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Leaflet shape, canopy light environment and yield components in soybean

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Changes in leaflet shape modify both the quantity and quality of light inside the canopy. Two pairs of lanceolate (L) and ovate (O) soybean near isogenic lines (NILs) were sown in high density (HD, 28-30 plants.m⁻²) and low density (LD, 14-16 plants.m⁻²) during the 2013/14 and 2014/15 growing seasons (GS) to evaluate the impact of leaflet shape on pods initiation, seed number, seed size and yield. NILs pairs were: FV15-L / FV15-O and FV9-L / FV9-O. L lines had always greater pod number (PN) than O (1860 for L vs 1717 for O in 2013/14 ($P < 0.10$) and 2606 for L and 2053 for O in 2014/15 ($P < 0.001$). These values were a result of an increase in reproductive nodes and pods per reproductive node in L compared to O. PN was inversely related to LAI before R5 in both GS. During the 2014/15 GS the R/FR ratio was measured inside the canopy. There was a significant linear and direct relationship between R/FR ratios and PN ($R^2 = 0.82$, $P < 0.001$). No association was found between PN and crop growth rate or light interception between R2 and R5. The mean number of seeds per pod (SPP) and seed size (SZ) was 2.7 and 151 mg and 2.3 and 164 mg, for L and O, respectively. Mean yield was 5830 and 5080 kg.ha⁻¹, for L and O, respectively, $P < 0.05$. Yield was highly associated with seed number ($R^2 = 0.77$; $P < 0.0001$). Yield increase in L compared with O lines was explained by the higher PN and SPP in the former. Additionally, the results support the hypothesis that R/FR ratio regulates PN in soybean canopies.