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No. DR/KVAFSU/ Project Report-VCH/2014-15 **Date:21.10.2014**

To
Ignatius Orwin Noronha,
Director
Leowin Solutions Pvt. Ltd,
Suvarna Building, 3-34 (B),
1st and 2nd floor right wing
Padukodi, Kuloor,
Mangalore-575013

Sir,

Sub: Final Report of Research Project…reg

Please find herewith the Final Project Report of the project title "Evaluation of MozziQuit mosquito trap in the control of mosquitoes and other Nematoceran insects" which was funded by your company for information.

DIRECTOR OF RESEARCH
Director of Research
KVAFSU, BIDAR

Copy to:

1. Dr. Placid E D' Souza, Professor cum Director, CAFT in Veterinary Parasitology, Veterinary College, Hebbal, Bangalore-24.
2. The Dean & Campus Head, Veterinary College, Hebbal, Bangalore-24.
3. Office File

KARNATAKA VETERINARY, ANIMAL AND FISHERIES SCIENCES UNIVERSITY, BIDAR 585 401

Department of Parasitology,
Veterinary College, Hebbal, Bangalore-560024.

RESEARCH PROJECT
Evaluation Report on "MozziQuit" Mosquito Trap

1.	**Department**	:	**Department of Veterinary Parasitology,** Veterinary College, Bangalore
2.	**Project title**	:	**"Evaluation of "MozziQuit" Mosquito Trap in the Control of Mosquitoes and other Nematoceran Insects"**
3.	**Principal Investigator**	:	**Dr. Placid E.D'Souza,** Professor & Head, Dept of Veterinary Parasitology
	Co investigators	:	**Staff from constituent Veterinary Colleges of KVAFSU** Dr.H.Dhanalakshmi, Dr.B.S.Pradeep, Dr.G.S.Mamatha Assistant Professors
4.	**Agencies funding for the project**	:	**LEOWIN SOLUTIONS PVT. LTD.** Suvarna Building, 3-34 (B), 1st and 2nd floor right wing Padukodi, Kuloor, Mangalore-575013
5.	**Location**	:	**Department of Parasitology, Veterinary College,** Hebbal Bangalore – 560 024

6. **Specific Objectives** :

1. To study the efficacy of **"MozziQuit"** (**MQ-MAX** and **MQ-MINI**) to trap mosquitoes and other Nematoceran Insects in Livestock Farms and Farm Premises.

2. To evaluate and validate **MQ-MINI** for Control of Mosquitoes and possibly other Nematoceran Flies

7. **Practical utility of the investigation including economic implication likely to achieved through the project** : The menace of Mosquitoes and other Nematoceran Insects of smaller size can be effectively checked. Since they are both Pests and Vectors, their eradication can have a good impact on general health and indirectly improves the productivity.

8. **Background and status of the problem as related to the proposed study** :

"MozziQuit" when switched on emits glowing effect mainly due to the Food Grade Proprietary Additives added in its casing part in combination of light which attracts mosquitoes towards the device. The temperature equivalent to the body or blood nerves temperature generated by **"MozziQuit"** is said to attract the mosquitoes. The vacuuming technology within the device sucks the mosquitoes from the trapping zone forcibly inside the trap making them to pass through the perforated holes which is the killing zone in the device. Dead mosquitoes get collected in the removable collection chamber at the bottom of the device.

Mosquitoes and Nematoceran Insects are very difficult to control in spite of a number of available methods being implemented, such as various insecticides, barriers and traps. Therefore novel approaches are highly essential.

Mosquitoes are everywhere. Female Mosquitoes bite people, animals and birds everyday again and again for blood meal required for their breeding. Female Mosquitoes lay 300 to 1000 eggs during their life span of 30 to 100 days depending upon the species as a result mosquito population multiply quickly in multi folds.

Sir Ronald Ross, British National was Awarded **Nobel Prize** in 1902 for his discovery that Malaria Parsite is been transmitted by Mosquitoes. Ref: http://www.nobelprize.org/nobel_prizes/medicine/laureates/1902/ross-facts.html Since then

Governments of all the countries with the assistance from **WHO** and **World Bank** are spending millions of amount every year for eradication of Mosquitoes under **National Vector Borne Disease Control Programme** besides conducting Malaria Awareness Programme. Inspite of this initiative since 112 years, as of date still Mosquito population is increasing every year.

According to **WHO Report** About 3.4 billion people – Half of the World's Population – are at risk of malaria. In 2012, there were about 207 million malaria cases and an estimated 627 000 malaria deaths and In 2013, 97 countries had ongoing malaria transmission. Ref: http://www.who.int/features/factfiles/malaria/en/

The incidence of dengue has grown dramatically around the world in recent decades. Over 2.5 billion people – over 40% of the world's population – are now at risk from dengue. WHO currently estimates there may be 50–100 million dengue infections worldwide every year according to report of **World Health Organisation**. Ref: http://www.who.int/mediacentre/factsheets/fs117/en/

9. **Techniques to be adopted for the investigation in brief** :
   1. **"MozziQuit"** traps will be placed in different livestock farms.
   2. **"MozziQuit"** traps will be monitored on daily basis.
   3. The efficacy of the **"MozziQuit"** trap in mosquito and fly control will be evaluated.

