

Managing nursery wastewater – drains and drainage systems

Nurseries are responsible for the quality of water that is collected and discharged from their property.

Drains and drainage systems in most production nurseries are designed to manage irrigation wastewater and excess rainfall and channel this water to storage facilities for reuse on gardens, grass and stock areas or recycle it back onto production areas after being filtered and disinfested. Drainage systems should be designed around calculations of the expected runoff from roofs, roadways, storage and production areas during rainfall or storm events. Systems should also be designed to manage the varying wastewater quality from different collection areas either separately or together often depending on the decision to recycle or reuse the wastewater. Drainage systems can be constructed as surface drains (open drains, grassed waterways, masonry drains, gutters, etc) or subsurface drains (ag pipes, slotted pipe, pipes, gravel trenches, etc) or most commonly a combination of both.

Production areas should be constructed with an impervious layer (eg. 200 micron builder's plastic ideally over compacted roadbase) beneath the growing beds to allow the collection of any wastewater. To ensure efficient drainage production areas are generally constructed with a minimum grade of 1:70 and for large growing beds a series of herringbone slotted drainage pipes in trenches beneath the beds will assist in directing wastewater effectively from the area. Efficient irrigation systems provide minimum leachate and wastewater but if the growing area is not planned and constructed to handle rainfall or storm events then the growing beds soon become waterlogged, providing an ideal environment for disease as well as making access and management difficult.

Wastewater from production areas often contain growing media fines, organic matter and other debris leached or otherwise lost from the containers that must be removed before entering the water storage facility. Other waste materials entering the drainage system such as scraps of paper, plant tags and labels must also be prevented from getting into the system. These waste materials if not removed may lead to water quality issues within the water storage, increasing water quality management, filtration and disinfestation costs. Simple sediment and floating trash traps should be installed to manage these waste materials.

Open drains are one of the most common drainage systems found in production nurseries and can be very successful in moving large volumes of water but must be carefully constructed to prevent erosion and reduce flow velocities. Grassed waterways are used to move rain and storm runoff, generally have grades of between 1:500 and 1:1500 and are designed to be mowed or otherwise maintained. Smaller grassed drains to remove irrigation wastewater are difficult to maintain due to being constantly wet from the regular daily flows of wastewater. Steeper slopes will require careful collection basin and drain design with baffles at regular intervals to break up the flow. Smaller open drains can be lined with weedmat to prevent erosion and can often contain baffles of large stones, rubble or aquatic grasses to dissipate the energy, break up the flow and allow depositing of sediments that may be suspended in the wastewater. Weedmat, concrete and masonry drains can be successfully utilized as open drains to efficiently remove wastewater from production areas and are sometimes used over difficult or steep terrain.

Piped drains are generally used in transferring high quality water from roofs and production areas to storage and are also commonly found moving wastewater under paths and roadways. Subsurface drains to move large volumes of wastewater need to be carefully designed. Junction boxes should be located at regular intervals to allow cleaning of the pipe and removal of obstacles such as nursery pots that may become lodged in the pipe system. Slopes of 1:100 for drainage pipes will ensure self cleaning of fine debris and algae.

Wastewater should be reused or recycled after storage and treatment. Wastewater storage may require pH adjustment, filtration, nutrient removal and disinfestation before the water is suitable for irrigation. For more information contact the nearest NGIQ, Farm Management System Officer in your area or consult the publication 'Managing water in plant nurseries' available from the NGIQ office.

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