5395	Costa Rica	
BLPDK1560-09	*Eucereon* dentataDHJ02	BOLD:AAB5395	Costa Rica	
BLPDK2108-09	*Eucereon* dentataDHJ02	BOLD:AAB5395	Costa Rica	
BLPDK623-09	*Eucereon* dentataDHJ02	BOLD:AAB5395	Costa Rica	
BLPDK624-09	*Eucereon* dentataDHJ02	BOLD:AAB5395	Costa Rica	
BLPDQ045-10	*Eucereon* dentataDHJ02	BOLD:AAB5395	Costa Rica	
BLPDT1594-10	*Eucereon* dentataDHJ02	BOLD:AAB5395	Costa Rica	
BLPDT1595-10	*Eucereon* dentataDHJ02	BOLD:AAB5395	Costa Rica	
BLPDT1990-10	*Eucereon* dentataDHJ02	BOLD:AAB5395	Costa Rica	yes
BLPDX1406-11	*Eucereon* dentataDHJ02	BOLD:AAB5395	Costa Rica	
BLPDX495-11	*Eucereon* dentataDHJ02	BOLD:AAB5395	Costa Rica	
BLPDX497-11	*Eucereon* dentataDHJ02	BOLD:AAB5395	Costa Rica	
BLPDX706-11	*Eucereon* dentataDHJ02	BOLD:AAB5395	Costa Rica	yes
BLPDY089-11	*Eucereon* dentataDHJ02	BOLD:AAB5395	Costa Rica	
BLPED547-11	*Eucereon* dentataDHJ02	BOLD:AAB5395	Costa Rica	
CNCLB2503-14	*Eucereon erythrolepsis*	BOLD:AAB5395	Mexico	yes
ARCTC842-11	Lepidoptera	BOLD:AAB5395	Guatemala	yes
BLPDW045-11	Lepidoptera	BOLD:AAB5395	Costa Rica	
BLPEF2497-13	Lepidoptera	BOLD:AAB5395	Costa Rica	yes
BLPEF6888-15	Lepidoptera	BOLD:AAB5395	Costa Rica	
BLPEF8680-15	Lepidoptera	BOLD:AAB5395	Costa Rica	
BLPEF921-12	Lepidoptera	BOLD:AAB5395	Costa Rica	
BLPEG1665-14	Lepidoptera	BOLD:AAB5395	Costa Rica	

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BLPBB906-07	*Eucereon decora*	BOLD:AAB5396	Costa Rica	
BLPBB907-07	*Eucereon decora*	BOLD:AAB5396	Costa Rica	
BLPBC185-07	*Eucereon decora*	BOLD:AAB5396	Costa Rica	
BLPBD387-07	*Eucereon decora*	BOLD:AAB5396	Costa Rica	
BLPBD550-07	*Eucereon decora*	BOLD:AAB5396	Costa Rica	
BLPBD935-07	*Eucereon decora*	BOLD:AAB5396	Costa Rica	
BLPBD937-07	*Eucereon decora*	BOLD:AAB5396	Costa Rica	
BLPBD938-07	*Eucereon decora*	BOLD:AAB5396	Costa Rica	
BLPBE011-07	*Eucereon decora*	BOLD:AAB5396	Costa Rica	
BLPBF230-07	*Eucereon decora*	BOLD:AAB5396	Costa Rica	
BLPBG729-07	*Eucereon decora*	BOLD:AAB5396	Costa Rica	
BLPCF534-08	*Eucereon decora*	BOLD:AAB5396	Costa Rica	
BLPCF677-08	*Eucereon decora*	BOLD:AAB5396	Costa Rica	
BLPCF678-08	*Eucereon decora*	BOLD:AAB5396	Costa Rica	yes
BLPCM046-08	*Eucereon decora*	BOLD:AAB5396	Costa Rica	
BLPDH843-09	*Eucereon decora*	BOLD:AAB5396	Costa Rica	
BLPDH844-09	*Eucereon decora*	BOLD:AAB5396	Costa Rica	
BLPDI206-09	*Eucereon decora*	BOLD:AAB5396	Costa Rica	
BLPDP226-10	*Eucereon decora*	BOLD:AAB5396	Costa Rica	
BLPDP521-10	*Eucereon decora*	BOLD:AAB5396	Costa Rica	
BLPDP522-10	*Eucereon decora*	BOLD:AAB5396	Costa Rica	
BLPDQ256-10	*Eucereon decora*	BOLD:AAB5396	Costa Rica	yes
BLPDQ542-10	*Eucereon decora*	BOLD:AAB5396	Costa Rica	
BLPDQ948-10	*Eucereon decora*	BOLD:AAB5396	Costa Rica	
BLPDQ949-10	*Eucereon decora*	BOLD:AAB5396	Costa Rica	
BLPDQ950-10	*Eucereon decora*	BOLD:AAB5396	Costa Rica	
BLPDS544-10	*Eucereon decora*	BOLD:AAB5396	Costa Rica	
BLPEB747-11	*Eucereon decora*	BOLD:AAB5396	Costa Rica	
BLPEF3434-13	Lepidoptera	BOLD:AAB5396	Costa Rica	
BLPEG1846-14	Lepidoptera	BOLD:AAB5396	Costa Rica	
NARCB214-10	Lepidoptera	BOLD:AAB5396	Costa Rica	
NARCB215-10	Lepidoptera	BOLD:AAB5396	Costa Rica	yes
NARCB216-10	Lepidoptera	BOLD:AAB5396	Costa Rica	
GBGL15465-14	*Hyaleucerea morosa*	BOLD:AAB6983	unknown	
BLPBG332-07	*Hyaleucerea* morosaDHJ02	BOLD:AAB6983	Costa Rica	
MHARB387-05	*Hyaleucerea* morosaDHJ02	BOLD:AAB6983	Costa Rica	yes
MHARB388-05	*Hyaleucerea* morosaDHJ02	BOLD:AAB6983	Costa Rica	yes
MHARB389-05	*Hyaleucerea* morosaDHJ02	BOLD:AAB6983	Costa Rica	yes
MHARB390-05	*Hyaleucerea* morosaDHJ02	BOLD:AAB6983	Costa Rica	yes
MHARB391-05	*Hyaleucerea* morosaDHJ02	BOLD:AAB6983	Costa Rica	yes
MHMXL614-07	*Hyaleucerea* morosaDHJ02	BOLD:AAB6983	Costa Rica	
MHMXL615-07	*Hyaleucerea* morosaDHJ02	BOLD:AAB6983	Costa Rica	
MHMXR078-08	*Hyaleucerea* morosaDHJ02	BOLD:AAB6983	unknown	
MHMYC1356-09	*Hyaleucerea* morosaDHJ02	BOLD:AAB6983	Costa Rica	
MHMYC329-09	*Hyaleucerea* morosaDHJ02	BOLD:AAB6983	Costa Rica	yes
MHMYC330-09	*Hyaleucerea* morosaDHJ02	BOLD:AAB6983	Costa Rica	
MHMYC331-09	*Hyaleucerea* morosaDHJ02	BOLD:AAB6983	Costa Rica	
MHMYC332-09	*Hyaleucerea* morosaDHJ02	BOLD:AAB6983	Costa Rica	
MHMYF276-10	*Hyaleucerea* morosaDHJ02	BOLD:AAB6983	Costa Rica	
MHMYF277-10	*Hyaleucerea* morosaDHJ02	BOLD:AAB6983	Costa Rica	
MHMYF278-10	*Hyaleucerea* morosaDHJ02	BOLD:AAB6983	Costa Rica	
MHMYF279-10	*Hyaleucerea* morosaDHJ02	BOLD:AAB6983	Costa Rica	yes
MHMYF280-10	*Hyaleucerea* morosaDHJ02	BOLD:AAB6983	Costa Rica	
XAA215-04	*Hyaleucerea* morosaDHJ02	BOLD:AAB6983	Costa Rica	

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XAA216-04	*Hyaleucerea* morosaDHJ02	BOLD:AAB6983	Costa Rica	
XAA217-04	*Hyaleucerea* morosaDHJ02	BOLD:AAB6983	Costa Rica	
XAA218-04	*Hyaleucerea* morosaDHJ02	BOLD:AAB6983	Costa Rica	
XAA219-04	*Hyaleucerea* morosaDHJ02	BOLD:AAB6983	Costa Rica	
MHMYG3102-10	Lepidoptera	BOLD:AAB6983	Costa Rica	
MHMYK7992-15	Lepidoptera	BOLD:AAB6983	Costa Rica	
MHMYL2381-11	Lepidoptera	BOLD:AAB6983	Costa Rica	
MHMYL2460-11	Lepidoptera	BOLD:AAB6983	Costa Rica	
MHMYN3294-14	Lepidoptera	BOLD:AAB6983	Costa Rica	
MHMYN3295-14	Lepidoptera	BOLD:AAB6983	Costa Rica	
MHMYN3296-14	Lepidoptera	BOLD:AAB6983	Costa Rica	
MHMYN3297-14	Lepidoptera	BOLD:AAB6983	Costa Rica	yes
MHMYN3298-14	Lepidoptera	BOLD:AAB6983	Costa Rica	
MHMYN3299-14	Lepidoptera	BOLD:AAB6983	Costa Rica	
MHMYN3300-14	Lepidoptera	BOLD:AAB6983	Costa Rica	
MHMYP1583-12	Lepidoptera	BOLD:AAB6983	Costa Rica	
MHMYQ2037-12	Lepidoptera	BOLD:AAB6983	Costa Rica	
MHMYS3857-13	Lepidoptera	BOLD:AAB6983	Costa Rica	
MHMYS806-12	Lepidoptera	BOLD:AAB6983	Costa Rica	yes
MHMYS807-12	Lepidoptera	BOLD:AAB6983	Costa Rica	
MHMYS808-12	Lepidoptera	BOLD:AAB6983	Costa Rica	
MHARB102-05	*Heliura aurorina*	BOLD:AAB8056	Costa Rica	
MHARB103-05	*Heliura aurorina*	BOLD:AAB8056	Costa Rica	yes
MHARB104-05	*Heliura aurorina*	BOLD:AAB8056	Costa Rica	
MHARB105-05	*Heliura aurorina*	BOLD:AAB8056	Costa Rica	
MHARB106-05	*Heliura aurorina*	BOLD:AAB8056	Costa Rica	yes
MHARB107-05	*Heliura aurorina*	BOLD:AAB8056	Costa Rica	
MHARB108-05	*Heliura aurorina*	BOLD:AAB8056	Costa Rica	yes
MHARB109-05	*Heliura aurorina*	BOLD:AAB8056	Costa Rica	
MHARB110-05	*Heliura aurorina*	BOLD:AAB8056	Costa Rica	
MHARB111-05	*Heliura aurorina*	BOLD:AAB8056	Costa Rica	
MHARB112-05	*Heliura aurorina*	BOLD:AAB8056	Costa Rica	yes
MHARB425-05	*Heliura aurorina*	BOLD:AAB8056	Costa Rica	
MHARB426-05	*Heliura aurorina*	BOLD:AAB8056	Costa Rica	yes
MHARB427-05	*Heliura aurorina*	BOLD:AAB8056	Costa Rica	
MHARB762-06	*Heliura aurorina*	BOLD:AAB8056	Costa Rica	
MHARB847-06	*Heliura aurorina*	BOLD:AAB8056	Costa Rica	yes
MHMXH427-07	*Heliura aurorina*	BOLD:AAB8056	Costa Rica	
BCIAR734-13	*Heliura tetragramma*	BOLD:AAB8056	Panama	yes
MHMYL2521-11	Lepidoptera	BOLD:AAB8056	Costa Rica	
MHMYL2522-11	Lepidoptera	BOLD:AAB8056	Costa Rica	
MHMYL2545-11	Lepidoptera	BOLD:AAB8056	Costa Rica	
MHMYL2546-11	Lepidoptera	BOLD:AAB8056	Costa Rica	
MHMYM3269-14	Lepidoptera	BOLD:AAB8056	Costa Rica	
MHMYN3331-14	Lepidoptera	BOLD:AAB8056	Costa Rica	
MHMYN3332-14	Lepidoptera	BOLD:AAB8056	Costa Rica	
BLPAA568-06	*Eucereon rosinum*	BOLD:AAB8288	Costa Rica	
BLPAF269-07	*Eucereon rosinum*	BOLD:AAB8288	Costa Rica	
BLPAF270-07	*Eucereon rosinum*	BOLD:AAB8288	Costa Rica	
BLPAG341-07	*Eucereon rosinum*	BOLD:AAB8288	Costa Rica	
BLPCA014-08	*Eucereon rosinum*	BOLD:AAB8288	Costa Rica	
BLPCA015-08	*Eucereon rosinum*	BOLD:AAB8288	Costa Rica	
BLPCA016-08	*Eucereon rosinum*	BOLD:AAB8288	Costa Rica	
BLPCA017-08	*Eucereon rosinum*	BOLD:AAB8288	Costa Rica	yes

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BLPCA728-08	*Eucereon rosinum*	BOLD:AAB8288	Costa Rica	
BLPCA730-08	*Eucereon rosinum*	BOLD:AAB8288	Costa Rica	
BLPCD202-08	*Eucereon rosinum*	BOLD:AAB8288	Costa Rica	
BLPCI863-08	*Eucereon rosinum*	BOLD:AAB8288	Costa Rica	
BLPDA938-09	*Eucereon rosinum*	BOLD:AAB8288	Costa Rica	
BLPDG622-09	*Eucereon rosinum*	BOLD:AAB8288	Costa Rica	
BLPDK1855-09	*Eucereon rosinum*	BOLD:AAB8288	Costa Rica	
BLPDU725-11	*Eucereon rosinum*	BOLD:AAB8288	Costa Rica	yes
BLPDV779-11	*Eucereon rosinum*	BOLD:AAB8288	Costa Rica	
LPYPB287-08	*Eucereon rosinum*	BOLD:AAB8288	Mexico	yes
LPYPB812-08	*Eucereon rosinum*	BOLD:AAB8288	Mexico	yes
BLPEE087-12	Lepidoptera	BOLD:AAB8288	Costa Rica	yes
BLPEF2749-13	Lepidoptera	BOLD:AAB8288	Costa Rica	
BLPEF8990-15	Lepidoptera	BOLD:AAB8288	Costa Rica	
BLPEF9185-15	Lepidoptera	BOLD:AAB8288	Costa Rica	
GMCDD1024-14	Lepidoptera	BOLD:AAB8288	Costa Rica	
GMCRC1052-13	Lepidoptera	BOLD:AAB8288	Costa Rica	
GMCRC1545-13	Lepidoptera	BOLD:AAB8288	Costa Rica	yes
GMCRD098-13	Lepidoptera	BOLD:AAB8288	Costa Rica	yes
GMCRD660-13	Lepidoptera	BOLD:AAB8288	Costa Rica	
GMCRE1589-13	Lepidoptera	BOLD:AAB8288	Costa Rica	
GMCRE1593-13	Lepidoptera	BOLD:AAB8288	Costa Rica	
GMCRI461-13	Lepidoptera	BOLD:AAB8288	Costa Rica	
GMCRK3143-13	Lepidoptera	BOLD:AAB8288	Costa Rica	yes
GMCYY1882-15	Lepidoptera	BOLD:AAB8288	Costa Rica	
MHMYN6278-14	Lepidoptera	BOLD:AAB8288	Costa Rica	
MHMYS2806-13	Lepidoptera	BOLD:AAB8288	Costa Rica	
MHMYS3088-13	Lepidoptera	BOLD:AAB8288	Costa Rica	
ARCTC841-11	*Eucereon erythrolepsis*	BOLD:AAB8816	Guatemala	yes
CNCLB1884-14	*Eucereon erythrolepsis*	BOLD:AAB8816	Mexico	yes
CNCLB1887-14	*Eucereon erythrolepsis*	BOLD:AAB8816	Guatemala	yes
CNCLB1888-14	*Eucereon erythrolepsis*	BOLD:AAB8816	Guatemala	yes
GWOTK252-12	*Eucereon erythrolepsis*	BOLD:AAB8816	Mexico	yes
GWOTK256-12	*Eucereon erythrolepsis*	BOLD:AAB8816	Mexico	yes
BLPAF267-07	*Eucereon* erythrolepsisDHJ01	BOLD:AAB8816	Costa Rica	yes
BLPCD204-08	*Eucereon* erythrolepsisDHJ01	BOLD:AAB8816	Costa Rica	yes
BLPDU399-11	*Eucereon* erythrolepsisDHJ01	BOLD:AAB8816	Costa Rica	
BLPDU724-11	*Eucereon* erythrolepsisDHJ01	BOLD:AAB8816	Costa Rica	
MHARB636-06	*Eucereon* erythrolepsisDHJ01	BOLD:AAB8816	Costa Rica	
MHARB637-06	*Eucereon* erythrolepsisDHJ01	BOLD:AAB8816	Costa Rica	
MHARB639-06	*Eucereon* erythrolepsisDHJ01	BOLD:AAB8816	Costa Rica	yes
MHARB640-06	*Eucereon* erythrolepsisDHJ01	BOLD:AAB8816	Costa Rica	yes
MHARB776-06	*Eucereon* erythrolepsisDHJ01	BOLD:AAB8816	Costa Rica	
MHARB839-06	*Eucereon* erythrolepsisDHJ01	BOLD:AAB8816	Costa Rica	
MHARB840-06	*Eucereon* erythrolepsisDHJ01	BOLD:AAB8816	Costa Rica	
MHARB842-06	*Eucereon* erythrolepsisDHJ01	BOLD:AAB8816	Costa Rica	yes
MHARB843-06	*Eucereon* erythrolepsisDHJ01	BOLD:AAB8816	Costa Rica	
XAA274-04	*Eucereon* erythrolepsisDHJ01	BOLD:AAB8816	Costa Rica	
XAA275-04	*Eucereon* erythrolepsisDHJ01	BOLD:AAB8816	Costa Rica	yes
XAA276-04	*Eucereon* erythrolepsisDHJ01	BOLD:AAB8816	Costa Rica	
XAA277-04	*Eucereon* erythrolepsisDHJ01	BOLD:AAB8816	Costa Rica	
XAA278-04	*Eucereon* erythrolepsisDHJ01	BOLD:AAB8816	Costa Rica	
BLPCA729-08	*Eucereon* erythrolepsisDHJ02	BOLD:AAB8816	Costa Rica	yes
BLPCC564-08	*Eucereon* erythrolepsisDHJ02	BOLD:AAB8816	Costa Rica	

