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Two new species of *Cyphocleonus* from Macaronesian Islands (Coleoptera: Curculionidae: Lixinae)

With 13 figures and 2 appendixes

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ABSTRACT: Two new species, *Cyphocleonus garajonay* Stüben from La Gomera and *Cyphocleonus aguiari* Stüben & Andrade from Madeira are described and distinguished from related species. They are incorporated into the current key of the Macaronesian species of the genus. In addition to morphological characters, first molecular analysis (barcoding) are presented, as well as a distance matrix and the new taxa are integrated into a dendrogram (Bayesian analysis) of the *Cyphocleonus* species (CO1, 658 bp). In addition to morphological characters, the DNA barcoding sequences of the new species are provided in fasta format.

Keywords: Coleoptera, Curculionidae, Cleonini, new species, morphology, molecular analysis, barcoding, integrative taxonomy, distribution, Spain, Portugal, Canary Islands, La Gomera, Tenerife, Gran Canaria, Madeira.

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RESUMO: Duas novas espécies, *Cyphocleonus garajonay* Stüben de La Gomera e *Cyphocleonus aguiari* Stüben & Andrade da Madeira são descritas e referidas as suas diferenças em relação a espécies relacionadas. Estas espécies novas são incorporadas à chave atual do género *Cyphocleonus* para as espécies da Macaronésia. Além dos caracteres morfológicos, são apresentadas as primeiras análises moleculares (barcoding), uma matriz de distância e os novos táxons são integrados num dendrograma (análise bayesiana) das espécies de *Cyphocleonus* (CO1, 658 pb). São também fornecidas as sequências de ADN barcoding das novas espécies no formato fasta.

Palavras-chave: Coleoptera, Curculionidae, Cleonini, espécie nova, morfologia, análise molecular, barcoding, taxonomia integrativa, distribuição, Espanha, Portugal, Ilhas Canárias, La Gomera, Tenerife, Gran Canaria, Madeira.

INTRODUCTION

The genus *Cyphocleonus* Motschulsky, 1860 with the type species *Curculio cenchrus* Pallas, 1781, is known from 14 species and a further subspecies mainly from Europe, parts of Asia and North Africa (Löbl & Smetana, 2013). Two species have been described so far from the Canary Islands, *C. armitagei* (Wollaston, 1864) (formerly *Cleonus*; type locality: Tenerife) and *C. sventeniusi* Roudier, 1957 (formerly *Cleonus*; Gran Canaria). Subsequently, *C. armitagei* has occasionally been reported from La Gomera (Spain) and Madeira (Portugal) (Stüben, 2011, 2017), without having been compared with the holotype of this species in the Natural History Museum, London (NHM). At the NHM, the first author was able to study the holotypes in the collection of T. V. Wollaston in detail (Fig. 1). A thorough comparison between the specimens from La Gomera (see type material), other collection material and specimens from Madeira kindly provided by I. Silva (Funchal), showed that we were in the presence of a different species, not *C. armitagei* described from Tenerife (Fig. 2).

All these species live on different *Argyranthemum* plants (Asteraceae), and the first author was able to confirm *C. armitagei* on *A. broussonetii* ('margarita de monte') in the Anaga Mountains and in the Orotava valley near Aguamansa on Tenerife. Basically, the two already known and the two new species can be easily distinguished morphologically by their patterns of bright spots on the elytra (see Figs. 1-3 and the "Key to the *Cyphocleonus* species from Macaronesia" below).

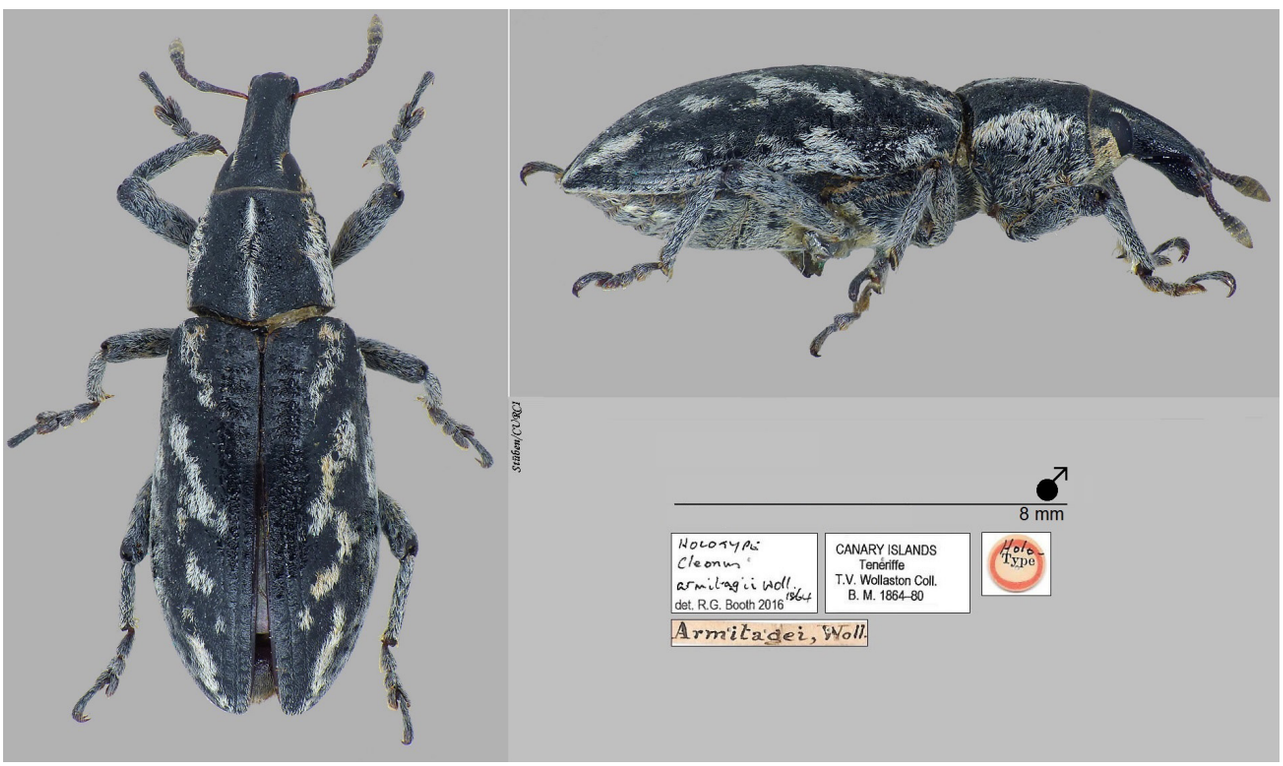

Fig. 1 – Holotype (male) of *Cyphocleonus armitagei* (Wollatson, 1864), Tenerife, Canary Islands; coll. Natural History Museum, London.

