

# Taxonomic Notes on *Chloroscyphae* causing Needle Blight of Japanese Conifers.

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## Introduction

In 1927, KITAJIMA<sup>11)</sup> reported the occurrence of severe needle blight of Japanese cedar, *Cryptomeria japonica* D. DON, in several forest stands, caused by a species of Discomycete on which he did not determine its systematic position. Later, TOGASHI *et al.*<sup>28)29)</sup> found the same disease in the course of a survey on the plant diseases in Iwate Prefecture, the Tohoku district. They identified its causal fungus as a species of the genus *Mollisia*. In 1950, SAWADA<sup>20)</sup> collected a Discomycete which was regarded as the same needle blight as recorded by KITAJIMA (l. c.) and TOGASHI *et al.* (l. c.), and he described it as a new species, *Mollisia cryptomeriae* SAWADA. Shortly after, he<sup>21)</sup> added two new species to this genus; one is *Mollisia chamaecyparidis* SAWADA causing the needle blight of *Chamaecyparis pisifera* ENDL. and the other is *Mollisia thujopsidis* SAWADA causing the needle blight of *Thujopsis dolabrata* var. *hondai* MAKINO and *Thuja standishii* CARR. Consequently, three *Mollisiae* have been known as the causal organisms of needle blights among Japanese foresters.

Concerning the genus name *Mollisia* accepted by SAWADA for the blight fungi, a question has arisen from the view of recent literature on the classification of Discomycetes. Judging from this literature, these fungi probably belong to either the genus *Kriegeria* or the genus *Chloroscypha*. Moreover, several species of *Kriegeria* and *Chloroscypha* have been known from North America and Europe as the causal organisms of needle blight on several kinds of conifers. For this reason, many materials of the needle blight fungi were collected from various localities throughout Japan, and restudies on their identification were carried out by the author. In this paper, results obtained from these restudies will be reported. Important characteristics, being available to differentiate the Japanese needle blight fungi, were preliminarily reported<sup>12)</sup>.

The author wishes to express his special appreciation to Dr. Kazuo ITO, Chief of the Forest Disease Section of the Government Forest Experiment Station, and to Dr. Osamu CHIBA, Chief of the Laboratory of Forest Pathology of the Station, under whose direction this study was made, for their helpful advice and instructive criticism during the work. Thanks are also due to Dr. Yozan TOKUSHIGE, Kyushu Branch Station, Mr. Takenori NUKUMIZU, Miyazaki Sub-branch Station, Mr. Shuji KONTANI, Kansai Branch Station, and Mr. Kunihiko SATO, Tohoku Branch Station, of the Government Forest Experiment Station, and Yuma MORIMOTO, Gifu Prefecture Forest Experiment Station, for their kindness in sending available materials to the author.

## Morphology of the needle blight fungi

In the modern classification of Discomycetes<sup>3)7)14)25)</sup>, the structure of apothecia and reaction

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of ascus and ascospore to several reagents, such as MELZER, KOH, cotton blue, etc., are considered to be more important than the size and colour of apothecia as aids to classifying species, genus, family or order. Then, the morphologic characters of the needle blight fungi which had been identified as the members of the genus *Mollisia*, were examined in detail on the materials which were collected newly and deposited in the herbarium of the Station. According to the author's examination and the description given by SAWADA, general features of these needle blight fungi are as follows:

Apothecium on blighted or self-pruned dead needle, black and turbinate under dry condition, cup- to disc-shaped and yellowish green to pale olive under moist condition, about 0.5 mm in diameter, short-stipitate. Ectal excipulum olivish, divided into two layers, inner layer composed of dense slender hyphae arranged parallel upwards, and outer layer composed of loose hyphae and filled with gelatinous substance between them (Plates 2 : C, 3 : C, D; Figs. 7 : B, 8 : B, 9 : B). Epithecium pale olive, composed of small angular cells and coloured tip of paraphyses (Figs. 7 : B, 8 : B, 9 : B). Hymenium formed with asci and paraphyses in a row (Plates. 2 : C, 3 : C, D). Hypothecium and medullary excipulum a little (Figs. 7 : A, 8 : A, 9 : A). Ascus hyaline, cylindric to clavate, containing eight ascospores in a single or two rows (Plates 2 : D, G, 3 : E, F; Figs. 7 : C, 8 : C, 9 : C). Ascospore hyaline to pale yellowish green, non-septate, globular, elliptic, fusoid or boat-shaped (Figs. 7 : E, 8 : E, 9 : E). Paraphysis hyaline, slender, usually branched, swollen and olivish-coloured at the tip (Figs. 7 : D, 8 : D, 9 : D).

#### Identification of the genus

TOGASHI *et al.*<sup>28)29)</sup> and SAWADA<sup>20)21)</sup> identified their needle blight fungi as the species of the genus *Mollisia*, probably referring to the classification of CLEMENTS and SHEAR<sup>4)</sup>. However, these fungi having the above-mentioned morphologic characteristics would belong to a genus other than *Mollisia*. According to the recent systematists<sup>3)7)8)14)25)</sup>, they belong in the genus *Kriegeria* known commonly in North America or the genus *Chloroscypha* used generally in Europe.

In 1931, SEAVER<sup>22)</sup> erected the genus *Chloroscypha* based on a fungus collected on *Thuja plicata* D. DON in the United States of America. At that time, the other three fungi were also treated in this genus by SEAVER. Then, a few years later, he<sup>23)</sup> added a species to the genus. However, SEAVER<sup>24)</sup> rejected the generic name *Chloroscypha* in 1943 and adopted *Kriegeria* instead. According to him, general features of the genus *Chloroscypha* quite agree with those of *Ombrophila? kriegieriana* described by RABENHORST<sup>16)</sup>. In the notes of the description, RABENHORST stated that "In Bezug auf die Gattung muss ich bemerken, dass ich den Pilz nur vorläufig seiner tremellenartigen Beschaffenheit halber zu *Ombrophila* gestellt habe, es wird besser sein, ein besonderes genus zu bilden, zu dem ich den Namen *Kriegeria* vorschlage und die Species dann mit *olivacea* bezeichne". SEAVER<sup>24)</sup> estimated this note as justifiable and treated *Chloroscypha* as a synonym of *Kriegeria* RABENHORST. At the time when the genus *Kriegeria* was accepted by SEAVER, he considered as unnecessary the alternation of species name proposed by RABENHORST, and gave the name *Kriegeria kriegieriana* (RABENH.) SEAVER for the type species. "Dictionary of fungi"<sup>2)</sup> accepted SEAVER's opinion.

On the other hand, DENNIS<sup>5)6)</sup> and TERRIER<sup>27)</sup> did not accept SEAVER's alternation of the generic name from *Chloroscypha* to *Kriegeria*. According to DENNIS<sup>5)</sup>, the genus *Kriegeria* proposed by RABENHORST was informal and interim, and the description given by RABENHORST was made for

the species but not for the genus. GREMMEN<sup>8)</sup> followed in DENNIS' direction and reported three species of *Chloroscypha* from the Netherlands. It seems likely that *Kriegeria* took its qualification as the genus when SEAVER revived it.

Another question concerning the similarity between the species of the genus *Chloroscypha* and *Ombrophila kriegeriana* RABENH. was derived from the view of previous literature. SEAVER<sup>24)</sup> thought that the species of *Chloroscypha* belonged to the same genus as *Ombrophila kriegeriana* RABENH. through the comparison with their description. It was stated by WINTER<sup>32)</sup> that morphologic characters of matured apothecia of the type specimen of *Ombrophila kriegeriana* RABENH., Fungi europaei No. 2315, quite agreed with those of *Peziza elatina* ALBERTINI et SCHWEINITZ, though they were almost immature. REHM<sup>17)(18)</sup> reached the same conclusion as WINTER after examining RABENHORTS's exsiccatus, Fungi europaei No. 2315, and treated it as a synonym of his new combination, *Rutstroemia elatina* (ALB. et SCHW.) REHM. WHITE<sup>31)</sup>, who published a monograph of the genus *Rutstroemia*, also treated *Ombrophila kriegeriana* RABENH. as a synonym of *R. elatina* (ALB. et SCHW.) REHM. He also examined RABENHORST's exsiccatus, Fungi europaei No. 2315. The genus *Rutstroemia* belongs to the family Sclerotiniaceae of the order Helotiales by the presence of its basal stroma formed in the substratum<sup>7)(14)(18)(25)(31)</sup>. On the other hand, in the genus *Chloroscypha* the basal stroma was absent and it was placed in the family Helotiaceae of the order Helotiales<sup>7)(14)(25)</sup>. Therefore, there is considerable doubt whether or not the species of the genus *Chloroscypha* established by SEAVER and *Ombrophila kriegeriana* RABENH. belong to the same genus. Apothecia of *Ombrophila kriegeriana* RABENH. as well as *Peziza elatina* ALB. et SCHW. occur on twigs of *Abies*, whereas those of *Chloroscypha* occur on needles of many kinds of conifers except *Abies*.

From the points of view mentioned above, the author agrees with DENNIS's opinion and accepts *Chloroscypha* SEAVER for the generic name of the needle blight fungi under consideration.

