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Allelopathic Potential of Selected Weeds Extract on Germination and Growth of *Borreria stachydea* (DC.)

Aliyu Abubakar[1*], Adamu Aliyu Aliero[2], Dharmendra Singh[3], Jibrin Naka Keta[4], Mubarak Aminu[5]

[1,3,4,5]Department of Plant Science and Biotechnology, Kebbi State University of Science and Technology Aliero, Nigeria
[2]Department of Biological Science, Usman Danfodiyo Sokoto, Nigeria

**Correspondence Author:alunkalgo42@gmail.com*

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Abstract—The uses of paraquat chemicals as weedicide in agriculture soil have causes the loss of natural habitats, food, and pollution of environment, risk of human health, animals and contamination of water body. This research aimed to study the allelopathic effect of aqueous extract of *Sesbania sesban* (L.), *Rhynchosia minima* L, *Indigofera hirsuta* L, *Tephrosia vogelli* F and *Crotalaria retusa* L on seed germination and growth of *Borreria stachydea* **(**DC.) using *in-vitro* and *in vivo* methods at different concentrations 5%, 10%, 15% and 20%. From, the results obtained, the extracts of *I. hirsuta* L and *S. sesban* (L.) had higher inhibitory effect at 20% concentration, than that of *T. vogelli* F, *Crotalaria retusa* L. and *R. minema* L on growth parameters of *B. stachydea* **(**DC.) when compared with control. In laboratory, most toxic plant extract against *B. stachydea* **(**DC.) was *S. sesban* (L.). Therefore mixed extract of these plant could be used in management of weed in order to reduce the use of synthetics herbicides in agricultural land for the control of weeds. Farmers should allow these five species with allelopathic properties to growth closed to cultivated crops.

Keywords—Allelopathic, weeds, germination and growth

I. INTRODUCTION

Weeds are the most important biological constraints in agricultural production systems which determined another ecological environment. All over the world diversity of unwanted plant species have been issue of concern by farmers due to the negative deleterious their cause on the soil or crops during the growth phase. However, allelopathy offers an important tool for selective biological weed management through production and release vital allelochemicals from leaves, flowers, seeds, stems and roots of plants, these chemicals affect the growth of other unwanted plant species [1,2]. Since the antiquity time weeds are controlled using hand weeding before the advanced of technologies. These traditional method of weeding recently is less common in developing countries due to labour scarcity on farms and high labour wages [3]. The used of paraquat chemicals as weeds killer have influent on the human health, cultivar plant, soil as well as diversity of microorganisms above or below the soil posse environmental hazards. These concerns have increased the interest of weed scientists around the globe to develop allelopathic weed management strategies with least effected [4]. The new approaches of allelopathic properties from some plants which inhibit the growth of surrounding plants and weeds [5]. Natural plant with sufficient phytotoxic have been under searched with their chemical composition [6]. In Nigeria, majority of the plants species reported as allelopathic are shrubs [7]. According to [7], within the forest ecosystem allelochemicals interaction plays a much larger role than previously thought, affecting growth, germination, plant succession, and vegetative patterning of forest ecosystem.

Borreria stachydea known as Danfarkami in Hausa belonging to the Rubiaceae family and commonly found grows in Kebbi state during rainy season in waste-places, ruderal plant along the roadside, garden and cultivated field e.t.c. It's an annual herb that has much branched of stems 10–50 cm tall with erect velvet-hairy, elliptic to elliptic-lanceolate leaves, ovate or ovate-lanceshaped, base blunt, tip pointed, membranous, stalkless; stipule pectinate [8]. Flowers are about 1.5 mm long, funnel-shaped; petals 4. Fruit Capsules sub-globose, 1 mm long with the persistent sepals more than three times as long as the fruit. Seeds pale yellowish brown, ellipsoid-rectangular, compressed, 0.8-0.9 mm long. Tropical Girdlepod is native Tropical Africa and America, now common in India and Nigeria [8].

Recently different methods such as manual, mechanical, biological, cultural and chemical methods have been practiced for centuries in control weeds [9,10,11]. Nonetheless, continuous and indiscriminate use of herbicides is posing environmental hazards. The allelochemicals are capable of acting as natural pesticides and can resolve problems of soil and environmental pollution, resistance development in weed biotypes, and

health defects caused by the indiscriminate use of synthetic herbicides. Weeds that competes with crop which result in reduction of quality and quantity of seeds of the crops [12]. These problems has been noted and observed by farmers as a weeds species causes stunted growth of crops there by reduces yield and market values of cultivated crops.

