

ショウガ根茎腐敗病菌 *Pythium zingiberum* の産地内およびその周辺未耕地における分布

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Distribution of *Pythium zingiberum* Causing Rhizome Rot in Ginger-growing and Its Surrounding Uncultivated Soils

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一谷多喜郎*・後藤久和**：ショウガ根茎腐敗病菌 *Pythium zingiberum* の
産地内およびその周辺未耕地における分布

Key Words: distribution, *Pythium zingiberum*, ginger-growing region.

Pythium zingiberum causing rhizome rots of ginger (*Zingiber officinale* Rosc. cv. Oshoga) and mioga (*Zingiber mioga* (Thunb.) Rosc.) was easily isolated from soils in which they are cultivated^{1,2)}. Using semi-quantitative detection method of the fungus in the soil³⁾, the pattern of incidence and development of the disease of ginger plant was then examined in continuous indoor cultivation for immature rhizome production⁴⁾. Further studies have demonstrated that naturally infested soils near plastic houses may be involved in primary infection to ginger cultivation inside the houses⁵⁾. This paper deals with the distribution of *P. zingiberum* in soils in and around the region of outdoor rotation cultivation for mature rhizome production in Miyazu city, Kyoto prefecture, Japan, and discusses a survival of this fungus in the ginger-growing area after a relatively shorter period of rotation cropping. A part of this work was presented at the meeting of the Kansai division, Phytopathological Society of Japan⁶⁾.

In Nakamura and Waki areas (See Fig. 1), ginger has been cultivated since late in 19th century. Ginger cultivation has increased in Shingu, Chishi and Yawara areas after the middle of 20th century by the promotion project for developing upland field cropping. Mixed cultivation of ginger and Yam (*Dioscorea japonica* Thunb.) is commonly seen in these regions although this system is rarely carried in Japan. The percentage of rhizome rot of ginger plant caused by the pathogen ranged from 5 to 30 during the survey in these areas. Field soil samples were collected by the method reported previously⁴⁾ from the place where ginger seed pieces are expected to be planted.

Mountainous districts around ginger-growing area where ginger has never been cultivated were also investigated. They have granitic dry brown forest soils⁷⁾ and

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1) Ichitani, T. and Shinsu, T. (1980). Ann. Phytopath. Soc. Japan 46: 435-441. 2) Ichitani, T. and Chikuo, Y. (1980). *Ibid.* 46: 539-541. 3) Ichitani, T. (1980). Proc. Kansai Pl. Prot. Soc. 22: 75 (Short Commun.). 4) Ichitani, T. and Shinsu, T. (1981). Ann. Phytopath. Soc. Japan 47: 151-157. 5) Ichitani, T. and Shinsu, T. (1981). *Ibid.* 47: 158-165. 6) Ichitani, T. and Goto, H. (1982). *Ibid.* 48: 104 (Abstr.). 7) Land Bureau (1976). Land Classification Map (Kyoto Prefecture). National Land Agency.

covered with *Pinus densiflora* forest, having a few evergreen conifer plantation. Bamboo forest is found only in the southeastern part of Shingu area⁸⁾. Forty-six plant materials of more than 16 families, including a wild mioga plant, and portions of rhizosphere soils were collected from 12 different locations around ginger-growing region (See location No. 1-12 in Fig. 1).

All samples were kept in a room temperature and detection was performed within 3 days after sampling by the method reported previously^{1,3)}. By this method, 10^1 - 10^4 propagules/g oven dry wt. soil of the fungus can be detected⁹⁾.

As shown in Fig. 1, no *P. zingiberum* was isolated from the soil where ginger seed pieces are expected to be planted in ginger-cultivation area, like Shingu, after rotation cropping for more than 6 years. But the rhizome rot still occurs in this soil. Further study of this problem is needed. No *P. zingiberum* also was isolated from any plant material including wild mioga plant and its rhizosphere soil collected from uncultivated land around ginger-growing region. However, this fungus was detected from the soil after a relatively shorter period of rotation within 4-5 years, and no definite relationship was found between the presence of *P. zingiberum*, and soil texture or a water source system. *P. zingiberum* isolates obtained from this survey were pathogenic to the young ginger plants.

P. zingiberum has a narrow host range¹⁰⁾ and its population declines fast in the soil⁴⁾. This could be the reason why this fungus failed to persist in the soil for a long period of time as shown in this survey.

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Fig. 1. Survey point for *Pythium zingiberum* in and around ginger-growing region.

