

# Esulent Basidiomycetes in the *Castanopsis cuspidata* Forest

by

M. MINAMIKAWA, T. HIRANO and T. OHSAWA

## Introduction

Japan extends from the high latitudes to the low latitudes. Therefore, various vegetation zones, namely subtropical zone, warm temperate zone, temperate zone and subarctic zone are recognized in this country. It is much rainfall from spring to autumn, and humid in all seasons. Therefore, the sylvan fungi grow remarkably throughout the year.

Recently the fungus has been regarded to be important as aromatic savory foodstuff and as sightseeing resources. Particularly *Tricholoma matsutake*, *T. aggregatum* and *Lentinus edodes* of *Basidiomycetes* are favorite esulent fungi. As a result of reckless harvest of fungus and reckless deforestation, the production of fungus is decreasing year and year, hence the persons concerned are promoting the research for the production increase, the artificial culture and the culture out of season of fungus.

The authors have investigated the environment, the ecology, the species, the chemical component of fruit body and culture of fungus in many forests and fields. In this paper, the investigations about esulent fungus growing in *Castanopsis cuspidata* forest were reported as preliminary report. In the *Pinus densiflora* forest or coppice, *Tricholoma matsutake*, *Lyophyllum aggregatum* and other fungi are observed. Also in the evergreen forest, many species of fungi grow in large quantities. However, there is little investigation about these fungi. This time, the authors investigated the esulent fungi growing in the *Castanopsis cuspidata* forest. As the areas of investigation, mountains in Kinki and Tokai districts were selected since near to the laboratory. In this paper the investigation about the forests of Suzuka mountains lying on Mie, Shiga and Gifu prefectures was reported.

## Methods

As a preliminary to this investigation, researches for the compositions of *C. cuspidata* forests in above area were carried out, and these forests were classified into various faciations. Fungi growing in the *C. cuspidata* forest of each faciation were investigated through the year. Among many kinds of fungus, the esulent fungi were selected and arranged.

## Composition of the Forest in which the Fungi Grow

The evergreen forests are distributed from seaside district of 38° N of the southern part of northeastern districts to Yakushima and Tanegashima islands in Japan. In Suzuka mountains, vertical distribution of evergreen forest is observed up to 800 meters above the sea. *C. cuspidata* forest is distributed up to 300 meters above the sea. Plant community was investigated, particularly in *C. cuspidata* forest in which fungus grew.

The result indicates *C. cuspidata* forest in Suzuka mountains belongs to *Sakakieta-Shiuetum cuspidatae*. Namely, *Castanopsis cuspidata* is the absolute dominant species, and *Cleyera japonica*, *Cyclobalanopsis glauca* and *C. saricina* var. *stenophylla* are secondly dominant species. The climax community in this forest is *Sakakieta-Shiuetum cuspidatae* whose characteristic species are *Cleyera japonica* and *Castanopsis cuspidata*. Further analytical research indicates the growth of *C. glauca* in high frequency, and the development of Subass. *Cyclobalanopsidetosum* whose characteristic species is *C. Glauca*, *Castanopsis cuspidata* community and Subass. *dicaletosum* in which *Symplocos glauca* is dominant and characteristic species. In these forests, moss and lichen, i. e. *Leucobryum bowringii*, *Hypnum plamaeforme*, *Isopterygium textorii*, *Dicranum japonicum* and *Bazzania pompeana*, grow vigorously.

