

Research Article

Evaluation of the Response of Sorghum to Tillage Systems and Nitrogen Fertilization

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In the subtropical semi-arid zones, sorghum *Sorghum bicolor* (L.) productivity is limited by numerous constraints. Relatively few studies have been conducted to measure the response of grain sorghum varieties to tillage and nitrogen. For sustainable crop production, selected tillage practice and fertilizer application are important. Field experiments were conducted at Al Qurna (QL), 74 km northwest Basrah province and Shatt al-Arab (SHL) and 17 km east Basrah province. A randomized complete block design, arranged in a split-split plot, was used with three replications. The tillage system was no tillage (NT), reduced tillage (RT), and conventional tillage (CT), while sorghum varieties were Inqadh, Rabih, and Cavire 2, and four levels of N fertilizer, viz., 0, 40, 80, and 120 kg ha⁻¹. The objective of research was to evaluate two sorghum (*Sorghum bicolor* L.) varieties to tillage system and nitrogen (N) fertilizer. The application of tillage was shown to enhance the growth of sorghum as observed in the plant height, leaf area, number of grains panicle⁻¹, 1000-grain weight, yield, biomass yield, and root dry matter. CT surpassed the other treatments for all studied traits. The highest value of plant height, number of grains panicle⁻¹, grain yield, biomass yield, and root dry matter in the QL and SHL locations, respectively, were produced by Cavire 2. The plots fertilized with 120 kg N ha⁻¹ maximize the values of plant height (132.33 cm in the SHL location), leaf area (3040.53 and 2751.47 cm² in the QL and SHL location respectively), number of grains panicle⁻¹ (1431.37 in the SHL location), 1000-grain weight (31.77 g in the QL location), biomass yield (15752.00 kg ha⁻¹ in the SHL location), and root dry matter (22.42 and 20.75 g root cm⁻³ in the QL and SHL locations, respectively). Cavire 2 variety under CT with 80 kg N ha⁻¹ in the QL location was the best (observed as the most promising) in terms of grain yield. Whereas Cavire 2 under CT showed best performance with 120 kg N ha⁻¹ in the QL location in terms of biomass yield character.