

PREAMBLE

1.1. The urgency of the topic

Cashew nut has the scientific name *Anacardium occidentale* L., it is native to Brazil. Cashew can be considered as industrial crops, fruit trees and forestry trees. It has many uses and is an important export source of many countries in the world and it has high economic value. However, the investment, intensive farming is still low compared to the cashew yield potential of 3-4 tons / ha; Farmers are less likely to focus on intensive farming practices to increase productivity. The investment to fertilize care and pest control for cashew is not reasonable.

Researching on " **Research the suitable fertilizer regime for cashew variety AB 29 on basalt soil and on acrisoil in the South East**" is very necessary.

1.2. The goal of the topic

Determine the optimum fertilizer N, P, K for cashew variety AB 29 during the basic construction and trading period, and propose suitable fertilizer regimes to increase productivity, quality and economic efficiency for cashew growing in the South East.

1.3. Research scope of the topic

The research contents of the project were implemented on basalt soil and on acrisoils in Dong Nai and Binh Duong province.

+ Center for Research and Development of Cashew Nuts - Institute of Agricultural Sciences of Southern Vietnam, Phu An Commune, Ben Cat Town, Binh Duong Province. (on acrisoils).

+ Center for Agricultural Research and Experimentation - Institute of Agricultural Sciences of Southern Vietnam, Hung Thinh commune, Trang Bom district, Dong Nai province. (on basalt soil).

- Research time : 2015 – 2017.

- Research on cashew tree AB 29 at the basic construction stage and trading period with 3 main types of fertilizer (N, P and K)

1.4. The scientific and practical significance of the thesis

1.4.1 Scientific significance

The study results will provide valuable scientific data on the effects of N, P, K on growth, development, productivity and quality of cashew AB 29 on basalt soil and on acrisoils in the South East.

The thesis is a valuable reference for research and development of cashew in some provinces in the Southeast and surrounding areas.

1.4.2 Practical significance

The result of the project is one of the additional contributing factors to develop intensive cashewnut cultivation, increase productivity and economic efficiency, increase income for cashewnut farmers in the South East.

1.5. New contributions of the topic

Research on determination of N, P and K mineral fertilizers suitable for cashew variety AB 29 in the period of basic construction on basalt soil and on Acrisols in the South East:

On basalt soil, when increasing 50% N and increasing 33% P_2O_5 , there was a significant difference in growth during the construction period, tree height increased 19.3%, canopy diameter increased 22.5%, root diameter increased 21.7% compared with control. The optimal formula is 180g N - 120g P_2O_5 - 60g K_2O / tree / year

On Acrisols, when increasing 50% N and increasing 50% K_2O , the tree height increased 19.6%, the canopy diameter increased 17.8%, the root diameter increased 21.9% compared with control. The optimal formula is 180g N-90g P_2O_5 - 90g K_2O / tree / year

Research to determine the appropriate amount of N, K fertilizer for cashew nut AB 29 during the trading period for the highest productivity and economic efficiency

On basalt soil, when increasing 40% N and 33% K_2O , in the fertilizer formula 700g N - 250g P_2O_5 -400g K_2O yield increased 23.7% (2.05 tons / ha), profit 46.8 million / ha, profit margin / fertilizer cost was 4.59.

On Acrisols when increasing 20% N and 33% K_2O , in the formula of 600g N- 250g P_2O_5 - 400g K_2O , yield increased 26.0% (1.73 tons / ha), profit 38.6 million / ha, the highest rate of fertilizer profit / cost was 3.96.

Study to determine the most appropriate fertilizer N when combined with treatment GA_3 growth regulator for cashew nut AB29 to achieve high productivity and economic efficiency in the business period:

On basalt soil, when increasing the N level by 40%, combining the specific GA_3 concentration of 100ppm in the fertilizer formula 700g N – 250 g P_2O_5 - 300g K_2O most effective increase the number of seeds / cluster 35.9% , increase the number of seeds for harvest 38.1%. Yield was 2.33 tons / ha. Profit 52.9 million / ha. Profit / cost of fertilizer and growth stimulants was 4.7.

On Acrisols when increasing 20% N combination GA_3 treatment of concentration 100ppm, fertilizer formula 600g N-250g P_2O_5 -300g K_2O increased number seeds/ cluster 37%, increase the number of seeds for

harvest 40.3%. Yield was 1.99 tons. Profit of 43.8 million / ha. Profit / cost of fertilizer and growth stimulant was 4.1 times. Grain size of the cashew AB 29 variety was not different on both basalt and acsisoil.

1.6 Thesis structure: The dissertation consists of 110 pages, 3 chapters, 40 tables of data, 6 pictures, 54 references with 32 documents in Vietnamese and 24 references in English.

CHAPTER 1

OVERVIEW OF DOCUMENTS

1.1 Overview of cashew trees

The cashew tree (*Anacardium occidentale* L.), belonging to the family Anacardiaceae, Rutales. A few centuries ago, cashews were a natural tree species in northeastern Brazil in South America. In the 16th century, when Portuguese and Spanish invaded South America, their sailors brought cashew nuts out of its native land, and planted it in several colonial countries in Central America, Africa and India. Thus, this time was the time when cashew trees were transferred from wilderness to cultivation (Ohler, 1988).

In Vietnam, cashew is grown from Da Nang to southern provinces. The South East region accounts for 60% of the total area, including Binh Phuoc, Dong Nai, Binh Duong, Ba Ria - Vung Tau. It has the most ecological conditions, stable production and most suitable with cashew trees. Therefore, area and cashew yield are highest

1.3.1.2 Research on the use of cashew nut fertilizer

Cashew is suitable for tropical climate, but there must be two distinct seasons, rainy and dry seasons for the plant to dissolve the flower buds. At Dimbulah, North Queensland Territory and Northwest Australia. According to Grundon (2003) [43], to determine the optimum fertilizer regime for each climatic zone, to increase cashew yields, it is necessary to determine the factors: quantity of fertilizer, type of fertilizer, And how to apply fertilizer to optimal yield and quality, economic efficiency and sustainability of production. According to Grundon, 2003 [43] at the 5-year-old cashew orchard in North Queensland, Australia, when increasing fertilizer N from 0 - 200 - 400 - 600g / root / year, seed weight. The yield was highest at N 600 g / root / year, N content correlated with cashew yield. For potassium fertilizer increased from 0 - 150 - 300g / root / year does not clearly show the increase in productivity. In Australia cashew fertilizer is split in two, 40% is applied at the beginning of the rainy season and 60% is applied at the end of the rainy season for commercial gardens without irrigation.

In India the cashewnut fertilizer formula (g / tree / year), first year 170 N - 40 P₂O₅ and 40 K₂O, second year 350N-80 P₂O₅ and 80 K₂O, third year 500N- 125P₂O₅ and 125 K₂O, the fourth year is 750 N -250 P₂O₅ and 250 K₂O, the minimum annual 500N – 120 P₂O₅ and 120 K₂O g / tree / year, the amount divided equally for the first two rainy season and the end of the rainy seas.

