



Productivity of irrigated bean submitted to water deficit in different phenological stages

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Water scarcity is the most important factor limiting crop yields worldwide. An increased sustainable use of irrigation water will be necessary to feed our growing population. Bean (*Phaseolus vulgaris* L.) is widespread in the social and economic scene in Brazil, as well it is Brazilian population main dish, and it also helps small and medium farmers' income. The damage caused by water deficit depends on the duration, severity and stage of plant development. The bean plant is classified as sensitive to both water deficit and excess water in the soil.

The hypothesis is that if the water supply is suppressed in just one of the five development stages of irrigated beans, it can result in productivity reduction lower than 20%, allowing water economy. The objective of this study was to compare the performance of bean Carioca group IAC Alvorada yield components, with irrigation suppression in each of the five phenological phases (emergence, vegetative, flowering, grain filling and maturation) and no irrigation and irrigated in all stages. The study was conducted at Agronomical Sciences College, UNESP, Botucatu, SP, Brazil. The statistical design was the randomized block with seven treatments and four replications. Data were subjected to analysis of variance and "t" test at 5% probability.

The irrigation suppression only during emergence, filling, and maturation phases did not show any statistical difference in productivity when compared with the irrigated at all stages. The irrigation suppression at vegetative and flowering phase, reduced the production at 75.1 and 76.2%, respectively, when compared with irrigation at all stages, despite the reduction of the water depth being around 20% for flowering and 33.8% for the vegetative phase when compared to the irrigated at all stages. Irrigation suppression in all phases generated a reduction of approximately 87.3% when compared with irrigation at all stages. During the experiment there was a total recorded rainfall of 156mm (35.6% of the total water applied).

Irrigation suppression only in the emergency phase or only in the maturation phase reduced productivity by 10.1% and 5.4%, respectively, when compared with irrigation at all stages, confirming the hypothesis that the water suppression in one selected phase can reduce productivity in less than 20%.