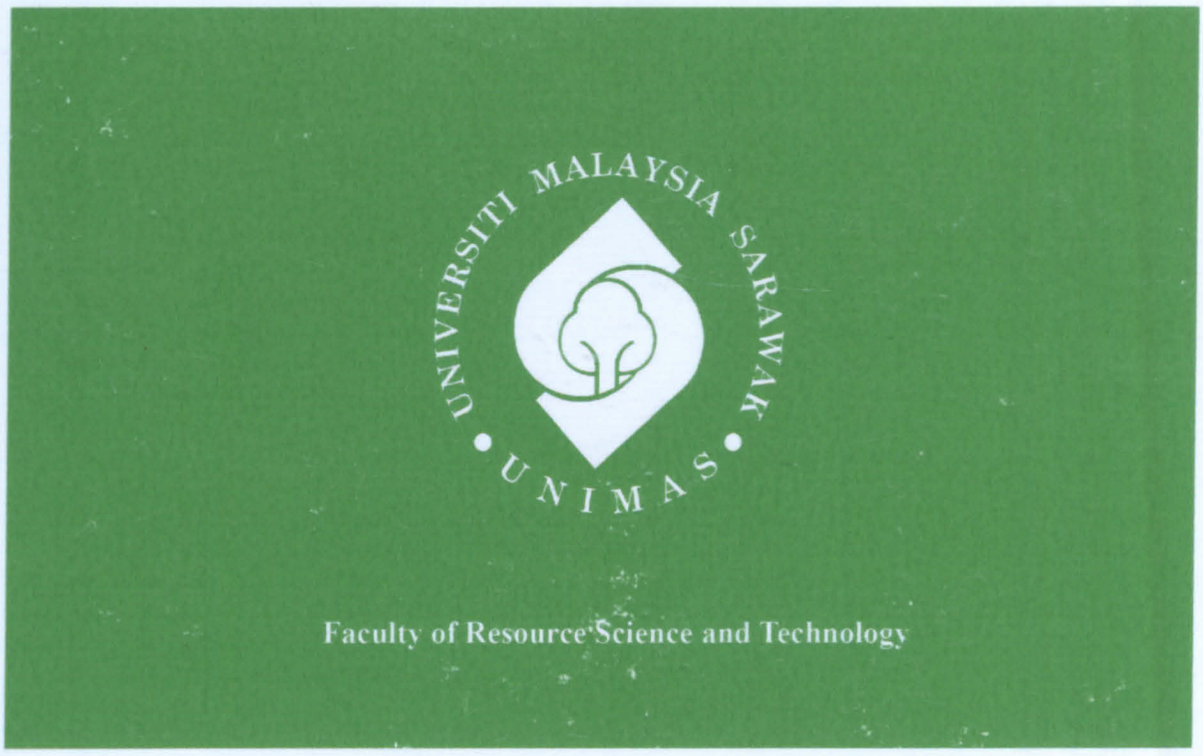

DISTRIBUTION AND POPULATION DENSITY OF COMMON MYNA (*ACRIDOTHERES TRISTIS*) IN UNIMAS CAMPUS, KOTA SAMARAHAN, SARAWAK

Lina Chieng Lin Na (36754)

Bachelor of Science with Honours
Animal Resource Science and Management
2015

UNIVERSITI MALAYSIA SARAWAK

Grade: _____

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Final Year Project Report ☑

Masters ☐

PhD ☐

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This declaration is made on the 3rd day of July 2015

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Distribution and Populati[on] [of] Myna (*Acridotheres tristis*) in UNIMAS [and] [Ke]han, Sarawak

Lina Chieng Lin Na (36754)

This project report is submitted in partial fulfilment of the Final Year Project 2 (STF 3015) course

Supervisor: Prof. Dr. Mustafa Abdul Rahman

Animal Resource Science and Management
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2015

Declaration

I hereby declare that no portion of the work referred to in this dissertation has been submitted in support of an application for another degree or qualification to this university or any other institution of higher learning.

