INVESTIGATION ON RESPONSE BLACK-HEADED MUNIA TOWARDS SOUND

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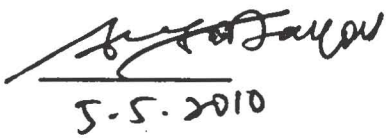

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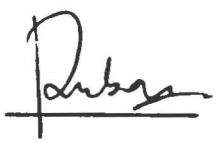

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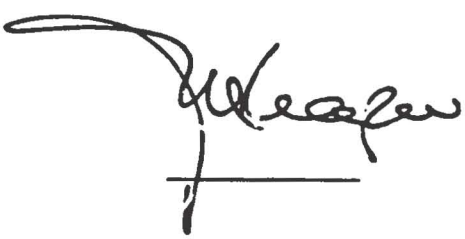

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ABSTRACT

Present study was focused on determining the effective sound to deter species *Lonchura Atricapilla jagori* which also known as Black-headed Munia. Few sample of sound playback have been used to test their effectiveness on scaring Black-headed Munia. Two categories of sound playback have been used in this study, which is complex sound playback and single signal sound playback. The two kinds of sound used for complex sound are high intensity sound and predator call. Whereas, high frequency single signal sounds are used from 17.0kHz until 15.0kHz. The frequency of the sound slowly reduce 0.2 kHz every 5 minutes from 17.0kHz to 15.0kHz. For complex sounds, the result showed that Black-headed Munias only give good responses to sound of siren, eagle call, and snake hiss playbacks. While for high frequency single signal sound, Munias only show good responses at 17.0 kHz. The reason might be the adaptability of Black-headed Munia to the repeated playback and hence slowly reduce their awareness to the sounds. In fact, the limited space in the cage can be another reason to explain the pattern of result.

ABSTRAK

Kajian ini dijalankan untuk mencari jenis bunyi bagi menakutkan spesies *Lonchura Atricapilla jagori* yang juga dikenali sebagai *Black-headed Munia* atau burung pipit. Dalam kajian, dua kategori bunyi yang digunakan adalah bunyi kompleks dan bunyi berisyarat tunggal. Bunyi kompleks terdiri daripada bunyi berintensiti tinggi dan bunyi pemangsa. Manakala, bunyi berisyarat tunggal dikaji bermula daripada 17.0 kHz sehingga 15.0 kHz dengan pengurangan sebanyak 0.2kHz setiap kali dengan jangka masa 5 minit. Dalam kajian ini, Munias memberikan reaksi kepada bunyi siren, bunyi helang, dan juga bunyi ular. Manakala, Munias reaksi yang paling jelas dapat dilihat kepada bunyi yang berfrekuensi 17.0kHz antara sebelas bunyi yang berfrequensi tinggi. Walaubagaimanapun, keputusan yang diperoleh menunjukan bahawa Munias semakin tidak memberikan reaksi apabila bunyi tersebut diulangi beberapa kali. Ini mungkin disebabkan oleh Munias tersebut telah biasa terhadap bunyian tersebut dan juga mungkin disebabkan oleh ruang untuk Munias terbang adalah had.

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kHz	kilohertz

CHAPTER 1

INTRODUCTION

1.1 RICE

Rice (paddy) is the staple food for around half the world's population, for whom it not only provides energy but is also an important source of protein. Rice is believed to have originated in southern Asia; it is known to have been cultivated in India and China for more than 6500 years (Whirter & Clasen, 1998). On a world scale, however, 90 % of all rice is still grown and consumed in Asia. In some parts of the continent, the word "rice" is same as that for food, for agriculture, or even for life itself. Price of rice was become higher as the population of resident in Asia increase and the need was increase. Under the Ninth Malaysia Plan, Malaysia had set a target to raise Malaysia's rice self-sufficiency level to 90% by 2010 from about 70% currently (Hanim Adnan, 2009). To achieve this goal, significant efforts have to put on solving the problems which affecting rice yield in Malaysia.

Many factors are affecting the rice yield in the country. The most common factors affecting the plants are sunlight, water, temperature, soil nutrients and farmer practices, which is the basic requirements for the growing rice. A continuous flooding of 5.0cm to 7.5 cm water considered best for optimum rice yield, nutrient supply and weed control. Light reaching the water may decrease as the rice plant grows. Shading by the rice plant can limit the photosynthetic activities of algae in the water as the crop grows. However, despite of the environmental factors, one of the main problems is the different kind of

pest attacks on the rice fields. The most serious pests were rice blast and birds attack. Some rice fields in Indonesia were experienced nearly 100% yield loss due to blast and birds attack (Bao-Rong, 1999).

