Two new species of Caliciopsis (Coryneliaceae) from Hunan Province, China

JOUKO RIKKINEN


Two new species of Caliciopsis (Ascomycota, Coryneliales) are described from temperate broad-leaved forests in Hunan Province, China. Caliciopsis toonae Rikkinen was found in bark crevices on trunks of Toona sinensis and Choerospondias axillaris. Caliciopsis rhoina (Juss.) Roem. Rikkinen was found on branches and twigs of Rhus chinensis, being associated with cankers in the bark, and on trunks of Toona sinensis.

Key words: Ascomycota, Caliciopsis, Choerospondias, China, Hunan, Rhus, Toona

Jouko Rikkinen, Department of Ecology and Systematics, P.O. Box 47, and Department of Plant Biology, P.O. Box 27, FIN-00014 University of Helsinki, Finland

The genus Caliciopsis Peck (Ascomycota, Coryneliales), is characterized by long stipitate, deliquescent asci and non-septate ascospores. It differs from other ostiolate genera of the Coryneliaceae in the production of an elevated asciigerous cavity and in having gelatinous tissue (textura intricata) in the core of the ascocarp (Fitzpatrick 1920, 1942a, b; Funk 1963; Benny et al. 1985a, b, c, d). The ascocarp is swollen in the region of the asciigerous cavity when viewed externally. Above the swelling, the ascocarp neck may be very short to several times as long as the diameter of the swelling. Thin-walled asci lack apical pores, and contain eight ascospores; there are no paraphyses. Ascospores released from evanescent asci are forced up through the neck of the ascocarp. This process is partly mediated by a hydroscopic swelling of the asci and gelatinous tissue within the centrum. Mature ascospores accumulate to form a dry mazaedium at the tip of the ascocarp. As in many other mazaedial fungi, the spores are probably dispersed mainly by insects and other invertebrates (Rikkinen & Poinar 2000).

Size, morphology, and habit of the ascomata, position and size of the asciigerous swelling, and the size, shape, and ornamentation of ascospores have been considered to be valid criteria in distinguishing between species of Caliciopsis. In addition, Funk (1963) emphasized the desirability of corroborating morphological observations with cultural and pathogenity data whenever possible. The genus badly needs a world-wide revision, but unfortunately even relatively well-known species of the genus are poorly represented in major herbaria.

Several Caliciopsis species occur in temperate regions of Eurasia, North America, and South America, while others are restricted to tropical regions. All Caliciopsis species are either saprobic or parasitic on vascular plants. Some of them cause cankers or colonize tissues surrounding wounds in host plants, but they are not considered to be of major economic importance as plant pathogens. Species of Caliciopsis have been recorded from a wide variety of hosts, including species of Abies, Chamaecyparis, Drimys, Elytranthe, Juniperus, Pinus, Podocarpus, Polypodium, Populus, Pseudotsuga, Quercus, Struthanthus, Symplocos, Tilia, Tsuga, and Xanthostemon (Fitzpatrick 1942b; Benny et al. 1985a, d). Host specificity in the genus varies; while some Caliciopsis species are limited to single hosts, others can grow on plants of several genera within the same family.
During a recent expedition to northwestern Hunan, China (Sept–Oct 1999; Koponen et al. 2000), two undescribed Caliciopsis species were found growing on broad-leaved trees. One species was detected in bark crevices on trunks of Toona sinensis (Juss.) Roem. (Meliaceae) and Choerospondias axillaris (Roxb.) B.L. Burtt & A.W. Hill (Anacardiaceae), while the other species was mainly confined to cankered areas on branches of Rhus chinensis Mill. (Anacardiaceae). One collection of the latter species was also made on the basal trunk of Toona sinensis. All three host trees are common in Hunan Province and of considerable economic importance in the area. The two new Caliciopsis species are described below.