Ethanol samples were collected for all species and from the different habitats of the two new species. Molecular analysis of the CO1 barcoding gene are now available, which are presented here for the first time in a dendrogram (Bayesian analysis) to the *Cyphocleonus* species from the Macaronesian islands and some other species of this genus from the European mainland (see Fig. 11). The DNA of all specimens / species was sequenced by us. For these four *Cyphocleonus* species, and one other whose occurrence in Madeira is very doubtful, a determination key for the Macaronesian Islands is presented here for the first time. This paper concludes with some observations on the bionomics of the new species *C. aguiari* in Madeira (Andrade & Stüben, 2020).

Fig. 2 – *Cyphocleonus armitagei* (Wollaston, 1864) from Tenerife (Aguamansa), Canary Islands, coll. Stüben.

Descriptions of the new species

***Cyphocleonus garajonay* Stüben sp. n.**

http://zoobank.org/urn:lsid:zoobank.org:act:047DE76B-EE25-4325-B053-5BBF15ADEDFD

Figures 3, 4 (centre), 5, 6 and 8

Type material. **Holotype**: 1 ♂, La Gomera, Garajonay National Park: 'Casa Olsen', 28° 06' 24" N 17° 13' 58" W, 1339 m, 30.12.2019, *Argyranthemum broussonetii*, leg. Stüben (42), coll. Senckenberg, Deutsches Entomologisches Institut (SDEI). **Paratypes**: 1 ♂, 2 ♀, data as for holotype, coll. Stüben, SDEI; 13 ex., same locality, 19.2.2010, 9.2.2011, 23.2.2011, 27.12.2011, leg. & coll. Stüben; 5 ex., La Gomera, Meriga, garden, 28° 09' 16" N 17° 14' 12" W, 825 m, 7.2.2011, 25.12.2011, 14.12.2013 leg. & coll. Stüben, Machado; 2 ex., La Gomera, El Cedro, 28° 07' 52" N 17° 13' 2" W, 845 m, 26.12.1998, 8.2.2011, leg. & coll. Stüben; 9 ♂, 3 ♀, La Gomera, 4.5 km SW Agulo: La Palmita, 28° 09' 37" N 17° 13' 38" W, 772 m, 14.12.2019, on *Argyranthemum broussonetii*, leg. Stüben (2), coll. Stüben; 2 ♂, 2 ♀, La Gomera, NE Los Acevinos, 28° 08' 59" N 17° 13' 19" W, 828 m, 14.12.2019, on *Argyranthemum broussonetii*, leg. Stüben (3), coll. Stüben. **DNA-types** (CO1) (= Paratypes): 1 ex., same locality as holotype, 15.12.2010, leg. Stüben, Zoologisches Forschungsmuseum Alexander Koenig (ZFMK), collector's no.: 68-PST, GenBank: **KC783777** (see also Appendix 1); 1 ex., La Gomera, NE Los Acevinos, 28° 08' 59" N 17° 13' 19" W, 828 m, 14.12.2019, on *Argyranthemum broussonetii*, leg. Stüben (3), coll. SDEI, collector's no.: 3423-PST, GenBank: **MT196361** (see Appendix 1).

Fig. 3 – Holotype (male) and paratype (female) of *Cyphocleonus garajonay* Stüben sp. n.: El Cedro, La Gomera, Canary Islands, coll. Senckenberg, Deutsches Entomologisches Institut (SDEI).

Description

Length: 10-17 mm (without rostrum).

Primary colour. Black, rarely dark brown.

Head and rostrum. Eyes flat, not protruding from the arch of the head; rostrum with a broad, shiny and finely punctured, central longitudinal curvature; with lightly scaled longitudinal furrows on both sides of it; rostrum of both sexes approximately equal in length (length-width ratio of 2.-2.4, measured between the insertions of the antennae); upper and lower margin of the long oval eyes densely covered with white scales, which are laterally covered by very long scale-hairs from the front margin of the pronotum; antennae are reddish-brown, scape straight or slightly bent, the first two funicles longer than broad, the following three spherical, the last two somewhat broader, trapezoidal; forehead between the eyes with a longitudinal pit and often finer (strongly punctuated) longitudinal grooves.

Pronotum. Conical with slight lateral curvature in front of the middle up to the wide constriction in front of the fore-margin; strongly tuberculated, between the large, flat and smooth tubercles with very fine, dense, needle-like punctures; midline and sides of the pronotum with densely placed, fine long scales.

Elytra. Elongated, in both sexes 1.9x longer than broad; always broadest behind the middle; most conspicuous markings are the bright patches of scales broken up into narrow stripes, which in *C. armitagei* from Tenerife always form oblique, uninterrupted bands of scales: whereas the striae of the new species from La Gomera are largely (except for the first obliquely positioned band) without scales. On the 4th interval of the elytra slope (in front of the apex) there is a strong hump, followed by a distinct depression.

Legs. Legs are black to dark-brown and covered with long, fine and white scales; fore-femora reach the fore-margin of the eyes, hind-femora reach to the fore-margin of the third sternite.

Venter. All abdominal sternites are densely covered with long, fine and white scales and are only interrupted by a few smooth, bald and flat tubercles. First abdominal sternite as long as the third and fourth sternite together; fore-coxae (almost) touch each other (Fig. 4, centre).