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MHARB635-06	*Eucereon* erythrolepsisDHJ02	BOLD:AAB8816	Costa Rica	
MHARB638-06	*Eucereon* erythrolepsisDHJ02	BOLD:AAB8816	Costa Rica	
BLPDW049-11	Lepidoptera	BOLD:AAB8816	Costa Rica	
BLPEE2870-14	Lepidoptera	BOLD:AAB8816	Costa Rica	yes
BLPEF8666-15	Lepidoptera	BOLD:AAB8816	Costa Rica	
BLPEF9182-15	Lepidoptera	BOLD:AAB8816	Costa Rica	
BLPEF9183-15	Lepidoptera	BOLD:AAB8816	Costa Rica	yes
BLPEF9184-15	Lepidoptera	BOLD:AAB8816	Costa Rica	
MHMYL2356-11	Lepidoptera	BOLD:AAB8816	Costa Rica	yes
MHMYS3089-13	Lepidoptera	BOLD:AAB8816	Costa Rica	yes
CNCLB1885-14	*Eucereon erythrolepsis*	BOLD:AAC2374	Mexico	
CNCLB1886-14	*Eucereon erythrolepsis*	BOLD:AAC2374	Mexico	yes
BLPAH509-07	*Eucereon pilati*	BOLD:AAC2374	Costa Rica	yes
BLPCD205-08	*Eucereon pilati*	BOLD:AAC2374	Costa Rica	yes
BLPCP084-08	*Eucereon pilati*	BOLD:AAC2374	Costa Rica	yes
BLPED733-11	*Eucereon pilati*	BOLD:AAC2374	Costa Rica	
MHARB624-06	*Eucereon pilati*	BOLD:AAC2374	Costa Rica	
MHARB625-06	*Eucereon pilati*	BOLD:AAC2374	Costa Rica	
MHARB626-06	*Eucereon pilati*	BOLD:AAC2374	Costa Rica	yes
MHARB627-06	*Eucereon pilati*	BOLD:AAC2374	Costa Rica	yes
MHARB837-06	*Eucereon pilati*	BOLD:AAC2374	Costa Rica	
MHARB841-06	*Eucereon pilati*	BOLD:AAC2374	Costa Rica	
XAA560-04	*Eucereon pilati*	BOLD:AAC2374	Costa Rica	
XAA571-04	*Eucereon pilati*	BOLD:AAC2374	Costa Rica	
XAA573-04	*Eucereon pilati*	BOLD:AAC2374	Costa Rica	
BLPEF8987-15	Lepidoptera	BOLD:AAC2374	Costa Rica	
MHMYS3190-13	Lepidoptera	BOLD:AAC2374	Costa Rica	
NARCA074-09	*Eucereon obscura*	BOLD:AAD0077	Ecuador	yes
INCTA938-10	*Eucereon obscurum*	BOLD:AAD0077	Brazil	yes
LNOUE639-11	*Eucereon obscurum*	BOLD:AAD0077	French Guiana	
LNOUE641-11	*Eucereon obscurum*	BOLD:AAD0077	French Guiana	yes
BLPBC264-07	*Eucereon* obscurumDHJ02	BOLD:AAD0077	Costa Rica	yes
BLPCI861-08	*Eucereon* obscurumDHJ02	BOLD:AAD0077	Costa Rica	
BLPCN306-08	*Eucereon* obscurumDHJ02	BOLD:AAD0077	Costa Rica	
BLPCP337-08	*Eucereon* obscurumDHJ02	BOLD:AAD0077	Costa Rica	
BLPDB185-09	*Eucereon* obscurumDHJ02	BOLD:AAD0077	Costa Rica	
BLPDF788-09	*Eucereon* obscurumDHJ02	BOLD:AAD0077	Costa Rica	
BLPDH858-09	*Eucereon* obscurumDHJ02	BOLD:AAD0077	Costa Rica	yes
BLPDK453-09	*Eucereon* obscurumDHJ02	BOLD:AAD0077	Costa Rica	
BLPDS391-10	*Eucereon* obscurumDHJ02	BOLD:AAD0077	Costa Rica	
XAA222-04	*Eucereon* obscurumDHJ02	BOLD:AAD0077	Costa Rica	yes
BCIAR047-10	*Eucereon* sp. 12YB	BOLD:AAD0077	Panama	
ARMOT473-12	Lepidoptera	BOLD:AAD0077	Argentina	yes
LNOUB267-10	Lepidoptera	BOLD:AAD0077	French Guiana	yes
LNOUD1491-12	Lepidoptera	BOLD:AAD0077	French Guiana	
MOTAR480-12	Lepidoptera	BOLD:AAD0077	Argentina	yes
NARCA117-09	Lepidoptera	BOLD:AAD0077	Ecuador	yes
NARCB244-10	Lepidoptera	BOLD:AAD0077	Costa Rica	
NARCB245-10	Lepidoptera	BOLD:AAD0077	Costa Rica	
GBGL8433-12	*Eucereon consorta*	BOLD:AAD3597	unknown	
ARCTD786-12	Lepidoptera	BOLD:AAD3597	Costa Rica	yes
ARCTD787-12	Lepidoptera	BOLD:AAD3597	Costa Rica	
NARCB045-09	Lepidoptera	BOLD:AAD3597	Costa Rica	
NARCB046-09	Lepidoptera	BOLD:AAD3597	Costa Rica	

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BLPDT1181-10	*Eucereon xanthoperas*	BOLD:AAD3599	Costa Rica	
BLPDT573-10	*Eucereon xanthoperas*	BOLD:AAD3599	Costa Rica	
BLPDT798-10	*Eucereon xanthoperas*	BOLD:AAD3599	Costa Rica	yes
BLPDT799-10	*Eucereon xanthoperas*	BOLD:AAD3599	Costa Rica	yes
BLPDU1069-11	*Eucereon xanthoperas*	BOLD:AAD3599	Costa Rica	
MHARB918-06	*Eucereon xanthoperas*	BOLD:AAD3599	Costa Rica	
XAA550-04	*Eucereon xanthoperas*	BOLD:AAD3599	Costa Rica	
XAA551-04	*Eucereon xanthoperas*	BOLD:AAD3599	Costa Rica	yes
XAA552-04	*Eucereon xanthoperas*	BOLD:AAD3599	Costa Rica	
XAA554-04	*Eucereon xanthoperas*	BOLD:AAD3599	Costa Rica	
NARCB218-10	Lepidoptera	BOLD:AAD3599	Costa Rica	yes
BLPBA335-07	*Hyaleucerea gigantea*	BOLD:AAD8928	Costa Rica	
BLPCOI77-08	*Hyaleucerea gigantea*	BOLD:AAD8928	Costa Rica	
BLPCOI78-08	*Hyaleucerea gigantea*	BOLD:AAD8928	Costa Rica	yes
BLPDB699-09	*Hyaleucerea gigantea*	BOLD:AAD8928	Costa Rica	
BLPDF701-09	*Hyaleucerea gigantea*	BOLD:AAD8928	Costa Rica	yes
BLPDU1231-11	*Hyaleucerea gigantea*	BOLD:AAD8928	Costa Rica	
BLPDW1047-11	*Hyaleucerea gigantea*	BOLD:AAD8928	Costa Rica	
BLPDW1048-11	*Hyaleucerea gigantea*	BOLD:AAD8928	Costa Rica	
BLPDX498-11	*Hyaleucerea gigantea*	BOLD:AAD8928	Costa Rica	yes
BLPDZ502-11	*Hyaleucerea gigantea*	BOLD:AAD8928	Costa Rica	yes
BLPEC477-11	*Hyaleucerea gigantea*	BOLD:AAD8928	Costa Rica	yes
XAA300-04	*Hyaleucerea gigantea*	BOLD:AAD8928	Costa Rica	
BLPEE3504-14	Lepidoptera	BOLD:AAD8928	Costa Rica	
BLPBA327-07	*Eucereon* aroaDHJ01	BOLD:AAD9130	Costa Rica	
BLPBC472-07	*Eucereon* aroaDHJ01	BOLD:AAD9130	Costa Rica	
BLPCA036-08	*Eucereon* aroaDHJ01	BOLD:AAD9130	Costa Rica	
BLPCD201-08	*Eucereon* aroaDHJ01	BOLD:AAD9130	Costa Rica	
BLPDJ255-09	*Eucereon* aroaDHJ01	BOLD:AAD9130	Costa Rica	yes
BLPDK1854-09	*Eucereon* aroaDHJ01	BOLD:AAD9130	Costa Rica	yes
BLPAB742-06	*Eucereon* aroaDHJ02	BOLD:AAD9130	Costa Rica	
BLPCO411-08	*Eucereon* aroaDHJ02	BOLD:AAD9130	Costa Rica	
BLPDT1596-10	*Eucereon* aroaDHJ02	BOLD:AAD9130	Costa Rica	
BLPDX1405-11	*Eucereon* aroaDHJ02	BOLD:AAD9130	Costa Rica	yes
BLPEE2351-14	Lepidoptera	BOLD:AAD9130	Costa Rica	
BLPEE2352-14	Lepidoptera	BOLD:AAD9130	Costa Rica	
BLPEE2353-14	Lepidoptera	BOLD:AAD9130	Costa Rica	
BLPEE2354-14	Lepidoptera	BOLD:AAD9130	Costa Rica	
BLPEE2549-14	Lepidoptera	BOLD:AAD9130	Costa Rica	
BLPEE2873-14	Lepidoptera	BOLD:AAD9130	Costa Rica	yes
BLPEE3133-14	Lepidoptera	BOLD:AAD9130	Costa Rica	
BLPEF3098-13	Lepidoptera	BOLD:AAD9130	Costa Rica	yes
BLPEF8156-15	Lepidoptera	BOLD:AAD9130	Costa Rica	
ARCTC002-09	*Eucereon atrigutta*	BOLD:AAE1486	Guatemala	
BCIGE745-12	*Eucereon atrigutta*	BOLD:AAE1486	Panama	yes
BLPBB874-07	*Eucereon atrigutta*	BOLD:AAE1486	Costa Rica	
BLPBB875-07	*Eucereon atrigutta*	BOLD:AAE1486	Costa Rica	
BLPBB876-07	*Eucereon atrigutta*	BOLD:AAE1486	Costa Rica	
BLPCG133-08	*Eucereon atrigutta*	BOLD:AAE1486	Costa Rica	
BLPDU722-11	*Eucereon atrigutta*	BOLD:AAE1486	Costa Rica	
BLPDW423-11	*Eucereon atrigutta*	BOLD:AAE1486	Costa Rica	
LEMMZ305-10	*Eucereon quadricolor*	BOLD:AAE1486	Brazil	
LEMMZ306-10	*Eucereon quadricolor*	BOLD:AAE1486	Brazil	
LEMMZ340-10	*Eucereon quadricolor*	BOLD:AAE1486	Brazil	yes

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ARCTD795-12	Lepidoptera	BOLD:AAE1486	Costa Rica	
ARMOT429-12	Lepidoptera	BOLD:AAE1486	Argentina	yes
BLPEF3101-13	Lepidoptera	BOLD:AAE1486	Costa Rica	
BLPEF4012-13	Lepidoptera	BOLD:AAE1486	Costa Rica	
BLPEF6323-14	Lepidoptera	BOLD:AAE1486	Costa Rica	
MHMYK10319-15	Lepidoptera	BOLD:AAE1486	Costa Rica	
BLPDK468-09	*Eucereon amadis*	BOLD:AAE4454	Costa Rica	yes
BLPDP520-10	*Eucereon amadis*	BOLD:AAE4454	Costa Rica	yes
BLPDS403-10	*Eucereon amadis*	BOLD:AAE4454	Costa Rica	
BLPDW691-11	*Eucereon amadis*	BOLD:AAE4454	Costa Rica	
MHMYC049-09	*Eucereon amadis*	BOLD:AAE4454	Costa Rica	
MHMYC617-09	*Eucereon amadis*	BOLD:AAE4454	Costa Rica	yes
XAA564-04	*Eucereon amadis*	BOLD:AAE4454	Costa Rica	
ARCTC852-11	Lepidoptera	BOLD:AAE4454	Guatemala	
BLPCC118-08	*Eucereon punctatum*	BOLD:AAE4582	Costa Rica	
BLPCE316-08	*Eucereon punctatum*	BOLD:AAE4582	Costa Rica	yes
GBGL15154-14	*Eucereon punctatum*	BOLD:AAE4582	unknown	
XAA568-04	*Eucereon punctatum*	BOLD:AAE4582	Costa Rica	yes
XAA569-04	*Eucereon punctatum*	BOLD:AAE4582	Costa Rica	
BLPEF2960-13	Lepidoptera	BOLD:AAE4582	Costa Rica	
BLPEF6887-15	Lepidoptera	BOLD:AAE4582	Costa Rica	yes
MHMYK5847-15	Lepidoptera	BOLD:AAE4582	Costa Rica	
MHMYK5848-15	Lepidoptera	BOLD:AAE4582	Costa Rica	
MHMYK9120-15	Lepidoptera	BOLD:AAE4582	Costa Rica	yes
MHMYN3320-14	Lepidoptera	BOLD:AAE4582	Costa Rica	
BLPCB201-08	*Eucereon maia*	BOLD:AAE4592	Costa Rica	
BLPDB458-09	*Eucereon maia*	BOLD:AAE4592	Costa Rica	yes
BLPDB459-09	*Eucereon maia*	BOLD:AAE4592	Costa Rica	yes
BLPDX1027-11	*Eucereon maia*	BOLD:AAE4592	Costa Rica	
BLPEC301-11	*Eucereon maia*	BOLD:AAE4592	Costa Rica	yes
BLPEC658-11	*Eucereon maia*	BOLD:AAE4592	Costa Rica	
XAA566-04	*Eucereon maia*	BOLD:AAE4592	Costa Rica	yes
BLPEF5829-13	Lepidoptera	BOLD:AAE4592	Costa Rica	
BLPEG2468-14	Lepidoptera	BOLD:AAE4592	Costa Rica	
BLPEG2469-14	Lepidoptera	BOLD:AAE4592	Costa Rica	
BLPEG2470-14	Lepidoptera	BOLD:AAE4592	Costa Rica	
BLPEG2471-14	Lepidoptera	BOLD:AAE4592	Costa Rica	
BLPEG2625-14	Lepidoptera	BOLD:AAE4592	Costa Rica	
BLPEG2730-14	Lepidoptera	BOLD:AAE4592	Costa Rica	
BLPEG2731-14	Lepidoptera	BOLD:AAE4592	Costa Rica	
BLPEG2877-14	Lepidoptera	BOLD:AAE4592	Costa Rica	
BLPAB502-06	*Cercopimorpha sylva*	BOLD:AAE9645	Costa Rica	yes
BLPBD558-07	*Cercopimorpha sylva*	BOLD:AAE9645	Costa Rica	yes
BLPBG316-07	*Cercopimorpha sylva*	BOLD:AAE9645	Costa Rica	
BLPDK152-09	*Cercopimorpha sylva*	BOLD:AAE9645	Costa Rica	yes
BLPEB618-11	*Cercopimorpha sylva*	BOLD:AAE9645	Costa Rica	
NARCB238-10	Lepidoptera	BOLD:AAE9645	Costa Rica	
NARCB239-10	Lepidoptera	BOLD:AAE9645	Costa Rica	
BLPAA939-06	*Eucereon* obscurumDHJ01	BOLD:AAF1123	Costa Rica	yes
BLPBD134-07	*Eucereon* obscurumDHJ01	BOLD:AAF1123	Costa Rica	yes
BLPCF064-08	*Eucereon* obscurumDHJ01	BOLD:AAF1123	Costa Rica	yes
BLPEC297-11	*Eucereon* obscurumDHJ01	BOLD:AAF1123	Costa Rica	yes
ARCTB557-08	*Elysius hades*	BOLD:AAF5831	Bolivia	yes
ARCTB607-08	*Elysius hades*	BOLD:AAF5831	Peru	

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ARCTC230-10	Lepidoptera	BOLD:AAF5831	Peru	yes
ARCTD392-12	Lepidoptera	BOLD:AAF5831	Peru	yes
NARCA629-11	Lepidoptera	BOLD:AAF5831	Ecuador	
GWORA2706-09	Lepidoptera	BOLD:AAG0886	Ecuador	yes
GWORQ008-10	Lepidoptera	BOLD:AAG0918	Ecuador	
NARCA630-11	Lepidoptera	BOLD:AAG0918	Ecuador	yes
LTOLB332-09	*Eucereon costaluta*	BOLD:AAG6240	Costa Rica	
NARCB226-10	Lepidoptera	BOLD:AAG6240	Costa Rica	yes
NARCB227-10	Lepidoptera	BOLD:AAG6240	Costa Rica	yes
GWORN121-09	Lepidoptera	BOLD:AAG6276	Peru	yes
GWORE1725-09	Lepidoptera	BOLD:AAG6289	Peru	yes
GWORN155-09	Lepidoptera	BOLD:AAG6289	Peru	
GWORP591-09	Lepidoptera	BOLD:AAG6289	Peru	yes
GWORP592-09	Lepidoptera	BOLD:AAG6289	Peru	yes
GWORP638-09	Lepidoptera	BOLD:AAG6289	Peru	
ARCTB238-08	*Eucereon rogersi*	BOLD:AAG6327	Guatemala	yes
ARCTC769-11	Lepidoptera	BOLD:AAG6327	Guatemala	yes
ARCTC770-11	Lepidoptera	BOLD:AAG6327	Guatemala	yes
ARCTC771-11	Lepidoptera	BOLD:AAG6327	Guatemala	yes
ARCTC772-11	Lepidoptera	BOLD:AAG6327	Guatemala	yes
ARCTC776-11	Lepidoptera	BOLD:AAG6327	Nicaragua	yes
ARCTC777-11	Lepidoptera	BOLD:AAG6327	Nicaragua	yes
ARCTC778-11	Lepidoptera	BOLD:AAG6327	Nicaragua	yes
ARCTC788-11	Lepidoptera	BOLD:AAG6327	Bolivia	yes
GWORQ094-10	Lepidoptera	BOLD:AAG6327	Ecuador	yes
NARCA566-10	Lepidoptera	BOLD:AAG6327	Ecuador	
NARCA654-11	Lepidoptera	BOLD:AAG6327	Ecuador	
GWORA2682-09	Lepidoptera	BOLD:AAG9205	Ecuador	yes
NARCA127-09	Lepidoptera	BOLD:AAG9205	Ecuador	
NARCA237-10	Lepidoptera	BOLD:AAG9205	Ecuador	yes
NARCA605-11	Lepidoptera	BOLD:AAG9205	Ecuador	
NARCA624-11	Lepidoptera	BOLD:AAG9205	Ecuador	yes
NARCA029-09	*Eucereon*	BOLD:AAH3421	Ecuador	yes
NARCA177-09	Lepidoptera	BOLD:AAH3421	Ecuador	yes
NARCA326-10	Lepidoptera	BOLD:AAH3421	Ecuador	
NARCA347-10	Lepidoptera	BOLD:AAH3421	Ecuador	yes
NARCA350-10	Lepidoptera	BOLD:AAH3421	Ecuador	yes
RDNMK320-11	Lepidoptera	BOLD:AAH3421	Peru	yes
NARCA034-09	Lepidoptera	BOLD:AAH3423	Ecuador	yes
NARCA115-09	Lepidoptera	BOLD:AAH3423	Ecuador	yes
NARCA180-09	Lepidoptera	BOLD:AAH3423	Ecuador	
NARCA060-09	*Eucereon*	BOLD:AAH3428	Ecuador	yes
NARCA080-09	Lepidoptera	BOLD:AAH3428	Ecuador	yes
NARCA445-10	Lepidoptera	BOLD:AAH3428	Ecuador	
NARCA642-11	Lepidoptera	BOLD:AAH3428	Ecuador	yes
NARCA951-13	Lepidoptera	BOLD:AAH3428	Ecuador	yes
NARCA130-09	Lepidoptera	BOLD:AAH3436	Ecuador	
NARCA477-10	Lepidoptera	BOLD:AAH3436	Ecuador	yes
NARCA673-11	Lepidoptera	BOLD:AAH3436	Ecuador	yes
NARCA136-09	Lepidoptera	BOLD:AAH3437	Ecuador	
NARCA143-09	Lepidoptera	BOLD:AAH3437	Ecuador	yes
NARCA628-11	Lepidoptera	BOLD:AAH3437	Ecuador	yes
BLPDT1172-10	*Eucereon flavicaput*	BOLD:AAI1017	Costa Rica	
BLPDT1590-10	*Eucereon flavicaput*	BOLD:AAI1017	Costa Rica	

