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Hayman's diallel analysis of traits related to fruit and seed production in *Citrullus mucosospermus*

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ABSTRACT

Objectives: Information on the type of gene action governing the expression of traits related to fruit and seed production of *Citrullus mucosospermus* (Fursa) are a prerequisite for starting an effective breeding program in Côte d'Ivoire and developing productive varieties.

Methodology and Results: For such purpose, a 4 x 4 full diallel cross was made among four *C. mucosospermus* parents in order to produce 12 hybrids, which, along with their parents, were phenotypically assessed in triplicate in a randomized complete block design. Analysis of variance showed that *C. mucosospermus* genotypes differed significantly for all traits: number of fruits per plant (NFr), mass of fruit (MFr), fruit diameter (DFr), fruit volume (VFr), mass of 100 seeds (M100), seed length (SL) and seed width (SW). The genetic component of variation revealed that non-additive gene effects were more pronounced in the inheritance of MFr, DFr and VFr, while additive gene effects were predominant in SL inheritance. No symmetry in the distribution of favourable and unfavourable alleles for the increase of all investigated traits was observed. The traits under study exhibited high broad and narrow sense heritability. The graphical analysis showed the over-dominance type of gene action in the control of MFr, DFr and VFr, while SL was under the genetic control of partial dominance.

Conclusions and application of findings: The high heritability of the studied traits and the type of gene actions involved in the expression of these traits allow us to deduce the improvement strategy of *C. mucosospermus* crops. Thus, the involvement of over-dominance type of gene action in the control of MFr, DFr and VFr suggests the exploitation of heterosis in specific parental cross combinations for improving these traits. The isolation of superior genotypes by sib selection is good strategy for improving the character SL.

Key words: *Citrullus mucosospermus*, Diallel analysis, Plant breeding, Gene effect, Heritability.