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Characterization data sheet for the genus *Auricularia*

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Abstract

The genus *Auricularia* includes wood decaying species of fungi, including edible ones. In Puerto Rico, *Auricularia* are generally found associated with decaying wood in humid forested areas. Although *Auricularia* is a cosmopolitan genus, which contains economically important species, the identification of collected specimens is often problematic. To facilitate the morphological characterization of *Auricularia* species, we selected various morphological characteristics and developed a detailed data sheet. After a validation process, the data sheet provided a new tool that facilitates the identification of specimens of *Auricularia* collected from the western region of Puerto Rico.

Key words – Auriculariales – Basidiomycota – mushroom

Introduction

Auricularia is a cosmopolitan, saprophytic basidiomycete genus (Malysheva & Bulakh 2014) usually found associated with decaying wood. Bonell (2001) reported this genus to have antibacterial and antiparasitic properties. Since the initial description of the genus in 1785 by Bulliard (Malysheva & Bulakh 2014), more than 100 reports have been recognized (Species Fungorum 2017). The close similarity and the variation within specimens make their identification difficult and the exact number of species of *Auricularia* are still unknown. Since the 1900s, the internal anatomy of the basiodiocarp has been used as a taxonomic characteristic to differentiate species (Lowy 1951). Nonetheless, there are discrepancies among taxonomic keys commonly used to identify *Auricularia* species. The description of this genus has not been reviewed in 65 years, creating taxonomic problems. This taxonomic problem may have contributed to the loss of species complexes such as *A. auricula-judae* (Wu et al. 2015).

To ease the process of characterizing specimens, we collected samples of *Auricularia* from the western region in Puerto Rico and developed a data sheet that merges the widely used taxonomic criteria in several taxonomic keys (Lowy 1951, Montoya et al. 2011, Looney et al. 2013). The purpose of this work is to present a characterization data sheet with macro– and microscopic details that facilitate the characterization of the species within *Auricularia*.

Materials & Methods

To create the data sheet, we took under consideration taxonomic characteristics described by Lowy (1951) and commonly used by other researchers (Montoya et al. 2011, Looney et al. 2013). For the

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validation process, we randomly collected twenty mature specimens of *Auricularia* from decaying wood using general protocols suggested by Lodge et al. (2004). Collection sites included three municipalities in the western region of Puerto Rico: Mayagüez, Rincón and Aguadilla. Specimens were placed in individual paper bags and oven dried at 50 ºC
for 24 hours. Macroscopic characterization of fresh material included the size of the basidiocarp, the color using Munsell Soil Color Chart (2010) and characterization of the pilose zone. For microscopic characterization, we made free-hand longitudinal sections using a size 10 scalpel for observation in semi-permanent slides mounted in lactophenol. To observe the basidia, we prepared semi-permanent slides with 10% KOH. Slides were observed under a light microscope to study the internal anatomy of the basidiocarp. Relevant characteristics were identified using taxonomic keys (Lowy 1951, Montoya et al. 2011, Looney et al. 2013) to identify the specimens.

