Blindness

Lettuce



Blindness is a common affliction in some fancy lettuce types, particularly in the coral and Salanova[®] butterhead varieties.

Symptoms

Blindness may be described as a stunting or loss of the growing point. This may occur at any stage of plant growth, but commonly appears during the seedling phase. The plant often goes on to develop multiple stunted growing points.

It is likely there is some confusion over symptoms, as it is also known lettuce can suffer from 'clenching' and premature heading.

Clenching

This condition occasionally observed in corals, but will appear in other fancy lettuce groups.

It may be described as the covering of the growing point by the distorted growth of a young wrapper leaf.

Premature Heading

This can occur when nights are still cool and good light levels exist. The condition is prevalent

in Victoria and South Australia in November, December and early January.

Varieties that head more strongly are more prone to the disorder.

Occurrence and cause of blindness

The condition may also be induced by inappropriate water and nutrient management, incorrect planting depth and the use of old or stressed seedlings.

The main factors involved seem to be:

High temperatures

High temperature conditions during germination as blindness occurs more frequently in warm conditions.

Variety sensitivity.

It is generally agreed some varieties and certainly some groups of varieties (e.g. coral and Salanova® butterhead varieties) are more susceptible.

Breeding in these programs aims to eliminate the problem in the future.



Sharing a healthy future

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Nutrition

Experienced growers and nurseries have cited plant nutrition on a number of occasions as the key to controlling blindness. The frequency of dosing may be a factor.

We have no evidence that nutrition is always the culprit, as normally changes in a grower's nutritional regime are understandably not checked against a control, given the nature of a conventional hydroponics set-up.

EC levels may need to be considered. There are a number of factors, which must be taken into account when establishing an appropriate level.

All other conditions being equal, it is possible to use slightly higher EC levels under hail net or similar due to the reduction in solar radiation and wind movement.

Lettuce varieties are likely to vary in their sensitivity to EC levels.

EC and time of year.

In winter, higher EC's may be used, perhaps up to 1.8. A range of 1.2 – 1.5 is probably most common. A summer range of 0.6 – 1.1 has been used with success in Qld, SA and NSW. Be influenced by ambient temperatures rather than the calendar.

During summer the plants are stressed during the sorting of plants from nursery system to the main production system.

There is more and more anecdotal evidence to suggest that growers and nurseries using higher Boron levels may have a lower incidence of Blindness.

The theory of Boron nutrition can be interpreted to support the findings in the field.

Boron readily leaches out of the medium and in hot conditions when irrigation is more frequent leaching is more likely.

Boron deficiency is more prevalent in dry media.

On the other hand blindness seems to occur very early in some instances. It is sometimes apparent as early as 7 days after seeding. In these cases it is unlikely that Boron would play a major part in the development of blindness.

Boron deficiency produces symptoms like blindness, however not all blindness is attributable to boron deficiency.

Actions

Based on current knowledge, the following suggestions are made in an effort to reduce incidence of blindness:

Refer to Rijk Zwaan Australia's Storage and Germination of Lettuce Seed leaflet.

Keep temperatures during seedling production as low as possible.

Using whitewash or shading on greenhouses during hot sunny spells can prevent stressed seedlings

Ensure sufficient Boron, as well as other nutrients are available in the seedling mix. Target level 0.5 - 1.0 grams Boron (5 - 9 grams Borax) per m3 of seedling mix.

Liquid feed the seedlings with nutrient solution containing 2 - 4 grams Borax per 1000 lit (0.22 -0.44 ppm). Some growers use higher rates but we recommend caution with this as the range between deficiency and toxicity is very small for Boron.

Poor nutrition at any stage of growth will retard plant development.

The pH of the mix should be approximately 5.8. Maintain sufficient moisture levels at all times during hot periods.

EC levels will need to be adjusted depending on the temperature and age of the plant.

Avoid stress on plants particularly during summer.

Transplant seedlings directly to the main production system and avoid using a nursery system.

Investigate the use of varieties particularly suited to the problematic timeslot.

Do not transplant seedlings too deep in hydroponics as this may result in the growing point being below the trough level. This also has implications for disease development.

Stressed seedlings

The use of only actively growing, young seedlings cannot be over emphasised.

When seedlings are held back too long in the nursery they can become stressed through being maintained too long, or through inadequate watering or nutrition.

As a result; seedling growth is checked seedlings can be stunted and likely to enter into the reproductive phase prematurely.

Conclusions

- Be careful of temperatures and light levels during germination and propagation of lettuce seedlings
- Manage nutrient, Ec and pH levels carefully (both in the seed raising mix and fertigation)
- Use only active, un-stressed seedlings
- Discuss the most appropriate varieties for the sowing conditions with your local Rijk Zwaan representative

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