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Adaptation of soybean in northern Ghana for smallholder farmers

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There is a high demand for soybean in African countries, but available varieties are poor yielding. This can be partially attributed to inadequate adaptation of soybean to a tropical climate. Adaptation will require knowledge of allelic combinations of the characterized maturity genes: *E1*, *E2*, *E3*, and *E4*; the long juvenile trait, and stem architecture. The long juvenile trait is a recessive allele that influences flowering time in short days and low latitudes, which characterize tropical climates. Stem architecture includes the determinate or indeterminate phenotypes, which regulate terminal stem growth. By understanding the influence of these genetic components on adaptation, it may be possible to control season length and improve yield greater than the currently available African varieties. To achieve this objective, six populations were initiated in which our genes of interest were segregating for either long juvenile only; *E1*/*e1-as*, long juvenile, and stem architecture; or *E1*, *E2*, *E3*, *E4*, and long juvenile. 260 recombinant inbred lines were created across the six populations and were field tested in 3 locations in northern Ghana in 2016. During this time phenotypes for flowering, maturity, yield and other agronomic traits were scored. Our initial results from one population suggest that the long juvenile trait plays the most influential role on days to flower over either allele of *E1*. However, across populations segregating for the long juvenile trait these data also insinuate that that different alleles of this gene may also influence different flowering phenotypes. Further analysis is being conducted to understand the effect of maturity gene allelic combinations on season length and the vegetative: reproductive stage ratio. The combined knowledge of the genetic control of these traits will allow Ghanaian soybean breeders to produce varieties that can cater to the needs of small farmers in the north.