## Fungus in the *Castanopsis cuspidata* Forest

- a) Fungi develop through the year in *C. cuspidata* forest of Suzuka mountains, especially in summer. The period of late June and early August is the best time of the year for fungus. Following fungi were observed in this period; *Leccinum scabrum*, *Lactarius violascens*, *L. volemus*, *Russula lepida*, *R. vesca*, *R. crustosa*, *R. rubescens*, *R. cyanoxantha*, *R. virescens*, *R. foetens*, *R. subnigricans*, *Amanita vaginata*, *A. echinocephala*, *A. spreta*, *A. griseofarinoso*, *Strobilomyces floccopus*, *Clitopilus lignyorus*, *Inocybe kasugayamensis*, *Tylopilus virens*, *Boletus regius*, *Porphyrellus subvirens*, *P. elegans*, *Pulveroboletus retipes*, *Cortinarius subalbovillaceus*, *C. rubicundulus*, *Xerocomus chrysenteron* and *Panellus rudis*.
- b) In winter and spring, *Galerina clavata*, *Mycena roseocandida* were observed on the earth, *Lentinus edodes* and *Favolus arcularius* were observed on the stump and withered branch.
- c) A few species of fungi were observed in autumn; *Lactarius chrysorrheus*, *Cantharellus cibarius*, *Hygrophorus russula*, *H. subviolaceus* and *Tricholoma fulvocastaneum*. On the stump and withered branch, *Lentinus edodes* and *Oudemansiella mucida* were observed.
- d) Fruit bodies of *Russula* (*Russulaceae*) and *Tylopilus* (*Boletaceae*) come out in large quantities in summer.

e) *Amanita echinocephala*, whose pileus of fruit body comes up to 20 centimeters in diameter, was observed in *C. caspidata* forest.

#### Summary

In this paper, the investigations of fungus growing in *Castanopsis cuspidata* forest, that develops in Suzuka mountains, are reported.

- 1) From the viewpoint of phytosociology, *C. caspidata* forest belongs to *Sakalieto-Shiietum cuspidatae*. These were classified into the faciations of Subass. *Cyclobalanopsidetosum*, *Castanopsis cuspidata* community and Subass. *dicaletosum*.
- 2) Fungi grow vigorously in summer in *C. caspidata* forest. Among others, *Russula* (*Russulaceae*) and *Tylopilus* (*Bletaceae*) are dominant.
- 3) Various species of esculent fungi are observed also in *C. caspidata* forest.

#### References

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	Locality	①	②	③	④	⑤	⑥	⑦	⑧	Average cover degree	Presence
	Altitude (m)	120	115	260	200	240	86	100	210		
	Exposition	EN	E	E	E	E	E	SE	NW		
	Slope degree	12°	10°	5°	20°	25°	5°	13°	15°		
	Quadrat number	125	30	17	131	136	76	133	69		
Tree layer	<i>Castanopsis cuspidata</i>	4	4	4	5	4	5	5	4	4.4	V
	<i>Cyclobalanopsis glauca</i>	1	1	+	1	•	1	•	2	0.8	II
	<i>Machilus Thunbergii</i>	•	+	1	•	1	1	1	•	0.5	I
	<i>Cyclobalanopsis myrsinaefolia</i>	+	+	•	+	+	+	•	•	+	I
	<i>C. salicina var stenophylla</i>	+	•	2	•	+	+	•	•	0.3	I
	<i>C. paucidentata</i>	•	+	•	•	•	•	•	1	0.3	I
	<i>Cryptomeria japonica</i>	•	2	+	+	+	+	+	1	0.4	II
	<i>Pinus densiflora</i>	•	+	•	•	•	•	+	1	0.1	I
Subtree layer	<i>Cleyera japonica</i>	1	1	2	2	1	3	2	1	1.6	V
	<i>Castanopsis cuspidata</i>	1	2	+	2	•	2	•	2	1.1	IV
	<i>Cyclobalanopsis glauca</i>	1	•	•	1	+	1	+	+	0.4	I
	<i>Machilus Thunbergii</i>	+	+	•	+	•	+	•	•	+	I
	<i>Camellia japonica</i>	1	+	1	+	+	1	+	+	0.4	I
	<i>Illicium anisatum</i>	+	+	•	1	•	+	+	+	0.1	I
Shrub layer	<i>Cleyera japonica</i>	2	2	3	2	2	2	2	2	2.1	V
	<i>Castanopsis cuspidata</i>	1	1	1	1	+	1	+	+	0.6	IV
	<i>Eurya japonica</i>	+	+	+	1	+	+	•	•	0.1	I
	<i>Illicium anisatum</i>	+	+	•	•	+	+	+	1	0.1	I
	<i>Ligustrum japonicum</i>	+	+	+	•	•	+	+	•	+	I
	<i>Pieris japonica</i>	+	+	•	+	•	+	•	•	+	I
Herb layer	<i>Dryopteris erythrosora</i>	+	+	+	+	+	+	•	+	+	II
	<i>D. varia</i>	+	+	+	+	+	+	+	+	+	II
	<i>Dicranopteris dichotoma</i>	+	•	•	+	•	•	+	•	+	I
	<i>Diplopterygium glaucum</i>	•	+	•	•	•	•	+	•	+	I
	<i>Struthiopteris japonica</i>	+	+	+	+	+	•	+	+	+	I
	<i>Bladhia japonica</i>	•	+	•	•	+	•	+	•	+	I
	<i>Wisteria floribunda</i>	+	1	+	•	•	+	•	+	0.1	I
	<i>Trachelospermum asiaticum</i>	+	+	+	+	•	+	+	+	+	I