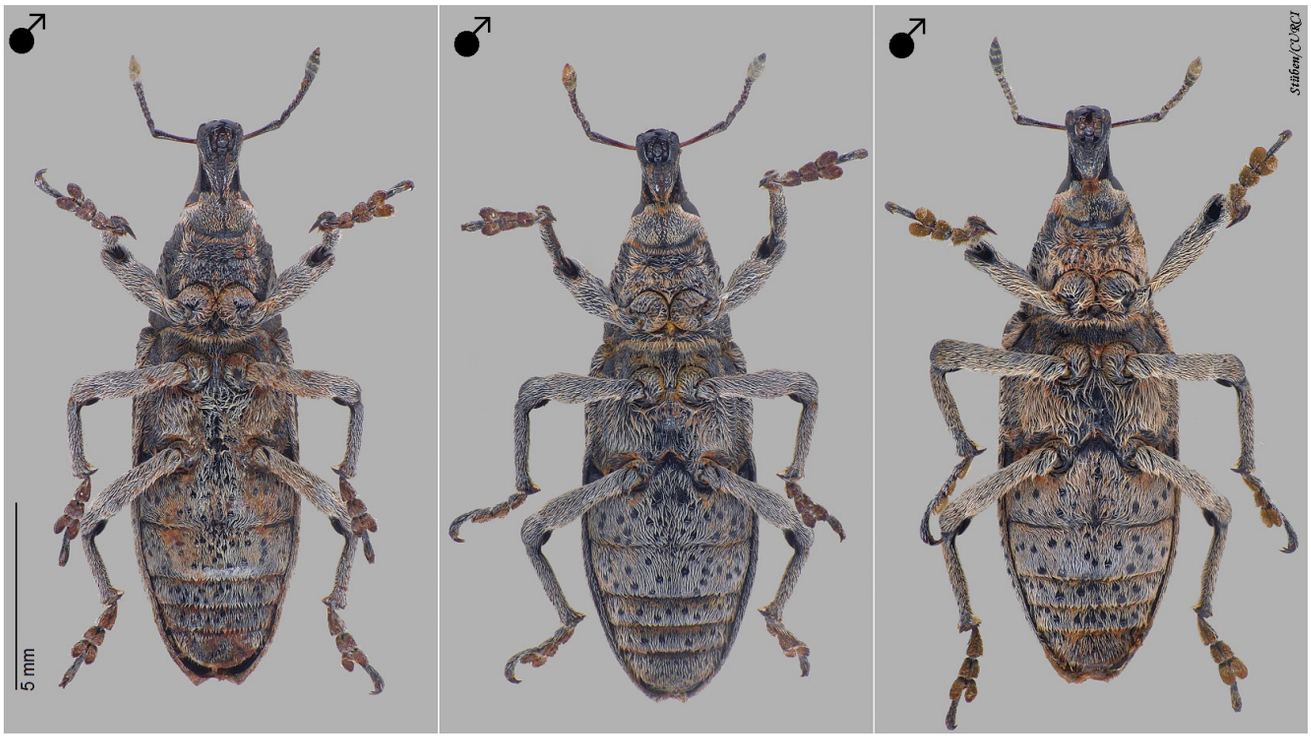

Fig. 4 – Ventral view of the *C. aguiari*, holotype, coll. SDEI (left), *C. garajonay*, holotype, coll. SDEI (centre) and *C. armitagei*, coll. Stüben (right).

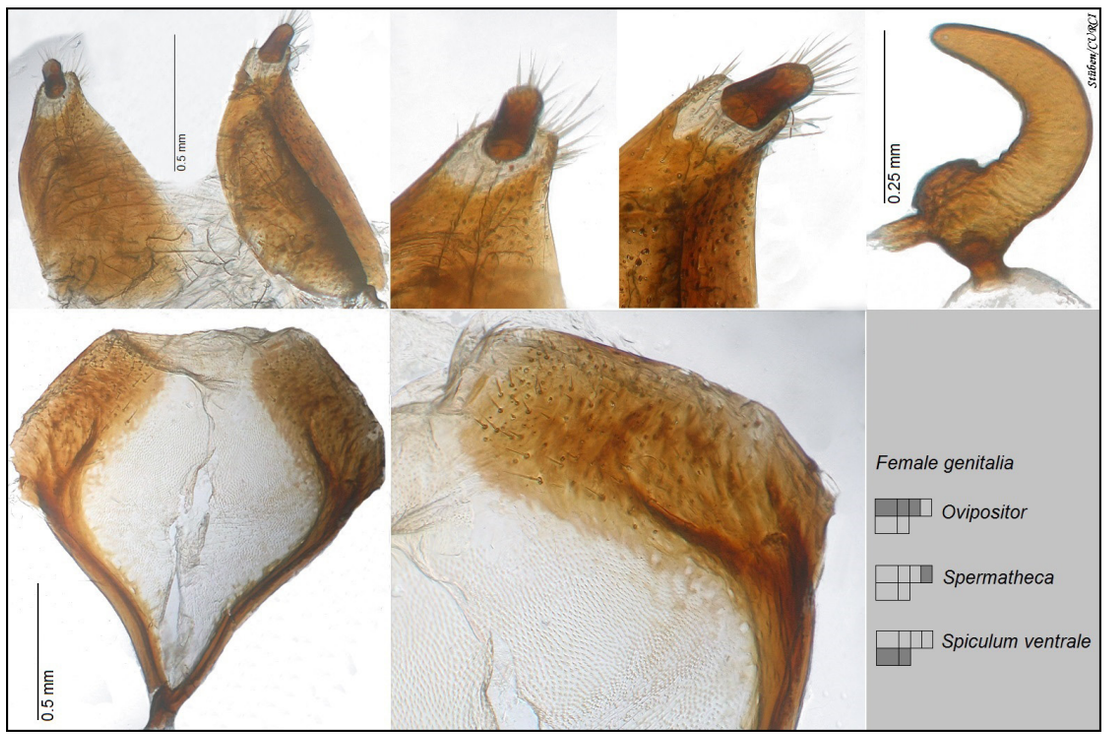

Fig. 5 – Female genitalia of *Cyphocleonus garajonay* sp. n. (paratype: La Palmita, La Gomera, Canary Islands).

Aedeagus. The aedeagi show no significant species-specific differences in the Macaronesian *Cyphocleonus* species (Fig. 8).

Female genitalia. See Fig. 5.

Differential diagnosis. The new species *Cyphocleonus garajonay* from the humid cloud forest zone of La Gomera clearly differs morphologically from *C. armitagei* from Tenerife. While the elytra of the latter species are always parallel-sided in the middle section (in the specimen of the holotype shown here, it should be noted that the elytra were spread during preparation, see Figs. 1, 2), the elytra of the new species – especially when viewing larger series – are considerably wider behind the centre (Fig. 3). Thus, the slightly ovoid form of the elytra corresponds to the shape of *C. sventeniusi* from Gran Canaria (Fig. 13). *C. garajonay* differs from both species by the strong hump followed by a deep depression on the 4th interval of the elytral slope. Both characteristics are – if present at all – only very weakly developed in the other three species. However, the main distinguishing and unique feature is the pattern of scale-spots of the new species, which are broken up into narrow strips. This fine stripe pattern is not found in the other three species where complete blocks of fine, narrow, light-coloured scales dominate, interrupted by at most a few bare and small spots.

Molecular analysis. The uncorrected *p*-distance value of the mitochondrial CO1 gene between the new species *C. garajonay* from La Gomera and *C. armitagei* from the neighbouring island of Tenerife is **6.8 to 7.1%** (see also Fig. 11 and Appendix 2).

Fig. 6 – In the absence of wind, and with temperatures at this time around 12°-15°C, *C. garajonay* can be observed climbing on the uppermost leaves of the endemic *Argyranthemum* plants (Asteraceae) (insert on top left). The bare, fine (black) stripes on the elytra can be seen very well here.

Etymology. The name of the new species refers to the mythological lovers on La Gomera: the princess Gara and the poor farmer's son Jonay, who were prohibited from marrying and who chose suicide in the laurel forest as a way out. Since that time the Gomeros say that the highest mountain in the island was named Garajonay. Nowadays one of the largest National Parks in the Canary Islands is the Garajonay NP on La Gomera.

Bionomics. The first author was able to prove that the species occurs on *Argyranthemum broussonetii* ssp. *gomerensis* Humphries ('margarita de monte') in open areas of the cloud forest zone in and around the laurel forests of La Gomera, especially in the winter months of December and January. In the absence of wind, and with temperatures at this time around 12°-15°C, the species can be observed climbing on the uppermost leaves of the endemic *Argyranthemum* plants (Asteraceae) (Fig. 6) for copulation and can be collected there.

Distribution and ecology. The species is only known from half a dozen localities on La Gomera. It is certainly not common and is probably associated with very old locations of its host plant. Where *Argyranthemum* has spread on La Gomera after the numerous forest fires of the last decades, I have never encountered this Lixinae. It should undergo a similar development in the woody stems of its host plant as the following species from Madeira.

