Jira Suwanprasert 2006: Genetic Control of Major Agronomic Characters in Bambara Groundnut. Doctor of Philosophy (Agricultural Biotechnology), Major Field: Agricultural Biotechnology, Interdisciplinary Graduate Program. Thesis Advisor: Assistant Professor Sontichai Chanprame, Ph.D. 80 pages.
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To produce progenies for inheritant study and to identify markers linked to traits in bambara groundnut, a high efficiency crossing technique has to be developed. The results revealed that emasculation method and pollination time were two critical factors affecting seed set. Emasculation by petal cutting could be done at any time between 3 to 10 PM. However, the hybridization was accomplished only when pollination was done during the period between 2:30 to 3:30 AM, within an hour after the pollen had started shedding. The phenotypes of 23 F_1 plants from 4 crosses showed the reddish-purple pod and red seed coat were dominant over white pod and cream seed coat, respectively. F_2 from the cross between a pure line with reddish-purple pod color and white pod color, and between a red seed coat line with a cream seed coat line segregated as a 3:1 ratio. In petiole color, the reddish-purple was dominant to the green. However, the segregation in F_2 revealed that this trait was controlled by more than one locus of gene. For leaflet shape, incomplete dominance was found in F_2 cross between the long-narrow leaflet and the lanceolate leaflets, giving a 1:2:1 segregation ratio between long-narrow: moderately long: lanceolate leaflets. Significant hybrid vigor of F_1 was found in petiole length, fresh pericarp thickness and seed size. The study of AFLP marker showed that AC/AGG marker linked to reddish-purple pod color, while red seed coat was flanked with 2 AFLP markers, TAC/CAA2 and AAA/GTC1. Another marker linked to this trait was VM27, a cowpea SSR marker.

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