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Waterlogging: one reason why our crops and pastures are not achieving maximum yields

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Waterlogging - one reason why our crops and pastures are not achieving maximum yields

Water, either its lack or excess, is the main factor affecting the yield of crops and pastures in Western Australia.

A combination of soils with low water storage and transmission properties and high winter rainfalls results in crops and pastures throughout large parts of the agricultural area suffering damage caused by waterlogging.

In many cases, farmers do not recognize the damage. However, waterlogging is one of the reasons why higher rainfall areas in particular do not achieve maximum yields.

All the articles in this issue of the Journal of Agriculture discuss waterlogging, how it affects plant growth and reduces yield, and practical, cost effective methods of draining the soil to control it.

Water itself is not toxic. However, too much water in the root zone affects the exchange of gases with the atmosphere. An oxygen deficit and a build up of other gases and potentially toxic substances damages plant roots and lowers crop yields and pasture growth.

Waterlogging costs farmers tens of millions of dollars in reduced cereal yields and pasture production each winter. It is a regular problem on susceptible soil types which receive more than 400 mm average annual rainfall.

The extent of the problem was hard to define until a breakthrough in the use of satellite remote sensing resulted in an accurate method of mapping waterlogged cereal crops. This technique, when it is more readily available, could be used by groups of farmers to map waterlogged crops for farm planning purposes.

The duplex soils - sandy topsoils over clayey subsoil - are among the main 'problem' soils. At East Beverley, for example, a study of crop yield variability on duplex soil showed that the severity of waterlogging was related to the permeability of the subsoil. Even in below average rainfall years, waterlogging accounted for almost half the variation in yield of wheat and lupin crops by restricting root growth in winter and water uptake from the subsoil in spring.

Waterlogging is particularly damaging if it is combined with salinity. Most crops can withstand moderate amounts of waterlogging providing it does not coincide with salinity. Unfortunately, almost all of the saline areas in Western Australia are also susceptible to waterlogging.

Drains which remove water ponding on recharge areas will reduce salinity, whereas level banks which pond water on recharge areas will increase groundwater levels and salinity.

This issue of the Journal of Agriculture brings together results of much of the work by the Department of Agriculture and the University of Western Australia into crop and pasture growth on waterlogged soils, and the effective drainage of these soils.