

English summary of papers which appeared in Nippon Kingakukai Kaiho Vol. 37 (1996)

Original paper: Hyphal interactions between a mycoparasite, *Pythium oligandrum*, and *P. ultimum*—Light microscopic observations of their interface in cucumber root

Tomio Kinoshita¹⁾ and Takio Ichitani²⁾

¹⁾Hyogo Women's College, Hiraoka-cho, Kakogawa, Hyogo-ken 675-01, Japan

²⁾Laboratory of Plant Pathology, University of Osaka Prefecture, Gakuen-cho, Sakai, Osaka 593, Japan

Lateral roots of cucumber, *Cucumis sativus* 'Suyo', seedlings inoculated with a mycoparasite, *Pythium oligandrum* (parasite), were examined for the modes of hyphal interactions with a phytopathogen, *P. ultimum* var. *ultimum* (host). In addition to the observations on cellophane paper or in the soil as reported previously, the following results were obtained. Much more host hyphae than those of the parasite penetrated into the roots. Although protoplasm of the host mycelium gradually degenerated as it was affected by the parasite, a mycelium was newly developed from the protoplasm remaining partially inside the hypha, and this also produced a few oospores, oogonia and hyphal swellings inside and outside the roots. Abundant mycelia of the parasite were found on the root surface, but a few hyphae penetrated, producing many hyphal swellings with a few oogonia and oospores inside and outside the roots. Mycelia of both fungi and also lateral root tissues were stained from pale red to dark red, depending upon the degree of damage.

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Original paper: Brown leaf spot of *Polygonatum odoratum* var. *pluriflorum* caused by *Phyllosticta cruenta*

Tsutomu Kanehira, Keiji Ishikita, Kazuki Inoue, Yuuko Ida and Masayuki Shinohara

College of Bioresource Sciences, Nihon University, Kameino, Fujisawa, Kanagawa 252, Japan

A new brown leaf spot disease of *Polygonatum odoratum* var. *pluriflorum* was found in Kanagawa prefecture, Japan in 1994. The causal fungus was isolated from diseased tissue and inoculated onto the host plant, which developed the same symptom. The fungus was identified as *Phyllosticta cruenta* on the basis of its morphological and pathological characteristics.

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Original paper: Development of *Graphostroma platystoma* on bed-logs of Shiitake (*Lentinus edodes*) and assessment of its injurious effects

Mitsutoshi Tsunoda, late Tadatoshi Hidaka and Minoru Taniguchi

Forestry and Forest Products Research Institute, Matsunosato,

Kukizakimachi, Ibaraki 305, Japan

Graphostroma platystoma formed perithecial stromata in the periderm of bed-logs which had been prepared for Shiitake (*Lentinus edodes*) cultivation and caused removal of the outer bark in the first summer. Dark zones were formed in the sapwood of the bed-logs where *G. platystoma* and *L. edodes* met, but *L. edodes* gradually displaced *G. platystoma* in and after autumn. To estimate the injurious effects of *G. platystoma* on the Shiitake cultivation, the "stroma ratio" was defined as a ratio of the areas with stromata to the total surface area of the bed-logs. The "sectional area ratio" was defined as the ratio of the area occupied by *G. platystoma*, which was identified as a dark zone, to the total cross-sectional area of the logs. High positive correlation was observed between the stroma ratio and the sectional area ratio. The stroma ratio was divided into four or five grades, and the bed-logs graded on this basis were selected for further tests of Shiitake cultivation. The injurious effects were then measured as dry weight of Shiitake mushroom produced on the test logs. Shiitake mushroom yields were negatively correlated with the stroma ratio when the ratio was above 11%. The yields from areas with stromata were less than a half of those from areas with the bark. Accordingly, we concluded that the stroma ratio was a dependable measure of the injurious effects of *G. platystoma* on Shiitake cultivation.

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Original paper: Cultural characteristics of mycelial growth in *Lyophyllum decastes*

Masahito Kinuta¹⁾, Takeshi Furuno²⁾ and Akira Takahashi²⁾

¹⁾Nara Prefectural Forest Experiment Station, Takatori-cho, Takaichigun, Nara 635-01, Japan

²⁾Interdisciplinary Faculty of Science and Engineering, Shimane University, 1060 Nishikawatsu-cho, Matsue-shi 690, Japan

Cultural characteristics of mycelial growth in five strains of *Lyophyllum decastes* were examined. The optimum temperature for mycelial growth was found to be 25°C. The optimum initial pH for mycelial growth on the SMY medium differed among the strains, each of which showed a variable range from 5.2 to 8.2. Among various carbon sources tested, fructose was utilized the most effectively for mycelial growth in all strains. Casamino acids was the best nitrogen source among those tested. The utilization of inorganic nitrogen sources was different among the strains. KNO₃, (NH₄)₂SO₄ and NH₄NO₃ supported mycelial growth. As for vitamins, thiamin and the mixture of five vitamins including thiamin supported the mycelial growth most effectively. The addition of external inorganic salts to the basal medium did not appreciably increase the mycelial growth. The addition of AlCl₃ to the basal medium

produced a slight increase in mycelial growth in one strain.