The marks, $\diamond$, $\blacklozenge$, $\square$, $\blacksquare$, $\circ$, $\bullet$ and $\triangle$, $\blacktriangle$, indicate the places where the soil samples were collected in 1978, 1979, 1980 and 1981, respectively, in ginger-growing region. The marks, ∇ and $\blacktriangledown$, indicate the places where plants and rhizosphere soils were collected in April, 1981, and July, 1981, respectively, around ginger-growing region. The black marks indicate the place where *P. zingiberum* was detected, the white marks indicate the places where no *P. zingiberum* was detected. Arrows indicate the spreading direction of ginger cultivation during past twenty years. Symbols (/ and \) indicate brooks and river, respectively.

8) Board of Education (1974). Vegetation Map of Kyoto Prefecture No.16-Miyazu city, Kyoto Prefecture. 9) Ichitani, T., Tanaka, Y. and Tagami, Y. (1980). Ann. Phytopath. Soc. Japan 46: 86-87 (Abstr.). 10) Ichitani, T. and Konyu, Y. (1981). Proc. Kansai Pl. Prot. Soc. 23: 1-7.

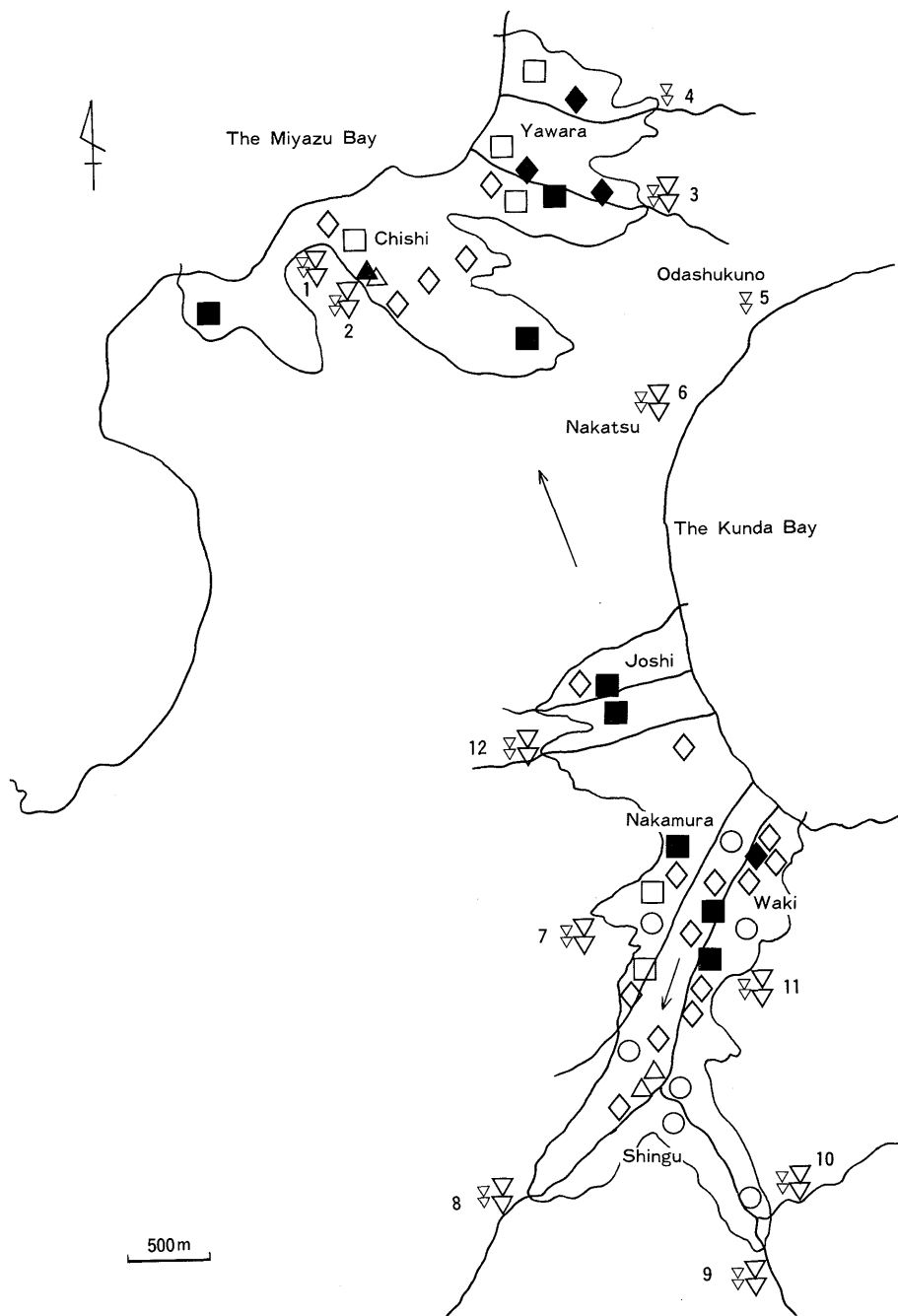


Fig. 1