10. **Duration of the investigation** : 6 months

11. **Facilities available** : All the infrastructure facilities required for the project & technical expertise is available in the department.

12. **Financial involvement** : **Leowin Solutions Pvt. Ltd.**
    The required number of **"MozziQuit"** traps were supplied by the company.

Mosquitoes are of major Veterinary and Medical importance due to their role as Vector for transmission of various parasitic, bacterial and viral diseases. Mosquitoes are distributed through out the world. They are found at altitudes of over ~4700 m as well as in mines ~1250 m below sea level. Besides a world wide distribution they are in general predominantly tropical pest. Mosquitoes usually travel a few hundred meters from their emergence sites. Generally, it is assumed that they do not fly further than 2km, but have been recorded to be dispersed 100 km or more, through wind.

All warm blooded vertebrates are affected. In large populations Mosquitoes cause irritation and extensive blood loss to livestock resulting in anaemia, reduced productivity of milk and sometimes even death. Mosquitoes are a great nuisance and their bites do cause painful reactions making cows panic. They also play an important role as intermediate hosts and as vectors in several important parasitic and viral diseases of domestic animals and man viz., filariosis,Canine heart worm disease, Malaria, dengue, chikungunya, equine viral encephalitis etc

Mosquitoes feed on fruit juices and sugar water and male Mosquitoes normally exist on such food, but the females are blood suckers and require a meal of blood in order to lay eggs. The females seem to be attracted by the warmth radiating from the skin of their host either people or animals. They are active at night and are attracted mainly by carbon dioxide emitted by their host, while during the day they hide in areas of darkness, behind hanged cloth or lofts or shoe racks etc.

The integrated pest management plays an important role in controlling larval and adult habitats. Management mainly involves altering water bodies in order to reduce sources for larval development and egg laying. Biological control can be accomplished with the assistance of mosquito fish Gambusia affinis which feed on mosquito larvae but these methods have very less impact in Control of Mosquito population. Chemical control by use of insecticides is most effectively employed but development of resistance and environmental pollution are a major issues of concern. Secondly, the application of larvicides must be repeated periodically during the breeding season, it is costly and requires personnel for application, supervision and also for inspection. Mostly Cow owners use chemical based mosquito repellent coils and also burn coconut shells to spread smoke in cow shed to chase mosquitoes. In fact, Cows are more sensitive than people and they are in tied position inside cow shed as a result cow's kidney and lever get affected leading them to die earlier than their actual life span due to slow poison from chemical repellents and from the harmful smoke emitted by burning coconut shells. Hence, alternative methods to Control Mosquitoes like use of trapping devices is very much needed.

Material and Methods:

An electrical and patented device having Indian Patent No. 240728, **"MozziQuit"** specially developed by **Mr. Ignatius Orwin Noronha**, Managing Director of **M/s. Leowin Solutions Pvt. Ltd.,** to attract, trap and kill Mosquitoes was evaluated in cattle sheds, poultry, piggery farms and certain building premises. This device contains food grade proprietary additives mixed with plastic raw materials in one of the casing part produced through injection molding machine.

Usually Mosquitoes are attracted to carbon di-oxide, temperature of human and animal body/blood nerves, sweat, foul smell etc. Female Mosquitoes need blood meal for their breeding process. Hence they take blood meal. Mosquitoes are usually found inside the houses or cow sheds or piggery farms including human dwellings between 5 pm to 7 pm in the evening. Similarly, **"MozziQuit"** which works on the same principle when switched on emits glowing effect mainly due to the food grade proprietary additives added in its casing part in combination of light attracting Mosquitoes towards the device. The temperature equivalent to warm blooded vertebrates is generated by **"MozziQuit"** attracting the Mosquitoes to come near the trapping zone. The vacuum technology within the device will suck the Mosquitoes from the trapping zone forcibly inside the trap making the mosquitoes to pass through the perforated holes which is killing zone. Dead Mosquitoes will be collected in the removable collection container at the bottom of the device for disposal.

"MozziQuit" was kept at a height between 2 to 4 feet height from ground level in cattle, poultry, piggery farms and human dwellings at various institutions of **KVAFSU**. When this device was switched on most of the lights were switched off so that all the Mosquitoes present in the farms were attracted to **"MozziQuit"**. The **"MozziQuit"** was kept on from evening 6 pm to next day morning till 6 am. The Mosquitoes which were attracted, killed and collected in the container were counted on daily basis to evaluate the trapping efficiency of **"MozziQuit"** in control of Mosquitoes and other Nematoceran Insects.

Results & Discussion:

The attracting, trapping and killing efficiency of **"MozziQuit"** was assessed during the period of May 2014 to August 2014.