Table 1 Summarized association table of *Sakakito-Sh etum cuspidatae*

	Locality	①	②	③		④	Average cover degree	Presence
		110	300	85	78	200		
	Altitude (m)	SE	SE	NE	NE	NW		
	Excosition	8°	25°	15°	15°	10°		
	Slope degree	122	94	26	27	66		
	Quadrat number							
Tree layer	<i>Castanopsis cuspidata</i>	4	4	5	5	4	4 4	V
	<i>Cyclobalanopsis glauca</i>	1	1	1	1	1	1 0	IV
	<i>C. gilva</i>	1	+	•	•	•	0 2	II
	<i>Cryptomeria japonica</i>	1	1	•	•	1	0 6	II
	<i>Pinus densiflora</i>	1	•	•	•	1	0 4	II
Subtree layer	<i>Cyclobalanopsis glauca</i>	1	1	1	1	+	0 8	V
	<i>Castanopsis cuspidata</i>	+	+	1	1	1	0 6	V
	<i>Vaccinium bracteatum</i>	1	+	+	•	+	0 2	II
	<i>Neolitsea sericea</i>	1	1	+	+	+	0 4	II
	<i>Camellia japonica</i>	1	+	+	+	+	0.2	II
Shrub layer	<i>Cyclobalanopsis glauca</i>	2	2	2	2	1	1 8	V
	<i>Castanopsis cuspidata</i>	1	1	1	1	1	1 0	IV
	<i>Machilus Thunbergii</i>	•	+	+	+	•	+	II
	<i>Ligustrum japonicum</i>	•	+	+	+	+	+	II
	<i>Damnacanthus indicus</i>	•	•	+	+	•	+	II
Herd layer	<i>Dryopteris erythrosora</i>	+	+	+	+	+	+	II
	<i>D. varia</i>	+	+	+	+	+	+	II
	<i>Lemmaphyllum microphyllum</i>	•	+	+	+	•	+	II

Table. 2 Summarized association table of Subass *cyclobalanopsidetosum*

Species	Height (m)														Total		
	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	10-12	12-13	13-14	14-15	15-16	16-19		19-20	20-21
<i>Castanopsis cuspidata</i> (Cc)	1				2	1	2			1	1			1	1	3	13
<i>Cyclobalanopsis glauca</i> (Cg)	1							1	1			1					4
<i>Cryptomeria japonica</i> (Cr)																1	1
<i>Machilus Thunbergii</i> (Mt)							1	1									2
<i>Cleyera japonica</i> (So)	6		1	3	1	1											12
<i>Camellia japonica</i> (Cj)				1													1
<i>Illicium amsatum</i> (Ia)		1															1
<i>Dendropanax trifidus</i> (Dt)	1																1
Total	9	1	1	4	3	2	3	2	2	1	1	1	1	1	1	4	35

Table. 3 Number of trees in each height grade in no. 31 belt-transect.