II. RELATED WORK

The quest of different plant species for the control of unwanted weeds in cultivated land is increases due to the influents of paraquat chemicals on human, animals and environment, and the availability of plant species in our natural environment. Although, in Kebbi state these weed species are found during the rainy season and used by local people to treat several diseases but knowledge of allelopathic of this species are not knowing. Different plants have been reported to have allopathic effect on the weed species all over the world by many researchers include [13] *Amarath*, [14] *Sorghum bicolor*, [15] *Chenopodium murale*, [16] *Leonurus siribicus*, [17] *Chenopodium Quinoa* and Segetal and rederal invasive [18]. Information on the allelopathic effect of weeds plant which constitutes an important weeds of cereal crops that are cultivated in Kebbi State, Nigeria is lacking. Therefore, this study aimed to investigate the biological characteristics of this species that could be useful in understanding its economic values in natural and agricultural ecosystem.

II. MATERIALS AND METHODS

Study Site
All experiments were conducted at the laboratory and Botanical garden of the Department of Plant Sciences and Biotechnology of Kebbi State University of Science and Technology, Aliero, Kebbi State, Nigeria**.**

Collection and Identification Plant Samples
Five species of plant were collected at Kalgo Local Government Area of Kebbi State during the months of November, 2020 from their natural habitants early morning using hoe and preserved into vacuum box. All collected plants were taken to the Kebbi State University of Science and Technology Aliero, Department of Plant Science and Biotechnology for identification and further study. The plants collected, *Sesbania sesban* (KSUSTA/PSB/H/308), *Rhynchosia minima* L. (KSUSTA/PSB/H/78), *Indigofera hirsuta* L. (KSUSTA/PSB/H/45), *Tephrosia vogelli* Hook F. (KSUSTA/PSB/H/308A) and *Crotalaria retusa* L. (KSUSTA/PSB/H/314) were authenticated by Prof. Dharmendra. S. and preserved in the herbarium for future reference.

Preparation of Plant Extract
The leaves of collected plants were prepared by Soxhlet extraction method. About 150g of powdered plant materials were uniformly packed into a thimble and extracted with 500 ml of methanol. The process of extraction continues till the solvent in siphon tube of an extractor become colourless. After that 60ml of the extract was taken in a beaker and kept on hot plate and heated at 30-40 ºC till all the solvent got evaporated. Dried extract was kept in refrigerator for 3 days (72 hrs) at 4 ºC.

Determination of Phytotoxic Effects of Aqueous Extracts
Adopting the method of [19], the solution of the aqueous leaves extracts were prepared from the dried materials with sterile distilled water to give the final concentrations of 5, 10, 15, and 20%. Whatman No.1 filter paper placed in 9 cm sterile Petri dishes containing seeds in between was impregnated with five mills of diluted extracts; while the distilled water was used as control. The root lengths of germinated seeds were measured in each Petri dish at 9 days after placing seeds on the medium [19].

Effect of Residues Incorporation
The milled leaves residues of collected plants were mixed with farm sandy soil (sand 65%, silt 22% and clay 13%) collected at a depth of 15 and 20 cm. The leaves residues incorporated in a soil medium at the rate of 0, 5, 10, 15, and 20g. The farm were irrigated with water by subsurface irrigation and allowed to equilibrate (absorbed by soil) for 48h. A 15 day old seedling at two leaves stage with an average height of 5.5 cm in a replicate of thrice for each concentration. The growing medium was maintained near field capacity by sub irrigation. All plant harvested to determine plant height, root length and seedling weight [20].

Experimental Design
A total of six seeds were planted in each hole and later thinned to three plants per hole after 15 days. There are three holes for each treatment distributed in three replication the planting holes were arranged in complete randomized design. The soil was mixed with 5, 10, 15 and 20g respectively of the powdered plant materials and a control (0%) without extract were used. The planting holes were watered at two days intervals with about 40ml of each extracted solution (5%, 10%, 15%, and 20%) beginning from the first day of planting this were done for the control using water 40ml [20]. The length of plumule and radicles, plant height of the germinating seeds were measured and recorded. In the laboratory seeds germination test were carried out to determine seeds germination rate, radical length and percentage of germination after 72 hours intervals after the first day of germination and was done for three days as adopted by [21,22].

