（学位第３号様式）

学　位　論　文　要　旨

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題　目	Study on the causal *Streptomyces* species and the control of potato scab disease in Kagoshima prefecture. （鹿児島県におけるジャガイモそうか病の原因菌と防除に関する研究）

Common scab is a serious disease of potatoes and other root crops, affecting crop quality and market value. In this study, I surveyed species of *Streptomyces* isolates causing potato common scab in Kagoshima prefecture (pref.) and Nagasaki pref., one of the major potatoes-production areas in Japan. Isolates used in this study were classified into three *Streptomyces* species by polymerase chain reaction（PCR）based on the species-specific primers in the 16S-23S rRNA internal transcribed spacer (ITS). About 42% and 52% of the isolates from Kagoshima pref. belonged to *S. scabiei* and *S. turgidiscabies*, respectively. However about 83% of the isolates from Nagasaki pref. belonged to *S. scabiei*. All isolates pathogenic on potato belonged to *S. scabiei*, *S. turgidiscabies* or *S. acidiscabies* and they had genes for biosynthesis of the pathogenicity determinant thaxtomin. There were some *S. acidiscabies* isolates from Nagasaki pref. and Saga pref. that lacked two genes (*tomA* and *nec1*) of the pathogenicity island. Pathogenic *S. scabiei* isolates were distinguished into two genotypes (T type and JK type) based on the sequences of variable regions in the 16S-23S rRNA ITS. Some isolates had both genotypes (B type). All strains of *S. scabiei* not producing melanin belonged to T type. Pathogenic S*treptomyces* species have different characters depending on species, and low-pH tolerance is important especially in order to control potato common scab. Therefore, we developed new primer sets for SYBR Green quantitative real-time PCR targeting 16S-23S rRNA ITS, to distinguish *S. scabiei* and *S. turgidiscabies*. In this method , the detection sensitivity of DNA from both species（*S.scabiei* and *S. turgidiscabies*.）were not affected even by mixing plant tissue or soil. Additionally, I investigated the population dynamisms of these species at different soil pH(4.4～5.2 at planting date), using the quantitative real-time PCR. Potato was planted with non-bottom frame pots in a greenhouse, and each pot was inoculated with *S. scabiei*, *S. turgidiscabies* or both pathogens. *S. turgidiscabies* tolerates lower soil pH than *S. scabiei* and can grow well in a pH greater than 4.7. In all pots inoculated with the mix of *S. scabiei* and *S. turgidiscabies*, *S. turgidiscabies* was always superior to *S. scabiei* in soil, roots and scab lesions. A seed tuber treatment is an important control that prevents the seed transmission of the disease. Therefore, to estimate the chemical effects, I investigated the dynamics of the pathogenic *Streptomyces* by real-time quantitative PCR. As a result, the population densities of pathogenic *Streptomyces* was kept low in seed tubers and the rhizosphere zone for a long period.We examined the minimum inhibitory concentration (MIC) of chamicals.The MIC of fluazinam or streptomycin against *S. acidiscabies* isolates was higher than that of the other two species. A few *S. turgidiscabies* isolates were tolerant against streptomycin. Hot-water disinfection of the seed tubers is one of the physical control, but the effect of its single treatment is very low. However, it was found that a prevention effect was improved remarkably by treating a microbiologic agent after the hot-water treatment of the seed tubers. In addition, I constructed the effective integrated pest management with the combination of soil solarization and application of rice bran in the soil before planting, or the combination of resistant varieties and fertilizers.