***Cyphocleonus aguiari* Stüben & Andrade sp. n.**

http://zoobank.org/urn:lsid:zoobank.org:act:FF3E1E3A-347F-48E2-B6BE-54F17CC7AC1B

Figures 4 (left), 7-10

Type material. **Holotype:** 1 ♂, Madeira, 2.5 km NW Camacha, Ribeiro Serrão / Ponte de Pau, 970 m, 5.5.2019, on *Argyranthemum pinnatifidum*, leg. Stüben & Andrade (4), coll. Senckenberg, Deutsches Entomologisches Institut (SDEI). **Paratypes:** 3 ♂, 5 ♀, data as for holotype, coll. Stüben, SDEI; 2 ex., Madeira, Ribeira Seca, near Fajã da Nogueira, 17.3.2019, 900 m, on *Argyranthemum pinnatifidum*, leg. I. Silva, coll. Stüben. **DNA-types** (CO1) (= Paratypes): 1 ex., data as for holotype, coll. Stüben, collector's no.: 3298-PST, GenBank: **MT196359** (see also Appendix 1); 1 ex., Madeira, Ribeira Seca, near Fajã da Nogueira, 17.3.2019, 900 m, on Argyranthemum pinnatifidum, leg. I.Silva", coll. Stüben, collector's no.: 3357-PST, GenBank: **MT196360** (see also Appendix 1).

Fig. 7 – Holotype (male) and paratype (female) of *Cyphocleonus aguiari* sp. n. Near Camacha, Madeira; coll. Senckenberg, Deutsches Entomologisches Institut (SDEI).

Description and differential diagnosis

Length: 12-16 mm (without rostrum).

The species is very similar to the species from La Gomera described above, so there is no need to repeat the detailed description at this point, mentioning the same characteristics. Nevertheless, some characteristics of the new species should be mentioned here, which help to distinguish the species (see also 'Key to the Macaronesian species of the genus *Cyphocleonus*' at the end).

Pronotum. Weakly conical (in *C. armitagei* from Tenerife the pronotum is more conically narrowed towards the front, and the anterior margin is only slightly longer than half the base of the pronotum).

Elytra. Elongated, narrower than in *C. garajonay* from La Gomera, in both sexes at least 2,1x longer than broad, clearly widest in front of the middle; the light elytral patches of scales begin with an oblique strip behind the elytra base. The following oblique strip is always connected with a longitudinal band that reaches to the apex. The fine longitudinal stripe structure is missing like in the bright patches of *C. garajonay* from La Gomera. In *C. armitagei* from Tenerife also the second oblique strip is isolated and always clearly visible, only the third oblique strip can be connected to the longitudinal band reaching the apex of the elytra (see Figs. 1 & 2). Apices of the elytra (Fig. 7) more acutely pointed and separated than in *C. armitagei* or *C. garajonay* (Figs. 3 & 7).

Venter. Anterior margin area of the underside of the pronotum (prosternum) almost as long as the precoxal zone in front of the coxae. In *C. garajonay* the front margin is narrower (Fig. 3).

Aedeagus. The aedeagi show no significant species-specific differences in the Macaronesian *Cyphocleonus* species (Fig. 8).

Female genitalia. See Fig. 9.

Molecular analysis. The uncorrected *p*-distance value of the mitochondrial CO1-gene between the new species *C. aguiari* from Madeira and the sister taxon *C. garajonay* from La Gomera is **6.8 to 7.1%** (see also Fig. 11 and Appendix 2).

Etymology. This species is dedicated to our esteemed colleague Antonio M. F. Aguiar (Madeira), who in November 1989 collected a specimen of this species in the centre of Camacha, Madeira (Erber & Aguiar, 1996, as *C. armitagii* (Woll, 1864)).

Bionomics. The host plant of the new species is *Argyranthemum pinnatifidum* ssp. *pinnatifidum* (L.f.) Lowe ('estreleira / pampilhos / margarida') in two very limited localities in the Island of Madeira (see distribution). In the wild the species can be found year-round, in the absence of wind and with temperatures around 12°-15°C, it can be observed climbing on the uppermost leaves of the endemic *Argyranthemum* plants (Asteraceae) for copulation and can be collected there.

The imagoes of *C. aguiari* are active during the day. In adverse weather conditions the adults are observed standing still on the stems and underneath the leaves of the host plant, but in favourable conditions they can be observed feeding on the *Argyranthemum* leaves and walking over the plant in search of food and a mate, as well as copulating.

After hatching, the small larva feeds on the soft, living tissues of the plant and, as it grows, it forms a tunnel inside the stem, up to about 10 cm long. When larvae are mature, they pupate inside the tunnel and form a hole when they emerge from inside the plant stem. The diameter of the emergence hole is 5-7 mm and therefore this species depends on larger and older plants whose stems are large enough to support its development. It has been observed that older plants can support the development of several specimens, but the health of these structures decreases over time.

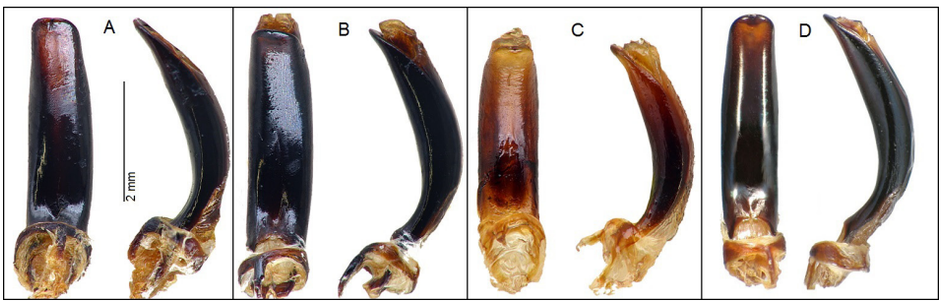

Fig. 8 – Aedeagi of the Macaronesian *Cyphocleonus species*: **A**) *Cyphocleonus armitagei*; **B**) *Cyphocleonus garajonay* sp. n.; **C**) *Cyphocleonus aguiari* sp. n.; **D**) *Cyphocleonus sventeniusi*.

