

Recycling Runoff Water for Irrigation

Tim Brubaker

Hines Nurseries, Inc , P O Box 42284, Houston, Texas 77242

Container nurseries are facing one of the biggest challenges of their time. Pressures are increasing to utilize resources more effectively and to work in an environmentally sound manner. Water use and containment of fertilizer and pesticide runoff are two of the most critical concerns. Recycling nursery runoff for irrigation provides an effective means for reusing water resources and minimizing runoff of fertilizer or other amendments into the environment.

INTRODUCTION

Hines Nurseries, Inc. is comprised of three wholesale container nurseries located in Santa Ana, California, Vacaville, California; and Houston, Texas. All three sites have recycling systems. The system in Houston, Texas, will be discussed as an example of how recycling functions.

COMPONENTS OF THE SYSTEM

Irrigation water is pumped out of one of two wells at the nursery. The largest well feeds a large main reservoir, which has a capacity of 12-million gal. This main reservoir contains water from this well, storm water runoff and recycled irrigation water from the nursery.

Water is pumped out of this reservoir by a series of pumps. This water irrigates most of the nursery. All of this irrigation runoff water is channeled through a series of ditches and pump stations, to a central collection or recycle reservoir. Before entering this pond, the water passes through sediment traps to prevent any large debris from entering this reservoir.

When the water in this body of water reaches a certain level, dictated by floats in a wet well in a pump station, water is automatically pumped back to the main reservoir. There it is blended with well water, and the process is repeated.

A separate well with a smaller reservoir feeds another section of the nursery which does not ever receive recycled runoff water. Water pumped out of this smaller reservoir flows through piping to mist propagation liner areas, bedding plant production or areas where the grower should have more initial control of fertility and salt levels. All of this runoff water will also eventually find its way to the recycle reservoir, then back to the main reservoir for reuse over the larger part of the nursery.

PERMITS AND GUIDELINES

Hines Nurseries in Houston is permitted by the Texas Water Commission to dispose of some reservoir water in the nursery when certain guidelines are met. The permit is fairly involved, but certain key points of interest will indicate how the permit process works.

The nursery is required to collect the first half inch of precipitation from a storm event. The recycle pump stations are equipped with rain gauges, and the pumps

cut off after one-half inch of rain has fallen.

A provision in the permit allows for discharging water from the main reservoir. Certain criteria must be met in order to discharge. Flow rates in nearby creeks must be at a certain flow rate resulting from a storm. Additionally, guidelines on reservoir water pH, pesticides and nutrient levels must be observed. Once discharging occurs, the nursery must keep and make correct samplings for a series of tests that the permit spells out.

The nursery must keep monthly self-reporting forms for notification of discharges. We must also keep reports of quarterly pesticide levels for the main reservoir.

Fort Bend Subsidence District, which oversees water use in the local area, requires another permit regulating the amount of water pumped out of the wells

Again, good record keeping on water use is the key to complying with permits such as this. The recycle system greatly increases water-use efficiency and reduces the need to draw continually on these underground sources.

FERTILITY AND WATER QUALITY MANAGEMENT

Fertility monitoring is essential in a recycling system. Liquid feed injectors now must be set to compensate for the amount of fertilizer returned to the reservoir. Several times during the week the technical services department tracks certain key components of the water such as electrical conductivity, pH, and total N.

The primary source of fertility for the nursery is slow-release fertilizer, which is incorporated into the growing media. A percentage of this is leached from the containers and returns to the main reservoir. Adjustments are then made manually at the fertilizer-injector station to realign the fertility for field irrigation water. The amounts vary with the time of year. Temperature, rainfall, and initial liquid-feed settings will all affect the fertility levels wanted in the main reservoir.

With proper monitoring of water quality, a recycling system can greatly reduce the liquid feed a container nursery normally would require.

CONCLUSION

A recycling system benefits a container nursery by capturing water and fertilizer for reuse. By complying with containment regulations, the nursery is also helping maintain the quality of the surrounding environment.