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Genetic and correlation analysis of oleoresin chemical components in slash pine

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ABSTRACT. This is the first comprehensive study of the genetic analysis of the majority of oleoresin components of slash pine (*Pinus elliottii*). Pine oleoresin, the resin secreted from the pine tree, is a raw material widely used in industrial products. The objective of this study was to explore the genetic variation and correlation between the major oleoresin components of 50 open pollinated families of slash pine. The individual narrow-sense heritability of the 23 oleoresin components and genetic correlations between them were estimated using the residual maximum likelihood in the flexible mixed modeling program, ASReml-R. A high heritability of 0.424 was observed for β-pinene. Moderate levels of heritability were estimated for β-phellandrene, methyl abietate, estragole, 15-hydroxy-dehydroabietic acid, and isopimaric acid methyl ester at 0.303, 0.294, 0.27, 0.258, and 0.2, respectively. The heritabilities for pimaric acid methyl ester, abieta-8, 13-diene-18-oic acid methyl ester, sandaracopimaric acid, methyl ester, and camphene were relatively low and ranged from 0.11 to 0.17. Many

negative genetic correlations were observed as unfavorable while the corresponding phenotypic correlations presented no significant relationships or positive phenotypic correlations. However, the heritabilities and genetic correlations showed that single or multiple component selections and improvement, directly or indirectly, were effective. We postulate that genetic parameters estimated in this study will work as a reference in breeding programs of oleoresin components, especially in slash pine.

Key words: Terpenoid; Oleoresin composition; Heritability; Genetic correlation; Genetic gain