

Variability and genetic parameters of chlorophyll content in forage peanut genotypes using the SPAD index

Cleia F. Santos¹, Giselle M. Lessa de Assis², Paulo M. Beber^{*1}, Daniela P. Miqueloni¹, Rafael de M. Clemêncio², Renata S. da Silva⁴

¹D.Sc. student in Agronomy, Federal University of Acre, BR 364, Km 04, 69920-900, Rio Branco, AC, Brazil. Scholarship from Capes; ²Scientific Researcher Embrapa Acre, Rio Branco, AC;

²Analyst, Embrapa Acre, Rio Branco, AC; ⁴Graduate student in Biology, North Educational Union, Rio Branco, AC

*paulobeber@yahoo.com.br

The species *Arachis pintoi* and *A. repens*, known as forage peanut, are important herbaceous perennial legumes in mixed pastures, capable to increase cattle milk and meat production. Physiological characteristics, such as chlorophyll content in leaves, are interesting to use in breeding programs, but few studies have been conducted in forage peanut. This characteristic is highly correlated with intensity of green color in leaf, which can be measured by SPAD-502 (*Soil Plant Analysis Development*) portable measuring device. Such device calculates the number or SPAD index, which can identify the nitrogen deficiency and can be used as descriptor of stress intensity by water deficit without destroying sample. This study aimed to verify the existence of variability and to estimate genetic parameters for chlorophyll content in forage peanut genotypes. Thirty-two genotypes were evaluated in a randomized block experimental design with four replications. The evaluations occurred between April and December 2015, carrying out six evaluations in an average interval of 47 days. The portable measuring device SPAD-502 was used to obtain the SPAD index. Five leaflets were sampled randomly in different leaves, fully expanded, and three evaluations were made per leaflet, totaling 15 evaluations per useful area of 1 m². The mean of these measures was used to perform statistical analyses by mixed model methodology, and genetic parameters were estimated by restricted maximum likelihood. According to deviance analysis, there was variability ($p < 0.05$) among genotypes for chlorophyll content in leaves by SPAD index. The mean of SPAD index was 38.42 ± 1.90 , with minimum value of 35.15 and maximum of 42.64. The mean heritability was high, estimated at 0.80. Three genotypes, including one F1 hybrid, stood out from the others, including controls. However, more evaluations (at least 11) are needed to increase the efficiency of selection, considering that the coefficient of determination for six evaluations was 67.4% and the repeatability of this characteristic was 0.26. The existence of genetic variability allows identifying superior genotypes with potential for use in breeding programs. However, higher numbers of evaluations are necessary to obtain 80% of determination. Studies of correlations with others characteristics of interest are necessary in order to use the SPAD index in the practice of indirect selection in forage peanut breeding program.

Palavras-chave: *Arachis*, chlorophyll, heritability, forage breeding, repeatability

Acknowledgments: Capes, Fapac and Unipasto