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RESEARCH ARTICLE

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Larvicidal and insecticidal effect of Camelgrass (*Cymbopogon schoenanthus*) oil on anopheles mosquito

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ABSTRACT

The effect of camelgrass oil on Anopheles mosquito and its larvae was tested to evaluate its repellence property. Different quantity of the oil extract viz:10ml, 5ml and 1ml was introduced into two set of twelve beakers each containing twenty larvae and adultmosquito. Mortality rate was recorded at certain time interval. Application of the oil extract on adult mosquitoes and larvae recorded 100% mortality. The maximum mortality time taken was fifteen (15) minutes for the adult mosquitoand eighteen (18) minutes for the larvae. The minimum mortality time taken was three (3) minute. The rapid mortality recorded in respect of bothlarvae and adult of anopheles mosquito indicated high insecticidal and larvicidalproperties of the chemical compounds present in the oil of the grass species.

Keyword: Camelgrass (*Cymbopogonschoenanthus*), Adult mosquito, Mosquito larvae, Larvicidal and Insecticidal.

INTRODUCTION

Mosquito, the vector that transmits the parasite causing malaria has been the focus in the control of malaria. Many attempts have been made by government and non-governmental organizations (NGOs) to control breeding of mosquitoes, and prevent mosquito from coming in contact with human but with little achievements. Malaria still poses a great danger to community and to the economy of our country. In view of the high cost of synthetic insecticides, associated health hazard and environmental pollution there is the need for alternative control measures. Camelgrass (*Cymbopogonschoenanthus*) is a compact tufted perennial grass with culms 60-90cm high, on dry stony ground of sub-desert bush land plant that can get along with a minimum of water [1]. All parts of the plant are aromatic [2]. Distillation of the root and leaves of camel grass yields a fragrant oil, (camelgrass oil or nimar oil) [3]. Due to its aroma, the plant is believed to be insect repellent against lice, mosquito, tick and many other insects [4].

The rural area within Sokoto, burn the grass in order to repel mosquito. In India, a homemade mosquito repellent has proven effectiveness particularly against the anopheles mosquito which spreads malaria. it's made from low cost neem oil (*Azardirachtaindica*) mixed with coconut oil in concentration of 1-2%. The efficiency take long period of time before it repel or kill the mosquito compared to camelgrass that is 100% effective within fifteen minutes of applications. So everywhere the search is intensifying the safe, cheap, effective, locally available alternatives to pesticides and to the malaria drug treatments that no longer work effectively. In other words, plants [5].

Three quarter of the modern medicine is plant based [6]. Most plant species have not yet been studied for their potential medical benefits. Meanwhile thousands of plant species are lost forever each year because of deforestation and industrialized farming methods. These are the key factor that increases the range of mosquitoes. The world health organization says global warming is also expanding the range of mosquitoes that carry malaria, yellow fever

and dengue fever, putting millions more humans at risk [6]. "The world most dangerous animal is the mosquito," according to a BBC World Service health program on 9th September, 2009, 12:45pm: malaria now infects approximately 110 million people annually, causing 2-3 million deaths, and with increasing drug resistance, the problem is worsening, while attempts to control the mosquitoes with pesticides have proved ineffective.

Available literature indicates thatcamelgrass have insects repelling properties but no study has been carried out on the locally available species in Sokoto to assess their insecticidal potentials on mosquito. There is therefore, the need to carry out a study to determine how effectively the extracted oil from this species can repel or kill mosquitoes.

The study aimed at evaluation of larvicidal and insecticidal effect of oil extracted from*C. schoenanthus* on mosquito. The specific objectives were to assess insecticidal effect on anopheles mosquito.

MATERIALS AND METHODS

Collection of Samples

Samples of camelgrass were obtained from main campus of UsmanuDanfodiyo University, Sokoto. The species was authenticated by comparison with preserved specimen in the University herbarium, Sokoto.Anopheles mosquito and its larvae were bred in the Biological garden, which were identified and authenticated by comparison with preserved specimen in the Entomology Laboratory of the University Department of Biological Sciences, UsmanuDanfodiyo University, Sokoto.

Drying and Pulverization of Grass Sample

The grass sample was dried in March, 2010 in the Biological garden. Each sample was then pulverized into a fine powder using mortar and pestle. The powder was sieved and kept in a dried polyethene bag.

Application of the Grass Oil Extracts on Mosquitoes and Mosquito Larvae.

Set Up for the Application of Extract

Fifteen beakers, each containing twenty mosquitoes, were used to test larvaecidal potential ofcamelgrass oils. Similarly, fifteen beakers each containing twenty adult mosquitoes were used to test insecticidal activities of the extracted oil from the grass species.

Larvaecidal Activities of Camelgrass

Fifteen beakers containing the larvae were divided into three sets of five beakers each. The beakers were labeled as a, b, c, d, and e. Three different quantity of the camelgrass oil, viz. 10ml, 5ml, and 1m were carefully introduced into the beakers by injecting the content on the wall of the beakers a, b, and c respectively. The fourth and fifth beaker served as the positive and negative control. In positive control insecticide was used while in negative control nothing was introduced.

