

Phosphoenolpyruvate Carboxylase Activity and Non-Structural Carbohydrates in Wild Rice

Su-Yeon Lee¹, So Hyun Park², Jwa-Kyung Sung², Ju-Young Lee², Byoung-Choon Jang², Jae-Hong Park² and Tae-Wan Kim^{1*}

¹Department of Plant Resources and Science, Hankyong National University

²National Institute of Agricultural Science and Technology

Objectives

The aim of this experiment is to identify the differences on PEP carboxylase activity and the synthesis and allocation of carbohydrate in vigorously growing wild rice.

Materials and Methods

- Plants : Wild rice (*Oryza grandiglumis*, *Oryza alta*)
Rice (cv. Saechucheongbyeo, Andabyeo), Maize (cv. Kwangpyeongok)
- Sampling and analysis
 - On 80th day after sowing, leaves and roots from each plant were collected in photo-period (13 AM), and immediately stored at -70°C.
 - PEP carboxylase activity : Blanke method (the oxidation amount of NADH)
 - Catalase activity : Aebi method (the destroyed amount of H₂O₂)
 - Carbohydrate contents : Yoshida method (ethanol soluble sugar and starch)

Results and Discussion

○ The specific activity of PEP carboxylase was measured (Fig. 1). Unlike expected, PEP carboxylase activity in two wild rices (*Oryza grandiglumis*, *Oryza alta*) was considerably low compared to maize. In addition, C₃-specific catalase activity showed over 3 fold higher in wild rices and Japonia type rices than maize (data not shown).

○ The contents of soluble sugars and starch in leaves and roots from collected plants were analyzed by colorimetric procedures (Fig. 2). The level of the total sugars was higher in leaves of *Oryza grandiglumis* compared to other rices or maize, and starch existed abundantly in two wild rices. Contrary to leaves, the contents of total sugars in roots were the highest in maize, whereas the amount of starch in roots couldn't show significant differences between examined plants.

* *Corresponding author*:(Phone) 031-670-5081 (E-mail) taewkim@hnu.hankyong.ac.kr

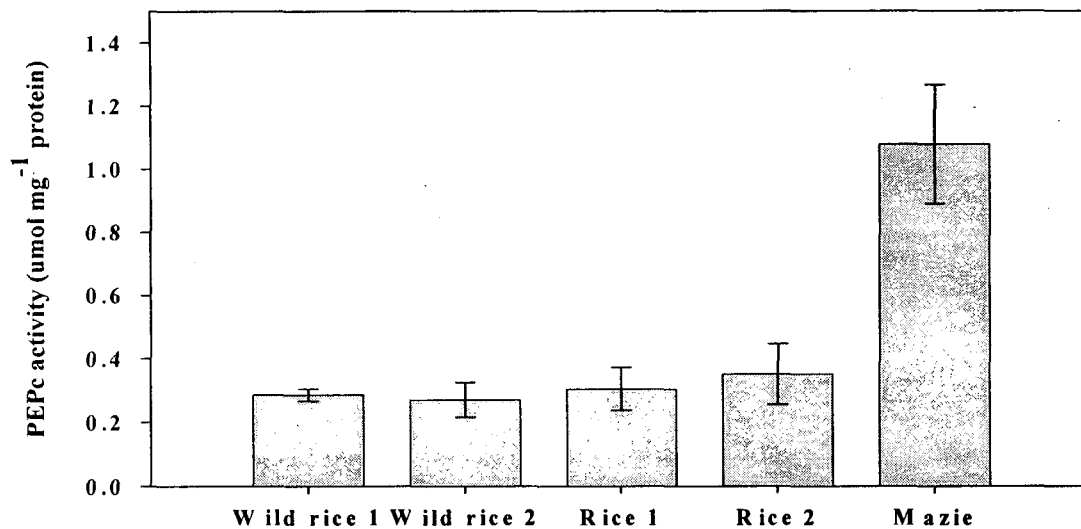


Fig. 1. Specific activity of PEP carboxylase from wild rice, rice and maize. Wild rice 1 (*Oryza grandiglumis*), Wild rice 2 (*Oryza alta*), Rice 1 (cv.Saechucheongbyeo), Rice 2 (cv. Andabyeo), Maize (cv. kwangPyeongok). Each value is the mean of two different experiments \pm SE.

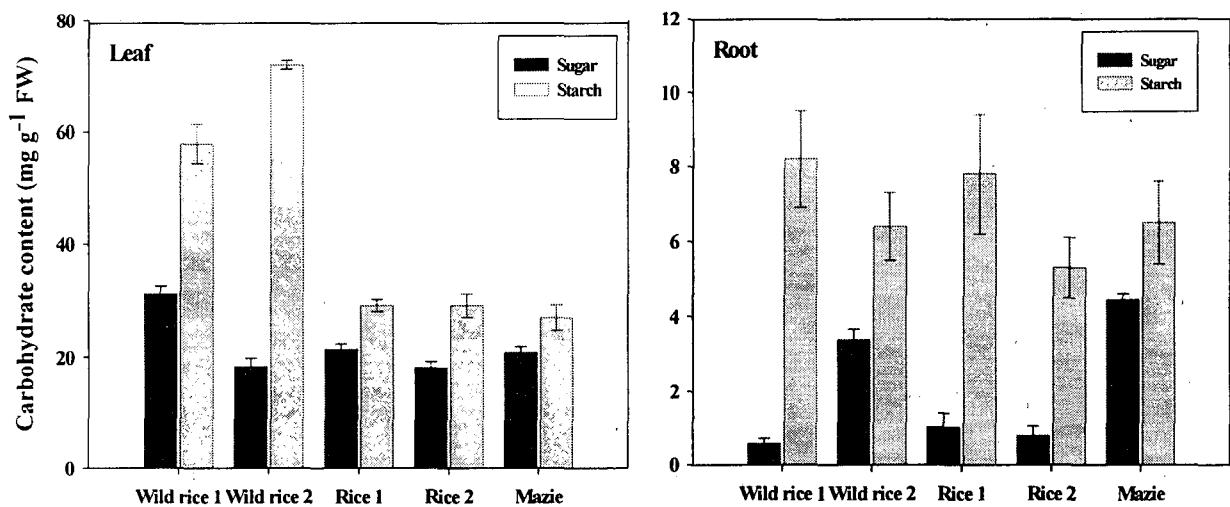


Fig. 2. The contents of total soluble sugars and starch in leaves and roots of each plant. Wild rice 1 (*Oryza grandiglumis*), Wild rice 2 (*Oryza alta*), Rice 1 (cv. Saechucheongbyeo), Rice 2 (cv. Andabyeo), Maize (cv. Kwangpyeongok). Each value is the mean of nine replications \pm standard deviation.