Alternative, non-animal based nutrient sources, for organic plant raising

Funder: DEFRA (Project Ref: OF0308/CSA 6028)
Collaborators: IOR-EFRC, IOR-HDRA
Start Date & Duration: January 2002; 12 months

Overall Aim

To identify and assess suitable alternative, non-animal based nutrient sources with adequate nutrient content and balance (particularly of nitrogen), for organic plant raising in the UK

Abstract of Research

Organic plant raising has been investigated under two previous government funded projects (OF0109 & OF0144) and it was shown in this research that organic 'transplants' could be produced for a range of crop species. However, some species were easier than others and one of the limiting factors was the availability of suitable nutrient sources, especially for supplementary feeding. Alliums were more difficult to produce due to the production period being longer than for other species which resulted in nutrients in the growing media being exhausted before the transplant was ready for planting out.

There is a need to identify non-animal based nutrient sources for plant raising and in particular sources that will provide enough and the correct balance of nitrogen.

Little if any has been published on the use of non-animal based nutrient sources in organic plant raising. FiBL have undertaken some work using ricinus cake (Maltaflor) and protein from potato and a product called Hexabio and faba bean meal (Ref 5). None were as successful as animal based products. In Sweden a by-product from the paper industry (Biobact) is currently used by organic plant raisers (Ref 6) and a granular form of alfalfa meal appears also to be available as a nutrient source.

Fragstein (Ref 1 & 4) suggests that crushed pulse seeds and ricinus cake could be substitutes for animal based nutrient sources. There are advantages of the crushed pulse seed feed as it can be produced on farm (or associated farms) and milled to the required particle size. However, with both crushed pulses and ricinus cake there can be a risk of phytotoxicity if the seed is sown too soon after incorporation of the feed into the media. Most of this work has also been carried out using the nutrient as a fertiliser for field crops.

Plant based nutrient sources have been studied previously. Comfrey was investigated during project OF0109 (Ref 7) but was found to be too low in nitrogen to be of any real benefit. Some work has been reported using nettles (Ref 8) and a further investigation of this readily available nutrient sources could be worthwhile.

We need to identify suitable nutrient sources for two different uses within plant raising. 1; to replace the base fertiliser that is added to the growing media formulation prior to sowing and 2; to provide a source that can be used for supplementary feed during the growth of the transplant. These nutrient sources are likely to be different due to the differing requirements of base and supplementary feeds. Base feeds should be slow release and become available to the plant throughout its development. The supplementary feed needs to provide more readily available nutrients, especially N. The supplementary feed should ideally be in a liquid form (solution and/or suspension of nutrients) suitable to be delivered through the irrigation system. Alternatively it could be in a granular or powder (solid) form.

Objectives

1. To identify suitable alternative, non-animal based nutrient sources for organic plant raising.
2. To assess these non-animal based nutrient sources under UK organic plant raising conditions.

Project Progress

Objective 1 (January 2002 – December 2002)

A European and international search (literature, web, phone/personal contacts) was made for possible suitable, non-animal based, nutrient sources. The search produced 36 products, including ricinus cake, pulse meal, potato protein as well as other plant based and bacterial/fermentation by-products.

An article has been produced for inclusion in the EFRC Bulletin.

Objective 2 (January 2002 – April 2002)

The glasshouse trials at HDRA are nearing completion and are currently being written up.

Expected Benefits

The results are critical to the UK organic plant raising industry. the effective sources of nutrients for organic plant raising are currently all animal based. If the regulation were to change to no longer allow animal based products (as it is suggested) then the industry would find it difficult if not impossible to raise plants under organic conditions.

References:

1. Braun, A., Mayer, J. and Fragstein, P. von, 2000: Coarse seed meals – are they suited for fertilizing purposes in early vegetable cultivation. In: "IFOAM 2000 – the world grows organic", (eds.) Alföldi, T., Lockerwetz, W. and Niggli, U., vdf Hochschulverlag AG, Zürich, p. 200
2. Kalauch, S., J. Mayer und P. von Fragstein, 2001: Körnerleguminosenschorote als alternative N-Ergänzungsdünger im Ökologischen Gemüsebau am Beispiel Spinat. In: "Von Leit-bildern zu Leit-Linien", 6. Wissenschaftstagung zum Ökologischen Landbaum 6.-8. März 2001, Weihenstephan, Verlag Dr. Köster, Berlin, S. 433-436
3. Braun, A., J. Mayer und P. von fragstein, 2001: Sind Leguminosenschrote für die N-Düngung von Frühgemüse geeignet? – Ergebnisse eines Brutversuches. In: "Von Leit-Linien", 6. Wissenschaftstagung zum Ökolgischen Landbaum 6.-8. März 2001, Weihenstephan, Verlag Dr. Köster, Berlin, S. 273-276
4. von Fragstein (2001). Pers comm..
5. Koller, M: (2001). Pers comm..
6. Ramert (2001). Pers comm..
7. Peterson, R & Jensén, P. (1985) Effects of nettle water on growth and mineral nutrition of plants 1. Composition and properties in nettle water. Biological Agriculture and Horticulture, 2 (4), 303-314
8. Final report OF0109: Organic transplant evaluation and development of production techniques. DEFRA.
9. Final report OF0144: Overwinter transplant production for extended season organic cropping. DEFRA.

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