

Productivity and Growth in Organic Value Chains (ProGrOV)

COMBINED APPLICATION OF ORGANIC FERTILIZERS AND LEGUME INTERCROPPING IMPROVES KALE QUALITY AND YIELDS

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Introduction

Kale is a popular vegetable in many Kenyan households where it is consumed with ugali. Soil fertility is the key factor contributing to low kale yields, among others, and can be improved by intercropping crop with legumes and use of organic fertilizers.

There was need to generate information on contribution of biological nitrogen fixation and soil amendments on crop performance. The study tested effect of intercropping kale with either chickpea or lupin, and application of either farmyard manure or rock phosphate (RP) on the extent of nitrogen-fixation and yield.

Approach

A kale monocrop, kale intercropped with chickpea and lupins separately and application of farm yard manure (FYM) at the rate of 10 tons/ha and rock phosphate (RP) at a rate of 490 kg/ha were planted at the University of Nairobi field station.

The effects of those treatments on crop nitrogen, phosphorus and yield was determined.

A model was used to estimate the amount of nitrogen originating from BNF.



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Results

Kale yield and Nutrient Concentrations

- Integration of lupin with application of FYM and RP led to increase in yield of kales. (Fig. 1)

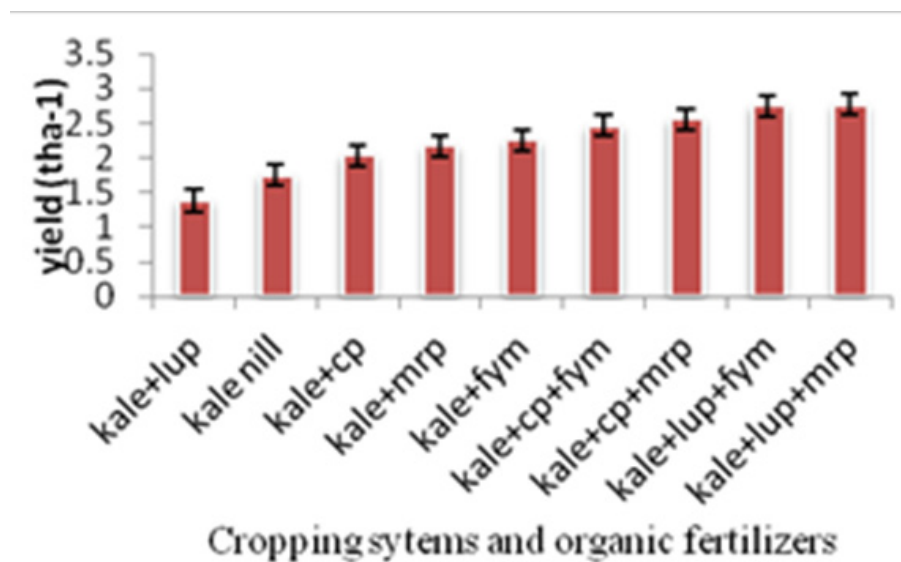


Fig.1: Effect of legume integration and application of organic fertilizers on kale yield (b) planting of kale



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- A similar trend as that of yield was observed with kale N and P content, where there was an increase in both nutrients with application of FYM and RP. (Fig 2).
- Integration of white lupin with application of rock phosphate significantly increased the N,P contents of kales (Fig 2).