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BLPDT807-10	*Eucereon flavicaput*	BOLD:AAI1017	Costa Rica	
BLPDU733-11	*Eucereon flavicaput*	BOLD:AAI1017	Costa Rica	
BLPDV253-11	*Eucereon flavicaput*	BOLD:AAI1017	Costa Rica	
BLPDV739-11	*Eucereon flavicaput*	BOLD:AAI1017	Costa Rica	
ARCTC846-11	Lepidoptera	BOLD:AAI1017	Guatemala	
NARCB293-10	Lepidoptera	BOLD:AAI1017	Costa Rica	yes
ARCTB220-08	*Theages decora*	BOLD:AAI1017	Guatemala	yes
ARCTB228-08	*Theages decora*	BOLD:AAI1017	Guatemala	
NARCA036-09	Lepidoptera	BOLD:AAI4929	Ecuador	
NARCA478-10	Lepidoptera	BOLD:AAI4929	Ecuador	
NARCA055-09	*Eucereon*	BOLD:AAI4930	Ecuador	yes
ARCTB277-08	*Heliura rhodophila*	BOLD:AAI6726	Guatemala	
ARCTB286-08	*Heliura rhodophila*	BOLD:AAI6726	Guatemala	
BCIGE684-12	*Heliura rhodophila*	BOLD:AAI6726	Panama	yes
BCIGE695-12	*Heliura rhodophila*	BOLD:AAI6726	Panama	yes
BCIGE735-12	*Heliura rhodophila*	BOLD:AAI6726	Panama	yes
ARCTB280-08	*Correbidia fana*	BOLD:AAI8938	Guatemala	
ARCTC038-09	*Correbidia fana*	BOLD:AAI8938	Guatemala	yes
BCIAR013-10	*Eucereon varia*	BOLD:AAJ0944	Panama	yes
BCIAR033-10	*Eucereon varia*	BOLD:AAJ0944	Panama	
BCIAR076-10	*Eucereon varia*	BOLD:AAJ0944	Panama	yes
BCIAR725-13	*Eucereon varia*	BOLD:AAJ0944	Panama	yes
BCIAR726-13	*Eucereon varia*	BOLD:AAJ0944	Panama	yes
BCIGE716-12	*Eucereon varia*	BOLD:AAJ0944	Panama	yes
BLPCN276-08	*Eucereon varium*	BOLD:AAJ0944	Costa Rica	yes
BLPCC119-08	*Eucereon* latifasciaDHJ02	BOLD:AAJ0947	Costa Rica	
BLPCO449-08	*Eucereon* latifasciaDHJ02	BOLD:AAJ0947	Costa Rica	
BLPDJ452-09	*Eucereon hogei*	BOLD:AAJ7744	Costa Rica	
MHMYK10316-15	Lepidoptera	BOLD:AAJ7744	Costa Rica	yes
MHMYK10317-15	Lepidoptera	BOLD:AAJ7744	Costa Rica	yes
BCIAR741-13	*Eucereon* sp. 17YB	BOLD:AAK4328	Panama	yes
ARCTC282-10	Lepidoptera	BOLD:AAK4328	Costa Rica	
ARCTC283-10	Lepidoptera	BOLD:AAK4328	Costa Rica	
ARCTC284-10	Lepidoptera	BOLD:AAK4328	Costa Rica	yes
ARCTC285-10	Lepidoptera	BOLD:AAK4328	Costa Rica	
MHMYN3346-14	Lepidoptera	BOLD:AAK4328	Costa Rica	yes
MHMYN3347-14	Lepidoptera	BOLD:AAK4328	Costa Rica	yes
MHMYS811-12	Lepidoptera	BOLD:AAK4328	Costa Rica	yes
MHMYS812-12	Lepidoptera	BOLD:AAK4328	Costa Rica	
MHMYS813-12	Lepidoptera	BOLD:AAK4328	Costa Rica	
MHMYS814-12	Lepidoptera	BOLD:AAK4328	Costa Rica	
ARCTA090-07	*Delphyre suffusa*	BOLD:AAL1130	French Guiana	yes
LEMMZ1067-12	ArctiinaeGEN sp. JAT03	BOLD:AAL1131	Brazil	yes
LEMMZ1068-12	ArctiinaeGEN sp. JAT03	BOLD:AAL1131	Brazil	
LEMMZ1069-12	ArctiinaeGEN sp. JAT03	BOLD:AAL1131	Brazil	
ARCTA089-07	*Delphyre* sp. 1	BOLD:AAL1131	Brazil	
ARCTA088-07	*Delphyre lemoulti*	BOLD:AAL1134	French Guiana	yes
LEPPC763-15	Lepidoptera	BOLD:AAL1134	French Guiana	
ARCTB252-08	*Eucereon darantasia*	BOLD:AAL4606	Guatemala	yes
GMHME001-15	*Eucereon darantasia*	BOLD:AAL4606	Honduras	yes
LNOUE285-11	*Heliura excavata*	BOLD:AAL7572	French Guiana	
GRACI674-10	Lepidoptera	BOLD:AAL7572	French Guiana	yes
LNOUB476-10	Lepidoptera	BOLD:AAL7572	French Guiana	
LNOUC792-10	Lepidoptera	BOLD:AAL7572	French Guiana	yes

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BCIAR001-10	*Heliura* sp. 1YB	BOLD:AAM3522	Panama	yes
BCIAR036-10	*Heliura* sp. 1YB	BOLD:AAM3522	Panama	
BCIAR040-10	*Heliura* sp. 1YB	BOLD:AAM3522	Panama	
BCIAR054-10	*Heliura* sp. 1YB	BOLD:AAM3522	Panama	
BCIAR078-10	*Heliura* sp. 1YB	BOLD:AAM3522	Panama	
BCIAR720-13	*Heliura* sp. 1YB	BOLD:AAM3522	Panama	yes
BCIAR723-13	*Heliura* sp. 1YB	BOLD:AAM3522	Panama	
BCIAR728-13	*Heliura* sp. 1YB	BOLD:AAM3522	Panama	
BCIAR729-13	*Heliura* sp. 1YB	BOLD:AAM3522	Panama	
BCIAR733-13	*Heliura* sp. 1YB	BOLD:AAM3522	Panama	yes
BCIAR018-10	*Eucereon* sp. 9YB	BOLD:AAM4399	Panama	yes
BCIAR026-10	*Eucereon* sp. 9YB	BOLD:AAM4399	Panama	
BCIAR048-10	*Eucereon* sp. 9YB	BOLD:AAM4399	Panama	yes
BCIAR740-13	*Eucereon* sp. 9YB	BOLD:AAM4399	Panama	yes
BCIAR756-13	*Eucereon* sp. 9YB	BOLD:AAM4399	Panama	
BCIGE686-12	*Eucereon* sp. 9YB	BOLD:AAM4399	Panama	
BCIGE691-12	*Eucereon* sp. 9YB	BOLD:AAM4399	Panama	
BCIAR100-10	*Delphyre* sp. 2YB	BOLD:AAM5154	Panama	yes
BCIAR002-10	*Eucereon* sp. 8YB	BOLD:AAM5889	Panama	yes
BCIAR004-10	*Eucereon* sp. 8YB	BOLD:AAM5889	Panama	
GBMIN80149-17	*Euceriodes* cf. *wernickei*	BOLD:AAM5890	unknown	yes
LEMMZ053-10	*Euceriodes wernickei* sp. MMZ01	BOLD:AAM5890	Brazil	
LEMMZ054-10	*Euceriodes wernickei* sp. MMZ01	BOLD:AAM5890	Brazil	
LEMMZ479-11	*Eucereon punctatum*	BOLD:AAM6364	Brazil	yes
ARCTD958-15	Lepidoptera	BOLD:AAM6364	French Guiana	yes
LNOUB080-10	Lepidoptera	BOLD:AAM6364	French Guiana	yes
LEMMZ437-11	*Trichromia* sp. JAT04	BOLD:AAM6364	Brazil	yes
LNOUB077-10	Lepidoptera	BOLD:AAM6740	French Guiana	
LNOUB322-10	Lepidoptera	BOLD:AAM6740	French Guiana	yes
LNOUB323-10	Lepidoptera	BOLD:AAM6740	French Guiana	
LNOUB489-10	Lepidoptera	BOLD:AAM6740	French Guiana	
GBMIN80280-17	*Telioneura glaucopis*	BOLD:AAM6740	unknown	yes
NARCA371-10	Lepidoptera	BOLD:AAM6979	Ecuador	yes
NARCA768-13	Lepidoptera	BOLD:AAM6979	Ecuador	yes
NARCA462-10	Lepidoptera	BOLD:AAM6996	Ecuador	
NARCA677-11	Lepidoptera	BOLD:AAM6996	Ecuador	
INCTA349-10	*Heliura nigriventris*	BOLD:AAM8379	Brazil	yes
INCTA940-10	*Eucereon beneluzi*	BOLD:AAM8540	Brazil	yes
LNOUB148-10	Lepidoptera	BOLD:AAM8690	French Guiana	yes
LNOUE197-11	*Delphyre pusilla*	BOLD:AAM8695	French Guiana	
LNOUE710-11	*Delphyre pusilla*	BOLD:AAM8695	French Guiana	
LNOUA194-10	Lepidoptera	BOLD:AAM8695	French Guiana	
LNOUB168-10	Lepidoptera	BOLD:AAM8695	French Guiana	yes
LNOUE200-11	*Heliura*	BOLD:AAM8819	French Guiana	
LNOUB443-10	Lepidoptera	BOLD:AAM8819	French Guiana	yes
GBMIN80288-17	*Theages* cf. *leucophaea*	BOLD:AAN0020	unknown	
LEMMZ051-10	*Theages leucophaea* sp. MMZ01	BOLD:AAN0020	Brazil	yes
LEMMZ296-10	*Theages leucophaea* sp. MMZ01	BOLD:AAN0020	Brazil	
LEMMZ060-10	*Galethalea pica*	BOLD:AAN0599	Brazil	yes
LEMMZ733-11	*Galethalea pica*	BOLD:AAN0599	Brazil	yes
LEMMZ806-11	*Galethalea pica*	BOLD:AAN0599	Brazil	yes
BCIAR003-10	*Eucereon* sp. 1YB	BOLD:AAN0729	Panama	
LEMMZ052-10	*Eucereon ladas*	BOLD:AAN1972	Brazil	
LEMMZ1261-12	*Eucereon ladas*	BOLD:AAN1972	Brazil	yes

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LEMMZ382-11	*Eucereon ladas*	BOLD:AAN1972	Brazil	
LEMMZ385-11	*Eucereon ladas*	BOLD:AAN1972	Brazil	yes
BLPDT1338-10	*Eucereon rogersi*	BOLD:AAN5487	Costa Rica	yes
LEMMZ456-11	*Eucereon setosum*	BOLD:AAN5487	Brazil	
LEMMZ530-11	*Eucereon setosum*	BOLD:AAN5487	Brazil	yes
LEMMZ531-11	*Eucereon setosum*	BOLD:AAN5487	Brazil	
ARCTC765-11	Lepidoptera	BOLD:AAN5487	Brazil	
ARCTC768-11	Lepidoptera	BOLD:AAN5487	Guatemala	yes
ARCTC773-11	Lepidoptera	BOLD:AAN5487	Guatemala	yes
ARCTC786-11	Lepidoptera	BOLD:AAN5487	Bolivia	
ARCTC790-11	Lepidoptera	BOLD:AAN5487	Nicaragua	
ARMOT436-12	Lepidoptera	BOLD:AAN5487	Argentina	yes
BLPDT1975-10	Lepidoptera	BOLD:AAN5487	Costa Rica	yes
BLPEE4168-14	Lepidoptera	BOLD:AAN5487	Costa Rica	yes
BLPEF8983-15	Lepidoptera	BOLD:AAN5487	Costa Rica	
LNOUF130-11	*Hyaleucerea leucosticta*	BOLD:AAN7025	French Guiana	
LNOUB671-10	Lepidoptera	BOLD:AAN7025	French Guiana	yes
LNOUE356-11	*Heliura flava*	BOLD:AAN7068	French Guiana	yes
LNOUF755-11	*Heliura flava*	BOLD:AAN7068	French Guiana	
LNAUT1322-14	Lepidoptera	BOLD:AAN7068	Suriname	
LNOUB895-10	Lepidoptera	BOLD:AAN7068	French Guiana	
LEMMZ1160-12	*Euceriodes wernickei* sp. MMZ03	BOLD:AAO5436	Brazil	yes
GWOR4885-09	Lepidoptera	BOLD:AAO5436	Peru	yes
LEMMZ1265-12	*Eucereon plumbicollum*	BOLD:AAP3450	Brazil	yes
LEMMZ261-10	*Eucereon plumbicollum*	BOLD:AAP3450	Brazil	yes
LEMMZ262-10	*Eucereon plumbicollum*	BOLD:AAP3450	Brazil	yes
LEMMZ341-10	*Eucereon plumbicollum*	BOLD:AAP3450	Brazil	yes
LEMMZ513-11	*Eucereon plumbicollum*	BOLD:AAP3450	Brazil	yes
LEMMZ1021-11	*Cercopimorpha dolens*	BOLD:AAP4062	Brazil	
LEMMZ264-10	*Cercopimorpha dolens*	BOLD:AAP4062	Brazil	
LEMMZ443-11	*Cercopimorpha dolens*	BOLD:AAP4062	Brazil	yes
LEMMZ464-11	*Cercopimorpha dolens*	BOLD:AAP4062	Brazil	yes
LEMMZ480-11	*Cercopimorpha dolens*	BOLD:AAP4062	Brazil	
LEMMZ485-11	*Cercopimorpha dolens*	BOLD:AAP4062	Brazil	
LEMMZ510-11	*Cercopimorpha dolens*	BOLD:AAP4062	Brazil	
LEMMZ668-11	*Cercopimorpha dolens*	BOLD:AAP4062	Brazil	yes
LEMMZ749-11	*Cercopimorpha dolens*	BOLD:AAP4062	Brazil	
LEMMZ807-11	*Cercopimorpha dolens*	BOLD:AAP4062	Brazil	
LEMMZ846-11	*Cercopimorpha dolens*	BOLD:AAP4062	Brazil	
LEMMZ1229-12	*Euceriodes wernickei* sp. MMZ02	BOLD:AAP4489	Brazil	yes
LEMMZ288-10	*Euceriodes wernickei* sp. MMZ02	BOLD:AAP4489	Brazil	yes
ARMOT564-12	Lepidoptera	BOLD:AAP4489	Argentina	yes
LEMMZ325-10	*Eucereon apicalis*	BOLD:AAP4892	Brazil	yes
LEMMZ326-10	*Eucereon apicalis*	BOLD:AAP4892	Brazil	
LEMMZ598-11	*Eucereon apicalis*	BOLD:AAP4892	Brazil	
LEMMZ599-11	*Eucereon apicalis*	BOLD:AAP4892	Brazil	
LEMMZ600-11	*Eucereon apicalis*	BOLD:AAP4892	Brazil	yes
LEMMZ405-11	*Eucereon discolor*	BOLD:AAU1399	Brazil	
LEMMZ433-11	*Eucereon discolor*	BOLD:AAU1399	Brazil	yes
LEMMZ468-11	*Eucereon discolor*	BOLD:AAU1399	Brazil	yes
LEMMZ512-11	*Eucereon discolor*	BOLD:AAU1399	Brazil	yes
LEMMZ741-11	*Eucereon discolor*	BOLD:AAU1399	Brazil	
LEMMZ439-11	*Eucereon punctatum*	BOLD:AAU2368	Brazil	yes
LEMMZ594-11	*Trichromia* sp. JAT04	BOLD:AAU2368	Brazil	

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LNOUE707-11	*Eucereon aoris*	BOLD:AAU5391	French Guiana	
LEPPC053-15	Lepidoptera	BOLD:AAU5391	French Guiana	
LNOUD019-10	Lepidoptera	BOLD:AAU5391	French Guiana	
LNOUD2525-12	Lepidoptera	BOLD:AAU5391	French Guiana	yes
LNOUF582-11	*Hyaleucerea erythrotela*	BOLD:AAV3323	French Guiana	yes
ARCTD985-15	Lepidoptera	BOLD:AAV3323	French Guiana	
LEMMZ1018-11	*Eucereon rosa* sp. MMZ02	BOLD:AAV7029	Brazil	yes
LEMMZ1019-11	*Eucereon rosa* sp. MMZ02	BOLD:AAV7029	Brazil	yes
LEMMZ507-11	*Eucereon rosa* sp. MMZ02	BOLD:AAV7029	Brazil	
LEMMZ508-11	*Eucereon rosa* sp. MMZ02	BOLD:AAV7029	Brazil	
LEMMZ956-11	*Eucereon rosa* sp. MMZ02	BOLD:AAV7029	Brazil	yes
LEMMZ511-11	*Delphyre pyroperas*	BOLD:AAV9147	Brazil	yes
ARMOT669-12	Lepidoptera	BOLD:AAV9147	Argentina	
ARMOT694-12	Lepidoptera	BOLD:AAV9147	Argentina	yes
ARMOT702-12	Lepidoptera	BOLD:AAV9147	Argentina	
ARMOT709-12	Lepidoptera	BOLD:AAV9147	Argentina	
ARMOT724-12	Lepidoptera	BOLD:AAV9147	Argentina	
MOTAR1064-12	Lepidoptera	BOLD:AAV9147	Argentina	
MOTAR1074-12	Lepidoptera	BOLD:AAV9147	Argentina	yes
ARCTA248-07	*Telioneura jocelynae*	BOLD:AAW6385	French Guiana	yes
ARCTB297-08	*Eucereon*	BOLD:AAW8784	Guatemala	yes
ARCTB120-08	*Lampruna punctata*	BOLD:AAX0615	Peru	yes
ARCTD434-12	Lepidoptera	BOLD:AAX0615	Bolivia	yes
ARCTD435-12	Lepidoptera	BOLD:AAX0615	Bolivia	yes
ARCTD436-12	Lepidoptera	BOLD:AAX0615	Venezuela	yes
ARCTD437-12	Lepidoptera	BOLD:AAX0615	Mexico	yes
ARCTD439-12	Lepidoptera	BOLD:AAX0615	Peru	yes
ARCTD440-12	Lepidoptera	BOLD:AAX0615	Peru	yes
NARCA792-13	Lepidoptera	BOLD:AAX0615	Ecuador	yes
NARCA841-13	Lepidoptera	BOLD:AAX0615	Ecuador	
NARCA863-13	Lepidoptera	BOLD:AAX0615	Ecuador	
BCIAR739-13	*Eucereon rosadora* xanthodoraDHJ01	BOLD:AAX7986	Panama	
BLPBA517-07	*Eucereon rosadora* xanthodoraDHJ01	BOLD:AAX7986	Costa Rica	yes
BLPDA926-09	*Eucereon balium*	BOLD:AAX7995	Costa Rica	yes
GBMIN80148-17	*Eucereon griseata*	BOLD:AAX7998	unknown	
LEMMZ1197-12	*Eucereon griseata*	BOLD:AAX7998	Brazil	
LEMMZ1200-12	*Eucereon griseata*	BOLD:AAX7998	Brazil	yes
LEMMZ1212-12	*Eucereon griseata*	BOLD:AAX7998	Brazil	yes
LEMMZ1214-12	*Eucereon griseata*	BOLD:AAX7998	Brazil	yes
LEMMZ1215-12	*Eucereon griseata*	BOLD:AAX7998	Brazil	
LEMMZ1217-12	*Eucereon griseata*	BOLD:AAX7998	Brazil	
LEMMZ1219-12	*Eucereon griseata*	BOLD:AAX7998	Brazil	
LEMMZ1220-12	*Eucereon griseata*	BOLD:AAX7998	Brazil	
LEMMZ529-11	*Eucereon griseata*	BOLD:AAX7998	Brazil	
NARCA947-13	Lepidoptera	BOLD:AAX7998	Ecuador	yes
NARCA590-11	Lepidoptera	BOLD:AAY6238	Ecuador	
NARCA669-11	Lepidoptera	BOLD:AAY6242	Ecuador	yes
LEMMZ1109-12	*Eucereon*	BOLD:AAY6244	Brazil	yes
NARCA685-11	Lepidoptera	BOLD:AAY6244	Ecuador	yes
LEMMZ687-11	*Eucereon chalcodon*	BOLD:AAZ4070	Brazil	
LEMMZ738-11	*Eucereon chalcodon*	BOLD:AAZ4070	Brazil	yes
LEMMZ810-11	*Eucereon chalcodon*	BOLD:AAZ4070	Brazil	yes

