



Workshop on “Boosting Agricultural Resilience: Advancing Knowledge Sharing in the IPPC Technical Panel on Diagnostic Protocols (TPDP) and New Plant Pest Diagnostic Techniques with MAFF Japan”

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## ARTIFICIAL INTELLIGENCE DEVELOPMENT FOR DETECTION OF PLANT PATHOGENIC FUNGI SPORES

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*Uromyces betae* (Pers.) Tul. (= *U. beticola*) is a rust fungus of obligate plant pathogens affecting beet production, occurring in Asia except India, China etc., most European countries, and some states in the United States, but not in Japan. To prevent the introduction of this seedborne pathogen, we inspect the imported beet seeds, and it has a process that is both time-consuming and labor-intensive. To address this issue, we developed Artificial Intelligence (AI) diagnosis model using deep learning to identify *U. betae* spores. Initially, AI model was trained and validated with a large number of Identified *U. betae* urediniospores, teliospores and beet pollen. Subsequently, the trained AI model was tested on the test dataset composed of identified images to evaluate its diagnostic accuracy and confidence. The trained AI model successfully distinguished urediniospores, teliospores, and pollen with high accuracy and confidence. Further improvements enabled real-time diagnostic capabilities. In the future, we aim to incorporate automatic size measurement of spore in addition to detection technology.