**Subsurface drainage reduces accessions to watertables**

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In south-west Victoria, waterlogging of the soil is common due to the combination of high rainfall (> 550 mm) and duplex soils in which subsoil permeability is low. The level of the resulting perched watertable fluctuates in response to rainfall, downward perculation and lateral seepage. Although flow rates through the subsoil are slow, significant recharge to underlying groundwaters does occur if waterlogging is prolonged. As this can be alleviated by subsurface drainage an attempt to quantify the reduction in saturated flow through the subsoil has therefore been made.

**Methods**

In 1986, an area of 6 ha was drained by a combination of piped collector drains (80 cm depth and backfilled with scoria gravel and spaced at 45 m intervals) and mole drains.

Rainfall, drain flow and electrical conductivity of the drainage water were monitored electronically during 1987/88 and 1988/89 from a drain which collected water from an area 300 m x 45 m. Evapotranspiration was estimated from pan evaporation and a crop factor appropriate for the ground cover and an approximate water budget calculated.

**Results and discussion**

**Table 1. Water budget for an area 300 m x 45 m with subsurface drainage**

| Period | Rain (mm) | Drainage (litres) | Drainage (mm) | Pan evaporation (mm) | Crop factor | Evapotrans-piration (mm) | % excess water drained |
|---|---|---|---|---|---|---|---|
| **1987:** | | | | | | | |
| 29/5-16/6 | 13.7 | 39,880 | 3.0 | 19.6 | 0.4 | 7.8 | 50 |
| 20/6-7/7 | 46 | 161,000 | 12 | 17.4 | 0.4 | 7.0 | 31 |
| 8/7-29/7 | 42 | 172,000 | 13 | 29.2 | 0.45 | 13.1 | 45 |
| 30/7-21/8 | 30 | 134,000 | 10 | 28.0 | 0.50 | 14.0 | 63 |
| 22/8-12/9 | 41 | 106,000 | 7.8 | 41.4 | 0.6 | 25.0 | 49 |
| **1988:** | | | | | | | |
| 20/7-4/8 | 49 | 179,000 | 13.3 | 21 | 0.4 | 8.4 | 33 |
| 5/8-13/8 | 15.2 | 156,000 | 11.5 | 14.2 | 0.4 | 5.7 | 100 |
| 14/8-31/8 | 64 | 333,000 | 24.7 | 34.4 | 0.5 | 17.2 | 53 |
| 1/9-9/9 | 40 | 175,000 | 13.0 | 24.6 | 0.5 | 13.3 | 49 |
| 10/9-16/9 | 17.4 | 99,000 | 7.4 | 16.4 | 0.6 | 9.8 | 97 |
| 17/9-26/9 | 20.5 | 88,000 | 6.5 | 27.4 | 0.6 | 16.4 | 100 |

Drain flows responded rapidly to rainfall events as low pressure systems moved across south-west Victoria and each "wet" period was analysed separately. Runoff was insignificant as evidenced by the very small flows in the creek into which the drainage system was discharged. The proportion of excess water (i.e., rainfall - evapotranspiration) removed by the drainage system varied from 30 to 100% for the periods analysed (Table 1). This variation probably resulted from differences **in rainfall** intensity since a greater proportion of a sudden heavy rainfall event is drained away than occurs if the same quantity of rain falls over a longer time. The quality of the drainage waters was high (electrical conductivities were initially 0.4 ms/cm but declined to less than 0.2 ms/cm by the end of winter 1988) and much better than the water in the streamline (conductivities often higher than 5 ms/cm).