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Effect of Poultry Manure and Eggshell Fertilizer on Growth and Yield of *Clitoria ternatea* under Shambat – Sudan Conditions

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Abstract:
This study was conducted at the demonstration farm of College of the Agricultural Studies, Sudan University of Science and Technology at Shambat Khartoum North, during the period: 25/11/2018 to 30/06/2019 to evaluate growth and yield of *Clitoria ternatea* forage as effected by poultry manure with eggshell fertilizers. The trail was done in randomized block design of four treatments and five replicates. The treatments consisted of Treatment1: no soil fertilizer used, Treatment 2: 5000kg/ha poultry manure, Treatment 3: 4600 kg/ha poultry manure+ 400kg /ha eggshell, Treatment 4: 4200 kg/ha poultry manure +800kg/ha eggshell. The parameters were Plant height (cm), stem diameter (cm), number of leaves per plant, Leaf/ Stem ratio, Fresh and Dry yields (Tons/ha), were measured over three harvests. The results showed that Poultry manure with eggshell at rate 4200 kg/ha poultry manure +800kg/ha eggshell were more effective in increasing Plant height, stem diameter, number of leaves per plant, Leaf/ Stem ratio, shoot fresh and dry yields of *C. ternate* L. than control and poultry manure alone under Shambat- Sudan conditions.

Keywords: Eggshell, Poultry Manure, Leguminous Forages, Fresh Yield, Dry Yield.

Introduction:

Clitoria ternatea L. belongs to the family Fabaceae, known as Butterfly pea (Australia), Kordofan pea (Sudan) (Morsy and Awadalla, 2017). *Clitoria ternatea* is a good source of livestock feeding, because the thin stem and large leaves, non- toxic nature which makes it highly palatable by livestock (Karel *et al*, 2018). This plant also is one of the important medicinal plants used for boosting memory and improving intellect and cure mental illness (Dhanraj *et al*., 2018). *Clitoria ternatea* is a perennial plant (Karel *et al*, 2018); and has been widely distributed throughout Africa, Asia, Australia, North and South America, Pacific (Northwestern, South-Central, and Southwestern) (Afrianto *et al*., 2020). It's a summer growing legume, which performs more best on fertile soils with high water holding capacity (Conway and Doughton, 2005). It is normally grown in full sunlight; but also can grow under light shade in rubber and coconut plantations (More and Hake, 2019; Neelamma *et al*, 2016; Hernández and Sánchez, 2014; FAO, 2012; Cook *et al*., 2005). *Clitoria ternatea* can be use as forage and hay making (Morsy and Awadalla, 2017). Due to its attractive

flower colors it is also grown as an ornamental crop, (Gomez and Kalamani, 2003). Its high-quality forages can be reducing the costs associated with feeding concentrates and supplements (Kathy et *al*., 2018). Moreover the Addition of NPK fertilizer improved forage productivity and quality of *Clitoria ternatea* compared with the control (no fertilizer used) Ahmed and Elfeel, (2012). The Litter from poultry, cows, sheep, etc., is commonly used as fertilizers, (Homenauth, 2013). In addition Poultry manure increased *Clitoria ternatea* fresh and dry yield over the control by 145 and 137%, respectively Abusuwar (2017). The Organic fertilizer is source of essential nutrients of plant nutrients, (Ritz and Merka, 2013). Abusuwar (2017) reported that the composted organic fertilizers (poultry and cow manures) are more effective in increasing, productivity and improving forage quality of *C. ternate* L. than inorganic fertilizer (NPK) under adverse conditions of salinity in arid lands. Also organic fertilizers (Eggshell) can be use as a stabilizing material for improving soil properties (Amu *et al.*, 2005). (King'ori, 2011), reported the clover plant when grown on eggshells fertilized soil grew 10 millimeters larger than the plants grown without eggshells (King'ori, 2011). Hen's eggshell contains calcium and trace amounts of other micro elements and best natural source of calcium and it is about 90% absorbable (Radha and Karthikeyan, 2019). The Calcium compared to other nutrients increases plant height and dry matter, (Nelson and Niedziela, 1998). Nikose (2015) reported that eggshell along with Bio-waste when used in potted plants resulted a remarkable growth in the plant. In Sudan fertilizers had highly cost of forage cultivation and using poultry waste like poultry manure and eggshell can be reduce the environment pollution and cost and increase forage production.

The objective of this study was to test the effect of addition of poultry manure and eggshell fertilizer on *C. ternatea* growth and yield.