#### Identification of the species of genus *Chloroscypha* in Japan

As mentioned previously, SAWADA described three fungi which now would be applied to the genus *Chloroscypha*, as *Mollisia* as follows: *Mollisia cryptomeriae* SAWADA, *M. chamaecyparidis* SAWADA and *M. thujopsidis* SAWADA. Many fresh materials of *Chloroscyphae* were collected from various localities throughout Japan, in addition to the specimens deposited in the herbarium. They were examined in detail and divided into three species in their morphologic characters, each of which agreed with three *Mollisia* described by SAWADA, respectively. It was revealed from the examination that these three fungi have respectively a wide host range and overlap each other in size of ascus and ascospore. Then, to distinguish them clearly from each other, some other features are to be utilized in combination with their size of ascus and ascospore. The important features utilized here are as follows: thickness of ascus tip, MELZER reagent\* reaction of apical pore of ascus, arrangement of ascospore in ascus, shape of ascospore, and length/width ratio of ascospore<sup>12)</sup>. Differences in these features among them are summarized in Table 1. Distribution of averaged size of ascus and ascospore from each material and of frequency in length, width, and length/width ratio of ascus and ascospore are given in Figures 1 to 6, respectively. Judged from these tables and figures, three species of the genus *Chloroscypha*

\*KOH : 1.5g, I : 0.5g, Distilled water : 20cc, CCl<sub>3</sub> CHO • H<sub>2</sub>O : 22g

Table 1. Important characteristics to differentiate three species of *Chloroscypha* causing needle blight in Japan.

Species		<i>Chloroscypha seaveri</i> (REHM) SEAVER	<i>C. chamaecyparidis</i> (SAWADA) KOBAYASHI	<i>C. thujaopsidis</i> (SAWADA) KOBAYASHI	
Host		<i>Cryptomeria japonica</i> D. DON  <i>Chamaecyparis obtusa</i> SIEB. et ZUCC.	<i>Chamaecyparis obtusa</i> SIEB. et ZUCC.  <i>C. pisifera</i> ENDL.  <i>C. lawsoniana</i> PARL.	<i>Thujaopsis dolabrata</i> SIEB. et ZUCC. <i>T. dolabrata</i> var. <i>hondai</i> MAKINO <i>Thuja standishii</i> CARR. <i>Cryptomeria japonica</i> D. DON <i>Chamaecyparis obtusa</i> SIEB. et ZUCC. <i>C. pisifera</i> ENDL.	
Ascus	Size	Range	105~160×17~28.5	105~155×14.5~23.5	80~135×15.5~21 μ
		Average	133×22	129×18	102×18 μ
	Length/width		6.1	7.1	5.6
	Jode reaction of apical pore		—	+	+
	Thickness of tip wall		5~15	2.5	2.5 μ
Ascospore	Size	Range	18~34×7.5~11.5	13~23.5×9~13	15.5~23.5×6.5~9 μ
		Average	25×9	17×11	20×8 μ
	Length/width		2.7	1.5	2.6
	Arrangement		2	1	2
	Shape		fusoid to boat-shaped	elliptic to globular	fusoid to boat-shaped

found in Japan would easily be differentiated from each other.

On the other hand, seven species of the genus *Chloroscypha* and *Kriegeria* have been known in North America and Europe. In order to compare these Japanese and foreign species which would belong to the genus *Chloroscypha*, morphologic characteristics and their host range are presented in Table 2.

As shown in Table 2, *Mollisia cryptomeriae* SAWADA<sup>10)12)20)</sup> quite agrees with not only *Chloroscypha cryptomeriae* TERRIER<sup>8)27)</sup> but also *C. seaveri* (REHM) SEAVER<sup>6)8)22)25)</sup>. TERRIER described it on the material collected on *Cryptomeria japonica* D. DON in Switzerland. He observed the thick wall of its ascus tip and negative jode reaction in apical pore of its ascus by means of the MELZER reagent. At the time when he identified the *Chloroscypha* on *Cryptomeria*, *C. seaveri* (REHM) SEAVER was only known on *Thuja*, and jode reaction of its ascus was not recorded. From these, TERRIER proposed his *Chloroscypha* as a new species and named it as *C. cryptomeriae* TERRIER. Recently, GREMMEN<sup>6)</sup> reported three species of the genus *Chloroscypha*, namely *C. seaveri* (REHM) SEAV. (on *Thuja*), *C. sabinae* (FUCK.) DENNIS (on *Juniperus*), and *C. cryptomeriae* TERRIER (on *Cryptomeria*), from the Netherlands. No details on their important characters being available to distinguish them, such as thickness of ascus tip, MELZER reagent reaction, etc., were given in this report. He regards these three species as separate for the time being, although their independency was doubted due to the great affinities between their morphologic characters, especially in size of ascus and ascospore. In the report, *Mollisia cryptomeriae* SAWADA

Table 2. Morphological characteristics of the fungi belonging to the genus *Chloroscypha*.

Species	Host	Worker	Ascus			Ascospore	
			Size	Jode reaction	Thickness of tip wall	Size	Arrangement
<i>Chloroscypha seaveri</i> (REHM) SEAVER	<i>Thuja plicata</i> D. DON <sup>8)22)</sup>	SEAVER <sup>22)25)</sup>	100~135×25~30			25~28×8~9	2
	<i>T. occidentalis</i> L. <sup>19)25)</sup>	DENNIS <sup>6)</sup>	80~90×15~20	—		24~30×8~12	2
	<i>Chamaecyparis lawsoniana</i> PARL <sup>5)~7)</sup>	GREMMEN <sup>8)</sup>	108~135×32~35			27~29×10.5~12	
<i>Mollisia cryptomeriae</i> SAWADA	<i>Cryptomeria japonica</i> D. DON <sup>10)12)20)</sup>	SAWADA <sup>20)</sup>	104~162×27~39			24~33×9~11	2
	<i>Chamaecyparis obtusa</i> S. et Z. <sup>12)</sup>	ITO <i>et al</i> <sup>10)</sup>	120~141×19~27			21~32×7~14	2
		KOBAYASHI <sup>12)</sup>	105~160×18~29	—	+	18~34×7.5~11.5	2
<i>C. cryptomeriae</i> TERRIER	<i>Cryptomeria japonica</i> D. DON <sup>8)27)</sup>	TERRIER <sup>27)</sup>	115~140×19~24	—	+	20~31×6~12	2
		GREMMEN <sup>8)</sup>	130~180×25~29			27~31×10.5~12	
<i>C. cedrina</i> (COOKE) SEAVER	<i>Juniperus virginiana</i> L. <sup>23)</sup>	SEAVER <sup>23)25)</sup>	140~160×12~14			20×10	1
<i>M. chamaecyparidis</i> SAWADA	<i>Chamaecyparis obtusa</i> S. et Z. <sup>12)</sup>	SAWADA <sup>21)</sup>	83~114×16~18			16~20×9~10	1
	<i>C. pisifera</i> ENDL. <sup>21)</sup> <i>C. lawsoniana</i> PARL <sup>12)</sup>	KOBAYASHI <sup>12)</sup>	105~155×15~23	+	—	13~23.5×9~13	1
<i>M. thujaopsidis</i> SAWADA	<i>Thuja standishii</i> CARR. <sup>21)</sup> <i>Thujaopsis dolabrata</i> S. et Z. <sup>12)</sup> <i>T. dolabrata</i> var. <i>hondai</i> MAKINO <sup>21)</sup> <i>Cryptomeria japonica</i> D. DON <sup>12)</sup> <i>Chamaecyparis obtusa</i> S. et Z. <sup>12)</sup> <i>C. pisifera</i> ENDL. <sup>12)</sup>	SAWADA <sup>21)</sup>	94~145×11~22			14~19×6~10	2
		KOBAYASHI <sup>12)</sup>	80~135×16~21	+	—	15.5~23.5×6.5~9	2
<i>Kriegeria enterochloma</i> (PECK) SEAVER	<i>Thuja occidentalis</i> L. <sup>25)</sup> <i>T. orientalis</i> L. <sup>25)</sup>	SEAVER <sup>25)</sup>	100~130×12~14			20~28×7~8	2
<i>C. sabinae</i> (FUCK.) DENNIS	<i>Juniperus sabina</i> L. <sup>6)7)</sup> <i>J. nana</i> WILD <sup>6)7)</sup> <i>J. virginiana</i> L. <sup>8)</sup> <i>J. communis</i> L. <sup>6)7)29)</sup>	DENNIS <sup>6)7)</sup>	90~150×14~20	—		15~21×6~8	2
		SEAVER <sup>22)25)</sup>	130×20			18~20×9~10	2
		GREMMEN <sup>8)</sup>	145~150×18~21			21~23×9~10	
<i>C. chloromella</i> (PHILL. et HARK.) SEAVER	<i>Sequoia sempervirens</i> ENDL. <sup>22)25)</sup>	SEAVER <sup>22)25)</sup>				20~25×6~7	
<i>K. alutipes</i> (PHILL.) SEAVER	<i>Libocedrus decurens</i> TORREY <sup>25)</sup>	SEAVER <sup>25)</sup>	90×10~12			18~20×5~8	

