

Barley growing in Tasmania

Suitability factors for assisting in site selection



Climate

An important site suitability factor contributing to the growing of a successful barley crop (*Hordeum vulgare*) is the risk of frost at the flowering stage as frost can affect yield and quality. A frost at this key growth stage can cause the grain to not fill resulting in reduced yield and downgrading to stock feed. Often these frost affected crops are best utilised as direct fodder for stock and are cut and baled prior to browning off.

Frost risk was defined by the chance of the minimum temperature falling below 0°C for at least 1 day at flowering. Chances of such a frost occurring: a) less than 2 years in 10, b) between 2 and 3 years in 10, c) between 3 and 4 years in 10, and d) more than 4 years in 10 were assigned to different suitability classes.

Barley is grown in Tasmania predominantly without the use of supplementary irrigation. Stored soil moisture, together with seasonal rainfall, is generally sufficient to ensure viable and profitable crops. Supplementary irrigation can be used to boost yield in some circumstances but this requires particular attention to supplementary nitrogen fertiliser management.

Excess rainfall just prior to, or during harvest, and summer storms resulting from tropical cyclones that come from the northeast, can all affect ultimate crop yield.

Landscape

Factors associated with the landscape including site slope and the risk of flooding contribute to the suitability of a particular site for barley growing.

The steepness of the land affects the risk of soil erosion, ease of machinery use and safety of paddock operations. Suitability classes were subdivided according to site slope: flat – 5% slope, 5 – 25 %, and greater than 25% slope. Different soil types can have different slope requirements due to differing susceptibility to erosion according to soil texture. Erosion control measures such as retaining stubble or mulched rip lines should be used to minimise soil erosion.

The likelihood and frequency of flood risk during the growing season can also affect site suitability for barley growing.



Soil

Soil type and drainage are interrelated factors that strongly affect a site's suitability for barley growing. Excessively drained, moderately well drained and well drained soils are all classified as well suited to barley growing. Imperfectly drained soils are either suitable or marginally suitable, depending on the depth to sodic heavy clay (20 - 30 cm; or less than 20 cm). Poorly or very poorly drained soils are unsuitable. Site drainage can be improved with surface drains, raised beds or underground drains.

Most soil textures are classified as well suited to barley growing but loamy sands are marginally suitable. Sandy soils with less than 8.5% clay are unsuitable due to the high risk of wind erosion causing sand blasting of young plants.

Sites were considered unsuitable for barley growing if total soil depth was less than 40 cm.

Topsoil pH is important in determining barley yield and so suitability was subdivided according to whether soil pH in water was less than 5.0, between 5.0 and 5.5, between 5.5 and 6.0, or greater than 6.0. Soil acidity can be corrected with application of lime or dolomite.

The amount of large stones (> 200 mm diameter) in the soil affects the ease of seedbed preparation and the wear and tear on machinery. Consequently, suitability classes based on soil stone content were: less than 10%, 10 – 20%, and greater than 20%.

Barley is one of the more tolerant crops to salinity but soil salinity can have a detrimental impact on crop yield and long term sustainability. Salinity, as measured by electrical conductivity of a saturated extract (EC_{se}), was used to assess soil suitability. Classes were assigned according to whether top soils had EC_{se} less than 4 dS/m, between 4 and 8 dS/m, between 8 and 16 dS/m, and greater than 16 dS/m.

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Developing rules to guide enterprise suitability mapping

Many plants require particular climatic and land characteristics for best performance. Frost, winter chilling, summer heat, drainage, slope and salinity are some of these characteristics. For each enterprise mapped by the Department of Primary Industries, Parks, Water and Environment (DPIPWE), the Tasmanian Institute of Agriculture (TIA) consulted industry experts and reference material to define land and climate "rules" that distinguish suitable from less suitable areas. These rules define the boundaries between the different classes of the enterprise suitability maps.

Suitability classes used are well suited, suitable, marginally suitable and unsuitable. Any limiting factors are also identified to guide the management practices that could help to overcome the limitations.

Landowners and potential investors are able to access comprehensive soil, climate, crop and enterprise information plus complementary farm business planning tools at:

<http://dpiwwe.tas.gov.au/agriculture/investing-in-irrigation>