Insecticidal Activities of Camelgrass

Fifteen beakers containing anopheles mosquitoes were also grouped as that of the larvaecidal activity above. The same procedure was done for the mosquitoes too.

RESULTS

Effect of the Oil on Mosquito and Its Larvae

The potency of the oil was tested on the mosquitoes and its larvae. The mortality rate was noted at various time intervals in different concentrations of the oil samples which showed hundred per cent efficiency. The results are present in tables 1and 2. Where table 3 and 4 are the positive control of adult mosquito and mosquito larvae.

Table I: Mortality rate of mosquito larvae in different concentration of camelgrass oil

Conc. (oil: water) (ml)	Time(minutes)																		Total	%	Mean	S	S.E
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18					
1:05	0	0	2	6	9	7	5	10	4	8	5	2	2	-	-	-	-	-	60	100	4.29	14.89	3.98
1:10	0	0	0	4	3	7	8	6	4	4	2	7	10	0	3	2	-	-	60	100	3.75	14.06	3.52
1:50	0	0	0	3	2	5	6	4	5	6	4	3	3	7	2	3	4	3	60	100	3.33	13.36	3.15
-VE Control	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	00	00	0.00	00.00	0.00

Table II: Mortality rate of mosquito in different concentration of camelgrass oil

Conc .(oil:water) (ml)	Time(minutes)															Total	%	Mean	S	S.E
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15					
1:05	0	0	5	7	4	11	8	6	9	6	-	-	-	-	-	60	100	6.00	17.08	5.40
1:10	0	0	3	5	7	9	5	7	9	6	8	1	-	-	-	60	100	5.00	15.88	4.58
1:50	0	0	1	4	3	9	4	6	7	5	7	4	7	2	1	60	100	4.00	14.46	3.73
-VE Control	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	00	0.00	00.00	0.00

Table III: Mortality rate of mosquito larvae treated with different concentration of insecticides (wonder 1000 EC)

Conc. (oil:water) (ml)	Time(minutes)															Total	%	Mean	S	S.E
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15					
1:05	0	8	11	21	-	-	-	-	-	-	-	-	-	-	-	60	100	12.00	32.20	16.20
1:10	0	6	13	20	2	-	-	-	-	-	-	-	-	-	-	60	100	10.00	45.00	18.37
1:50	0	4	11	18	21	10	-	-	-	-	-	-	-	-	-	60	100	10.00	37.00	15.10
-VE Control	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	00	0.00	00.00	0.00

Table IV: Mortality rate of mosquito treated with different concentration of insecticides (wonder 1000 EC)

Conc. (oil:water) (ml)	Time(minutes)															Total	%	Mean	S	S.E
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15					
1:05	0	11	23	26	-	-	-	-	-	-	-	-	-	-	-	60	100	15.00	7.09	3.55
1:10	0	9	12	23	16	-	-	-	-	-	-	-	-	-	-	60	100	12.00	5.40	2.48
1:50	0	7	11	21	11	10	-	-	-	-	-	-	-	-	-	60	100	10.00	4.49	1.83
-VE Control	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	00	0.00	0.00	0.00

DISCUSSION

Thelarvicidal and insecticidal effect of the oil*C. schoenanthus*shows that it is highly effective having hundred percent mortality rate efficiency. The time duration for the mosquitoes to die decreases by increasing the amount of oil extract; this indicates that the higher the amount of extract the faster the mortality rate. The grass proved to be active, that within fifteen minutes of application all the larvae and mosquito were dead.Even though, positive control is three times faster and more hazardous than the oil extract. But when compared to previous work done in Sokoto by on neem seeds oil [7] leaves extract, it's faster.Where decreasing the amount of the oil extract of *Azadirachtaindica* reduces the mortality to 98% and 83%respectively after twelve hours and the concentration is higher viz: 20ml, 30ml and 50ml respectively. If such concentration and time could take for the mosquito larvae to die, it is advisable to use a faster and more effective substitute.

The variations oflarvicidal potentiality depend on mosquito species, plant parts and polarity of solvents used.The efficacy of phytochemicals against mosquito larvae can vary significantly depending on plant species, plant parts used, age of plant parts (young, mature or senescent), solvent used during extraction as well as upon the available vector species. [4]have described the existence of variations in the level of effectiveness of phytochemical compounds on target mosquito species, plant parts from which these were extracted, responses in species and their developmental stages against the specified extract, solvent of extraction, geographical origin of the plant, photosensitivity of some of the compounds in the extract, effect on growth and reproduction. Changes in the larvicidal efficacy of the plant extracts occurred due to geographical origin of the plant.

CONCLUSION

The analysis showed that the oil extract is highly effective because all the larvae and mosquitoes were dead. These can be a good means of controlling mosquitoes breeding in the community since camelgrass are found locally in abundance in north-western Nigeria more especially around Sokoto which was the study area.

Recommendations

1. Camelgrass can be grown around residential areas to repel mosquito.
2. Oils extracted from this grass can also be used to repel mosquito.
3. To popularize the economic important of this grass in this area, people should be trained on the cultivation method so that mosquito breeding could be stop.
4. Also there is need to further conduct a research to determine the active chemical constituent responsible for the death of mosquito.

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