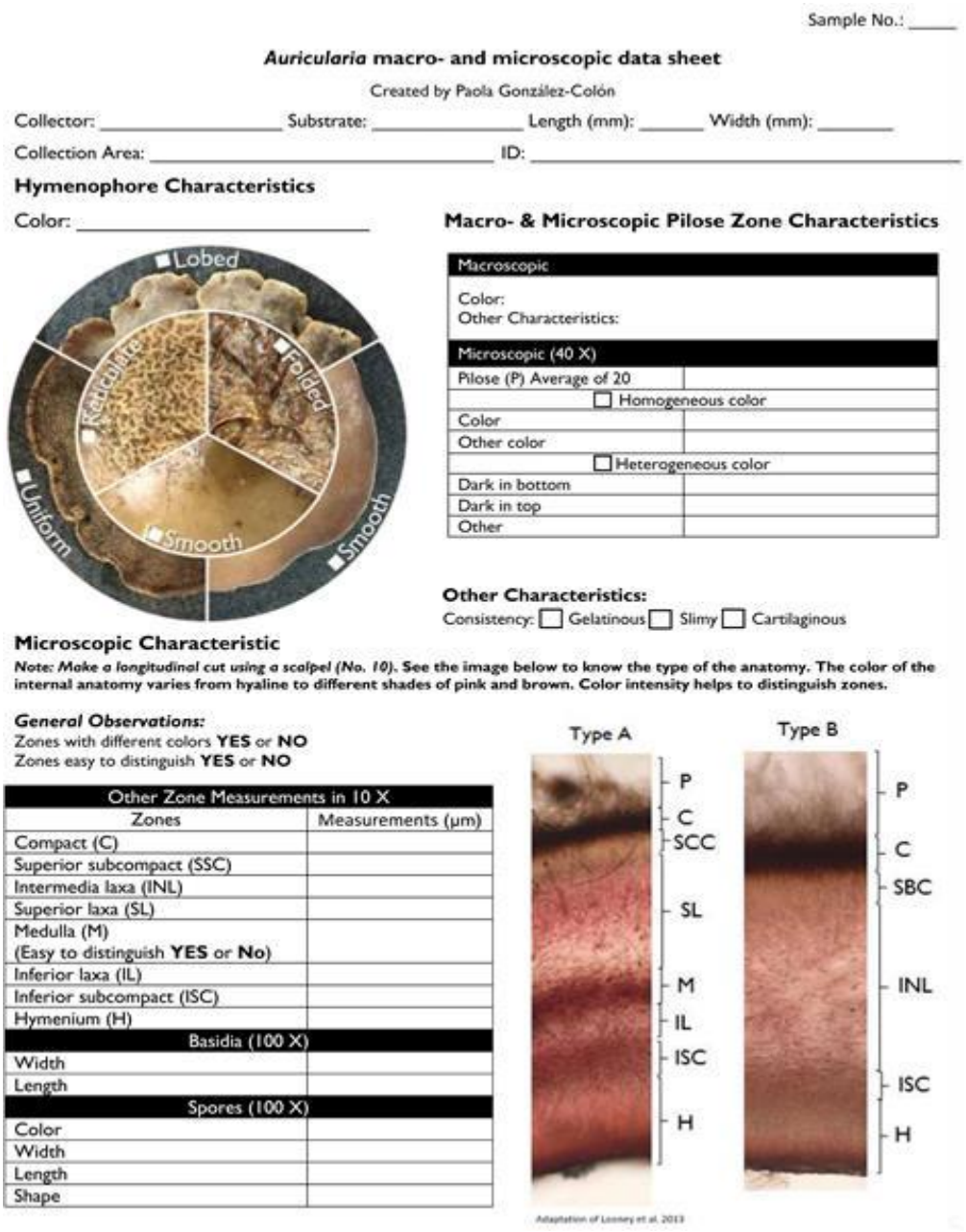

Fig 1 – Data sheet for the characterization of *Auricularia* species using the internal anatomy of the basidiocarp (created by Paola González-Colón). Type A refers to species that have a medulla and eight zones. Type B refers to species that lack a medulla and have only six zones, where the Superior and Inferior Laxa are absent.

Results

The taxonomic keys by Lowy (1951), Montoya et al. (2011) and Looney et al. (2013) allowed the identification of the specimens collected, but the lack of a data sheet that facilitated having all the information required to use the keys proved to be time consuming and sometimes delayed the identification process. To facilitate the identification of specimens, we created a data sheet that included individual sections to document the characteristics of each specimen at both macro- and microscopic levels. (Fig. 1) presents the final version of the data sheet, which begins with the macroscopic characterization of the basidiocarp (color, texture, margins, and details of the pilose zone). Photographs were included to characterize the margins and textures commonly observed. At the microscopic level, the data sheet provides photographs of the internal anatomy of the basidiocarp at 10X magnification as suggested by Looney et al. (2013). In the data sheet, measurements of each zone, the basidia and the spores can be clearly documented to be used later for identification using the taxonomic keys by Lowy (1951), Montoya et al. (2011) and Looney et al. (2013).

Discussion

This original data sheet (Fig. 1) provides a new, useful tool for the characterization of specimens of the genus *Auricularia*. Currently, there are no data sheets available to annotate the various morphological characteristics we observed in *Auricularia* specimens. This is the first tool that facilitates the annotation of morphological characteristics necessary to identify the species of *Auricularia* when using the available taxonomic keys by Montoya et al. (2011), Looney et al. (2013) and Lowy (1951). Having the common characteristics available in a single sheet facilitates comparison of specimens for identification purposes. The schizomedulla (Looney et al. 2013) is not considered in this data sheet because it is only used to distinguish *A. subglabra* and *A. scissa* from the morphologically similar *A. delicata*. Also, according to Lowy (1951), the use of morphological features such as color of the basidiocarp is not considered a stable taxonomic characteristic, since it varies depending on exposure to light and age of the observed specimen (Lowy 1951, Bandara et al. 2017). We decided to include this characteristic in the data sheet to make a complete characterization of the basidiocarp. The information collected in this data sheet also provides a good source of information to label specimens before placing them in an herbarium collection for future reference. Although there are other articles describing new species (Bandara et al. 2015, Bandara et al. 2017) and species complexes (Wu et al. 2015), we are using the articles that provided taxonomic keys.

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