

Effect of Different Levels of Nutrients and Intercropping on Flowering Behavior of Cashew (*Anacardium occidentale* L.) Variety VRI -2

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Abstract: An experiment was conducted to study the effect of different level of nutrients and intercropping (Pulses) on flowering behaviour of Cashew (*Anacardium occidentale* L.) variety VRI -2 at State Horticultural Farm, Neyveli and Tamil Nadu. The study was revealed that the application of 100% of the recommended dose of fertilizer + 100 kg of FYM and growing of cowpea as an intercrop was observed to be best which was recorded maximum total number of flowers panicle⁻¹ (899.35), number of hermaphrodite flowers panicle⁻¹ (65.71 and this was on par with the treatment 75% of the recommended dose of fertilizer + 100 kg of FYM and growing of cowpea as intercrop which recorded the total number of flowers panicle⁻¹ (897.58), number of hermaphrodite flowers panicle⁻¹ (64.56) as compared to control.

Key words: Cashew • *Anacardium occidentale* L. • Nutrients • Intercrops

INTRODUCTION

Cashew (*Anacardium occidentale* L.) belongs to the family Anacardiaceae and is native to Brazil. It was introduced into India by Portuguese travellers in the 16th century for afforestation and soil conservation. India was the first country in the world to exploit international trade in cashew kernels in the early part of 20th century [1]. It earns valuable foreign exchange for the country and is therefore regarded as a “gold mine”. Tree nuts are globally consumed for their desirable sensory and nutritional attributes. Among dry fruits, cashew nuts are very popular due to their characteristic odor and taste. Cashew nuts are a good source of proteins (20%), carbohydrates (23%) and fats (45%) [2].

The cashew seed is a good source of oil (45%) which is mainly used in brake linings as a friction particle and as a major constituent in phenalkamine (floor coating material). Cashew shells contain high quality oil known as cashew nut shell liquid (CNSL) which has several industrial applications. Value added products such as juice, fenni, wine, dried cashew apple, syrup and jam can be prepared from cashew apple [3]. The global production of cashew is around 43, 10, 027 MT from a total of 53, 13,

415 hectares. India is the second largest producer of raw cashew in the world, next only to Vietnam. India produces about 0.75 million MT of cashew from an area of 1.01 million hectares with a ISSN : 0974-9411 (Print), 2231-5209 (Online) All Rights Reserved © Applied and Natural Science Foundation www.ansfoundation.org productivity of 0.7 MT/ha. Currently cashew occupies about 8.35 thousand hectare area in Gujarat with a production of 26.0 thousand MT. Dang and Valsad districts of Gujarat account for about 99% of the total cashew production in the state. Cashew farmers in South Gujarat are now-a-days growing improved varieties like Vengurla-4, Vengurla7 and Ullal. Amongst these, the maximum area is under cultivar Vengurla-4 due to its excellent kernel quality and high yield. Prolonged flowering, poor production of perfect flowers, narrow sex ratio and low fruit set are some major problems plaguing cashew cultivation across the country. Over the years, application of exogenous hormones has significantly improved flowering and fruiting in fruit crops like citrus [4], grape [5]. It has been reported that foliar sprays of Gibberellic acid (GA3), 1- Naphthaleneacetic acid (NAA) and Ethylene increased the production of perfect flowers and improved sex ratio in cashew [6-8]. However, there is a

dearth of information on the effect of plant growth regulators in cashew cultivar Vengurla-4 grown under South Gujarat conditions. Therefore, the present investigation was conducted to determine the effectiveness of plant growth regulators in improving flowering parameter of cashew nut cv. Vengurla-4. Cashews being a regular bearer, considerable amount of nutrients are removed every year from soil through roots, stems, nut and apple. However, majority of the farmers are not using chemical fertilizer to Cashew. Studies conducted elsewhere in the country in the nutrient requirement of Cashew revealed the necessity of the major nutrients like Nitrogen, Phosphorus and Potassium in fairly big amount for its growth and development and also for ensuring its sustained productivity.

MATERIALS AND METHODS

The present investigation was carried out during 2003-04 at State Horticultural Farm, Neyveli and 4th block. This experiment was designed with a view to increase the productivity of Cashew var.VRI-2 through judicious application of major nutrients along with farm yard manure (FYM) and pulse crops. This experiment was laid out following the principle of split plot design with three replications. The main treatment comprised of application of nitrogen, phosphorus and potassium (NPK) in full recommended dose with 50 and 100 kg of FYM and 75% recommended dose of fertilizer + 100 kg of FYM. The sub treatments involved intercropping of three pulse crops viz., black gram, horse gram and cowpea. The interaction effect of the entire main and sub treatment were studied for this experiment. Twelve years old trees were selected and for which the recommended dose of fertilizer @ 500:250:250 g NPK tree⁻¹ was applied through urea, superphosphate and potash. The seeds of the black gram, horse gram and cowpea were sown in respective treatments during the first week of September. The pulse crops were allowed to grow up to maturity and their haulms were incorporated into the field.