In Việt Nam, according to Pham Van Bien (2005), the amount of fertilizer for cashew trees in the first year 60N- 20 P₂O₅ and 20 K₂O (g / tree / year) did not meet the growing and development needs of cashew trees basic construction period. When increasing 120 N- 20 P₂O₅ and 20 K₂O (g/ tree / year) increased the canopy diameter, root diameter compared 60N- 20 P₂O₅ and 20 K₂O (g / tree / year) formula, six months after fertilization, the difference was statistically significant. The Research Center for Cashew Research and Development - Southern Agricultural Science has recommended the first year to apply 120N- 90 P₂O₅ and 60 K₂O (g / tree / year), the second year 150N - 90P₂O₅ - 90 K₂O (g / tree / year), 3 times / year. Business 500N – 250 P₂O₅-300 K₂O, apply twice a year. Depending on the yield of each year to 20-30% salary increase fertiliz.

The above research results have contributed positively to the cashew nut development program in recent years. However, the recommended amount of fertilizer is still not widely applied in each ecological region. There are different characteristics of the soil conditions, especially the varieties, each has its own characteristics and potential of its own productivity, so the detailed research for each region, each set of varieties is needed. important and important.

1.3.1.4 Growth regulators on cashew trees

In Vietnam, according to the research of Le Quang Hung (2010), using GA₃ at concentrations of 100mg / L, 50mg / L, 25mg / L and control spray water for cashew trees 6, 8 and 20 years old. The yield increased from 42.4 to 51.3% at concentrations of 50 mg / L. The highest profit in 8 and 20 year old trees. At 6-year-old trees, the concentration of GA 3 100 mg / L for the highest yield.

CHAPTER 2

SUBJECTS, CONTENTS AND RESEARCH METHODOLOGY

2.1. Objects, research materials

2.1.1 Research object: Cashew tree AB 29

2.1.2 Research materials

+ Fertilizer: urea [$\text{CO}(\text{NH}_2)_2$]: 46%, phosphorus: (17% P_2O_5); Potassium: (60% K_2O). Growth regulator: Gibberellin (GA_3) 99.9

2.2 Time and place of research

+ Center for Research and Development of Cashew Nuts - Institute of Agricultural Sciences of Southern Vietnam, Phu An Commune, Ben Cat Town, Binh Duong Province. (on acrisoils).

+ Center for Agricultural Research and Experimentation - Institute of Agricultural Sciences of Southern Vietnam, Hung Thinh commune, Trang Bom district, Dong Nai province. (on basalt soil).

+ Research time: 2015 - 2017.

2.3 Research content and methodology

2.3.1 Research on the effect of fertilizer N, P, K to growth and development of cashew variety AB 29 basic construction on basalt soils and acrisoils in the South East.

Experimental layout was RCBD, 3 replicates, 5 seedlings / plot, experimental area was 0.6 ha (8 crops). x 5 trees x 3 replicates = 0.6 ha), density (6 x 8 = 208 trees / ha). Experiment 3 factors: N, P, K, each element has 2 levels of fertilizer

$\text{N}_1 = 120\text{g N}$; $\text{N}_2 = 180\text{g N}$ (g / tree / year)

$\text{P}_1 = 90\text{g P}_2\text{O}_5$; $\text{P}_2 = 120\text{g P}_2\text{O}_5$ (g / tree / year)

$\text{K}_1 = 60\text{g K}_2\text{O}$; $\text{K}_2 = 90\text{g K}_2\text{O}$ (g / tree / year)

2.3.2 Research on the effect of N and K fertilizer to yield and grain quality of cashew variety AB 29 during the trading period on basalt soils and acrisoils in the South East.

The experiment was arranged in RCBD with 3 replicates, 7 trees / plot area, 8 treatments x 7 trees x 3 replicates = 0 , 85 ha / experiment, density (6 x 8 = 208 trees / ha).

Experiment 2 factors: N, K (g / tree / year)

$\text{N}_1: 500\text{g N}$; $\text{N}_2: 600\text{g N}$; $\text{N}_3: 700\text{g N}$; $\text{N}_4: 800\text{g N}$

$\text{K}_1 = 300\text{g K}_2\text{O}$; $\text{K}_2: 400\text{g K}_2\text{O}$

(Phosphate: 250g P_2O_5 / tree / year, organic fertilizer 20kg / tree / year)

2.3.3. Research on the effect of fertilize N with Giberellin treatment (GA₃) to productivity and grain quality of cashew variety AB 29 during trading periods on basalt soils and acrisoils in the South East.

Experimental layout: Randomized block design (RCBD), 3 replicates, 5 seedlings / plot, experimental area: 16 treatments x 5 trees x 3 Repeat, equivalent to 1.15 ha / 1 experiment, density (6 x8 = 208 trees / ha).

- There are four levels N: N1: 500; N2: 600, N3: 700, N4: 800 (g / tree / year)
There are 4 levels: G1: 0ppm (water spray), G2: 50ppm, G3: 100ppm, G4: 150ppm

(P = 250g P₂O₅; K = 300g K₂O (g / tree / year);
organic fertilizer 20 kg / tree / year).

2.4 Data processing

The data of the experiments were processed using SAS 9.1 software, compared the treatments with P <0.05 and P <0.01 under the LSD test and compared the Dunnett test.

CHAPTER 3
RESULTS AND DISCUSSION

3.1 Research on the effect of fertilizer N, P, K to growth and development of cashew variety AB 29 basic construction on basalt soils and acrisoils in the South East.

3.1 .1 Research on the effect of fertilizer N, P, K to growth and development of cashew trees AB 29 basic construction on basalt soils in the South East.

Table 3.1 Analysis of soil before and after experiments on Trang Bom - Dong Nai

Treatments	pH _{KCl}	Total (%)		(mg/100g soil)		(meq/100g soil)	
		HC	N	P ₂ O ₅	K ₂ O	Ca ⁺⁺	Mg ⁺⁺
Before EX	4,56	2,56	0,116	5,38	9,49	1,26	1,11
N1P1K1	4,67	2,59	0.116	5,39	9,50	1,28	1,14
N1P1K2	4,68	2,68	0.118	5,38	9,52	1,30	1,17
N1P2K1	4,64	2,58	0.116	5,40	9,51	1,27	1,15
N1P2K2	4,56	2,67	0.117	5,39	9,52	1,34	1,13
N2P1K1	4,57	2,60	0,119	5,41	9,50	1,30	1,18
N2P1K2	4,66	2,67	0,118	5,38	9,53	1,29	1,17
N2P2K1	4,65	2,58	0,120	5,39	9,50	1,27	1,12
N2P2K2	4,59	2,59	0,117	5,41	9,53	1,32	1,19

(Results of analysis at the Institute for Southern Agricultural Sciences, 2017)

Results of tablet 3.1, after two years of experiment (2015- 2017), when applying N: 120-180g , P₂O₅: 90-120g, K₂O: 60-90g (roof / year). There was difference in total N content, P₂O₅, K₂O, Ca²⁺, Mg²⁺, pH KCl, and organic in cashew field before and after the experiment. However, these levels did not affect the soil chemistry after the experiment.

