Journal of Applied Biosciences 219: 24287 – 24301
ISSN 1997-5902

Physiological and agronomic evaluation of the tolerance to continuous water deficit of two varieties of sesame (*Sesamum indicum L.*) grown in Burkina Faso

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Submitted 04/02/2026, Published online on 30/04/2026 in the https://www.m.elewa.org/journals/journal-of-applied-biosciences-about-jab/ https://doi.org/10.35759/JABs.219.6

ABSTRACT

Objective: The objective of this study is to analyze the physiological and agronomic responses of two local sesame varieties (Sesamum indicum L.), HB168 and SN103, when subjected to continuous water stress under controlled conditions, in order to determine their adaptability and tolerance to water stress.

Methodology and Results: A Ficher block design with two factors (variety and water regime) and three replicates was set up in a greenhouse. The variety factor has two categories (SN103 and HB168) while the water regime factor has three: watering every two days at soil water retention capacity, the control without deficit (T0); watering every two days at 3/4 of the soil water retention capacity, moderate deficit (T1); and watering every two days at 1/4 of the soil water retention capacity, severe deficit (T2). The results showed that, regardless of the level of water deficit, a significant reduction in collar diameter, plant height, and number of branches was observed, particularly under T2 in both varieties. On the 32nd day of stress, an increase in chlorophyll content was noted for both varieties under T1. All yield parameters including the number of pods per plant, number of seeds per pod, seed weight, and dry biomass decreased significantly as water stress intensity increased ($P<0.0001$) in both varieties. Moderate water deficit induced a decrease in seed yield per plant of 15.5% for SN103 and 21.8% for HB168, while severe stress reduced seed yield by approximately 52.8% for both varieties. The HB168 variety proved to be more sensitive to moderate water deficit, while SN103 showed better overall tolerance, making it a promising variety for the genetic improvement of sesame in drought conditions.

Conclusion and application of results: SN103 and HB168 exhibit different growth strategies: SN103 prioritizes biomass and seed number, while HB168 is characterized by a higher number of pods and heavier seeds. Water stress reduces the performance of both varieties, but SN103 shows better overall tolerance, unlike HB168, which is more sensitive despite relative chlorophyll

stability. Thus, SN103 appears better adapted to Sahelian conditions and constitutes a promising resource for plant breeding programs.

Keywords : Sesame, Variety, Water stress, moderate, severe.