

Economic Propagation Benches

Tom Demaline

Willoway Nurseries, 4534 Center Road, P.O. box 299, Avon, Ohio 44011-2399

Rolling benches built from steel products have many cultural and economic advantages for propagation. The first advantage is that steel benching can be easily disinfected for control of disease. Secondly benching built from steel products have a longer life verses wood products. The third advantage is rolling benching allows a propagator to increase the usable area in a greenhouse — thus reducing overhead cost.

Typical benching in a 29-ft greenhouse consists of five benches of 54 inches each, with four aisles of 20 inches each. With rolling benches you can increase your usable growing area by 20%.

The first step to building rolling benches consisted of saddles made from 1-inch galvanized pipe which are welded together and cemented into the ground. The saddles are spaced 12 ft apart along the length of the bench.

In the second step two length's of 1-1/4-inch pipe are used to roll the bench top from one side of the saddle to the other. The bench top is constructed from 1/4-inch ridged galvanized cattle fence. Each sheet is 54 inches wide and 16 ft long.

In the next step 3/4-inch galvanized pipe is tack welded to the galvanized cattle fence every 2 ft to allow the bench top to move from side to side on top of the rollers. Then threaded rod is bent into an "U" to act as a safety catch so the bench will not tip if it gets out of balance. The "U" is attached to the bench top. As the bench top moves to one side, the safety "U" moves under the 1-inch pipe on the saddle. Safeties are spread every 50 ft.

For the mist line 3/4-inch PVC pipe is used. The 3/4-inch PVC is attached to the bottom of the 3/4-inch galvanized bench top and supports with a #1 EMT clamp. The mist line moves with the bench top. One-half-inch PVC risers are used for each mist nozzle. The risers are spaced 64 inches apart on the bench and are staggered from bench to bench. The mist nozzle is a D.G.T./Volmatic nozzle available from Agro Dynamics.

Biotherm root-zone heating is used on the top of the bench. This hot water heat source creates an even uniform bottom heat to the soil which increases rooting percentages and reduces rooting time. The tubing is spaced 2 inches apart. Automotive heater hose (3/4 inches) is used to connect the supply line in the ground to the bench tops. This flexible hose allows the bench top to roll. Each house has a soil-probe-operated thermostat to control the soil temperature. With root-zone heating in cold climates, you will need a supplemental heat source to heat the air in the greenhouse. We use a 1-1/4-inch steam line under each bench to provide the additional heat. This heat source is operated by a Wadsworth Step 50 greenhouse controller.

In the final step 48-inch galvanized expanded metal is placed on top of the biotherm tubing to keep the tubing in place. The expanded metal also allows the bench to be more versatile for other crops. This type of benching will provide a low maintenance propagation area at an economical cost. Rolling benches also maximize the space in your greenhouse to increase your return per square foot.

Table 1. Cost for benching 450 ft² bench.

Bench costs		
Pipe saddles	\$11.83 each × 12	\$106.47
Safety	1.00 each × 6	6.00
Cattle fence	14.99 each × 6.25 sheets	166.50
3/4 inch pipe for tops	225 ft	166.50
*Optional expanded metal	24.00 each × 12.5 sheets	300.00
1-1/4 inch pipe for rollers	27.84 each × 10	278.40
Concrete		79.38
TOTAL		\$1,030.44
Cost per ft ²		\$2.28
Cost per ft ² excluding expanded metal		\$1.62
Heating		
Biotherm tubing	27 × 100 × .32¢ per ft	\$864.00
Biotherm header		15.40
Thermostat		46.50
TOTAL		\$925.90
Cost per ft ²		\$2.05
Mist		
PVC pipe with fittings and hangers		\$38.25
Mist nozzles	\$2.11 each × 19	40.09
TOTAL		\$78.34
Cost per ft ²		17.4¢