



TRANSPIRATION RATE OF CITRUS TREES



TRANSPIRATION RATES OF CITRUS WITH OROCIT® ADJUVANT AND MINERAL OIL (THREE APPLICATIONS OVER 4 DAYS)

TARGET	Citrus trees	CROP	Citrus (<i>Navels</i>)	LOCATION	Wellington, Western Cape, South Africa
TRIAL DATE	April 2012	RESEARCHER	Dr. D. Uys, J. Kotze, M. Matthew, A. Mhlaba; Oro Agri SA (Pty.) Ltd.		

STOMATAL CONDUCTANCE

Stomatal conductance is the measure of carbon dioxide entering, or water vapor exiting through the stomata of a leaf. It provides an indication of the potential for photosynthesis, provided the other conditions necessary for photosynthesis are met. Under conditions of full sunlight and sufficiently high temperatures, as was encountered in the trial described below, the stomatal conductance obtained can be seen as a proxy for photosynthetic potential.

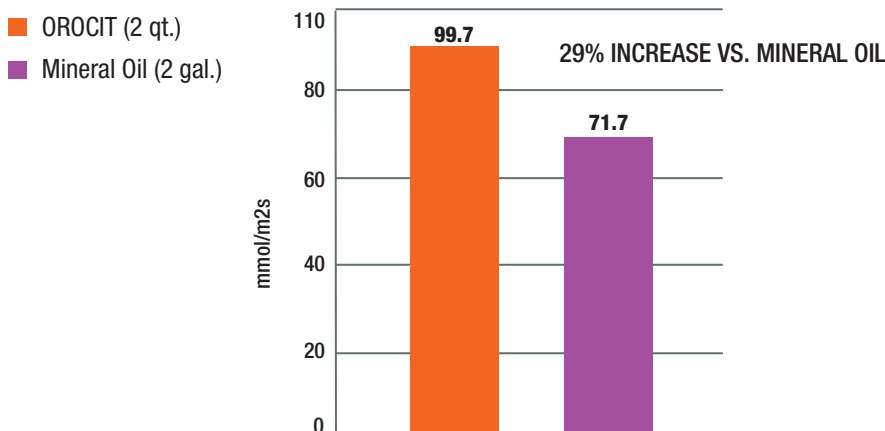
APPLICATION

Mineral oil is known to induce stress in plants when applied as a foliar spray. In an attempt to quantify the level of stress, a trial was conducted in which single applications of mineral oil and OROCIT were made to citrus trees. Measurements were taken with a porometer, an instrument that measures the stomatal conductance (transpiration) as an indicator of stress. A strong correlation between transpiration and CO₂ assimilation, which in turn indicates the level of photosynthesis, is known to exist. In order to eliminate tree variation as much as possible, individual trees were pre-selected by measuring their transpiration rates before the trial. Individual trees were then grouped for each treatment so that the starting values were similar. Corrections to the post-treatment values based on the starting values were made. The first measurement, during which the level of transpiration of 10 leaves from each of 5 trees per treatment were measured, was done 1 day after application. This was then repeated at 4 days after application. The 1 DAT and 4 DAT figures were averaged to obtain figures based on a larger number of leaves.

RESULTS

Mineral oil depressed transpiration rates at 1 and 4 DAT compared with the OROCIT treatment. Both transpiration and the exchange of CO₂ for photosynthesis depend on the extent to which the leaf stomata open. A lower stomatal conductance, as was found with the mineral oil, indicates that the stomata were less open and the leaves had less potential for photosynthesis than the OROCIT-treated trees.

STOMATAL CONDUCTANCE ON CITRUS TREES AFTER MINERAL OIL AND OROCIT SPRAYS | AVERAGES OF 1 AND 4 DAT





TRANSPIRATION RATES OF CITRUS TREATED WITH OROCIT® ADJUVANT AND MINERAL OIL (THREE APPLICATIONS OVER 16 DAYS)

TARGET	Stomatal conductance	CROP	Citrus (<i>Navel</i>)	LOCATION	Wellington, Western Cape, South Africa
TRIAL DATE	March – April 2012	RESEARCHER	J. Kotze, Dr. D. Uys, M. Matthew, A. Mhlaba; Oro Agri SA (Pty.) Ltd.		

STOMATAL CONDUCTANCE

Stomatal conductance provides an indication of the potential for photosynthesis, provided the other conditions for photosynthesis are met. Under conditions of full sunlight and sufficiently high temperatures, as was encountered in the trial described below, the stomatal conductance obtained can be seen as a proxy for photosynthetic potential.

APPLICATION

Mineral oil is known to induce stress in plants when applied as a foliar spray. In an attempt to quantify the level of stress, a trial was conducted in which a single application of three rates of mineral oil and three rates of OROCIT were applied to citrus trees. Stomatal conductance (a measure of transpiration) readings were taken using a Decagon SC-1 Leaf Porometer. The first measurement was made 30 minutes after application of each treatment, during which the level of transpiration of 5 leaves from 3 trees per treatment were measured. These measurements were repeated 6 times over a 16-day period.

RESULTS

Increased levels of transpiration were observed on the trees treated with OROCIT compared with those treated with mineral oil. The higher transpiration rates for the OROCIT treatments lasted for about 14 days after which time the mineral oil treatments recorded similar levels of transpiration. **Higher transpiration levels - which are positively correlated with photosynthesis - indicate that the trees treated with OROCIT exhibited higher levels of photosynthesis under the trial conditions.**

STOMATAL CONDUCTANCE READINGS ON CITRUS TREES (AVERAGE OF 7 MEASUREMENT TIMES)

- OROCIT
- Mineral Oil

