

CASE STUDY

Six years of effluent water subsurface drip irrigation (SDI) on a Jojoba plantation, using Metzerplas Adi dripper with Rootguard® Technology (RT) *G. Sagi Eco-Stream - Water & Environment, gsagi@zahav.net.il*

Introduction:

Subsurface Drip Irrigation (SDI) is the most advanced irrigation method supplying water directly to the root zone, precisely according to the plants needs. SDI's greatest benefits when using effluent and recycled water either in agriculture or in landscape irrigation are by keeping the soil surface dry and preventing the transfer of contaminants and pathogens from the effluent water to the crop and the environment. SDI provides additional benefits in water conservation, soil cultivation, labor saving, weed control, root-zone aeration as well as lengthening the life time of the driplines.

The fear of dripper clogging is the major reason why SDI hasn't become the leading and most popular irrigation method. Dripper blockage is usually caused by a combination of water quality factors such as: particulate matter in the water (*Physical clogging*), precipitation of dissolved ions (*Chemical clogging*), or biofilm development in the dripline and emitters (*Biological clogging*). Dripper clogging in SDI may be caused by either water quality factors or root intrusion into the dripper through the emitter's outlet.

The dripper design has a major effect on its sensitivity to clogging and is affected by both the size of the inlet filter and water passages and the water flow mode (turbulence and velocity) in the dripper's labyrinth.

Root intrusion into the emitter in SDI is usually controlled by periodical and regular injections of herbicide into the water which is absorbed by the soil near the emitter and prevents root development in this area. Rootguard® Technology (RT) impregnates Treflan™ in the polyethylene of the dripper and the herbicide is released at the required uniform rate into the soil surrounding the dripper and prevents root intrusion into the dripper for the length of the dripline lifetime.

The combination of RT with the Adi (Metzerplas) dripper, a pressure compensated dripper with a large triple inlet filter and high resistant to clogging, has been found to be very successful in SDI when using secondary treated effluent water.



Figure 1: A dripper without RT blocked by root intrusion, clogging the emitter's outlet and the inner water passageway.



Figure 2: The Jojoba plantation irrigated with SDI using Adi (Metzerplas) 3.5 L/h dripper impregnated with Treflan™ by RT.



Figure 3: Root zone development around and along the dripline but not in proximity to the drippers

The Galon case study:

Thirty hectares of the Jojoba plantation of Kibbutz Galon were irrigated with SDI, using 3.5 L/h Adi (Metzerplas) drippers, 1m spacing, with RT. The driplines were installed 6 years ago (April 2000) at a depth of 35 cm. Secondary treated effluent water, stored in an irrigation reservoir and filtered by a 120 mesh automatic screen filter were used to irrigate the plantation at an average amount of 3,500 m³/Hectare/year. The SDI at the Galon plantation kept the soil surface dry and free of weeds (Figure 2) even though each irrigation period



Figure 4: The soil adjacent to the dripper is clear of root development.



Figure 5: The Adi Rootguard® dripper with no root intrusion or accumulation of clogging matter at the inlet filter, the water passageway, or the emitter outlet.

was longer than 24 hours of watering. During the seven irrigation seasons that this SDI system has been operating the flow rate has remained stable with no dripper blockage due to either water quality causes or root intrusion. Excavation and exposure of the SDI pipelines show an abundance of roots around and along the dripline (Figure 3), but no roots were developed in the soil adjacent to the emitters (Figure 4) or in the dripper outlet. A detailed examination of the drippers themselves indicated that the emitter outlet and the entire water passageway of the dripper, including the inlet filter, remained significantly free of any root intrusion or accumulation of clogging matter, such as organic or inorganic particles, chemical precipitates or biofilm development (Figure 5).

Summary:

The case study of SDI at the Galon Jojoba plantation indicates the reliability of the Adi (Metzerplas) 3.5 L/h dripper impregnated with Treflan™ by RT. No dripper clogging was found, due to either water quality factors or root intrusion in the SDI system after seven seasons of irrigation with secondary treated reclaimed wastewater.



METZERPLAS

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