Evaluation of Phenotype Characteristics and Ethylene Content of Selected Rice Varieties Under Two Ecological Zones in Sri Lanka

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Abstract

Rice, an important staple crop in Asia, exhibits a significant relationship between phenotypic traits and yield performance depending on ecological zones and submergence conditions. In Rathnapura, IR19A8790 stands out in the number of plant rows, while IR19A7712 lags behind in the same feature. In contrast, in Horana, IR19A7668 outperforms the number of plant rows, while IR19A9132 does not do as well. Rathnapura has a spectrum of varieties, with IR19A8982 and 30 others showing superior performance at 50% flowering, reflecting Horana's varieties including IR19A7798, IR19A7885, IR19A8596, IR19A8762, IR19A8982, IR19A8989, IR19A9000, IR19A9140, IR19A9153, IR19A7679, IR19A7963, IR19A8597, IR19A8784, IR19A8975 and IR19A8997. Rathnapura's IR19A7798 and IR19A9003 are distinguished by plant height, IR19A8994 by panicle number, IR19A9132 by panicle weight, IR19A8992 by 100-seed weight, and IR19A8574 by panicle seed number. Horana's IR19A8791 is characterized by plant height, IR19A7710 by the number of panicles, IR19A7972 by the weight of panicles, IR19A7972 by the weight of 100 seeds and IR19A7983 by the number of panicle seeds. The best performing varieties are IR19A8589, IR19A9150, IR19A7868, IR19A9128, IR19A7990 in Rathnapura and IR19A8592, IR19A8582, IR19A8589, IR19A8584, IR19A8588 in Horana. This research investigates ethylene dynamics in plant responses under stress conditions using live plant samples and a headspace extraction method. Despite careful execution, challenges were encountered in detecting ethylene content using GCMS analysis due to factors such as sample exposure time, GCMS instrument sensitivity, and solvent selection and need re-evaluation for conclusion.

Keywords: Ethylene analysis, GCMS analysis, Phenotypic traits, Rice varieties, Submerge tolerance