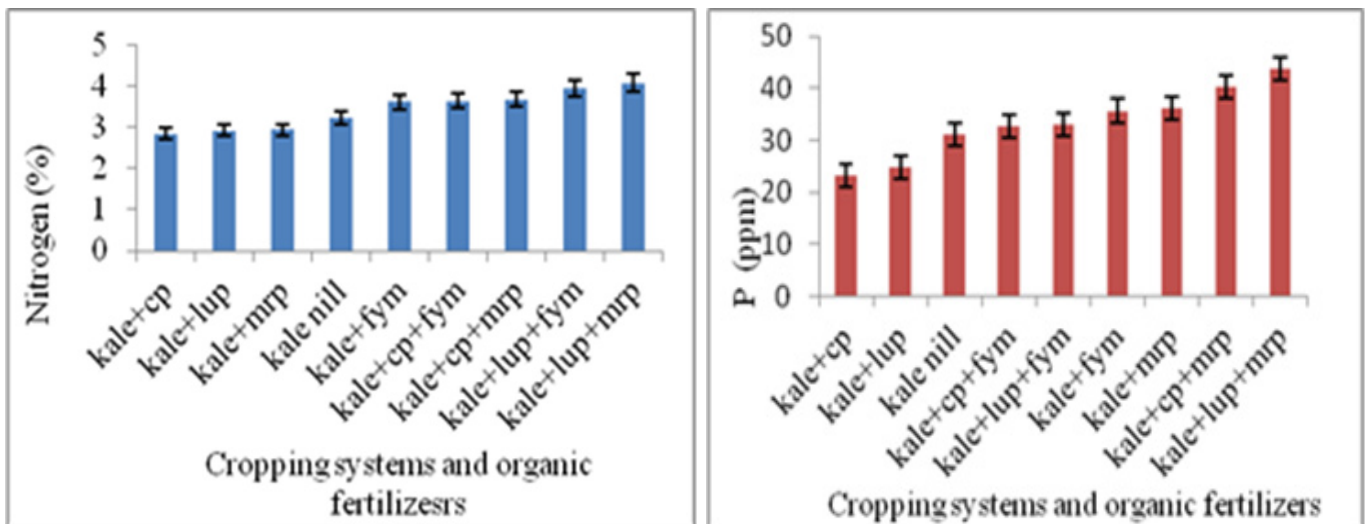


Fig 2. Effect of legume integration and application of organic fertilizers on Nitrogen and Phosphorus concentration in kale leaves

Biological nitrogen fixation:

- More nitrogen was fixed by lupin following application of MRP compared to chick-pea.
- Application of farm yard manure recorded a slightly lower level of nitrogen fixation by lupin than rock phosphate (Fig. 3).

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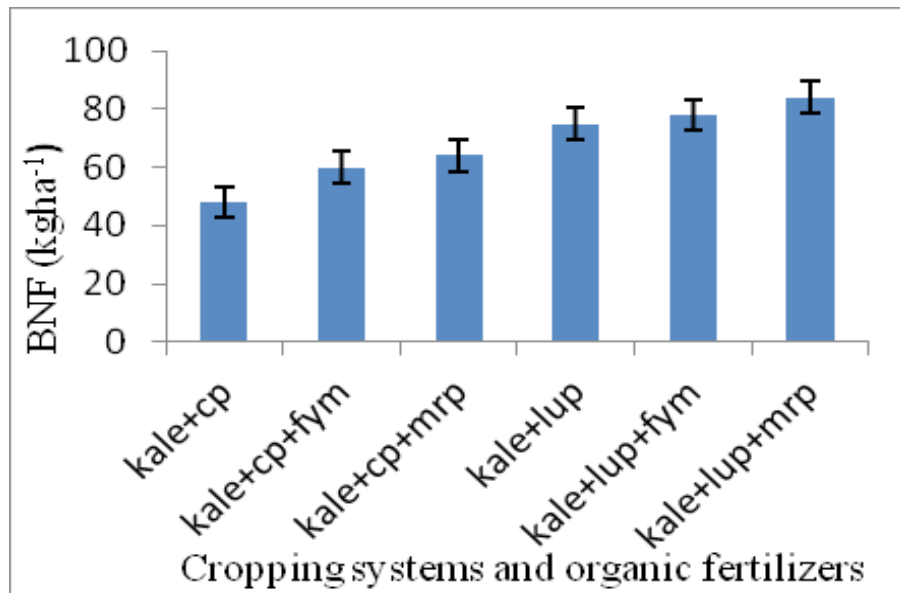


Fig 3: Effects of legume integration and application of organic fertilizers on Nitrogen fixed (b) chickpea and white lupin.

Recommendations

- For increased kale yields and improved nutrient concentrations, intercropping white lupin with application of Rock phosphate is recommended.
- More nitrogen fixation can be achieved through intercropping white lupin with kale and application of Rock phosphate.

Partners

Makerere University, Uganda
University of Nairobi, Kenya
Sokoine University of Agriculture, Tanzania
Aarhus University, Denmark
University of Copenhagen, Denmark
International Centre for Research in Organic Food Systems (ICROFS), Denmark

Associated partners

National Organic Movement of Uganda (NOGAMU)
Kenya Organic Agriculture Network (KOAN)
Tanzania Organic Agriculture Movement (TOAM)
Project

Duration

January 2011-December 2016

Further reading:

The project 'Productivity and Growth in Organic Value Chains (ProGrOV)' is funded by the Danish Ministry of Foreign Affairs.

For more information visit:

<http://icrofs.dk/en/research/international-research/progrov/>

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