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Farmers’ and academia’s views”

## Speed breeding in *Urochloa humidicola*: changes in photoperiod accelerate flowering and increase seed yield

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### Abstract

*Urochloa humidicola* is an economically important tropical forage grass that is being improved through hybridisation techniques to produce genotypes with waterlogging and spittlebug (Hemiptera: Cercopidae) resistance, high nutritional quality and superior agronomic characteristics. Empiric observations suggest that changes in photoperiod and vernalisation induce natural flowering in *U. humidicola* and, consequently, seed production. Under tropical sunlight conditions, a flowering, and therefore crossing, season occurs every 12 to 16 months. As a result, breeding cycles are long and genetic gain is reduced. Little is known about the effect that changes in photoperiod can have on flowering and seed yield in *U. humidicola*. Two trials were carried out at the CIAT experimental station in Palmira, Colombia (3°30'07.1N 76°21'19.0"W) to determine the response of sexual parental lines to different photoperiod treatments. Two light spectra, red and white, were tested in a factorial design with six photoperiod length treatments: 12/12 hours day/night, 14/10 hs d/n, 16/8 hs d/n, 20/4 hs d/n, 23.5/0.5 hs d/n and 24/0 hs d/n in order to develop a functional tool to accelerate the *U. humidicola* breeding scheme. The first trial carried out during 2019 showed treatments “16/8 hs d/n with white light” and “24/0 hs d/n with red light” as the best to induce flowering, indicated by the increased number of spikes.m<sup>-1</sup> and seeds/spike (Tukey HSD,  $\alpha = 0.05$ ). In the second trial, a factorial design was used to test the two previous successful light/photoperiod treatments over a larger number of genotypes to evaluate the variability in flowering response. The results showed that while red light triggers a faster development of flowering, white light allows for an increase in the number of inflorescences and a higher seed yield. Once established, the optimised methodology will reduce the time between breeding crossing seasons from 12–16 to 8–12 months. The findings of the study suggest that longer photoperiods can be used as a potential speed-breeding tool in *U. humidicola* breeding programme under tropical conditions.

**Keywords:** Flowering, photoperiod, seed production, speed breeding, tropical forages, urochloa