**Caliciopsis toonae** Rikkinen, sp. nov. – Figs. 1–4

Ascomata dispersa vel gregaria, satis variabilia, vulgo 1.5–4.5 mm alta, nigra, recta vel curvata; loculo fertili submediano, 200–300 μm alta et 140–250 μm diam., apice rostro elonga-

---

to attenuato, 90–140 µm diam. Asci clavati, octospori, evanescentes. Ascosporae globosae vel subgloboseae, hyalinae deinde brunneae, laeves, 3.5–5.0 µm diam. Pycnidia solitaria vel laxe aggregata, globosa, ostiolata, atra, usque ad 150 µm diam. Conidia espetata, allantoidea, hyalina, 2.5–4.5 × 0.7–1.5 µm. Hab. Toona sinensis (Juss.) Roem. (Meliaceae) et Choerospondias axillaris (Roxb.) B.L. Burtt & A.W. Hill (Anacardiaceae).


Ascomata dispersed or gregarious, variable in size, usually large, 1.5–4.5 mm high, black, straight or curved, with a submedian ascigerous swelling (loculus), 200–300 µm high and 140–250 µm diam., the upper part attenuated to an elongated beak, 90–140 µm diam. Asci clavate, eight-spored, evanescent. Ascospores globose or subglobose, at first hyaline, later becoming brown, smooth, 3.5–5.0 µm diam. Pycnidia solitary or in loose groups, globose, ostiolate, black, about 150 µm diam. Conidia non-septate, allantoid, hyaline, 2.5–4.5 × 0.7–1.5 µm. On Toona sinensis (Juss.) Roem. (Meliaceae) et Choerospondias axillaris (Roxb.) B.L. Burtt & A.W. Hill (Anacardiaceae).

Caliciopsis toonae belongs to a group of Caliciopsis species with relatively large, 1–4 mm high, ascomata. It produces submedian or basal ascigerous swellings, similar to those in C. calicioides (Ellis & Everh.) Fitzp. However, C. calicioides is readily distinguished from C. toonae by its large, ellipsoid to subsutiform ascospores. Morphologically, C. toonae is quite close to C. subcorticalis (Ellis & Everh.) Fitzp. and C. tiliae Arnaud. All three taxa share the habit of often growing deep in bark crevices and producing relatively large, curved ascomata, which frequently wind through cracks in bark to reach the surface. However, the ascigerous locules of the latter two species are subterminal to terminal, and their ascomata are frequently forked or bearing lateral branches. Some variation in the position of ascigerous swellings may be environmentally induced, as ascomata of C. toonae growing deep in bark crevices tend to produce more central locules than those growing on smooth bark. However, subterminal to terminal ascigerous swellings have not been observed in C. toonae. It also differs from the two other species in producing larger, stouter, and more rigid ascomata, and in host range; C. subcorticalis has only been collected on Quercus and C. tiliae on Tilia. The ascospores of C. toonae and C. subcorticalis are very similar, subglobose and relatively small. In this context one could point out that some European and North American collections cited under C. subcorticalis by Fitzpatrick (1920, 1942) are far from being identical and may not represent one taxon (specimens examined: Zwackh, Lich. exs. 477, H-NYL 40611 as Calicium ephemereum; Ellis & Everhart, N. Am. Fungi 2123, H as Hypotheca subcorticalis). Apparently Fitzpatrick (1920) did not see a specimen of the material distributed by Zwackh, but based the synonymy on Rehm (1896).

Caliciopsis tiliae has larger, more ellipsoidal ascospores than C. toonae and C. subcorticalis. Also all other Caliciopsis species with relatively large ascomata and globose or ovoid ascospores, i.e., C. confusa Bat., C. symplocri Fitzp., and C. quercina Marm., produce larger spores than C. toonae. Their host ranges are also quite different, including fruits of Myrsine africana, leaves of Symplacodobus obtusa, and wasp galls on oak twigs, respectively (Fitzpatrick 1942; Benny et al. 1985d; Marmolejo 1999). Caliciopsis toonae has so far been collected on trunks of Toona sinensis and Choerospondias axillaris. The only other Caliciopsis species known to attack related trees is C. rhoina. The later fungus is readily distinguished from C. toonae by its much smaller ascomata with subapical ascigerous swellings. The asci and ascospores of both species are quite similar, with the spores of C. toonae maybe exhibiting a slightly wider range of sizes and stronger tendency to become subglobose or slightly angular.

mature Toona sinensis in small opening in riparian forest. 29°19'N, 110°25'E, elev. 630 m, 16 Sept 1999 J. Rikkinen 990177 (H; Herb. Hunan Forest Botanical Garden).

