千九百二十三年九月一日東京大火災の直後
被害樹に大發生せる橙黃色菌に就て

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ON THE FUNGUS LUXURIANTRY GROWN ON THE
BARK OF THE TREES INJURED BY THE GREAT
FIRE OF TOKYO ON SEPTEMBER 1, 1923.

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People's utmost attention was directed towards a remarkable reddish-yellow fungus which has grown up luxuriantly on the bark of burnt or half-burnt trees after a few days of the terrible fire of Tokyo on September 1, 1923. The fungus was found to belong always to the same species, though a number of Coniferous as well as broad-leaved trees were over-grown with it. It appears externally just like some wild yeast which very commonly is found living on the exudation of some trees or on some organic substances, but under the microscope it reveals itself evidently to be a certain species of *Monilia*.

Since I was able to collect several times samples of this fungus from trees belonging to various species, I have studied its morphology and life history, as well as its systematic position. The present paper will bring out the results of these experiments and observations.

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MORPHOLOGY.

Mycelium. The mycelium is found abundantly in the tissues of the bark; young mycelium is narrow and slender, septate at remote intervals, hyaline, and not at all constricted at the septa. Older hyphae are wider, irregularly branched, multi-septate, constricted at the septa, light yellow; contents are fine granular or vacuolate. The width of mycelium is variable in different stages of its development: in average the young one is 3.5 microns and the old 12.8 microns (usually 4.8-6.4 microns.)

Conidia. Conidia (macro-conidia) are not only produced in chains at the free ends of ordinary mycelium, but also in conidial layers. When the mycelium grows luxuriantly in bark tissues, there are found numerous yellowish corenia which are composed of richly septated hyphae with conspicuous constrictions at the septa. From this corenium develops the multi-septate mycelium, and innumerable conidia are formed in chains at its free end; the conidial layers being thus formed. At first they are imbedded in the bark tissues, after maturity the epidermis is ruptured, and numerous spore-masses appear on the bark of the injured trees. Since the conidial layers assume a beautiful reddish-yellow color, they are very attractive in appearance. The bark, when covered by the numerous conidial layers, seems as it were spoiled by yellowish dust. Under the microscope a single spore is yellowish; filament is rather thick and provided with granular contents. Conidia are globose, oval or pear-shaped, but usually short elliptical, and measure $12.8-19.2 \times 16.0-25.0$ microns.

Generally speaking, there are found two types of conidia in *Monilia*, macro- and micro-conidia. In the fungus under this discussion the conidia are always macro-conidia, and no micro-conidia have ever been observed throughout my investigation.

Perithecia Formation. On September 17, 1923, pure cultures of this species were obtained by transferring with a sterilized platinum needle the conidia directly from the conidial layers on Soya-agar (Soya 50 c.c. Onion decoction 150 c.c. Grape sugar 50 g, Agar 25 g., Water 800 c.c.); no plate culture has been especially done. In a few days the mycelium came to grow vigorously, and the surface of the culture media was covered with cotton-like hyphae. On October 27, many small black-bodies were recognizable on the surface of culture media when the mycelium become old. At first, it was considered that they are to be looked as the young stages of sclerotia generally produced by the fungus belonging to *Monilia* and *Botrytis*. It was, however, beyond my expectation that these black-bodies represent really young stages of perithecia, containing immature asci; it may be added that on November 10, I was able to observe matured ones.

At the same time I have succeeded to discover the perithecial form produced naturally in the bark tissues of fire-injured pine trees collected in the temple of

Shiba of Tokyo. Under the microscopical examination it was found that it is entirely the same as that produced on the artificial media. Above all I have succeeded to get a pure culture derived from a single ascospore, produced the conidia which are of *Monilia* type in coloration, size and shape. They were developed along the wall of the test tube, especially near the cotton-plugs.

From the writer's observations and experiments, it may be safely concluded that these perithecial stages are related with conidia of *Monilia* under discussion.

Speaking generally, however, *Monilia* is known to produce sclerotia and apothecia as its perfect fruit stages, and so far as I am aware, no reports have ever appeared about the relationship of perithecial form with *Monilia*.

Perithecia, Asci and Ascospore. The perithecia are produced on the pseudostroma developed in the bark tissues, pear-shaped, and provided with short neck; their wall is deep black, and carbonaceous to leathery in consistence, with thread-like mycelium around them. The perithecia are about 464.0 microns high and 302.0 microns broad, and asci arise from their bottom in clusters. Asci are cylindrical or clavate, short stalked, with no appendages, measuring 15.7–16.0 $\times$ 157.8–160.0 microns, 8-spored, more or less thickened at the top with a pore. Ascospores are arranged continuously, elliptical with sharp ends, and their wall is rather thick, young ones being more or less light brown and becoming dark brown when old; contents are homogeneous, they measure about 12.0–13.6 $\times$ 17.6–22.4 microns. Paraphyses are hyaline, and provided with many septa.