3.1.1.3 Effect of N, P and K fertilizer levels to the height of cashew variety AB 29 on basalt soil at 12 and 24 months after planting

At the time of 12 month after planting, the height of cashew nut at different N application rates had a statistically significant difference (p <0.01). The N2 level reached an average of 209.1 cm, N1 only reached 185.2 cm. Average tree height of phosphorus levels (192.2- 202.2 cm) and potassium (196.7 - 197.7 cm); P and K levels in the experiment did not show statistically significant differences (Table 3.3). At the time of 24 months after planting, the treatment of N from N1 to N2 ranged from 271.4- 308.5 cm. This difference was statistically significant (p <0.01). The K fertilizer levels have average tree height from 287.4- 292.5 cm, the P fertilizer application rate from 286.9 -293.0 cm; The levels of P and K in the experiment did not show statistically significant difference.

Table 3.3 Effect of fertilizer levels N, P and K to the height of cashew variety AB 29 on basalt soil 12 and 24 months after planting

Levels (cm)	N g/tree/year					
		N1:120		N2:180		
		P1 90	P2 120	P1 90	P2 120	TB(K)
Height of tree at 12 month	K1: 60	182,5	181,6	201,2	221,5	196,7
	K2 :90	180,8	196,0	204,2	209,7	197,7
	TB(N)	185,2 B		209,1 A		
	TB(P)	P1= 192,2		P2= 202,2		
CV (%) = 7,98, LSD _{0,05N} = 13,7**; LSD _{0,05K} = ns; LSD _{0,05P} = ns						
Height of tree at 24 month	K1: 60	269,5	270,1	308,7	321,6	287,4
	K2: 90	227,1	274,8	298,3	305,5	292,5
	TB(N)	271,4 B		308,5 A		
	TB(P)	P1= 286,9		P2= 293,0		
CV (%) = 8,92; LSD _{0,05N} = 22,6 ** LSD _{0,05K} = ns; LSD _{0,05P} = ns						

3.1.1.4 Effect of N, P and K fertilizer levels to the canopy diameter of cashew variety AB 29 on basalt soil at 12 and 24 months after planting

Table 3.4, At the time of 12 months after planting, The levels of N2 (180g / tree / year) has canopy diameter 214.7cm, N1 (120g) reaches 194.1cm; The difference is statistically significant. Increase the level of fertilizers from P1 (90g) - P2 (120g / tree / year) average canopy diameter from 197.2 to 211.6cm. Potassium fertilizers are applied at the rate K1 (60 g) - K2 (90 g / tree / year). Potassium , phosphate levels did not show any significant differences.

At 24 months the level of fertilizer from N1-N2 has increased the diameter of the cashew from 263.5 to 290.5 cm; The difference is statistically significant. Phosphate and potassium levels of the experiment did not show statistically significant differences.

Table 3.4 Effect of fertilizer levels N, P and K to the canopy diameter of cashew tree AB 29 on basalt soil at 12 and 24 months after planting

Levels (cm)		N (g/tree/year)				
		N1:120		N2:180		
		P1 90	P2 120	P1 90	P2 120	TB(K)
Canopy diameter of tree at 12 month	K1: 60	183,3	197,2	198,7	223,3	200,6
	K2: 90	190,3	205,5	216,6	220,3	208,2
	TB(N)	194,1B		214,7 A		
	TB(P)	P1= 197,2		P2= 211,6		
CV (%) = 9,24; LSD _{0,05N} = 16,5 ** LSD _{0,05K} = ns; LSD _{0,05P} = ns						
Canopy diameter of tree at 24 month	K1:60	243,6	265,3	294,2	298,5	275,4
	K2: 90	277,8	267,2	284,6	284,7	278,6
	TB(N)	263,5 B		290,5 A		
	TB(P)	P1= 275,1		P2= 278,9		
CV (%) = 7,88; LSD _{0,05N} = 19,1 ** LSD _{0,05K} = ns; LSD _{0,05P} = ns <i>ns không khác biệt có ý nghĩa thống kê, **Khác biệt có ý nghĩa p<0,01</i>						

3.1.1.5 Effect of N, P and K fertilizer levels to root diameter of cashew variety AB 29 on basalt soil at 12 and 24 months after planting

Table 3.5 Effect of N, P and K fertilizer levels to root diameter of cashew tree AB 29 on basalt soil at 12 and 24 months after planting

Levels (cm)		N (g/tree/year)				
		N1:120		N2:180		
		P1 90	P2 120	P1 90	P2 120	TB(K)
Root diameter of tree at 12 month	K1: 60	4,62	5,04	5,09	5,61	5,12
	K2: 90	4,72	5,16	5,20	5,59	5,17
	TB(N)	4,88 B		5,40 A		
	TB(P)	P1= 4,93		P2= 5,35		
CV (%) = 8,35; LSD _{0,05N} = 0,37 ** LSD _{0,05K} = ns; LSD _{0,05P} = ns						
Root diameter of tree at 12 month	K1:60	7,05	7,34	8,19	8,58	7,79
	K2: 90	7,91	7,78	8,18	8,24	8,02
	TB(N)	7,52 B		8,29 A		
	TB(P)	P1= 7,82		P2= 7,98		
CV (%) = 9,45; LSD _{0,05N} = 0,65**, LSD _{0,05K} = ns; LSD _{0,05P} = ns						

At 24 months after planting, only the nitrogen factor was developed to develop the root diameter from 7.52 to 8.29 cm, the difference was statistically significant. Phosphate and potassium levels in the experiment did not show statistically significant differences after 12 and 24 months of planting.

3.1.1.7 Summary of effects of fertilizer levels N, P, K to growth parameters of cashew variety AB 29 on basalt soil at 24 months after planting

Table 3.7 . The treatment (N2P2K1) 180g N- 120g P₂O₅- 60g K₂O has the effect of height 321.6cm (19.3%), the diameter of canopy 298.5cm (22.5%), the root diameter of 8.58cm (21.7%) compared with control. At fertilizer application levels of N, P, K fertilizers, it was not clear how the interaction of growth of cashew nut AB 29 during the period of basic construction.

