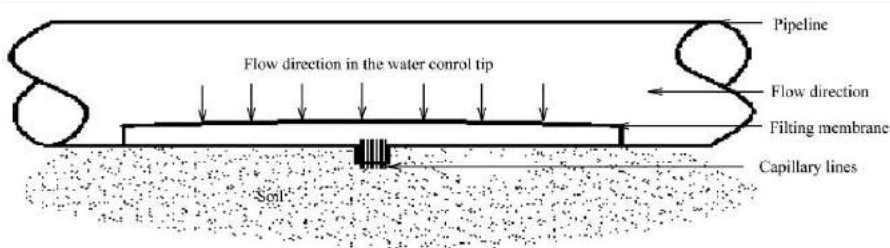




Effect of Trace Quantity Irrigation(TQI) on Wine Grape Culture in Arid Region in China



Double-layer Structure of TQI



Cutaway view of water control tip

Flow rate 1-500 mL/h without clogging. Used 6 years without clogging problem in field trial, result from lab test showed more than 20 years life.



Materials and methods

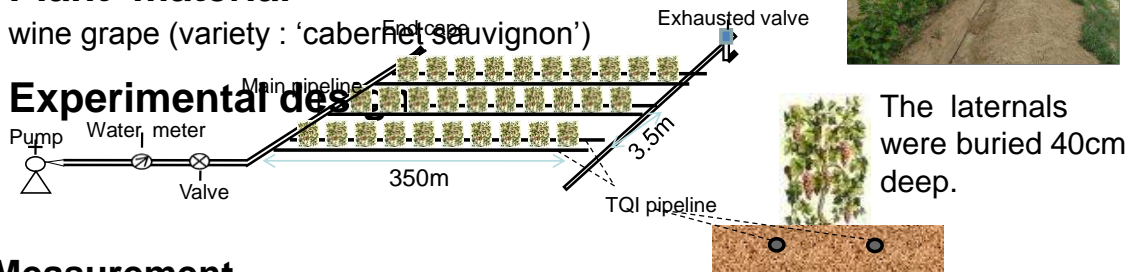
Experimental site

Changyu grapevine farm in Xixia district, Ningxia province, China
aeolian sandy soil, Soil bulk density : 1.42 g/cm³

Plant material

wine grape (variety : 'cabernet sauvignon')

Experimental design



Measurement

Irrigation amount, Soil water content, Grapevine growth.



Results

Irrigation amount

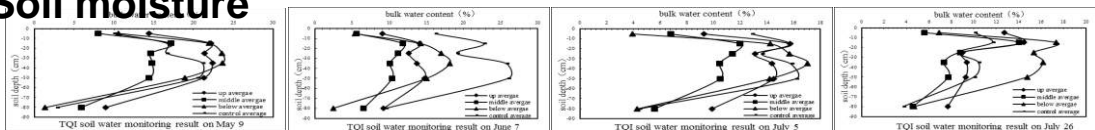
Irrigation amount of wine grape during growth period

Month	Trace quantity irrigation (m ³ /hm ²)	Drip irrigation (m ³ /hm ²)
May	150	300
June	300	720
July	300	600
August	300	600
September	150	300
Total	1200	2520

Irrigation uniformity

Single trace quantity irrigation line was extended 350m long. The irrigation uniformity was 90% in the range of 350m.

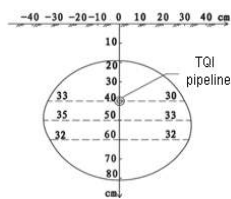
Soil moisture



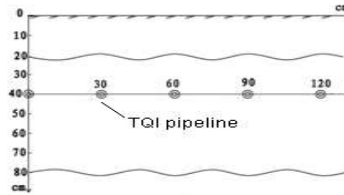


Results

Wetting front

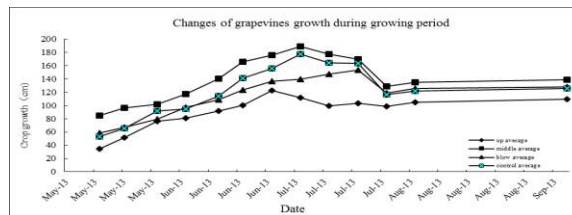


Single TQI water control tip



multiple TQI water control tip

Crop growth



Conclusions

52.4% water could be saved compared with drip irrigation for same yield; uniformity in flow rate was 90% when extended 350m.

Wetted perimeter was from 20cm to 80 cm in depth when lateral lines were buried 40 cm deep, and width of wetness was 50 cm to 60 cm.

Plants grew vigorously under trace quantity irrigation and 20% more yield was achieved compared with drip irrigation

Note: A commercial scale trial, 30 Ha. (500m*600m), laterals extended 500m long, uniform soil moisture; irrigated simultaneously in comparison of 2-3 ha. rotation area of drip irrigation; 1-2 valves for 30 Ha. easy for automation.