Material and Methods:

Experimental location and climatic data:

This study was conducted at the Demonstration Farm of College of the Agricultural Studies, Sudan University of Science and Technology at Shambat Khartoum North, during the period: 25/11/2018 - 30/06/2019 to evaluate growth and yield of *Clitoria ternatea* forage as affect by poultry manure with eggshell fertilizers. The latitude of the location is 15º 40´ N and longitude is 32º 32´ E. The information about the weather during the growth of *Clitoria ternatea* plants was obtained from The Ministry of Irrigation and Water Resources Meteorological Authority, Khartoum, Sudan, (Table 1).

Table (1): Monthly accumulative air temperature (Cº), Relative humidity (%) and Rainfall (mm) of the experimental area during 2018 and 2019:-

2018												
	Jan	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**
Maximum Temperature (Cº)	29.4	36.7	38.0	39.0	41.4	39.8	38.1	35.9	37.5	39.1	26.0	30.4
Minimum Temperature(Cº)	14.1	18.7	21.0	20.4	25.9	26.9	26.3	25.5	25.3	24.6	17.8	16.9
Relative Humidity (%)	30	24	19	16	23	34	45	54	47	32	24	28

Rainfall (mm)	0.0	0.0	0.0	0.0	0.0	0.2	1.1	4.1	1.5	0.1	0.0	0.0
2019												
	Jan	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**
Maximum Temperature (Cº)	32.8	33.3	34.8	39.7	42.3	39.8	39.8	35.3	38.9	37.0	35.6	30.7
Minimum Temperature(Cº)	15.7	16.1	16.9	20.6	23.8	24.6	26.5	24.8	26.2	23.2	17.6	15.1
Relative Humidity (%)	26	24	18	15	20	36	38	58	43	43	25	28
Rainfall (mm)	0.0	0.0	0.0	0.0	15.7	5.0	10.0	64.6	31.0	25.0	0.0	0.0

Plant material: The seeds of *Clitoria Ternatea* cultivar were brought from the local market.

Land preparation and. **Planting:** The land was ploughed by a disc plough (40 cm), harrowed twice by a disc harrow, leveled by a leveler and ridged up by a ridge 70 cm apart (plot size was 3×4 m^2). The trail was done in randomized block design of four treatments and five replicates of each treatment**.** Sowing date of *Clitoria ternatea* was on 25/11/2018 at rate 12.5 kg/ ha. The seeds were sowed on top of the shoulder of the ridge (2.5 cm depth) at distance of 70 cm between rows and 20 cm between holes. 5 seeds were planted in each hole.

The treatments consisted:

(1) T1: no fertilizer used (control).

(2) T2: 5000kg/ha poultry manure.

(3) T3: 4600 kg/ha poultry manure+ 400kg /ha eggshell.

(4) T4: poultry manure 4200 kg/ha +800kg/ha eggshell.

The fertilizers were broadcasted once before the sowing of seeds. A representative soil sample (0-20), (20-40) and (40-60 cm) were taken before sowing to determine some physical and chemical properties (Table 2). The first irrigation was done immediately after the sowing of seeds; the frequency of irrigation was every 12-15 days intervals depending on the temperature, relative humidity and soil moisture conditions. Manual weeding by a hand implement "Nagama" was done, five weeks from planting.

Table (2): Mechanical and chemical properties of the experimental soil site:-

Depth (cm)	**PH paste**	**ECe dS/m**	**Soluble Cations Meql/L**			**SAR**	**Soluble anions Meql/L**		
			Na	**K**	**Ca+Mg**		**CO_3**	**HCO_3**	**CL**
0-20	7.9	1.09	7.4	0.8	2.7	6	0.0	0.2	0.1
20-40	7.9	1.38	5.7	1.3	6.8	3	0.0	0.2	0.1
40-60	7.9	1.26	9.2	0.3	3.2	7	0.0	0.2	0.1

Depth(cm)	N %	P (ppm)	O.C %	Ex.Ch. Cations Meql/L			CEC Meql/100g	ESP	$CaCO^3$ %	Particle size distribution (%)		
				Na	K	Ca+Mg				Sand	Silt	Clay
0-20	0.001	3	0.001	5.3	0.4	32.3	38	14	13	41	20	39
20-40	0.001	4	0.001	5.8	0.4	36.8	43	14	14	33	22	45
40-60	0.001	3	0.001	5.1	0.4	34.5	40	13	14	34	23	43

Measurements of growth parameters:-

Plant height (cm): Twenty plants were randomly measured at (15, 30, 45, 60 days) and plants height (cm) were taken from the base of the main stem to the tip of panicle using meter tape average plants height were calculated.