Table 3.7 Summary of effects N, P, K fertilizer levels on growth parameters of cashew variety AB 29 on basalt soil during the period of basic construction

Treatments	Growth indicators after 24 months					
	Height of tree (cm)	Height of tree (%)	Canopy diameter of tree (cm)	Canopy diameter of tree (%)	Root diameter of tree (cm)	Root diameter of tree (%)
N1P1K1(đc)	269,5	100	243,6	100	7,05	100
N1P1K2	271,1	100,5	277,8	114,0	7,91	112,2
N1P2K1	270,1	100,2	265,3	108,9	7,34	104,1
N1P2K2	274,8	101,9	267,2	109,7	7,78	110,3
N2P1K1	308,7	114,5	294,2	120,8	8,19	116,0
N2P1K2	298,3	110,6	284,6	116,8	8,16	115,7
N2P2K1	321,6	119,3	298,5	122,5	8,58	121,7
N2P2K2	305,5	113,3	284,7	116,8	8,24	116,9

3.1.2 Research on the effect of fertilizer N, P, K to growth and development of cashew variety AB 29 basic construction on acrisoils in the South East.

Table 3.8 Results of soil analysis before and after experiment on acrisoil

Treatments	pH _{KCl}	Total (%)		(mg/100g soil)		(meq/100g soil)	
		HC	N	P ₂ O ₅	K ₂ O	Ca ⁺⁺	Mg ⁺⁺
Before EX	4,23	2,14	0,086	4,26	5,15	1,26	1,10
N1P1K1	4,25	2,25	0,087	4,29	5,17	1,29	1,11
N1P1K2	4.24	2,22	0,086	4,26	5,20	1,24	1,13
N1P2K1	4.25	2,15	0,089	4,29	5,16	1,36	1,18
N1P2K2	4.26	2,17	0,088	4,29	5,20	1,37	1,25
N2P1K1	4.37	2,16	0,090	4,34	5,21	1,35	1,12
N2P1K2	4.36	2,18	0,088	4,32	5,24	1,34	1,19
N2P2K1	4.23	2,17	0,090	4,31	5,17	1,29	1,17
N2P2K2	4.24	2,19	0,088	4,28	5,20	1,27	1,15

(Results of analysis at the Institute for Southern Agricultural Sciences, 2017)

There was difference in total N content, P₂O₅, K₂O, Ca²⁺, Mg²⁺, pH KCl, and organic in cashew field before and after the experiment. However, these levels did not affect the soil chemistry after the experiment.

3.2.1.7 Summary of effects of fertilizer levels N, P, K to growth parameters of cashew variety AB 29 on acrisoil at 24 months after planting

Bảng 3.14 Summary of effects N, P, K fertilizer levels on growth parameters of cashew variety AB 29 on acrisoil during the period of basic construction

Treatments	Growth indicators after 24 months					
	Height of tree (cm)	Height of tree (%)	Canopy diameter of tree (cm)	Canopy diameter of tree (%)	Root diameter of tree (cm)	Root diameter of tree (%)
N1P1K1(đc)	263,3	100	238,6	100	6,51	100
N1P1K2	267,7	101,6	254,6	106,7	6,95	106,7
N1P2K1	264,2	100,3	241,7	101,2	6,89	105,8
N1P2K2	275,0	104,4	240,0	100,5	7,06	108,4
N2P1K1	302,1	114,7	264,2	110,7	7,87	120,8
N2P1K2	315,0	119,6	281,2	117,8	7,94	121,9
N2P2K1	291,6	110,7	267,6	112,1	7,74	118,8
N2P2K2	298,8	113,4	261,4	109,5	7,65	117,5

Table 3.8 . The treatment (N2P1K2) 180gN -90g P₂O₅ - 90g K₂O / rooft / year. The height of the tree reached 315.0 cm (up 19.6%), the canopy diameter reached 281.2 cm (up 17.8%), the root diameter was 7.94 cm (up 21.9%) compared with control. At fertilizer application levels of N, P, K fertilizers, it was not clear how the interaction of growth of cashew nut AB 29 during the period of basic construction.

Summary of contents 1

Research on determination of N, P and K mineral fertilizers suitable for cashew AB 29 in the period of basic construction on basalt soil and on acrisoils in the South East:

On basalt soil, when increasing 50% N and increasing 33% P₂O₅, there was a significant difference in growth during the construction period, tree height increased 19.3%, canopy diameter increased 22.5%, root diameter increased 21.7% compared with control. The optimal treatment is 180gN -120g P₂O₅ - 60g K₂O / tree / year.

On acrisoils, when increasing 50% N and increasing 50% K₂O, the tree height increased 19.6%, the canopy diameter increased 17.8%, the root diameter increased 21.9% compared with control. The optimal treatment is 180g N-90g P₂O₅ - 90g K₂O / tree / year

3.2 Research effect of fertilizer N, K to productivity and grain quality of cashew variety AB 29 in the period of business on basalt soil, acrisoil in the South Eas.

3.2.1 Research effect of fertilizer N, K to productivity and grain quality cashew variety AB 29 in the period of business on basalt soil Trang Bom, Dong Nai

3.2.1.8 Research effect of fertilizer N, K to productivity cashew variety AB 29 in the period of business on basalt soil Trang Bom, Dong Nai

The results of (Table 3.21) At the N3 application yielded the highest yield of 9.46 kg / tree, (1.93 tons / ha), the N1 application yielded the lowest yield of 7.98 kg / tree, (1.66 tons / ha), difference very statistically significant. The highest was the N3K2 treatment gaining 9.9 kg / tree increased 23.7% compared with N1K1 (control)

On average N4 fertilizer yield was only 8.45 kg / tree (1.76 tons / ha), equivalent to N2 fertilizer yield was 8.53 kg / tree (1.77 tons / ha).

When increasing the K fertilizer application rate from K1 to K2, the yield of K factor was 8.55 - 8.75 kg / tree, did not show any significant difference.

Bảng 3.21 Research effect of fertilizer N, K to productivity on basalt soil

Levels	K (g/tree)	N(g/tree/year)				Average (K)
		N1: 500	N2: 600	N3: 700	N4: 800	
Yield (Kg / tree)	K1: 300	7,83	8,46	9,01	8,50	8,55
	K2: 400	8,13	8,60	9,90	8,40	8,75
	Average (N)	7,98B	8,53B	9,46A	8,45B	
CV (%) = 6,40; LSD _{0,05N} = 2,14**; LSD _{0,05K} = 0,48 ns						
Yield (tons/ ha)	K1: 300	1,63	1,76	1,82	1,77	1,78
	K2: 400	1,69	1,78	2,05	1,74	1,82
	Average (N)	1,66	1,77	1,93	1,76	

(Data are converted from kg / tree, density is 208 trees / ha)

3.2.1.9 Research effect of fertilizer N, K to grain quality cashew variety AB 29 in the period of business on basalt soil Trang Bom, Dong Nai

The number harveste of seeds / kg of the treatments ranged from 128.1-132.8 seeds/kg, reaching 93.6 -95.9% of the number of seeds/kg, with the rate of 93-95% standard response of Vietnam Cashew Association. There was no statistically significant difference between the treatment, the rate of /seeds 30.4-30.6%. The rate of /seeds depends on the characteristics of each variety.