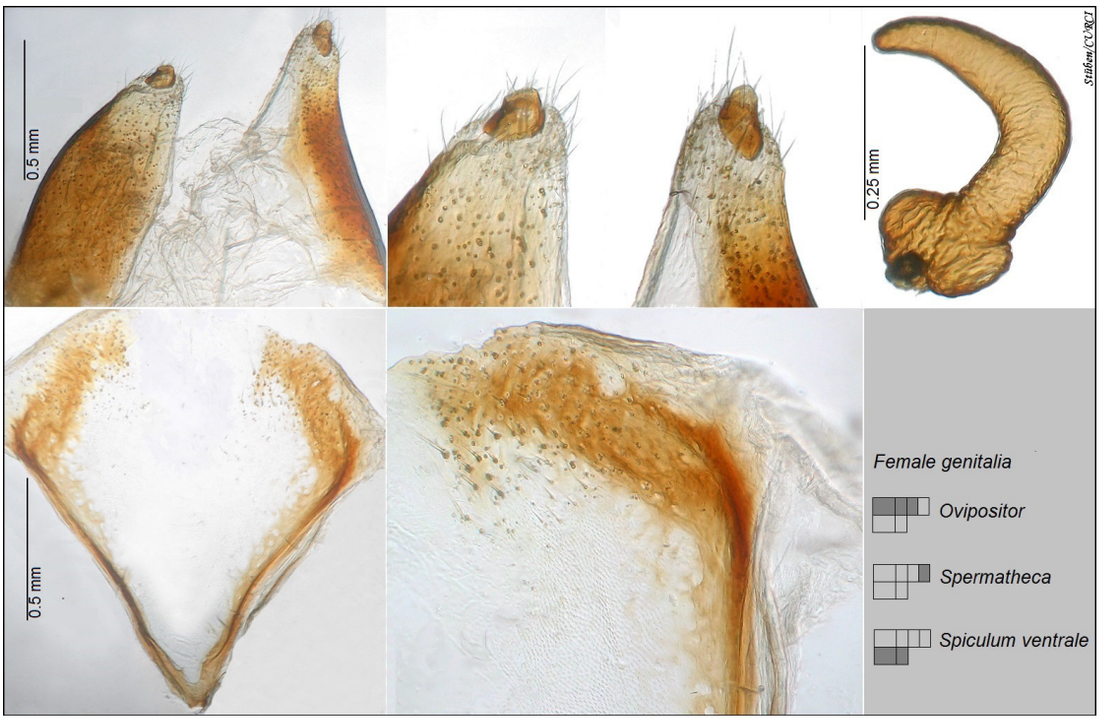

Fig. 9 – Female genitalia of *Cyphocleonus aguiari* sp. n. (paratype: near Camacha, Madeira).

Distribution. It remains a great mystery how the single specimen, already collected by A. Aguiar, came to a local fruit and vegetable sales tent in the centre of Camacha (Largo da Achada) on Madeira in 1989 (see Etymology). It could possibly have been brought within vegetables or with native cut flowers from nearby agricultural land and gardens. In fact, its distribution on Madeira Island seems to be very localized, sparse, and occupies two remote, very small areas. However, these two populations seem to be well established. In order not to endanger these populations of weevils, we have restrained the exact GPS coordinates at this point. There is also no need for further collections since the comprehensive type material, as well as the deposited DNA tissue samples and DNA extractions (ZFMK and SDEI), are available to any interested person (see type material).

Molecular analysis and classification of the new species within *Cyphocleonus* from Macaronesia

The number and density of new descriptions among the Western Palearctic weevils has significantly increased in the past decades, especially among the Macaronesian weevils. We consider it essential to provide the molecular data, for example, via the DNA barcode in addition to the morphological descriptions in order to enable the validation and identification of species. For successful laboratory routine work the tissue material should be collected and stored in 96% ethanol as soon as possible after collecting.

Fig. 10 – *Cyphocleonus aguiari* sp. n.: **A**) during copulation; **B**) emergence hole; **C**) feeding marks on the host plant; **D**) larval tunnel; **E**) host plant, *Argyranthemum pinnatifidum* ssp. *pinnatifidum* (L.f.) Lowe.; **F**) female drilling the stems and laying the eggs (all photos by M. Andrade / CURCULIO Institute).

The molecular analysis consists of 17 sequences of 8 species: 15 *Cyphocleonus* sequences including 7 sequences of 4 Macaronesian species and 8 sequences of 3 *Cyphocleonus* species from southern and eastern Europe. 2 sequences of *Coeniocleonus excoriatus* from Fuerteventura and Morocco were chosen as outgroup. The two new Cyphocleonus species from different localities of La Gomera and Madeira are highlighted in blue and green colour in the phylogenetic tree and in corresponding *p*-distance matrix (Appendix 2).

Details on the specimens, finding spots and corresponding GenBank accession numbers are provided in type material chapter of the new descriptions (see above) and will be published as well in Schütte, Stüben & Astrin (*in prep.*). 15 sequences were generated by the Zoological Research Museum Alexander Koenig (**ZFMK**, Bonn) within the Molecular Weevil Identification project (**MWI**, Schütte *et al.*, 2013 and Stüben *et al.*, 2015). 4 sequences, including some of the new species, were provided by the German Entomological Institute (**SDEI**, Müncheberg).

In both facilities the widely used Folmer DNA barcode region (Folmer *et al.*, 1994) of Cytochrome c oxidase subunit I gene (CO1) has been sequenced. The barcodes of the new species have been amplified with weevil adopted LCO1490-JJ and HCO2198-JJ primers (Astrin & Stüben, 2008), obtaining 658 nucleotides per sequence for full length barcode. For one *Cyphocleonus garajonay* specimen only 605 nbarcode length could be received (68-PST, KC783777). The other two sequences from the same species in the dataset show the full-length barcode. Pinned collection evidence of the sequenced specimens are deposited in the first author's collection. The extracted DNA samples are stored either at ZFMK or SDEI.

The plain sequences of the new species in this work are provided within this manuscript in fasta format (Appendix 1), but are also commonly available in GenBank, accession numbers as follows: KC783777, MK892370, MT196361, MT196359, MT196360. The laboratory procedure of the specimens follows Schütte *et al.*, (2013) for ZFMK samples and Stüben & Kramp, 2019 for SDEI samples.

Alignment of 17 sequences has been evaluated for suitable nucleotide substitution model with jModelTest 0.1.1 (restrained to three substitution schemes including rate variation +I and +G). HKY+G model was suggested. Bayesian analysis was carried out with MrBayes 3.2.7a (Ronquist & Huelsenbeck, 2003) with settings as follows: metazoan mitochondrial DNA (code = metmt), the "wobble base" was defined as third character set in codon and unlinked in shape, revmat, statefreq and pinvar, nucleotide substitution model HKY + G was designated as suggested by jModelTest (nst = 2, rates = gamma). The bayesian analysis was run for 20 million generations with a sample frequency of 1.000, last average standard deviation of split frequencies was 0.001471. The standard setting of two independent analyses (Nruns = 2) calculated two times 20.001 trees, after absolute burnin of 50 trees, 39902 trees have been retained and a 50%-majority rule consensus tree with posterior probabilities was built (Fig. 11). Geneious Pro 6.5.8 (Drummond *et al.*, 2012) was used for graphical display of the tree and for calculation of (uncorrected) *p*-distance values of CO1 sequences (Appendix 2). For informational reasons a second scale bar with roughly corresponding with the *p*-distance values (Appendix 2) is provided as well.

