

PRODUCTION DYNAMICS OF GINGER (*Zingiber officinale* R.)
UNDER VARYING LEVELS OF SHADE,
NUTRIENTS AND TRIAZOLE

DECLARATION



BY

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THESIS

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CHAIRMAN

CERTIFICATE


Dr. B. K. JAYACHANDRAN

Certified that this thesis entitled "**Production dynamics of ginger**
(Zingiber officinale R.) under varying levels of shade, nutrients and triazole"
is a record of research work done independently by Mr. K. Ajithkumar under my
guidance and supervision and that it has not previously formed the basis for the
award of any degree, fellowship or associateship to him.

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ABSTRACT

The experiments were conducted at the Coconut Research Station, Balaramapuram, during 1996-97 and 1997-98 to study the production dynamics of ginger under varying levels of shade, nutrients and triazole. The specific objectives were to study the production potential of ginger under open and different shade levels, to standardise optimum dose of nutrients and mulch for ginger intercropped in coconut garden and to evaluate the efficacy of triazole in the improvement of yield and other desirable characters.

The effect of shade on growth and yield contributing parameters *viz.*, tiller number, leaf number, leaf area, leaf dry weight, root spread, root volume, rhizome spread, rhizome thickness, number of rhizomes, leaf thickness, stomatal frequency, DMP and LAI under 20 and 40 per cent shade levels exhibited significant superiority in pot culture study.

In pot culture study, maximum fresh ginger yield of 450.0 and 396.3 g plant⁻¹ were resulted from plants kept under 20 and 40 per cent shade levels respectively. This was 27.4 and 12.2 per cent higher compared to open condition. The dry ginger yield of 94.5 and 89.2 g plant⁻¹ were obtained from plants kept under 20 and 40 per cent shade levels respectively. This was 27.8 and 20.7 per cent higher compared to open condition. However, the dry ginger yield obtained from 60 and 80 per cent shade levels were significantly lower compared to open. The shade levels 20 and 40 per cent gave the highest shoot dry weight of 48.9 and 53.6 g plant⁻¹ respectively.

Volatile oil content showed an increasing trend with increasing levels of shade in pot culture study. Maximum NVEE was recorded under 20 and 40 per cent shade levels. Highest starch content was obtained from 20 per cent shade level. Crude fibre gradually reduced with increase in shade levels.

The field trial on nutrient requirement of ginger as intercrop in coconut garden revealed that, NPK application at higher levels increased plant height, tillering, leaf number, leaf area, DMP and chlorophyll content. Physiological parameters like, NAR, CGR and RGR were promoted by higher rates of nitrogen application. The results revealed that, N : P, N : K and P : K ratios of 1.5 : 1, 1.5 : 1 and 1 : 1 respectively, were ideal to get maximum fresh ginger yield.

Application of 150 kg N, 100 kg P₂O₅ and 100 kg K₂O ha⁻¹ gave maximum net profit of Rs. 96605/- and Rs. 99227/- during first and second year respectively. The net profit when the existing recommendation of 75 kg N, 50 kg P₂O₅ and 50 kg K₂O ha⁻¹ was Rs. 54960/- and Rs. 54730/- during first and second year respectively. Hence the study suggests that the existing recommendation (75 kg N, 50 kg P₂O₅ and 50 kg K₂O ha⁻¹) has to be doubled (150 kg N, 100 kg P₂O₅ and 100 kg K₂O ha⁻¹) for increasing the productivity of ginger intercropped in coconut garden.

Increased rate of fertilizer application did not influence the quality of the produce. Plant uptake of NPK increased with higher levels of fertilizer application.

The field experiment on mulch requirement of ginger intercropped in coconut garden showed that the rhizome yield from plots mulched with 30.0, 22.5 and 15.0 t ha⁻¹ were on par. Therefore the mulch requirement of ginger intercropped in coconut garden can be reduced from 30 t ha⁻¹ to 15.0 t ha⁻¹.

Application of triazole did not exhibit any beneficial effect on yield and quality of ginger.