Physical and Chemical Analysis of the Soil
The nutrient status such as, nitrogen, pH, Ca, Mg, K and Na of the soil used in the experiment were conducted using methods described by [23]**.** The data collected was subjected to analysis of Variance and significant means were separated using Duncan Multiple Range Test (DMRT) (Duccan 1995) with SPSS computer software version 20.

III. RESULTS AND DISCUSSION

The result shows the various concentration of leaves extracts on the radicle/root length of *B. stachydea* which indicated that, there no much significant difference in day 15 and 30 but there was a significant difference (P<0.05) between the control and 15 and 20% with greater effects as seen in Table 1. Table 2 revealed that the shoot length is affected by increased of concentration of the plant leaves extracts of *S. sesban*, *R. minima*, *I. hirsuta*, *T. vogelli* and *C. Retusa* with little significant difference between the control and 5%, 10%, 15% and 20% respectively. However, there was a significant difference (P<0.05) in the days 15 and 30 except at day 45 where concentration cause the increases in number of leaves per plant, also the extract on *B. stachydea* was affected by different concentration at day 30 and 45, resulting in decreasing the number of leaves/plants *S. sesban* extract affected the number of leaves/plant from day 15-30 as the number of leaves per plant decreased with increase in concentration there with a similar response in all the days after planting as presented in Table 3.

Table 4 shows a significant difference (P<0.05) between control and 10, 15 and 20% concentration of the aqueous plant leaf extracts *Sesbania sesban*, *R. minima*, *I. hirsuta*, *T. vogelli* and *C. retusa* on *B. stachydea* root length but no significant differences in leaf area of the test plant treated with the leaf extracts of *R. minima*, *T. vogelli* and *C. retusa* on *B. stachydea.* However there was a significant diference (P<0.05) between the control and 15 and 20% concentration of *S. sesban* and *I. hirsuta* on *B. stachydea*. Table 5 revealed the effects of extracts on the fresh weight as in *S. sesban* on the *B. stachydea* where various concentration affects the weight of fresh leaf also there much significant difference (P<0.05) between control and that of 5, 10, 15 and 20% concentration in *R. minima*. The species of *I. hirsuta* , *T. vogelli* and *C. retusa* on *B. stachydea* had significant difference (P<0.05) between control and that of 5, 10, 15 and 20% concentration of leaf extracts respectively. The Soil samples from the experimental sites (Botanical Garden) were collected at two soil depth (30 and 60 cm). The soil analyzed were clay in texture; soil had fairly uniforms in nature without distinct changes in the texture with physiochemical properties such as K, Calcium, Magnesium, Potassium and Nitrogen among the others shown in Table 7.

Table 1: Effects of various concentrations of plants extracts on length of radical/root (cm) of *Borreria stachydea* (DC.)

		Days		
Treatment	**Conc.(%)**	**15**	**30**	**45**
S. sesban* on *B. stachydea	0	1.05 ± 0.39^{a}	3.12 ± 0.45^{c}	4.34 ± 0.6^{d}
	5	1.08 ± 0.16^{b}	2.50 ± 0.2^{b}	3.27 ± 0.4^{bc}
	10	0.94 ± 0.17^{a}	2.43 ± 0.20^{bc}	2.30 ± 0.32^{b}
	15	0.83 ± 0.19^{a}	1.39 ± 0.12^{a}	1.96 ± 0.20^{a}
	20	0.73 ± 0.12^{b}	1.21 ± 0.23^{a}	0.88 ± 0.16^{b}
R.minima* on *B. stachydea	0	2.01 ± 0.34^{c}	3.00 ± 0.86^{b}	4.06 ± 0.60^{b}
	5	1.05 ± 0.2^{b}	2.19 ± 0.54^{ab}	3.09 ± 0.32^{a}
	10	1.00 ± 0.18^{b}	2.21 ± 0.35^{ab}	3.01 ± 0.53^{a}
	15	0.94 ± 0.05^{b}	1.32 ± 0.62^{a}	2.66 ± 0.11^{a}
	20	0.56 ± 0.04^{a}	1.15 ± 0.50^{a}	2.52 ± 0.16^{a}
I. hirsute* on *B. stachydea	0	1.43 ± 0.24^{c}	2.52 ± 0.55^{b}	3.88 ± 0.67^{b}
	5	1.27 ± 0.08^{bc}	2.48 ± 0.26^{b}	3.51 ± 0.55^{b}
	10	1.14 ± 0.06^{ab}	2.39 ± 0.15^{b}	3.24 ± 0.40^{b}
	15	1.06 ± 0.05^{ab}	1.60 ± 0.13^{a}	2.01 ± 0.19^{a}
	20	0.95 ± 0.01^{a}	1.42 ± 0.28^{a}	1.98 ± 0.28^{a}
T vogelli* on *B. stachydea	0	1.52 ± 0.40^{b}	2.16 ± 0.56^{b}	3.64 ± 0.55^{b}
	5	1.49 ± 0.26^{b}	2.10 ± 0.48^{b}	2.59 ± 0.42^{b}
	10	1.34 ± 0.26^{ab}	2.05 ± 0.29^{b}	2.46 ± 0.18^{b}
	15	0.97 ± 0.18^{a}	1.32 ± 0.16^{a}	1.94 ± 0.25^{a}
	20	1.01 ± 0.14^{ab}	2.25 ± 0.21^{b}	2.33 ± 0.27^{b}
C. retusa* on *B. stachydea	0	1.31 ± 0.61^{a}	2.55 ± 0.32^{b}	3.01 ± 0.61^{b}
	5	1.12 ± 0.55^{a}	2.46 ± 0.52^{b}	3.11 ± 0.53^{bc}
	10	0.93 ± 0.44^{a}	1.38 ± 0.58^{a}	2.69 ± 0.48^{b}
	15	0.89 ± 0.34^{a}	1.31 ± 0.12^{a}	2.52 ± 0.53^{b}
	20	0.83 ± 0.29^{a}	1.24 ± 0.06^{a}	1.47 ± 0.16^{a}