LC

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List of Abbreviations

IUCN – International Union for Conservation of Nature

UNIMAS – Universiti Malaysia Sarawak

GPS – Global Positioning System

GIS – Geographical Information System

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Distribution and Population Density of Common Myna (*Acridotheres tristis*) in UNIMAS Campus, Kota Samarahan, Sarawak

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ABSTRACT

The research project was carried out to investigate the distribution and population density of common myna (*Acridotheres tristis*) in Universiti Malaysia Sarawak (UNIMAS) campus. The common mynas were observed and studied for a period of six months from November 2014 to April 2015 using line transect method. From the study initiated, a total of 276 common mynas were recorded from 16 road transects done in both East and West of UNIMAS campus. The results showed that the common myna was distributed abundantly throughout the campus and the density of common myna was estimated at 2.42 individuals per hectare. The results also showed that the distribution and density of the common mynas are primarily linked to areas with high human population and food resources. This research has contributed useful information and knowledge for distribution and density of the common myna in a campus environment.

Keywords: common myna, distribution, density, UNIMAS

ABSTRAK

Satu projek penyelidikan telah dijalankan untuk menyiasat pengagihan dan ketumpatan burung tiong gembala kerbau (Acridotheres tristis) di kampus Universiti Malaysia Sarawak (UNIMAS). Burung tiong kembala kerbau telah diperhati dan disiasat dalam tempoh enam bulan dari bulan November 2014 sehingga April 2015 menggunakan kaedah garisan transek. Melalui kajian yang dimulakan, sejumlah 276 burung tiong gembala kerbau telah direkodkan daripada 16 jalan transek yang telah dijalankan di timur dan barat kampus UNIMAS. Keputusan menunjukkan bahawa burung tiong gembala kerbau diagihkan di serata kampus dan ketumpatan burung tiong gembala dianggarkan sebagai 2.42 individu per hektar. Keputusan kajian juga menunjukkan bahawa pengagihan dan ketumpatan burung tiong gembala kerbau tertumpu kepada kawasan yang mempunyai populasi manusia yang tinggi dan sumber makanan. Penyelidikan ini telah menyumbang informasi serta pengetahuan yang berguna untuk pengagihan dan ketumpatan burung tiong gembala kerbau dalam persekitaran kampus.

Kata kunci: burung tiong gembala kerbau, pengagihan, ketumpatan, UNIMAS

1.0 Introduction

The common myna (*Acridotheres tristis*) is part of the starling family called Sturnidae. Native to India, the local people dubbed the bird as a "farmer's friend" because the bird species was originally known to feed on insects or bugs which destroys crop plants. The bird species was then deliberately introduced into many other countries to eliminate insect pests. In certain cases, common mynas were said to be accidentally introduced; being escapees from cages (Holzapfel *et al.*, 2006), transporting ships or from the wild. Govorushko (2011) mentioned that the expansion range of common myna has risen to the point that it was declared as one of the world's 100 worst invasive species in 2000 by the IUCN. Presently, the distribution range of common myna is from Afghanistan to Southwest China (King *et al.*, 1991). It is a common resident in Southeast Asia countries.

The Indian Mynah is described as a bird with yellow bill, legs and patch around its eyes. Its body is brown in colour with black hooded head. During flight, distinctive white patches under the wings can be spotted easily. The bird species is approximately medium in size, measuring up to 23-26 cm in length, 82-143 g in weight and have a 120-142 mm wing-span (Kaur & Khera, 2014). The females and males are alike (Kotpal, 2010). According to Craig and Feare (2010), common mynas are normally spotted on the ground, walking "jauntily" while making variety of loud noises. Unlike other birds, the common mynas prefer to walk instead of hopping. Most of their activities are done in pairs, small groups or sometimes could reach up to thousands of birds. Apart from that, they also make use of their vocalisation to interact with its kind in times of threat or to warn them of any possible dangers. In addition, the common mynas are also able to copy human speeches which make them a remarkable bird species (Bebarta, 2011).

