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Carbon and Nitrogen Dynamics with Aging in Seminal Root System of Rice Seedling

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Abstract:
The allocation pattern of carbon (C) and nitrogen (N) with aging among several organs of rice seedling was investigated with particular attention to the difference in seminal root axis (SRA) and concomitant lateral roots (LR). Rice (Oryza sativa L. cv. Aichiasahi) was grown in root boxes under submerged conditions for 35 days after sowing (DAS). Overall C and N concentration of LR were higher than those of SRA, and the difference was more pronounced in N concentration. In the seminal root portion of the same age, C and N content decreased in both SRA and LR with progression of age, however a trend of declining N content in LR was alleviated by the rooting of higher (2nd order) LR. The ratios of root length to C content and dry weight in LR were 27 times that of SRA, and the ratio of root length to N content in LR was 12 times that of SRA after Day 21. These results suggest that the aging patterns of LR and SRA are different, and LR plays a more important role in controlling the metabolic activity of the whole root system than SRA. Moreover, increase in N content in SRA after Day 12 and the increase in the number of LR up to 35 DAS suggested that the seminal root of rice was alive and maintained its metabolic activity for at least 35 DAS.

Keywords:
Aging, Carbon, Lateral roots, Nitrogen, Partitioning, Rice, Seminal root axis

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