Bayesian and correlation network applied to morphological, physiological, diseases and pest characteristics in *Coffea arabica*

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Abstract

The association between characteristics is of great importance in breeding, both plant and animal. Understanding this relationship allows solving possible difficulties in selecting some characteristics over others. Such difficulties are linked to the low heritability of the trait under study and/or measurement difficulties. Different techniques can be applied to understand these relationships, thus, the aim of this study was to apply the Correlations Networks (CN) and the Bayesian Network (BN) in an coffee database, in order to obtain the connections between variables related to morphology, physiology, pests and diseases. The data used composes the breeding program of the Empresa de Pesquisa Agropecuária de Minas Gerais in partnership with Universidade Federal de Viçosa and Empresa Brasileira de Pesquisa Agropecuária-Café. This data consisted of 195 genotypes of *Coffea arabica* and 20477 markers after quality control. The phenotypic database consists of six characteristics related to coffee morphology, physiology, pests and diseases. It was possible to observe that similar links were found between the techniques, however, using the BN enabled the visualization of the targeted relationship, which in the CN can not be obtained, thus, the use of the BN tends to facilitate the selection process, mainly between characteristics that the meaning of the relationship is unknown.

Keywords: Coffee; Correlation Networks; Bayesian Network.

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