

一项新的罐渗技术——砖罐罐渗技术*

张 信 宝

(中国科学院、水利部成都山地灾害与环境研究所 成都 610041)

提 要 砖罐罐渗技术的优点在于:材料易取,成本低廉,制作工艺简单,节水节肥效益显著. 罐渗果园可不择地貌-土壤条件,利用零星水源,分散经营,管理方便,适合在我国中西部山区推广应用.

关键词 砖罐 罐渗技术 节水性能 果园

罐渗是在树木根部埋设一渗灌罐,其中的水体通过罐壁渗出,可满足树木的生长需求. 由于根具有趋水性,树木根系渐趋包裹渗灌罐生长,从而几乎能全部吸收灌渗水分. 罐渗原是巴基斯坦、突尼斯、印度等国一项传统的果园节水灌溉技术. 他们所用的渗灌罐为不上釉的陶罐.

1992 年引进了罐渗技术,并做了试验研制,加以改进. 试验点设在中国科学院、水利部成都山地灾害与环境研究所元谋干热河谷水土保持生态试验站(后文简称试验站). 当地干湿季分明,年降水量(614mm)的 92%集中于 6—10 月,有七八个月为干季,缺水少雨,而年蒸发量 3 737mm,年均温 21.9℃,岭谷相对高度 1 800m,土壤为膨胀性变形土.

经试验结果证实,陶罐罐渗技术的节水性能良好,但陶罐制作工艺要求严格,成本高,运输困难,在我国推广应用前景欠佳. 为克服陶罐存在的问题,改用普通红砖制成砖罐. 每一砖罐为一 29 块红砖砌成的立方体容器(包括顶盖),砖块之间用水泥砂浆勾缝. 砖罐外部尺寸 36cm(长)×36cm(宽)×60cm(高),砖罐内部尺寸 24cm(长)×24cm(宽)×48cm(高),容积 27.6L. 普通红砖存在有砂眼、微裂隙,渗水速率过快、渗透不均匀,对此通过数十次试验,研究出一种简便易行的防渗处理技术,可有效地控制砖罐的渗水速率. 根据需要,砖罐的自由渗水速率可控制在 1.0—5.0L/d 之间. 1993 年试验站已建成 0.07ha (1 亩)罐渗果园,果树品种为石榴、芒果和葡萄,果树生长良好.

砖罐罐渗技术有如下优点:

1. 制作工艺简单. 用普通红砖为基本材料,可就地挖坑砌制成砖罐,材料易取,运输方便,成本低廉. 本试验站每棵罐渗果树的建设费用约 10.00 元,其中材料费 5.00 元(红砖价 0.15 元/块),开挖、砌制费 2.00 元,苗木费 2.00 元,种植、肥料费 1.00 元. 每亩果园以 80 棵果树计,建设费用约 800.00 元.

2. 节水效益显著. 试验站在干旱季节对果园砖罐半个月灌水一次,每罐每次灌水

* 国家“八五”攻关课题《云南元谋干热河谷生态环境综合整治与退化土地合理开发利用试验示范研究》(项目号: 85-910-01-04)成果之一.

参加试验研制工作的还有高维森(助理研究员)、王道杰(实习研究员)、杨忠(助理研究员)等.

本文收稿日期:1994-04-26.

25L,每亩果园每次灌水 2m³,每年灌水以 8 个月计,每亩需水 32m³/a. 与沟灌相比,砖罐罐渗节水>80%.

3. 罐渗施肥,肥料利用率高. 每个砖罐为一小沤肥池,杂草、粪便和化肥可直接施入罐内,养分溶于渗出的水分中,直接被果树吸收,肥效显著.

罐渗果园可不择地貌-土壤条件,材料易得,制作工艺简单,成本低廉,省水省肥,管理方便,可利用零星水源,分散经营,适合在我国中西部山区推广应用.

为了迅速将砖罐罐渗技术转化为生产力,现愿向所有对此项技术感兴趣的单位、个人提供服务,并热忱欢迎来本试验站实地参观指导. 同时也恳请各级领导和业务部门,对砖罐罐渗技术的进一步试验研究和推广应用给予必要的支持.

A BRICK PITCHER IRRIGATION TECHNIQUE

Zhang Xinbao

(*Institute of Mountain Hazards and Environment, Chinese Academy of Sciences*
& *Ministry of Water Conservancy* Chengdu 610041)

Abstract

Pitcher irrigation is a water saving irrigation technique that water slowly delivers from a pitcher, installed under the ground near a tree, to water the tree. Tree roots are distributed around the pitcher. Pottery pitchers, used for several centuries in Pakistan and Tunisia etc., are easy to break and not convenient for transportation. Brick pitcher irrigation system has been used in a pomegranate orchard at the Yuanmou Dry-Hot Valley Soil Conservation and Ecology Station, under Institute of Mountain Hazards and Environment, Chinese Academy of Sciences & Ministry of Water Conservancy.

The brick pitcher irrigation has following advantages:

1. Brick is cheap and convenient for transportation. A brick pitcher with a volume of 27.6L is made from 29 commercial bricks.

2. Pitcher irrigation is very water saving. Water delivery rates of a pitcher can be controlled between 1—5L/d. The brick pitchers, installed in the pomegranate orchard at the station, were filled up with water once a half month during dry seasons, and the pomegranate trees grew well. By comparison of normal irrigation methods, it saved 80% of irrigation water.

3. Brick pitchers can be used for fertilizing. Fertilizers (chemicals, manures and organic materials etc.), putting into a pitcher, delivers from the pitcher with the water to supply a tree, so that the efficiency of fertilizers is higher than normal methods.

Key words brick pitcher, pitcher irrigation technique, water saving, orchard