

# ***Coniochaetidium zulianensis*, A NEW RECORD IN THE WORLD**

## ***Coniochaetidium zulianensis*, un Nuevo Registro en el Mundo**

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### **ABSTRACT**

On the basis of a study of coprophilous fungi from Zulia state, Venezuela, one specie of the family Coniochaetaceae, with cleistothecial ascocarp and ascospores with germ pore was isolated from dove dung. It was identified as species of *Coniochaetidium* Malloch and Cain. The species described in this paper differs from the other five (5) species in its morphological characteristic, globose asci, 8 spored and ellipsoidal ascospores, also this species differs from another by having larger ascospores, which are nearly double its length in culture. The species was identified as *Coniochaetidium zulianensis* Delgado, Urdaneta and Piñeiro, which represents a new record in the world.

**Key words:** Cleistothecia, ascospores, Coniochaetaceae, *Coniochaetidium*.

### **RESUMEN**

Basado en un estudio de hongos coprofílicos en el estado Zulia, Venezuela, una especie de la familia Coniochaetaceae, la cual presenta un ascocarpo tipo cleistotecio y ascósporas con poro germinativo, fue aislada de heces de paloma. Ésta fue identificada como una especie del género *Coniochaetidium* Malloch and Cain., la cual difiere de las otras cinco (5) especies descritas, en sus características morfológicas, presenta 8 esporas, ascas globosas y ascósporas elipsoidales. Además difiere de las otras porque las ascósporas desarrolladas en medios de cultivo son más largas, casi el doble de largo. La especie fue identificada como *Coniochaetidium zulianensis* Delgado, Urdaneta y Piñeiro, la cual representa un nuevo registro en el mundo.

**Palabras clave:** Cleistotecio, ascósporas, Coniochaetaceae, *Coniochaetidium*.

### **INTRODUCTION**

The genus *Coniochaetidium* Malloch & Cain has been described by Malloch et. al. [8] for the non ostiolate counter parts of *Coniochaeta* (Sacc) Cooke, both genera have been classified in the family Coniochaetaceae, characterized by unilocular asci and 1-celled, pigmented ascospores provided with a germ slit. The type species of the genus *Coniochaetidium* is characterized by large, dark cleistothecial ascomata with a thick, pseudoparenchymatous wall, and by oblate ascospores. In the other species the ascomata are small and thin walled and the ascospores are oblate, fusiform or reniform [8]. The genus *Coniochaetidium* was erected by Malloch [8] to accommodate five species, *C. savouji* (Booth) Malloch & Cain, *C. ostreum* Malloch & Cain in 1977, was identified *C. coprophilum* Pathak and Agrawal [10] and Arx [1], *C. boothii* (Manoharachary & Ramarao) Arx, *C. mirabile* Udawawa and Tsubouchi [11]. They differentiated these species on the asci of shape and size of ascospores. The genus *Coniochaetidium* and *Coniochaeta* were kept together by Malloch and Cain [8] in a separate family Coniochaetaceae which was distinguished from Sordariaceae by the presence of ascospores with elongated germ slits and from Xylariaceae in lacking stromatic tissue [9]. After comparison of the Venezuelan material with published species descriptions [1, 8, 10, 12]. It was identified as *C. zulianensis*, a new species of *Coniochaetidium* and represents the first report of a species of *Coniochaetidium* in Venezuela and other new in the world, a description of this material is given below.

The objectives of this research were to identify and taxonomies classification of coprophilous fungi in Zulia State, Venezuela and to determinate the appearance of new species. In addition to keeping a collection of microscope slides which you have identified a small herbarium can be extremely useful.

## MATERIALS AND METHODS

### Collection and incubation of the samples

During a study of coprophilous fungi in 17 municipalities of Zulia State, Venezuela, conducted from June 2005 to May 2006, were collected 180 animal dung samples to determine the appearance of coprophilous fungi. The sample dung was proceeded of domestic and wild animal such as: dove (*Columba livia*), dog (*Canis familiaris*), rat (*Rattus norvegicus*), cat (*Felis catus*), frog (*Bufo bufo*), hen (*Gallus domesticus*), tiger (*Panthera tigris*), deer (*Cervus elaphus*), pig (*Sus scrofa*), horse (*Equus caballus*), lion (*Felis leo*), turkey (*Meleagris gallopavo*), cow (*Bos taurus*), duck (*Oxyura jamaicensis*), donkey (*Aquus sp.*) and others.

In the dove dung samples was identified *C. zulianensis* fungus. The sample dung that appeared to be relatively recent and unweathered were collected, intermittently of the period mentioned before, into clean receptacles and usually set to incubated within a day or four collection. If samples could not be incubated shortly after collection they were gently air-dried stored in paper envelopes until incubation [2- 7, 11] after 10-14 days yielded numerous cleistothecias. Procedures for collection and inducing ascomal formations in the sample dove dungs were similar to those described by others authors [1, 2, 5, 8- 12].