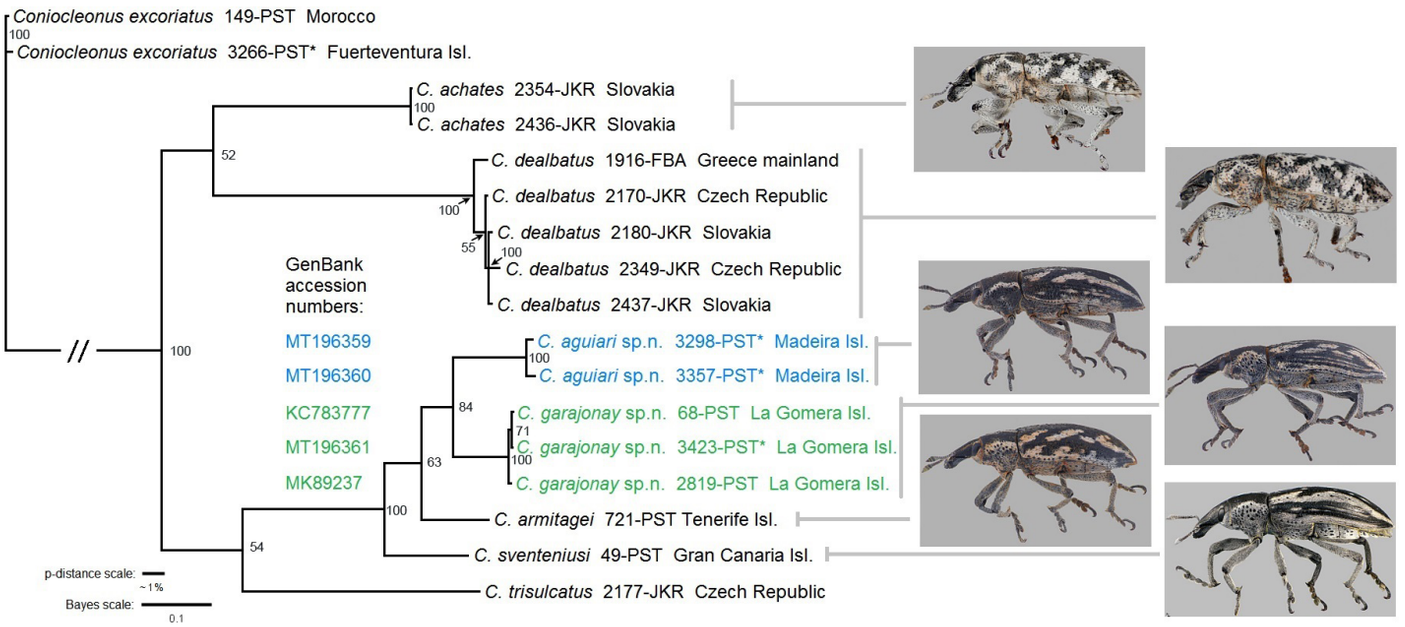

Fig 11 – Bayesian dendrogram of *Cyphocleonus weevils* (CO1, 658 nt). New taxa in blue or green text color. Bayesian posterior probability values provided on nodes. Specimen marked with a star * have been processed at SDEI, the ones without at ZFMK. Bayes scale bar: 0.1 estimated substitutions per site. Second scale bar: *p*-distance values manually added for informational reasons, please refer to Appendix 2.

Key to the *Cyphocleonus* species from Macaronesia

Cyphocleonus achates (Fåhraeus, 1842), a widespread species in the Mediterranean region, is mentioned as doubtful for Madeira by Borges *et al.* (2008) and we are not aware of any evidence of the presence of this species in this archipelago. Nevertheless, we opted to include this species in the key as well as illustrate it for a better guidance. At this point we would like to thank Filip Trnka (Czech Rep.) for his illustration of this species (see also Skuhrovec *et al.*, 2014)

Fig. 12 – *Cyphocleonus achates* (Fåhraeus, 1842): Moravia, Czech Republic (male), photo by F. Trnka / SNUDEBILLER 15 (2014).

1. Elytra marbled, mainly with separated, oblique and bright spots and stripes of scales, without longitudinal stripes in front of the apex. A species that probably does not occur in Madeira (misidentification or false report are very likely). Distribution: Central and south-eastern Europe, Asia (Near East to China), introduced in Nearctic region (Skuhrovec *et al.*, 2014) ---------- ***Cyphocleonus achates* (Fåhraeus, 1842)**

1a. Elytra with 1 or 2 oblique stripes and always with longitudinal spots or strips in front of the apex. ---------- **2**

2. Elytra widest in front or in the middle (mostly subparallel), with 1 or 2 oblique stripes behind the base and in front of the centre ---------- **3**

2a. Elytra always broadest behind the middle, only with a single longitudinal stripe or with oblique spots consisting of many fine longitudinal stripes; striae always without bright scales ---------- **4**

3. Elytra with two isolated, oblique strips (only the third strip turns into a longitudinal strip towards the apex of elytra). Endemic on Tenerife ---------- ***Cyphocleonus armitagei* (Wollaston, 1864)**

3a. Elytra only with a single isolated oblique strip behind the base (the second oblique strip extends into a longitudinal stripe towards the apex). Endemic on Madeira ---------- ***Cyphocleonus aguiari* Stüben & Andrade sp. n.**

4. Elytra with a single, very wide, light-coloured (notched in the middle) longitudinal band and a white scaled suture strip (see Fig. 13). Endemic on Gran Canaria ---------- ***Cyphocleonus sventeniusi* (Roudier, 1957)**

4a. Elytral spots broken up into many fine, lightly scaled interval stripes; striae and suture strip are without white scales. Endemic on La Gomera ---------- ***Cyphocleonus garajonay* Stüben sp. n.**