Unlike many birds which are focused on one type of vegetation, the common mynas can feed on variety types of food. Sengupta (1976) mentioned that the bird's diet consist of insects, greens, nectars, and sometimes, but rarely, little animals. Apart from that, common mynas are also seen to feed at residential areas, such as outdoor eateries, fast food outlets or even at a pet's bowl. As for reproduction, the common myna usually nests in hollows or crevices of trees (Siddique *et al.*, 1993). Woodward and Quinn (2011) mentioned that the parents of common mynas take care of their young. They will take turn to incubate the eggs, feed the hatchlings, and protect the chicks until they are independent enough to search for food by themselves.

The increasing range of distribution and density of common mynas over the years are slowly becoming a concern as the bird species pose many problems to the areas where it inhabit. For instance, their presence may inflict health problems towards the human community and local wildlife (Central Coast Indian Myna Action Group, 2003). They carry mites, ticks and sometimes avian malaria (Markula *et al.*, 2009). Apart from that, they destroy food crops, particularly fruits such as blueberries, mangoes, figs, apples and grapes (Tracey *et al.*, 2007). They also prey and chase away (Craig & Feare, 2010) native species during breeding season, thus, reducing the indigenous biodiversity. Furthermore, Tidemann (2001) mentioned that the species also pose public discomfort, through noise produced during communal roosting and fouling of areas with bird droppings.

1.1 Problem statement

According to Peacock *et al.* (2007), the monitoring of the increase in the range of the common mynas, as well as the understanding of the relative significance of influential factors leading to its density and spread helps the ecologists to manage or predict the

invasion of alien species in the region. However, no research has been done concerning the distribution of the common myna in a campus landscape. On the other hand, there haven't been many studies conducted on the population density of common myna in UNIMAS campus.

1.2 Objectives

Hence, in this study, the following research objectives are addressed:

i. To determine the distribution of common myna in UNIMAS campus, Kota Samarahan, Sarawak.

ii. To determine the population density of common myna in UNIMAS campus, Kota Samarahan, Sarawak.

2.0 Literature Review

2.1 Distribution and Behaviours of Common Myna

Holzapfel *et al.* (2006) stated that common mynas have been showing a large increase in its range of distribution, expanding up to global levels, with most of it occurred due to introduction of the species into new areas. The common mynas were introduced in countries such as Hawaii, Nicobars, Andamans and Africa (King *et al.*, 1991). Apart from that, they were also introduced in Mauritis, New Zealand, Fiji and many other localities in the world for the purpose of combating insect pests in agriculture (Sengupta, 1976). In Australia, the range of common myna includes Australian Capital Territory, Eastern Queensland, Southern Australia and New South Wales (Tidemann, 2005). After a while, the bird species is seen to spread quickly, showcasing its ability to adapt to rural and urban areas in Australia, making the bird a pest as it believed to compete aggressively for nesting hollows and food resources with the native birds (Lowe *et al.*, 2011). In addition to threaten native birds, they are also destroying crop plants, impacting fauna and flora (Feare *et al.*, 2011).

In addition, Yap and Sodhi (2004) also mentioned that the bird species is undergoing natural expansion and continuously introduced in Asia. Presently, the common myna is a common resident in Southeast Asia countries. This is due to probable widespread clearing of grasslands and growing human population size (Peacock *et al.*, 2007). Peacock *et al.* (2007) further stated that the bird is found everywhere outside of its native range other than Antarctica and South America. The common myna is now recognised throughout various Southeast Asian countries namely Thailand, Vietnam, Singapore and Malaysia (Yap & Sodhi, 2004). It was also being introduced in countries such as Hong Kong and Japan. Due to their nature of anthropogenic dependence, the human habitats present abundant chances

for the establishment of the mynas, in both urban and suburban environment (Cunningham, 1948).

Tidemann (2005) mentioned that common mynas keep away from closed forest, and are more likely to be found at human habitation. They are often found in areas with litters, bins or among grazing livestock to feed on insects or maggots (Jeyarajasingam, 2012). Other than that, King *et al.* (1991) mentioned that their habitats are generally found in open country, cities, gardens or cultivations. The bird species normally walk in pairs or in small groups while foraging for food. They adopt a habit to roost communally with other mynas or starlings at night. Among the roosting sites include marketplace, holes in roof or in tree hollows. These bird species roost communally as a form of defence (Craig & Feare, 2010), an act to synchronise social activities or to exchange information (Hobbs, 2000) through their daily experiences such as food sources or nearby threats. The common mynas are generally omnivorous. They forage mostly on the ground for insects; particularly grasshoppers, which give rise to their generic name *Acridotheres,* which means "grasshopper hunter" (Woodward & Quinn, 2011). Apart from that, they also feed on fruits, grains and sometimes on the nestlings and eggs of other species of birds (Woodward & Quinn, 2011).