Table 2: Effects of various concentration of leave extracts on plumule/shoot (Cm) of *Borreria stachydea* (DC.)

		Days After Sowing		
Treatment	**Conc.(%)**	**15**	**30**	**45**
S. sesban* on *B. stachydea	0	10.42 ± 0.54^{c}	11.07 ± 1.82^{d}	12.00 ± 0.89^{b}
	5	10.26 ± 0.25^{c}	11.14 ± 1.86^{d}	11.56 ± 0.73^{b}
	10	7.86 ± 0.97^{b}	8.27 ± 0.43^{c}	9.04 ± 0.62^{a}
	15	6.85 ± 0.39^{b}	5.46 ± 0.66^{a}	8.06 ± 0.54^{a}
	20	3.13 ± 0.73^{a}	7.06 ± 0.59^{ab}	8.99 ± 0.52^{a}
R.minima* on *B. stachydea	0	10.86 ± 1.24^{a}	11.91 ± 1.27^{a}	12.00 ± 1.29^{a}

	5	10.41±0.35[a]	10.98±1.15[a]	12.0±1.00[a]
	10	9.5±0.91[a]	10.96±1.10[a]	11.14±0.96[a]
	15	9.47±0.59[a]	10.29±0.78[a]	11.00±1.14[a]
	20	8.16±0.47[a]	9.55±0.69[a]	10.09±0.73[a]
I. hirsute* on *B. stachydea	0	10.02±0.67[e]	10.99±0.56[b]	12.23±0.11[d]
	5	9.19±0.13[d]	9.84±0.31[b]	10.61±0.00[c]
	10	5.16±0.18[a]	7.44±0.97[a]	8.03±0.15[a]
	15	6.18±0.10[b]	7.69±0.84[a]	8.52±0.19[b]
	20	8.10±0.19[c]	7.31±0.70[a]	8.05±0.82[ab]
T vogelli* on *B. stachydea	0	11.19±0.49[d]	11.77±0.94[d]	12.98±0.52[b]
	5	10.14±0.16[c]	10.99±0.48[bc]	11.89±0.69[a]
	10	9.43±0.73[bc]	10.11±0.12[ab]	11.04±0.25[a]
	15	9.03±0.19[ab]	10.51±0.19[b]	11.04±0.88[a]
	20	8.10±0.69[a]	9.31±0.15[a]	10.94±0.11[a]
C. retusa* on *B. stachydea	0	11.15±0.74[c]	11.34±0.13[b]	11.32±0.35[b]
	5	10.25±0.19[bc]	10.69±0.45[b]	10.90±0.56[b]
	10	10.18±0.19[b]	10.45±0.56[b]	11.00±0.12[b]
	15	8.19±0.55[a]	8.40±0.88[a]	8.75±0.74[b]
	20	8.15±0.43[a]	8.22±0.51[a]	8.23±0.67[a]

Table 3: Effects of various concentrations of leaf extracts on germination rate in Petri dish (Laboratory).