**Caliciopsis rhoina** Rikkinen, sp. nov. – Figs. 5–6

Ascomata dispersa vel laxe aggregata, 0.7–1.4 mm alta, nigra, recta, cum basi usque ad 100 μm diam; loculo fertili subrostrali vel mediano, 180–230 μm alto et 120–130 μm diam. Asci clavati, octospori, evanescenti. Ascosporae globose, hyalinae deinde brunneaee, laeves, 4.0–5.0 μm diam. Hab. Rhus chinensis Mill. (Anacardiaceae) et Toona sinensis (Juss.) Roem. (Meliaceae).

Typus: China. Hunan Province. Sanzi Co.: Badagonshan National Nature Reserve. Yangjatai, on lower branches of Rhus chinensis in open mixed forest. 29°45.7'N, 110°02.9'E, elev. 1400 m, 29 Sept 1999 J. Rikkinen 991084 (holotypus, H; isotypi F, HMAS, Herb. of Hunan Forest Botanical Garden).

Ascomata dispersed or in loose groups, 0.7–1.4 mm high, black, straight, about 100 μm diam. at the base. Ascigerous swelling subapical or medi-

Asci clavate, eight-spored, evanescent. Ascospores globose, at first hyaline later becoming brown, smooth, 4.0–5.0 μm diam. Pycnidia not seen. On Rhus chinensis Mill. (Anacardiaceae) and Toona sinensis (Juss.) Roem. (Meliaceae).

**Caliciopsis rhoina** is characterized by medium size, production of subapical ascigerous swellings (usually laterally collapsed in dry specimens), and globose, relatively small spores. Young ascocarps are terminated by short tapering beaks, while older ascomata have dry, brownish mazaedia. In their general habit, the ascomata of *C. rhoina* are very similar to those of *C. orientalis* A. Funk and *C. pseudotsugae* Fitzp. However, both of these species have ellipsoidal ascospores, and grow on coniferous hosts. With regard to other similar species, *C. clavata* (Lev.) Fitzp. and *C. confusa* Bat. produce larger ascospores than *C. rhoina*, while the spores of *C. myrticola* Hug. and *C. thujiina* (Ellis & Everh.) Fitzp. are smaller. *C. rhoina* has been collected on dead or dying branches of *Rhus chinensis* where it grew associated with conspicuous, rough cankers in the bark. The cankers are perennial, and the associated fungus is clearly capable of producing ascomata during more than one season. One collection of *C. rhoina* was made on the trunk of *Toona sinensis*, where it grew together with *C. toonae*. In this case there was no

obvious association with a cankered area. *C. too-nae* is readily distinguished from *C. rhoina* by much larger ascomata with basal or submedian ascigerous swellings. As *C. rhoina* and *C. too-nae* are not restricted to only one host species, they may as well occur also on other trees in the Sapindales/Rutales-complex.

**Additional specimens examined:** Dayong Co. Wulingyuan World Heritage Area, Zhangjiajie National Forest Park, Matianya, on felled log of *Toona sinensis* by road-side on mountain slope. 29°19’N, 110°27’E, elev. 950 m, 16 Sept 1999 J. Rikkinen 990159 (H).

**Acknowledgements:** This research was done in cooperation with the Forestry Department of Hunan Province and its Forest Botanical Garden, and the Division of Systematic Biology, Department of Ecology and Systematics, and the Botanical Museum, University of Helsinki. The project has received financing from the Academy of Finland (project nos. 34229, 40867, 10134227, and 153706). I wish to especially thank Mr. Li-Hong Yan, who assisted me in the field. This paper is dedicated to my teachers in mycology, Marja Härkönen and Tuomo Niemelä, on occasion of their 60th birthdays.

**References**


