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The effect of nitrogen and the method of application on nitrogen uptake of cauliflower and on nitrogen in crop residues and soil at harvest

A.P. EVERAARTS^{1*}, C.P. DE MOEL¹ AND M. VAN NOORDWIJK²

¹ Research Station for Arable Farming and Field Production of Vegetables (PAGV), P.O. Box 430, NL-8200 AK Lelystad, The Netherlands

² Research Institute for Agrobiology and Soil Fertility (AB-DLO), P.O. Box 129, NL-9750 AC Haren, The Netherlands (Current address: ICRAF-S.E.Asia, P.O. Box 161, Bogor 16001, Indonesia)

* Corresponding author (fax: +31-320-230479; e-mail: a.p.everaarts@pagv.agro.nl)

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Abstract

The effects of the rate of nitrogen and of the method of application on the nitrogen utilization of cauliflower were studied during two seasons and at four locations. Maximum nitrogen uptake by the crop was around 310 kg per hectare. Uptake of nitrogen was influenced neither by the method of application (band placement vs broadcast) nor by splitting the applications (twice vs once). The utilization efficiency decreased with increasing nitrogen rates. Independent of the amount of nitrogen applied, about 50 per cent of the nitrogen taken up in the above-ground plant parts was removed from the field with the product.

The amount of soil mineral nitrogen at harvest increased with an increase in nitrogen applied, but was not significantly influenced by band placement. With broadcast application, more nitrogen was sometimes found between the rows as compared to in the row. With band placement at the highest fertilizer rate, considerably more nitrogen was found where the fertilizer had been placed. The 'loss' of nitrogen from the crop/soil system during cultivation increased with increased availability of nitrogen. At the optimum application of nitrogen fertilizer around 100–120 kg ha⁻¹ of nitrogen remained in crop residues and about 50–80 kg ha⁻¹ in the soil (0–60 cm). Practical implications for the reduction of loss of nitrogen from crop and soil after harvest are discussed.

Keywords: cauliflower, *Brassica oleracea* var. *botrytis*, nitrogen fertilization, band placement, nitrogen uptake, crop residues, soil nitrogen distribution.

Introduction

Band placement of fertilizer, as compared to broadcast application, may increase yield in Brassica vegetables (Everaarts, 1993b). Therefore in seven experiments during three seasons the effects of band placement of nitrogen on quality and yield of