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Root exudation of two rice varieties grown at different nutrient concentration levels

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Stress causes reduction of plant growth, delay in development and in severe cases, lead to the destruction of the plant. Root exudation plays an important role in determining resistance of varieties to different soil stress conditions. It is therefore, important to study root exudation patterns of plants, exposed to stress conditions.

Two rice varieties, a variety resistant to iron toxicity (BW 267-3) and one susceptible to iron toxicity (BG 94-1) were used. Both varieties were grown on nutrient solutions with optimal and marginal nutrient status and at three iron levels. The carbon translocation to the shoot, root and nutrient solution was followed using ^{14}C -CO₂ pulse labeling technique.

Under high iron level (52mg/l) and under low nutrient conditions (50%) the amount of exudates was high in both varieties. In the susceptible variety, exudation rate was higher than in the tolerant one. The ^{14}C activity in the shoot

decreased under high iron level and low nutrient level. Under conditions of stress, more carbon is translocated to the root. Root dry weight was high in both varieties under low nutrient level and high iron concentration. Shoot dry weight decreased with the nutrient level but increased with iron concentration.

Therefore, it can be concluded that as the amount of exudates increase in both rice varieties when plants are exposed to stress conditions. Nutrient and iron level had a significant effect on the release of organic metabolites in the nutrient solutions. The exudation rate was higher in the susceptible variety than in the resistant variety. The dry matter content in the root was high when plants were grown under unfavourable conditions. The shoot/ root ratio decreases when plants are exposed to stress. Finally, it can be concluded that approximately 3.5% of the net C is released by the rice through root exudation.

Financial Assistance by Belgium-Sri Lanka Iron toxicity project at the Institute of Fundamental Studies is greatly acknowledged.

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