1.2 BIRD PEST IN RICE FIELD

Birds give damage to agricultural crops during cultivating periods as in many countries in the world. Subsequently reduces the agricultural crops output and quality of products (Saglam & Onemli., 2005). In birds attack, birds always come with large flocks of various species of birds. They squeeze the milky grains to remove the milky white substances covering the grains and feed on the grains. For ripening grains, bird often removed entire grains. The signs that showed birds attack are chewed grains, milky substance covering the grains, empty grains, missing grains at maturity and whiteheads. Sometimes, whiteheads are also damage symptom caused by stemborers, but it is different (Figure 1.1). In stemborers, all grains in the panicle are chaffy and the panicle can be pull easily, while in bird's damage, not all grains are chaffy.

Figure 1.1 Whiteheads (IRRI, 2003).

The factors that favoring bird pest development is the ripening stage of the crop and staggered planting. Hence, the ripened grains are most susceptible stage of the crop. However, the damage due to perching of birds on the panicles will also result crop loss. According to International Rice Research Institute (IRRI) (2003), the crop loss in

Malaysia due to birds attack may run up to 40%. In order to protect agricultural crops from birds attack, many studies about mechanical and chemical fighting methods has been made. From the results of these works, the most effective method is the physical barriers such as nets and fibers for agricultural areas (Koyuncu & Lule, 2008). Nevertheless, the use of proper mounted and maintained nets costs high.

In Malaysia, bird pest is a common problem facing by rice field farmers. Farmers have to pay attention to these birds in order to protect their crop from damaged by birds, especially ripening rice, because birds are most favor on it. Most of the farmers using their own method in chase birds away from their crop. Bird controlling method by auditory deterrents has been applied in many fields, for example, at airport. Distress calls and calls of predator both have been used as auditory deterrents on birds at airport (Harris & Davis, 1998). Due to over flight of birds is a problem; hence controlling programs are necessary, even nocturnal control. Playbacks of these calls are use commonly in attempt to chase birds always from airports, agricultural, and residential areas.

Figure 1.2 Bird attack (IRRI, 2003).

1.3 OBJECTIVE

1. To observe the response of Black-headed Munia towards different sounds.
2. To determine the effective sounds to scare the common paddy eater birds, Black-headed Munia.
3. To determine the frequency range that may annoy Black-headed Munia.

1.4 SCOPE OF STUDY

This research will investigate the response of Munias, which will be focus on Black-headed Munia species. This species was chosen because they are commonly found in paddy field at Sabah. Three birds of the species will be catch from the paddy field that located in Penampang, Kota Kinabalu. Different sounds are applying to Munia and observe the response of birds in order to find out the effectiveness of each sound.

CHAPTER 2

LITERATURE REVIEW

2.1 MUNIA

Munias birds are the most common avian pests found in rice field in Malaysia. These birds are commonly known by locals as "Pipit" or "Burung Pipit". Munias are a menace in most rice growing areas, especially ripening rice.

According to Sabah Agriculture Department, there have a very common species Munia found in Sabah rice fields, which is Black Headed or Chestnut Munia (*Lonchura Atricapilla jagori*). Generally, *Lonchura* is a genus from Estrildidae family, and it is in Passeriformer order (Grzimek & McDade, 2005). They often have brownish feathers and a large, cone-shaped bill. They are found in sub-Saharan Africa, southeastern Asia, Australia, and South Asia. Their diet consists of small half-ripe and fully ripe grass seeds and fruits. Munias are highly social birds that maintain strong bonds between the mating pair and among members of small flocks.

2.1.1 Black-headed Munia

Figure 2.1 Figure showing Black-headed Munia (Oriental, 2005).

The Black-headed Munia (*Lonchura Atricapilla jagori*), also called Chestnut Munia is a munia which widely distributed in Malaysia (Figure 2.1). They have light grey beak, black head, and rich chestnut brown to mahogany body. The length of this bird is between 11.0cm to 11.5cm. The male was easily to be detected by its bright mahogany body, which is obvious with its black head. These birds generally had seen at grassy areas, especially rice field. In addition, Black-headed Munias also live in social groups throughout the year (Grzimek & McDade, 2005). They gather in rushes and tall grasses to roost in a flock.

2.2 CONTROL MEASURE

Over the years, agricultural researchers have tried to identify some effective and economical ways of dealing with crop predation by birds. These methods can be classified in the following categories.

2.2.1 Visual Repellents

According to British Columbia Ministry of Agriculture, Food and Fisheries (2002) reported that visual deterrents normally present a visual stimulus that is novel, and startling, or the birds associate with danger. The danger can be simulated predator or a result of predator attack, such as dead bird. Scarecrows, mylar strip, flash tape, balloons, kites , smoke and dead or live birds are visual stimuli that were disperse birds. These devices require frequently movement to maintain effectiveness over time. However, some products incorporate both visual and auditory stimuli.

a. Scarecrows

Scarecrows are one of the oldest devices which widely used to control bird in the farm. Most of the scarecrows are being human-shape; they have been constructed from a wide variety of inexpensive materials such as old clothes stuffed with straw. The more realistic the scarecrows appearance, the more effective scarecrows are likely to be. Hence, the birds will respond in a prompt flight to minimize the predation risk.

b. Reflecting Tape

Reflecting tape is made by an elastic, three-layered tape which has a silver metal layer coated in one side. This tape flashes when it striking by sunlight, and produce noise when it flaps in the wind. The auditory stimulus in reflecting tape is believed to make it

more effective than other reflector. Birds would avoid from these objects because of their natural caution to unfamiliar object. There has previous study showed that, the reflecting tape successfully deter birds from cornfields, sunflowers, and sorghum. The reflecting tapes successfully deter birds by suspended parallel above the crops from the entry point (Bruggers *et al.*, 1986). However, habituation will occur quickly in the birds since the biological basis is not strong.

