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UNIFORMITY OF IRRIGATION IN NEW SPRINKLERS AT LOW PRESSURE

ABSTRACT

Beet crop in irrigation is closely linked to the sprinkler system. The main irrigation system is full sprinkler coverage, but today irrigation machines (pivot) are gently being introduced.

In 2015 AIMCRA and IFAPA made an agreement to improve the efficiency and energy saving sprinkler irrigation by the use of new sprinklers and nozzles in a bank sprinklers. Previously AIMCRA studied irrigation uniformity and its influence on the yield (Salvatierra *et al.*, 2010). We know that with a uniformity below the acceptable (Distribution Uniformity, DU <75%) crop losses of 20% occur (Mantovani *et al.*, 1995).

In an automatic sprinkler test bank with wind, property of IFAPA (Andalusian Agricultural Institute) in Chipiona (Cádiz) we studied the behavior of 9 sprinkler models from five irrigation houses (Senninger, Vyrsa, Nelson, Unirain, NaandanJain) with 20 nozzles in different combinations of single, double and with or without pods. The operation of the sprinklers is measured in real conditions. The instalation allows the direction and wind speed and is possible to analyze the distribution of water at different pressures and flow rates. They were tested normal pressure (3.5 bar) and reduced pressures of 2.5 to 2 bar. The objective is clear, find a combination of sprinkler and nozzle able to distribute well the water at low pressure to save energy.

Each trial is to test a model of sprinkler and nozzle for at least two hours with the same speed and wind direction at a given pressure. There have been a total of 78 trials. A program displays frames DU for irrigation from 10 x 10 m between sprinklers to 18 x 18 m for square or triangular frames.

There are changes that improve the UD. Some combinations of sprinklers and nozzles work well at low pressures. Sometimes just removing the sheath jet prolonging it would a DU value of 73% to 76%, thereby obtaining an acceptable value of DU.

The framework could be changed to rectangular array. It is noted that otherwise improves the DU to 79%.

All this results in significant energy savings.