

## Evaluation of Various Nozzle Performance for Orchard Irrigation

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### Abstract

In addition to the physiology of crops and characteristic of soil, the performance of irrigation equipment is also determinant for fruits both in quantity and quality, especially in the time of water shortage. Upgrading utilization of irrigation facility becomes more and more important. The study tested various nozzles of inches diameter type pipeline irrigation system, a popular implement in Taitung, to find their flow rate and sprinkle radius under different pressures. Soil moisture content of tested orchard was also recorded by a soil tension meter to trace the change of moisture with irrigation time. Results indicated that flow rate reached to 6.8~21.5 l/min and sprinkle radius was 2.9~5.5 m when fixed type nozzle was used with 2 and 3 mm clearance and water pressure was 0.5~2.5 kg/cm<sup>2</sup>. Soil at depth 40 cm got saturation after 80 minutes irrigation at operation condition of 1 kg/cm<sup>2</sup>, and 11.3 l/min. When round type nozzle tested at 0.5~2.5 kg/cm<sup>2</sup>, flow rate changed from 2.4~13.2 l/min while sprinkle radius was 2.9~5.5 m. Soil at depth 40 cm got saturation for 100 minutes irrigation under 1 kg/cm<sup>2</sup> working pressure and 8.4 l/min flow rate. In impact sprinkle type, both for single hole model and double holes model, flow rate varied from 7.0~25.6 l/min of 5.7~11.3m sprinkle radius when pressure was 0.5 to 2.5 kg/cm<sup>2</sup>. After 140 minutes, soil got saturation at 40 cm depth for working condition of 1 kg/cm<sup>2</sup> and 10.8 l/min.

**Key words:** Orchard irrigation, Sprinkler, Soil moisture.

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