Process ID	Identification	BIN	Country	Haplotype
LCCFH051-11	*Eucereon*	BOLD:AAZ5655	Honduras	yes
GBMIN80128-17	*Delphyre hebes*	BOLD:ABU6587	unknown	
LEMMZ862-11	*Delphyre hebes*	BOLD:ABU6587	Brazil	yes
LEMMZ1166-12	*Eucereon tarona*	BOLD:ABU7628	Brazil	yes
LEMMZ1174-12	*Eucereon tarona*	BOLD:ABU7628	Brazil	
LEMMZ1175-12	*Eucereon tarona*	BOLD:ABU7628	Brazil	
LEMMZ1144-12	ArctiinaeGEN sp. JAT01	BOLD:ABV3942	Brazil	yes
LEMMZ1164-12	*Theages*	BOLD:ABV3942	Brazil	yes
LEMMZ1165-12	*Eucereon pittieri*	BOLD:ABV4827	Brazil	yes
ARCTD788-12	Lepidoptera	BOLD:ABW7158	Costa Rica	yes
ARCTD789-12	Lepidoptera	BOLD:ABW7158	Costa Rica	yes
ARCTD798-12	Lepidoptera	BOLD:ABW7183	Costa Rica	yes
BLPDU1228-11	*Eucereon darantasia*	BOLD:ABX6140	Costa Rica	yes
BLPDW692-11	*Eucereon darantasia*	BOLD:ABX6140	Costa Rica	yes
NARCA044-09	*Hyaleucerea gigantea*	BOLD:ABZ6298	Ecuador	yes
NARCA213-10	Lepidoptera	BOLD:ABZ6298	Ecuador	
NARCA214-10	Lepidoptera	BOLD:ABZ6298	Ecuador	yes
NARCA319-10	Lepidoptera	BOLD:ABZ6298	Ecuador	
NARCA344-10	Lepidoptera	BOLD:ABZ6298	Ecuador	
ARMOT781-12	Lepidoptera	BOLD:ACA8864	Argentina	
ARMOT835-12	Lepidoptera	BOLD:ACA8864	Argentina	yes
LEPPC1306-15	Lepidoptera	BOLD:ACB8506	French Guiana	yes
MOTAR563-12	Lepidoptera	BOLD:ACB8506	Argentina	yes
BCIAR755-13	*Eucereon* sp. 14YB	BOLD:ACC9448	Panama	yes
BCIGE696-12	*Eucereon* sp. 14YB	BOLD:ACC9448	Panama	yes
BCIGE692-12	*Eucereon* sp. 15YB	BOLD:ACC9481	Panama	
BCIGE706-12	*Eucereon* sp. 15YB	BOLD:ACC9481	Panama	yes
BCIGE724-12	*Eucereon varia*	BOLD:ACC9509	Panama	yes
BCIAR011-10	*Eucereon* sp. 18YB	BOLD:ACE5637	Panama	yes
BCIAR027-10	*Eucereon* sp. 18YB	BOLD:ACE5637	Panama	
BCIAR051-10	*Eucereon* sp. 18YB	BOLD:ACE5637	Panama	yes
BCIAR058-10	*Eucereon* sp. 18YB	BOLD:ACE5637	Panama	
BCIAR067-10	*Eucereon* sp. 18YB	BOLD:ACE5637	Panama	
BCIAR075-10	*Eucereon* sp. 18YB	BOLD:ACE5637	Panama	
BCIAR710-13	*Eucereon* sp. 18YB	BOLD:ACE5637	Panama	yes
BCIAR711-13	*Eucereon* sp. 18YB	BOLD:ACE5637	Panama	
BCIAR716-13	*Eucereon* sp. 18YB	BOLD:ACE5637	Panama	
GBMIN80129-17	*Delphyre* sp. ML01	BOLD:ACE6701	unknown	yes
LEMMZ839-11	*Prosopidia oviplaga*	BOLD:ACE6701	Brazil	
LEMMZ911-11	*Prosopidia oviplaga*	BOLD:ACE6701	Brazil	
LEMMZ1022-11	*Hyaleucerea morosa*	BOLD:ACE7129	Brazil	
LEMMZ447-11	*Hyaleucerea morosa*	BOLD:ACE7129	Brazil	yes
LEMMZ836-11	*Hyaleucerea morosa*	BOLD:ACE7129	Brazil	
BBLOB1321-11	*Nelphe carolina*	BOLD:ACE8501	United States	
BBLOB438-11	*Nelphe carolina*	BOLD:ACE8501	United States	yes
BBLOB441-11	*Nelphe carolina*	BOLD:ACE8501	United States	
BBLOB447-11	*Nelphe carolina*	BOLD:ACE8501	United States	
BBLOB449-11	*Nelphe carolina*	BOLD:ACE8501	United States	
BBLOB451-11	*Nelphe carolina*	BOLD:ACE8501	United States	yes
BBLOB456-11	*Nelphe carolina*	BOLD:ACE8501	United States	
BBLOB503-11	*Nelphe carolina*	BOLD:ACE8501	United States	
BBLOE2034-12	*Nelphe carolina*	BOLD:ACE8501	United States	
RDNML302-13	*Nelphe carolina*	BOLD:ACE8501	United States	
RDNML303-13	*Nelphe carolina*	BOLD:ACE8501	United States	

Process ID	Identification	BIN	Country	Haplotype
LEMMZ1037-11	*Hyaleucerea morosa*	BOLD:ACE9299	Brazil	yes
BLPCD207-08	*Eucereon* BioLep03	BOLD:ACF0957	Costa Rica	
BCIAR086-10	*Eucereon latifascia*	BOLD:ACF0957	Panama	yes
BCIAR091-10	*Eucereon latifascia*	BOLD:ACF0957	Panama	
ARCTC008-09	*Delphyre rufiventris*	BOLD:ACF3616	Guatemala	yes
ARCTC009-09	*Delphyre rufiventris*	BOLD:ACF3616	Guatemala	yes
ARCTC025-09	*Delphyre rufiventris*	BOLD:ACF3616	Guatemala	yes
ARCTC026-09	*Delphyre rufiventris*	BOLD:ACF3616	Guatemala	
ARCTB001-08	*Symphlebia haenkei*	BOLD:ACF3705	Bolivia	
ARCTB002-08	*Symphlebia haenkei*	BOLD:ACF3705	Bolivia	yes
ARCTB011-08	*Symphlebia haenkei*	BOLD:ACF3705	Bolivia	
ARCTB012-08	*Symphlebia haenkei*	BOLD:ACF3705	Peru	
ARCTB022-08	*Symphlebia haenkei*	BOLD:ACF3705	Peru	
ARCTB031-08	*Symphlebia haenkei*	BOLD:ACF3705	Peru	yes
ARCTB080-08	*Symphlebia haenkei*	BOLD:ACF3705	Peru	
NARCA916-13	Lepidoptera	BOLD:ACJ8067	Ecuador	yes
NARCA918-13	Lepidoptera	BOLD:ACJ8067	Ecuador	
LEMMZ739-11	*Eucereon rosa* sp. MMZ01	BOLD:ACJ8235	Brazil	yes
ARCTD792-12	Lepidoptera	BOLD:ACJ8876	Peru	
NARCA905-13	Lepidoptera	BOLD:ACJ8876	Ecuador	
CNCLB1879-14	*Eucereon myrina*	BOLD:ACR1626	Mexico	yes
CNCLB1880-14	*Eucereon myrina*	BOLD:ACR1626	Mexico	
CNCLB1881-14	*Eucereon myrina*	BOLD:ACR1626	Mexico	yes
CNCLB1882-14	*Eucereon myrina*	BOLD:ACR1626	Mexico	yes
CNCLB1883-14	*Eucereon myrina*	BOLD:ACR1626	Mexico	
CNCLB2155-14	*Eucereon myrina*	BOLD:ACR1626	Mexico	yes
CNCLB1896-14	*Nelphe*	BOLD:ACR1972	Dominican Republic	yes
GMHMN1869-16	Arctiinae	BOLD:ADA5760	Honduras	yes
LEMMZ267-10	*Delphyre flaviceps*	BOLD:ADF5716	Brazil	yes
LEMMZ346-10	*Delphyre flaviceps*	BOLD:ADF5716	Brazil	yes
LEMMZ347-10	*Delphyre flaviceps*	BOLD:ADF5716	Brazil	
NARCA352-10	Lepidoptera	BOLD:ADO2209	Ecuador	

Appendix 3: DNA isolation from small tissue samples or biopsies, innuPREP DNA Micro Kit (Analytik Jena AG).

analytikjena

Cut at the scattered line and laminate the card for a more convenient handling on the table top

innuPREP DNA Micro Kit

Protocol 1: DNA isolation from small tissue samples or biopsies

Recommended steps before starting
- Heat thermal mixer or water bath (50 °C)
- Prepare Washing Solution HS, Washing Solution MS and Proteinase K according to the instruction

1.	Starting material		▪ Max. 5 mg
2.	Lysis		▪ Add 200 µl Lysis Solution TLS and 20 µl Proteinase K ▪ Vortex: 5 sec ▪ Incubation: 50 °C, 30 min ▪ 10.000 x g (~12.000 rpm): 1 min ▪ Transfer supernatant; 1.5 ml tube
3.	Optional: RNA removal		▪ 4 µl 100 mg/ml RNase A; vortex ▪ Incubation: 5 min @ RT
4.	Binding of DNA		▪ Add 200 µl Binding Solution TBS ▪ Vortex: 15 sec ▪ Add Spin Filter to Receiver Tube ▪ Add sample to Spin Filter ▪ 10.000 x g (~12.000 rpm): 1 min
5.	Washing New Receiver Tube		▪ Add 400 µl Washing Solution HS ▪ 10.000 x g (~12.000 rpm): 30 sec ▪ Add 750 µl Washing Solution MS ▪ 10.000 x g (~12.000 rpm): 30 sec
6.	Remove Ethanol New Receiver Tube		▪ Discard filtrate ▪ Add Spin Filter to Receiver Tube ▪ Centrifuge: max speed, 2 min
7.	Elution		▪ Add Spin Filter to an Elution Tube ▪ Add 50 – 100 µl Elution Buffer ▪ Incubation: 1 min @ RT ▪ 6.000 x g (~8.000 rpm): 1 min

Appendix 4: Modifications in bold of the DNA isolation protocol, adapted to abdomen.

Extraction of DNA from lepidopteran abdomens

- Place abdomen in an 1.5 ml Eppendorf tube (anterior facing up)
- Add a 200 µl buffer Lysis Solution TLS (big sample **400 µl** TLS). It is essential to record the exact amount of buffer used for each sample!
- **Incubate** at 50˚C for 30 min
- Add 30 µl Proteinase K (big sample **60 µl**)
- **Incubate overnight** (at least 8h) at 50˚C on a shaker (400min^{-1})
- Transfer liquid into new Eppendorf tube. It is recommended to also aspire as much as possible of the liquid contained in the abdomen itself. (careful with female
- Store abdomen in **lactic acid**, and then in -20 °C freezer

BINDING of DNA

- Add 200 µl Binding Solution TBS (big sample **400 µl** TBS)
- Vortex 15 sec
- Add Spin Filter to receiver tube
- Add sample to Spin Filter
- 10,000 g 1 min

WASHING

- Add 400 µl Washing Solution HS
- 10.000 x g (~ 12.000 rpm): 30 sec
- Add 750 µl Washing Solution MS
- 10.000 x g (~ 12.000 rpm): 30 sec
- Discard filtrate
- Add Spin Filter to receiver Tube
- Centrifuge at max speed for 2 min

ELUTION

- Add Spin Filter to an Elution Tube
- Add 100 µl Elution Buffer
- Incubation 1 min @ RT
- 6.000 x g (~8.000 rpm) 1 min

Appendix 5: GelRed™ Nucleic Acid Gel Stain (Biotium, Inc.) protocol.

Biotium
Glowing Products for Science™

www.biotium.com

July 15, 2015

Product Information

GelRed™ Nucleic Acid Gel Stain, 10,000X

Catalog Numbers:
41002 (in DMSO)
41003 (in water)

Packaging Sizes: 0.1 mL (41003-T), 0.5 mL (41002 and 41003), 10 mL (41002-1 and 41003-1)

Storage and Handling

GelRed is a very stable dye. Store 10,000X solution and dilute solutions of GelRed™ at room temperature, protected from light. Dye precipitation may occur at lower temperatures, resulting in lower signal or the appearance of precipitate on the surface of the gel. If this occurs, heat the solution to 45-50°C for two minutes and vortex. GelRed™ is stable for at least one year from the date it is received.

Product Description

GelRed is a sensitive, stable and environmentally safe fluorescent nucleic acid dye designed to replace the highly toxic ethidium bromide (EtBr) for staining dsDNA, ssDNA or RNA in agarose gels or polyacrylamide gels. GelRed and EtBr have virtually the same spectra (Figure 1), so you can directly replace EtBr with GelRed without changing your existing imaging system. In addition, GelRed is far more sensitive than EtBr (Figure 2).

GelRed™ was subjected to a series of tests at Biotium and by three independent testing services to assess the dye's safety for routine handling and disposal. Test results confirm that the dye is impenetrable to both latex gloves and cell membranes. The dye is noncytotoxic and nonmutagenic at concentrations well above the working concentrations used in gel staining. GelRed™ successfully passed environmental safety tests in compliance with CCR Title 22 Hazardous Waste Characterization, under which GelRed™ is not classified as hazardous waste. A complete safety report is available at www.biotium.com.

Although GelRed™ has undergone extensive safety testing, Biotium recommends following universal safety precautions when working in the laboratory.

Spectral Properties

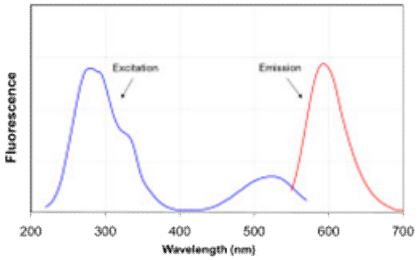

Figure 1. Excitation (left) and emission (right) spectra of GelRed™ bound to dsDNA in TBE.

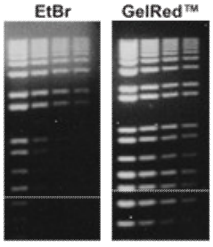

Figure 2. Comparison of ethidium bromide (EtBr) and GelRed™ in precast gel staining using 1% agarose gel in TBE buffer. Two-fold serial dilutions of 1 kb Plus DNA Ladder (Invitrogen) were loaded in the amounts of 200 ng, 100 ng, 50 ng and 25 ng from left to right. Gels were imaged using 300 nm transilluminator and photographed with an EtBr filter and Polaroid 667 black-and-white print film.

Staining Protocols

Because high affinity nucleic acid binding dyes can affect DNA migration during electrophoresis, post-staining of gels is highly recommended. Post-staining with GelRed results in superior sensitivity and eliminates the possibility of dye interference with DNA migration. Agarose gels can be precast with GelRed™, however, GelRed™ may affect the migration or resolution of some DNA samples in precast gels. The precast protocol is not recommended for polyacrylamide gels.

GelRed can be used to stain dsDNA, ssDNA or RNA, however GelRed is twice as sensitive for dsDNA than ssDNA or RNA. Gel staining with GelRed™ is compatible with downstream applications such as sequencing and cloning. GelRed is efficiently removed from DNA by phenol/chloroform extraction and ethanol precipitation.

1. Post-Staining Protocol

1.1 Run gels according to your standard protocol.

1.2 Dilute GelRed 10,000X stock solution 3,300 fold to make a 3X staining solution in H_2O. Generally 50 mL staining solution is an adequate volume for one minigel. Note: including 0.1 M NaCl in the staining solution enhances sensitivity, but may promote dye precipitation if the gel stain is reused.

1.3 Place the gel in a suitable container such as a polypropylene staining tray. Add a sufficient amount of the 3X staining solution to submerge the gel.

1.4 Agitate the gel gently at room temperature for ~30 minutes. Note: Optimal staining time may vary somewhat depending on the thickness of the gel and the percentage of agarose. For polyacrylamide gels containing 3.5-10% acrylamide, typical staining time is 30 minutes to 1 hour with gels of higher acrylamide content requiring longer staining time.

1.5 Destaining is not required, but the gel can be washed in water to reduce background if necessary.

1.6 View the stained gel with a standard transilluminator (302 or 312 nm) and image the gel using an ethidium bromide filter. SYBR or GelStar filters also may be used for gel imaging with equally good results.

1.7 Staining solution can be reused at least 2-3 times. Store staining solution at room temperature protected from light.

2. Precast Protocol for Agarose Gels

2.1 Prepare molten agarose gel solution using your standard protocol. Note: the precast protocol is not recommended for polyacrylamide gels. Polyacrylamide gels can be stained using the post-stain protocol.

2.2 Dilute the GelRed 10,000X stock reagent into the molten agarose gel solution at 1:10,000 and mix thoroughly. GelRed can be added while the gel solution is still hot.

2.3 Cast the gel and allow it to solidify.

2.4 Load samples and run the gels using your standard protocol.

2.5 View the stained gel using a standard transilluminator (302 or 312 nm) and image the gel using an ethidium bromide filter. SYBR or GelStar filters also can be used for gel imaging with equally good results.

2.6 Unused agarose containing GelRed™ can be remelted to cast more gels, but it may be necessary to add more dye for optimal signal. We do not recommend storing agarose containing GelRed™ in molten form (i.e., at 50°C) for more than a few days. Precast gels containing GelRed™ can be stored for future use for up to a week. We recommend storing gels at room temperature in the dark. Storage of GelRed™ precast gels at 4°C can cause dye precipitation and poor performance.

Continued next page

Appendix 6: List of species and the corresponding PopSets with the accession numbers of the six genes cytochrome c oxidase subunit 1 (COI), elongation factor 1 alpha (EF-1α), glyceraldhyde-3-phosphate dehydrogenase (GAPDH), cytosolic malate dehydrogenase (MDH), ribosomal protein S5 (RpS5) and wingless (wgl), downloaded from GenBank. Empty fields indicate that the sequence of the corresponding gene was not available.