Stem diameter (cm): from the plant above stem diameter (cm) was determined by measuring on the center of the plants above, average was determined.

Number of leaves: It was counted from the above plants and the average was determined.

Leaf to stem ratio: Leaves were separated from stem and branches of the above plants. Both leaves and stem was oven dried and then weighted to calculated leaf/stem ratio.

Total yield per hectare: Three cuts were harvested throughout the year with cut interval 56 days; the first cut was at 60 days. The fresh and dry yield (ton/ hectare) were measured at the end of each harvest.

Fresh yield (t/ha): All plants from each plot were cut at height 10 cm above the ground; then weighted to measure fresh weight, and the yield was transformed into ton per hectare.

Dry yield (t/ha): The sample was taken from each plot, then oven dried (105º for 24 hour) to obtain dry yields, and then the weight was transformed into ton per hectare.

Statistical Analysis: Data collected were presented as Mean± Standard deviation and were analyzed using **SPSS** (Version 17.0) (2008) computer software program as one way analysis of variance (ANOVA), treatments means were separated by the least significant difference (LSD) method.

Results and discussion:-

Plant height (cm): The statistical analysis showed significant difference at ($p \leq 0.01$) in plant height. The highest mean of plant height was obtained by T4 with values (7.30±0.45), (12.30±0.73), (19.36±1.40) and (49.44±1.72) cm for day 15, 30, 45 and 60 respectively (Table 3); while control (T1) obtained the lowest plant height with values (4.60±0.89), (7.44±0.65), (13.52±0.98) and (25.76±1.13) cm for day 15, 30, 45 and 60 respectively (Table 3). This may be due to the fact that the eggshell is source of calcium and in the present study the treatment T4 (contain highest level of eggshell powder) increased the soil calcium level; and this agreed with Kris, (2010), who reported the calcium is cell wall component of plant and the calcium deficient the cell of plant become weak and unstable Kris, (2010). The present study are compatible with the findings of Nikose (2015) who reported that eggshell along with Bio-waste when used in potted plants resulted a remarkable growth in the plant. This result also Agreed with (King'ori, 2011).also matched with (Nelson and Niedziela, 1998); they reported Calcium compared to other nutrients increases plant height. Also agreed with (King'ori, 2011) who reported the clover plant when grown on eggshells

fertilized soil grew 10 mm larger than the plants without eggshells.

Stem diameter (cm): The results showed no significant difference between treatment on 15, 30 and 60 days; while exposed significant differences at ($p \leq 0.01$) among different treatments in 45 day of plant age; whereas the highest Stem diameter was recorded by T 4 (0.72±0.04 cm), but the lowest Stem diameter was obtained by T1 (0.50±0.10 cm) (Table 3); this may be due to addition of eggshell in T4 compared with no addition in T1; and this result compatible with Kris (2010), who reported that eggshell as source of calcium and calcium is cell wall component of plant. Also this result matched with Nikose (2015).

Number of leaves: The result showed no significant difference between treatments in number of leaves on 15 and 30 days; whereas the result showed a highly significance difference at ($p \leq 0.01$) between treatments on 45 and 60 days in number of leaves. The highest number of leaves was obtained by T4 with values (20.80±0.84) and (28.20±1.30) for days 45 and 60 respectively, (Table 3). This result was lower than result that recorded by Morsy and Awadalla, (2017), they reported the number of leaves per plant of first cut (*Clitoria ternatea*) when cut at 80 days was range between 61.33 and 66.22; this difference may be due to differ in plant age when harvest of plant; because in the present study the plants were harvest at 60 days of age. This result also agreed with Radha and Karthikeyan, (2019).

Leaf to stem ratio: The results showed that the treatments of fertilizers had significant effect in leaf to stem ratio of *Clitoria Ternatea at* ($p \leq 0.01$). T 4 recorded the highest Leaf to stem ratio (3.86± 0.50); compared with other treatments Leaf/stem ratio was ranged between (2.08± 0.64) to (2.60±0.04). This result nearly to result that reported by (Abreu *et al*., 2014) ; they recorded The leaf to stem mass ratios at 35, 50, 70, and 90 days, were 3.11, 3.10, 2.30, and 1.37, respectively. And higher than the results that obtained by Barro and Ribeiro (1983); they reported that the ratio after haymaking has values of 1.26, 0.87, 0.73, and 0.97 for harvested plant on 42, 50, 70, and 84 days, respectively; this maybe due to losing of leaves during haymaking.