Tablet 3.22 Effect of fertilizer N, K to grain quality cashew variety AB 29 in the period of business on basalt soil

(Seeds)	K (g/tree)	N(g/tree/year)				Average (K)
		N1: 500	N2: 600	N3: 700	N4: 800	
The number seeds/kg	K1: 300	142,3	138,3	142,0	139,0	140,4
	K2: 400	140,3	140,0	135,3	140,0	138,9
	Average (N)	141,3	139,1	138,6	139,5	
CV (%) = 10,2; LSD _N = 17,2ns; LSD _{0,05K} = 12,5ns						
The number harveste seeds/kg	K1: 300	134,0	129,6	128,3	129,0	130,2
	K2: 400	131,3	130,0	128,0	132,5	130,4
	Average (N)	132,6	129,8	128,1	130,6	
CV (%) = 11,7; LSD _{0,05N} = 18,3ns; LSD _{0,05K} = 14,2ns						
The rate of /seeds (%)	K1: 300	30,9	30,5	30,5	30,6	30,7
	K2: 400	30,4	30,5	30,3	30,5	30,4
	Average(N)	30,6	30,6	30,6	30,4	
CV (%) = 1,72; LSD _{0,05N} = 0,65ns; LSD _{0,05K} = 0,46ns,						

3.2.1.10 Economic efficiency of fertilizer investment N and K fo cashew variety AB 29 in the period of business on basalt soil Trang Bom, Dong Nai

Table 3.23 Economic Efficiency and Efficiency of N and K fertilizer investment on basalt soil Unit: 1.000

VND

Treatment	Total Kg/ha	Total output value	Total cost	Cost for fertilizer	Profit	Profit/ Cost
N1K1	1,629	57,002	23,882	8,882	33,120	3.73
N1K2	1,691	59,186	24,290	9,290	34,896	3.76
N2K1	1,760	61,589	24,340	9,340	37,249	3.99
N2K2	1,789	62,608	24,748	9,748	37,860	3.88
N3K1	1,874	65,593	24,798	9,798	40,795	4.16
N3K2	2,059	72,072	25,206	10,206	46,866	4.59
N4K1	1,768	61,880	25,214	10,214	36,666	3.59
N4K2	1,747	61,152	25,622	10,622	35,530	3.35

Profit / cost ratio of fertilizer: the highest was the treatments N3K2 (4.59), N3K1 (4.16), N2K1 (3.99), N2K2 (3.88). The treatment (N3K2) 700gN-250gP₂O₅-300gK₂O gave the highest profit of 46.8 million / ha. Profit / cost of fertilizer reached 4.59.

3.2.2 Research effect of fertilizer N, K to productivity and grain quality cashew variety AB 29 in the period of business on acrisoil Ben Cat, Binh Duong

3.2.2.8 Research effect of fertilizer N, K to productivity cashew variety AB 29 on acrisoil Ben Cat, Binh Duong

Table 3.30 results: average yield of N2 application was highest at 8.16 kg / tree, equivalent to 1.69 tons / ha, with no significant difference in N3 (8.05 kg / tree). The highest N2K2 treatment was 8.36 kg / tree, 26% higher than control.

Table 3.30 Effect of fertilizer N, K to productivity cashew variety AB 29 on acrisoil

Levels	K (g/tree)	N(g/tree/ year)				Average (K)
		N1500	N2: 600	N3: 700	N4: 800	
Yield (Kg / tree)	K1: 300	6,63	7,96	8,03	7,10	7,43
	K2: 400	6,96	8,36	8,06	6,93	7,58
	Average (N)	6,80B	8,16A	8,05A	7,01B	
CV (%) = CV (%) = 10,8; LSD _{0,05N} = 1,0**; LSD _{0,05K} = 0,79 ns						
Yield (tons / ha)	K1: 300	1,32	1,65	1,67	1,42	1,54
	K2: 400	1,59	1,74	1,67	1,44	1,57
	Average (N)	1,41	1,69	1,67	1,45	

(Data are converted from kg / tree, density is 208 trees / ha)

3.2.2.9 Research effect of fertilizer N, K to grain quality cashew variety AB 29 on acrisoil Ben Cat, Binh Duong

Table 3.31 Effect of fertilizer N, K to grain quality cashew tree AB 29 on acrisoil

(Seeds)	K (g/tree)	N(g/tree/year)				Average (K)
		N1: 500	N2: 600	N3: 700	N4: 800	
The number seeds/kg	K1: 300	140,0	137,1	142,0	137,0	139,1
	K2: 400	140,3	138,0	135,3	138,6	138,0
	Average (N)	140,1	137,5	138,6	137,8	
CV (%) = 10,2, LSD _N = 17,5ns; LSD _{0,05K} = 12,3ns						
The number harveste seeds/kg	K1: 300	135,0	130,0	128,3	129,3	130,6
	K2: 400	131,3	130,0	128,3	127,5	129,3
	Average (N)	131,8	130,0	128,3	128,4	
CV (%) = 12,0, LSD _N = 19,4ns; LSD _{0,05K} = 13,7ns						
The rate of /seeds (%)	K1: 300	30,6	30,3	30,4	30,7	30,5
	K2: 400	29,9	30,5	30,3	31,1	30,4
	Average (N)	30,2	30,4	30,3	30,9	
CV (%) = 7,3; LSD _{0,05N} = 2,78ns; LSD _{0,05K} = 1,97ns,						

The number harveste of seeds / kg of the treatments ranged from 128.4-131.8 seeds/kg, reaching 94,2 -95,7% of the number of seeds/kg, with the rate of 93-95% standard response of Vietnam Cashew Association. There was no statistically significant difference between the treatment, the rate of /seeds 30.2-30.9%.

3.2.2.10 Economic efficiency of fertilizer investment N and K fo cashew variety AB 29 in the period of business on acrisoil Ben Cat, Binh Duong

Table 3.32 Economic Efficiency and Efficiency of N and K fertilizer investment on acrisoil

Unit: 1.000 VND

Treatment	Total Quantity Kg/ha	Total output value	Total cost	Cost for fertilizer	Profit	Profit/ Cost
N1K1	1,379	48,266	21,382	8,882	26,884	3.03
N1K2	1,447	50,669	21,790	9,290	28,878	3.11
N2K1	1,655	57,949	21,840	9,340	36,109	3.87
N2K2	1,738	60,861	22,248	9,748	38,613	3.96
N3K1	1,670	58,458	22,298	9,798	36,161	3.69
N3K2	1,676	58,677	22,706	10,206	35,971	3.52
N4K1	1,476	51,688	22,714	10,214	28,974	2.84
N4K2	1,441	50,450	23,122	10,622	27,329	2.57

- The price 1 kg of urea is 8,000 VND, 1kg of potassium price is 10,000 VND

- The price of 1 kg of cashew nuts in 2016 is 35,000 VND

Fertilizer treatment (N2K2) 600g N- 250g P₂O₅- 400g K₂O, the highest yield was 1.73 tons / ha (up 26.0%), profit reached 38.6 million / ha, Profit / cost of fertilizer reached was 3.96.