Species	Diameter above breast height (cm)													Total
	1-2	2-4	4-5	5-6	6-7	7-8	8-10	20-22	24-26	30-32	34-36	48-50	50-52	
<i>Castanopsis cuspidata</i> (Cc)		1			1	2	2	1	1	1	1	1	2	13
<i>Cyclobalanopsis glauca</i> (Cg)	1				1		1		1					4
<i>Cryptomeria japonica</i> (Cr)													1	1
<i>Machilus Thunbergii</i> (Mt)						1	1							2
<i>Cleyera japonica</i> (So)	6		1	2	2		1							12
<i>Camellia japonica</i> (Cj)			1											1
<i>Illicium anisatum</i> (Ia)		1												1
<i>Dendropanax trifidus</i> (Dt)	1													1
Total	8	2	2	2	4	3	5	1	2	1	1	1	3	35

Table 4 Number of trees in each diameter grade in no 31 belt-transect

species	Height (m)											Total
	0-2	2-4	4-6	6-8	8-10	12-14	14-16	18-19	19-20	21-22	22-23	
<i>Castanopsis cuspidata</i> (Cc)		1	1	1	1		1		1	2	1	9
<i>Cyclobalanopsis glauca</i> (Cg)		2	2	1			1	1	1			8
<i>C salicina var stenophylla</i> (Ss)			1									1
<i>Machilus Thunbergii</i> (Mt)			1			1						2
<i>Vaccinium bracteatum</i> (Vb)	1											1
<i>Ligustrum japonicum</i> (Lj)	1											1
<i>Camellia japonica</i> (Cj)					1							1
<i>Neolitsea sericea</i> (Ns)			1									1
<i>Damnacanthus indicus</i> (Di)	2											2
Total	4	3	6	2	1	1	2	1	2	2	1	26

Table 5 Number of trees in each height grade in no 29 belt-transect

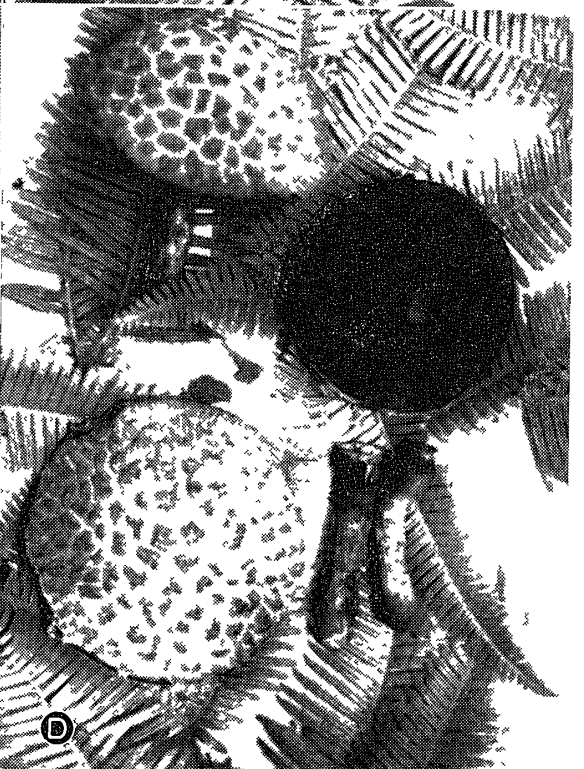
Species	Diameter above breast height (cm)										Total
	2-4	4-6	6-8	16-18	24-26	26-28	32-34	40-42	46-48	48-50	
<i>Castanopsis cuspidata</i> (Cc)	2		2		1			2	1	1	9
<i>Cyclobalanopsis glauca</i> (Cg)	3	2				1	1	1			8
<i>C salicina var stenophylla</i> (Ss)	1										1
<i>Machilus Thunbergii</i> (Mt)	1				1						2
<i>Vaccinium bracteatum</i> (Vb)	1										1
<i>Ligustrum japonicum</i> (Lj)	1										1
<i>Camellia japonica</i> (Cj)			1								1
<i>Neolitsea sericea</i> (Ns)	1										1
<i>Damnacanthus indicus</i> (Di)	2										2
Total	12	2	3	1	1	1	1	3	1	1	26

