Full Length Research Papers

Survey of Weeds on Tea (*Camellia sinensis* L. Kuntze) Plantations on the Mambilla Plateau in Nigeria

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Survey of weeds on tea (*Camellia sinensis*. L. Kuntze) plantations was conducted on Mambilla Plateau, Sardauna Local Government area of Taraba State. Data were collected through weed sampling from 52 tea farms selected randomly and proportionally as per tea farm density in the fifteen villages. A weed quadrant of O.5m^2 x O.5m^2 (O.25rn^2) was taken at three different points on each farm. Administration of questionnaire as well as oral interview was undertaken. A total of seventy questionnaires were distributed randomly and proportionally to farmers in the fifteen villages. The objective was to identify prevailing weed species on tea plantations on Mambilla Plateau. Results have shown that most weeds flora in the study area are annuals and morphologically are broadleaves. Also *Imperata cylindrica* was indentified as the worst noxious weed. Increase in age of tea crop which results in wider canopy, reduced weed infestation and increased weeding intervals.

INTRODUCTION

Tea (*Camellia sinensis*) Kuntze) is an evergreen bush, which develops young shoots if kept at low level through pruning. These shoots produce the tea the leaves which are processed as beverage. Tea production is restricted to the mountainous areas of sub-tropical regions which in the range of 1200-1800m above sea level, with temperature regimes of 10-27^{0}c without frost (Famaye, *et al*.,2006). In the 1970s the Federal of Nigeria saw the need for fresh quality tea and by 1975 a Tea Estate was established at Kakara village on the Mambilla Plateau of Taraba State under the Nigerian Beverages Production Company Limited, with more than 600 hectares of land under cultivation. It has out growers scheme involving about 900

farmers living in fifteen villages around the Tea Estate. These include, Kakara Yerimaru, Nguroje, Kachalasha Nyiwa, Bangoba Galadima, Furumi Maigoge, Tappare Yahya, Masewa, Mayo-Kusuku, and Lekitaba. The farmers produce and sell their green tea leaves to the Estate. Fresh tea has a high content of vitamins and minerals. It contains ascorbic acid in amount that is comparable of lemon. Also it contains vitamins B complex which are water soluble and quickly released when inserted in hot water. Hudson and Tabet (2003) opined 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 calories and unwanted fats through thermogenic process. The phenol groups in tea are extremely active oxidants. Hudson and Tabet (2003) remarked that tea is effective in reducing the

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formation of dangerous and potentially mutagenic peroxide that form in rancid fats .Furthermore traditional healers have long believed that drinking tea is a means of prolonging life. (Chopra, and David, 2002).

The gap between the potential and actual yield of crops can be attributed to several limiting factors such as poor weed management, insect pests, diseases poor technological adoption and low soil fertility status. The devastating effect of weed not only depresses crop yield but also limits areas that could be brought under effective production. Weeds cause reduction in the yield and quality of both arable and plantation crops. Yield reduction has been estimated to be 42% of the total losses due to pests in the field crops (Rao, 2003). Also De (2002) remarked 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 in crop growth. In spite of the importance of tea as a beverage crop its production is also by infestation of various species of weeds just like in any other crop. If weeds are not properly managed, the yield of tea can be seriously depressed (Opeke, 2005). Also Rao (2003) remarked that complete elimination of an infestation of *Imperata cylindrica* one of the world's worst weed in tea increased the yield by 50-80%. Weed poses threat to agricultural production which requires appreciable effort to combat the menace so as to increase food production for the fast growing population world- wide (Akobundu,1987, Ayeni., 1991). The effective control of these weeds to ensure high tea yield requires good knowledge of the weed flora type infesting the area of production. This will serve as a guide to the appropriate weed control method to be adopted. However there has never been such a study of weed flora in the tea producing area on the Mambilla Plateau. This buttresses the need to conduct a weed survey of tea plantation on the plateau. The survey was undertaken with the objective of identifying the prevailing weed species in the study area where tea is grown on the Mambilla Plateau.

METHODS

Description of Survey Area

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°30' and 70201 North and longitude 100 511 and 110 371 East. It covers an area of about 3,885 km2, Mambilla Plateau has a montane 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 4000 mm, while temperature ranges from 12^0c 30^0c. 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 P^H 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 0.5m2X 0.5m2 (0.25m2) at three different points on each farm.

Administration of Questionnaires

Information was 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.

RESULTS

Classification of Weed Species
General weed species
Data collected from the survey area on Mambilla plateau by the use of questionnaires and the weed sample collected from tea farms to identify the weed species are presented in (Table 2).

Noxious weeds

The information on the perceived most troublesome weed in the study area is presented in Table 3. The result has shown that 34% of the respondents considered *Imperata cylindrica* as the most troublesome weed species, while 16% considered *Pennisetum purpureum* to be the most troublesome. *Cammelina benghanesis* ranked third with 6%. Those ratedl ow are *Bidens Pilosa*, *Cynodon dactylon* and *Ageratum conyzoides linn*, each 2%.

