

Heritability of early growth traits and their genetic correlations for gall rust disease of *Falcataria moluccana*

ABSTRACT

A study to understand the degree of genetic factor influence on gall rust disease caused by *Uromycladium falcatarium* sp. nov, of eleven *Falcataria moluccana* seed sources from Indonesia and Malaysia, has these objectives, i.e.: (1) determine the heritability of gall rust disease severity particularly on stem and height of *F. moluccana* seedlings, (2) estimate genetic correlation between gall rust disease severity and height of *F. moluccana* seedlings. The preliminary study was conducted at the Laboratory of Forest Health and Protection of Faculty Forestry, Universitas Gadjah Mada, Yogyakarta, Indonesia, while preparing seedlings and artificial inoculation assessment which conducted at Sabah Softwood's Nursery and *F. moluccana* plantation, Tawau Malaysia. Randomized Complete Block Design (RCBD) with 3 blocks, 7 replications in each block and 4 seedlings as plot in each replication were set up for gall rust inoculation and the control for 11 seed sources (7 from Indonesia and 4 from Brumas, Tawau Malaysia) of *F. moluccana* seedlings. Gall rust disease severity was calculated using modified Chester's formula. Broad-sense heritability for gall rust disease severity and height were calculated using Baker formula, and covariance analysis of genetic correlations was computed by the formula given by Zobel and Talbert. Linear additive model was employed to estimate the components of variance for seed sources. The broad sense heritability of gall rust disease was moderate (0.42 – 0.47) for inoculated seedlings and 0.40 – 0.41 for control, but moderate to high for inoculated seedling (0.5 – 0.84) and for control (0.44 – 0.79). The genetic correlation between gall rust disease severity and height of seedling was unstable, high (0.85) and positive only at 27 days after inoculation. This finding indicates that the contribution of genetic and environmental factor to f gall rust disease severity on 11 seed sources *F. moluccana* seedlings were almost the same. Hence, it is also difficult to select the best seed source using height and gall rust disease severity characters concurrently.

Keyword: Heritability; Genetic correlation; *Uromycladium falcatarium*; *Falcataria moluccana*