Species	Voucher	COI, PopSet: 1151032320	EF1a, PopSet: 1151032436	GAPDH, PopSet: 1151032548	MDH, PopSet: 1151032684	RpS5, PopSet: 1151032754	wgl, PopSet: 1151032858
Aclytia heber	MZ073	KX360795.1	KX360853.1	KX360923.1	KX360993.1	KX361032.1	KX361084.1
Agyrta albisparsa	MZ076	KX360796.1	KX360854.1	KX360924.1	KX360994.1		KX361085.1
Alytarchia leonina	LN018	KX360797.1	KX360855.1	KX360915.1	KX360985.1	KX361023.1	KX361075.1
Arctiinae sp. 1 NW-2017	MZ132	KX360826.1	KX360883.1	KX360933.1	KX361005.1	KX361048.1	KX361102.1
Ardonea tenebrosa	GBA018	KX360798.1	KX360856.1			KX361016.1	KX361068.1
Argyroeides sanguinea	MZ085	KX360799.1	KX360857.1	KX360925.1	KX360995.1	KX361033.1	KX361086.1
Arhabdosia sp. ML01	MZ086	KX360800.1	KX360858.1			KX361034.1	KX361087.1
Atyphopsis roseiceps	MZ088	KX360801.1	KX360859.1	KX360926.1	KX360996.1	KX361035.1	KX361088.1
Balbura intervenata	GBA020	KX360802.1	KX360860.1			KX361017.1	KX361069.1
Belemnia ochriplaga	MZ037	KX360803.1	KX360861.1		KX360990.1	KX361029.1	KX361081.1
Callopepla similis	MZ093	KX360804.1	KX360862.1	KX360927.1	KX360997.1	KX361036.1	KX361089.1
Calonotos acutipennis	MZ038	KX360805.1	KX360863.1	KX360921.1	KX360991.1	KX361030.1	KX361082.1
Cercopimorpha dolens	MZ096	KX360806.1	KX360864.1		KX360998.1	KX361037.1	KX361090.1
Chlorhoda metamelaena	GBA001	KX360807.1	KX360865.1	KX360909.1	KX360977.1	KX361012.1	KX361064.1
Chrysocale regalis	GBA005	KX360808.1	KX360866.1	KX360910.1	KX360979.1	KX361014.1	KX361066.1
Cloesia sp. ML01	MZ100	KX360809.1	KX360867.1			KX361038.1	KX361091.1
Coreura simsoni	GBA006		KX360868.1	KX360911.1		KX361015.1	
Correbia lycoides	MZ101	KX360810.1	KX360869.1	KX360928.1	KX360999.1	KX361039.1	KX361092.1
Creatonotos omanirana	LN001	KX360812.1	KX360871.1	KX360914.1	KX360984.1	KX361022.1	KX361074.1
Cyanopepla jucunda	MZ106	KX360813.1	KX360872.1			KX361041.1	KX361094.1
Delphyre hebes	MZ107	KX360814.1	KX360873.1	KX360929.1	KX361000.1	KX361042.1	KX361095.1
Dinia sp. JAT01	MZ103	KX360811.1	KX360870.1			KX361040.1	KX361093.1
Dipaenae contenta	GBA022	KX360815.1	KX360874.1		KX360980.1	KX361018.1	KX361070.1
Ecdemus hypoleucus	MZ017	KX360816.1	KX360875.1	KX360916.1		KX361024.1	KX361076.1
Epanycles imperialis	MZ112	KX360817.1					KX361096.1

Species	Voucher	COI, PopSet: 1151032320	EF1a, PopSet: 1151032436	GAPDH, PopSet: 1151032548	MDH, PopSet: 1151032684	RpS5, PopSet: 1151032754	wgl, PopSet: 1151032858
Epidesma ursula	MZ018	KX360818.1	KX360876.1	KX360917.1	KX360986.1	KX361025.1	KX361077.1
Episcepsis endodasia	MZ114	KX360819.1	KX360877.1	KX360930.1	KX361001.1	KX361043.1	KX361097.1
Euagra azurea	MZ118	KX360820.1	KX360878.1		KX361002.1	KX361044.1	KX361098.1
Euagra coelestina	MZ163	KX360838.1	KX360896.1	KX360936.1		KX361054.1	
Eucereon griseata	MZ119	KX360821.1	KX360879.1	KX360931.1	KX361003.1	KX361045.1	KX361099.1
Eucereon pica	MZ126	KX360824.1	KX360881.1	KX360932.1	KX361004.1	KX361047.1	KX361101.1
Euceriodes cf. *wernickei* MMZ01	MZ120	KX360822.1					
Euthyone purpurea	MZ124	KX360823.1	KX360880.1			KX361046.1	KX361100.1
Gardinia paradoxa	GBA023	KX360825.1	KX360882.1			KX361019.1	KX361071.1
Hypercompe lemairei	GBA024	KX360827.1	KX360884.1		KX360981.1	KX361020.1	
Hypermaepha sp. ML01	MZ138	KX360828.1	KX360885.1			KX361049.1	
Hypomolis sp. 1 NW-2017	GBA031	KX360829.1	KX360886.1	KX360912.1	KX360982.1	KX361021.1	KX361072.1
Hypomolis sp. 2 NW-2017	GBA033	KX360830.1	KX360887.1	KX360913.1	KX360983.1		KX361073.1
Illice endoxantha	MZ145	KX360831.1	KX360888.1			KX361050.1	KX361103.1
Isia alcumena	MZ149	KX360832.1	KX360889.1	KX360934.1	KX361006.1		KX361104.1
Lycomorphodes strigosa	MZ152	KX360833.1	KX360890.1			KX361051.1	KX361105.1
Lymire strigivenia	MZ031	KX360834.1	KX360891.1	KX360918.1	KX360987.1	KX361026.1	KX361078.1
Metaloba argante	MZ062	KX360835.1	KX360892.1	KX360922.1	KX360992.1	KX361031.1	KX361083.1
Metalobosia varda	MZ157	KX360836.1	KX360893.1			KX361052.1	KX361106.1
Mevania basalis	GBA013		KX360894.1				KX361067.1
Neotrichura nigripes	MZ162	KX360837.1	KX360895.1	KX360935.1	KX361007.1	KX361053.1	KX361107.1
Nodozana cf. *coresa* MMZ01	MZ165	KX360839.1	KX360897.1			KX361055.1	KX361108.1
Palaeomolis palmeri	GBA002	KX360840.1	KX360898.1		KX360978.1	KX361013.1	KX361065.1
Paracles variegata	MZ172	KX360841.1	KX360899.1	KX360937.1	KX361008.1	KX361056.1	KX361109.1
Paraethria mapiria	MZ032	KX360842.1	KX360900.1	KX360919.1	KX360988.1	KX361027.1	KX361079.1
Philoros affinis	MZ178	KX360843.1			KX361009.1		KX361110.1
Prepiella sesapina	MZ181	KX360844.1	KX360901.1			KX361057.1	KX361111.1
Rhabdatomis mandana	MZ190	KX360845.1	KX360902.1			KX361058.1	KX361112.1
Sciopsyche tropica	MZ197	KX360846.1	KX360903.1	KX360938.1		KX361059.1	KX361113.1
Talara semiflava	MZ203	KX360847.1	KX360904.1			KX361060.1	KX361114.1
Telioneura glaucopis	MZ204	KX360848.1					

Species	Voucher	COI, PopSet: 1151032320	EF1a, PopSet: 1151032436	GAPDH, PopSet: 1151032548	MDH, PopSet: 1151032684	RpS5, PopSet: 1151032754	wgl, PopSet: 1151032858
Theages cf. *leucophaea* MMZ01	MZ205	KX360849.1	KX360905.1	KX360939.1	KX361010.1	KX361061.1	KX361115.1
Timalus leucomela	MZ208	KX360850.1	KX360906.1		KX361011.1	KX361062.1	KX361116.1
Utetheisa lotrix	NW17810	KX360851.1	KX360907.1			KX361063.1	KX361117.1
Xanthopleura perspicua	MZ035	KX360852.1	KX360908.1	KX360920.1	KX360989.1	KX361028.1	KX361080.1

Appendix 7: OTUs calculated by the different algorithms. Groups marked in red represent differences compared to the BIN assignment. For the GMYC algorithms the haplotypes were used. Red colored OTUs indicate a split by the respective algorithm, yellow colored OTUs indicate a merge.

Process ID	Identification	Country	BIN	2% threshold	1% threshold	3% threshold	ABGD P=0.46%	GMY single	GMYC multiple	bPTP
ARCLG088-18	*Eucereon* sp. 01	Costa Rica	BOLD:AAA1335	1	1	1	1	10	9	12
EUCE025-18	*Eucereon* sp. 01	Costa Rica	BOLD:AAA1335	1	1	1	1	10	9	12
EUCE026-18	*Eucereon* sp. 01	Costa Rica	BOLD:AAA1335	1	1	1	1	10	9	12
EUCE027-18	*Eucereon* sp. 01	Costa Rica	BOLD:AAA1335	1	1	1	1			12
EUCE028-18	*Eucereon* sp. 01	Costa Rica	BOLD:AAA1335	1	1	1	1			12
EUCE029-18	*Eucereon* sp. 01	Costa Rica	BOLD:AAA1335	1	1	1	1			12
EUCE030-18	*Eucereon* sp. 01	Costa Rica	BOLD:AAA1335	1	1	1	1			12
EUCE079-18	*Eucereon* sp. 01	Costa Rica	BOLD:AAA1335	1	1	1	1			12
EUCE085-18	*Eucereon* sp. 01	Costa Rica	BOLD:AAA1335	1	1	1	1			12
EUCE086-18	*Eucereon* sp. 01	Costa Rica	BOLD:AAA1335	1	1	1	1			12
EUCE132-18	*Eucereon* sp. 01	Costa Rica	BOLD:AAA1335	1	1	1	1	10	9	12
ARCLG089-18	*Cercopimorpha sylva*	Costa Rica	BOLD:ABW7183	2	2	2	2	13	12	20
EUCE073-18	*Cercopimorpha sylva*	Costa Rica	BOLD:ABW7183	2	2	2	2	13	12	20
EUCE074-18	*Cercopimorpha sylva*	Costa Rica	BOLD:ABW7183	2	2	2	2			20
EUCE075-18	*Cercopimorpha sylva*	Costa Rica	BOLD:ABW7183	2	2	2	2			20
EUCE076-18	*Cercopimorpha sylva*	Costa Rica	BOLD:ABW7183	2	2	2	2			20
EUCE077-18	*Cercopimorpha sylva*	Costa Rica	BOLD:ABW7183	2	2	2	2	13	12	20
ARCLG090-18	*Eucereon* nr. *varium*	Costa Rica	BOLD:AAJ0944	3	3	3	3	2	1	34
EUCE011-18	*Eucereon* nr. *varium*	Costa Rica	BOLD:AAJ0944	3	3	3	3	2	1	34
EUCE012-18	*Eucereon* nr. *varium*	Costa Rica	BOLD:AAJ0944	3	3	3	3	2	1	34
EUCE013-18	*Eucereon* nr. *varium*	Costa Rica	BOLD:AAJ0944	3	**9**	3	3	2	**17**	34
EUCE014-18	*Eucereon* nr. *varium*	Costa Rica	BOLD:AAJ0944	3	**9**	3	3			34
EUCE015-18	*Eucereon* nr. *varium*	Costa Rica	BOLD:AAJ0944	3	3	3	3	2	1	34
EUCE016-18	*Eucereon* nr. *varium*	Costa Rica	BOLD:AAJ0944	3	3	3	3			34
EUCE017-18	*Eucereon* nr. *varium*	Costa Rica	BOLD:AAJ0944	3	3	3	3			34
EUCE078-18	*Eucereon* nr. *varium*	Costa Rica	BOLD:AAJ0944	3	3	3	3	2	**18**	34

Process ID	Identification	Country	BIN	2% threshold	1% threshold	3% threshold	ABGD P=0.46%	GMY single	GMYC multiple	bPTP
ARCLG091-18	*Eucereon aurantiaca*	Costa Rica	BOLD:AAA1311	4	4	4	**4**	1	16	35
ARCLG174-18	*Eucereon aurantiaca*	Costa Rica	BOLD:AAA1311	4	4	4	40	1	16	35
EUCE005-18	*Eucereon aurantiaca*	Costa Rica	BOLD:AAA1311	4	4	4	40	1	16	35
EUCE006-18	*Eucereon aurantiaca*	Costa Rica	BOLD:AAA1311	4	4	4	40	1	16	35
EUCE007-18	*Eucereon aurantiaca*	Costa Rica	BOLD:AAA1311	4	4	4	40			35
EUCE008-18	*Eucereon aurantiaca*	Costa Rica	BOLD:AAA1311	4	4	4	40			35
EUCE009-18	*Eucereon aurantiaca*	Costa Rica	BOLD:AAA1311	4	4	4	40	1	16	35
EUCE010-18	*Eucereon aurantiaca*	Costa Rica	BOLD:AAA1311	4	4	4	40			35
EUCE084-18	*Eucereon aurantiaca*	Costa Rica	BOLD:AAA1311	4	4	4	40			35
EUCE121-18	*Eucereon aurantiaca*	Costa Rica	BOLD:AAA1311	4	4	4	40			35
EUCE125-18	*Eucereon aurantiaca*	Costa Rica	BOLD:AAA1311	4	4	4	40			35
EUCE126-18	*Eucereon aurantiaca*	Costa Rica	BOLD:AAA1311	4	4	4	40			35
EUCE130-18	*Eucereon aurantiaca*	Costa Rica	BOLD:AAA1311	4	4	4	40			35
EUCE131-18	*Eucereon aurantiaca*	Costa Rica	BOLD:AAA1311	4	4	4	40			35
ARCLG092-18	*Eucereon latifascia*	Costa Rica	BOLD:ACF0957	5	5	5	5	4	3	7
EUCE003-18	*Eucereon latifascia*	Costa Rica	BOLD:ACF0957	5	5	5	5	4	3	7
EUCE004-18	*Eucereon latifascia*	Costa Rica	BOLD:ACF0957	5	5	5	5			7
ARCLG093-18	*Eucereon pseudarchias*	Costa Rica	BOLD:ADL1208	6	6	6	6	18	19	6
ARCLG182-18	*Eucereon pseudarchias*	Costa Rica	BOLD:ADL1208	6	6	6	6			6
ARCLG094-18	*Eucereon tesselata*	Costa Rica	BOLD:AAJ0947	7	7	7	7	3	2	8
EUCE001-18	*Eucereon tesselata*	Costa Rica	BOLD:AAJ0947	7	7	7	7			8
EUCE002-18	*Eucereon tesselata*	Costa Rica	BOLD:AAJ0947	7	7	7	7	3	2	8
ARCLG095-18	*Eucereon* sp. 02	Costa Rica	BOLD:ADL0434	8	8	8	8	34	35	19
EUCE055-18	*Eucereon* sp. 02	Costa Rica	BOLD:ADL0434	8	8	8	8			19
EUCE056-18	*Eucereon* sp. 02	Costa Rica	BOLD:ADL0434	8	8	8	8			19
EUCE018-18	*Eucereon aeolum*	Costa Rica	BOLD:AAA8661	9	10	9	9	5	4	27
EUCE019-18	*Eucereon aeolum*	Costa Rica	BOLD:AAA8661	9	10	9	9	5	4	27
EUCE020-18	*Eucereon maia*	Costa Rica	BOLD:AAE4592	10	11	10	10	6	5	41
EUCE021-18	*Eucereon maia*	Costa Rica	BOLD:AAE4592	10	11	10	10	6	5	41
EUCE022-18	*Eucereon maia*	Costa Rica	BOLD:AAE4592	10	11	10	10	6	5	41
EUCE023-18	*Eucereon maia*	Costa Rica	BOLD:AAE4592	10	11	10	10	6	5	41

Process ID	Identification	Country	BIN	2% threshold	1% threshold	3% threshold	ABGD P=0.46%	GMY single	GMYC multiple	bPTP
EUCE024-18	*Eucereon maia*	Costa Rica	BOLD:AAE4592	10	11	10	10	6	5	41
EUCE089-18	*Eucereon maia*	Panama	BOLD:AAE4592	10	11	10	10			41
EUCE093-18	*Eucereon maia*	Panama	BOLD:AAE4592	10	11	10	10			41
EUCE031-18	*Eucereon rosinum*	Costa Rica	BOLD:AAN0729	11	12	11	11	14	13	3
EUCE032-18	*Eucereon rosinum*	Costa Rica	BOLD:AAN0729	11	12	11	11			3
EUCE033-18	*Eucereon rosinum*	Costa Rica	BOLD:AAN0729	11	12	11	11	14	13	3
EUCE034-18	*Eucereon rosinum*	Costa Rica	BOLD:AAN0729	11	12	11	11			3
EUCE035-18	*Eucereon rosinum*	Costa Rica	BOLD:AAN0729	11	12	11	11			3
EUCE098-18	*Eucereon rosinum*	Panama	BOLD:AAN0729	11	12	11	11			3
EUCE100-18	*Eucereon rosinum*	Panama	BOLD:AAN0729	11	12	11	11			3
EUCE036-18	*Eucereon punctatum*	Costa Rica	BOLD:ADM7139	12	13	12	12	9	8	29
EUCE037-18	*Eucereon punctatum*	Costa Rica	BOLD:ADM7139	12	13	12	12			29
EUCE038-18	*Eucereon punctatum*	Costa Rica	BOLD:ADM7139	12	13	12	12			29
EUCE039-18	*Eucereon punctatum*	Costa Rica	BOLD:ADM7139	12	13	12	12			29
EUCE040-18	*Eucereon punctatum*	Costa Rica	BOLD:ADM7139	12	13	12	12			29
EUCE083-18	*Eucereon punctatum*	Costa Rica	BOLD:ADM7139	12	13	12	12			29
EUCE122-18	*Eucereon punctatum*	Costa Rica	BOLD:ADM7139	12	13	12	12			29
EUCE123-18	*Eucereon punctatum*	Costa Rica	BOLD:ADM7139	12	13	12	12			29
EUCE127-18	*Eucereon punctatum*	Costa Rica	BOLD:ADM7139	12	13	12	**42**	9	8	29
EUCE128-18	*Eucereon punctatum*	Costa Rica	BOLD:ADM7139	12	13	12	12			29
EUCE129-18	*Eucereon punctatum*	Costa Rica	BOLD:ADM7139	12	13	12	12			29
EUCE041-18	*Eucereon punctatum*	Costa Rica	BOLD:ACC9448	13	14	13	13	8	7	28
EUCE092-18	*Eucereon punctatum*	Panama	BOLD:ACC9448	13	14	13	13	8	7	28
EUCE124-18	*Eucereon punctatum*	Costa Rica	BOLD:ACC9448	13	14	13	13	8	7	28
EUCE042-18	*Eucereon aoris*	Costa Rica	BOLD:AAA1365	14	15	14	14	16	15	31
EUCE043-18	*Eucereon aoris*	Costa Rica	BOLD:AAA1365	14	15	14	14			31
EUCE044-18	*Eucereon aoris*	Costa Rica	BOLD:AAA1365	14	15	14	14	16	15	31
EUCE046-18	*Eucereon aoris*	Costa Rica	BOLD:AAA1365	14	15	14	14			31
EUCE047-18	*Eucereon aoris*	Costa Rica	BOLD:AAA1365	14	15	14	14			31
EUCE048-18	*Eucereon atrigutta*	Costa Rica	BOLD:AAE1486	15	16	15	15	17	**43**	**42**
EUCE049-18	*Eucereon atrigutta*	Costa Rica	BOLD:AAE1486	15	16	15	15			**42**