Weeding Intervals

Results on weeding intervals has shown that most of the farmers
(78.9%) weed their tea farms at the interval of 4-5 weeks (Table 4). The remaining 21.1% weed their farms at 2-3 weeks intervals.

Table 1 Distribution of questionnaire based on the number of villages

S/No.	S/No. Village	No. of questionnaire Distributed	No. Recovered	No. not recovered	Percentage recovered	Percentage not recovered
1	Kakara	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	-	100	-
8	Bangoba	2	1	1	50	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	Lekitaba	1	1	-	100	-
	Total	**70**	**63**	**8**	**90**	**12**

Table 2 Weed species found in tea producing area on the Mambilla Plateau

Weed Species	Weed type	Life Cycle
Ageratum conyzoides linn	B	A
Bidenspilosa	B	A
Aneilema benneniens	S	P
Eragrostis tenella	G	A
Brachiaria lata	G	A
Launaea taraxacfolia	B	A/P
Pennisetum purpureum	G	A
Em Ella coccinea	B	A
Conyza sumatrenis	B	A
Sida garckeana polka	B	P
Malvastrum coromandellaum	B	A/P
Ekeasine Indica gaertn	G	A
Cyperus iria linn	S	A
Pennisetum predicellatum	G	A
Paspalum scrobiculatum	G	P
Acroceras zizaniodes	G	P
Chamaecrista mimosoides	B	A/P
Sida cordfolia	B	P
Brachiaria deft exa	G	A
Oplismenus burmannii	G	P
Cynodon dactylon	G	P
Mimosa pudica linn	B	P
Manniophytonfulvun mull	B	-
Aspilia bussei 0	B	A
Aspilia Africana	B	P
Nymphaea lotus linn	B	A
Polycarpaea corymbosa linn	B	-
Sclerocarpus africanusjacq	B	A
Croton hirtus	B	-
Heterotis rotundfolia	B	P
Imperata cylindrical	G	P
Spermacoce ocymoides	B	P
Hyptis suaveocens	B	A

Table 2: Continue

Synegrella nofiflora	G	A
Leptocholora caerulescens	G	A
Ryllinga squamulata	S	A
Ryhnchospora corrinbosa	S	-
Mariscus con gibracteatus	s	-
Comm elina benghalensis	B	A/P
Amaranthus Spainosus	B	A
Alternantherea sesilis	B	A

A: B= Broad leaves, 0= Grass, b: A = Annual P= perennial, and c: s= sedge
The major class of weed found on the tea farms is broad leaves constituting 56.1% (Table 4.1) followed by grasses which forms 31.7% and the least sedges (12.2%). Based on life — cycle 48.8% are annuals and 29.3% perennials while 9.8% are both.

Table 3 Distribution based on the perceived most troublesome weed

Perceived most troublesome weed	Respondents	Percentage (%)
Imperata cylindrical	21	42
Pennisetum purpureum	10	20
Jmperata cylindrica/pennisetum purpureum	10	20
Caminelina ben ghalensis	4	8
Sida garekeana polka	2	4
Bidenspilosa	1	2
Cynodon daclylon	1	2
Ageratum conyzoides linn	1	2
TOTAL	50	100

Table 4. Weeding intervals of tea plantations

Weeding intervals	Frequency	Percentage (%)
2 – 3 weeks	8	21.1
4 – 5 weeks	30	78.9
Total	**38**	**100**

Figure 1. Histogram on age of tea crop and weeding intervals

DISCUSSIONS

Weed Flora Type

Weed species found in the tea producing area on Mambilla Plateau indicate that majority of the weeds are annuals which constitute 48.8%. Furthermore, based on morphology, most of the weeds are broad leaves accounting for 56% of the weed types. Since the weeds are mainly annuals it makes weed control easier since they don't have perennnating organs. Also it can be regarded that herbicides that are effective on broad leaves will be of greater need in the area, since most of the weeds are broad leaves. Among the weeds flora in the area, *Imperata cylindrica* has been considered as the worst noxious weed. This can be attributed to its rhizomatous perennnating organ; even when the above ground structure is controlled, the rhizomes which are underground can further sprout within a short time. Rao, (2003) reported that elimination of an infestation of *Imperata cylindrica* the world's worst weed in tea increased yield by 50- 80%. Rao, (2003) remarked that identification and analysis 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. Invariably, crops in the age of 11-15 years, have more branches, with wider canopy cover and grater suppression of weeds, hence; lower weed dry weight and the longer weeding intervals.

SUMMARY AND CONCLUSION

Survey of weeds on tea plantations on the Mambilla Plateau has shown that most weed flora in the survey area are annuals while morphologically classification has shown that the weed are mainly broad leaves. Furthermore, it has been noted that Imperata cylindrica is the worst noxious weed. Effect of the age tea crop on weeds has indicated that the increase in age of tea crop resulted in wider canopy cover which increases weeding intervals.

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