

Morphological and Physiological Development of *Pyricularia oryzae* Isolates from North-western Region of Sarawak on Different Media under Laboratory Conditions

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ABSTRACT

Rice blast (causal agent: *Pyricularia oryzae*) is an important disease of rice in Sarawak. Understanding the pathogen's morphological characteristics, genetic diversity and pathogenicity is important. Having a suitable medium for culturing and maintaining *P. oryzae* is important to ensure the availability of inoculum or materials under laboratory conditions. Oatmeal agar (OMA) and potato dextrose agar (PDA) are common media used for growing *P. oryzae*. OMA allows better mycelial growth and better sporulation as compared to PDA. There are also other alternatives such as fresh rice leaf agar and rice straw agar. Although OMA seems to be the best medium, unfortunately the opaqueness of the medium causes difficulty in observing the morphology and growth of mycelia. In addition, it is known that different isolates of *P. oryzae* will respond differently to different media. This study aims to identify the best media for culturing and maintaining *P. oryzae* isolates from Sarawak. A total of 14 *P. oryzae* isolates were characterised for their morphological characteristics, growth rate and sporulation rate using seven growing media. These 14 isolates included seven newly identified isolates in this study and seven isolates from a previous study, which were verified using internal transcribed spacer DNA sequence. The colony surface of the 14 *P. oryzae* isolates varied on different growing media. The pigmentation of colony surface varied from different shades of grey, translucent light brown, white and colourless. *Pyricularia oryzae* isolates grew better on OMA and PDA, while OMA was the best for sporulation. These two media can be recommended for culturing and maintaining different *P. oryzae* isolates under laboratory conditions.

Keywords: Growth media, *Pyricularia oryzae*, rice blast, Sarawak, sporulation

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INTRODUCTION

Rice feeds 50% of the world population (Zhou, 2016). Rice production can be at stake due to diseases and pest infestations, which may lead towards the economic losses and threat to food security. Rice blast is one of the most important rice diseases, caused by ascomycetes fungus *Pyricularia oryzae* (teleomorph: *Magnaporthe oryzae*). The fungus can attack at different growth stages and on almost every part of paddy plant such as leaf, neck, sheath, nodes, panicle, and pedicels. Rice blast infection typically appeared as diamond-shaped lesions with greyish centre and brown margin on leaves. The lesions may grow rapidly under favourable conditions and tend to merge leading to plant death (Wang *et al.*, 2014).

Rice blast has caused 10 – 30% global yield loss annually (Skamnioti & Gurr, 2009; Zhou, 2016) and up to 70% yield loss in Malaysia (Gianessi, 2014). A survey conducted by Malaysian Agricultural Research and Development Institute (MARDI) in 2015 showed 43% of rice field in Peninsular Malaysia were infected by rice blast (Harun, 2015). In 2017, rice blast disease had infected 10% of rice field area under Muda Agricultural Development Authority (MADA) and approximately 10,000 tons of rice grains were lost, causing severe economic loss up to 50% of production cost (Suzalina, 2017). In Sarawak, 58% of the surveyed rice fields (128 farms in total) between the year 2009 to 2012 were infected by *P. oryzae* with disease severity ranging from moderate (6 – 25% affected leaf area) to high (>50% affected leaf area) (Lai & Eng, 2011, 2013; Lai, 2016).