



Resource Conservation District of Santa Cruz County

How to size the oval hose for strawberry irrigation based on field size and drip tape flowrate

By Dr. Gerry Spinelli and Lizzy Eichorn

Sizing an oval hose for strawberry irrigation is a challenge because of the tradeoff between high costs of the hose (since larger hoses are more expensive) and pressure loss along the hose (if the hose is too small). High pressure losses across an oval hose create non-uniform distribution of water and water wastage. In our valley, water is precious and growers do all they can to irrigate more efficiently and save water. In this article, we provide recommendations on how to correctly size an oval hose for strawberry production based on a) oval hose length; b) bed length; c) bed width; d) drip tape nominal flowrate.

To achieve high water distribution uniformity, the pressure loss across hoses and tapes in the field should be kept to a minimum. This way all emitters will be exposed to roughly the same amount of pressure and will produce about the same flowrate and consequently all plants will be irrigated uniformly. Pressure losses in a pipe or hose are larger when: a) the pipe length is larger; b) the flowrate traveling inside the pipe is higher; c) the diameter of the pipe is smaller; d) the internal surface of the pipe is rougher (this is determined by the pipe material and its age). In other words, to keep the pressure loss in a pipe at a minimum, the diameter of the pipe should be sized based on pipe length and flowrate. In strawberry irrigation, the length of the oval hose is determined by the block size while the flowrate is determined by 1) how many drip tapes are inserted into the hose (which in turn is determined by the bed width and the number of tapes per bed); 2) the length of the drip tapes; 3) the nominal flowrate of the drip tapes (which is expressed in gpm/100 ft and can be found on the drip tape label). In this area, 48-inch beds with 2 drip tapes per bed and 52-inch beds with 2 drip tapes per bed are the most common configurations. The two tables below were created for these two configurations. The columns list the length of the oval hose and the rows list the length of the drip tapes and their flowrates. For each combination of rows and columns the tables list the diameter in inches of the oval hose needed to keep the pressure loss below 2 psi across the hose. Hazen-Williams equation was used to calculate the tables, with a multiple outlet F factor of 0.4. The table was calculated based on flat ground, if the oval hose is oriented so that water is flowing downhill, it is recommended to install gate valves to burn off excessive pressure and Schrader valves to measure the pressure. Never orient an oval hose so that water is flowing uphill!!!

An example of how to use the tables: Lupe grows organic strawberries on 48-inch beds with 2 driplines per bed. Her beds are 300 ft long her tape has a flowrate of 0.67 gpm/100ft. Her oval hose is 200 ft long. From the table, Lupe finds that she needs a 4 inch oval hose. Another example: Grace grows conventional strawberries on 52-inch beds with 2 drip tapes per bed. Her beds are 200 ft long and her oval hose is 250 ft long and the flowrate of her tape is 0.5 gpm/100 ft. Grace should install a 3 inch oval hose.

For more information, questions, comments, for a free irrigation system evaluation or irrigation management assistance, contact the RCD of Santa Cruz County: (831) 464-2950, info@rcdsantacruz.org.