Process ID	Identification	Country	BIN	2% threshold	1% threshold	3% threshold	ABGD P=0.46%	GMY single	GMYC multiple	bPTP
EUCE050-18	*Eucereon atrigutta*	Costa Rica	BOLD:AAE1486	15	16	15	15	17	**44**	**43**
EUCE051-18	*Eucereon atrigutta*	Costa Rica	BOLD:AAE1486	15	16	15	15			**43**
EUCE052-18	*Eucereon obscurum*	Costa Rica	BOLD:AAD0077	16	17	16	16	15	14	33
EUCE054-18	*Eucereon obscurum*	Costa Rica	BOLD:AAD0077	16	17	16	16	15	14	33
EUCE053-18	*Eucereon obscurum*	Costa Rica	BOLD:AAF1123	17	18	17	17	41	42	32
EUCE057-18	*Eucereon xanthura*	Costa Rica	BOLD:AAA1337	18	19	18	18	25	26	4
EUCE058-18	*Heliura rhodophila*	Costa Rica	BOLD:AAI6726	19	20	19	19	11	10	11
EUCE059-18	*Heliura rhodophila*	Costa Rica	BOLD:AAI6726	19	20	19	19			11
EUCE060-18	*Heliura rhodophila*	Costa Rica	BOLD:AAI6726	19	20	19	19			11
EUCE061-18	*Heliura rhodophila*	Costa Rica	BOLD:AAI6726	19	20	19	19			11
EUCE062-18	*Heliura rhodophila*	Costa Rica	BOLD:AAI6726	19	20	19	19			11
EUCE063-18	*Heliura rhodophila*	Costa Rica	BOLD:AAI6726	19	20	19	19	11	10	11
EUCE064-18	*Heliura rhodophila*	Costa Rica	BOLD:AAI6726	19	20	19	19			11
EUCE065-18	*Heliura rhodophila*	Costa Rica	BOLD:AAI6726	19	20	19	19			11
EUCE066-18	*Heliura rhodophila*	Costa Rica	BOLD:AAI6726	19	20	19	19	11	10	11
EUCE067-18	*Heliura thysbodes*	Costa Rica	BOLD:AAM3522	20	21	20	20	12	11	14
EUCE068-18	*Heliura thysbodes*	Costa Rica	BOLD:AAM3522	20	21	20	20			14
EUCE069-18	*Heliura thysbodes*	Costa Rica	BOLD:AAM3522	20	21	20	20			14
EUCE070-18	*Heliura thysbodes*	Costa Rica	BOLD:AAM3522	20	21	20	20	12	11	14
EUCE071-18	*Heliura thysbodes*	Costa Rica	BOLD:AAM3522	20	21	20	20			14
EUCE072-18	*Heliura thysbodes*	Costa Rica	BOLD:AAM3522	20	21	20	20			14
EUCE080-18	*Heliura thysbodes*	Costa Rica	BOLD:AAM3522	20	21	20	20			14
EUCE081-18	*Heliura thysbodes*	Costa Rica	BOLD:AAM3522	20	21	20	20			14
EUCE082-18	*Heliura thysbodes*	Costa Rica	BOLD:AAM3522	20	21	20	20			14
EUCE087-18	*Eucereon* sp. 03	Panama	BOLD:ACC9481	21	22	21	21	7	6	10
EUCE096-18	*Eucereon* sp. 03	Panama	BOLD:ACC9481	21	22	21	21	7	6	10
EUCE097-18	*Eucereon* sp. 03	Panama	BOLD:ACC9481	21	22	21	21			10
EUCE088-18	*Eucereon* sp. 04	Panama	BOLD:AAG6289	22	23	**10**	41	20	21	40
EUCE091-18	*Eucereon* sp. 06	Panama	BOLD:ADM7491	23	24	22	22	29	30	30
EUCE094-18	*Eucereon* sp. 07	Panama	BOLD:AAX7986	24	25	23	23	42	45	15
EUCE095-18	*Eucereon* sp. 08	Panama	BOLD:ABU7628	25	26	24	24	40	41	2

Process ID	Identification	Country	BIN	2% threshold	1% threshold	3% threshold	ABGD P=0.46%	GMY single	GMYC multiple	bPTP
EUCE101-18	*Eucereon* sp. 08	Panama	BOLD:ABU7628	25	26	24	24			2
EUCE102-18	*Eucereon* sp. 10	Ecuador	BOLD:AAN5487	26	27	25	**25**	36	37	38
EUCE103-18	*Eucereon* sp. 11	Ecuador	BOLD:ADN4389	27	28	26	26	21	22	13
EUCE104-18	*Eucereon* sp. 12	Ecuador	BOLD:AAM6996	28	29	27	27	19	20	9
EUCE106-18	*Eucereon* sp. 14	Ecuador	BOLD:AAY6238	29	30	28	**28**	30	31	37
EUCE107-18	*Eucereon* sp. 15	Ecuador	BOLD:AAG0918	30	31	29	29	27	28	26
EUCE108-18	*Eucereon* sp. 16	Ecuador	BOLD:ADO2209	31	32	30	30	23	24	17
EUCE109-18	*Eucereon* sp. 17	Ecuador	BOLD:ADF5649	32	33	31	31	33	34	23
EUCE110-18	*Eucereon* sp. 18	Ecuador	BOLD:AAI4929	33	34	32	32	26	27	22
EUCE111-18	*Eucereon* sp. 19	Ecuador	BOLD:AAG6327	34	35	33	**25**	35	36	39
EUCE112-18	*Eucereon* sp. 20	Ecuador	BOLD:AAH3437	35	36	34	33	39	40	21
EUCE113-18	*Eucereon* sp. 21	Ecuador	BOLD:ACJ8067	36	37	35	34	28	29	25
EUCE117-18	*Eucereon* sp. 21	Ecuador	BOLD:ACJ8067	36	37	35	34			25
EUCE114-18	*Eucereon* sp. 22	Ecuador	BOLD:AAF5831	37	38	36	35	22	23	16
EUCE115-18	*Eucereon* sp. 23	Ecuador	BOLD:AAH3436	38	39	37	36	37	38	18
EUCE116-18	*Eucereon* sp. 24	Ecuador	BOLD:ADP0759	39	40	38	**28**	31	32	36
EUCE118-18	*Eucereon* sp. 25	Ecuador	BOLD:AAG9205	40	41	39	37	32	33	24
EUCE119-18	*Eucereon* sp. 26	Ecuador	BOLD:ACJ8876	41	42	40	38	38	39	5
EUCE120-18	*Eucereon* sp. 27	Ecuador	BOLD:AAX0615	42	43	41	39	24	25	1
Total:	**40**		**42**	**42**	**43**	**41**	**42**	**42**	**45**	**43**

merges:				**0**	**0**	**1**	**2**	**0**	**0**	**0**
splits:				**0**	**1**	**0**	**2**	**0**	**3**	**1**

Appendix 8: All 402 samples used for the haplotype networks. Costa Rica was subdivided into the regions Área de Conservación Guanacaste (ACG) and the provinces Cartago, Heredia and Puntarenas. 32 of the samples are from the newly generated sequences of this study, their process IDs start with EUCE and ARCLG.

BIN	Process ID	Identification	Country	Region	Network
BOLD:AAA1310	GMHJL082-15	*Eucereon*	Honduras		a
BOLD:AAA1310	BLPAC647-06	*Eucereon centrale*	Costa Rica	ACG	a
BOLD:AAA1310	BLPAG477-07	*Eucereon centrale*	Costa Rica	ACG	a
BOLD:AAA1310	BLPBD538-07	*Eucereon centrale*	Costa Rica	ACG	a
BOLD:AAA1310	BLPCD170-08	*Eucereon centrale*	Costa Rica	ACG	a
BOLD:AAA1310	BLPCD171-08	*Eucereon centrale*	Costa Rica	ACG	a
BOLD:AAA1310	BLPCD172-08	*Eucereon centrale*	Costa Rica	ACG	a
BOLD:AAA1310	BLPCD173-08	*Eucereon centrale*	Costa Rica	ACG	a
BOLD:AAA1310	BLPCN289-08	*Eucereon centrale*	Costa Rica	ACG	a
BOLD:AAA1310	BLPCO081-08	*Eucereon centrale*	Costa Rica	ACG	a
BOLD:AAA1310	BLPCO176-08	*Eucereon centrale*	Costa Rica	ACG	a
BOLD:AAA1310	BLPDC858-09	*Eucereon centrale*	Costa Rica	ACG	a
BOLD:AAA1310	BLPDK1278-09	*Eucereon centrale*	Costa Rica	ACG	a
BOLD:AAA1310	BLPDK1839-09	*Eucereon centrale*	Costa Rica	ACG	a
BOLD:AAA1310	BLPDK465-09	*Eucereon centrale*	Costa Rica	ACG	a
BOLD:AAA1310	BLPDK626-09	*Eucereon centrale*	Costa Rica	ACG	a
BOLD:AAA1310	BLPDM1522-10	*Eucereon centrale*	Costa Rica	ACG	a
BOLD:AAA1310	BLPDT1591-10	*Eucereon centrale*	Costa Rica	ACG	a
BOLD:AAA1310	BLPDU376-11	*Eucereon centrale*	Costa Rica	ACG	a
BOLD:AAA1310	BLPDU377-11	*Eucereon centrale*	Costa Rica	ACG	a
BOLD:AAA1310	BLPDU723-11	*Eucereon centrale*	Costa Rica	ACG	a
BOLD:AAA1310	BLPDV259-11	*Eucereon centrale*	Costa Rica	ACG	a
BOLD:AAA1310	BLPDV785-11	*Eucereon centrale*	Costa Rica	ACG	a
BOLD:AAA1310	BLPDV786-11	*Eucereon centrale*	Costa Rica	ACG	a
BOLD:AAA1310	BLPDX496-11	*Eucereon centrale*	Costa Rica	ACG	a
BOLD:AAA1310	BLPED860-11	*Eucereon centrale*	Costa Rica	ACG	a
BOLD:AAA1310	MHARB641-06	*Eucereon centrale*	Costa Rica	ACG	a
BOLD:AAA1310	MHARB642-06	*Eucereon centrale*	Costa Rica	ACG	a
BOLD:AAA1310	MHARB643-06	*Eucereon centrale*	Costa Rica	ACG	a
BOLD:AAA1310	MHARB644-06	*Eucereon centrale*	Costa Rica	ACG	a
BOLD:AAA1310	MHARB645-06	*Eucereon centrale*	Costa Rica	ACG	a
BOLD:AAA1310	MHARB646-06	*Eucereon centrale*	Costa Rica	ACG	a
BOLD:AAA1310	MHARB647-06	*Eucereon centrale*	Costa Rica	ACG	a
BOLD:AAA1310	MHARB648-06	*Eucereon centrale*	Costa Rica	ACG	a
BOLD:AAA1310	MHMXC772-06	*Eucereon centrale*	Costa Rica	ACG	a
BOLD:AAA1310	MHMYC618-09	*Eucereon centrale*	Costa Rica	ACG	a
BOLD:AAA1310	MHMYC619-09	*Eucereon centrale*	Costa Rica	ACG	a
BOLD:AAA1310	MHMYC620-09	*Eucereon centrale*	Costa Rica	ACG	a
BOLD:AAA1310	XAA563-04	*Eucereon centrale*	Costa Rica	ACG	a
BOLD:AAA1310	ARCTB276-08	*Eucereon formosa*	Guatemala		a
BOLD:AAA1310	ARCTB285-08	*Eucereon formosa*	Guatemala		a
BOLD:AAA1310	ARCTB294-08	*Eucereon formosa*	Guatemala		a
BOLD:AAA1310	BLPDW072-11	Lepidoptera	Costa Rica	ACG	a
BOLD:AAA1310	BLPEE1651-12	Lepidoptera	Costa Rica	ACG	a
BOLD:AAA1310	BLPEE2161-12	Lepidoptera	Costa Rica	ACG	a
BOLD:AAA1310	BLPEE3345-14	Lepidoptera	Costa Rica	ACG	a
BOLD:AAA1310	BLPEE3683-14	Lepidoptera	Costa Rica	ACG	a
BOLD:AAA1310	BLPEE3684-14	Lepidoptera	Costa Rica	ACG	a

BIN	Process ID	Identification	Country	Region	Network
BOLD:AAA1310	BLPEF1363-12	Lepidoptera	Costa Rica	ACG	a
BOLD:AAA1310	BLPEF156-12	Lepidoptera	Costa Rica	ACG	a
BOLD:AAA1310	BLPEF2582-13	Lepidoptera	Costa Rica	ACG	a
BOLD:AAA1310	BLPEF2968-13	Lepidoptera	Costa Rica	ACG	a
BOLD:AAA1310	BLPEF3102-13	Lepidoptera	Costa Rica	ACG	a
BOLD:AAA1310	BLPEF4786-13	Lepidoptera	Costa Rica	ACG	a
BOLD:AAA1310	MHMYG3098-10	Lepidoptera	Costa Rica	ACG	a
BOLD:AAA1310	MHMYG3099-10	Lepidoptera	Costa Rica	ACG	a
BOLD:AAA1310	MHMYS3309-13	Lepidoptera	Costa Rica	ACG	a
BOLD:AAA1311	ARCLG174-18	*Eucereon aurantiaca*	Costa Rica	Puntarenas	b
BOLD:AAA1311	BCIAR070-10	*Eucereon aurantiaca*	Panama		b
BOLD:AAA1311	BCIAR081-10	*Eucereon aurantiaca*	Panama		b
BOLD:AAA1311	BCIGE719-12	*Eucereon aurantiaca*	Panama		b
BOLD:AAA1311	BCIGE749-12	*Eucereon aurantiaca*	Panama		b
BOLD:AAA1311	BCIGE750-12	*Eucereon aurantiaca*	Panama		b
BOLD:AAA1311	BCIGE753-12	*Eucereon aurantiaca*	Panama		b
BOLD:AAA1311	BLPAA731-06	*Eucereon aurantiaca*	Costa Rica	ACG	b
BOLD:AAA1311	BLPAB720-06	*Eucereon aurantiaca*	Costa Rica	ACG	b
BOLD:AAA1311	BLPAG480-07	*Eucereon aurantiaca*	Costa Rica	ACG	b
BOLD:AAA1311	BLPBB908-07	*Eucereon aurantiaca*	Costa Rica	ACG	b
BOLD:AAA1311	BLPBC208-07	*Eucereon aurantiaca*	Costa Rica	ACG	b
BOLD:AAA1311	BLPBH160-07	*Eucereon aurantiaca*	Costa Rica	ACG	b
BOLD:AAA1311	BLPCB570-08	*Eucereon aurantiaca*	Costa Rica	ACG	b
BOLD:AAA1311	BLPCF062-08	*Eucereon aurantiaca*	Costa Rica	ACG	b
BOLD:AAA1311	BLPCL416-08	*Eucereon aurantiaca*	Costa Rica	ACG	b
BOLD:AAA1311	BLPCM194-08	*Eucereon aurantiaca*	Costa Rica	ACG	b
BOLD:AAA1311	BLPCM768-08	*Eucereon aurantiaca*	Costa Rica	ACG	b
BOLD:AAA1311	BLPCM769-08	*Eucereon aurantiaca*	Costa Rica	ACG	b
BOLD:AAA1311	BLPCN274-08	*Eucereon aurantiaca*	Costa Rica	ACG	b
BOLD:AAA1311	BLPCN811-08	*Eucereon aurantiaca*	Costa Rica	ACG	b
BOLD:AAA1311	BLPCO744-08	*Eucereon aurantiaca*	Costa Rica	ACG	b
BOLD:AAA1311	BLPDA651-09	*Eucereon aurantiaca*	Costa Rica	ACG	b
BOLD:AAA1311	BLPDC075-09	*Eucereon aurantiaca*	Costa Rica	ACG	b
BOLD:AAA1311	BLPDK1279-09	*Eucereon aurantiaca*	Costa Rica	ACG	b
BOLD:AAA1311	BLPDU732-11	*Eucereon aurantiaca*	Costa Rica	ACG	b
BOLD:AAA1311	EUCE005-18	*Eucereon aurantiaca*	Costa Rica	Puntarenas	b
BOLD:AAA1311	EUCE006-18	*Eucereon aurantiaca*	Costa Rica	Puntarenas	b
BOLD:AAA1311	EUCE007-18	*Eucereon aurantiaca*	Costa Rica	Puntarenas	b
BOLD:AAA1311	EUCE008-18	*Eucereon aurantiaca*	Costa Rica	Puntarenas	b
BOLD:AAA1311	EUCE009-18	*Eucereon aurantiaca*	Costa Rica	Puntarenas	b
BOLD:AAA1311	EUCE010-18	*Eucereon aurantiaca*	Costa Rica	Puntarenas	b
BOLD:AAA1311	EUCE084-18	*Eucereon aurantiaca*	Costa Rica	Puntarenas	b
BOLD:AAA1311	EUCE121-18	*Eucereon aurantiaca*	Costa Rica	Puntarenas	b
BOLD:AAA1311	EUCE125-18	*Eucereon aurantiaca*	Costa Rica	Puntarenas	b
BOLD:AAA1311	EUCE126-18	*Eucereon aurantiaca*	Costa Rica	Puntarenas	b
BOLD:AAA1311	EUCE130-18	*Eucereon aurantiaca*	Costa Rica	Puntarenas	b
BOLD:AAA1311	EUCE131-18	*Eucereon aurantiaca*	Costa Rica	Puntarenas	b
BOLD:AAA1311	MHARB584-06	*Eucereon aurantiaca*	Costa Rica	ACG	b
BOLD:AAA1311	MHARB585-06	*Eucereon aurantiaca*	Costa Rica	ACG	b
BOLD:AAA1311	MHARB586-06	*Eucereon aurantiaca*	Costa Rica	ACG	b
BOLD:AAA1311	MHARB587-06	*Eucereon aurantiaca*	Costa Rica	ACG	b
BOLD:AAA1311	MHARB613-06	*Eucereon aurantiaca*	Costa Rica	ACG	b
BOLD:AAA1311	MHARB614-06	*Eucereon aurantiaca*	Costa Rica	ACG	b
BOLD:AAA1311	MHARB615-06	*Eucereon aurantiaca*	Costa Rica	ACG	b

