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Influence of Weeds on the Vegetative Performance and Yield of Tea (*Camellia sinensis* L. Kuntze) On Plantation Mambilla Plateau in Nigeria.

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ABSTRACT

A survey was conducted on the type of weeds infesting tea (*Camellia sinensis* L. Kuntze) plantations on the Mambilla Plateau, Nigeria. .Weeds were sampled from fifty- two randomly selected tea farms in fifteen villages. A weed quadrant Of 0.5m x0.5m (0.25m ^{2}) was taken at three different points at each farm.. Crops in the age range of 1-5 years were exhibited the highest weed infestation and had the most frequent weeding. Those in the age range of 11-15 years were given wider weeding interval and yet produced the highest tea leaf yield .The use of herbicide controlled weed better than hoe weeding and produced higher leaf yield.

Keywords: Weeds survey tea plantation

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INTRODUCTION

Tea (*Camellia sinensis* (L) Kuntze) belongs to the family of theacea. It is an evergreen bush which if kept at low level through pruning, more young shoots. It is these shoots that produce the tea leaves which are processed as beverage. Tea and coffee are mainly taken as a beverage which refreshes the brain and aids in eliminating pains and stress in the head, and is useful for producing soberness in people intoxicated with wine (Wellman 1961). Hudson et *al*, (2003) remarked that previously tea was taken only as a stimulant drink, but today tea plays an important role in human health by activating the central nervous system, which may aid the body's ability to burn calolries and unwanted fats through thermogenic process. The phenol groups in tea are extremely active, easily able to capture and neutralize free radicals and other pro-oxidants. It has been found that (tea is over 200 times more powerful than vitamin E in neutralizing pro-oxidants and free radicals that attack lipid (oil and fats), it is also 20 times more potent than vitamin E in reducing the formation of dangerous and potentially mutagenic peroxide that form in rancid fats and lard. (Hudson and Tabet, 2003). Ody (1993) reported that tea has been consumed socially and habitually by people for so long (since 3000 BC) but apart from the a stringent taste, its medicinal properties are often over looked. However, traditional healers have long believed that drinking tea is a means of prolonging life. (Chopra, 2002).

Rao (1999) defined weed as undesirable plants which interfere with the utilization of land and water resources, and thus adversely affect human welfare, while Akobundu and Ahissou (1985) defined weed as a plant out of place or growing where it is not wanted. Weed is a global threat to agriculture which the agricultural sector must contend with so as to increase food production for the fast growing population world – wide (Akobundu, 1987, Ayeri, 1991). Weed generally compete with crops for nutrients, water light and also for space. Since weeds have the ability to grow and establish faster than crops, the competition favours the weed resulting in the suppression of crops. According to Fadayomi (1991), total annual loss of agricultural produce from various pest were: weeds 45% insect 30%, disease 20% and others 5%. Furthermore, Parker and Frayer (197\87) remarked that depending on the degree of competition, weeds reduce crop yield by 10 to 25%. It is estimated that the world was losing annually 11.5% of the total food production to weed infestation. Also De (2002) reported that reduction in crop yield and quality has direct correlation with weed competition. Generally an increase of 1 kilogram of weed growth, correspond to a reduction of 1 kilogram of crop growth. Mac Donald and John, (1990) reported that the control of weeds during the early first few years of establishment of plantation crops is very essential since weeds can reduce the yield by as much as ½ kilogram per bush. Rao (1999), remarked that weed also have smothering effect on three crops and beverages crop in the planting year, causing stand loss, inhibition of branches. Infestation of perennial grasses such as *Imperata cylindrical* , *Cynodon Dactylon and Paspalum conjugalum* can cause severe setback in the growth of tea bushes by several years.

Just like any other plantation crop, yield of tea can be drastically reduced by weed infestation if weed control is not affected or poorly done (Opeke, 2005). Weed growth in young tea and other beverages is very intensive particularly during the first two to three years as the ground is not completely covered by the canopy of the bush. According to Anonymous (1980), weed competition causes 45 – 85% reduction in yield of tea. Weeds

remove 5 – 6 times more N, 5 – 12 times P and 2 – 5 times K than a beverage crop in the early stages of crop growth leading to low tea yield. Also weeds causes 15 – 40% yield loss in tea. Rao (2005) remarked that complete elimination of an infestation of imperarata cylindrical one of the world's worst weed in tea increased the yield by 50 – 80%.

Adverse effect of weeds on crops is most pronounced when growth factors are in limited supply. A shortage of one growth factor creates an imbalance that adversely affect the uptake and utilization of the other factors (Akobundu and Ahissou, 1985). It has been reported that weed compete with tea for above and below ground resources, thus causing yield losses which range from 50 – 86%.Methods of Weed Control.

Weed control is the removal of unwanted plants and shrubs from the plantation (Opeke, 2005). Furthermore, Rao (2003) remarked that the choice and efficacy of weed management depends on the type of weed present. Two major method of weed control are adopted in the plantation crops which are mechanical and chemical methods. Mechanical control such as manual weeding by digging, slashing and pulling are the most widely methods of weed control on plantation crops and other field crops. (Opeke, 2005). The use of chemical can be beneficial in weed control.

