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Leaflet removal during early reproductive stages increase pod number and yield in soybean

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The photomorphogenic effect of red (R) to far red (FR) ratio (R/FR) on plant development are well known. Interestingly both quantitative and qualitative effect of light on crop growth and development depends on the leaf area and canopy architecture. Five field experiments were performed to investigate whether leaflet removal (LR), applied at different stages between full bloom (R2) and beginning seed growth (R5), could increase the canopy R/FR ratio and enhance numerical yield components of several soybean genotypes. LR was applied twice, at R2 and R5 stages in experiment one (Exp1); only once at R2 in Exp2 and Exp3; one to four consecutive times in experiment Exp4 and one to three consecutive times in Exp5. In Exp5, a total developed leaves removal at R2 treatment was also added. Exp1 demonstrated that the number of initiated pods (IP) increased as LAI decreased between R2 and R5. A second LR applied shortly after R5, increased pod abscission and seed abortion. In Exp2 and Exp3, a single LR at R1 triggered the outgrowth of branches, increase the IP and increase in the pod number at maturity (MP). LR produced an increase in the canopy R/FR ratio. In all experiments the increase in the R/FR ratio within the canopy was significantly associated with the increase in the number of IP. In Exp4 and Exp5, MP was also increased by LR treatments, even though light interception between R2 and R5 was below 95 % in some cases. These results demonstrated that LR could have both positive and negative effects on numerical components of yield depending on the phenological stage, frequency and intensity at which the leaflet removal is performed and support the role of photomorphogenic radiation on yield.