

Adaptation of Bean (Phaseolus vulgaris L.) to Water Deficit

C.M. Guimarães, O. Brunini and L.F. Stone
EMBRAPA-CNPAP Caixa Postal 179, 74001 Goiânia, GO, Brasil

The drought adaptation of bean (Phaseolus vulgaris L.), cvs. BAT 477 and Carioca, drought-tolerant, and RAB 96, drought-sensitive, was studied in 1987 and 1988, at the National Center of Research for Rice and Bean (EMBRAPA-CNPAP), Goiânia, GO. The specific leaf weight at flowering of the cultivars BAT 477, Carioca and RAB 96 was, respectively, 12.6, 4.1 and 17.2% higher under mild drought stress, when compare to the irrigated treatment (Fig. 1). Under severe stress was observed 29.1% of increase for RAB 96, and 22.6 and 14.2%, respectively, for BAT 477 and Carioca. It was observed also the influence of the level of water stress on the development of the leaf area index (LAI) of the same cultivars. It was observed a reduction of 45.7 and 60.3% of the LAI, respectively, under mild and severe drought stress for RAB 96 (Fig. 2). The reduction of the LAI was lower for the drought-tolerant cultivars. It was observed also that the mild water stress, during flowering, decreased the canopy dry weight of RAB 96, in 26.2%, while 6.9 and 2.3% was observed, respectively, for BAT 477 and Carioca. The severe stress decreased the canopy dry weight in 35%, 27.3% and 19%, respectively, for RAB 96, BAT 477 and Carioca (Fig. 3) This results indicated that canopy dry weight of those drought-tolerant varieties, BAT 477 and Carioca was less reduced, at flowering, under drought, than the drought-sensitive, RAB 96. It was suggested that the mechanisms governing the drought

adaptation, of the cultivars studied, during the vegetative stage will be the same of those governing the drought adaptation during the reproductive stage.

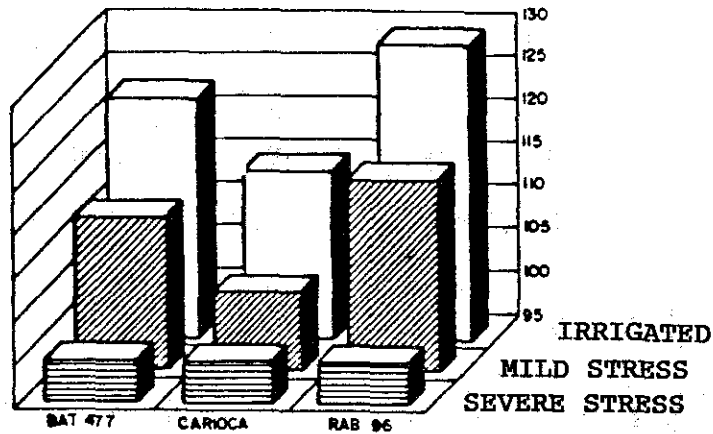


FIGURE 1. Relative specific leaf weight (average of 1987 and 1988), mg/cm², of bean cultivares BAT 477, Carioca and RAB 96, under irrigation, mild and severe drought stress.

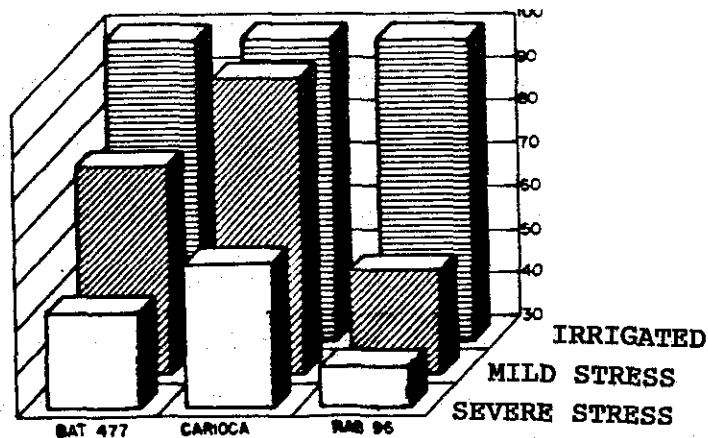


FIGURE 2. Relative leaf area index (average of 1987 and 1988) of bean cultivares BAT 477, Carioca and RAB 96, under irrigation, mild and severe drought stress.

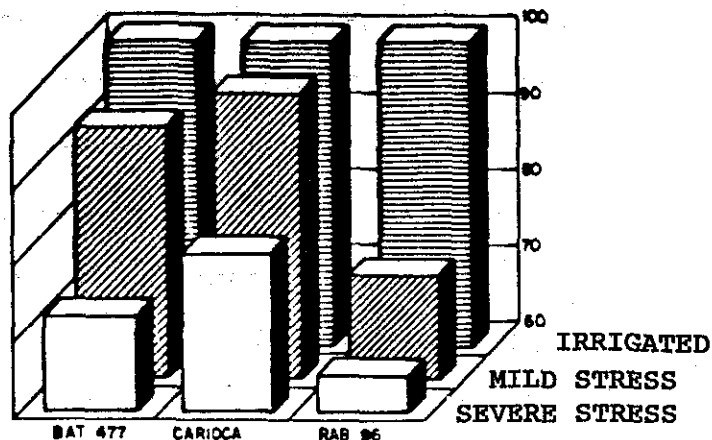


FIGURE 3. Relative canopy dry weight (average of 1987 and 1988) of bean cultivares BAT 477, Carioca and RAB 96, under irrigation, mild and severe drought stress.