		Days After Sowing		
Treatment	**Conc.(%)**	**15**	**30**	**45**
S. sesban* on *B. stachydea	0	9.41±0.14[b]	12.04±1.15[c]	13.09±0.88[d]
	5	8.12±0.45[b]	10.11±0.58[b]	12.01±0.69[c]
	10	5.21±0.34[a]	8.16±0.15[a]	9.0.61±0.53[a]
	15	4.20±0.61[a]	8.02±0.29[a]	10.53±0.25[a]
	20	3.00±0.90[a]	7.01±0.33[a]	10.16±0.12[b]
R.minima* on *B. stachydea	0	9.80±0.58[d]	10.89±0.00[d]	12.01±0.67[d]
	5	7.42±0.19[b]	9.41±0.82[c]	11.01±0.61[bc]
	10	6.06±0.30[a]	8.03±0.42[b]	9.89±0.58[ab]
	15	5.26±0.74[a]	7.09±0.29[a]	9.35±0.91[a]
	20	7.09±0.13[b]	9.02±0.48[c]	10.45±0.86[ab]
I. hirsute* on *B. stachydea	0	8.90±0.30[d]	9.86±0.07[d]	11.04±0.81[d]
	5	7.59±0.12[c]	8.16±0.45[b]	9.89±0.97[b]
	10	7.11±0.17[b]	8.00±0.68[a]	9.87±0.35[a]
	15	6.16±0.40[a]	7.99±0.54[b]	9.65±0.79[a]
	20	5.21±0.45[c]	7.04±0.76[b]	10.01±0.62[ab]
T vogelli* on *B. stachydea	0	8.04±0.49[b]	8.34±0.12[d]	8.99±0.67[d]
	5	8.22±0.12[a]	7.00±0.89[b]	6.39±0.66[b]
	10	7.75±0.31[b]	8.07±0.27[bc]	8.45±0.19[bc]
	15	6.00±023[b]	6.58±0.68[a]	4.59±0.40[a]
	20	8.22±0.92[b]	7.45±0.77[ab]	7.98±0.26[b]
C. retusa* on *B. stachydea	0	8.02±0.57[c]	8.73±0.21[d]	8.95±0.12[d]
	5	8.00±0.01[c]	8.17±0.41[d]	8.19±0.23[c]
	10	6.09±0.77[b]	6.89±0.45[c]	7.00±0.01[b]
	15	5.78±0.22[b]	6.05±0.10[b]	6.72±0.45[a]
	20	3.99±089[a]	5.00±0.42[a]	5.98±0.64[a]

Table 4**:** Effects of various concentration of leaf extract on length of root and leaf area.

Treatment	**Conc. (%)**	**Root length (Cm)**	**Leaf area (Cm^2)**
S. sesban* on *B. stachydea	0	13.16±0.14[d]	83.07±5.47[c]
	5	10.32±0.46[c]	72.83±4.24[b]
	10	7.54±0.45[b]	89.83±5.38[b]
	15	5.59±0.19[b]	72.33±4.55[c]
	20	4.69±0.99[a]	85.67±3.52[a]
R. minima* on *B. stachydea	0	15.00±0.42[d]	84.33±3.89[b]
	5	14.15±0.40[c]	68.17±2.84[a]
	10	12.15±0.59[b]	90.00±4.28[b]
	15	9.45±0.52[b]	83.17±4.38[b]
	20	6.55±0.16[a]	87.00±5.26[b]
I. hirsute* on *B. stachydea	0	10.96±1.43[d]	97.17±4.94[c]
	5	8.49±0.78[c]	74.50±3.46[b]
	10	6.77±0.62[b]	81.19±7.48[b]
	15	5.58±0.14[b]	92.50±4.78[c]

	20	3.69±0.59[a]	54.50±5.38[a]
T. vogelli B. stachydea	0	10.84±0.68[e]	83.28±4.62[d]
	5	9.66±0.65[d]	80.11±1.46[d]
	10	8.52±0.61[c]	64.73±7.91[c]
	15	6.40±0.57[b]	55.06±1,53[b]
	20	4.30±0.36[a]	42.12±0.92[a]
C. retusa* on *B. stachydea	0	11.15±0.65[d]	89.14±5.41[c]
	5	9.10±0.63[b]	82.12±0.17[b]
	10	8.09±0.57[b]	85.01±1.55[bc]
	15	8.05±0.54[b]	79.60±2.07[b]
	20	6.04±0.50 [a]	49.07±5.10[a]