Fresh yield (t/ha): The results showed that fresh yield production was significantly differed between the different fertilizers applied. Higher fresh yield was obtained by T 4 over the three harvests (Table 5), with yield production (0.95±0.15), (6.53±0.95) and (11.03±2.11) tons/hectare for first, second and third cut respectively; the result agreed with Radha and Karthikeyan, (2019). The enhanced growth increase fresh weight this may be due to the effect of calcium on plant cell division and absorbed nitrate; this matched with Rodríguez, (1992), who reported the calcium acts in the mitotic cell division in the growth of meristemis and the absorption of nitrate.

Dry yield (t/ha): Similar to fresh yield, dry yield production was differed and significantly affected by the fertilizer type applied, also T4 had the highest dry yield production with yield (0.25±0.039), (1.76±0.18) and (4.64±1.28) tons/hectare for first, second and third cut respectively (Table 6); this agreed with Nelson and Niedziela, (1998); they recorded the Calcium compared to other nutrients increases plant dry matter. Also this result agreed with Radha and Karthikeyan, (2019).

Table (3): Effect of poultry manure and eggshell fertilizers on plant height; stem diameter and leaves number of *C. ternatea*:-

Parameters	Plant height (cm)				Stem diameter (cm)				Number of leaves			
Days	15	30	45	60	15	30	45	60	15	30	45	60
T 1	4.60±0.89^{d}	7.44±0.65^{b}	13.52±0.98^{cd}	25.76±1.13^{d}	0.24±0.06^{a}	0.46±0.05^{a}	0.50±0.10^{d}	0.76±0.15^{a}	5.20±0.45^{a}	8.20±1.30^{a}	14.80±1.30^{b}	24.00±1.00^{b}
T 2	5.80±0.84^{cb}	8.24±0.87^{b}	14.72±1.40^{cd}	36.52±2.63^{c}	0.32±0.13^{a}	0.50±0.10^{a}	0.60±0.07^{bc}	0.68±0.08^{a}	5.80±0.44^{a}	8.60±0.89^{a}	15.34±0.85^{b}	27.80±0.76^{a}
T 3	6.70±0.84^{abc}	8.20±0.67^{b}	18.38±1.10^{ab}	47.62±1.71^{ab}	0.26±0.05^{a}	0.60±0.12^{a}	0.68±0.04^{abc}	0.74±0.05^{a}	5.60±0.55^{a}	9.40±0.89^{a}	15.6±1.67^{b}	27.80±1.48^{a}
T 4	7.30±0.45^{ab}	12.30±0.73^{a}	19.36±1.40^{ab}	49.44±1.72^{ab}	0.34±0.05^{a}	0.58±0.08^{a}	0.72±0.04^{a}	0.76±0.05^{a}	5.40±0.55^{a}	7.80±0.84^{a}	20.80±0.84^{a}	28.20±1.30^{a}
Level of significance	**	**	**	**	Ns	Ns	**	Ns	Ns	Ns	**	**
CV%	20.66	22.9	16.7	24.9	29.31	18.52	17.46	12.16	9.27	12.94	16.35	7.64

*Means within columns followed by the same letters are not significantly different at $p \leq 0.05$ according to **LSD** test. * = P≤ 0.05 ** =P ≤ 0.01 NS = not significant

Table (4): Effect of poultry manure and eggshell fertilizers on leaf: stem ratio of *C. ternatea*:-

Treatment	Leaf: Stem ratio
T1	2.08± 0.64[b]
T2	2.42± 0.43[b]
T3	2.60± 0.04[b]
T4	3.86± 0.50[a]
Level of significance	**
CV%	29.56

*Means within columns followed by the same letters are not significantly different at $p \leq 0.05$ according to **LSD** test. * = P≤ 0.05 ** =P ≤ 0.01 NS = not significant

Table (5): Effect of poultry manure and eggshell fertilizers on fresh yield (Ton/hectare) of *C. ternatea*:-