When placed in a drop of nutrient solution, the conidia germinate within 20 hours at 25° C. throwing out germ-tubes, and develop to young hyphae. Although their germination can take place in distilled water, the mycelial growth is not so rapid as in nutrient solution.

HISTORICAL SKETCH AND SYSTEMATIC POSITION OF THE FUNGUS.

From the morphological characters, above described, it is highly probable that this ascus stage belongs to the genus *Anthostomella*.

Its morphology is described by G. Lindau in "Engler's *Natürlichen Pflanzenfamilien*" as follows: the mycelium grows superficially on the substratum,

forming a thin and black pseudostroma; fruit-bodies are sunken, have short neck, are conical, ostiolate; wall is black and carbonaceous; asci are cylindrical, 8-spored; ascospores are elliptical, one-celled, brown; paraphyses usually present, saprophyte; conidial stages are obscure; it is divided into two sections owing to the absence or presence of appendages of ascospore, *Euanthostomella* and *Entosordaria*. According to Stevens, the mycelium thrives on the substratum, forming a thin black pseudostroma; perithecia are immersed in the tissues, subglobose with short neck; wall is black carbonaceous, with thread-like mycelium around it; asci are cylindrical, 8-spored; ascospores are continuously arranged, elliptical, brown, unappendaged; paraphyses usually present. Saprophyte. Clement wrote that this fungus has no stroma: ascospore is one-celled, brown, and elliptical. Saccardo in his "Sylloge Fungorum" described as follows: perithecia are subglobose, their wall is pseudoparenchymatous; asci are 8-spored; ascospores are elliptical, brown; paraphyses present. According to Winter in "Rabenhorst's Kryptgamen-Flora" this fungus has no stroma; the perithecia are immersed in the host tissues with a mouth slightly proturded through the ruptured epidermis; wall is generally carbonaceous; asci are cylindrical, 8-spored; ascospore is elliptical, one-celled, brown; paraphyses are present.

From my observations and the descriptions of several mycologists, I came to conclude that the ascus stage under question belongs to the genus *Anthostomella*, and in view of the results of repeated pure cultures from conidia as well as from ascospores, the almost no doubt that the perfect stage of *Monilia* above mentioned belongs to *Anthostomella*.

Though I think that my present researches makes probable the relationship of *Anthostomella* and *Monilia*, yet further investigations will be necessary to establish my view perfectly. It will be, however, not too much to say, that *Monilia* should not always be looked upon the conidial stages of *Sclerotinia*, as it is the case till now.

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摘 要

大正十二年九月一日東京市大火災の際市内各所に於て焼枯せる諸種の樹木に鮮美なる橙黄色菌の夥しく發育せることは多數の人の注意を引きたる所に於て其の胞子の形態、着色并胞子、發生の狀況より考察して「モニリヤ」*Monilia aurea* 菌なることは疑なきことなるが如し（胞子は單細胞にして微黄色を呈し球形、卵形又は短橢圓形をなし巾一二・八—一九・二「ミクロン」長さ一六・〇—二五・六「ミクロン」あり）而して右分生胞子を醤油寒天培養基に純粹培養し置きたるに培養後五十日前後にして培養基面に多數の成熟せる子囊殻及子囊胞子を生ぜり。同時に曩に多數の分生胞子を發生せし焼枯せるアカマツの表皮内にも形態同一なる子囊殻を發見せり、即ち「モニリヤ」菌の子囊時代としては先づ菌核を形成し而して後に子囊盤を構成するものなるにも拘はらず其の完全結實體として子囊殻を作りたるは誠に興味ある事實なりしを以て培養基及松の表皮内に生じたる子囊殻中より單一なる子囊胞子を採り出し數回に亘り之れを人工培養基に培養し置きたるに形態、着色共に元のものと同なる分生胞子を形成せるを認めたり。子囊胞子は子囊内に八個ありて黒褐色、乃至黑色にして單細胞長さ一七・六—二二・四「ミクロン」巾一二・〇—一三・六「ミクロン」を有す。此の子囊時代は *Anthostomella* 屬に該當するものなるが如し、而して本菌屬の分生胞子時代に就きては未だ明確に記載されたるものなく且培養試験の結果前述せる二胞子型の生活關係は大體に於て誤なきものと認めらるゝを以て *Monilia aurea* は *Anthostomella* 屬の分生胞子時代なるが如く思惟せらるゝなり。