Table 5: Effects of various concentration of leaves extract of on fresh weight and dry matter accumulation. (g)

Treatment	Conc. (%)	Fresh Weight	Dry Matter Accumulation
S. sesban* on *B. stachydea	0	5.88±1.13[c]	4.40±0.87[a]
	5	4.03±0.10[b]	3.62±0.10[a]
	10	3.66±0.10[b]	3.16±0.26[a]
	15	3.82±0.25[b]	3.74±0.28[a]
	20	1.73±0.13[a]	2.94±0.39[a]
R. minima* on *B. stachydea	0	5.79±1.78[c]	3.56±0.32[c]
	5	5.77±1.66[b]	3.40±0.22[c]
	10	4.96±1.00[bc]	3.11±0.26[c]
	15	2.89±1.15[ab]	1.45±0.20[b]
	20	1.68±0.29[a]	0.97±0.16[a]
I. hirsute* on *B. stachydea	0	5.50±0.62[c]	3.93±0.02[c]
	5	3.16±1.20[b]	2.00±0.01[b]
	10	2.03±0.40[ab]	1.34±0.62[a]
	15	1.12±1.06[a]	0.98±0.09[a]
	20	1.07±1.25[a]	0.95±0.10[a]
T. vogelli B. stachydea	0	3.14±0.25[a]	1.40±0.16[a]
	5	2.54±0.09[a]	1..23±0.25[a]
	10	1.92±0.36[a]	1.29±0.18[a]
	15	1.56±0.14[a]	0.73±0.14[a]
	20	1.35±0.12[a]	0.69±0.13[a]
C. retusa* on *B. stachydea	0	3.74±0.47[a]	1.48±0.41[a]
	5	2.86±0.52[ab]	1.40±0.27[a]
	10	2.53±0.11[ab]	1.34±0.16[a]
	15	1.94±0.20[b]	1.16±0.14[a]
	20	1.18±0.22[bc]	0.96±0.33[a]

6: Effects of aqueous extracts on germination and growth percentage (%) of *B. stachydea* (DC.)

Treatment	Conc. (%)	Lab	Field
S. sesban* on *B. stachydea	0	100[a]	100[a]
	5	99[ab]	100[a]
	10	80[ab]	89[ac]
	15	60[b]	63[bc]
	20	50[c]	56[b]
R. minima* on *B. stachydea	0	87[a]	95[a]
	5	72[a]	86[ab]
	10	50[b]	59[bc]
	15	43[ab]	52[abc]
	20	30.5[b]	46[bc]
I. hirsute* on *B. stachydea	0	98[ac]	100[a]
	5	86[b]	95[ab]
	10	80[ab]	89[a]
	15	71.9[b]	80[abc]
	20	59.5[b]	72[bc]
T. vogelli B. stachydea	0	99[a]	100[a]
	5	97[ab]	100[a]
	10	89[ab]	92[ab]
	15	73[b]	86[ab]
	20	55[bc]	62[bc]
C. retusa* on *B. stachydea	0	100[a]	100[a]
	5	90.5[a]	97[a]
	10	89.5[a]	90[ab]
	15	53.2[b]	61.5[ab]
	20	40.8[c]	51.6[c]

7: Physical and chemicals properties of soil used in the experimental site, before and after Application of powder

Properties	Before After Application of Powder				
Property	**Control**	**5%**	**10%**	**15%**	**20%**
Sand	90.2	89.7	82.3	84.9	73.5
Silt	7.9	7.4	6.8	6.5	5.8
Clay	0.7	0.7	0.6	0.6	3.2
Textural class	Loamy	Loamy	Loamy	Loamy	Loamy
pH	5.5	5.5	5.9	6.0	6.0
% of organic carbon	0.07	0.07	0.69	0.67	0.62
% of Nitrogen	0.03	0.15	0.21	0.23	0.30
K	0.33	0.33	0.39	0.43	0.47
Calcium	0.53	0.52	0.018	0.058	0.061
Magnesium	0.51	0.51	0.59	0.60	0.60
Potassium	0.86	0.87	0.87	0.88	0.89
Sodium	0.44	0.44	0.45	0.47	0.45

