

Mole drainage in the Lower Murray for poorly drained soil

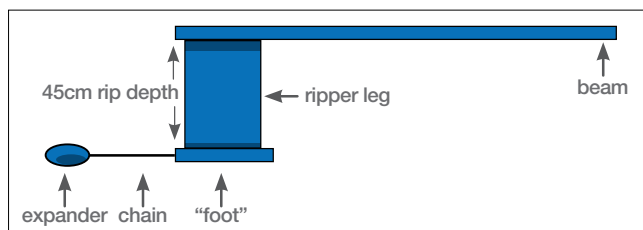
Why use mole drains?

Mole drainage is used to lower water tables in clay soils throughout the world. When used properly, mole drains are a cheap, cost effective way of draining excess irrigation water quickly from the active rootzone of the pasture in areas that have drainage problems, such as wet and boggy soils, after irrigation or rainfall.

The quicker water is removed from the rootzone of a poorly drained area, the quicker pasture will start re-growing after irrigation. Trials around Australia have shown how ryegrass/white clover pastures stop growing while the rootzone is saturated or water logged. Mole drains are also useful in removing surface water from low spots in the paddock.

What is a mole drain?

A mole drain is formed when a single tyne ripper fitted with an expander is pulled through the soil. An expander is attached to the “heel” of the ripper by a short length of chain. It is usually 75mm to 100mm in diameter and “bell shaped” — see diagram.



Long beam mole plough.

How effective are mole drains?

Trials conducted by PIRSA on the Lower Murray found mole drains were effective in rapidly draining the top soil after irrigation. Twenty-four hours after irrigation the water table in the mole drained plots had dropped to 40cms (the drain depth) while it took more than 2 days for non-moled plots to drop to the same depth. Sixty hours after an irrigation there was no significant difference between the plots.

The rapid draining caused by the mole drains had an effect on soil salinity, with moled plots being lower in salinity than the non-moled plots.

Mole drains, when correctly installed, are capable of rapidly lowering the water table after irrigation to the depth of the mole drain. They can be expected to function for at least three seasons on the LMRIA, where they are installed into stable clay soils. Some have been found to be still functioning after 9 to 10 years.

Pasture production responses are most likely to occur in poorly drained areas where salinity levels are high and water-logging and salt sensitive pastures are sown (ryegrass/white clover). Little response can be expected where water tables retreat naturally after irrigation (well drained soil) and where soil salinity levels are low, or where water-logging and salt tolerant pasture is grown.

Irrigators have reported that a mole plough pulled to the surface in a low spot where water ‘puddles’ is effective in draining these areas.

How do I install a mole drain?

Mole drains must be installed at the right soil moisture content—too wet and the sides of the drain seal over by smearing the soil, too dry and the soil shatters and falls into the drain restricting flow.

The right soil moisture for pulling mole drains is called the sub-plastic limit—this means when the soil can be easily handled, like plasticine—when you dig up soil from 40–45cms (the depth you should install a mole drain) it should be able to be broken up and reformed into a ball without crumbling and without smearing over your hands.

Mole drain spacing depends on how badly the soil drains—in the worst situation, they can be installed a tractor width apart, however, usually 4 to 5 metres apart is sufficient. The drains should be pulled from the side drain across the paddock at a 45° angle to the side drain. Tractor draft must be kept constant, gradually lifting the ripper as you get to the end of the run. The tractor wheel should then be run back over the rip line to prevent surface water from running into the drain—mole drains are for removing sub-surface water from the rootzone.

Mole drains are cheap and effective at rapidly dropping water tables after irrigation, when properly installed into poorly drained soil.

Do mole drains have any problems?

One disadvantage of mole drains on the LMRIA soils is that they can lead to over irrigation by draining water ahead of the irrigation “front”. This problem should be overcome by installing moles using a plough or ripper with a narrow “leg”, a larger expander and when the soil moisture is right. This will reduce the size of the cracks created by the plough or ripper “leg” which act as channels for water to flow through into the mole drain. It is these cracks that lead to irrigation water draining from the soil before it is fully “wet up”.

Do not install mole drains into grey clay—they will not drain water effectively—it is best to install mole drains just on the top of the grey clay layer where it is 45cms or closer to the surface.

Mole ploughing may not be needed in many paddocks affected by the drought.

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