

Development and Evaluation of Dual Applicator (LEPA & Spray) Pivots (Field 5ABEF)

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Objective: To construct and evaluate a dual nozzle application system that uses the LEPA irrigation method on flat topography (dikes not needed) and the low elevation spray method in sloping areas.

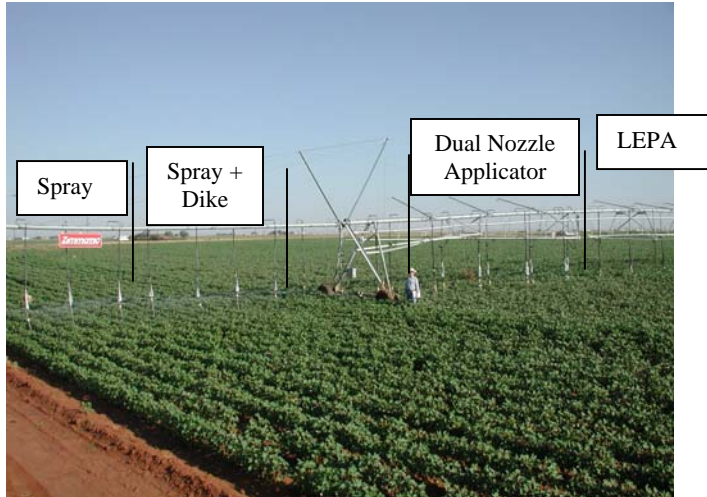


Figure 1. Distal portion of pivot with applicators used in Dual Nozzle applicator experiment, 2003.

Methodology: Growers use spray irrigation systems rather than efficient LEPA systems due to the inconvenience of using and maintaining furrow dikes. The distal portion of an existing center pivot was modified for this field experiment (Figure 1). This project used the control system of a variable rate (VR) irrigation system to activate solenoid valves allowing flow through either LEPA or spray devices. Both application devices were located on each pivot drop within a section of the pivot. A pre-planned application map was downloaded into the VR controller with information on which device was

to be used at specific locations in the field. Within the **Dual Nozzle** treatment area, spray irrigations took place in all areas with furrow slope greater than 0.3%, and non-diked LEPA treatments occurred in areas of less than 0.3% slope. Crop response to the **Dual Nozzle** applications were compared to traditional LEPA and low elevation spray systems at 40 locations (zones) around the perimeter of the pivot with furrow slope ranging from 0 to >1%.

Results: Cotton lint was harvested from each treatment in each of the 40 zones. Average yields are given in Figure 2. Paired statistical analysis showed LEPA treatments produced significantly higher yields than the **Dual Nozzle** and spray treatments. However, yields and water use efficiencies of the **Dual Nozzle** treatment were not significantly higher than those of low elevation spray indicating no clear advantage of the **Dual Nozzle** system over traditional spray systems. This unexpected outcome may be due to the unusual growing conditions in 2003. Continued evaluation of **Dual Nozzle** applicators during typical growing seasons may increase the acreage irrigated by LEPA on the Texas High Plains.

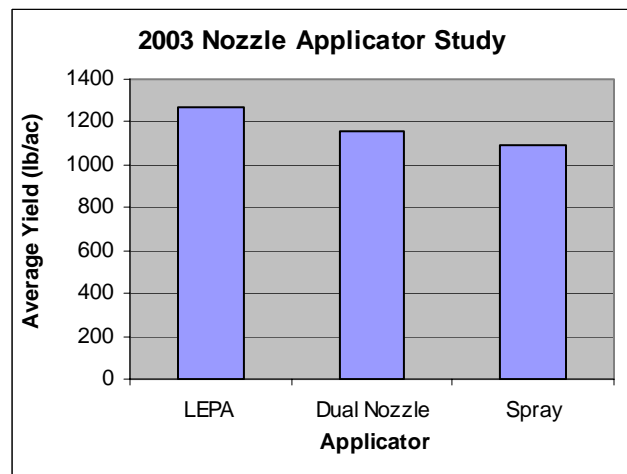


Figure 2. Average cotton lint yield as a function of irrigation system applicator, Helm Farm, 2003.