PYRUVATE DECARBOXYLASE ACTIVITY OF *Cyperus rotundus* L. UNDER UPLAND AND LOWLAND CONDITIONS

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ABSTRACT

VILLALOBOS, MIZPAH C. University of the Philippines Los Baños. December 2006. **Pyruvate Decarboxylase Activity of *Cyperus rotundus* L. under Upland and Lowland Conditions.**

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Pyruvate decarboxylase (PDC) activity was measured from the roots of *Cyperus rotundus* seedlings obtained from upland and lowland ecosystems. PDC activity was detected in small amounts in the lowland plants but was almost absent in the upland plants during germination in their respective ecotype environments. Subjecting the seedlings to 24 h of hypoxia resulted in a significant increase in enzyme activity in the lowland plants but leveled off as hypoxia was prolonged to 48 h. The upland plants exhibited an increase in PDC activity after 24 h hypoxia treatment following germination under upland conditions, which was further increased as the hypoxic treatment was extended to 48 h.

Total amylase activity present in the tubers of the lowland plants prior to germination was found to be high. Amylase activity in the lowland tuber decreased after 24 h and 48 h of hypoxia following germination in water-saturated soil, but no change in amylase activity levels took place in the upland tubers prior to and during germination, and after 24 h and 48 h of hypoxia treatment.

Thus, the lowland ecotype of *C. rotundus* adapted to flooded conditions by maintaining high levels of soluble sugars to fuel the ethanol fermentation pathway, and by utilizing low rates of ethanol fermentation to conserve energy sources throughout extended periods of flooding stress.

The production of PDC isozymes was not observed to occur in the lowland weed ecotype after 24 h and 48 h of hypoxic treatment following germination. The PDC enzyme induced by hypoxia in both the upland and lowland weeds was characterized to have a distinct lag phase.