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BOLD:AAA1311	MHARB616-06	*Eucereon aurantiaca*	Costa Rica	ACG	b
BOLD:AAA1311	MHARB617-06	*Eucereon aurantiaca*	Costa Rica	ACG	b
BOLD:AAA1311	MHARB618-06	*Eucereon aurantiaca*	Costa Rica	ACG	b
BOLD:AAA1311	MHARB619-06	*Eucereon aurantiaca*	Costa Rica	ACG	b
BOLD:AAA1311	MHARB838-06	*Eucereon aurantiaca*	Costa Rica	ACG	b
BOLD:AAA1311	MHARB897-06	*Eucereon aurantiaca*	Costa Rica	ACG	b
BOLD:AAA1311	MHARB898-06	*Eucereon aurantiaca*	Costa Rica	ACG	b
BOLD:AAA1311	MHARB899-06	*Eucereon aurantiaca*	Costa Rica	ACG	b
BOLD:AAA1311	MHARB900-06	*Eucereon aurantiaca*	unknown		b
BOLD:AAA1311	MHARB901-06	*Eucereon aurantiaca*	Costa Rica	ACG	b
BOLD:AAA1311	MHMXC771-06	*Eucereon aurantiaca*	Costa Rica	ACG	b
BOLD:AAA1311	MHMXH366-07	*Eucereon aurantiaca*	Costa Rica	ACG	b
BOLD:AAA1311	MHMXL611-07	*Eucereon aurantiaca*	Costa Rica	ACG	b
BOLD:AAA1311	MHMXO056-08	*Eucereon aurantiaca*	Costa Rica	ACG	b
BOLD:AAA1311	MHMXO057-08	*Eucereon aurantiaca*	Costa Rica	ACG	b
BOLD:AAA1311	MHMXT595-08	*Eucereon aurantiaca*	unknown		b
BOLD:AAA1311	MHMYC050-09	*Eucereon aurantiaca*	Costa Rica	ACG	b
BOLD:AAA1311	MHMYC613-09	*Eucereon aurantiaca*	Costa Rica	ACG	b
BOLD:AAA1311	MHMYC614-09	*Eucereon aurantiaca*	Costa Rica	ACG	b
BOLD:AAA1311	MHMYF288-10	*Eucereon aurantiaca*	Costa Rica	ACG	b
BOLD:AAA1311	MHMYF289-10	*Eucereon aurantiaca*	Costa Rica	ACG	b
BOLD:AAA1311	MHMYF290-10	*Eucereon aurantiaca*	Costa Rica	ACG	b
BOLD:AAA1311	MHMYF291-10	*Eucereon aurantiaca*	Costa Rica	ACG	b
BOLD:AAA1311	MHMYF292-10	*Eucereon aurantiaca*	Costa Rica	ACG	b
BOLD:AAA1311	MHMYF293-10	*Eucereon aurantiaca*	Costa Rica	ACG	b
BOLD:AAA1311	MHMYF294-10	*Eucereon aurantiaca*	Costa Rica	ACG	b
BOLD:AAA1311	MHMYF295-10	*Eucereon aurantiaca*	Costa Rica	ACG	b
BOLD:AAA1311	MHMYF296-10	*Eucereon aurantiaca*	Costa Rica	ACG	b
BOLD:AAA1311	MHMYF297-10	*Eucereon aurantiaca*	Costa Rica	ACG	b
BOLD:AAA1311	XAA556-04	*Eucereon aurantiaca*	Costa Rica	ACG	b
BOLD:AAA1311	XAA557-04	*Eucereon aurantiaca*	Costa Rica	ACG	b
BOLD:AAA1311	XAA558-04	*Eucereon aurantiaca*	Costa Rica	ACG	b
BOLD:AAA1311	XAA559-04	*Eucereon aurantiaca*	Costa Rica	ACG	b
BOLD:AAA1311	ARCTB262-08	*Eucereon pseudarchias*	Guatemala		b
BOLD:AAA1311	BLPDW050-11	Lepidoptera	Costa Rica	ACG	b
BOLD:AAA1311	BLPEF2763-13	Lepidoptera	Costa Rica	ACG	b
BOLD:AAA1311	MHMYG3100-10	Lepidoptera	Costa Rica	ACG	b
BOLD:AAA1311	MHMYG3101-10	Lepidoptera	Costa Rica	ACG	b
BOLD:AAA1311	MHMYL2357-11	Lepidoptera	Costa Rica	ACG	b
BOLD:AAA1311	MHMYL2455-11	Lepidoptera	Costa Rica	ACG	b
BOLD:AAA1311	MHMYL2456-11	Lepidoptera	Costa Rica	ACG	b
BOLD:AAA1311	MHMYL2462-11	Lepidoptera	Costa Rica	ACG	b
BOLD:AAA1311	MHMYL2504-11	Lepidoptera	Costa Rica	ACG	b
BOLD:AAA1311	MHMYP1579-12	Lepidoptera	Costa Rica	ACG	b
BOLD:AAA1311	MHMYP1581-12	Lepidoptera	Costa Rica	ACG	b
BOLD:AAA1311	MHMYP1582-12	Lepidoptera	Costa Rica	ACG	b
BOLD:AAE1486	ARCTC002-09	*Eucereon atrigutta*	Guatemala		c
BOLD:AAE1486	BCIGE745-12	*Eucereon atrigutta*	Panama		c
BOLD:AAE1486	BLPBB874-07	*Eucereon atrigutta*	Costa Rica	ACG	c
BOLD:AAE1486	BLPBB875-07	*Eucereon atrigutta*	Costa Rica	ACG	c
BOLD:AAE1486	BLPBB876-07	*Eucereon atrigutta*	Costa Rica	ACG	c
BOLD:AAE1486	BLPCG133-08	*Eucereon atrigutta*	Costa Rica	ACG	c
BOLD:AAE1486	BLPDU722-11	*Eucereon atrigutta*	Costa Rica	ACG	c
BOLD:AAE1486	BLPDW423-11	*Eucereon atrigutta*	Costa Rica	ACG	c

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BOLD:AAE1486	EUCE048-18	*Eucereon atrigutta*	Costa Rica	Puntarenas	c
BOLD:AAE1486	EUCE049-18	*Eucereon atrigutta*	Costa Rica	Puntarenas	c
BOLD:AAE1486	EUCE050-18	*Eucereon atrigutta*	Costa Rica	Puntarenas	c
BOLD:AAE1486	EUCE051-18	*Eucereon atrigutta*	Costa Rica	Puntarenas	c
BOLD:AAE1486	LEMMZ305-10	*Eucereon quadricolor*	Brazil		c
BOLD:AAE1486	LEMMZ306-10	*Eucereon quadricolor*	Brazil		c
BOLD:AAE1486	LEMMZ340-10	*Eucereon quadricolor*	Brazil		c
BOLD:AAE1486	ARCTD795-12	Lepidoptera	Costa Rica		c
BOLD:AAE1486	ARMOT429-12	Lepidoptera	Argentina		c
BOLD:AAE1486	BLPEF3101-13	Lepidoptera	Costa Rica	ACG	c
BOLD:AAE1486	BLPEF4012-13	Lepidoptera	Costa Rica	ACG	c
BOLD:AAE1486	BLPEF6323-14	Lepidoptera	Costa Rica	ACG	c
BOLD:AAE1486	MHMYK10319-15	Lepidoptera	Costa Rica	ACG	c
BOLD:AAA1337	BLPBF229-07	*Eucereon xanthura*	Costa Rica	ACG	d
BOLD:AAA1337	BLPCD211-08	*Eucereon xanthura*	Costa Rica	ACG	d
BOLD:AAA1337	BLPCE549-08	*Eucereon xanthura*	Costa Rica	ACG	d
BOLD:AAA1337	BLPDK1405-09	*Eucereon xanthura*	Costa Rica	ACG	d
BOLD:AAA1337	BLPDK1406-09	*Eucereon xanthura*	Costa Rica	ACG	d
BOLD:AAA1337	BLPDK1853-09	*Eucereon xanthura*	Costa Rica	ACG	d
BOLD:AAA1337	BLPDK625-09	*Eucereon xanthura*	Costa Rica	ACG	d
BOLD:AAA1337	BLPDK796-09	*Eucereon xanthura*	Costa Rica	ACG	d
BOLD:AAA1337	BLPDU734-11	*Eucereon xanthura*	Costa Rica	ACG	d
BOLD:AAA1337	BLPDV738-11	*Eucereon xanthura*	Costa Rica	ACG	d
BOLD:AAA1337	BLPDX251-11	*Eucereon xanthura*	Costa Rica	ACG	d
BOLD:AAA1337	BLPDX252-11	*Eucereon xanthura*	Costa Rica	ACG	d
BOLD:AAA1337	BLPDX499-11	*Eucereon xanthura*	Costa Rica	ACG	d
BOLD:AAA1337	BLPDY623-11	*Eucereon xanthura*	Costa Rica	ACG	d
BOLD:AAA1337	BLPED631-11	*Eucereon xanthura*	Costa Rica	ACG	d
BOLD:AAA1337	EUCE057-18	*Eucereon xanthura*	Costa Rica	Puntarenas	d
BOLD:AAA1337	IBOLG019-08	*Eucereon xanthura*	Costa Rica	ACG	d
BOLD:AAA1337	MHARB378-05	*Eucereon xanthura*	Costa Rica	ACG	d
BOLD:AAA1337	MHARB379-05	*Eucereon xanthura*	Costa Rica	ACG	d
BOLD:AAA1337	MHARB380-05	*Eucereon xanthura*	Costa Rica	ACG	d
BOLD:AAA1337	MHARB381-05	*Eucereon xanthura*	Costa Rica	ACG	d
BOLD:AAA1337	MHARB382-05	*Eucereon xanthura*	Costa Rica	ACG	d
BOLD:AAA1337	MHARB392-05	*Eucereon xanthura*	Costa Rica	ACG	d
BOLD:AAA1337	MHARB393-05	*Eucereon xanthura*	Costa Rica	ACG	d
BOLD:AAA1337	MHARB394-05	*Eucereon xanthura*	Costa Rica	ACG	d
BOLD:AAA1337	MHARB734-06	*Eucereon xanthura*	Costa Rica	ACG	d
BOLD:AAA1337	MHARB735-06	*Eucereon xanthura*	Costa Rica	ACG	d
BOLD:AAA1337	MHARB761-06	*Eucereon xanthura*	Costa Rica	ACG	d
BOLD:AAA1337	MHARB890-06	*Eucereon xanthura*	Costa Rica	ACG	d
BOLD:AAA1337	MHARB891-06	*Eucereon xanthura*	Costa Rica	ACG	d
BOLD:AAA1337	MHMXA853-06	*Eucereon xanthura*	Costa Rica	ACG	d
BOLD:AAA1337	MHMXC769-06	*Eucereon xanthura*	Costa Rica	ACG	d
BOLD:AAA1337	MHMXJ346-07	*Eucereon xanthura*	Costa Rica	ACG	d
BOLD:AAA1337	MHMXJ347-07	*Eucereon xanthura*	Costa Rica	ACG	d
BOLD:AAA1337	MHMXQ145-08	*Eucereon xanthura*	Costa Rica	ACG	d
BOLD:AAA1337	MHMYC012-09	*Eucereon xanthura*	Costa Rica	ACG	d
BOLD:AAA1337	MHMYF284-10	*Eucereon xanthura*	Costa Rica	ACG	d
BOLD:AAA1337	XAA210-04	*Eucereon xanthura*	Costa Rica	ACG	d
BOLD:AAA1337	XAA211-04	*Eucereon xanthura*	Costa Rica	ACG	d
BOLD:AAA1337	XAA212-04	*Eucereon xanthura*	Costa Rica	ACG	d
BOLD:AAA1337	XAA213-04	*Eucereon xanthura*	Costa Rica	ACG	d

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BOLD:AAA1337	XAA214-04	*Eucereon xanthura*	Costa Rica	ACG	d
BOLD:AAA1337	ARCTC847-11	Lepidoptera	Guatemala		d
BOLD:AAA1337	BLPDW046-11	Lepidoptera	Costa Rica	ACG	d
BOLD:AAA1337	BLPEF2561-13	Lepidoptera	Costa Rica	ACG	d
BOLD:AAA1337	BLPEF2762-13	Lepidoptera	Costa Rica	ACG	d
BOLD:AAA1337	BLPEF3239-13	Lepidoptera	Costa Rica	ACG	d
BOLD:AAA1337	BLPEF923-12	Lepidoptera	Costa Rica	ACG	d
BOLD:AAA1337	GWORL150-09	Lepidoptera	Peru		d
BOLD:AAA1337	LEMMZ1216-12	*Theages leucophaea* sp. MMZ02	Brazil		d
BOLD:AAA1337	LEMMZ1218-12	*Theages leucophaea* sp. MMZ02	Brazil		d
BOLD:AAN5487	EUCE102-18	*Eucereon* sp. 10	Ecuador		e
BOLD:AAN5487	BLPDT1338-10	*Eucereon rogersi*	Costa Rica	ACG	e
BOLD:AAN5487	LEMMZ456-11	*Eucereon setosum*	Brazil		e
BOLD:AAN5487	LEMMZ530-11	*Eucereon setosum*	Brazil		e
BOLD:AAN5487	LEMMZ531-11	*Eucereon setosum*	Brazil		e
BOLD:AAN5487	ARCTC765-11	Lepidoptera	Brazil		e
BOLD:AAN5487	ARCTC768-11	Lepidoptera	Guatemala		e
BOLD:AAN5487	ARCTC773-11	Lepidoptera	Guatemala		e
BOLD:AAN5487	ARCTC786-11	Lepidoptera	Bolivia		e
BOLD:AAN5487	ARCTC790-11	Lepidoptera	Nicaragua		e
BOLD:AAN5487	ARMOT436-12	Lepidoptera	Argentina		e
BOLD:AAN5487	BLPDT1975-10	Lepidoptera	Costa Rica	ACG	e
BOLD:AAN5487	BLPEE4168-14	Lepidoptera	Costa Rica	ACG	e
BOLD:AAN5487	BLPEF8983-15	Lepidoptera	Costa Rica	ACG	e
BOLD:AAA8661	BCIAR060-10	*Eucereon aeolum*	Panama		f
BOLD:AAA8661	BCIAR061-10	*Eucereon aeolum*	Panama		f
BOLD:AAA8661	BCIAR073-10	*Eucereon aeolum*	Panama		f
BOLD:AAA8661	BCIAR080-10	*Eucereon aeolum*	Panama		f
BOLD:AAA8661	BCIAR092-10	*Eucereon aeolum*	Panama		f
BOLD:AAA8661	BCIAR697-13	*Eucereon aeolum*	Panama		f
BOLD:AAA8661	BCIAR698-13	*Eucereon aeolum*	Panama		f
BOLD:AAA8661	BCIAR699-13	*Eucereon aeolum*	Panama		f
BOLD:AAA8661	BLPBC469-07	*Eucereon aeolum*	Costa Rica	ACG	f
BOLD:AAA8661	BLPDT091-10	*Eucereon aeolum*	Costa Rica	ACG	f
BOLD:AAA8661	BLPDT1592-10	*Eucereon aeolum*	Costa Rica	ACG	f
BOLD:AAA8661	EUCE018-18	*Eucereon aeolum*	Costa Rica	Puntarenas	f
BOLD:AAA8661	EUCE019-18	*Eucereon aeolum*	Costa Rica	Puntarenas	f
BOLD:AAA8661	LEMMZ432-11	*Eucereon aeolum*	Brazil		f
BOLD:AAA8661	LEMMZ477-11	*Eucereon aeolum*	Brazil		f
BOLD:AAA8661	LEMMZ478-11	*Eucereon aeolum*	Brazil		f
BOLD:AAA8661	MHARB628-06	*Eucereon aeolum*	Costa Rica	ACG	f
BOLD:AAA8661	MHARB629-06	*Eucereon aeolum*	Costa Rica	ACG	f
BOLD:AAA8661	MHARB630-06	*Eucereon aeolum*	Costa Rica	ACG	f
BOLD:AAA8661	MHARB631-06	*Eucereon aeolum*	Costa Rica	ACG	f
BOLD:AAA8661	MHARB632-06	*Eucereon aeolum*	Costa Rica	ACG	f
BOLD:AAA8661	MHARB633-06	*Eucereon aeolum*	Costa Rica	ACG	f
BOLD:AAA8661	MHARB634-06	*Eucereon aeolum*	Costa Rica	ACG	f
BOLD:AAA8661	MHARB896-06	*Eucereon aeolum*	Costa Rica	ACG	f
BOLD:AAA8661	MHMXC770-06	*Eucereon aeolum*	Costa Rica	ACG	f
BOLD:AAA8661	MHMXH428-07	*Eucereon aeolum*	Costa Rica	ACG	f
BOLD:AAA8661	MHMXH429-07	*Eucereon aeolum*	Costa Rica	ACG	f
BOLD:AAA8661	MHMXH430-07	*Eucereon aeolum*	Costa Rica	ACG	f

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BOLD:AAA8661	MHMXH431-07	*Eucereon aeolum*	Costa Rica	ACG	f
BOLD:AAA8661	MHMXH432-07	*Eucereon aeolum*	Costa Rica	ACG	f
BOLD:AAA8661	MHMXH433-07	*Eucereon aeolum*	Costa Rica	ACG	f
BOLD:AAA8661	MHMXH434-07	*Eucereon aeolum*	Costa Rica	ACG	f
BOLD:AAA8661	MHMXH435-07	*Eucereon aeolum*	Costa Rica	ACG	f
BOLD:AAA8661	MHMXH436-07	*Eucereon aeolum*	Costa Rica	ACG	f
BOLD:AAA8661	MHMXH437-07	*Eucereon aeolum*	Costa Rica	ACG	f
BOLD:AAA8661	MHMXL612-07	*Eucereon aeolum*	Costa Rica	ACG	f
BOLD:AAA8661	MHMXO050-08	*Eucereon aeolum*	Costa Rica	ACG	f
BOLD:AAA8661	MHMXO051-08	*Eucereon aeolum*	Costa Rica	ACG	f
BOLD:AAA8661	MHMXO052-08	*Eucereon aeolum*	Costa Rica	ACG	f
BOLD:AAA8661	MHMXO053-08	*Eucereon aeolum*	Costa Rica	ACG	f
BOLD:AAA8661	MHMXO054-08	*Eucereon aeolum*	Costa Rica	ACG	f
BOLD:AAA8661	MHMXO055-08	*Eucereon aeolum*	Costa Rica	ACG	f
BOLD:AAA8661	MHMXQ144-08	*Eucereon aeolum*	Costa Rica	ACG	f
BOLD:AAA8661	MHMXT568-08	*Eucereon aeolum*	unknown		f
BOLD:AAA8661	MHMXT569-08	*Eucereon aeolum*	unknown		f
BOLD:AAA8661	MHMXT570-08	*Eucereon aeolum*	unknown		f
BOLD:AAA8661	MHMXT596-08	*Eucereon aeolum*	unknown		f
BOLD:AAA8661	MHMYC621-09	*Eucereon aeolum*	Costa Rica	ACG	f
BOLD:AAA8661	MHMYC622-09	*Eucereon aeolum*	Costa Rica	ACG	f
BOLD:AAA8661	MHMYC623-09	*Eucereon aeolum*	Costa Rica	ACG	f
BOLD:AAA8661	MHMYC624-09	*Eucereon aeolum*	Costa Rica	ACG	f
BOLD:AAA8661	MHMYF282-10	*Eucereon aeolum*	Costa Rica	ACG	f
BOLD:AAA8661	XAA270-04	*Eucereon aeolum*	Costa Rica	ACG	f
BOLD:AAA8661	XAA271-04	*Eucereon aeolum*	Costa Rica	ACG	f
BOLD:AAA8661	XAA272-04	*Eucereon aeolum*	Costa Rica	ACG	f
BOLD:AAA8661	XAA273-04	*Eucereon aeolum*	Costa Rica	ACG	f
BOLD:AAA8661	BLPED1471-12	Lepidoptera	Costa Rica	ACG	f
BOLD:AAA8661	BLPEE3556-14	Lepidoptera	Costa Rica	ACG	f
BOLD:AAA8661	BLPEE4461-14	Lepidoptera	Costa Rica	ACG	f
BOLD:AAA8661	BLPEF1362-12	Lepidoptera	Costa Rica	ACG	f
BOLD:AAA8661	MHMYG3096-10	Lepidoptera	Costa Rica	ACG	f
BOLD:AAA8661	MHMYG3097-10	Lepidoptera	Costa Rica	ACG	f
BOLD:AAA8661	MHMYM2021-11	Lepidoptera	Costa Rica	ACG	f
BOLD:AAA8661	MHMYM2022-11	Lepidoptera	Costa Rica	ACG	f
BOLD:AAA8661	MHMYM2023-11	Lepidoptera	Costa Rica	ACG	f
BOLD:AAA8661	MHMYP1578-12	Lepidoptera	Costa Rica	ACG	f
BOLD:AAD0077	NARCA074-09	*Eucereon obscura*	Ecuador		g
BOLD:AAD0077	EUCE052-18	*Eucereon obscurum*	Costa Rica	Puntarenas	g
BOLD:AAD0077	EUCE054-18	*Eucereon obscurum*	Costa Rica	Puntarenas	g
BOLD:AAD0077	INCTA938-10	*Eucereon obscurum*	Brazil		g
BOLD:AAD0077	LNOUE639-11	*Eucereon obscurum*	French Guiana		g
BOLD:AAD0077	LNOUE641-11	*Eucereon obscurum*	French Guiana		g
BOLD:AAD0077	BLPBC264-07	*Eucereon* obscurumDHJ02	Costa Rica	ACG	g
BOLD:AAD0077	BLPCI861-08	*Eucereon* obscurumDHJ02	Costa Rica	ACG	g
BOLD:AAD0077	BLPCN306-08	*Eucereon* obscurumDHJ02	Costa Rica	ACG	g
BOLD:AAD0077	BLPCP337-08	*Eucereon* obscurumDHJ02	Costa Rica	ACG	g
BOLD:AAD0077	BLPDB185-09	*Eucereon* obscurumDHJ02	Costa Rica	ACG	g
BOLD:AAD0077	BLPDF788-09	*Eucereon* obscurumDHJ02	Costa Rica	ACG	g
BOLD:AAD0077	BLPDH858-09	*Eucereon* obscurumDHJ02	Costa Rica	ACG	g
BOLD:AAD0077	BLPDK453-09	*Eucereon* obscurumDHJ02	Costa Rica	ACG	g

