Time Course of Foliar Absorption of Water in *Panicum* and *Paspalum*

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Abstract. The leaves of two tropical grasses (*Panicum maximum* Jacq. and *Paspalum notatum* Flügge) recovered from water deficit within 1 to 3 h after surface wetting. No substantial differences were found in absorption activity of abaxial and adaxial leaf epidermes between apical and basal parts of a leaf blade, or between leaves of different age.

Species composition and productivity of grasslands in Cuba are greatly influenced by sudden changes in moisture conditions. Soil water potential decreases below permanent wilting point in the course of dry periods and the survival of individual species is dependent on their adaptive capabilities. Even during the dry periods, water vapour concentration in the air is high (dew point above 15 °C), which results in abundant formation of dew. The duration of dew in grasslands is usually 12 to 15 h, and its quantity up to 0.6 mm.

The most important contribution of dew to the water balance of grassland plants is probably in saving soil water resources by reduction of both evaporation from soil surface and water uptake by plants (Sharma 1976). In their studies the authors were trying to estimate this indirect ("external") effect, and also the extent to which dew could be utilized by aerial organs of plants. The latter problem is treated in this paper.

MATERIAL AND METHODS

The plants used for experiments (*Panicum maximum* Jacq. and *Paspalum notatum* Flügge) were grown in pots from tillers sampled in an experimental area near Managua (Havana District). The tillers were planted into clay-sand mixture. The pots with plants were placed in an experimental garden of the Botanical Institute in Havana. The experiments were performed in June and July 1978.

The leaves chosen for experiments were detached from plants and left for some time (10 to 120 min) in darkness to induce stomatal closing and to decrease their relative water content to various extents.
Foliar absorption of water was tested on leaf segments, 75 mm in length, which were cut out from the basal, central, and apical parts of a leaf blade. After estimating their initiated mass, the segments were placed on a foam polyurethane strip fully saturated with water (Fig. 1). The central part of the segments was gently pressed to the wet polyurethane foam by thin rubber threads in order to assure perfect contact with the water. At several predetermined time intervals and after standard surface drying procedure the segments were weighed. Then they were put back on the wet polyurethane strip in the same position as before. Finally, each segment was cut into four equal pieces and these were placed with their cut edges against strips of wet polyurethane foam for 3 h. After this time the segments were considered fully saturated with water. Relative water content (RWC) of segments before their full saturation was calculated according to the formula:

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\text{RWC [%]} = \frac{\text{nonsaturated mass} - \text{dry mass}}{\text{saturated mass} - \text{dry mass}} \times 100.
\]

With the exception of weighing, the segments were kept in darkness during the whole experiment and ambient air was saturated with water vapour.

RESULTS

Experiments comparing the absorption activity of apical and basal parts of a leaf blade (Fig. 2) were carried out using leaves of two age categories. The first fully developed leaf from apex (usually the 2nd one) was chosen as "young", and the oldest, but yet perfectly green, leaf as "old". The total number of leaves was 5 to 7 per plant.

The differences in water absorption between leaves of different insertion as well as between the basal and apical parts of a leaf blade were very small. In most cases, resaturation of segments to the constant value of RWC was attained within 3 h. When the initial RWC was not below 80%, resaturation was usually completed within one hour.

The final value of RWC after 20 or more hours of foliar uptake reached, very exceptionally, the value of 100%. This should not necessarily be regarded as showing how imperfect foliar absorption is. At least two other factors may interfere: (a) the relative "oversaturation" of shorter segments, which were saturated through their cut edges, and (b) the extension growth of segments during the determination, especially in the case of young leaves. The values of RWC were not corrected by extrapolation method for this error.