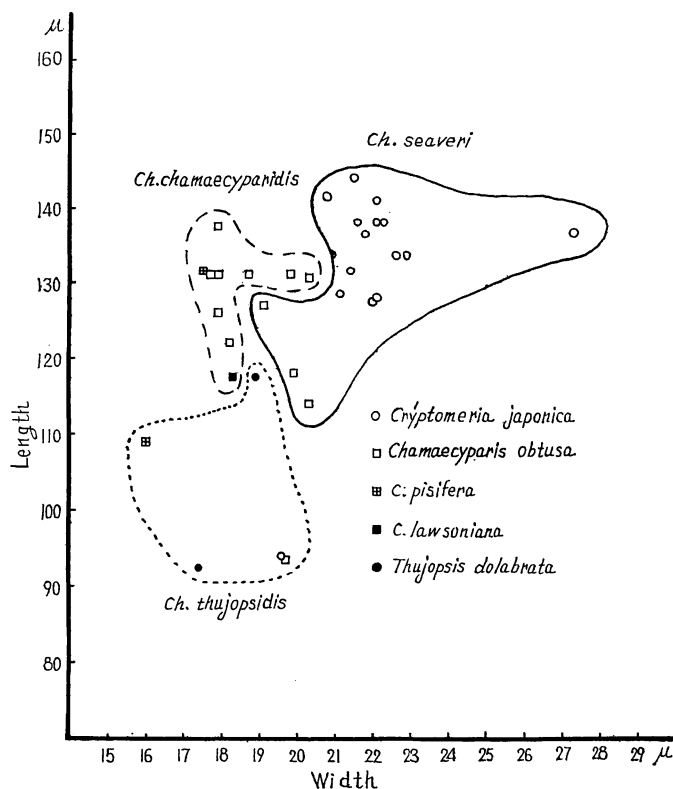


Fig.1 Distribution of average size of ascus in each material of three *Chloroscypha* causing needle blight in Japan.

was considered as the same species as *Chloroscypha cryptomeriae* TERRIER, having in mind the description of the former fungus given by ITO *et al*<sup>10)</sup>. On the other hand, DENNIS<sup>9)</sup> tested MELZER reagent reaction of *Chloroscypha seaveri* (REHM) SEAVER collected on *Cupressus lawsoniana* MURR. (= *Chamaecyparis lawsoniana* RARL.) in Britain and obtained negative results. In the case of *Mollisia cryptomeriae* SAWADA, the apical pore of its ascus reacted negative to the MELZER reagent and its ascus tip has thick wall<sup>12)</sup> as those of *Chloroscypha cryptomeriae* TERRIER. It was collected on not only *Cryptomeria japonica* D. DON but also *Chamaecyparis obtusa* SIEB. et ZUCC.<sup>12)</sup>. From these facts, it is quite clear that among the three fungi discussed here no difference is recognized in their morphology and host range. Then, *Mollisia cryptomeriae* SAWADA and *Chloroscypha cryptomeriae* TERRIER are treated as the synonyms of *C. seaveri* (REHM) SEAVER, respectively.

*Mollisia chamaecyparidis* SAWADA<sup>12)21)</sup> and *M. thujaopsidis* SAWADA<sup>12)21)</sup> seem to be similar in their morphologic characters to *Chloroscypha cedrina* (COOKE) SEAVER<sup>23)</sup> and *Kriegeria enterochloma* (PECK) SEAVER<sup>25)</sup>, respectively. *Mollisia chamaecyparidis* SAWADA was collected on *Chamaecyparis* spp.<sup>10)21)</sup>, but *Chloroscypha cedrina* (CKE.) SEAVER on *Juniperus virginiana* L.<sup>23)</sup> In the case of *Mollisia thujaopsidis* SAWADA and *Kriegeria enterochloma* (PECK) SEAVER, *Thuja* is the common host plant<sup>12)21)25)</sup>. In the case of *Mollisia chamaecyparidis* SAWADA and *M. thujaopsidis* SAWADA, the apical pore of their ascus reacted positive and blue-stained with the MELZER reagent<sup>12)</sup>, whereas SEAVER did not confirm jode reaction in the ascus of *Chloroscypha cedrina* (CKE.) SEAVER and *Kriegeria enterochloma* (PECK) SEAVER. Although the difference of the host range is not greatly important

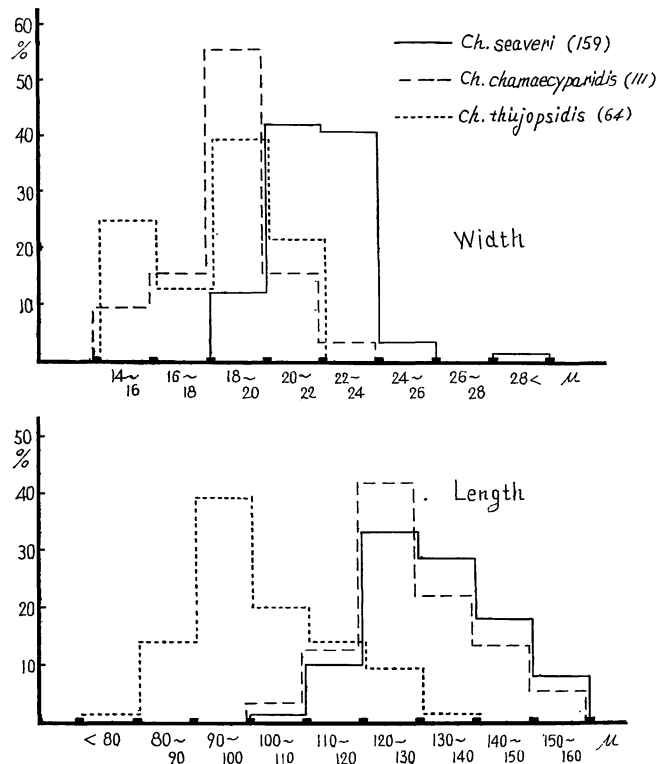


Fig. 2 Frequency of length and width of ascus in three *Chloroscypha* causing needle blight in Japan (Total numbers of measured ascus).

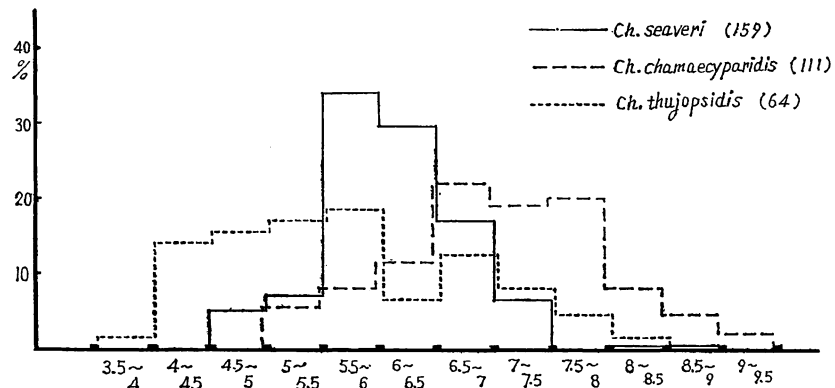


Fig. 3 Frequency of length/width ratio of ascus in three *Chloroscypha* causing needle blight in Japan (Total numbers of measured ascus).

in separating the species in the genus *Chloroscypha*, MELZER reagent reaction is one of the important features to distinguish them. Then, the two Japanese species described by SAWADA are regard as the other species from SEAVER's two species, respectively, and their generic name is alternated from *Mollisia* to *Chloroscypha*.

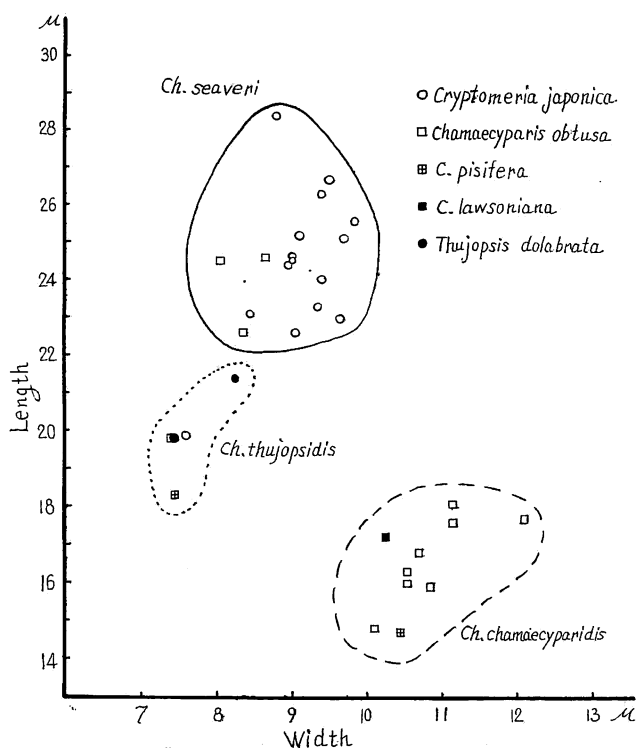


Fig. 4 Distribution of average size of ascospore in each material of three *Chloroscypha* causing needle blight in Japan.

