

Re-use of Irrigation Drainage Water



One of the female palms in fruit. The fruit are covered in protective bags to prevent bird and insect damage

Background

Saline irrigation drainage water is normally a waste product and releasing it directly back into the environment can have negative environmental impacts. The date palm (*Phoenix dactylifera*) has the ability to tolerate high salinity levels and drought therefore this project was an investigation in to re-using saline irrigation drainage water for irrigating date palms to grow a secondary crop, date fruit.

A number of water and crop response parameters were measured over a 6-month period from November 2014. A report has been developed that summarises the data collected and fills knowledge gaps in the application of drainage water to date palms to demonstrate 'proof of concept'.

The method

A small existing planting of five date palms was pruned back in 2013 in preparation for commercial production. In October 2014, water meter and sprinklers were installed to measure and deliver the re-used water on the date palms.

Detailed measurements and observations were recorded over a 6-month period. This included drainage water analysis, nematode testing, leaf tissue testing, microbiology and soil sampling, and fruit assessment.

Date palm crop yield was measured to investigate the economic returns to the grower. Fruit from the test site was harvested 18 June 2015.

The results

A total of 675 kilolitres was applied to the date palms between November 2014 and 30th June 2015. This translates to approximately 135 KI per palm and meets the recommended requirements. Salinity readings were 2140-2250 EC units.

The salinity of the irrigation drainage water is relatively low at 2140-2250 EC units. This is consistent with water quality from the Loxton drainage scheme averaging 2178 EC units. International scientific research reports that date palms are highly suited to perform under these conditions and there is no yield loss where water quality is less than 4,000 EC units. At 10,000 EC units a 25% yield loss can be expected.

Nematodes can be problematic to date palms. Soil and water sampling did not uncover any nematodes in the water sample. Root Knot and Stunt nematodes were found in the soil sample but at low levels. Where water and nutrients are limited, Root Knot nematodes can cause plant damage but Stunt nematodes are unlikely to cause damage.

Early leaf tissue monitoring revealed some nutrient deficiencies – mainly calcium, zinc, iron, magnesium and manganese. Fertiliser was applied during February and a subsequent leaf test in June reflected some improvement. It is assumed that nutritional deficiencies affected the performance of the date palms with reduced fruit yield.

The two female palms produced 5 fruit bunches and yielded 58.5 and 44kg. In comparison, commercial date growers would aim



for around 90kg per palm from 10-12 fruit bunches. The female palms in this study originated from seed whereas selected elite cultivars are used to establish commercial plantings. With time and management it is expected production will increase.

Fruit quality was assessed against commercial fruit quality and was found to be similar although Calcium levels were on the low side due to nutrient deficiency. In general, the growing conditions were favourable for date fruit production.



The date palms after pruning ready for irrigation

Conclusion

The results of this project indicate that re-using saline irrigation water for date palm fruit production is a viable management option.

In a fully commercial plantation elite cultivars would be chosen for production with a male to female ratio of 1:15 to give the production required for a profitable enterprise

Recommendations

Each irrigation district serviced by drainage schemes would benefit from assessments in re-use capability. Installing loggers that measure discharge volumes and salinity can do this. At the farm level an inexpensive flow meter can provide valuable data for on-farm irrigation management.

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