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Original paper: Changes in soluble proteins in the mycelia and the culture filtrate of *Pholiota nameko* in a phosphate-deficient culture

Toshio Joh, Yuji Tasaki, Junshi Yazaki and Toshiro Hayakawa

Faculty of Agriculture, Niigata University, Ikarashi 2-8050, Niigata 950-21, Japan

Changes in the dry weights of mycelia and the soluble protein contents of mycelia and the culture filtrate during the phosphate-supplied (P+) and depleted (P-) cultures of *Pholiota nameko* were examined. The rate of increase of mycelial dry weights was lower in the P- culture than in the P+ culture from 10 d of cultivation, and the dry weight in the P- culture was reached at 82% of that in the P+ culture after cultivation for 40 d. The protein contents of mycelia in the P+ culture increased remarkably between 10 and 20 d and was significantly higher than that in the P- culture. But the dry weight of mycelia was 1.4-fold larger in the P- culture than in the P+ culture. The protein contents of the P+ and P- culture filtrates were reached at the maximal level at 20 and 30 d, respectively, and the former was half as the latter. SDS-PAGE analysis of soluble mycelial proteins showed three specific bands in the P- culture, and six or nine bands which increased or decreased only in the P- culture, respectively. It also detected two specific bands and four or three bands which increased or decreased in the culture filtrate of the P- culture, respectively. The activity staining of acid phosphatase demonstrated two active bands in the P- culture, but not detected in the P+ culture.

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Short Communication: *Exobasidium gracile* isolated from *Camellia tenuiflora*

Xingyao Zhang¹⁾, Kei Arai²⁾ and Hisashi Iwai²⁾

¹⁾United Graduate School of Agricultural Sciences, Kagoshima University, 1-21-24, Korimoto, Kagoshima-shi 890, Japan

²⁾Faculty of Agriculture, Kagoshima University, 1-21-24, Korimoto, Kagoshima-shi 890, Japan

Exobasidium leaf gall symptoms of *Camellia tenuiflora* were found in Kagoshima-shi in April, 1995, and a parasitic fungus was isolated from the infected leaves. Disease symptoms, morphological and cultural characters of the fungus, and the mode of spore germination were examined. The fungus was identified as *Exobasidium gracile*.

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Note: Decay type of a wood-rotting fungus, *Tyromyces incarnatus*

Sho-ichi Tsujiyama and Naoko Nakano

Faculty of Agriculture, Kyoto Prefectural University, Shimogamo-Nakaragi-cho, Sakyo-ku, Kyoto 606, Japan

The decay type of a wood-rotting fungus indigenous to Japan, *Tyromyces incarnatus*, was examined. Chemical analyses of decayed wood revealed a decrease in lignin content, which is characteristic of white-rot fungi. Bavendamm's reaction and enzyme assay indicated that this fungus produces phenol-oxidizing enzymes such as laccase. Based on these results, *T. incarnatus* is concluded to be a white-rot fungus.

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Note: Biological species of *Armillaria* symbiotic with *Galeola septentrionalis*

Takakiyo Terashita

Kasugaen 1-39, Furuichi-cho, Nara 630, Japan

The biological species of 15 *Armillaria* strains (testees) isolated from *Galeola septentrionalis* were determined by compatibility testing. As the testers, European 18 *Armillaria* strains were used. They belonged to *A. borealis*, *A. cepistipes*, *A. gallica*, *A. mellea*, *A. ostopoyae* and *A. tabescens*, 3 strains per species. Among the testee strains four were identified as *A. cepistipes*, five were identified as *A. gallica*, one was identified as *A. mellea*, and four were identified as *A. tabescens*, of which two were already known to form fruit bodies of the species on agar medium. *Armillaria borealis* and *A. ostopoyae* were not found among the testee strains.

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Note: The chemical components in the vegetative mycelia of Basidiomycotina

Hiroshi Yoshida¹⁾, Hiroko Sasaki²⁾, Suiseki Fujimoto³⁾ and Tatsuyuki Sugahara²⁾

¹⁾Kanto-gakuin Women's Junior College, Mitsuura-cho 4834, Kanazawa-ku, Yokohama-shi 236, Japan

²⁾Kagawa Nutrition University, 3-9-21, Chiyoda, Sakado-shi, Saitama 350-02, Japan

³⁾Yamato Mycological Institute, Miyake-cho 447, Shikigun, Nara 636-03, Japan

The chemical components in the vegetative mycelia of Basidiomycotina of nine species (*Agrocybe cylindracea*, *Hericium erinaceum*, *Hypsizygus marmoreus*, *Mycoleptodonoides aitchisonii*, *Pholiota adiposa*, *Pleurotus cystidiosus*, *Pleurotus sajor-caju*, *Pleurotus pulmonarius*, *Pleurotus salmoneostramineus*) were investigated. On a dry-weight basis, the proximate component contents were as follows: crude protein, 28.4-44.6%; crude fat, 3.8-5.8%; crude ash, 3.3-5.5%; carbohydrate, 44.1-63.2%. The low molecular weight carbohydrate contents were in the range of 2.8-18.5%. Trehalose, mannitol, glucose, fructose and arabinol were detected in these vegetative mycelia, of which trehalose and mannitol were predominant. The polysaccharide contents were in the range of 32.4-48.1%. The distributions and contents of polysaccharide fractions showed low similarities among different species of vegetative mycelia. The organic acid contents were in the range of 0.6-1.4%, and malic, pyroglutamic, fumaric, citric, and succinic acids were predominant. The free amino acid contents

were in the range of 1.8–9.4%, and alanine, glutamic acid, glutamine, serine, lysine, arginine and ornithine were predominant.

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Note: Additional records on the Laboulbeniales (Ascomycetes) and their carabid hosts (Coleoptera, Caraboidea)

Katsuyuki Terada

Omiya 1–2–20–203, Nishi-ku, Hiroshima 733, Japan

New hosts of the Japanese Laboulbeniales are reported. They are the carabid beetles with 47 species in 13 genera, from which 16 species of *Laboulbenia* and *Enarthromyces indicus* were isolated. Photographs of thalli are given for each fungus.

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