In the laboratory each dung was placed in a moist chamber, if the dung is very dry on collection it should be moistened. But if made to wet, fungal growth was inhibited at room temperature 24-26°C [2- 7, 11].

The fruiting bodies were removed and mounted in water and studied with a light microscope (Leica™ DMLS, type 020-518.500, Germany). Measurements and drawings of the various structures were made. Attempts to obtain the fungus in pure culture were unsuccessful. The Venezuelan material has been accessioned in the herbarium of the Plant Sanitary Department, Faculty de Agronomy, University of Zulia, Maracaibo, Venezuela (HERZU-1061).

## RESULTS AND DISCUSSION

During the study numerous cleistothecia of a *Coniochaetidium* fungus were found growing on dove dung. A description of this material is given below.

***Coniochaetidium zulianensis*.**  
**Delgado, Urdaneta and Piñeiro**  
**= *Thielavia* spp Zopf.**  
**= *Chaetomidium* spp (Zopf). Sacc.**

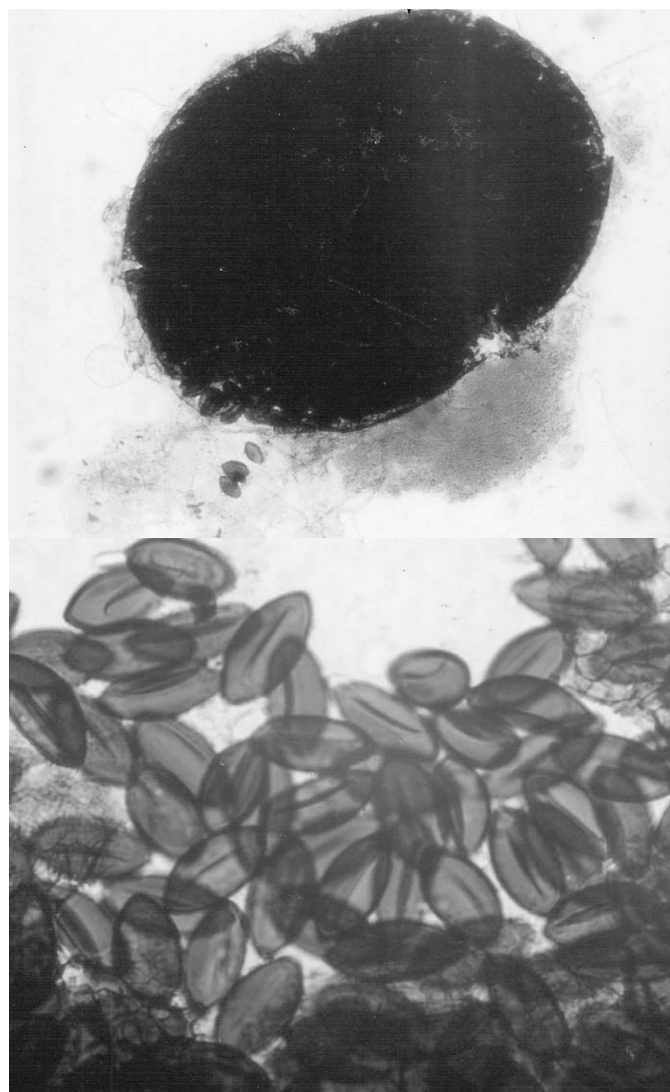
Ascomata a cleistothecia nonstromaticae in catervis parvis, 150-300 µm in diameter, superficialia, aggregate, cinerea, glovosaevel, subglobosae. Peridium ascomatis tenuous, ca, 10-15 µm. Pseudoparenchymatae fusco-brunneae, crassum, bistratum, stratum exterius ex asci subglobosi vel clavatae mi-

nor paries, uniseriatae, unitunicatae, evanescentes, 8 asporae, cum mensurae 32-56 X 7.4 µm, ascosporeae imaturae grisea flavae, maturae in colorem succineum, obscure brunneo, lenticula, ornatae, fissura germinali aequatorialibus, 35-40 X 18-20 µm, avere unus vel duo germinali porae. FIG. 1.