Summary of content 2

On basalt soil, when yield increased by 40% N and 33% K₂O, yield increased by 23.7% (2.05 tons / ha), profit was 46.8 million / ha, Profit / cost of fertilizer reached was 4.59, in fertilizer treatment 700gN - 250g P₂O₅-400g K₂O.

On acrisoil, when increasing 20% N and 33% K₂O, yield increased by 26.0% (1.73 tons / ha), profit reached 38.6 million / ha, Profit / cost of fertilizer reached was 3.96, in the treatment 600g N-250g P₂O₅-400g K₂O. The rate of /seeds, the number of seeds/kg of varieties AB-29 is unchanged.

With the application times and time as follows:

+ Phosphate and organic fertilizer: Apply once a year at the beginning of rainy season (June)

+ Fertilizer N, KCl: apply twice a year (early and late rainy season, June, September).

The first application: 50% N + 40% K2O; The second application: 50% N + 60% K2O,

- Quantity: Organic fertilizer 20kg / tree / year.

3.3 Research effect of N fertilizer levels in combination with Giberellin growth factor treatment (GA₃) to yield and grain quality of cashew variety AB 29 on basalt soil, acrisoil in the South East.

3.3.1 Research effect of N fertilizer levels in combination with Giberellin growth factor treatment (GA₃) to yield and grain quality of cashew variety AB 29 on basalt soil in Trang Bom Dong Nai

3.3.1.2 Effect of N fertilizer levels in combination with Giberellin growth factor treatment (GA₃) to yield of cashew variety AB 29 on basalt soil

Table 3.34 Effect of N fertilizer levels in combination with Giberellin growth factor treatment (GA₃) to yield of cashew variety AB 29 on basalt soil

Levels	N (g/tree/year)	Concentration GA ₃ (ppm)				Average (G)
		G1: 0	G2: 50	G3: 100	G4:150	
Yield (Kg / tree)	N1: 500	7,8	8,4	10,1	7,9	8,6B
	N2: 600	8,4	8,7	10,0	8,7	8,9B
	N3: 700	8,8	9,9	11,2	9,4	9,8A
	N4: 800	8,4	8,1	10,0	7,8	8,6B
	Average (N)	8,3B	8,8B	10,3A	8,4B	
LSD _{N 0,05} = 0,63**, LSD _{G 0,05} = 0,63**, LSD _{G*N 0,05} = 1,61*; CV (%) = 8,44						
Yield (Kg / ha)	N1: 500	1,63	1,75	2,11	1,65	1,78
	N2: 600	1,75	1,81	2,10	1,80	1,87
	N3: 700	1,83	2,06	2,33	1,95	2,04
	N4: 800	1,76	1,68	2,09	1,63	1,79
	Average (N)	1,74	1,83	2,16	1,79	

(Data are converted from kg / tree, density is 208 trees / ha)

Table 3.34 shows that for the fertilizer levels, the highest yield was N3 at 9.8 kg / tree with significant difference. Treatments N1, N2, N4, respectively, ranged from 8.6-8.9 kg / tree, when combined with different GA₃ growth stimulants, the highest yield was 10.3 kg / tree equivalent to 2.16 tons / ha at the G3 level of 100ppm, up 24.1% compared to G1 at only 8.3 kg / tree (1.74 tons / ha) and significant difference. There was a statistically significant (p <0.01) interaction between the N levels of GA₃ and the kg / tree yield in treatment treatments GA₃ 100 ppm N1G3, N2G3, N3G3, N4G3 yielded 10.0 to 11.2 kg / tree. Mostly N3G3 reached 11.2 kg / tree equivalent to 2.33 tons / ha, an increase of 42%

3.3.1.3 Research effect of N fertilizer levels in combination with Giberellin growth factor treatment (GA₃) to grain quality of cashew variety AB 29 on basalt soil

Table 3.35 Research effect of N fertilizer levels in combination with Giberellin growth factor treatment (GA₃) to grain quality

(Seeds)	N (g/tree/year)	Concentration GA ₃ (ppm)				Average (G)
		G1: 0	G2: 50	G3: 100	G4:150	
The number seeds/kg	N1: 500	135,0	140,3	131,3	133,3	135,0
	N2: 600	140,6	140,0	139,3	138,3	139,5
	N3: 700	138,3	135,6	137,6	138,0	137,4
	N4: 800	140,6	137,0	138,0	139,3	138,7
	Average (N)	138,6	138,2	136,5	137,2	CV (%) = 7,28
LSD _{N 0,05} = 8,36ns, LSD _{G 0,05} = 8,36 ns						
The number harveste seeds/kg	N1: 500	132,3	135,6	127,0	128,6	130,9
	N2: 600	134,0	132,3	133,6	129,6	132,4
	N3: 700	134,6	132,6	134,0	134,0	133,8
	N4: 800	137,0	133,3	130,3	134,3	133,7
	Average (N)	134,5	133,5	133,8	133,7	CV (%) = 6,13
LSD _{N 0,05} = 6,79ns, LSD _{G 0,05} = 6,79ns,						
The rate /seeds (%)	N1: 500	30,1	30,3	30,6	30,5	29,6
	N2: 600	28,9	30,8	30,6	30,3	30,4
	N3: 700	29,5	31,0	30,4	30,2	30,4
	N4: 800	30,0	29,6	30,2	30,1	30,2
	Average (N)	30,4	30,1	30,3	30,0	CV (%) = 4,78
LSD _{N 0,05} = 1,20ns, LSD _{G 0,05} = 1,20ns						

Table 3.35: Factors N fertilizer has the number seeds / kg from 135-139.5 seeds / kg, the treatments were not statistically significant difference . When treating GA₃ with concentrations from 0ppm, 50ppm, 100ppm, 150ppm. The number of seeds / kg was 136.5-138.6 seeds / kg. The number harveste seeds / kg of the treatments was 130.9-134.5 seeds / kg, (94.4 -95.8%) compared to the number of seeds / kg. The rate /seeds of GA₃ concentrations reached 30.2 - 30.5% as well as the fertilizer N ratios were also from 29.6-30.4%, there was no significant difference .

