The Thailand Natural History Museum Journal3(1) : 69-73, June 2008.

Sound Wave Frequency Study to Annoy in Wild Elephants

PRATHEEP MEEWATTANA*

Department of Biology, Faculty of Science and Technology,
Suan Sunandha Rajabhat University, Dusit, Bangkok 10300 Thailand

ABSTRAC.- The study had proceeded at some agricultural area nearby Kuiburi National Park, Kuiburi District, Prachub Kirikhan Province during on January - July 2007. The result, some sound wave frequencies disturb wild elephants whenever they came to agriculture area were about 21 kHz - 28 kHz, range on 30-100 meters (m.), source to the elephant. There had been 11 tests on 28 elephants in the study and all elephants move from the place that they live when they hear the sound wave. In the same time, some behaviors had been revealed 4 patterns are as following ; First, suddenly they walk into the jungle, 6 time on about 54.54% from 11 time. Second, immediately move when some sound wave were release but they are far about 30-70 meters from origin, 3 time on about 27.27%. Third, a time on about 9.09% when elephants hear sound wave, in the same time, they walk and trumpet to the jungle. Lastly, while the sound wave was broadcasted an elephant was eating some plants about 15-20 minute before return to the jungle, it just only one and that is 9.09% from 11 time.

Whereas, whenever sound wave was discharged and changed over and over on 21-28 kHz and 28-21 kHz, that elephant suddenly move from the place.

KEY WORDS.- Sound wave frequency, wild elephants

INTRODUCTION

Elephants is large terrestrial mammal and they are usually lived together, small or large group but some lonely. Elephant there have been important in several aspects, umbrella species and national need treasure species. Elephant have a large trunk and that they much more for food in whole day, 100-120 kg. thus their almost time were used for food. Elephant is social animal and there have been the leader in a group and usually there have been communicated by sound and especially. Elephants have used special sound to communicate and sound below the level of human hearing. There have been researched on sound wave for wild elephantís communication, and Payne (2003) discover that elephants use infrasound. Further work with Payne and other(1986) showed that the elephants were indeed making infrasonic calls. In addition, Poole and other (1988) studied in Kenya, Nambia and Zimbabwe and led to the conclusion that elephants use their powerful deep calls in long distance communication.

Infrasonic is sound below the level of human hearing and range of sound between 1-20 Hz and that Payne and other (1986) have recorded infrasonic calls in captive Asian elephants. While Poole, Poole and other (1988) studied in African forest elephants, they found that most elephants rumbles consist of a fundamental frequency between 5-30 Hz. With audible harmonics or overtone but it is good working range for capturing elephant rumbles with their harmonic, is 5-250 Hz. In contrast, when a sound can be communication that it can be dislodgement as well.

* Corresponding author.
E-mail : drpratheep@gmail.com

Materials and methods

The sound wave had been experimented at some of agricultural areas elephant often have left the jungle nearby Kui-Buri Nation Park between January - September, 2005 The study were concentrated in frequency of sound wave (Hertz) because the trial need to protect for hearing health in wild elephants. Functional Generator is the electronic box to produce some sound wave frequency and it were connected the power amplifier and megaphone (horn type). Some sound wave frequency were discharged gradually increasing on 1 Hz per 1-2 second and as the same time elephant's behavior had been recorded. Moreover, the sound source were fixed for distance between it and an elephant, at least 30 meter, for safety a researcher and a power of sound wave. After trial in the field some frequency again will be found a true sound wave frequency in the laboratory

Result

The 5 study sites (figure 1) had decided for the trial that are ;

1. Arng-Hin
2. Obstructional Point
3. Kui-Buri National Park Head Office
4. Pa-Yang Check point
5. The Pineapple Plantation (front of obstructional point)

An elephants have been found 28 individuals in 11 trials of all study areas but an elephant and trial amount in each study site were different found (Table 1) and got a sound wave frequency between 2,100 - 2,800 Hz to annoy in a wild elephants.

First study site in first time, sound wave frequency were started on 1,000 Hz on the elephant, far from source 40 meter and that the

