

Deep Pipe Irrigation

By David Bainbridge

Deep pipe irrigation uses a pipe (traditionally bamboo, a bundle of sticks, or straw) to place irrigation water deeper in the soil. Nowadays, it is commonly done with 3/4" to 3" diameter pipe placed 12-18" deep (or deeper) under or near the tree or plant to be irrigated. A larger pipe is preferred if watering is done by hand, while a smaller diameter pipe can be used with a drip emitter. The holes in the earth for the pipes can be drilled by hand (a brace with a large wood bit and 3 foot long 1/8" pipe extension) or a small gas drill (1/2" drill available from Oakfield Apparatus, P O Box 65, Oakfield, WI 53065) will do the job. In rocky soil a large hole may have to be dug to place the pipe. Several pipes may be used for mature trees.

The pipes can be filled from a hand-carried jerry can, an inverted water bottle, (observed in Kenya), a water truck (used by the city of San Juan Capistrano), or a drip emitter.

Deep pipe irrigation has the same benefits as buried drip systems--greater water use efficiency (due to reduced evaporation) and weed control--and several other advantages as well. First, it can be used with low-quality water and low technology. Second, it can be monitored and repaired easily. Finally, the pipes can be easily collected at the end of the season,

allowing tillage operations to any depth desired.

Experiments in Africa have shown that the deep pipe drip system is much more efficient than surface drip or conventional surface irrigation. Vine weight [ed: mass of plant] on the deep pipe drip system was 4 times that of conventional surface irrigation and more than double that of surface drip. Deep pipe irrigation allows a much larger effective rooting volume to develop and produces a plant much better adapted to survive on its own after establishment.

Our research in the low desert of California (rainfall 3" per year) showed that a 16" long, 2" diameter pipe, buried 12" deep, provided sufficient water for palo verde transplants when filled about every two weeks. While only 80% of the trees were alive after 8 months, compared to 100% irrigated with ollas and on porous capsules, the trees on the deep pipes responded best to a heavy rain and appear to have the best chances for long term survival.

Deep pipes are also useful as underground supports for protective screens. Plastic mesh seedling protection tubes (Terra Tech, P O Box 5547, Eugene, OR 97405) are good although some animals can chew through them. Metal screen should be avoided, as it is too difficult to cut off a plant.