- During this period of study, a number of insects were attracted, trapped and killed by this device.
- A large number of Mosquitoes were attracted, trapped and killed along with the other harmful flies like Psychodida, moths, midges and Culiocoids.
- Among Mosquitoes, maximum number of Culex species were attracted and killed followed by Aedes and Anopheles species which were found in the vicinity.
- Maximum number of Mosquitoes were attracted, trapped and killed during the months of May and June. when the Mosquito population was high
- **"MozziQuit",** an electrical device was found to be very effective in attracting, trapping and killing the maximum number of Mosquitoes in livestock farms. This indicates that all the farm animals and poultry birds are devoid of annoyance caused by the Mosquitoes and as Mosquito Population reduces there are less chances of transmission of other

parasitic and viral diseases to animals and man. This indirectly helps to increase milk yield in bovines and weight of poultry birds because of proper feeding, sleep and no nuisance or irritability.

- This device is cost effective and eco-friendly, does not involve personnel for monitoring or supervision and also for evaluation. Daily operating cost claimed by the manufacturer is said to be at very lower level equivalent to 15 Watts for MQ-MAX and 3Watts for MQ-MINI for Electricity consumption.
- "MozziQuit" attracts, traps and kills mosquitoes without use of any chemicals or liquids or refills or consumables or smell or smoke or ash.
- More number of mosquitoes were attracted and trapped during the month of May and June compared to July and August. This variation could be probably due to the change in the environmental temperature. In later months, there was enough rain in Karnataka state were this device was assessed when the environmental temperature was reduced.
- This trap named "MozziQuit" can be used for effective control of mosquitoes and related insects in all farms, residential areas and institutions with no side effects and economically viable as well with increase in production levels from farm animals. Presently available mosquito repellents in the market made out of chemicals do not kill mosquitoes. Repelled mosquitoes lay eggs at their external breading location and multiply into multi folds making it difficult to control mosquito population. It is possible to eradicate mosquito population by use of "MozziQuit" Mosquito Trap as it eliminates further multiplication of mosquitoes by attracting, trapping and killing.

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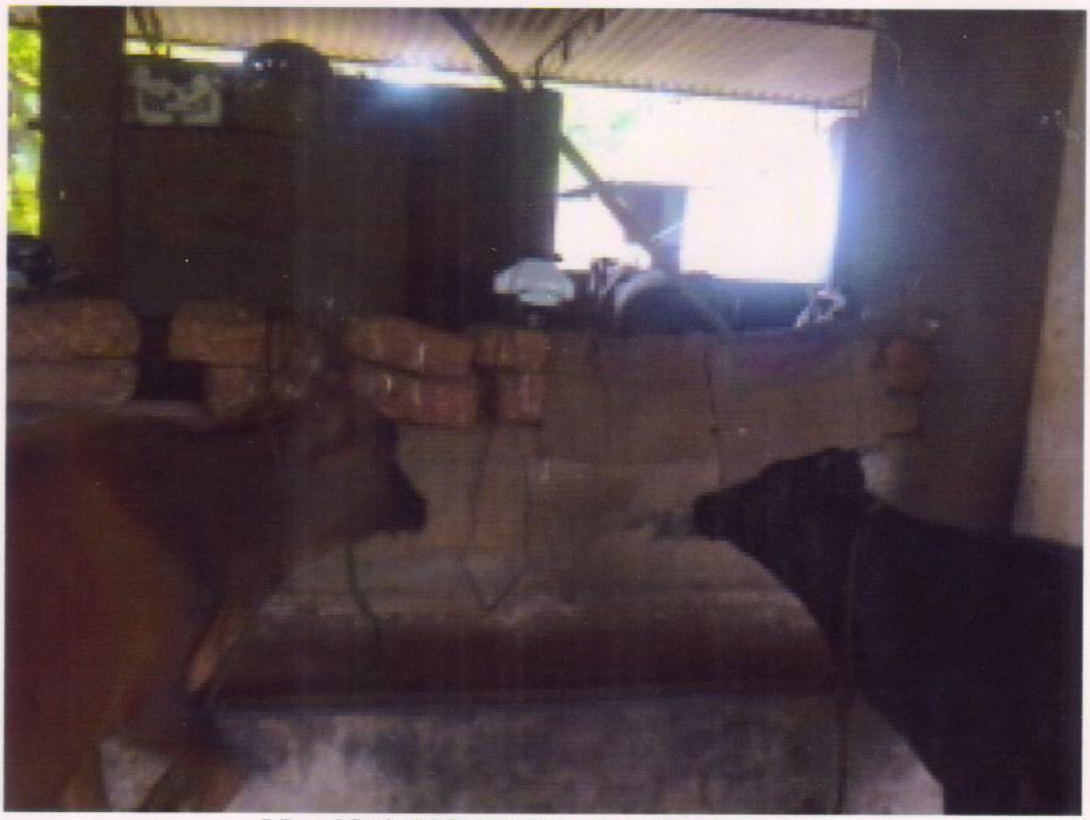
MozziQuit MQ-MAX

MozziQuit MQ-MINI

Trapped Mosquitoes

Trapped Mosquitoes

Trapped Mosquitoes



MozziQuit MQ-MAX in Cow Shed

Mosquitoes Trapped in Cow Shed in 1 month by MozziQuit MQ-MAX approx. more than 5 crores in count