BIN	Process ID	Identification	Country	Region	Network
BOLD:AAD0077	BLPDS391-10	*Eucereon* obscurumDHJ02	Costa Rica	ACG	g
BOLD:AAD0077	XAA222-04	*Eucereon* obscurumDHJ02	Costa Rica	ACG	g
BOLD:AAD0077	BCIAR047-10	*Eucereon* sp. 12YB	Panama		g
BOLD:AAD0077	ARMOT473-12	Lepidoptera	Argentina		g
BOLD:AAD0077	LNOUB267-10	Lepidoptera	French Guiana		g
BOLD:AAD0077	LNOUD1491-12	Lepidoptera	French Guiana		g
BOLD:AAD0077	MOTAR480-12	Lepidoptera	Argentina		g
BOLD:AAD0077	NARCA117-09	Lepidoptera	Ecuador		g
BOLD:AAD0077	NARCB244-10	Lepidoptera	Costa Rica	Heredia	g
BOLD:AAD0077	NARCB245-10	Lepidoptera	Costa Rica	Heredia	g
BOLD:AAA9439	ARCTC759-11	Lepidoptera	Paraguay		h
BOLD:AAA9439	ARCTC760-11	Lepidoptera	Paraguay		h
BOLD:AAA9439	ARCTC761-11	Lepidoptera	Paraguay		h
BOLD:AAA9439	ARCTC762-11	Lepidoptera	Argentina		h
BOLD:AAA9439	ARMOT382-12	Lepidoptera	Argentina		h
BOLD:AAA9439	ARMOT392-12	Lepidoptera	Argentina		h
BOLD:AAA9439	ARMOT470-12	Lepidoptera	Argentina		h
BOLD:AAA9439	ARMOT475-12	Lepidoptera	Argentina		h
BOLD:AAA9439	LEPPA483-12	Lepidoptera	Argentina		h
BOLD:AAA9439	LEPPA490-12	Lepidoptera	Argentina		h
BOLD:AAA9439	ARCTC766-11	*Nelphe relegatum*	Guatemala		h
BOLD:AAA9439	ARCTC780-11	*Nelphe relegatum*	Nicaragua		h
BOLD:AAA9439	ARCTC781-11	*Nelphe relegatum*	Nicaragua		h
BOLD:AAA9439	ARCTC782-11	*Nelphe relegatum*	Nicaragua		h
BOLD:AAA9439	ARCTC784-11	*Nelphe relegatum*	Costa Rica	Cartago	h
BOLD:AAA9439	BCIGE758-12	*Nelphe relegatum*	Panama		h
BOLD:AAA9439	BLPAA237-06	*Nelphe relegatum*	Costa Rica	ACG	h
BOLD:AAA9439	BLPAA804-06	*Nelphe relegatum*	Costa Rica	ACG	h
BOLD:AAA9439	BLPAB230-06	*Nelphe relegatum*	Costa Rica	ACG	h
BOLD:AAA9439	BLPAB723-06	*Nelphe relegatum*	Costa Rica	ACG	h
BOLD:AAA9439	BLPAD858-06	*Nelphe relegatum*	Costa Rica	ACG	h
BOLD:AAA9439	BLPAG786-07	*Nelphe relegatum*	Costa Rica	ACG	h
BOLD:AAA9439	BLPBA323-07	*Nelphe relegatum*	Costa Rica	ACG	h
BOLD:AAA9439	BLPBD536-07	*Nelphe relegatum*	Costa Rica	ACG	h
BOLD:AAA9439	BLPBH161-07	*Nelphe relegatum*	Costa Rica	ACG	h
BOLD:AAA9439	BLPCC121-08	*Nelphe relegatum*	Costa Rica	ACG	h
BOLD:AAA9439	BLPCC122-08	*Nelphe relegatum*	Costa Rica	ACG	h
BOLD:AAA9439	BLPCC567-08	*Nelphe relegatum*	Costa Rica	ACG	h
BOLD:AAA9439	BLPCC568-08	*Nelphe relegatum*	Costa Rica	ACG	h
BOLD:AAA9439	BLPCC569-08	*Nelphe relegatum*	Costa Rica	ACG	h
BOLD:AAA9439	BLPCD203-08	*Nelphe relegatum*	Costa Rica	ACG	h
BOLD:AAA9439	BLPCE348-08	*Nelphe relegatum*	Costa Rica	ACG	h
BOLD:AAA9439	BLPCE349-08	*Nelphe relegatum*	Costa Rica	ACG	h
BOLD:AAA9439	BLPCG697-08	*Nelphe relegatum*	Costa Rica	ACG	h
BOLD:AAA9439	BLPCG698-08	*Nelphe relegatum*	Costa Rica	ACG	h
BOLD:AAA9439	BLPCJ333-08	*Nelphe relegatum*	Costa Rica	ACG	h
BOLD:AAA9439	BLPDC076-09	*Nelphe relegatum*	Costa Rica	ACG	h
BOLD:AAA9439	BLPDD315-09	*Nelphe relegatum*	Costa Rica	ACG	h
BOLD:AAA9439	BLPDD379-09	*Nelphe relegatum*	Costa Rica	ACG	h
BOLD:AAA9439	BLPDH845-09	*Nelphe relegatum*	Costa Rica	ACG	h
BOLD:AAA9439	BLPDS404-10	*Nelphe relegatum*	Costa Rica	ACG	h
BOLD:AAA9439	BLPDU1229-11	*Nelphe relegatum*	Costa Rica	ACG	h

BIN	Process ID	Identification	Country	Region	Network
BOLD:AAA9439	BLPED1717-12	*Nelphe relegatum*	Costa Rica	ACG	h
BOLD:AAA9439	BLPED1718-12	*Nelphe relegatum*	Costa Rica	ACG	h
BOLD:AAA9439	BLPEE2069-12	*Nelphe relegatum*	Costa Rica	ACG	h
BOLD:AAA9439	BLPEE2872-14	*Nelphe relegatum*	Costa Rica	ACG	h
BOLD:AAA9439	BLPEE3970-14	*Nelphe relegatum*	Costa Rica	ACG	h
BOLD:AAA9439	CNCLB1895-14	*Nelphe relegatum*	Mexico		h
BOLD:AAA9439	LPMX279-07	*Nelphe relegatum*	Mexico		h
BOLD:AAA9439	LYHES397-09	*Nelphe relegatum*	Mexico		h
BOLD:AAA9439	MHARB588-06	*Nelphe relegatum*	Costa Rica	ACG	h
BOLD:AAA9439	MHARB589-06	*Nelphe relegatum*	Costa Rica	ACG	h
BOLD:AAA9439	MHARB590-06	*Nelphe relegatum*	Costa Rica	ACG	h
BOLD:AAA9439	MHARB591-06	*Nelphe relegatum*	Costa Rica	ACG	h
BOLD:AAA9439	MHARB592-06	*Nelphe relegatum*	Costa Rica	ACG	h
BOLD:AAA9439	MHARB593-06	*Nelphe relegatum*	Costa Rica	ACG	h
BOLD:AAA9439	MHARB594-06	*Nelphe relegatum*	Costa Rica	ACG	h
BOLD:AAA9439	MHARB893-06	*Nelphe relegatum*	Costa Rica	ACG	h
BOLD:AAA9439	MHARB894-06	*Nelphe relegatum*	Costa Rica	ACG	h
BOLD:AAA9439	MHARB895-06	*Nelphe relegatum*	Costa Rica	ACG	h
BOLD:AAA9439	MHMYC616-09	*Nelphe relegatum*	Costa Rica	ACG	h
BOLD:AAA9439	MHMYL2465-11	*Nelphe relegatum*	Costa Rica	ACG	h
BOLD:AAJ0944	ARCLG090-18	*Eucereon* nr. *varium*	Costa Rica	Puntarenas	i
BOLD:AAJ0944	EUCE011-18	*Eucereon* nr. *varium*	Costa Rica	Puntarenas	i
BOLD:AAJ0944	EUCE012-18	*Eucereon* nr. *varium*	Costa Rica	Puntarenas	i
BOLD:AAJ0944	EUCE013-18	*Eucereon* nr. *varium*	Costa Rica	Puntarenas	i
BOLD:AAJ0944	EUCE014-18	*Eucereon* nr. *varium*	Costa Rica	Puntarenas	i
BOLD:AAJ0944	EUCE015-18	*Eucereon* nr. *varium*	Costa Rica	Puntarenas	i
BOLD:AAJ0944	EUCE016-18	*Eucereon* nr. *varium*	Costa Rica	Puntarenas	i
BOLD:AAJ0944	EUCE017-18	*Eucereon* nr. *varium*	Costa Rica	Puntarenas	i
BOLD:AAJ0944	EUCE078-18	*Eucereon* nr. *varium*	Costa Rica	Puntarenas	i
BOLD:AAJ0944	BCIAR013-10	*Eucereon varia*	Panama		i
BOLD:AAJ0944	BCIAR033-10	*Eucereon varia*	Panama		i
BOLD:AAJ0944	BCIAR076-10	*Eucereon varia*	Panama		i
BOLD:AAJ0944	BCIAR725-13	*Eucereon varia*	Panama		i
BOLD:AAJ0944	BCIAR726-13	*Eucereon varia*	Panama		i
BOLD:AAJ0944	BCIGE716-12	*Eucereon varia*	Panama		i
BOLD:AAJ0944	BLPCN276-08	*Eucereon varium*	Costa Rica	ACG	i

Appendix 9: Proposed members of the genus *Eucereon* with BIN codes and the current species names stored on BOLD.

BINs	Identification BOLD
BOLD:AAM8695	*Delphyre pusilla*
BOLD:AAH3423	*Eucereon*
BOLD:AAI4929	*Eucereon*
BOLD:AAI4930	*Eucereon*
BOLD:AAM6996	*Eucereon*
BOLD:AAW8784	*Eucereon*
BOLD:AAY6238	*Eucereon*
BOLD:AAY6244	*Eucereon*
BOLD:AAZ5655	*Eucereon*
BOLD:AAA8661	*Eucereon aeolum*
BOLD:AAE4454	*Eucereon amadis*
BOLD:AAA1365	*Eucereon aoris*
BOLD:AAU5391	*Eucereon aoris*
BOLD:AAA1407	*Eucereon* argutumDHJ01
BOLD:AAD9130	*Eucereon* aroaDHJ01 *Eucereon* aroaDHJ02
BOLD:AAE1486	*Eucereon atrigutta* *Eucereon quadricolor*
BOLD:AAA1419	*Eucereon baleris*
BOLD:AAX7995	*Eucereon balium*
BOLD:AAM8540	*Eucereon beneluzi*
BOLD:AAA1335	*Eucereon* BioLep03 *Eucereon* Janzen44
BOLD:AAZ4070	*Eucereon chalcodon*
BOLD:AAD3597	*Eucereon consorta*
BOLD:AAG6240	*Eucereon costaluta*
BOLD:AAL4606	*Eucereon darantasia*
BOLD:ABX6140	*Eucereon darantasia*
BOLD:AAB5396	*Eucereon decora*
BOLD:AAB5395	*Eucereon* dentataDHJ01 *Eucereon* dentataDHJ02 *Eucereon erythrolepsis*
BOLD:AAB8816	*Eucereon erythrolepsis* *Eucereon* erythrolepsisDHJ01 *Eucereon* erythrolepsisDHJ02
BOLD:AAC2374	*Eucereon erythrolepsis* *Eucereon pilati*
BOLD:AAA1338	*Eucereon* Espinoza01
BOLD:AAI1017	*Eucereon flavicaput* *Theages decora*
BOLD:AAA1310	*Eucereon formosa* *Eucereon centrale*
BOLD:AAX7998	*Eucereon griseata*
BOLD:AAJ7744	*Eucereon hogei*
BOLD:AAA1457	*Eucereon* Janzen01DHJ01
BOLD:AAN1972	*Eucereon ladas*
BOLD:ACF0957	*Eucereon latifascia* *Eucereon* BioLep03
BOLD:AAA1356	*Eucereon* latifasciaDHJ01
BOLD:AAJ0947	*Eucereon* latifasciaDHJ02

BINs	Identification BOLD
BOLD:AAE4592	*Eucereon maia*
BOLD:ACR1626	*Eucereon myrina*
BOLD:ADF5649	*Eucereon* nr. *flavicincta*
BOLD:AAG6289	*Eucereon* nr. *maia*
BOLD:AAA1340	*Eucereon patrona*
BOLD:AAN0599	*Eucereon pica* *Galethalea pica*
BOLD:AAA1311	*Eucereon pseudarchias* *Eucereon aurantiaca*
BOLD:AAE4582	*Eucereon punctatum*
BOLD:AAM6364	*Eucereon punctatum*
BOLD:AAG6327	*Eucereon rogersi*
BOLD:ACJ8235	*Eucereon rosa* sp. MMZ01
BOLD:AAV7029	*Eucereon rosa* sp. MMZ02
BOLD:AAX7986	*Eucereon rosadora* xanthodoraDHJ01
BOLD:AAA1441	*Eucereon rosadora* xanthodoraDHJ02
BOLD:AAB8288	*Eucereon rosinum*
BOLD:AAN5487	*Eucereon setosum* *Eucereon rogersi*
BOLD:ACC9448	*Eucereon* sp. 14YB
BOLD:ACC9481	*Eucereon* sp. 15YB
BOLD:AAN0729	*Eucereon* sp. 1YB
BOLD:AAM4399	*Eucereon* sp. 9YB
BOLD:AAA1336	*Eucereon tarona*
BOLD:ABU7628	*Eucereon tarona*
BOLD:AAG0918	*Eucereon testaceum*
BOLD:AAA1334	*Eucereon tripunctatum* *Eucereon dentata*
BOLD:ACC9509	*Eucereon varia*
BOLD:AAJ0944	*Eucereon varia* *Eucereon varium*
BOLD:AAD3599	*Eucereon xanthoperas*
BOLD:AAA1337	*Eucereon xanthura* *Theages leucophaea* sp. MMZ02
BOLD:AAM5890	*Euceriodes* cf. *wernickei* *Euceriodes wernickei* sp. MMZ01
BOLD:AAP4489	*Euceriodes wernickei* sp. MMZ02
BOLD:AAO5436	*Euceriodes wernickei* sp. MMZ03
BOLD:AAM8819	*Heliura*
BOLD:AAB8056	*Heliura aurorina* *Heliura tetragramma*
BOLD:AAA1423	*Heliura banoca* *Heliura subplena*
BOLD:AAL7572	*Heliura excavata*
BOLD:AAN7068	*Heliura flava*
BOLD:AAM8379	*Heliura nigriventris*
BOLD:AAI6726	*Heliura rhodophila*
BOLD:AAM3522	*Heliura* sp. 1YB *Heliura thysbodes*
BOLD:AAV3323	*Hyaleucerea erythrotela*
BOLD:AAA1450	*Hyaleucerea* Janzen01
BOLD:ACR1972	*Nelphe*
BOLD:ACE8501	*Nelphe carolina*
BOLD:AAA9439	*Nelphe relegatum*

BINs	Identification BOLD
BOLD:ADL1208	new BIN, *Eucereon*
BOLD:ADM7139	new BIN, *Eucereon*
BOLD:ADM7491	new BIN, *Eucereon*
BOLD:ADN4389	new BIN, *Eucereon*
BOLD:ADP0759	new BIN, *Eucereon*
BOLD:AAN0020	*Theages* cf. *leucophaea* *Theages leucophaea* sp. MMZ01

Zusammenfassung

Lepidoptera sind eine der artenreichsten Insektenordnungen weltweit, dennoch sind viele Arten speziell in den Tropen, wo ihre Diversität besonders hoch ist, der Wissenschaft noch immer unbekannt. Artbestimmungen erfolgen oft aufgrund morphologischer Merkmale, was in einigen Fällen jedoch sehr schwierig sein kann. Aus diesem Grund wurden molekulare Methoden entwickelt, um die Arterkennung zu erleichtern. Einer der meist verwendeten Ansätze ist das sogenannte DNA-Barcoding, bei dem kurze DNA-Sequenzen aus Mitochondrien analysiert und verglichen werden. Dabei werden Cluster aus ähnlichen Sequenzen gebildet, genauer gesagt „operative taxonomische Einheiten“ (OTUs), welche Stellvertreter für Arten darstellen. Diese Studie konzentrierte sich auf die Gattung *Eucereon* (Erebidae, Arctiinae). Derzeit besteht diese Gattung aus über 150 beschriebenen Arten, morphologisch sind diese aber oft schwer zu unterscheiden. Außerdem wurde diese Gattung bisher nie taxonomisch überarbeitet. Die geographische Verbreitung von *Eucereon* Arten reicht von den südlichen USA über Mittelamerika bis zur Ostküste Brasiliens und sie kommen bis über 2000 m Höhe über dem Meeresspiegel vor. Eine Recherche dokumentierter Assoziationen der Larven mit Ihren Futterpflanzen zeigte eine Tendenz zur Spezialisierung auf giftige und milchsafthaltige Pflanzen auf; möglicherweise findet auch Pharmakophagie der adulten Falter statt. Insgesamt konnten 138 neue DNA-Sequenzen von mutmaßlichen *Eucereon*-Exemplaren erstellt werden, welche in Costa Rica, Panama und Ecuador gesammelt wurden. Um Hypothesen über Artgrenzen aufzustellen, wurden mehrere hochmoderne Methoden zur Artabgrenzung auf der Grundlage von Sequenzdaten angewandt und ihre Ergebnisse verglichen, und zwar BIN, 2% Distanzschwelle, ABGD, GMYC und bPTP. Die Befunde dieser Untersuchungen stimmten größtenteils mit der morphologischen Bestimmung überein. Mittels molekularbiologischer Auswertung wurden 42-45 OTUs gefunden, im Gegensatz zu den 40 Morphospezies. Keine der getesteten molekularbiologischen Methoden funktionierte besser als alle anderen. Die nähere Untersuchung der kompletten Gattung, nämlich die Auswertung aller in der Datenbank BOLD verfügbaren Barcode-Daten und der Flügelmuster der zugehörigen Falter, ergab 89 „Arten“, die vermutlich „echte“ Vertreter des Taxons *Eucereon* darstellen. Außerdem wurden für neun der erkannten BINs Haplotyp-Netzwerke erstellt und phylogeographische Analysen durchgeführt. Dabei wurde kein einheitliches Muster entdeckt, da sich das Ausmaß der DNA-Sequenzvariabilität innerhalb der BINs erheblich unterschied. Darüber hinaus ergab die Untersuchung der Gattung, dass etliche Arten, die aktuell acht anderen nominellen Gattungen zugeordnet werden, ebenfalls als zu *Eucereon* gehörig angesehen werden sollten. Um diese Hypothese zu testen, sind allerdings noch weiterführende Studien nötig.