According to Akobundu (1989), the use of herbicide could result in considerable saving to the farmers. Effective weed management requires an integrated approach which is referred to as integrated weed management. This requires the incorporation of all appropriate management techniques such as chemical, mechanical and cultural practices in a wee control programme (Akobundu, 1989)

MATERIALS AND METHODS

The survey was conducted on Mambilla Plateau, Sardauna Local Government of Taraba State. The Plateau is the continuation of Cameron's mountains with the highest point reaching an altitude of 2,133 meter. It lies between latitudes $6^{o}30'$ and $7^{o}20'$ North and longitude $10^{o}51'$ and $11^{o}37'$ East. It covers an area of about 3,885km2, Mambila Plateau has a mountain climate with main vegetation consisting of short grass. However some few indigenous trees species are found in the valleys. In addition, the inhabitants of each village plant encalyptus trees (*Eucalyptatus camaldulensis* in their surroundings.

Rainfall on the Plateau start in March and end in October or early November, Heavy rainfalls are experienced in the months of June – August. The annual rainfall ranges from 1860mm to 400mm, while temperature ranges from 12^{oc} – 30^{oc}. The soil of the area is predominantly loamy, while some clay loam is also found in the valleys. The soils are slightly acidic in most areas with a Ph range of 5.2 – 5.9.

Weed Sampling: weed samples were collected from 52 farms chosen randomly and proportionally as per tea farm density in the fifteen villages. Weed samples were taken from a quadrant of $0.5m^2$ X $0.5m^2$ ($0.25m^2$) at three different points on each farm.
Administration of Questionnaire

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Information were gathered through the administration of questionnaires as well as oral interview of those who cannot read. The questionnaires were randomly and proportionally distributed to tea farmers in the fifteen tea production villages. A total of seventy questionnaires were distributed randomly and proportionally to the farmers in the fifteen villages. Out of these, sixty three were answered correctly and returned as given in the Table 1. below:

Table 1: Number of questionnaires administered and recovered.

S/No.	Village	No. of questionnaire Distributed	No. Recovered Received	No. Not Recovered	Percentage Recovered	Percentage Not recov.
1.	Kahara	11	9	3	82	27
2.	Kusuku	7	5	2	71	28
3.	Sabongari	4	4	-	100	-
4.	Yerimaru	9	9	-	100	-
5.	Nguroje	1	1	-	100	-
6.	Kachalasah	7	6	1	86	14
7.	Nyiwa	2	2	-	50	50
8.	Bangoba	2	1	1	10	50
9.	Galadima	4	4	-	100	-
10.	Tappere Yahya	7	7	-	100	-
11.	Furmi	7	6	1	86	14
12.	Maigoge	3	3	-	100	-
13.	Masewa	3	3	-	100	-
14.	Mayo Kusuku	2	2	-	100	-
15.	Lekkitaba	1	1	-	100	-
Total		70	63	8	90	12

Analytical techniques using simple descriptive statistical tool such as histogram frequency distribution and percentage were used.

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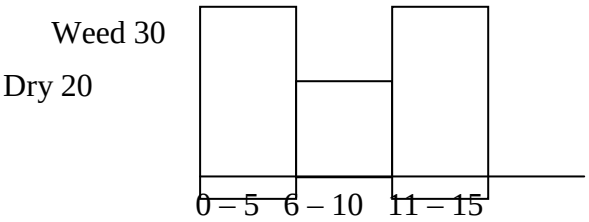
RESULTS

Influence of Crop Age on weed Dry Weight, Weeding Intervals and Crop Yield

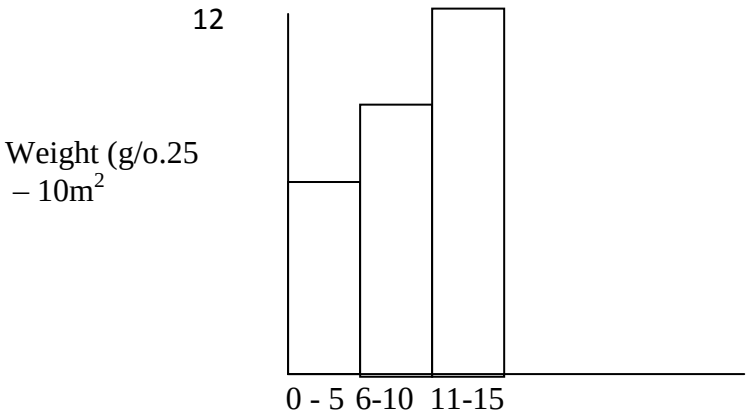
Highest weed dry weight and most frequent weeding were recorded in crops in the age group of 0.5 years (fig.1) while the weeding intervals was highest in crops in the age group of 11 – 15 years. (Fig.2). In terms of yield, crops in the age group of 11 – 15 years produced the highest tea yield while the least was obtained from crops in the age groups of 0 – 5 years (fig.3).