*Chloroscypha* SEAVER, Mycol. 23 : 248, 1931 ; DENNIS, Kew Bull. 3 : 410, 1954.

Syn. *Kriegeria* RABENHORST sensu SEAVER, Mycol. 35 : 492, 1943.

1. *Chloroscypha seaveri* (REHM) SEAVER—(Plates 1: A, B, 2: A-D; Fig. 7)—Mycol. 23 : 249, 1931 ; DENNIS, Kew Bull. 3 : 410, 1954 ; DENNIS, Commonw. Mycol. Inst. Mycol. Pap. 62 : 123, 1956 ; GREMMEN, Nova Hedw. 6 : 21~22, 1963.

Syn. *Mollisia cryptomeriae* SAWADA, Bull. Gov. For. Exp. Sta. (Tokyo) 45 : 34, 1950 ; Ito *et al.*, Bull. Gov. For. Exp. Sta. (Tokyo) 52 : 126~131, 1952 ; KOBAYASHI, Jour. Jap. For. Soc. 46 : 338~343, 1964.

*Chloroscypha cryptomeriae* TERRIER, Ber. Schw. Bot Ges. 62 : 422, 1952 ; GREMMEN, Nova Hedw. 6 : 22~23, 1963.

Apothecium on needle, single or aggregate, non- or short-stipitate, black and turbinate under dry condition, cup- to disk-shaped and yellowish green to olive under moist condition, 0.5~0.7mm in diameter, 0.3mm in height. Ectal excipulum 70~80μ thick, prosenchymatous, divided into two layers, inner layer composed of dense slender hyphae arranged parallel upwards, and outer layer composed of a loose one and filled with gelatinous substance. Epithelium 13~18μ thick, olivish, constituted from small angular cells and coloured tip of paraphyses. Hymenium hyaline, formed with asci and paraphyses in a row. Hypothecium and medullary excipulum a little. Ascus hyaline, cylindric to clavate, 105~160×18~28.5μ, usually 120~140×20~24μ, 8-spored, wall 1~2.5μ thick at the side, 5~15μ thick at the tip, apical pore not blued with the MELZER reagent. Ascospore biserial, unicellular, hyaline to pale yellowish green, fusoid to boat-shaped, sometimes



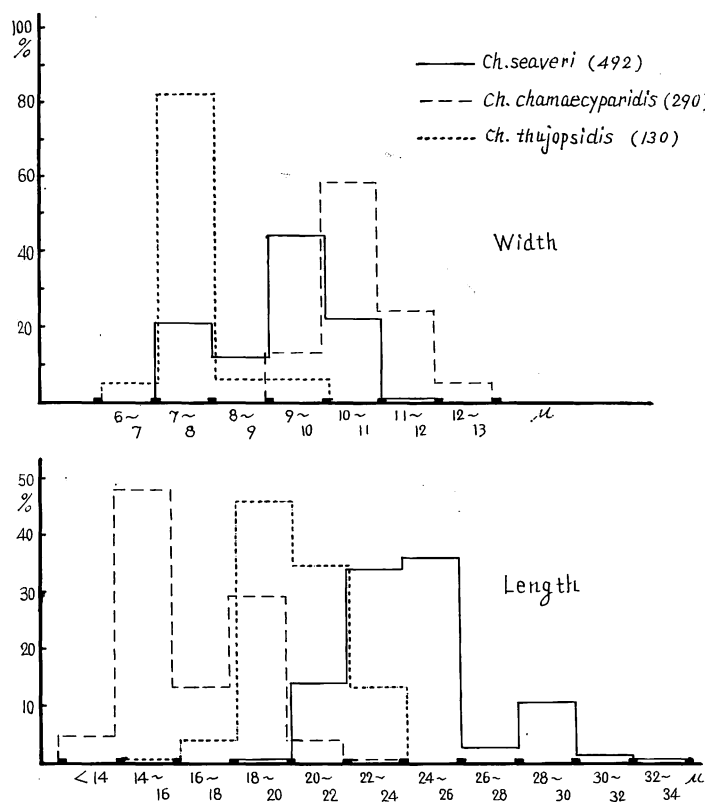


Fig. 5 Frequency of length and width of ascospore in three *Chloroscypha* causing needle blight in Japan (Total numbers of measured ascospore).

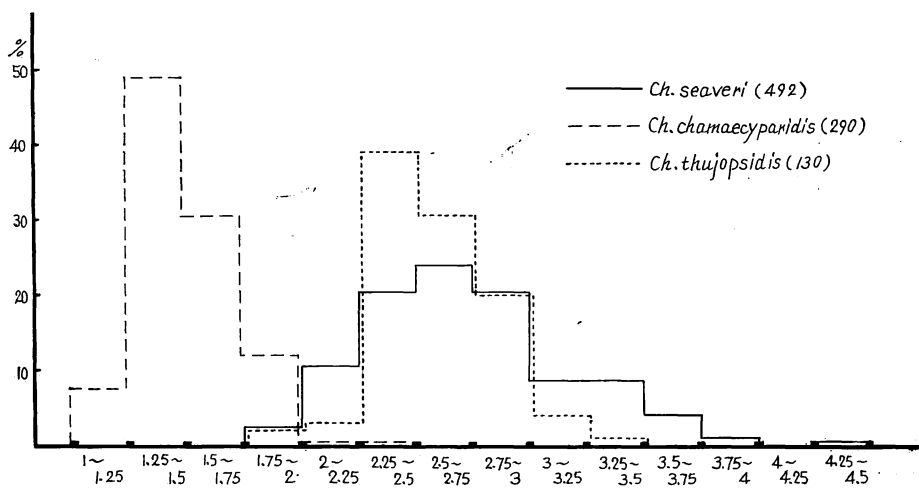


Fig. 6 Frequency of length/width ratio of ascospore in three *Chloroscypha* causing needle blight in Japan (Total numbers of measured ascospore).

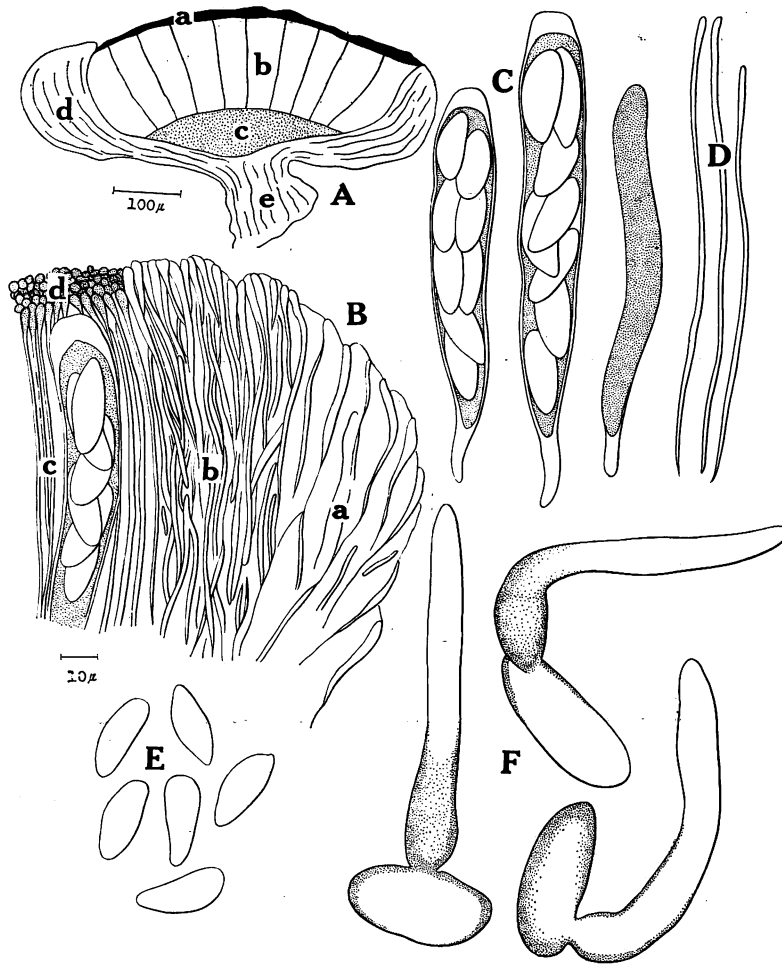


Fig.7 *Chloroscypha seaveri* (REHM) SEAVER

A : Schematic figure of apothecium (a : epithecium, b : hymenium, c : hypothecium and medullary excipulum, d : ectal excipulum, e : stalk) B : A part of apothecium (a : outer layer of ectal excipulum, b : inner layer of ectal excipulum, c : hymenium, d : epithecium) C : Asci and ascospores D : Paraphyses E : Ascospores F : Germinating ascospores

elliptic,  $18\sim34\times7.5\sim11.5\mu$ , usually  $23.5\sim26\times8\sim10.5\mu$ . Paraphysis hyaline, filiform, usually branched, swollen and pale olivish at the tip,  $125\sim165\mu$  in length.

