



NORTHERN

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& DEVELOPMENT
CORPORATION

SOYBEAN

SECTION 14

ENVIRONMENTAL ISSUES

WATERLOGGING/FLOODING ISSUES FOR SOYBEAN | OTHER ENVIRONMENTAL
ISSUES

SECTION 14

Environmental issues

14.1 Waterlogging/flooding issues for soybean

Plants in fields that are flooded for extended periods of time often die. Factors such as air and water temperature and whether the water is still or moving can influence the mortality rate. Poor drainage, low lying areas and compacted soil can all contribute to the period of inundation.

Waterlogging of soil during periods of heavy rain or flooding can leach vital nutrients from the soil and promote root diseases, as well as depleting oxygen supply to roots and nodules, which will reduce nitrogen fixation. These effects can cause stunting, yellowing and, in severe cases, plant death.

Waterlogging effects can be minimized by a combination of variety selection and improved land management. Sow varieties tolerant to phytophthora if waterlogging is expected, avoid planting in low lying areas, improve paddock drainage and avoid extended periods of water run during furrow irrigation.¹

14.2 Other environmental issues

14.2.1 Heat canker

In temperatures above 35°C, the seedling stems are girdled at or just above ground level by a red-brown ring. The affected seedlings usually die and re-planting may be required if a significant proportion of the stand is affected.

14.2.2 Salinity

Soil salinity tends to occur in patches across a paddock. Plants are stunted, wilted on hot days but recover at night, have small pale to grey leaves, and reduced flowering and seed production can occur. Older leaves tend to show symptoms first. In severe conditions younger leaves turn pale brown and the plant dies.

Salinity occurs in soils high in sodium and chloride ions in the soil solution and/or soils that were previously fertile but flooded or heavily irrigated with water high in salt. Irrigation water quality is important, as soybeans are more sensitive to saline conditions than other summer crops.

Salinity can be managed by testing soils to identify saline areas and by checking the quality of irrigation water. Apply gypsum and leach the soluble sodium and chloride beyond the rooting depth of plants. Rotate to deeper rooting plants such as perennials or more tolerant crops such as lucerne to help lower the water table.²

14.2.3 Soil acidity

Optimum soybean yields cannot be achieved in very acidic soil conditions. Soybeans are more sensitive to high levels of soil acidity than most other field crops. The optimum

¹ Australian Oilseeds Federation (2013), Better Soybeans manual http://www.australianoilseeds.com/soy_australia/Soybean_Production

² Australian Oilseeds Federation (2013), Better Soybeans manual http://www.australianoilseeds.com/soy_australia/Soybean_Production

pHw for soybeans on sandy and clay-textured soils ranges from 5.8 to 6.2, while yields often decrease as soil pH falls below pHw 5.5.

If soils are acidic, applications of lime or dolomite should be made well before planting. Remember that lime is slowly soluble in soil, and so time and soil moisture are necessary for the lime to be effective. It is preferable to develop a liming program to maintain soil pH in or near the optimal range, rather than trying to overcome extreme acidity in the months before planting. In other words, soil pH should be managed across the farming system, rather than as a specific input for a particular crop.

The effectiveness of lime or dolomite is generally controlled by purity and fineness. The finer the lime particles and the higher the purity (described as neutralizing value), the more rapidly and effectively soil acidity can be countered.³

14.2.4 Sooty mould

Sooty mould is a black powdery fungal growth that forms spots on the leaves, flowers and branches. It is not a disease of soybeans, but a secondary infection. Sap sucking insects, such as silverleaf whitefly and aphids, secreting honeydew cause conditions for the fungi to develop. The condition is more likely to occur in dry conditions as rain can wash the honeydew off the plant.

The mould hinders plant photosynthesis and may cause poor growth. High populations of sap sucking insects can cause the mould to expand to cover the entire plant. The mould is easily rubbed off the plant and may dry, flaking off if insect numbers are reduced. Irrigation can also be used to wash the mould from plants.⁴

14.2.5 Sunburn

This condition develops when leaves turn over and are exposed to intense sunlight. The lower leaf surfaces of the leaves develop a reddish colour. Generally only a small proportion of leaves are affected, so there is very little impact on yield.⁵

³ Australian Oilseeds Federation (2013), Better Soybeans manual http://www.australianoilseeds.com/soy_australia/Soybean_Production

⁴ Australian Oilseeds Federation (2013), Better Soybeans manual http://www.australianoilseeds.com/soy_australia/Soybean_Production

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