

Controlling transplant shock in lettuce



NEW RESEARCH UNDERTAKEN BY APPLIED HORTICULTURAL RESEARCH SHOWS THAT DRENCHING LETTUCE SEEDLINGS WITH POTASSIUM NITRATE AT TRANSPLANTING CAN INCREASE YIELDS BY 20 PER CENT.

Transplant shock is the reduction in growth which occurs when seedlings are transplanted from a container into the field. Significant transplant shock can cause poor plant stands and a lower percentage cut of good quality lettuce at harvest.

It has been observed that drenching lettuce seedlings with potassium nitrate just before they are transplanted into the field can help the young plants to establish more quickly. In other words, reduce transplant shock.

Potassium nitrate supplies the plants with both potassium and nitrogen at the same time, and it can be readily absorbed both by the roots and the leaves of the young plants.

Recently, Applied Horticultural Research (AHR) set out to test this observation in properly conducted, replicated field trials.

Investigating transplant shock in lettuce cultivars

AHR researchers applied a potassium nitrate solution to seedlings of cos (cv. Quintas) and iceberg (cv. Toscanas) lettuce just before they were transplanted into the field at a commercial lettuce farm in Sydney.

The potassium nitrate was applied as a drench over the top of the plants, at a rate of 40 grams per 2.5 litres

of water per 1,000 seedlings while the seedlings were still in the trays. The seedlings were then transplanted into the field (September 2014) at a density of 44,000 plants per hectare as a randomised complete block trial.

The plants were assessed four weeks after transplanting, and then again at seven weeks (commercial maturity). At each assessment, individual plants were harvested from the centre rows, trimmed as fresh market lettuce with the roots and the base of the stem removed. Head fresh weights were then recorded in grams per plant.

What was found?

Pre-harvest growth responses

Researchers found that potassium nitrate drenching resulted in larger plants, four weeks from transplanting (see Figure 1).

The potassium nitrate treatment resulted in a 25 per cent increase in shoot fresh weight compared to the control when applied to iceberg lettuce (see Figure 2) and a 22 per cent increase in fresh weight in cos lettuce, four weeks after transplanting (see Figure 3). The pre-harvest shoot weight results were statistically significant ($P < 0.05$) for both lettuce types.

Harvest growth responses

Improvement in shoot weight

in response to the potassium nitrate treatment was also observed at the harvest stage.

In iceberg lettuce, the head weights of drenched plants were 19 per cent higher than plants that did not receive the potassium nitrate drench (see Figure 4).

In cos lettuce, potassium nitrate drenching improved head weights at harvest by 12 per cent compared to the control plants (see Figure 5). The harvest yield results were statistically significant ($P < 0.05$) for both lettuce types.

Researchers found that lettuce fresh weight was significantly improved when potassium nitrate was applied as a drench at transplanting at a dilution rate of 40 grams per 2.5 litres of water per 1,000 seedlings.

Overall, potassium nitrate was observed to reduce transplant shock which resulted in 12-19 per cent higher yields at harvest.

Looking ahead, the researchers plan to expand their study to other treatments, such as controlling lettuce pests.

"The next stage is to test the effect of

drenching lettuce seedlings with potassium nitrate after Durivo® or Confidor® have been applied in the nursery to control lettuce aphid," Applied Horticultural Research CEO Dr Gordon Rogers said.



For more information, contact Dr Gordon Rogers at gordon@ahr.com.au or 0418 517 777.

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Iceberg Lettuce (cv. Toscanas)

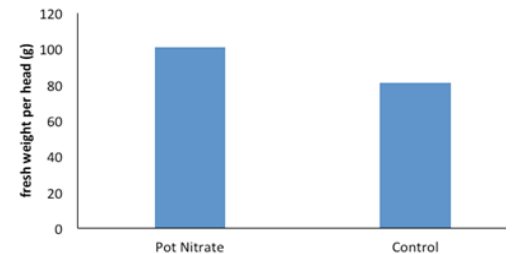


Figure 2: Iceberg lettuce shoot weight, four weeks post-transplant (pre-harvest).

Cos Lettuce (cv. Quintas)

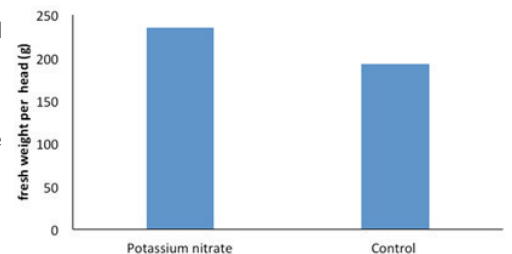


Figure 3: Cos lettuce shoot weight, four weeks post-transplant (pre-harvest).

Iceberg Lettuce (cv. Toscanas)

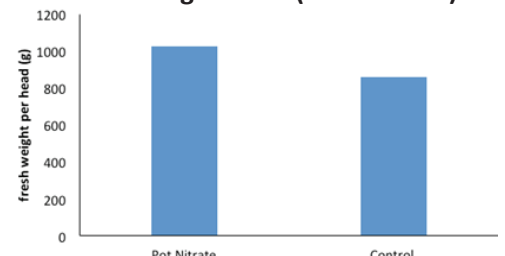


Figure 4: Iceberg lettuce head weights at harvest.

Cos Lettuce (cv. Quintas)

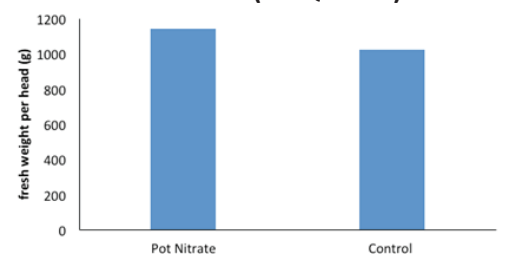


Figure 5: Cos lettuce head weights at harvest.



Figure 1: Iceberg lettuce 15 days after transplant. Potassium nitrate (left) versus control (right).