

学 位 論 文 要 旨	
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題 目	Studies on the ecology and control of mango anthracnose in greenhouse cultivation in Okinawa Prefecture (沖縄県の施設マンゴー栽培における炭疽病の発生生態および防除に関する研究)
<p>This study investigated the ecology and control of anthracnose in mangoes grown in rain-out shelters in Okinawa Prefecture. Anthracnose causes significant quality degradation and economic losses in mangoes cultivated in Okinawa, particularly after shipment to market. To address this issue, we investigated the latent infection period of the causal pathogens (<i>Colletotrichum gloeosporioides</i> and <i>C. acutatum</i>), established systematic application methods for effective fungicides, developed an assay to evaluate pathogenicity, selected disease-resistant varieties, and clarified the species composition and characteristics of isolates associated with mango anthracnose in Okinawa Prefecture.</p> <p>First, we investigated the development of anthracnose in fruit shipped to Tokyo. Disease incidence increased as fruit ripened during shipment. In particular, high humidity and condensation due to differences in packaging conditions were considered to promote disease development. The disease appears to result from latent field infection, with post-harvest symptoms linked to decreased content resorcinol in the skin of unripe fruit. Furthermore, the most prevalent anthracnose fungus isolated from diseased fruit in Okinawa belonged to the <i>C. gloeosporioides</i> (88.6%), followed by the <i>C. acutatum</i> (11.4%).</p> <p>Next, we attempted to determine the timing of latent anthracnose infection in rain-out shelters. Latent infection was already established in healthy-looking areas of apical buds, flower buds, inflorescences, and fruitlets. The finding that latent infection rates peak during the rainy season in May suggests that it is important to implement preventative measures from December of the previous year, before apical bud emergence. In addition, we demonstrated the efficacy of a simple diagnostic method using ethanol immersion treatment for detecting anthracnose fungi and showed that the method can be used for disease occurrence forecasting and disease-free seedling diagnosis in mango production sites.</p> <p>The anthracnose fungi we isolated exhibited high sensitivity to four fungicides: captan wettable powder, mancozeb wettable powder, azoxystrobin flowable, and kresoxim-methyl dry flowable. Systematic application of these fungicides from before apical bud emergence to just before bagging (ver. 1) effectively controlled the disease, with suppression of anthracnose in fruit ranging from 76% to 96%. We developed a second fungicide regime (ver. 2) for simultaneously controlling stem-end rot of mango and QoI-resistant strains. This second regime was also highly effective against both anthracnose and stem-end rot, two important diseases. Furthermore, we developed a simple method for testing virulence using uncured leaves to select disease-resistant varieties, enabling assessment of the susceptibility of mango varieties (genetic resources) to the pathogen. 'Golden Nugget' was found to be particularly resistant to the disease and shows promise as future breeding material.</p> <p>Finally, we conducted multi-gene phylogenetic analysis to elucidate the species composition of isolates associated with mango anthracnose in Okinawa Prefecture. A total of 13 species were identified, including nine species belonging to the <i>C. gloeosporioides</i> species complex and four species belonging to the <i>C. acutatum</i> species complex. Although <i>C. fructicola</i> is the dominant species in Okinawa, it exhibited relatively weak pathogenicity. Observed interspecies differences in pathogenicity and sensitivity to registered fungicides indicate that such information considered important for the development of control strategies.</p>	