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## Changes in Freezing Tolerance and its Relationship with the Contents of Carbohydrates and Proline in Overwintering Centipedegrass (*Eremochloa ophiuroides* (Munro) Hack.)

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**Abstract:** The objective of this study was to clarify the changes in the contents of endogenous carbohydrates and proline in the stolons and leaves of centipedegrass (*Eremochloa ophiuroides* (Munro) Hack.), during the natural cold acclimation (hardening) and de-acclimation (dehardening) in relation to freezing tolerance in the field at the transition zone between temperate and subtropical areas in China. The contents of carbohydrates and proline, and freezing tolerance estimated by  $LT_{50}$ , which is the temperature at which 50% of the electrolytes in the organ was measured in the leachate, were determined at 10-day intervals from October 1, 2001 to April 18, 2002. It was indicated that the freezing tolerance of stolons increased ( $LT_{50}$  of stolons decreased) quickly, as temperature dropped before winter, but that of leaves which senesced along with the drop in temperature did not. The freezing tolerance of stolons decreased gradually along with the rise in temperature above 5 °C in spring, when the overwintered plants started to grow. The contents of proline and soluble carbohydrates, including sucrose, fructose and glucose, increased as  $LT_{50}$  decreased when temperature dropped below 5 °C before winter, and decreased as  $LT_{50}$  increased in early spring. Correlation analysis revealed that the freezing tolerance of stolons of centipedegrass significantly and positively correlated with the contents of proline and soluble carbohydrates, and the ratio of the soluble carbohydrates to starch. Thus, the

freezing tolerance of stolons, which are critical organs that determine the winter surviving ability, largely depended on the content of soluble carbohydrates and the ratio of soluble carbohydrates to starch in centipede grass. The possible relationship between freezing tolerance and carbohydrate metabolism was also discussed.

**Keywords:** [Carbohydrates](#), [Centipede grass](#), [Freezing tolerance](#), [LT<sub>50</sub>](#), [Overwintering](#), [Proline](#), [Stolon](#)

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