**Host :** on blighted or self-pruned dead needles of *Thuja plicata* D. DON<sup>22)</sup>, *T. occidentalis* L. (Nioi-hiba)<sup>19)24)</sup>, *Chamaecyparis lawsoniana* PARL. (Bei-hi)<sup>5)~7)12)</sup>, *C. obtusa* SIEB. et ZUCC. (Hinoki)<sup>12)</sup>, and *Cryptomeria japonica* D. DON (Sugi)<sup>10)12)20)</sup>.

**Distribution :** North America (United States<sup>22)</sup> and Canada<sup>19)24)</sup>), Europe (England<sup>5)~7)</sup>, Switzerland<sup>27)</sup> and Netherlands<sup>8)</sup>), and Asia (Japan<sup>10)12)20)</sup>).

**Material :** *Cryptomeria japonica* D. DON—Yahaba, Iwate Pref., V-28, 1949, by K. SAWADA

(Paratype); Toribuchi, Gunma Pref., VII-7, 1951, by S. KONTANI; Kaminoyama, Yamagata Pref., XI-2, 1954, by K. ITO; Shidara, Aichi Pref., V-17, 1963; V-26, 1964, by T. KOBAYASHI; Nippara, Tokyo, XI-9, 1963, by T. KOBAYASHI; Kitafusa, Okayama, Pref., XI-21, 1963, by S. KONTANI; Kishuku, Nagasaki Pref., III-6, 1964, by Y. TOKUSHIGE; Okutama, Tokyo, IV-, 1964; Ikawa, Shizuoka Pref., V-6, 1964, by S. MIZUMOTO; Nakano, Yamanashi Pref., V-8, 1964, by Y. ZINNO; Hikawa, Tokyo, V-13, 1964, by O. CHIBA; Kurokawa, Gifu Pref., V-, 1964, by Y. MORIMOTO; Kanuma, Tochigi Pref., VI-6, 1964, by O. CHIBA. *Chamaecyparis obtusa* SIEB. et ZUCC. — Momoyama, Kyoto, IV-15, 1964, by S. KONTANI; Asakawa, Tokyo, IV-23, 1964, by T. KOBAYASHI; Shidara, Aichi Pref., V-26, 1964, by T. KOBAYASHI.

Besides the above-listed localities, the fungus has been recorded hitherto from several localities in Japan as follows: Aomori<sup>20)</sup>, Iwate<sup>10)20)</sup>, Akita<sup>10)20)</sup>, Yamagata<sup>10)20)</sup>, Fukushima<sup>20)</sup>, Miyagi<sup>10)</sup>, Saitama<sup>9)15)</sup>, Gunma<sup>9)</sup>, Okayama<sup>18)26)</sup>, Ehime<sup>10)</sup>, and Kochi<sup>30)</sup> prefectures.

**Note:** Since the first record of this fungus in 1950 in Japan, outbreaks of the needle blight of *Cryptomeria japonica* D. DON caused by it were recorded in the forest stands of Tochigi, Saitama and Gunma prefectures in 1951<sup>9)15)</sup>, and in the Kanto and Chubu districts in 1964<sup>12)</sup>.

Symptoms first appear in early spring on the 1-year-old needles of under part of the crown, and the disease immediately spreads outwards of the crown until July. Affected needles are soon killed and later twigs are also killed. Then, the heavily affected trees become reddish brown except the outermost part of the crown, and from a distance give an appearance of having been scorched by fire or injured by late frost. Branches survive and give forth adventitious buds. In August, affected trees recover their green appearance as a result of the growth of the new shoots. Apothecia are formed on the blighted needles and many matured ones are recognized from April to July. Almost all of them fall off in August and only black dots are found on these needles.

The present *Chloroscypha* may not cause the needle blight on *Chamaecyparis obtusa* SIEB. et Zucc. It was recognized only on the self-pruned dead needles of *Chamaecyparis obtusa* SIEB. et Zucc., even though they were grown adjacent to the heavily diseased stands of *Cryptomeria japonica* D. DON.

Several attempts to isolate this fungus were made and its ascospore germinated only once on *Cryptomeria* needle decoction agar. Its colony developed on the transferred potato-sucrose agar slant. Growth of the colony on this medium was very slow as noted by KONTANI and MINEO<sup>13)</sup>, and GREMMEN<sup>8)</sup>. Though they obtained the culture of this fungus, their notes on the isolation of the fungus indicated that there were certain difficulties in obtaining it. Reason for the uncertainty in germination of ascospore of the present fungus has not been explained.

## 2. *Chloroscypha chamaecyparidis* (SAWADA) T. KOBAYASHI, comb. nov. — (Plates 3, Fig. 8)

Syn. *Mollisia chamaecyparidis* SAWADA, Bull. Gov. For. Exp. Sta. (Tokyo) 46: 126, 1950; KOBAYASHI, Jour. Jap. For. Soc. 46: 339~342, 1964.

Apothecium on needle, single or aggregate, black and turbinate under dry condition, cup- to disk-shaped and yellowish green to pale olive under moist condition, 0.5~1mm in diameter, 0.1~0.2 mm in height, non- or short-stipitate. Ectal excipulum 40~80 $\mu$  thick, prosenchymatous, divided into two layers, inner layer composed of dense slender hyphae arranged parallel upwards, outer layer composed of a loose one and filled with gelatinous substance. Epithecium 15~40 $\mu$  thick, pale olive to yellowish green, constituted from small angular cells and coloured tip of paraphyses. Hymenium hyaline, formed with asci and paraphyses in a row. Stalk, if recognized, 90~220 $\mu$

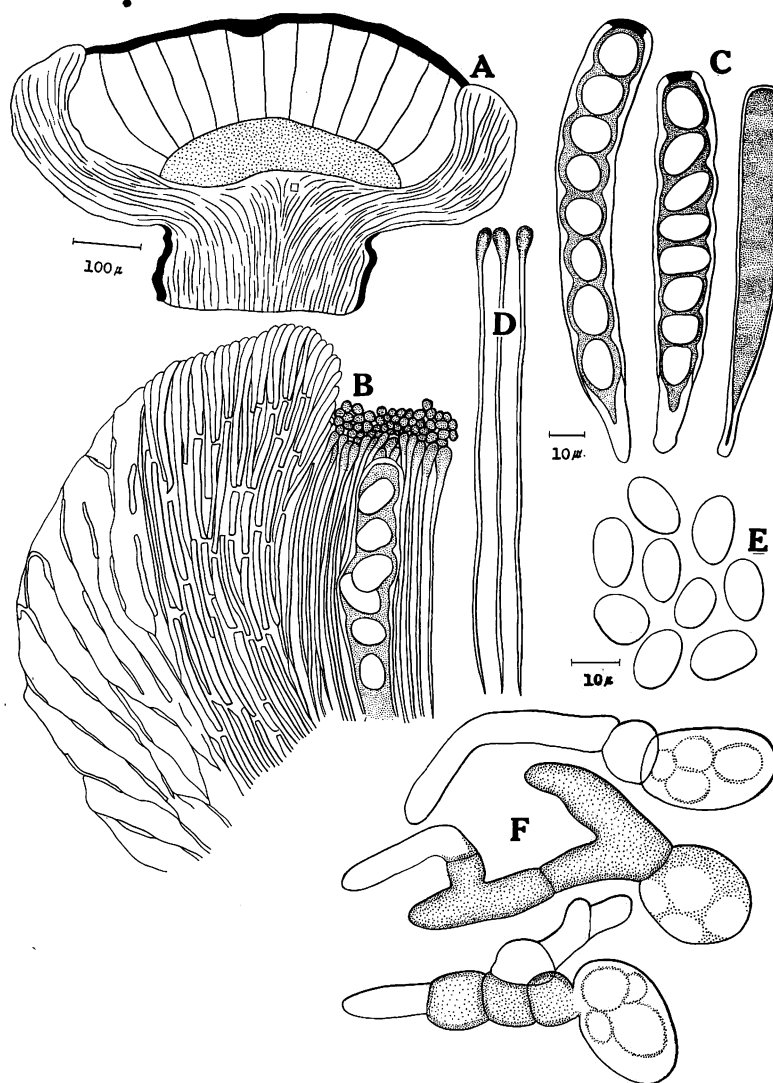


Fig. 8 *Chloroscypha chamaecyparidis* (SAWADA) KOBAYASHI

A : Schematic figure of apothecium B : A part of apothecium C : Asci and ascospores, apical pores blued with MELZER reagent D : Paraphyses E : Ascospores F : Germinating ascospores

in diameter,  $110\sim220\mu$  in length. Ascus hyaline, cylindric to clavate,  $105\sim155\times14.5\sim23.5\mu$ , usually  $120\sim140\times16\sim21\mu$ , 8-spored, wall  $1\sim2.5\mu$  in thickness, apical pore blued with MELZER reagent. Ascospore hyaline to pale yellowish green, uniseriate, rarely irregularly biseriate, unicellular, elliptic to globular, rounded at the ends,  $13\sim23.5\times9\sim13\mu$ , commonly  $14.5\sim18\times10.5\sim11.5\mu$ . Paraphysis hyaline, filiform, usually branched, swollen and olivish at the tip,  $150\sim170\mu$  in length.

