



Agriculture & Horticulture  
DEVELOPMENT BOARD



# New Project

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## **FV 370b**

The impact of nitrogen and phosphorus fertiliser application on field grown wild rocket and spinach

**Project Number:** FV 370b

**Project Title:** The impact of nitrogen and phosphorus fertiliser application on field grown wild rocket and spinach.

**Project Leader:** Dr Richard M. Weightman

**Contractor:** ADAS UK Ltd

**Industry Representative:** Shaun Clarkson  
Vitacress Ltd

**Start Date:** 1<sup>st</sup> April 2012

**End Date:** 31<sup>st</sup> December 2012

**Project Cost:** £46,776.00

*SUBJECT TO CONTRACT*

**Project Summary:**

The work proposed will comprise four N x P response experiments in each of spinach and rocket (eight experiments in total) in the 2012 growing season. All eight experiments will be taken to final yield (for estimation of the optimum economic P rate), and samples from six of the experiments used for determination of total N and P offtake, TNC, leaf greenness and shelf life. Experiments will be carried out on growers premises, and will employ a common variety of each species.

In recent years our understanding of the N requirements of wild rocket have improved through HDC funded work. Project FV 370 examined the tissue nitrate concentrations (TNC) in commercial crops of wild rocket in 2010, and showed that while TNC levels were high in mid-summer when there was a prolonged cold period of dull wet weather, there was scope to improve N recommendations by taking into account the relatively high levels of soil mineral N seen in some field situations. Subsequent work in 2011 in FV 370a has specifically investigated responses of wild rocket to N and has shown that there is scope to reduce N rates without compromising yield and quality.

No work has been done to date on phosphorus (P) nutrition in rocket – there is an HDC study FV359 'Nutrient requirements for field grown herbs', but this focussed principally on N requirement and to a lesser extent on K, but not P. It is not clear when data on P responses on spinach were last determined.

Phosphorus is a highly mobile element within plants and it has a key role in respiration to drive crop growth. However, much P remains bound to soil particles, and high P indices are needed to get available P into the soil solution where it can be taken up by the plant. Phosphorus application conveys agronomic benefits which include enhanced leaf quality and root branching and depth, but the precise concentration required both in the soil and for subsequent uptake by the plant remain to be elucidated. Lettuce is known to be responsive to P, even when soil P indices are high, and shallow rooted, fast growing crops like wild rocket and spinach could be the same.

Phosphorus is of growing concern for the industry. Most soils now have adequate P levels, but one consequence is that the removal of P by erosion and/or run-off is becoming of increasing concern. Under the Water Framework Directive (WFD; expected to be implemented by 2015), water quality will be assessed on a catchment basis. Since phosphorus is more significant than nitrate in terms of eutrophication, the industry needs to demonstrate that it is applying P at optimal levels for yield, but not in excess.

As a minimum this work will provide a basis for recommendations of P as there are currently none in the Fertiliser manual (RB209) for baby leaf crops such as rocket or spinach.

### **Aims & Objectives:**

(i) Project aim(s): The aim of this project is to improve recommendations for N and P applications, as a route to optimising fertiliser use and production efficiency of field-grown wild rocket and spinach.

(ii) Project Objectives: Field based experiments on grower holdings will be carried out to:

- Measure yield responses of rocket and spinach to P fertiliser application,
- To investigate interactions between N and P supply and yield,
- Evaluate N and P utilisation in relation to soil indices and crop residues,
- Quantify N and P application rates on leaf tissue N and P concentrations, and relate these to visual quality,
- Improve N and P fertiliser recommendations to improve the production efficiency field grown spinach and rocket,
- Prepare factsheet on N and P recommendations in rocket and spinach.

### **Benefits to industry**

The project will provide a better understanding of the fertiliser requirements of rocket and spinach, which will enable more efficient use of fertilisers by the industry. This will allow growers to stay within proposed EC limits while meeting retail requirements for nitrate, and avoid risk of causing P pollution in the context of the WFD.

Work in 2010 (FV 370) showed that half the rocket crops sampled would have exceeded the proposed nitrate levels being discussed by the Commission. Evidence of research into nitrate levels and development of best practice guidelines will enable growers to maintain crops below proposed limits, and will provide robust evidence to support FSA negotiations on behalf of the industry in Brussels, to oppose legislation which might negatively impact the industry.

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## **Further information**

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HDC  
AHDB  
Stoneleigh Park  
Kenilworth  
Warwickshire  
CV8 2TL

Tel – 0247 669 2051

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