3.3.1.4 Economic efficiency of fertilizer levels N with treatment of GA₃ growth regulator of cashew variety AB 29 on basalt soil

Table 3.36 Economic efficiency of fertilizer levels N with treatment of GA₃ growth regulator of cashew variety AB 29 on basalt soil

Unit: 1.000VND

Treatment	Total Quantity Kg/ha	Total output value	Total cost	Cost for fertilizer	Profit	Profit/ Cost
N1G1	1,633	57,148	23,882	8,882	33,266	3.75
N2G1	1,747	61,152	24,340	9,340	36,812	3.94
N3G1	1,830	64,064	24,798	9,798	39,266	4.01
N4G1	1,747	61,152	25,214	10,214	35,938	3.52
N1G2	1,747	61,152	24,589	9,589	36,563	3.81
N2G2	1,810	63,336	25,047	10,047	38,289	3.81
N3G2	2,059	72,072	25,505	10,505	46,567	4.43
N4G2	1,685	58,968	25,921	10,921	33,047	3.03
N1G3	2,068	72,380	25,296	10,296	47,084	4.57
N2G3	2,101	73,528	25,754	10,754	47,774	4.44
N3G3	2,330	79,206	26,212	11,212	52,995	4.73
N4G3	2,080	72,800	26,628	11,628	46,172	3.97
N1G4	1,643	57,512	26,003	11,003	31,509	2.86
N2G4	1,810	63,336	26,461	11,461	36,875	3.22
N3G4	1,955	68,432	26,919	11,919	41,513	3.48
N4G4	1,635	57,221	27,335	12,335	29,886	2.42

- The price 1 kg of urea is 8,000 VND, 1kg of potassium price is 10,000 VND

- The price of 1 kg of cashew nuts in 2016 is 35,000 VND

Treatment (N3G3) applied 700g N / tree in combination with spraying GA₃ concentration of 100ppm was the highest yield, increasing the number nuts/cluster (35.9%) , increasing the number of fruit for harvesting (38.1%) . Yield is 2.33 tons / ha. Profit of 52.9 million VND / ha. Profit / investment in fertilizers and growth stimulants was 4.73.

3.3.2 Research effect of N fertilizer levels in combination with Giberellin growth factor treatment (GA₃) to yield and grain quality of cashew variety AB 29 on acrisoil in Ben Cat Binh Duong

3.3.2.2 Research effect of N fertilizer levels in combination with Giberellin growth factor treatment (GA₃) to yield of cashew variety AB 29 on acrisoil

Bảng 3.38 Effect of N fertilizer levels in combination with Giberellin growth factor treatment (GA₃) to yield of cashew variety AB 29 on acrisoil

Levels	N g/tree/year)	Concentration GA ₃ (ppm)				Average (G)
		G1: 0	G2: 50	G3: 100	G4:150	
Yield (Kg / tree)	N1:500	7,3	7,8	9,4	7,3	7,9C
	N2: 600	7,9	9,3	9,6	8,1	8,7AB
	N3: 700	8,0	9,2	9,5	8,8	8,8A
	N4: 800	8,0	7,5	9,4	7,4	8,1B
	Average (N)	7,8B	8,4B	9,4A	7,9B	CV (%) = 9,17
LSD _{N 0,05} = 0,64**, LSD _{G 0,05} = 0,64**, LSD _{G*N 0,05} = 1,03*,						
Yield (Kg / tree)	N1:500	1,51	1,63	1,95	1,51	1,65
	N2: 600	1,65	1,93	1,99	1,69	1,81
	N3: 700	1,67	1,91	1,97	1,83	1,83
	N4: 800	1,67	1,56	1,95	1,55	1,68
	Average (N)	1,62	1,76	1,95	1,65	

(Data are converted from kg / tree, density is 208 trees / ha)

The results of Table 3.38: the fertilizer levels N the highest yield reached 8.8 kg / tree with significant difference. However, on gray soil at the rate of N 600 g / tree / year combined with GA₃ growth stimulant at 100ppm, the yield was highest at 9.6 kg / tree. There was a statistically significant (p <0.01) interaction in GA₃100 ppm N1G3 treatment with GA₃100 ppm GA₃ 100 ppm treatment , N3G3, N4G3, yield 9.4-9.6 kg / tree. The highest was the N2G3 formula gaining 9.6 kg (up 31.5%) compared with N1G1. At the treatment level of G2 (50 ppm), treatments N2G2, N3G2 yielded 9.2-9.3 kg / tree with significant interaction (p <0.05)

3.3.2.3 Effect of N fertilizer levels in combination with Giberellin growth factor treatment (GA₃) to grain quality of cashew variety AB 29 on acrisoil in Ben Cat Binh Duong

Table 3.39 Factors N fertilizer has the number seeds / kg from 137,5-138, 9 seeds / kg, the treatments were not statistically significant difference . When treating GA₃ with concentrations from 0ppm, 50ppm, 100ppm, 150ppm. The number of seeds / kg was 136,5-140,6 seeds / kg. The number

harveste seeds / kg of the treatments was 130,6-134.0 haeveste seeds / kg, (94,6 -9633%) compared to the number of seeds / kg. The rate /seeds of GA₃ concentrations reached 30.2 – 31,1% as well as the fertilizer N ratios were also from 30,4- 31,2%, there was no significant difference .

Table 3.39 Effect of N fertilizer levels in combination with Giberellin growth factor treatment (GA₃) to grain quality of cashew variety AB 29 on acrisoil

(Seeds)	N (g/tree/year)	Concentration GA ₃ (ppm)				Average (G)
		G1: 0	G2: 50	G3: 100	G4:150	
The number seeds/kg	N1:500	142,3	140,0	133,3	134,6	137,5
	N2: 600	139,6	140,3	137,3	135,0	138,0
	N3: 700	139,6	135,6	140,0	140,0	138,9
	N4: 800	141,6	137,0	135,6	139,6	138,9
	Average (N)	140,6	138,2	136,5	137,2	CV (%) = 6,83
LSD _{N 0,05} = 7,89ns, LSD _{G 0,05} = 7,89ns,						
The number harveste seeds/kg	N1:500	135,6	134,4	128,0	128,6	131,6
	N2: 600	133,6	134,0	132,0	129,6	132,3
	N3: 700	132,0	132,0	134,3	134,0	133,0
	N4: 800	135,0	133,3	128,3	134,3	132,7
	Average (N)	134,0	133,4	130,6	131,6	CV (%) = 7,53
LSD _{N 0,05} = 8,31ns, LSD _{G 0,05} = 8,31ns,						
The rate /seeds (%)	N1:500	31,5	31,1	30,8	31,3	31,2
	N2: 600	29,4	31,1	30,8	30,3	30,4
	N3: 700	30,1	31,4	31,6	30,9	31,0
	N4: 800	30,0	30,0	31,1	30,4	30,4
	Average (N)	30,2	30,9	31,1	30,7	CV (%) = 5,61
LSD _{N 0,05} = 1,43ns, LSD _{G 0,05} = 1,43ns						