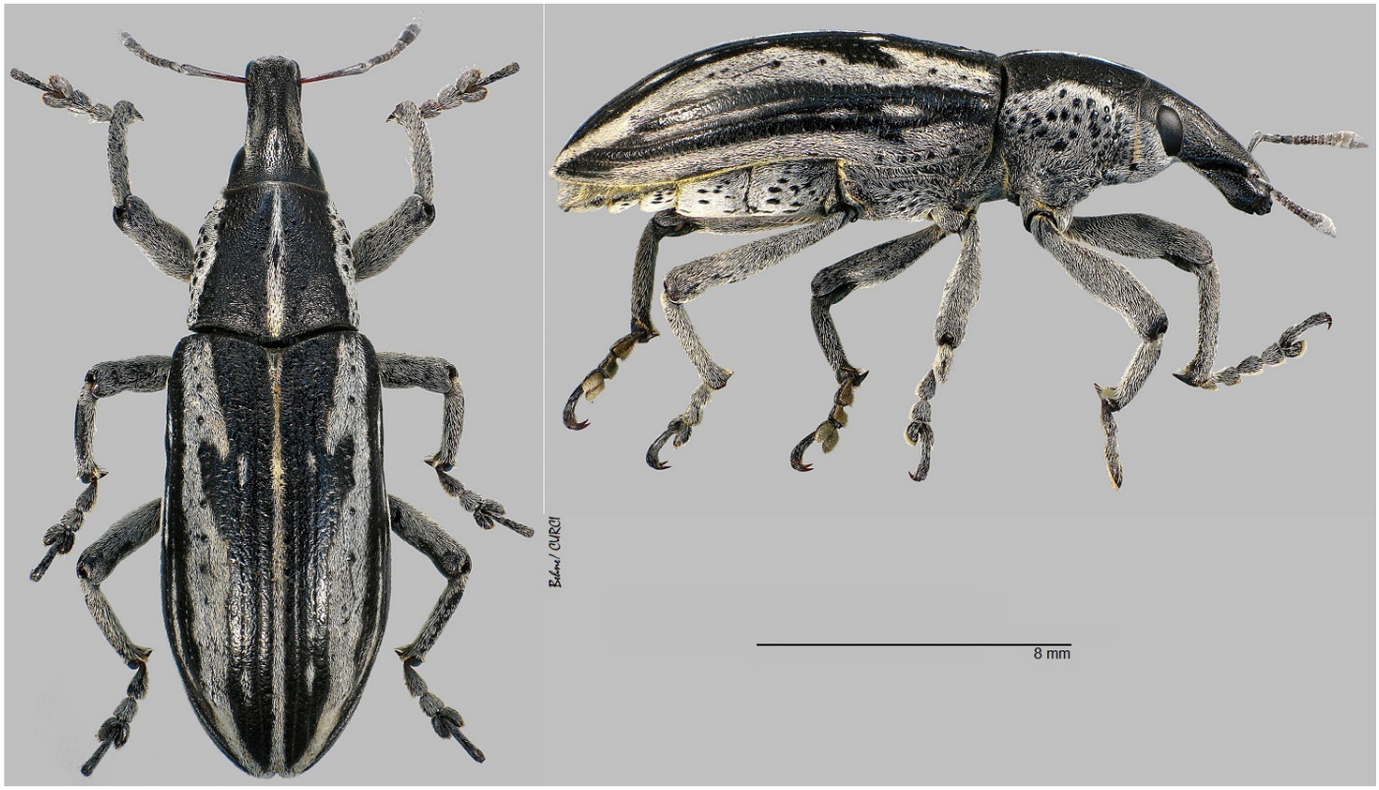

Fig. 13 – *Cyphocleonus sventeniusi* (Roudier, 1957), male, from Gran Canaria (San Bartolomé), Canary Islands, photo by L. Behne.

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Appendix 1

DNA Barcodes (CO1) of the new species

We are firmly convinced that molecular sequences should be part of the description in which new species are first published. The fact that they are also deposited separately in gene banks is undoubtedly a further safeguard for long-term accessibility (but of course no longer absolutely necessary).

We provide all CO1 sequence data of this study in fasta format. The content can be copied and pasted into a *.fasta text file which can be imported easily into any bioinformatics application. Sample names follow the pattern: species name / locality / collector's no. / and GenBank accession no.

>***Cyphocleonus garajonay*** sp. n. Stüben, 2020; La Gomera: Parque Nacional Garajonay; 68-PST (ZFMK), GB acc: KC783777

AACTTTATATTTTATTTTTGGATCTTGATCCGGAATAGTCGGAACATCCTTAAGAATATTAA
TTCGCACAGAACTAGGAAACCCTGGGAGATTAATTGGAAACGATCAAATTTATAATACTAT
CGTAACTGCCCATGCTTTCATTATAATTTTTTTTATAGTAATACCAATTATAATTGGGGGCT
TCGGAAACTGATTAGTCCCTTTAATATTGGGAGCCCCAGATATAGCCTTTCCACGATTAAA
TAATATAAGATTTTGACTCCTACCACCCTCACTAACACTTTTATTAATAAGAAGTATTGTAG
ATAGGGGAGCTGGGACAGGATGAACAGTTTATCCCCCTTTATCGGCTAATATCGCCCATG
AGGGAGCATCAGTAGACTTAGCTATTTTTAGACTTCATATAGCAGGAATCTCCTCAATTCT
TGGGGCAATTAATTTTATTTCAACTGTTTTAAACATACGATCTAGGGGTATAAAACCAGAT
CAAACAACTCTTTTTTCCTGAGCAGTAGAAATTACAGCTATCCTATTACTGCTATCACTCC
CAGTATTGGCGGGAGCTATCACTATACTTTTAACTGATCGTAATATTAACACAT

>***Cyphocleonus garajonay*** sp. n. Stüben, 2020; La Gomera; 2819-PST (ZFMK), GB acc: MK892370

AACTTTATATTTTATTTTTGGATCTTGATCCGGAATAGTCGGAACATCCTTAAGAATATTAA
TTCGCACAGAACTAGGAAACCCTGGGAGATTAATTGGAAACGATCAAATTTATAATACTAT
CGTAACTGCCCATGCTTTCATTATAATTTTTTTTATAGTAATACCAATTATAATTGGGGGCT
TCGGAAACTGATTAGTCCCTTTAATATTGGGAGCCCCAGATATAGCCTTTCCACGATTAAA
TAATATAAGATTTTGACTCCTACCACCCTCACTAACACTTTTATTAATAAGAAGTATTGTAG
ATAGGGGAGCTGGGACAGGATGAACAGTTTATCCCCCTTTATCGGCTAATATCGCCCATG
AGGGAGCATCAGTAGACTTAGCTATTTTTAGACTTCATATAGCAGGAATCTCCTCAATTCT
TGGGGCAATTAATTTTATTTCAACTGTTTTAAACATACGATCTAGGGGTATAAAACCAGAT
CAAACAACTCTTTTTTCCTGAGCAGTAGAAATTACAGCTATCCTATTACTGCTATCACTCC
CAGTATTAGCGGGAGCTATCACTATACTTTTAACTGATCGTAATATTAACACATCTTTTTTT
GATCCAGCTGGTGGGGGAGACCCTATTCTATACCAACATTTATTT

>***Cyphocleonus garajonay*** sp. n. Stüben, 2020; La Gomera; 3423-PST (SDEI), GB acc: MT196361

AACTTTATATTTTATTTTTGGATCTTGATCCGGAATAGTCGGAACATCCTTAAGAATATTAA
TTCGCACAGAACTAGGAAACCCTGGGAGATTAATTGGAAACGATCAAATTTATAATACTAT
CGTAACTGCCCATGCTTTCATTATAATTTTTTTTATAGTAATACCAATTATAATTGGGGGCT
TCGGAAACTGATTAGTCCCTTTAATATTGGGAGCCCCAGATATAGCCTTTCCACGATTAAA
TAATATAAGATTTTGACTCCTACCACCCTCACTAACACTTTTATTAATAAGAAGTATTGTAG
ATAGGGGAGCTGGGACAGGATGAACAGTTTATCCCCCTTTATCGGCTAATATCGCCCATG
AGGGAGCATCAGTAGACTTAGCTATTTTTAGACTTCATATAGCAGGAATCTCCTCAATTCT
TGGGGCAATTAATTTTATTTCAACTGTTTTAAACATACGATCTAGGGGTATAAAACCAGAT
CAAACAACTCTTTTTTCCTGAGCAGTAGAAATTACAGCTATCCTATTACTGCTATCACTCC
CAGTATTGGCGGGAGCTATCACTATACTTTTAACTGATCGTAATATTAACACATCTTTTTTT
GATCCAGCTGGTGGGGGAGACCCTATTCTATACCAACATTTATTT