According to Woodward and Quinn (2011), the breeding season of common myna takes place between the month of March and July, where competition for nesting sites will occur in late February or early March. Because of their boldness and aggressiveness, the common myna has been known to replace many native birds for nesting sites (Craig & Feare, 2010), indirectly reducing their reproductive rates. They are continuously spreading because of their broad habitat and climatic tolerances (Peacock *et al.*, 2007). Apart from that, common

mynas have extreme adaptability towards local environment. The common myna is an intelligent bird that learns quickly through observations or experience, giving it advantage compared to other birds.

2.2 Line Transect

Generally, line transect involves the observer walking along a selected route and recording birds seen on any sides of the observer. The method is useful in studies relating to bird habitats (Sutherland *et al.*, 2004) and abundance. Line transects are best used in large areas where it needs to be evenly spaced to avoid double counting of birds at an extensive range (Bibby *et al.*, 1992). In addition, the method enables censuses to be done rather quickly and easily. It is also convenient as it allows observer to spot changes happening on line. According to Sutherland (2006), distance of the bird should be estimated perpendicular to the transect line. Figure 1 depicts illustration of three measurements that can be taken for each bird sighted;

1. Distance of the bird sighted (r_i)
2. Angle of the bird sighted (θ_i)
3. Perpendicular distance (x_i)

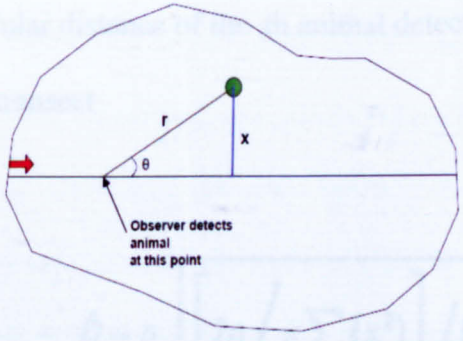

Figure 1 Simplified diagram of line transect method and measurements that are taken for each bird (green dot) observed along a transect line

The sighting distance and sighting angle can be used to calculate the perpendicular distance of individual spotted using $x = r \sin \theta$ (Krebs, 2014).

To avoid any possible bias, the observer should travel at a sufficiently slow speed in order to spot all the birds nearby and on the transect line itself. Furthermore, all the birds surveyed using line transects are presumed to be sighted with certainty. Generally, the degree of detectability will decrease with increasing distance from the line transect. According to Jayson and Sivaperuman (2010), there are a few main assumptions involving the line transects method;

1. Birds very near or on the line will always be observed.
2. None of the birds are counted twice or moving in response to the observer.
3. No measurement errors are made when recording all perpendicular distances.
4. Observation of each bird is considered as an independent event.

Sutherland (2006) further stated that line transect data can be used to estimate densities using DISTANCE software or a simple formula which presumes half-normal detectability function where;

n = total number of animals detected

x_i = perpendicular distance of the $_i$th animal detected from the transect line

L = length of transect

$$\hat{D} = n \sqrt{\left[2n \Big/ \pi \sum (x_i^2) \right] / (2L)}$$

2.3 Capturing Mynas

According to Tidemann (2005), starlings and mynas are intelligent birds with good communication and keen vision. They quickly learn to evade traps or dangers through experience or distress calls given by their kind. Several dedicated groups have been selling trap plans and cage traps to enthusiasts' members who wish to place it in their backyard (Lowe *et al.*, 2011) to reduce the number of the invasive species. Apart from traps, baits are also utilised to capture common myna. A research study on the title "Discriminant Analysis of Morphometric Characters as a Means of Sexing Mynas" done by Counsilman *et al.* (1994) uses bait to capture the mynas. Baits used were in a form of bread, which were cut into small cubes and drugged with 1 cm^3 of stupefying narcotic (alpha-chloralose) at 1% of the bait weight. They added that, this method, which involves poisoning, was chosen as compared to other methods due to its effectiveness in acquiring sufficient units of birds for their study.