**Host :** on blighted or self-pruned dead needles of *Chamaecyparis pisifira* ENDL. (Sawara)<sup>12)21)</sup>, *C. obtusa* SIEB. et ZUCC. (Hinoki)<sup>12)</sup>, and *C. lawsoniana* PARL. (Bei-hi)<sup>12)</sup>.

**Distribution :** Asia (Japan<sup>12)21)</sup>).

**Material :** *Chamaecyparis pisifera* ENDL. — Nishi-nasuno, Tochigi Pref., VII-13, 1964, by T. KOBAYASHI. *C. obtusa* SIEB. et ZUCC. — Ueno, Chiba Pref., VI-14, 1954, by T. KOBAYASHI ; Otaki, Shiga Pref., VI-, 1954 ; Hachioji, Tokyo, VI-20, 1955, by Y. ZINNO ; Asakawa, Tokyo, VI-29, 1955, by Y. ZINNO ; Ikawa, Shizuoka Pref., VII-15, 1960 ; Uratakao, Tokyo, IV-23, 1964, by T. KOBAYASHI ; Nishi-nasuno, Tochigi Pref., VII-13, 1964, by T. KOBAYASHI ; Mt. Keicho, Tochigi Pref., VII-14, 1964, by T. KOBAYASHI. *C. lawsoniana* PARL. — Kiyomi, Gifu Pref., VII-16, 1962, by Y. MORIMOTO.

SAWADA first described this species on *Chamaecyparis pisifera* ENDL. collected from Iwate and Akita prefectures.

**Note :** This fungus was collected only on *Chamaecyparis* spp. An outbreak of the needle blight caused by the present *Chloroscypha* was recorded in 1954 on *Chamaecyparis obtusa* SIEB. et ZUCC. in nurseries and forest stands. Two-year-old seedlings in two nurseries of Chiba prefecture were severely attacked and one hundred thousand of the seedlings became useless during the year. Symptoms on them appeared in the early spring. The disease spreads immediately and affected needles fall to the ground. Twigs gradually die by the loss of their needles and heavily affected seedlings finally die. In the case of the plantations, extremely closed forests are often affected severely. Damaged trees did not die but they lost a half or more branches of the crown by the needle blight. In this year, extreme drought was recorded in spring. There were no rainfalls for about a month after transplanting the seedlings. It is assumed from the foregoing that a weakened condition caused by the drought stimulated the development of the needle blight.

In the case of *Chamaecyparis pisifera* ENDL. the fungus was collected only on its dead needles in hedges.

This fungus was also found in a forest of *Chamaecyparis lawsoniana* PARL. planted experimentally in Gifu prefecture. It causes severe needle blight on the host together with another needle blight fungus, whose systematic position has not yet been determined. Occurrence of the mixed infection was first discovered in 1960 and has been continuously observed every year since.

In several attempts to isolate the present *Chloroscypha*, its ascospore germinated only once on *Cryptomeria* decoction agar. Germinating ascospore swelled, became greenish brown and bore its germ-tube everywhere. However, germinated ascospore which was transplanted to potato-sucrose agar failed to develop its colony.

3. *Chloroscypha thujopsidis*(SAWADA)T. KOBAYASHI, comb. nov. — (Plates, 2 : E-G, Fig. 9)

Syn. *Mollisia thujopsidis* SAWADA, Bull. Gov. For. Exp. Sta. (Tokyo) 46 : 141, 1950 ; KOBAYASHI, Jour. Jap. For. Soc. 46 : 339~343, 1964.

Apothecium on needle, hypophyllous on *Thujopsis*, amphigenous on the other hosts, single or aggregate, black and turbinate under dry condition, cup- to disk-shaped and yellowish green to olivish under moist condition, 0.4~0.6mm in diameter, non- or short-stipitate. Ectal excipulum olivish, prosenchymatous, divided into two layers, inner layer composed of dense slender hyphae arranged parallel upwards, outer layer composed of loose hyphae and filled with gelatinous substance. Epithecium olivish, constituted from small angular cells and coloured tip of paraphyses. Hymenium hyaline, formed with asci and paraphyses in a row. Hypothecium and medullary excipulum a little. Ascus hyaline, cylindric to clavate, 80~135×15.5~21μ, usually 90~120×15.5~21μ, 8-spored, apical pore blued with the MELZER reagent, wall

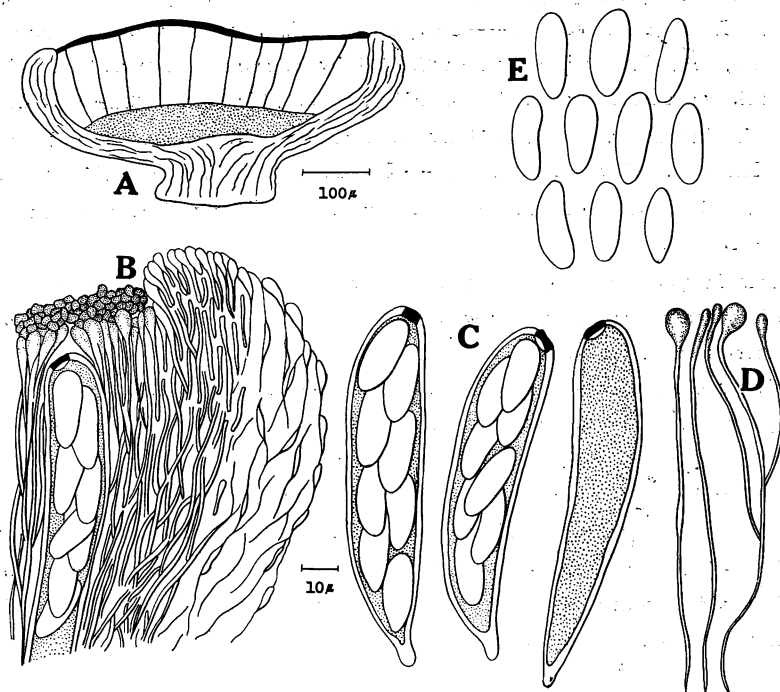


Fig. 9 *Chloroscypha thujopsidis* (SAWADA) KOBAYASHI

A : Schematic figure of apothecium    B : A part of apothecium    C : Asci and ascospores, apical pores blued with MELZER reagent    D : Paraphyses    E : Ascospores

1~2.5 $\mu$  in thickness. Ascospore biseriata, unicellular, hyaline to pale yellowish green, fusoid to boat-shaped, sometimes elliptic, 15.5~23.5 $\times$ 6.5~9 $\mu$ , usually 18~21 $\times$ 7.5~8 $\mu$ . Paraphysis hyaline, filiform, usually branched, swollen and olivish at the tip, 100~150 $\mu$  in length.

**Host :** on blighted or self-pruned dead needles of *Thujopsis dolabrata* SIEB. et ZUCC. (Hiba)<sup>12)</sup>, *T. dolabrata* var. *hondai* MAKINO (Hinoki-asunaro)<sup>21)</sup>, *Thuja standishii* CARR. (Nezuko)<sup>21)</sup>, *Chamaecyparis obtusa* SIEB. et ZUCC. (Hinoki)<sup>12)</sup>, *C. pisifera* ENDL. (Sawara)<sup>12)</sup>, and *Cryptomeria japonica* D. DON (Sugi)<sup>12)</sup>.

**Distribution :** Asia (Japan<sup>12)21)</sup>).

**Material :** *Thujopsis dolabrata* SIEB. et ZUCC. — Shizukuishi, Iwate Pref., V-11, 1964, by K. SATO ; Morioka, Iwate Pref., VI-23, 1964, by K. SATO. *Cryptomeria japonica* D. DON — Kitagawa, Miyazaki Pref., V-11, 1964, by Y. YOSHINAGA. *Chamaecyparis obtusa* SIEB. et ZUCC. — Fushimi, Kyoto, IV-15, 1964, by S. KONTANI. *C. pisifera* ENDL. — Nishi-nasuno, Tochigi Pref., VII-13, 1964, by T. KOBAYASHI.

SAWADA described this species on *Thujopsis dolabrata* var. *hondai* MAKINO collected in Aomori and Akita prefectures, and on *Thuja standishii* CARR. collected in Miyagi prefecture.

**Note :** No serious outbreak of the needle blight caused by the present fungus has been recorded up to the present. On *Thujopsis dolabrata* SIEB. et ZUCC. it causes needle blight, but does not cause heavy damage. The fungus was also collected on *Cryptomeria japonica* D. DON in Kyushu. Symptoms caused by the present species on them are quite similar to those caused by *Chloroscypha seaveri* (REHM) SEAYER. Two species of *Chloroscypha* on *Cryptomeria* are to be differentiated only by microscopic examination of each other.

The fungus may inhabit saprophytically *Chamaecyparis obtusa* SIEB. et Zucc. and *C. pisifera* ENDL.

Isolation of this species was unsuccessful. Ascospore could not be germinated on any tested agar media.

### Summary

1. Systematic position of three needle blight fungi on several kinds of Japanese conifers which had been previously regarded as the species of the genus *Mollisia* by SAWADA, was restudied, and *Chloroscypha* SEEVER was accepted as the generic name for them.

