The effects of fruits load on frond elongation of date palms

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Introduction

Date palms serve as an important cash crop with highly nutritive fruits and are widely cultivated in the Mediterranean region. Palm fronds promote growth and bearing fruits through photosynthesis. Since both frond elongation and fruits growth consume sugar, a throughout comprehension of fruits growth effects on frond elongation under sufficient irrigation condition might be helpful in irrigation scheduling. The objective of this study was to evaluate the effects of fruits load on frond elongation and relevant physiological activities of date palms with sufficient irrigation application.

Methodology

Twelve date palms, 6 with fruits removed (“without fruits”) and 6 untouched (“with fruits”), were irrigated with equal amounts of water for maintaining optimal soil water conditions. Rotary encoder was initially utilized to measure transient frond elongation with resolution of 0.5 mm in wireless sensor network (Fig.1).

During the experiment, daily photosynthesis, transpiration and stomata conductance of fronds were measured throughout growing season of date palms.

Results

The results showed that palms with fruits had significantly lower frond elongation (Fig.2 and Fig.3) and higher physiological activities (Fig.5) than those without fruits. Besides, frond elongation decreased with the increase of stomata conductance (Fig.4).

Conclusions

1) Fruits load reduced frond elongation due to sugar accumulation in fruits. The effects of fruits load on frond elongation of palms varied with the development of fruits.
2) Frond elongation rate decreased with the increase of stomata conductance. Thus frond elongation were minimized during daytime and mainly occurred at night.
3) Fruits load enhanced daily photosynthesis, transpiration and stomata conductance of palms.

References


Acknowledgement

ICORE Program of the Israel Science Foundation (grant no. 152/11)