

# A Study on Pollen Viability of *Piper colubrinum* Link

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**Abstract:** Pollen viability study on *Piper colubrinum* Link. carried out to develop interspecific hybridization between *P. nigrum* L. and *P. colubrinum* Link.. This plant has good potential as a donor plant in breeding programme for *Phytophthora* foot rot resistance in the cultivated species, *P. nigrum*. This project was carried out to reveal the optimum time to collect pollen of *P. colubrinum* for artificial pollination. Through this study, anther dehiscence was proved occurred around 9 am. Based on the result obtained from study on the time of anther dehiscence, the pollen was classified into five stages for testing on the viability, i.e., stage 1, before anther dehiscence, i.e., around 7 am (pollen obtained by crushing on the anther); stage 2: immediately after anther dehiscence, i.e., around 9 am; stage 3: two hours after anther dehiscence, i.e., around 11 am; stage 4: four hours after anther dehiscence, i.e., around 1 pm; and stage 5: six hours after anther dehiscence, i.e., around 3 pm. Data obtained from pollen germination and pollen tube growth study showed that pollen of *P. colubrinum* was the most viable at two hours after anther dehiscence and onward. It was also proved that the viability can be maintained up to at least eight hours. Pollen obtained before anther dehiscence by crushing on the anther was found less viable with lower percentage of pollen germination and retarded pollen tube growth. In other words, the experiment enlightened that artificial pollination between *P. nigrum* L. and *P. colubrinum* Link was ideally to be carried out approximately starting from 11 am until 5 pm, considering the viability of pollen of *P. colubrinum*.

**Key words:** *P. nigrum* L., *P. colubrinum* Link., pollen viability, artificial pollination, interspecific hybridization.

## 1. Introduction

Diminishing of pepper (*Piper nigrum* L.) industry in Malaysia was mainly due to occurrence of pests and diseases [1]. Among all diseases of pepper, *Phytophthora* foot rot disease has been recognized as one of the most devastating. This disease affects all parts of pepper plant in every stage. The fatal infection occurred when the pathogen infects the “collar” or “foot” (lower part of stem just below the soil) which eventually causes death of the plant. In Malaysia, *Phytophthora* disease causing estimated crop losses of 5%-10% annually and up to 95% for individual farmers [1]. Until now, there is no cultivated pepper variety has resistance to *Phytophthora capsici* in all

black pepper producing countries [2]. *Piper* species of South East Asia origin tested are all susceptible to this disease [2-4]. All cultivated pepper varieties in Sarawak are also susceptible to this disease [2, 5-7].

*Piper colubrinum* Link., a species in the same genus as the cultivated black pepper originated from Puerto Rico is a shrub which shows high degree of resistance to many serious diseases of cultivated black pepper particularly the *Phytophthora* footrot disease [8]. The plant had not been affected by *Phytophthora capsici* [2]. According to Dicto and Manjula [9], salicylic acid (SA), the phenyl propanoid derivative of *P. colubrinum* had played a key role on disease resistance. Malaysia state of Sarawak [2] had successfully proved the resistance of *P. colubrinum* against *Phytophthora* foot rot disease through leaf screening method. Thus, this species has a good

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