**P09**

## Modelling phyllochron-plastochron relationship in sorghum in order to predict panicle initiation date

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When the rates of leaf initiation and leaf emergence are identical, as in rice, the rank of the last initiated leaf can be directly determined by the last emerged leaf ranking. Oppositely, when plastochron is shorter than phyllochron, as in maize and sorghum, the number of growing leaves inside the whorl increases with time and prevents estimating the panicle initiation date on simple visual observation.

The objective of this work was to quantify the relationships between leaf initiation, leaf appearance and leaf ligulation in three contrasted sorghum genotypes (two parents and their hybrid) in order to 1) estimate the date of panicle initiation based on the number of appeared leaves and 2) investigate the potential heterosis effect.

The appearance rate in thermal time varied according to the genotype, with the hybrid having a faster rate than its two parents. Leaf initiation rate also presented a variability within the three lines, the hybrid having an intermediate position. The shorter phyllochron in the hybrid corresponded to its higher growth rate, expression of an heterosis effect.

The relationships between leaf initiation and appearance were highly significant and genotype-specific. Nevertheless, the slopes of the regressions were close, leading to small differences in the prediction: thus when the 12th leaf just emerges, between the 19th or 20th leaf is initiated according to the genotype. Therefore, using a single model across the three lines does not increase the rank error and can be applied in breeding programs to estimate the date of panicle initiation.

The result needs to be confirmed on a larger panel of sorghum genotype in order to test the model robustness. The main limitation for field application remains the estimation in a genotype of the total number of leaves to be developed before panicle initiation, trait that can vary in photoperiod sensitive cultivars.

References:
1. Clerget, Annals of Botany, 2008, 579-594.