RESULTS AND DISCUSSION

The present study was conducted with a view to increase the use efficiency of applied fertilizers and to improve the soil health and productivity of Cashew by intercropping leguminous crops. Among the main treatments, application of 100% NPK along with 100 kg of FYM resulted in highest values of floral characters viz.,

total number of flowers panicle⁻¹, number of hermaphrodite flowers panicle⁻¹ as compared to other treatments. Among the other two in respect of increasing floral characteristics intercropping with cowpea in the treatment receiving NPK @ 100% recommended dose along with 100 kg FYM showed superior performance as compared to other treatments in respect of floral characteristics and yield attributes (Table 1). It is more vivid that application of FYM in the nutrient hungry soil increased the availability of nutrients and improved the soil health. Especially, intercropping in Cashew is done to get additional remuneration as well as to create employment during the off-season. Intercropping of Cashew with pulse crops significantly improved the available nutrient status of soil, especially the available N status of soil. This is due to the nitrogen fixed by the microbe *Rhizobium spp* in the roots of pulses. The organic matter addition due to the fallen leaves and slough off roots increased the available nutrient status of soil. In addition, growing of pulses as intercrops in Cashew minimized the nutrient loss by improving the soil physiochemical properties. Improvement in soil tilth and soil structure increased water holding capacity, reduced runoff and improvement in percolation rate. Increased level of organic matter and improvement in the available nutrient (particularly N) status of soil grown with pulses [9].

Biologically, pulse crops promote the activity of soil organisms especially the beneficial microbes and supply some growth promoting substances and vitamin during the decomposition. This could also be one of the reasons for increased plant growth and yield of Cashew. In the present study, applications of recommended dose of NPK along with 100 kg FYM tree⁻¹ and intercropping of cowpea very much improved the floral characteristics and yield attributes. This finding was in consonance with findings of [10-13]. Improvement in the sex ratio with the application of Ethrel was mainly due to increased number of perfect flowers. Ethrel may also have exerted its effect on sex expression by manipulating endogenous auxin levels corresponding to a reduction in staminate flowers in cv. Vengurla-7 [14, 15]. The author reported that number of perfect flowers per panicle was positively correlated with yield in Cashew [16]. A similar correlation was observed [17]. It was identified that clones having broader sex ration were high yielder. Based on the current trial, it can safely assumed that yield would be higher in Cashew trees sprayed with Ethrel 10 or 50 ppm as they had higher number of perfect flowers per panicle and a broader sex ratio [18].

Table 1: Effect of different levels of nutrients and intercrops on total number of flowers and Hermaphrodite flowers panicle⁻¹.

Main	No. of flowers panicle ⁻¹				Hermaphrodite flowers panicle ⁻¹			
Sub	M ₁	M ₂	M ₃	Mean	M ₁	M ₂	M ₃	Mean
S ₀	695.78	888.20	887.32	823.76	39.31	59.42	59.30	52.67
S ₁	882.57	893.71	892.18	889.48	58.77	62.90	62.00	61.22
S ₂	880.65	890.17	890.12	886.98	58.68	61.13	61.06	60.29
S ₃	885.34	899.35	897.58	894.09	58.95	65.71	64.56	63.07
Mean	836.08	892.85	891.80	873.58	53.92	62.29	61.73	59.31

M1-NPK 100% + 50 kg FYM tree⁻¹, M2-NPK 100% + 100kg FYM tree⁻¹, M3- NPK 75% +100kg FYM tree⁻¹ S0-No inter crops, S1-Black gram, S2- Horse gram, S3- Cow pea

	No. of flowers panicle ⁻¹		Hermaphrodite flowers panicle ⁻¹	
	SEd	CD (P=0.05)	SEd	CD (P=0.05)
Main	0.52	1.05	0.29	0.58
Sub	0.62	1.25	0.24	0.51
Sub at same main	1.03	2.17	0.42	0.89
Main at same/diff. sub	0.93	1.87	0.76	1.53

Summary: The present investigation conducted at the State Horticultural Farm, Neyveli, Tamil Nadu during 2003-04 on "Effect of different levels of nutrients and inter crops on flowering behavior of cashew var.VRI-2" revealed that the application of 100% of the recommended dose of fertilizer + 100 kg of FYM and growing of cowpea as an intercrop was observed to be best and this was on par with the treatment, which received 75% of the recommended dose of fertilizer + 100 kg of FYM and growing of cowpea as intercrop which recorded maximum total number of flowers panicle⁻¹ and hermaphrodite flowers panicle⁻¹ of cashew.

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