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Morphotypes of Phytoliths in Selected Traditional Rice Landraces

Thennakoon M.*, Munasinghe M.

Department of Botany, University of Sri Jayewardenepura, Sri Lanka
**malshathejani@gmail.com*

Abstract

Rice (*Oryza sativa*), belong to family Poaceae can absorb Silica from the soil solution to the plant structure in the form of monosilicic acid (H_4SiO_4) via the silica transporters available in plasma membrane of root cells thus forming amorphous structures known as phytoliths. Among the diverse morphotypes of phytoliths available in Sri Lankan traditional rice varieties, abundant number of bilobate, rectangular and bulliform phytolith shapes could be observed. The major objective of this study is to determine the statistical relationship of selected three phytolith types; bilobate, rectangular and bulliform shapes in thirteen selected Sri Lankan traditional rice varieties and to determine the statistical variations among them. Dry Ashing method was used to extract phytoliths from dried leaf samples of selected Sri Lankan traditional rice varieties and the specimens were observed using B350 OPTIKA microscope. The dimensions of each phytolith morphotype; length: breadth of bilobate shape, length: height and width of the base of bulliform shape and length: breadth of rectangular shape were measured. Phytoliths of selected Sri Lankan traditional rice varieties showed different sizes among selected varieties and the statistical analysis showed lowest and highest length to breadth ratio in Herath Banda and Sulai varieties respectively in which Herath Banda variety does not exceed the ratio value 2 while other selected Sri Lankan traditional rice varieties exceed the ratio value 2 showing elongated bilobate shapes. A considerable variation of length: breadth ratio of rectangular shape phytoliths is shown by Kahawanu variety in which the ratio exceeds 1.25 whereas all other rectangular phytoliths of selected varieties are below 1.20 ratio value. Length: width of the base and height: width of the base ratios of bulliform phytoliths show similar distribution of each selected variety but, length: height ratios show variations in which Kalu Heenati exceeds the ratio value 1 while all the other varieties are below the ratio value 1. Comparison of the ratio values of phytolith types of selected Sri Lankan traditional rice varieties show the size variations of the same phytolith type among traditional rice varieties of the same species. These statistical variations could be used for the identification of fossilised phytoliths of rice varieties used in ancient history of human civilisation.

Keywords: Phytoliths, Morphotypes, Bilobate, Bulliform