2. Several characteristics which are recognized under microscope, such as size of ascus and ascospore, thickness of ascus wall at the tip, MELZER reagent reaction of apical pore of ascus, arrangement of ascospore in ascus, and shape and length/width ratio of ascospore, are available to identify the species of *Chloroscypha* causing the needle blight in Japan.

3. Of three fungi restudied here, *Mollisia cryptomeriae* SAWADA was treated as a synonym of *Chloroscypha seaveri* (REHM) SEEVER. *Chloroscypha cryptomeriae* TERRIER described by TERRIER from Switzerland was also treated as a synonym of it. The other two fungi remained as independent species, respectively, but they were recombined under the genus *Chloroscypha* from *Mollisia* respectively as *C. chamaecyparidis* (SAWADA) KOBAYASHI and *C. thujopsidis* (SAWADA) KOBAYASHI.

4. These three *Chloroscyphae* have a wide host-range and, in general, inhabit harmlessly on the self-pruned dead needles of several kinds of conifers. However, they sometimes cause severe needle blight on particular host plants. *Chloroscypha seaveri* (REHM) SEEVER causes severe needle blight on *Cryptomeria japonica* D. DON, but not on *Chamaecyparis obtusa* SIEB. et Zucc. In the cases of *Chamaecyparis obtusa* SIEB. et Zucc. and *C. lawsoniana* PARL. the needle blight is caused by *Chloroscypha chamaecyparidis* (SAWADA) KOBAYASHI, though the other two species inhabit saprophytically on them. *Chloroscypha thujopsidis* (SAWADA) KOBAYASHI causes commonly the needle blight of *Thujopsis dolabrata* SIEB. et Zucc. It is found saprophytically on *Chamaecyparis obtusa* SIEB. et Zucc. and *C. pisifera* ENDL. It is observed in rare cases that *Chloroscypha thujopsidis* (SAWADA) KOBAYASHI causes the needle blight of *Cryptomeria japonica* D. DON which is quite similar to that caused by *C. seaveri* (REHM) SEEVER on the same host.

5. Worth noting in the fact that there was great uncertainty in the germination of their ascospore. Almost all of the attempts to isolate these fungi failed, since their ascospores did not germinate on any kind of agar media tested. Germination of ascospore was obtained only twice. Reason for the capricious germination of ascospore in these fungi has not been explained.

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### Explanation of plates

#### Plate 1

*Chloroscypha seaveri* (REHM) SEAYER

A : A diseased forest of *Cryptomeria japonica* D. DON (Danto National Forest., Photo. V-26, 1964).

B : Apothecia produced on the infected needle of *Cryptomeria japonica* D. DON

#### Plate 2

*Chloroscypha seaveri* (REHM) SEAYER

A : Infected needles of *Cryptomeria japonica* D. DON showing apothecia as black dots.  $\times 1$

B : Do. Enlarged.  $\times 2$

C : Apothecium.  $\times 130$

D : Ascus having thick wall at the tip.  $\times 500$

*Chloroscypha thujopsidis* (SAWADA) KOBAYASHI

E : Infected needles of *Thujopsis dolabrata* SIEB. et ZUCC. showing apothecia as black dots.  $\times 1.5$

F : Infected needles of *Cryptomeria japonica* D. DON showing apothecia as black dots.  $\times 2$

G : Ascus having thin wall and blue-stained apical pore.  $\times 500$

#### Plate 3

*Chloroscypha chamaecyparidis* (SAWADA) KOBAYASHI

A : Infected needles of *Chamaecyparis obtusa* SIEB. et ZUCC. showing apothecia as black dots.  $\times 2$

B : Infected needles of *Chamaecyparis lawsoniana* RARL. showing apothecia as black dots.  $\times 2.5$

C : Apothecium produced on *Chamaecyparis obtusa* SIEB. et ZUCC.  $\times 130$

D : Apothecium produced on *Chamaecyparis lawsoniana* RARL.  $\times 90$

E : Clushed apothecium showing many asci in circle.  $\times 150$

F : Ascus having thin wall.  $\times 500$

## 針葉樹黒粒葉枯病菌の属ならびに種の

## 分類同定に関する再検討

小林 享 夫<sup>(1)</sup>

## (要 旨)

現在わが国には針葉樹の黒粒葉枯病菌の病原菌として3種の菌が知られている。すなわち、スギ黒粒葉枯病菌(*Mollisia cryptomeriae* SAWADA)<sup>20)</sup>、ヒノキ(サワラ)黒粒葉枯病菌(*M. chamaecyparidis* SAWADA)<sup>21)</sup>、およびヒノキアズナロ(ヒバ)黒粒葉枯病菌(*M. thujae* SAWADA)<sup>21)</sup>である。このうちスギ黒粒葉枯病菌によると思われるスギの病害は、すでに1920年代に北島<sup>11)</sup>によって各地から報告され、また別に富樫ら<sup>28)29)</sup>によって岩手県下から報告されている。これらの報告では病原菌の種の同定はおこなわれず、1950年沢田によってはじめて命名記載された。しかし、近年になって欧米の針葉樹に日本産の黒粒葉枯病菌によく似た葉枯性病菌が数種あり、それらには *Mollisia* とは異なる属名が用いられていることがわかった。そこでこれら日本産ならびに欧米産の葉枯性病菌の異同と所属について検討を加えることとし、研究室保存標本および新たに各地から採集された標本の調査をおこない、日本産の黒粒葉枯病菌の所属と類別をあきらかにした。

国内各地から採集されたスギ15、ヒノキ12、サワラ2、ベイヒ1、ヒバ2の計32標本の調査の結果、日本産の黒粒葉枯病菌は、沢田が記載したように3種に類別されるが<sup>12)</sup> (Table 1, Figs. 1~6)、それらは子のう盤の構造、子のう胞子の形状などから、あきらかに *Mollisia* 属ではなく、北米では *Kriegeria*、欧州では *Chloroscypha* として用いられている属に所属する。1931年にこの群の菌類をまとめて *Chloroscypha* 属を創設した SEAVER<sup>22)</sup> は、のち文献により *Chloroscypha* 属の菌は1887年に記載された *Ombrophila? kriegeriana* RABENHORST<sup>16)</sup> と同じ特徴を有するとし、この種の記載のあとがきを正式な記述と認め *Kriegeria* RABENHORST を属名として採用し、*Chloroscypha* SEAVER をその異名とした<sup>24)</sup>。「Dictionary of fungi」<sup>2)</sup> は SEAVER にしたがって *Kriegeria* 属を採用している。

一方、DENNIS<sup>5)</sup> は RABENHORST のあとがきはかりの意見であって正式な属の記載ではないとして SEAVER の属名変更を認めず、*Chloroscypha* SEAVER を正名として用いた。GREMMEN<sup>8)</sup> は DENNIS にしたがって *Chloroscypha* 属を用いている。筆者も DENNIS と同じく、RABENHORST の記載は種の記載であり、そのあとがきは属の記載とは認め難いと考える。さらに *Ombrophila kriegeriana* RABENH. の標本を直接しらべた WINTER<sup>32)</sup>、REHM<sup>17)18)</sup>、WHITE<sup>31)</sup> らはいずれもこの菌を *Rutstroemia elatina* (ALB. et SCHW.) REHM と同一菌とし、その異名とした。*Rutstroemia* 属は子のう盤が寄主組織内の子座から生じ Sclerotiniaceae に所属する<sup>7)14)18)25)31)</sup> が、*Chloroscypha* 属にはこのような子座はなく Helotiaceae に所属する<sup>7)14)25)</sup>。したがって、SEAVER が *Kriegeria* 属のタイプ種とした *Ombrophila kriegeriana* RABENH. を、*Chloroscypha*

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属の菌と同一属とするには大きな疑問があり、属の資格についての疑義とともに *Kriegeria* 属を用いるのは不適当と考える。これらの点から、黒粒葉枯病菌の属名には DENNIS と同じく *Chloroscypha* SEAYER を採用する。

次に日本産および欧米産の黒粒葉枯病菌の異同を比較するため、それらの主要な形態的特徴と寄主を Table 2 にしめた。表にみるごとく、スギ黒粒葉枯病菌は1952年にスイスでスギ上に記載された *Chloroscypha cryptomeriae* TERRIER によく一致するとともに *Chloroscypha* 属のタイプ種 *C. seaveri* (REHM) SEAYER にもよく一致する。最近 GREMMEN<sup>8)</sup> はオランダから3種の *Chloroscypha* を報告したが、そのなかで伊藤ら<sup>11)</sup> の記載によって *Mollisia cryptomeriae* SAWADA を *Chloroscypha cryptomeriae* TERRIER と同一菌と考えた。現在のうえにあげた3種の菌は、子のう頂孔が MELZER 試薬に青染しないこと、子のう頂膜が著しく厚いこと、子のう胞子の形、大きさ、ならび方などの点でまったく一致し同一種と考えられるので、*Mollisia cryptomeriae* SAWADA および *Chloroscypha cryptomeriae* TERRIER をいずれも *C. seaveri* (REHM) SEAYER の異名として処理した。ヒノキ黒粒葉枯病菌およびヒバ黒粒葉枯病菌は、それぞれ *Chloroscypha cedrina* (COOKE) SEAYER および *Kriegeria enterocloma* (PECK) SEAYER に似るが、あとの2菌については MELZER 試薬反応が不明であるので、沢田の記載した2種はそれぞれ独立種として残し、属名変更にとどめた。以上によって日本産黒粒葉枯病菌の属、種名を整理して次にしめす。

***Chloroscypha* SEAYER**, Mycol. 23 : 248, 1931, DENNIS, Kew. Bull. 3 : 410, 1954.

異名 : *Kriegeria* RABENHORST sensu SEAYER, Mycol. 35 : 492, 1943.

