

**Project Number:** SF 137

**Project Title:** Timing of nitrogen applications to optimise growth and yield without adversely affecting fruit storability and frost sensitivity

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## **GROWER SUMMARY**

### **Headline**

The rate of nitrogen applied to pot grown blueberries significantly altered growth and yield but had no effect on fruit size or quality.

### **Background and expected deliverables**

The blueberry crop is relatively new to the U.K. with most crops currently grown in pots. There is a need for data on the nutrition requirements of pot grown blueberries. The U.K. is unique in its reliance on pot grown systems for blueberries and so to date, research elsewhere has generally been conducted on field grown crops.

To maximise yield of blueberry bushes, optimum growth in pots is required, with larger bushes offering significantly greater yield potential. Nitrogen application is important to encourage growth but is not without potential problems. During fruiting, high nitrogen application has been shown to reduce fruit firmness in a number of crops and may reduce blueberry storage life. Commercial experience has shown that damage to branches and developing flowers caused by frosts during autumn and winter can have deleterious effects on yield, and late nitrogen applications seem likely to increase sensitivity to frost. Excessive nitrogen applications at the time of autumn flower initiation have the potential to reduce flower number. Each of these effects will have a considerable influence on yields. This project will address these issues by testing the effect of three constant levels of nitrogen during the first six months of the project. Then, over the following three seasons, the effects of increasing or decreasing nitrogen levels during three critical phases of growth: early spring growth, fruiting and autumn flower initiation will be tested.

This work could lead to a number of commercial benefits:

- Pot grown plants are more sensitive to changes in the nutrients applied through the irrigation system and so this presents growers with an opportunity to manipulate nutrient balance to improve production.
- An understanding of the role of nitrogen at specific times of the year to promote growth of blueberries would allow the targeting of nitrogen applications where they would have most benefit.

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- Determining how or whether nitrogen can be applied prior to fruiting without reducing storability, will inform those aiming to extend the storage season of blueberries.
- Yield losses due to frost damage are not sustainable and so a method of reducing the risk of frost damage is needed.

## **Summary of the project and main conclusions**

During 2012, the first year of the project, three constant concentrations of nitrogen were applied to a subset of plants of both Duke and Aurora in a randomized block design. Nitrogen was applied at 60, 120 and 180mg/L using dosatrons to achieve the desired treatments. Nitrogen level significantly affected growth of plants with higher nitrogen levels causing greater growth. Higher nitrogen levels decreased yield. Leaf, feed and compost analysis confirmed differences in applied nitrogen did influence nitrogen uptake. However, there were no significant effects on fruit size or fruit quality including fruit °brix, size and storability.

The second part of the project aims to determine the effect of raising and lowering nitrogen concentration at specific growth stages during the season – autumn flower initiation (August to October), spring growth and flowering (April to May), and fruiting (June to August). During autumn 2012, the first treatment was applied where separate plants were transferred from 120mg/L N to both 60mg/L N and 180mg/L N. Whilst the higher nitrogen concentration did cause slightly more growth, this difference was not significant.

The project continues for another three seasons and during 2013, the effect of spring and summer nitrogen treatments will be determined.

## **Financial benefits**

The project is only in its first year and definite conclusions on the effect of treatments on yield and fruit quality can only be made following further experimental work.

## **Action points for growers**

At this stage in the project there are no specific action points for growers as further evidence of the effects seen is needed.