3.3.2.4 Economic efficiency of fertilizer levels N with treatment of GA₃ growth regulator of cashew variety AB 29 on acrisoil in Ben Cat, Binh Duong

Treatment (N2G3) applied 600g N / tree in combination with spraying GA₃ concentration of 100ppm was the highest yield, increasing the number nuts/cluster (37%) ,increasing the number of fruit for harvesting (40,3%) . Yield is 1,99 tons / ha. Profit of 43,8 million VND / ha. Profit / investment in fertilizers and growth stimulants was 4.1

Table 3.40 Economic efficiency of fertilizer levels N with treatment of GA₃ growth regulator of cashew variety AB 29 on acrisoil

Unit: 1.000 VND

Treatment	Total Quantity Kg/ha	Total output value	Total cost	Cost for fertilizer	Profit	Profit/ Cost
N1G1	1,518	53,144	23,882	8,882	29,262	3.29
N2G1	1,643	57,512	24,340	9,340	33,172	3.55
N3G1	1,670	58,458	24,798	9,798	33,661	3.44
N4G1	1,664	58,240	25,214	10,214	33,026	3.23
N1G2	1,622	56,784	24,589	9,589	32,195	3.36
N2G2	1,943	67,995	25,047	10,047	42,948	4.21
N3G2	1,914	66,976	25,505	10,505	41,471	3.95
N4G2	1,560	54,600	25,921	10,921	28,679	2.63
N1G3	1,955	68,432	25,296	10,296	43,136	4.09
N2G3	1,990	69,597	25,754	10,754	43,843	4.10
N3G3	1,976	67,184	26,212	11,212	40,972	3.65
N4G3	1,955	68,432	26,628	11,628	41,804	3.60
N1G4	1,531	53,581	26,003	11,003	27,577	2.51
N2G4	1,685	58,968	26,461	11,461	32,507	2.84
N3G4	1,830	64,064	26,919	11,919	37,145	3.12
N4G4	1,539	53,872	27,335	12,335	26,537	2.15

- The price 1 kg of urea is 8,000 VND, 1kg of potassium price is 10,000 VND

- The price of 1 kg of cashew nuts in 2016 is 35,000 VND

Summary of content 3

Treatment of GA₃ 0ppm, 50ppm, 100ppm, 150ppm on N substrate increased from 20 - 40-60% compared to control :

+ On the basalt soil, treatment (N3G3) applied 700g N / tree in combination with spraying GA₃ concentration of 100ppm was the highest yield, increasing the number nuts/cluster (35.9%) , increasing the number of fruit for harvesting (38.1%) . Yield is 2.33 tons / ha. Profit of 52.9 million VND / ha. Profit / investment in fertilizers and growth stimulants was 4.73.

+ On the acrisoil, treatment (N2G3) applied 600g N / tree in combination with spraying GA₃ concentration of 100ppm was the highest yield, increasing the number nuts/cluster (37%) , increasing the number of fruit for harvesting (40,3%) . Yield is 1,99 tons / ha. Profit of 43,8 million VND / ha. Profit / investment in fertilizers and growth stimulants was 4.1

+ The rate of /seeds, the number of seeds/kg of varieties AB-29 is unchanged.

CONCLUSION AND RECOMMENDATIONS

1. Conclusion

Research on determination of N, P and K mineral fertilizers suitable for cashew variety AB 29 in the period of basic construction on basalt soil and on acrisoils in the South East:

- On basalt soil, when increasing 50% N and increasing 33% P₂O₅, there was a significant difference in growth during the construction period, tree height increased 19.3%, canopy diameter increased 22.5%, root diameter increased 21.7% compared with control. The optimal formula is 180gN -120g P₂O₅ - 60g K₂O /tree/year

- On acrisoils, when increasing 50% N and increasing 50% K₂O, the tree height increased 19.6%, the canopy diameter increased 17.8%, the root diameter increased 21.9% compared with control. The optimal formula is 180g N-90g P₂O₅ - 90g K₂O / tree/year

- Research to determine the appropriate amount of N, K fertilizer for cashew nut AB 29 during the trading period for the highest productivity and economic efficiency

On basalt soil, when increasing 40% N and 33% K₂O, in the fertilizer formula 700g N - 250g P₂O₅-400g K₂O yield increased 23.7% (2.05 tons / ha), profit 46.8 million / ha, profit margin / fertilizer cost was 4.59.

- On acrisoils when increasing 20% N and 33% K₂O, in the formula of 600g N- 250g P₂O₅- 400g K₂O, yield increased 26.0% (1.73 tons / ha), profit 38.6 million / ha, the highest rate of fertilizer profit / cost was 3.96.

- Study to determine the most appropriate fertilizer N when combined with treatment GA₃ growth regulator for cashew nut AB29 to achieve high productivity and economic efficiency in the business period:

- On basalt soil, when increasing the N level by 40%, combining the specific GA₃ concentration of 100ppm in the fertilizer formula 700g N – 250 g P₂O₅- 300g K₂O most effective increase the number of seeds / cluster 35.9% , increase the number of seeds for harvest 38.1%. Yield was 2.33 tons / ha. Profit 52.9 million / ha. Profit / cost of fertilizer and growth stimulants was 4.7.

- On acrisoils when increasing 20% N combination GA₃ treatment of concentration 100ppm, fertilizer formula 600g N-250g P₂O₅-300g K₂O increased number seeds/ cluster 37%, increase the number of seeds for harvest 40.3%. Yield was 1.99 tons. Profit of 43.8 million / ha. Profit / cost of fertilizer and growth stimulant was 4.1 times. Grain size of the cashew AB 29 variety was not different on both basalt and acsisoil.

2. Suggest

Fertile fertilizer regime on reddish brown soil and gray soil for cashew variety AB 29 in the Southeast:

2.1 On the basaltsoil it is recommended to fertilize N, P and K with the most appropriate level of 180gN -120g P₂O₅-60g K₂O / tree / year; Apply 3 times / year in June, August, October each year, in the basic construction period. Apply 700gN-250g P₂O₅-400g K₂O/ tree/ year. Apply twice a year in June and September at the trading period, combine the Giberellin (GA₃) concentration 100ppm when flowering simultaneously to achieve the highest productivity.

2.2. On gray soil, it is recommended that N, P and K fertilizers be the most suitable: 180gN- 90g P₂O₅- 90g K₂O / tree / year; Apply 3 times / year in June, August, October each year in the basic construction period and fertilizer 600gN-250g P₂O₅-400g K₂O; Apply 2 times /year in June and September at the business period, combined treatment Giberellin (GA₃) concentration 100ppm when flowering simultaneously to achieve the highest productivity./.