Range Management and Agroforestry 44 (1) : 84-94, 2023
ISSN 0971-2070 (Print); 2249-5231 (Online)
https://doi.org/10.59515/rma.2023.v44.i1.10

Research article

Determination of physiological and harvestable mass-maturity of seeds during rainy and post-rainy seasons in barnyard millet (*Echinochloa frumentacea* (Roxb). Link)

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Received: 10th August, 2022 Accepted: 21st April, 2023

Abstract

It is essential to identify the appropriate stage of physiological maturity (PM) and harvestable mass-maturity (HM) of seed, considering both seed yield and physiological quality traits in barnyard millet. The earliest possible date for the appearance of seed formation (setting) was marked as the first stage of harvest (HS-I) at 21 days after anthesis (DAA) during the rainy season (RS) and 14 DAA during the post-rainy season (PRS) in cultivars VL172 and VL207, respectively. The traits *viz*., seed hardness, moisture content, test weight, yield, germination, field emergence, seedling vigour index, electrical conductivity and seedling α-amylase activity were assessed to understand the effect of eight different maturation stages on seed yield, vigour and storability. Based on illustrations of significant differences for most of these traits, the PM was identified at 42 DAA during RS and 35 DAA during PRS; and HM until 49 DAA during RS and 42 DAA during PRS. The study also illustrated the use of second-order polynomial regression models to predict the proper stages of harvest during RS and PRS. The study revealed prominent morphological indicators of seed maturity (PM to HM). The findings provided meaningful and relevant information for successful seed crop management aiming at higher yield coupled with better physiological quality of seeds in barnyard millet across the seasons.

Keywords: Barnyard millet, Morphological indices, Polynomial regression, Seed physiological quality, Seed yield