2.2.2 Auditory Deterrents

Auditory deterrents commonly formed with the devices which emit sounds. The sounds produced by auditory deterrents basically will make birds feel uneasy or frightened and avoid entering the area. The auditory deterrents include recorded bird distress call and predator's calls, high intensity sound, and ultrasonic.

a. Distress Call Playback

Playback of distress calls are used commonly in attempts to dispersal birds form airports, agriculture facilities, and some other locations. Distress and alarm calls are given by many species of bird when they are in danger. In some cases, distress calls of a species are recognized, and cause dispersal by other species (Aubin, 1991). Birds were dispersed from the airport by repeated broadcast of distress calls (Smith, 1986). The link between distress call and escape responses is very strong because of its high survival value. It is biological significance of the calls that makes them a powerful tool for bird dispersal. In recent years, high quality digital recordings have become available as well. The sound quality is much better and does not degrade like the cassette tapes were used last time (British Columbia Ministry of Agriculture, Food and Fisheries, 2002). Burger (1983) showed that the efficacy of distress calls will be increase with proper deployment in

timing. Hence, habituation of birds to distress calls will be slower if the broadcast of sounds used sparingly. In the previous study, most of scrubwrens birds fled away when the playback of four-element trills calls of Canary which putatively encoded the degree of danger (Leavesley& Magrath, 2005).

b. Predator Call Playback

Predator calls playback used the same equipment as distress calls playback. The predator calls include calls of other birds, mammals, and humans. The playback of the predator's calls indicates that predators is nearby, therefore bird may react to this with high awareness and perhaps flight. The playback of a Peregrine Falcon call successfully dispersed gulls from Vancouver International Airport (Harris & Davis, 1998).

c. High Intensity Sound

High intensity sound can be produced from many ways, such as blasting using sonic booms, explosives, horns, and air-raid sirens. According to Holthuijzen *et al.* (1990), Prairie Falcons flew away from their nests after blasting from explosives occurred. However, falcons returned to their nest after few minutes. Most of the birds flying away, running or crowding together after heard to sounds with high intensity produced by sonic booms (Bell, 1971). High intensity sounds produce variable responses when birds are exposed to them. Most of the high intensity sounds are not able to reproduce easily although they are effective in dispersing birds. However, this technique is impractical at most the fields because it requires extremely high intensities sound near the source, and this can affect human health (Frings, 1964).

d. Ultrasonic

Ultrasonic sounds are the sounds which defined with human as reference, by having frequencies above human hearing range (Frings, 1964). The upper limit of human is about 20,000 Hz and it is decrease as the age grown up. The advantage of ultrasonic

deterrents is, it would not be audible by human unlike others auditory deterrents. Suppliers of ultrasonic emitting devices have claimed that their devices can deter birds. However, the previous study showed that birds do not hear ultrasonic. Woronecki (1988) found that pigeons were not avoiding areas where covered with ultrasonic and pigeons did not show any noticeable reaction with the changes in ultrasonic frequency. Most of the birds have the hearing range lower compared to human. Hence, the sounds that birds can hear must be in human hearing range (Frings, 1964).

2.2.3 Traditional Method

Most of the farmers in Malaysia used the traditional method to deter bird pest away. According to Sabah Agricultural Department, farmers use strings attached with empty cans at one of the end, and tie another end to the hut which located at the central of the rice field. Those strings were suspended parallel on the crops and extended to every corners of the rice field, so that the rice field was being covered. Once seeing the birds landing on the crops, the person manning the hut will pull the strings which may produce noise and disperse the birds. In order to increase the effectiveness of this method, some farmers also tie the reflector tapes on the strings.

2.2.4 Trap

Sabah Agricultural Department has introduced a specially design trap for rice field farmers. The trap can be set up by using cheap materials and it is easy to handle. However, it require worker to carry out this trap. Firstly, the trap is laid on the ground in a open form (Figure 2.3). A stick is placed in the middle of the trap and three birds is tied to the it which work as bait. When carry out this task, a person need hide at a corner and pull the string which tied to the stick (Figure 2.4). Another worker needs to help this out by chasing the birds around the rice field with the hope the birds will land on the trap. Once a flock of birds were landing on the trap, the string attach to the two netting frame being pulled hard and shut the trap in a snap (Figure 2.5). The birds which trapped in the net are killed by trampling with food and removed with hand when

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