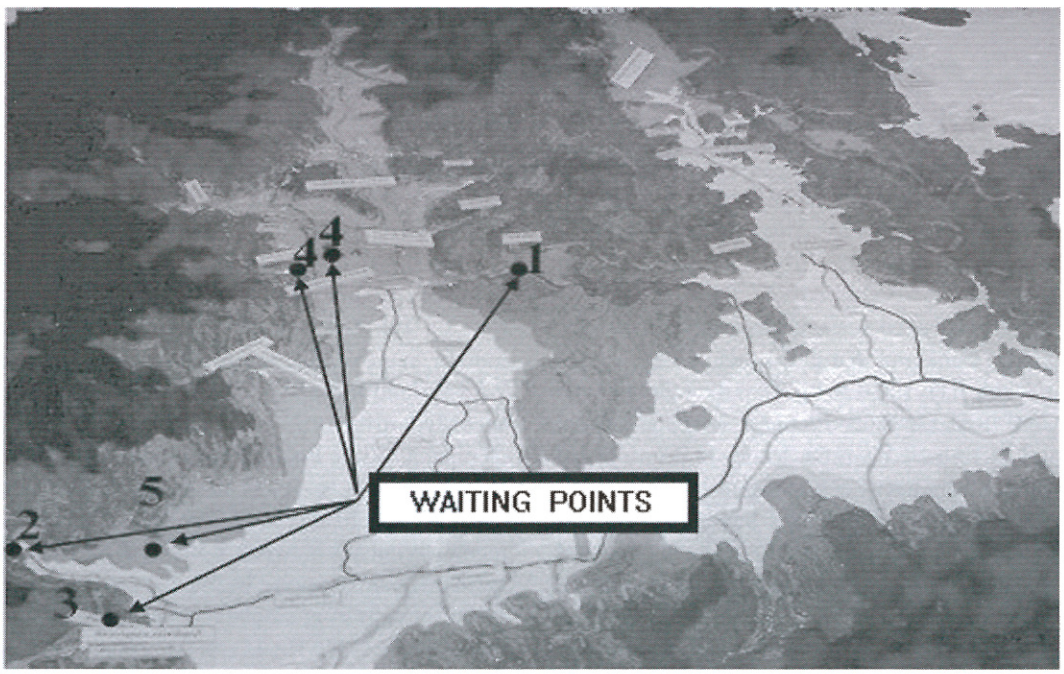

Figure 1. Five study sites

elephant was looking around until 2,000 Hz they more shake their head. On 2,100 Hz the elephant was turn back to the jungle but we still open some sound wave and increase 1 Hz until 3,000 Hz. All time for open the sound wave is about 30 minute. From second to last study site and time sound wave frequency were started on 2,000 Hz and in the second study site, first time when the elephant heard the sound far from source 43 meter, it was looking for like first study site. After 2,100 Hz the elephant more moved until 2,500 Hz it was turn back to the jungle. Third study site, sound wave were still started on 2,000 Hz and same two time ago, an elephants were far from source 40 meter until 2,100 Hz they were moving and turn back when the sound wave is on 2,755 Hz. After third study site, sound wave frequency were changed for release, will be released from 2,100-2,800 Hz for moving up and down (2,100-2,800 and 2,800-2,100 Hz), swallowing. Eventually, all study sites and time in the trial last process have been used whenever an elephants come in a study site.

For estimately distance from the source to an elephants is 40-50 meters and that is longer than the method but the sound can still annoying an elephants

Sound wave frequency, however, annoy for an elephantís hearing but it is may nothing or little to auditory system. By the way, range of the sound wave frequency (Hertz=Hz) is rather low for noise (Decibel= db).

Table 1. An elephants and trial amount in each study sites

Study Area	Time	Elephant (Individual)	Period
1. Arng-Hin	1	1	20/04/2550/23:25
	2	7	20/05/2550/23:45
	3	2	21/05/2550/02:15
2. Obstructional Point	1	1	21/04/2550/ 20:15
	2	1	24/05/2550/03:40
3. Kui-Buri National Park Head Office	1	2	24/04/2550/00:25
	2	3	16/04/2550/03:40
4. Pa-Yang Check point	1	2	22/05/2550/02:30
	2	3	23/05/2550/03:15
	3	2	26/05/2550/04:10
5. The Pineapple Plantation (front of obstructional point)	1	4	18/04/2550/22:20
Total	**11**	**28**	