1. ***Chloroscypha seaveri* (REHM) SEAYER** — (Plate 1, 2, A~D, Fig. 7) — Mycol. 23 : 249, 1931 ; DENNIS, Kew. Bull. 3 : 410, 1954 ; DENNIS, Commonw. Mycol. Inst. Mycol. Pap. 62 : 123, 1956 ; GREMMEN, Nova Hedw. 6 : 21~22, 1963.

異名 : *Mollisia cryptomeriae* SAWADA, 林試研報 45 : 34, 1950 ; 伊藤ら, 林試研報 52 : 126~131, 1952 ; 小林, 日林誌 46 : 339~343, 1964.

*Chloroscypha cryptomeriae* TERRIER, Ber. Schw. Bot. Ges. 62 : 421, 1952 ; GREMMEN, Nova Hedw. 6 : 22~23, 1963.

寄主 : *Thuja plicata* D. DON<sup>22)</sup>, ニオイヒバ<sup>19)25)</sup>, ベイヒ<sup>5)~7)</sup>, ヒノキ<sup>12)</sup> およびスギ<sup>10)12)20)</sup> の針葉に生ずる。

分布 : 北米 (アメリカ<sup>22)</sup>, カナダ<sup>19)25)</sup>), 欧州 (イギリス<sup>5)~7)</sup>, スイス<sup>27)</sup>, オランダ<sup>8)</sup>) およびアジア (日本<sup>10)12)20)</sup>)。

和名 : スギ黒粒葉枯病菌<sup>9)</sup>

2. ***Chloroscypha chamaecyparidis* (SAWADA) T. KOBAYASHI**, comb. nov. — (Plate 3, Fig. 8)

異名 : *Mollisia chamaecyparidis* SAWADA, 林試研報 46 : 126, 1950 ; 小林, 日林誌 46 : 339~343, 1964.

寄主 : サワラ<sup>12)21)</sup>, ヒノキ<sup>1)12)</sup> およびベイヒ<sup>12)</sup> の針葉に生ずる。

分布 : アジア (日本<sup>12)21)</sup>)。

和名 : ヒノキ黒粒葉枯病菌。沢田<sup>21)</sup> はサワラ黒粒葉枯病菌と命名したが、一般にはヒノキ黒粒葉枯病菌<sup>1)</sup> として用いられている。本菌による黒粒葉枯病はヒノキにもっとも重要であるから、ヒノキ黒粒葉枯病菌

を残した。

3. *Chloroscypha thujopsidis* (SAWADA) T. KOBAYASHI, comb. nov. — (Plate 2 : E~G, Fig. 9)

異名 : *Mollisia thujopsidis* SAWADA, 林試研報 46 : 141, 1950 ; 小林, 日林誌 46 : 339~343, 1946.

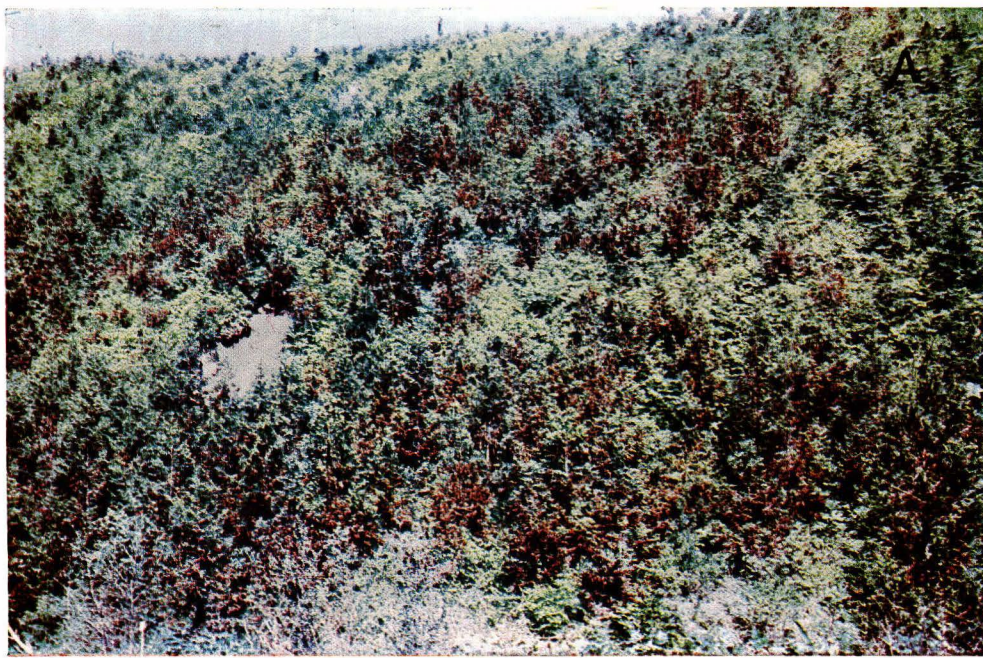
寄主 : ヒバ<sup>12)</sup>, ヒノキアスナロ<sup>21)</sup>, ネズコ<sup>21)</sup>, ヒノキ<sup>12)</sup>, サワラ<sup>12)</sup> およびスギ<sup>12)</sup> の針葉に生ずる。

分布 : アジア (日本<sup>12)</sup><sup>21)</sup>)

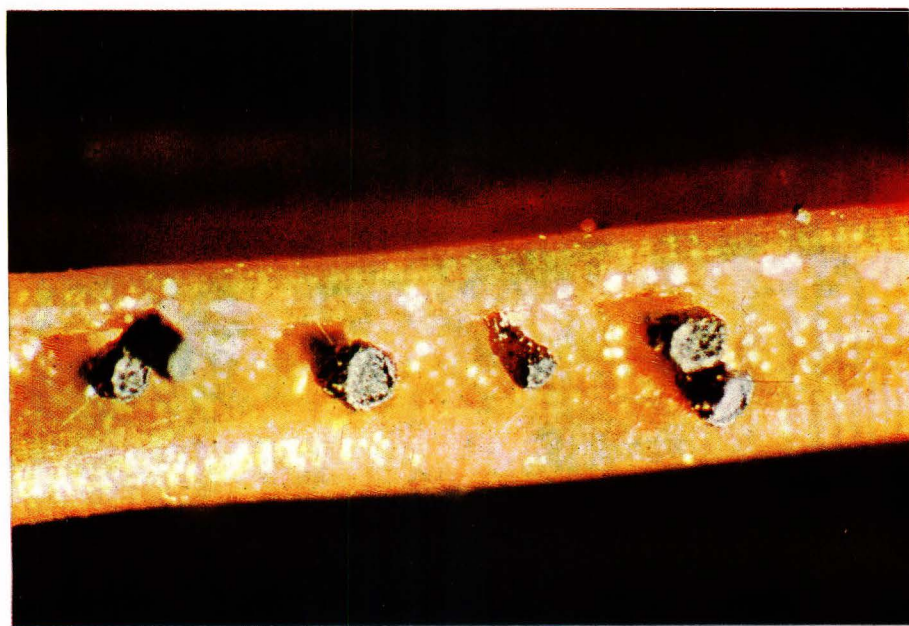
和名 : ヒバ黒粒葉枯病菌。沢田<sup>21)</sup> はヒノキアスナロ黒粒葉枯病菌と命名したが, ヒノキアスナロはヒバの変種であること, 寄主の重要性などから, 本菌をヒバ黒粒葉枯病菌と改めたい。

これら3種の黒粒葉枯病菌は, 寄主範囲がひろくたがいに重複するが, いままでのところスギ黒粒葉枯病菌がスギに<sup>9)</sup><sup>12)</sup><sup>15)</sup>, ヒノキ黒粒葉枯病菌がヒノキ<sup>1)</sup><sup>12)</sup> に大発生して問題になったほかは, 特に病害として問題になった記録はなく, 今回の調査においても, 他の樹種上では下枝の枯死針葉上に腐生的に生じたものがほとんどであった。ただヒバ黒粒葉枯病菌がスギ上にスギ黒粒葉枯病菌によるのによく似た病状をしめした1例があり, あるいは今後他の樹種上でも問題になる可能性がないとはいえない。

黒粒葉枯病菌の子のう胞子は, かなり容易に放出されるにもかかわらず, 寒天培地上で発芽させることがなかなかむずかしいものである。このことは紺谷・峰尾<sup>13)</sup> および GREMMEN<sup>8)</sup> の報告からもうかがえるが, 筆者のおこなった多くの分離実験のうち, 発芽したのは2回のみであった。



A



B