Discussion

The Effect of various concentration of plant leaves extract on germination and growth rate of the *Borreria stachydea* revealed that there is no much significant differences at the early stage of their germination. These indicated that it neither stimulated nor inhibited their germination both the species at 20%. Aqueous extract solution concentration of clover and vetch flower cluster decreased the weeds of the corn, cotton, mustard and wild morning glories crops and also germination and growth of wild mustard and rye were wide open [24]. Similar resulted were obtained by [25], that reported plant has an allelopathic effect when root and stem are powdered and apply to arable crops. The degree of inhibition increased when the extracts concentration increased, leading to complete inhibition at the highest concentration. [26], the leaves extract of *S. sesban* inhibit germination of *Cleome* species a 50%t. This is also agreed with the findings of [27] determined the potential anti-cyanobacterial allelopathic effects of seven plants species obtained, that *Sesbania* species and *I. pseudacorus* had anti-cyanobacterial compounds. However, fresh shoot extract of squash (*Cucurbita pepo L. cv. Scarlette*, *Sesbania* and *I. hirsuta*) reduced germination and growth of *Amaranthus retroflexus, Chenopodium murale , Eruca sativa , Malva sylvestris , Portulaca oleracea and Solanum nigrum* in Petri-dishes [28]. This supported our findings. Reducing environmental risk and the use of synthetic weedicides allelopathic control has beneficial affect [29,30].

The various concentration of extracts had implication on radicle and Plumule length on tested plant. Table 2, revealed that extract inhibited (slowed down) the rate of growth of plumule of the crops in Petri dish at 10, 15, 20%, when compared with the control. Furthermore, there was no much significant effect on the radical length except for *I. hirsuta* that showed a significant difference when compared with the control at 10, 15, and 20%. This is corroborated with the study conducted by [31] that said seedling length was significantly reduced when compared with control except for lower concentrations as well as decrease in dry weight of seedling. Moreover, the degree of the inhabitation increased with the increasing concentration of the extracts. From the result obtained in this study it was observed that leaf extracts of *S. sesban* (L.), *R. minima* , *I. hirsututa* , *T. vogelli* Hook F and *C. retusa* decreases growth parameters considered or when compared with the control ($P<0.05$). [32] evaluated that, wild oat (*Avena fatua* L.) germination and seedling growth as affected by allelopathic of black mustard (*Brassica nigra* L.). Allelopathic extraction were significantly affected germination and radical length, the inhibitory effect on germination increased with increasing concentration of extract solution of the fresh allelopathic plant parts use. While on the determination of soil physical and chemicals properties it shows that, the soil was clay in texture and had fairly uniforms without distinct changes in the texture. Physiochemical properties the pH of the soil is 5.5 at 5%, 5.9at 10%, 6.0 at 15 and 20 % respectively, the soil consist of sand, silt, K, calcium, magnesium, potassium, and also Sodium in various percentage.

IV. CONCLUSION AND FUTURE SCOPE

The influent of weedicides on cultivated plants, soil and other organisms found below or above the soil cannot be over emphases. But quest of another source/methods of controlling weeds without or less insidious in our agricultural produce, land, and diversity of organisms and human is paramount globally by weed scientists. The weeds plant have some chemicals compound that they release to control another weed species in cultivated land area without effect on planted species, cultivated land, human and the entire ecosystem. The result from the evaluation of the allelopathic effects of the aqueous extracts of the *S. sesban*, *R. minima*, *I. hirsuta*, *T. vogelli* and *C. retusa* on germination of *B. stachydea* L showed significant reduction of all the growth parameters considered. In the laboratory the germination rate of the control was faster than that of the other treatments under favourable condition. Therefore it was concludes that the germination of the treatments in the Petri dishes were inhibited completely, this could be due to the allelochemicals in the plant. From the results obtained, it can be concluded that *S. sesban*, *R. minema* , *I. hirsuta*, *T. vogelli* and *C. retusa* possess allelochemicals that can suppress, delay/or inhibit the germination and growth of the selected crops, hence have potentials to be used as a weeds control by dusting the powdered or sprayed of the water extracts. Farmers should allow these five species

with allelopathic properties to grow closed to their planted crops such as beans, maize e.t.c. are hereby recommended in the study area. Also, *S. sesban* , *R. minima*, *I. hirsuta* , *T. vogelli* and *C. retusa* should be raised in commercial quality, as such industrials extracts should be made and posed as they contains some herbicidal ability which could be useful in weed management.

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