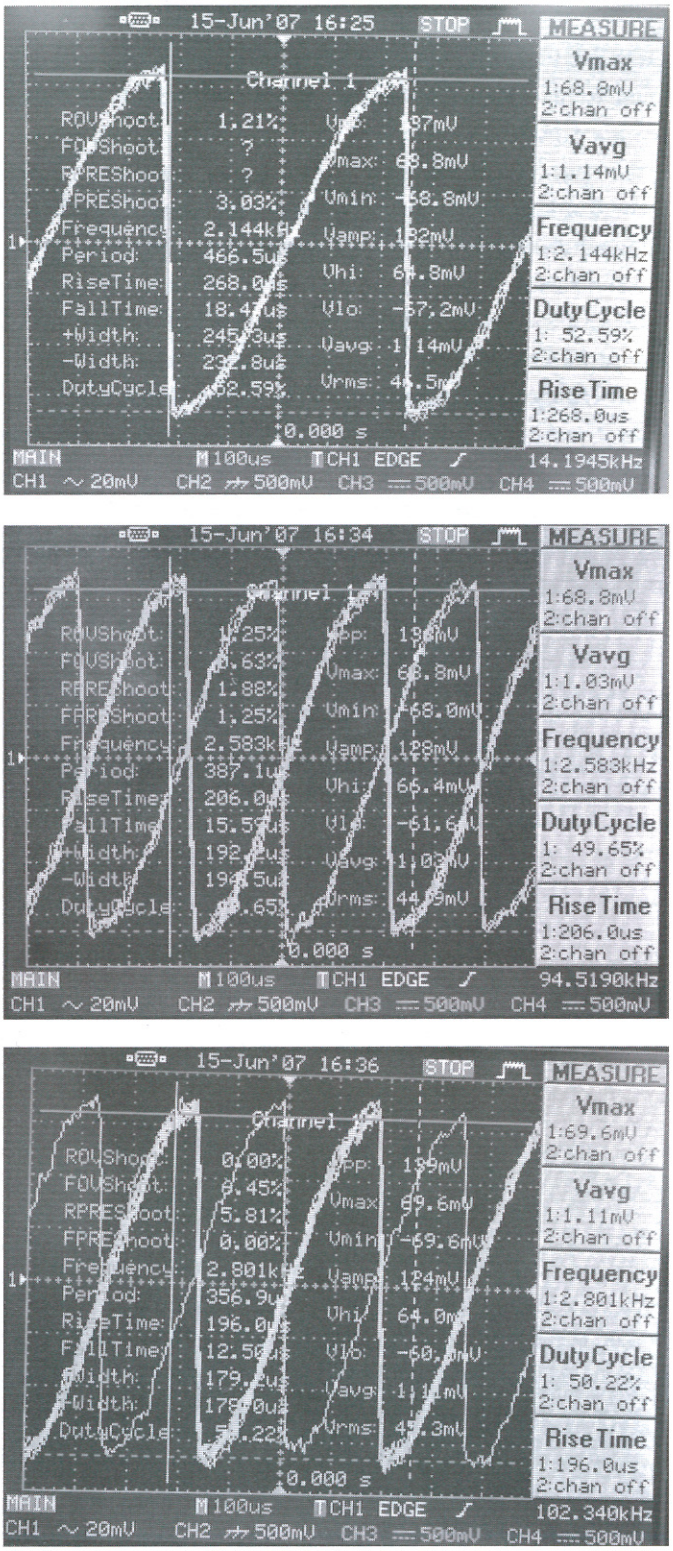

Figure 2. Sound Wave Frequency, level on 2,100. 2,500 and 2,800 Hz

DISSUSSION

This study was done 11 times with 28 elephants in the study area of Kui Buri National Park, Prachuab Kiri Khan Province. At the spectrum around 2,100 Hz to 2,800 Hz was making elephants nervous and running out from the vocal source. The surveyed elephants were not reached 50% of the total amount of elephants in the study area. As well as the surveyed elephants were not certain that they were the same because the duration of surveying was not continued. Even though the survey of spectrum could made elephants nervous and almost immediately walked away (99% walked away). However, if there were the study to monitor for a while (at least 6 months) in order to ensure that such level of spectrum has an enough efficiency to interrupt elephants to destroy pineapple farms.

For such reasons, this study was just a beginning of the connection between two essential academics basic; biology and physics. It could bring the knowledge from this study to apply with other studies such as birds. Therefore, such the kind of this study, it should has the monitoring and evaluation in the same study area as well as other areas that facing problems of destroy agriculture area like Kui Buri National Park. However, the study team was acknowledged that the study might cause some interruption to wild elephants that they are the national animal. In fact, this study was implemented in order to protect elephants from other harmful in which it would affect more to elephants. The most way to protect wild elephant to destroy pineapple farms in the studied area and other areas is stopping destroy and violating forest that is the residential of wild elephants. Wild elephants would have more areas for their daily life as in the past.

ACKNOWLEDGMENT

I would like to thank following persons who support in the fieldwork ; a farmers in the site, a leader and some rangers of Kuiburi National Park and many thanks Ms. Ravi utthamatanin (Department of Electricity and Electronic , Suansunandha Rajabhat University) who are the adviser in the laboratory. The research was supported by the Research and Development Institute of Suansunandha Rajabhat University. Lastly, I would like to express thank to my work group for everything in a fieldwork, encouragement and their strength for working until finish.

LITERATURE CITED

Payne, K.B.,Thomson, M., Kramer, L. (2003). Elephant calling patterns as indicators of group size and composition: the basis fro an acroustic monitoring system. *African Lournal of Ecology* 41, 99-107.

Payne, K,. W. R. Langbauer, Jr., & E. Thomas. 1986. Infrasonic Call of the Asian Elephant (*Elephas maximus*). *Behavioral Ecology and Sociobiology Journals.* 18 : 297-301.

Poole, J. H., K. B. Payne, W.R. Langbauer, Jr., and C. J. Moss. 1988. The Social Contexts of Some Very Low frequency Calls of African Elephants. *Behavioral Ecology and Sociobiology Journals.* 22 : 385-392.

Received : 7 December 2207
Accepted : 16 December 2207