and 19.2% less than the estimated ET in the drip irrigated field during the last 4 weeks before harvest. The results suggest that the crop water use during late season is less than predicted with ETo and Kc values. The Kc estimates are for unstressed water use so the lower crop water use is most likely due to water stress during late season senescence.

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State of the art of irrigation research on processing to matoes in Brazil

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Despite the importance of irrigation for processing tomatoes crops in Brazil, research contributions to this subject have been modest and considerable gaps in knowledge still exist. This paper has the objective of presenting a survey of irrigation technology research on processing tomatoes in Brazil, emphasizing recent developments and trends, and pointing out the need of further work.

Until the mid seventies irrigation of processing tomatoes crops used to be performed by furrow systems, even in coarse textured soils. In the last ten years, however, the crop has been irrigated mostly by sprinkler systems, primarily center pivot machines. The progressive use of center pivots associated with the lack of efficient crop and water management has brought out many problems mainly related to soilborne diseases. Recent studies have shown some measures to be taken in order to mitigate these problems, principally by adopting efficient water management and crop rotation schemes. Other results have shown technical and economical feasibility of drip irrigation for processing tomatoes crop in Brazil and that high yields associated with low occurrence of pests and diseases can be obtained by using subsurface drip fertigation.

There is also a lack of reliable information about the application of herbicides, fungicides and insecticides through irrigation water. This kind of knowledge is important primarily for intensive cropping under center pivots. Experiments on drip fertigation, however, have indicated that the application of nitrogen and potassium through the irrigation water can increase yield in about 20% compared to conventional fertilization.

The few water consumption data available are mostly by-product



estimates. Crop coefficients are only available for the Central Brazil region. Most of the research which has been done is related to irrigation scheduling and water management. Critical levels of soil water tensions to maximize yield, for different crop growing periods, have been determined for the major producing areas. The right moment to suspend irrigation in order to obtain best results has also been determined. Furthermore, studies have shown the importance of using sound techniques to schedule irrigations.

Irrigation research has given little but significant contributions to the improvement of the processing tomatoes crop in Brazil in the last fifteen years. A whole lot of research, however, still remains to be done on irrigation and related fields, in order to define optimal parameters of the plant-water-nutrient system.

Processing tomato evapotranspiration measurements using weighing Lysimeters

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The present study has as main objective the use of weighing Lysimeters on two different crops: one of reference (grass) and another of processing tomato, for the determination and adjustment of the crop coefficients as well as to analyze the appropriate methodology for the reference crop evapotranspiration estimation with the use of micrometeorological data provided by Bowen Ratio Energy Balance and Eddy Covariance met stations.

Methods

The studies were carried out at the Lysimeter site of "Finca La Orden" belonging to the "Servicio de Investigación y Desarrollo Tecnológico (Junta de Extremadura)". The total surface of the Lysimeters site is about 4 Has where two identical lisunetros with loaded cells were built having a rectangular surface of 6 m². Each Iysimeter crop occupies a surface of 1.8 Has approximately. One of the Lysimeter is dedicated to a permanent grass crop and the other one to annual crops that it was of processing tomato Nemagema 1401 variety for the 1997 season. Lysimeter data were recorded with a Campbell Scientific 21X Datalogger using a P9 instruction averaging the last minute (1 second sample interval) for each 30 minute period.

Two micromet stations were also installed over the reference crop