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167. Handling stormwater and wastewater management. Bartok, J. W., Jr. Greenhouse Management and Production 30(9):36-37. 2010.

By John W. Bartok Jr.

Handling stormwater and wastewater management

Wastewater from greenhouse operations can come from five separate sources: greenhouse roofs, driveways/parking areas, indoor growing benches, outdoor growing beds and flood floors or benches. Best management practices should be used in handling water from each of these locations.

Rainwater

In most operations, the greatest amount of water comes from building roofs. A 1-inch rainfall on an acre of impervious surface such as a greenhouse roof or parking area amounts to about 27,000 gallons of water. Good drainage design is required to handle this water without degrading the water with sediment, pollutants or debris.

Rainwater from greenhouses can be kept relatively clean with grass or stone-lined swales. Directing this water to a detention pond or wetland will allow most sediment to settle out before it reaches a brook or stream.

For gutter-connected greenhouses consideration should be given to installing a rainwater harvesting system to store some of the water for use in irrigation. Removing this water from runoff lessens the impact on nearby wetlands or streams. Storing this water in a heated area tempers it before using it for irrigation.

A basic harvesting system consists of a

storage tank, a roof washer, inflow pipes, overflow pipes and a diverter to redirect the excess water when the tank is full. Concrete or plastic tanks can be used but are usually limited to about 15,000 gallons. Corrugated steel tanks can be built to almost any capacity as the tanks are delivered in preformed panels and assembled on site. A retention pond can also be used, but greater filtration is needed due to the potential for greater sedimentation. A roof washer is a device that diverts the first flush of water that is collected that may contain leaves, dust, bugs and bird droppings.

Driveways and parking areas

This space can add up to a significant amount of impervious area if it is paved. There is a greater impact if some of the area is sloped. Non-paved driveways and parking areas should have a minimum 10-inch compacted gravel base with 2 inches of processed gravel on top. This allows for good drainage underneath. Maintaining a cross slope of 3 percent from the middle of the driveway to the edges allows water to flow off to a swale. A curtain drain with 6-inch filter fabric pipe on the uphill side keeps water from getting under the driveway. Where the grade is greater than 10 percent, the driveway should be paved with a minimum of 3 inches of bituminous concrete laid in two courses. This prevents erosion of the driveway.

Truck turn-arounds, dock and material handling equipment areas should have a bituminous paving over a 12-inch minimum granular base. Adequate natural drainage or culverts should be installed to remove runoff. Drainage from paved areas with considerable vehicular traffic or where vehicles are parked should be filtered through a sediment/oil separator to remove sand, silt, oil and growing media before it is discharged to a wetland or brook. For large impervious vehicle areas, it may be desirable to have the water directed to a detention pond for further settling.

Indoor growing areas

Careful selection of the fertilizer and application that meets the nutrient needs as the plants grow can help to reduce environmental impact. With wire mesh benches, leached water drips onto the floor. Experience has shown that with careful watering, there is very little excess water that runs off. Most of the excess water evaporates within the greenhouse.

When benches are not full or when container plants are spaced far apart, significant runoff can occur. If the floor is concrete, drains can be installed to collect and treat this runoff.

Recirculating flood floor and bench systems eliminate runoff as irrigation water is returned to holding tanks. Provision has to be made to dispose of the

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See page 10.

Photo by David Kuack

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