Treatment	First cut	Second cut	Third cut	Total yield
T1	0.58±.08[cd]	3.76±0.47[cd]	5.23±0.44[d]	9.56±0.66[d]
T2	0.69±0.16[cd]	5.63±0.84[ab]	7.24±1.11[bc]	13.56±1.50[bc]
T3	0.86±0.07[ab]	4.3±0.3[cd]	8.02±.73[bc]	13.19±1.02[bc]
T4	0.95±0.15[ab]	6.53±0.95[ab]	11.03±2.11[a]	18.50±3.12[a]
Level of significance	**	**	**	**
CV%	24.68	25.54	30.96	26.79

*Means within columns followed by the same letters are not significantly different at $p \leq 0.05$ according to **LSD** test. * = P≤ 0.05 ** =P ≤ 0.01 NS = not significant

Table (6): Effect of poultry manure and eggshell fertilizers on dry yield (Ton/hectare) of *C. ternatea*:-

Treatment	First cut	Second cut	Third cut	Total yield
T1	0.15±0.022[cd]	1.20±0.18[cd]	2.05±0.1[bcd]	3.40±0.18[bcd]
T2	0.18±0.041[bcd]	1.73±0.32[ab]	2.44±0.25[bcd]	4.36±0.41[bcd]
T3	0.22±0.019[abc]	1.17±0.07[cd]	2.68±0.23[bcd]	4.06±0.28[bcd]
T4	0.25±0.039[ab]	1.76±0.18[ab]	4.64±1.28[a]	6.65±1.46[a]
Level of significance	**	**	**	**
CV%	25	23.8	39.67	31.17

*Means within columns followed by the same letters are not significantly different at $p \leq 0.05$ according to **LSD** test. * = P≤ 0.05 ** =P ≤ 0.01 NS = not significant

Conclusion:

From the results obtained we can conclude that *Clitoria ternatea* can grow well and obtained higher yield with addition of poultry manure + eggshell fertilizer, compared with control and poultry manure alone under Shambat – Sudan Conditions.

References:

Abreu M L, Vieira R A, Rocha N S, Araujo R P, Gloria L S, Fernandes A M, de Lacerda P D, Junior A G. (2014). *Clitoria ternatea* l. as a potential high quality forage legume. Asian Australas J Anim Sci 27 (2): 169-178.

Afrianto W F, Fadila T, Laeli N H. (2020). A relation between ethnobotany and bioprospecting of edible flower Butterfly Pea (*Clitoria ternatea*) in Indonesia. *Asian Journal of Ethnobiology* Volume 3, Number 2, November 2020 E-ISSN: 2580-4537 Pages: 51-61

Ahmed A. B and Elfeel AA (2012). Foliage productivity and quality of valuable medicinal plant(*Clitoria ternatea L.*) as affected by different fertilizers. Journal of Medicinal Plants Research Vol. 6(25), pp. 4225-4230, 5 July, 2012.

Amu, O.O., A.B. Fajobi and B.O. Oke.(2005). Effect of eggshell powder on the stabilizing potential of lime on an expansive clay soil. Res. J. Agric. & Biol. Sci. 1: 80–84.

Barro, C.; and Ribeiro, A, (1983). The study of Clitoria ternatea L. hay as a forage alternative in tropical countries. Evolution of the chemical composition at four different growth stages. *Journal of the Science of Food and Agriculture 34(8): 780-782.*

Conway, M. and Doughton, J. (2005).The Butterfly Pea Book, a guide to establishing and managing butterfly pea pastures in central Queensland, Department of Primary Industries and Fisheries.

Cook, B. G; Pengelly, B. C.; Brown, S. D.; Donnelly, J. L.; Eagles, D. A.; Franco, M. A; Hanson, J.; Mullen, B. F.; Partridge, I. J.; Peters, M.; Schultze-Kraft, R., (2005). Tropical forages. CSIRO, DPI&F(Qld), CIAT and ILRI, Brisbane, Australia.

Dhanraj, P., Mallikarjuna Gowda, A. P., Shankarappa, T. H., Anil kumar, S., Praneeth, Y. S., Tulasigeri, G. and Suma, A. M.(2018), Effect of Plant Growth Promoting Rhizobacteria on Growth, Yield and Quality of Shankapushpi (*Clitorea ternatea* L.)" Under Irrigated Situation, *Int. J. Pure App. Biosci.* **6(6):** 287-292 (2018). doi: http://dx.doi.org/10.18782/2320-7051.7061

FAO, 2012. Grassland Index. A searchable catalogue of grass and forage legumes. FAO, Rome, Italy.

Hernández,I. and Sánchez, M. D. (2014), Small ruminant management and feeding with high quality forages in the Caribbean, Inter american Institute of Cooperation in Agriculture (IICA). 2014.