Effects of Methods of Weeds Control on weed Dry Weight, Crop Yield

The use of herbicide reduced weed dry weight better than manual weeding (fig.4). Furthermore, crop yield from crops where herbicide was used was higher than those where weed control was done manually (fig.5).



Age of crop (years)
Fig. 1 Histogram showing age of tea crop and weed dry weight



Age of tea crop (years)
Fig.2 Histogram on age of tea crop and weeding intervals

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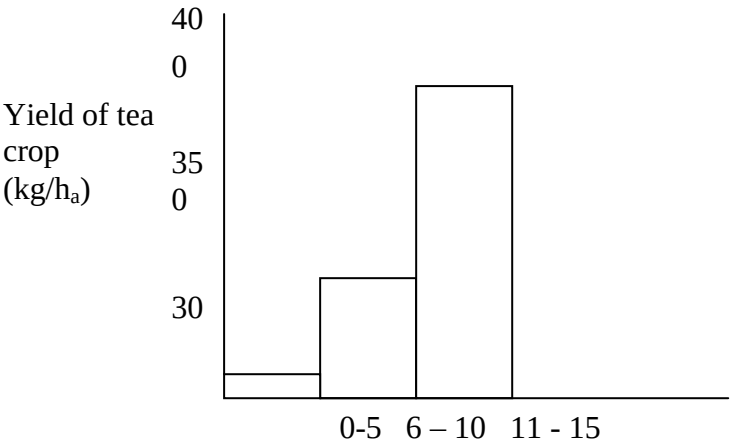

Fig. 3 Histogram showing age of tea crop

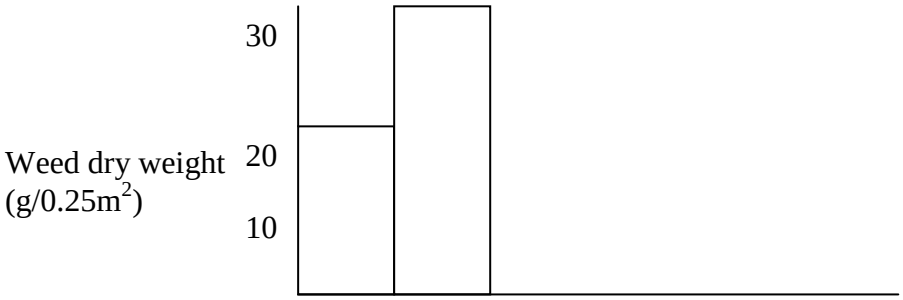

Fig.4 Histogram on method of weed Control and weed dry weight.

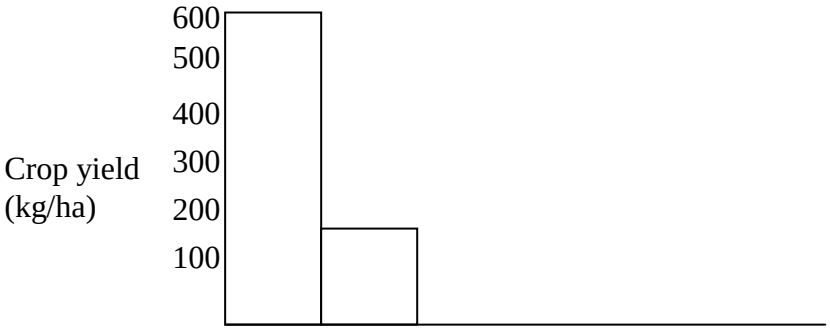

Fig.5 Histogram on Method of weed control And yield of tea crop

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DISCUSSION

Among the weeds flora in the area, *Imperata cylindrica* has been considered as the worst noxious weed. This can be attributed to its rhizomatous perennating organ; even when the above ground structure is controlled, the rhizomes which are underground can further sprout within a short time. Rao, (2005) reported that elimination of an infestation of *Imperarata cylindrica* the world's worst weed in tea increased yield by 50-80%. Rao, (1999) remarked that identification and analyhsis of weed leads to possible solution as to which effective method of weed control to adopt. When the best weed management is identified and adopted by farmers growing tea crops, it will increase their tea yield.

Effect of the Age of Tea Crop on Weeds

The higher weed infestation on crops that are in the ages of 0 – 5 years can probably be attributed to the lesser canopy cover in this age group. This implies weeds in the uncovered areas will have better interception of solar energy, less competition from crops and greater growth, have the higher weed dry weight and the shorter weeding intervals. Also this could be contributed to the lowe4r tea yield of the crops in this age group, apart from the influence of their smaller vegetative size.

Invariably, cops in the age of 11-15 years, have more branches, with wider canopy cover and greater suppression of weeds, hence; lower weed dry weight and the longer weeding intervals.Herbicide usage on ten farms has been observed to reduced weed infestation and concomitantly giving higher tea yield. This shows, that use of herbicide is a better method of weed control in this area. The reasons for this observation is the influence of the higher rainfall on the plateau. The frequent high rainfall hardly allows the hoe weeded weeds to dry up; consequently the weeds get re-established within a short time after weeding.

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