ABSTRACT OF DOCTORAL THESIS

The major results of the thesis are summarized as follows:

- Selecting 30 individual resistant trees have not been attached by *D. punctatus* at 3 research locations, which have resin production higher from 16.87 to 74.55% and from 122.29 to 302.76% than the average resin production of resistant and susceptible stand, respectively.
- Determining two mechanisms of resistance in *P. merkusii* to *D. punctatus*.

Antixenosis

+ Differences in morphological characteristics of resistant and susceptible trees: branch angle distribution (35-60^o in resistant trees compare to 80-90^o in susceptible trees), resistant trees has little branches and leaves, branches grow straight forward like Y-shaped; the leaves concentrate on tip, very few leaves grow in primary branches; little cone (even no any cone), little seed; deeply cracked bark are dark grey.

+ Leaves of resistant trees is dark green and harder than leaves of susceptible trees. Moreover, leaves of resistant trees longer up to 31%, thicker up to 33% compare to leaves of susceptible trees. Cutin and epidermal layer of leaves of the resistant trees are deeper than leaves of the susceptible trees; hypodermis and parenchyma is thinner.

Antibiosis

+ Resistant trees has percentage of Carene <D-3-> higher and percentage of Pinene <a-> lower than susceptible trees. Correlation between resin production and percentage of Carene <D-3-> is tightly correlation.

- There are clear differences in the composition and density of endophytic microorganisms between resistant and susceptible host trees. In resistant trees, more diverse of endophytic microorganisms composition. Moreover, the density of bacterial endophyte strains in resistant trees is much higher than in susceptible trees (highest and lowest density of endophytic bacteria in resistant trees is $8.6x10^8$ CFU/g and $3.7x10^5$ CFU/g, respectively; whereas in susceptible trees the highest density is only $1.3x10^5$ CFU/g).