Table 6 Number of trees in each diameter grade in no 29 belt-transect

Table 7 The Growth Period of Fungus *Castanopsis cuspidata* Forest (Suzuka mountains)

Species	January	February	March	April	May	June	July	August	September	October	November	December
<i>Hygrophorus subrotulaceus</i>												
<i>H. nussula</i>												
<i>Panellus rudis</i>												
<i>Lentinus edodes</i>												
<i>Mycena roseocanadica</i>												
<i>Amanita griseofarinoso</i>												
<i>A. vaginata</i>												
<i>A. Sprieta</i>												
<i>Inocybe kasugayamensis</i>												
<i>A. echinocephala</i>												
<i>Cortinarius subalbivolucens</i>												
<i>C. rubicundulus</i>												
<i>Galerina clavata</i>												
<i>Clitopilus lignyolus</i>												
<i>Pulveroboletus retipes</i>												
<i>Xerocomus chrysenteron</i>												
<i>Boletus regius</i>												
<i>Leccinum scabrum</i>												
<i>Strobilomyces floccopus</i>												
<i>Porphyrellus subvirens</i>												
<i>Russula subnigricans</i>												
<i>R. lepida</i>												
<i>R. rubescens</i>												
<i>R. foetens</i>												
<i>R. inescens</i>												
<i>R. crustosa</i>												
<i>R. cyanoviridis</i>												
<i>R. Vesca</i>												
<i>Lactarius volemus</i>												
<i>L. chrysorrheus</i>												
<i>L. violascens</i>												
<i>Cantharellus cibarius</i>												
<i>Polyorellus elegans</i>												
<i>Farolus arcularius</i>												

○ — Esulent  
 × — Poisonous or uneatable



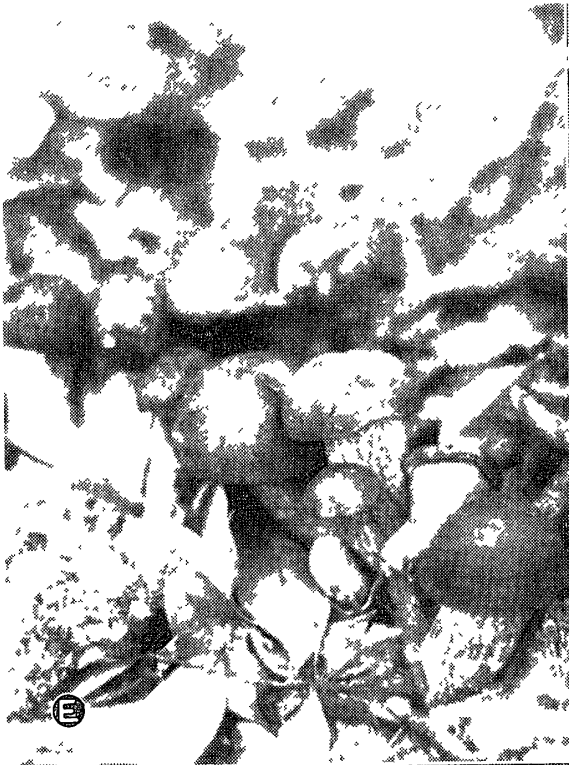
A) *Russula lepida*

B) *Amanita echinocephala*

C) *A. Vaginata*

D) *Strobilomyces floccopus*





E) *Leccinum scabrum*



G) A view of the Vegetation in *Castanopsis cuspidata*



F) Ecology of *Russula lepida* existing in *Castanopsis cuspidata* forest of Mt Kirara-dake



H) *Sakakito-Shiitake* (*Shiitake cuspidata*) on the foot of Suzuka mountains