New Project Summary Report for FV 418: Baby leaf lettuce: N response studies

Project Number	31304180
Title	Baby leaf lettuce: N response studies to maximise yield and manage nitrate levels
Short Title	FV 418
Lead Contractor	ADAS UK Ltd
Other Contractors	
Start & End Dates	31 March 2013 - 31 January 2014
Industry Representative	Mr Shaun Clarkson, Vitacress Salads Ltd
Project Budget	£27,000
AHDB Contribution	£27,000

The Problem

• Baby leaf lettuce is a fast growing leafy vegetable which is valued for its visual appearance and flavour, and is widely used in bagged salads, showing rapid growth in sales in recent years

• There is little currently available advice on N nutrition of baby leaf types; the fertiliser manual (RB209) advice is based on traditional lettuce (crisp and escarole) types, grown to maturity, and simply notes that lower yielding types may need less nitrogen.

• At the same time, RB209 also acknowledges that rooting may only be to 30 cm depth in lower yielding types, and so less soil N may be available to such crops.

• However RB209 also notes that the soil nitrogen supply (SNS) index for second crops grown in the same season will be between Index 3 and 5 depending on growing conditions.

• The crop assurance protocol for field grown lettuce notes that all speciality lettuces require less nitrogen than iceberg and that too much nitrogen can lead to excessive tip burn in the Little Gem and Cos types, and lead to loss of colour in the coloured varieties.

• It is also known from traditional lettuce production that nitrate levels tend to be lower in larger, more mature lettuce plants particularly after trimming the outer leaves; however baby leaves may have a tendency to higher nitrate contents simply because they are effectively small plants (with all the functional leaves being outer leaves, trimming back is not an option).

• Incidence of disease, and particularly levels of mildew may be higher in crops over-fertilized with N.

• It could be anticipated that retailers may set stricter limits than those set by the Commission, and practically, growers may have to work to a limit less than 3,000 mg/kg.

• It is not easily distinguished whether previous crop residues or seasonal light levels contribute most to the higher nitrate levels later in the cropping season, because these factors occur together in later crops (e.g. if there is a wet summer, later sown crops drilled on previously incorporated residues in warm conditions are conducive to mineralization of soil organic matter, coincident with dull, wet conditions).

Aims and Objectives

Project aim(s): To gather robust and independent data on nitrate levels in commercial baby leaf lettuce crops, and determine the yield response to nitrogen fertiliser, taking into account varietal types, soil mineral nitrogen prior to drilling, soil type and previous cropping.

Project objective(s):
The objectives are to:
- quantify yield responses to N on growers sites (representative soil types across the season) and determine optimum N needed to produce a marketable crop while remaining below the proposed EC limit of 3,000 mg NO3-/kg fresh weight.
- evaluate of the extent to which yield response to fertiliser N can be predicted from soil mineral nitrogen measurements taken prior to drilling
- critically assess N offtake as way to measure crop N demand, and for the grower provide a better way of estimating of fertiliser N requirement.

Approach

Soil mineral nitrogen (SMN) to 30 cm depth, topsoil (pH, P, K, Mg), tissue nitrate concentration (TNC) and total crop N analyses will be subcontracted to NRM labs. SMN and topsoil measurements will be made at the start of each experiment, before establishing the trial. ADAS apply N by hand, a common form of N such as calcium ammonium nitrate (CAN) will be used.

As well as yield and TNC, total N in crop will be measured at harvest in order to estimate crop N offtake. A representative sample of crop will be taken using quadrats to produce a bulked sample of 1 kg fresh weight as per official sampling guidelines.

Leaf greenness will be measured using a Minolta SPAD meter on returning to the lab (ADAS Boxworth), and assessments of leaf disease (e.g. mildew) and pest damage by ADAS pathologists and entomologists.

Samples will be taken early in the morning at the normal time and on the day of commercial harvesting. Close contact will be maintained with the site managers to coordinate ADAS sampling. Where necessary, overnight stays close to the growers' sites will be included to facilitate being on site at the correct time of day.