Homenauth, O. (2013). National Agricultural Research & Extension Institute, (2013). Fertilizer Manual (Concepts, Application, Storage and Handling), November 2013.

Karel, A.; Kumar H and Chowdhary B. (2018). *Clitoria ternatea* L. A Miraculous Plant. *Int.J.Curr.Microbiol.App.Sci.* 7(09): 672-674.

Kathy, P; Jackie, D and Tamara, T (2018). Sheep and Goat Management in Alberta Nutrition. Alberta Lamb Producers and Alberta Goat Association.

King'ori, A. M. (2011) A Review of the Uses of Poultry Eggshells and Shell Mem-branes. International Journal of Poultry Science, 10, 908-912.

Kris (2010) Egg Shells in the Garden. https://www.baliadvertiser.biz/egg_shells/

More, P. M. and Hake, K. R. (2019). Medicinal importance of *Clitoria ternatea.* International Journal of Applied Research 2019; 5(11): 222-225.

Morsy, A. S. and Awadalla A. (2017). Growth, Forage Yield and Quality of Clitoria (*Clitoria ternatea*) as

Affected by Dates and Methods of Sowing and Phosphorus Fertilizer under Toshka Region Condition. *Middle East J. Agric. Res., 6(2): 506-518, 2017*

Neelamma G., Durai Swamy B. and Dhamodaran P.,(2016). Pharmacogn-ostical, Phytochemical and pharmacological perspective of *Clitoria ternatea L. IJCTPR, 2016, 4(3): 159–165,* CODEN (USA): IJCTGM | ISSN: 2321-3760.

Nelson, P. V. and Niedziela, C. E. (1998). Effects of calcium source and temperature regime on calcium deficiency during hydroponic forcing of tulip. Sci. Hort. 73: 137-150.

Nikose, H. S. (2015) Egg Shell and Bio-Waste Manure. International Journal of Scientific & Engineering Research, 6, 1680-1685.

Radha, T. and Karthikeyan, G. (2019). Hen Eggshell Waste as Fertilizer for the Growth of *Phaseolus Vulgaris* (Cow Pea Seeds). *Research Journal of Life Science Bioinformatics, Pharmaceutical and chemical science*: *Jan – Feb RJLBPCS 5(1) Page No.406*

Ritz, C.W. and Merka, W. C. (2013). Maximizing Poultry Manure Use Through Nutrient Management Planning.UGA Extention, Bulletin 1245.

Rodríguez, S. A. (1992). Fertilizers, plant nutrition. AGT editor. second reprint. Mexico, D.F.

تاثير سماد روث الدواجن وقشر البيض علي نمو وإنتاجية الكلايتوريا تيرناتا تحت ظروف شمبات- السودان

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جامعة السودان للعلوم والتكنولوجيا– كلية الدراسات الزراعية[2]

المستخلص:

أجريت هذه الدراسة بالمزرعة التجريبية بكلية الدراسات الزراعية (شمبات)، جامعة السودان للعلوم والتكنولوجيا خلال الفترة من2018/11/25 والى 2019/6/30 لدراسة تاثير التسميد بروث الدواجن وقشر البيض على نمو وإنتاجية الكلايتوريا تيرناتا. أستعمل تصميم القطع العشوائية الكاملة باربعة معاملات وخمس مكررات. شملت المعاملات: معاملة 1 (دون استخدام سماد)، معاملة 2 (روث دواجن 5000 كجم للهكتار)، معاملة3 (4600 كجم للهكتار روث دواجن + 400 كجم للهكتار قشر بيض) ومعاملة 4 (4200 كجم للهكتار روث دواجن + 800 كجم للهكتار قشر بيض). تم قياس ارتفاع النبات (سم)، محيط الساق (سم)، عدد الاوراق، نسبة الاوراق للسيقان، الاوزان الجافة والرطبة للمجموع الخضري (طن/ هكتار). اظهرت النتائج أن استخدام روث الدواجن وقشر البيض معاً بمعدل 4200 كجم للهكتار روث دواجن + 800 كجم للهكتار قشر البيض؛ ذا تاثير في زيادة ارتفاع النبات، محيط الساق، عدد الاوراق، نسبة الاوراق للسيقان، الوزان الجاف والرطب للمجموع الخضري للكلايتوريا تيرناتا مقارنة بعدم إستخدام السماد وباستخدام روث الدواجن لوحده تحت ظروف شمبات–السوان.