Ascoma is a cleistothecia non-stromatic, on the mycelial felt, 150-300 µm in diameter, superficial, gregarious in small clusters, grey or dark brown, globose to subglobose. Ascomatal peridium thin, 10-15 µm thick pseudoparenchymatous dark brown to black, two layered with a pigmented outer layer. Asci subglobose to clavate small walled, uniseriate, unitunicate, evanescent, 8 ascospores, with measure 32-56 x 7,4 µm, young ascospore greyish yellow in colour at maturity, turning amber in colour, ellipsoidal with an equatorial germ slit, 35-40x 18-20 µm, having one or two germ pore. FIG. 1, fungus grows well on PDA medium colony, diameter reaches up to 10 cm after 7 days of incubation at 25°C. Germination of ascospores takes place by splitting through the germ slit resulting in one to three germ tubes no conidial state was observed when grown on PDA medium. Isolated from dove dung collected at Caja Seca, Sucre Municipality, Zulia State, Venezuela.

As with most coprophilous ascomycetes, the biology of *Coniochaetidium* is poorly understood [8]. This represents the first report of *C. zulianensis* in the world. It appears to occur preferentially on dung domesticated such as the dove is described here, in accordance with this study. The presents authors have in several cases found cleistocarpus to be reliable as a generic character only, and *Coniochaetidium* is for this and other reasons placed in the Coniochataceae, characterized by unitunicate asci and large, dark cleistothecial with a thick pseudoparenchymatus wall, and oblate.

Based on the observations, cleistothecial development takes 9-10 days [5] contrasting with the 12 days in moist chamber indicated by Pathak et al. [10]. Such variations may reflect differences in the age and conditions of the material sampled ascospores. This species described in the paper differs from the other by having larger ascospores, which are nearly double its length in culture. In the *C. ostreatum* have ascospores oblate, brown, 5-8 x 4-5,5 µm, with an equatorial germ slit, ascomata thick walled. *C. savoryi*, ascospores fusiform, 14-21x7-8µm size, ascomata spherical with few asci formed, they contain 4 ascospores, are greenish brown with a prominent, longitudinal germ slit. *C. boothii*, ascospores reniform, 6-8 x 3-5 µm size asci clavate, 8 spored. *C. mirabile* Udagawa & Tsubouchi, asci singly borne on ascogenous hyphae, 2-8 spored, subglobose to ovoid or pyriform, 12-15 x (8)10-11 µm, evanescent, ascospores dark olive brown to dark brown, one celled, irregular in shape and size, lenticular, subglobose to oblate in face view, 5-6(-10) x 4,5-5(-8) x 3,5 µm, smooth walled, with an equatorial germ slit dividing the spore into two equal valves. and *C. coprophilum* Pathak and Agrawal, asci globose, smooth walled, 4 spored, 32-56 x 7,4-14 µm young ascospore greyish yellow in colour at maturity turning amber in colour, lenticular, with an equatorial germ slit 19,95-28 x 13,3 µm.



**FIGURE 1. MORPHOLOGY OF *Coniochaetidium zulianensis*. TOP: EXTERIOR OF CLEISTOTHECIUM WITH ASCOSPORES. BOTTON: MATURE ASCOSPORE WITH GERM SLIT. 40X / MORFOLOGÍA DE *Coniochaetidium zulianensis*. ARRIBA: EXTERIOR DEL CLEISTOTECIO CON ASCÓSPORAS. ABAJO: ASCÓSPORA MADURA CON HENDIDURA GERMINAL. 40X.**

The genus *Coniochaetidium* has been described by Malloch and Cain [8], for the non-ostiolate counterparts of *Coniochaeta*; both genera have been classified in the family Coniochaetaceae, characterized by unitunicate asci and by 1-celled, pigmented ascospores provided with a germ slit. Types species of the genus *Coniochaetidium* are characterized by large, dark ascomata with a thick, pseudoparenchymatous and by oblate ascospores. In the other species the ascomata are small and thin-walled and the ascospores are fusiform or reniform.

They are most readily distinguished from members of the Sordariaceae by their ascospores with germ slits and from the Xylariaceae [9] in lacking stromatic tissue. The pink colonies

which occur on some media such as PDA and four spored asci, however, are common in the Coniochaetaceae and rare or absent in the Xylariaceae. In addition there is no stroma or aleuriospore conidial stage as in Xylariaceae. The genus *Thielavia* is restricted to Pyrenomycetes characterized by non ostiolate ascomata and ascospores with a simple distinct germ pore although *C. savorgi* was first described as a *Thielavia* its ascospores with germ slit would eliminate it from that group.

## CONCLUSIONS

A new species for the world *Coniochaetidium zulianensis* is described here, in accordance with this study. The presents authors have found in several cases cleistocarpy to be reliable as a generic character only, and *Coniochaetidium* is for this and other reasons placed in the Coniochaetaceae. Because of its ellipsoidal spore large with elongated germ slits and germ pore which are 32-56 X 7.4  $\mu\text{m}$ , young ascospores grayish yellow in colour at maturity, turning amber in color with an equatorial germ slit, 35-40X18-20  $\mu\text{m}$ .

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