>***Cyphocleonus aguiari*** sp. n. Stüben & Andrade, 2020; Madeira; 3298-PST (SDEI), GB acc: MT196359

AACTTTGTATTTTATTTTTGGATCTTGATCCGGAATAGTTGGAACATCCTTAAGAATATTAA
TTCGTACAGAATTAGGAAACCCTGGGAGATTAATTGGAAATGACCAAATTTACAACACTAT
TGTAACTGCTCACGCTTTTATTATAATTTTTTTCATAGTAATACCAATTATAATTGGGGGCT
TCGGAAACTGATTAGTCCCTTTAATATTAGGAGCCCCAGATATGGCCTTTCCACGATTAAA
TAATATAAGATTTTGGCTCCTACCCCCCTCACTGACACTTTTATTAATAAGAAGTATTGTAG
ATAGGGGGGCCGGAACTGGGTGAACAGTTTACCCCCCCTTATCAGCCAATATCGCCCAT
GAAGGAACGTCAGTAGACTTAGCTATTTTTAGACTTCATATAGCAGGAATCTCCTCAATTC
TTGGAGCAATTAATTTTATTTCAACTGTTTTAAATATGCGATCTAGGGGTATAAAACCAGAT
CAAACAACTCTTTTTTCCTGAGCAGTAGAAATTACAGCTATTTTACTACTACTATCACTACC
AGTATTAGCAGGAGCTATCACCATACTTTTAACTGATCGTAATATTAACACATCTTTTTTTG
ACCCGGCTGGCGGTGGAGACCCTATTTTATACCAACATTTATTT

>***Cyphocleonus aguiari*** sp. n. Stüben & Andrade, 2020; Madeira; 3357-PST (SDEI), GB acc: MT196360

AACTTTGTATTTTATTTTTGGATCTTGATCCGGAATAGTTGGGACATCCTTAAGAATATTAA
TTCGTACAGAATTAGGAAACCCTGGGAGATTAATTGGAAATGACCAAATTTACAACACTAT
TGTAACTGCTCACGCTTTTATTATAATTTTTTTCATAGTAATACCAATTATAATTGGGGGCT
TCGGAAACTGATTAGTCCCTTTAATATTAGGAGCCCCAGATATGGCCTTTCCACGATTAAA
TAATATAAGATTTTGGCTCCTACCCCCCTCACTGACACTTTTATTAATAAGAAGTATTGTAG
ACAGGGGGGCCGGAACTGGGTGAACAGTTTACCCCCCCTTATCAGCCAATATCGCCCAT
GAAGGAGCATCAGTAGACTTAGCTATTTTTAGACTTCATATAGCAGGAATCTCCTCAATTC
TTGGAGCAATTAATTTTATTTCAACTGTTTTAAATATGCGATCTAGGGGCATAAAACCAGAT
CAAACAACTCTTTTTTCCTGAGCAGTAGAAATTACAGCTATTTTACTGCTACTATCACTACC
AGTATTAGCAGGAGCTATCACCATACTTTTAACTGATCGTAATATTAACACATCTTTTTTTG
ACCCGGCTGGCGGTGGAGACCCTATTTTATACCAACATTTATTT

Appendix 2

Distance matrix

	Coniocl. excoriatus (149-PST)	*Coniocl. excoriatus* (3266-PST)	*C. achates* (2354-JKR)	*C. achates* (2436-JKR)	*C. aguiari* sp.n. (3298-PST)	*C. aguiari* sp.n. (3357-PST)	*C. armitagei* (721-PST)	*C. dealbatus* (1916-FBA)	*C. dealbatus* (2170-JKR)	*C. dealbatus* (2180-JKR)	*C. dealbatus* (2349-JKR)	*C. dealbatus* (2437-JKR)	*C. garajonay* sp.n. (68-PST)	*C. garajonay* sp.n. (2819-PST)	*C. garajonay* sp.n. (3423-PST)	*C. sventeniusi* (49-PST)	*C. trisulcatus* (2177-JKR)
Coniocl. excoriatus (149-PST)		0.5	17.3	17.3	16.7	16.7	15.6	17.8	17.3	17.6	17.6	17.3	16.7	16.3	16.4	15	16.4
Coniocl. excoriatus (3266-PST)	0.5		17.5	17.5	16.9	16.9	15.8	17.8	17.5	17.8	17.8	17.5	16.9	16.4	16.6	15	16.6
C. achates (2354-JKR)	17.3	17.5		0	14.7	14.7	13.8	14	14	14	14	14	15.4	14.9	15	13.7	16
C. achates (2436-JKR)	17.3	17.5	0		14.7	14.7	13.8	14	14	14	14	14	15.4	14.9	15	13.7	16
C. aguiari sp.n. (3298-PST)	16.7	16.9	14.7	14.7		0.9	7.6	16	15.8	16.1	15.7	16.1	6.8	6.8	7	9	13.4
C. aguiari sp.n. (3357-PST)	16.7	16.9	14.7	14.7	0.9		7.6	16.1	16	16.3	15.8	16.3	7.1	7.1	7.3	9.3	14
C. armitagei (721-PST)	15.6	15.8	13.8	13.8	7.6	7.6		14.1	14.3	14.3	14.5	14.3	7.1	6.8	7	7.3	14
C. dealbatus (1916-FBA)	17.8	17.8	14	14	16	16.1	14.1		1.2	1.5	2.1	1.5	15.5	15.5	15.7	15.2	16.6
C. dealbatus (2170-JKR)	17.3	17.5	14	14	15.8	16	14.3	1.2		0.3	0.9	0.3	15.7	15.7	15.8	15.5	16.7
C. dealbatus (2180-JKR)	17.6	17.8	14	14	16.1	16.3	14.3	1.5	0.3		0.9	0.3	16	16	16.1	15.5	17
C. dealbatus (2349-JKR)	17.6	17.8	14	14	15.7	15.8	14.5	2.1	0.9	0.9		0.9	16.2	15.8	16	15.7	16.9
C. dealbatus (2437-JKR)	17.3	17.5	14	14	16.1	16.3	14.3	1.5	0.3	0.3	0.9		16	16	16.1	15.5	16.7
C. garajonay sp.n. (68-PST)	16.7	16.9	15.4	15.4	6.8	7.1	7.1	15.5	15.7	16	16.2	16		0.2	0	7.8	14.2
C. garajonay sp.n. (2819-PST)	16.3	16.4	14.9	14.9	6.8	7.1	6.8	15.5	15.7	16	15.8	16	0.2		0.2	7.9	14.6
C. garajonay sp.n. (3423-PST)	16.4	16.6	15	15	7	7.3	7	15.7	15.8	16.1	16	16.1	0	0.2		8.1	14.7
C. sventeniusi (49-PST)	15	15	13.7	13.7	9	9.3	7.3	15.2	15.5	15.5	15.7	15.5	7.8	7.9	8.1		13.7
C. trisulcatus (2177-JKR)	16.4	16.6	16	16	13.4	14	14	16.6	16.7	17	16.9	16.7	14.2	14.6	14.7	13.7	