

Evaluation of Seed Vigor of Nine Selected Traditional Rice Varieties of Sri Lanka

A.A.C.B. Alahakoon^{1, 2*}, D.S.D.Z. Abeysiriwardena³, J.W. Damunupola^{1, 2} and N.S. Gama-Arachchige^{1, 2}

¹Department of Botany, Faculty of Science, University of Peradeniya, Peradeniya, Sri Lanka

²Postgraduate Institute of Science, University of Peradeniya, Peradeniya, Sri Lanka

³CIC Agri Business Center, Pelwehera, Dambulla, Sri Lanka

Abstract

There is an increasing demand for traditional rice varieties due to their nutritional and medicinal value. Standard germination test (SGT) used for rice seed testing, does not accurately predict the field emergence (FE). Therefore, the objective of this study was to determine whether the accelerated aging (AA) seed vigor test can be used to predict FE of nine popular traditional rice varieties (Beheth Heenati, Herath Banda, Kahawanu, Madathawalu, Pachchei Perumal, Pokkali, Sudu Heenati, Sulai and Suwandel). For the SGT, four replicates, each containing 100 seeds, were germinated according to AOSA paper towel method. To calculate FE of seedlings, four replicates of 400 pre-germinated seeds each from each variety were sown in 1 m² plots in a paddy field at Pelwehera, Sri Lanka. To evaluate seed vigor, seeds from each variety were aged at three different temperatures (42, 43 and 44 °C) for two different time durations (72 and 96 hours) in a water-jacketed incubator. Germination of aged seeds was tested according to AOSA paper towel method. In each experiment, normal seedlings (%) were calculated after seven days. Data were analyzed using proportion analysis. Normal seedlings (%) in the SGT and FE test were >85% and >75%, respectively for all the tested varieties. In the two varieties Beheth Heenati and Sulai, the normal seedlings (%) in FE test was similar to that of SGT ($P>0.05$) while in other varieties, FE (%) was significantly lower than SGT (%) ($P<0.05$). Pachchei Perumal and Sulai showed the highest vigor (>75%) under 44 °C for 96 hours, while suwandel showed the lowest vigor (2±1%). For Beheth Heenati, Herath Banda, Madathawalu, Pokkali, Sudu Heenati and Sulai, more than one AA treatment could predict FE. To predict the FE of the tested varieties, AA conditions 43 °C for 72 hours, 44 °C for 96 hours and 42 °C for 72 can be recommended for Herath Banda, Pachchei Perumal and the other tested varieties except Kahawanu, respectively. To select the best AA parameters to predict FE of Kahawanu, more combinations of temperature and time of exposure need to be tested.

Keywords: Accelerated aging, Seed germination, Seed vigor, Traditional rice

***Corresponding Author:** chamindaalahakoon6@gmail.com