Yap (2003) also utilises bait in capturing the mynas. Compared to Counsilman *et al.* (1994), Yap improvised the bait by coating the bread with butter and also experimented with different doses of alpha-chloralose. The dose containing 1-3% (by bait mass) caused the bird to be dizzy in the first 15 to 30 minutes and fainted for the next few hours after that. In contrast, higher doses resulted in death. Yap proceeded with maximum 3% of dosage due to its effectiveness. Birds captured were inspected for condition of feathers, breeding status, moulting stage and age. Birds in good condition and shows no active symptoms of breeding were attached with radio transmitters at its tail feathers using adhesive method. Bird was checked for signs of behaviour upon attachment of transmitter before releasing it back to the wild. Yagi antenna was used to track the mynas on a clear day, with the same duration of hours every time. Information such as time, behaviour,

weather, location and habitat were recorded throughout the study. ArcView GIS software was used to plot locations of the birds tagged with radio transmitters.

2.4 Radio-telemetry

Paxton *et al.* (2003) make use of radio-telemetry to study movement patterns, habitat use and home range sizes of willow flycatchers (*Empidonax traillii*). The study was done over a period of eight days with four willow flycatchers attached with glued-on transmitters. Their home range results on an average size of 1.2 ha for three out of the four flycatchers whereas the fourth covered a much wider area, recording up to 2.5 km in movement during tracking. Mist-nets and specific capture traps were used to capture the flycatchers. Birds caught are determined for sex, breeding status, nest locations and colour-banded to aid identification. Its home range was evaluated using the method of minimum convex polygon. Flycatchers were tracked using R-1000 telemetry receiver and aided by a 3-element yagi antenna which are hand-held. When the individual was spotted, its behaviours were noted, together with any apparent effects of transmitters while being attached to the bird. Location coordinates were then detected using Garmin E-trek Legend GPS unit.

Lim and Sodhi's (2009) study in Singapore on the "Space use and habitat selection of house crows (*Corvus splendens*) in a tropical urban environment: A radio-tracking study" were able to determine the roost sites and predict the movements of house crows at a specific time. From the information obtained, they were able to estimate home range sizes of house crows which vary from 1.3 ha to 158.1 ha. Their results showed that the house crows prefer housing and commercial areas. They have also discovered that the crows were only found outside the core areas (fixed kernel method) during dawn and evening time, unlike during the middle of the day where they tend to settle in their core areas. Apart from

that, they also found that the birds studied in Singapore were generally faithful to their respective core areas. The birds roosted communally, similar to other species such as European starling (*Sturnus vulgaris*), javan myna (*Acridotheres javanicus*) and common myna. By understanding the patterns of movement using radio-telemetry, proper management skills can be taken to control these birds.

Another study, done by Spurr *et al.* (2010) using radio telemetry to study the bellbird (*Anthornis melanura*) movements and home range was carried out. They defined home range as an area in which individuals or pairs engage in activities such as mating and foraging. This area may be large or small compared to the average area. In addition, the study of home range is important as it involves measures or evaluation of space used as it contributes to survival of the individual or pairs. In their study, two main locations were chosen and mist nets were deployed in five different locations at the first main location and two different locations in the second main location. Speakers playing bellbirds song were also utilised to attract bellbirds into the net. Birds that were captured were weighed, banded (with different colours) and attached with radio transmitter, with 56 days of battery life. A total of 11 birds were captured and observed to determine their home range and movements using radio-telemetry method.

3.0 Materials and Methods

3.1 Study Area

All activities were carried out with Sarawak Forestry Department's research permit. As Figure 2 indicates, the common mynas were observed, studied and captured in UNIMAS campus (1°27′53″N 110°25′33″E) for a period of six months. The university is located at Kota Samarahan, which covers about 2,000 ha in size and takes about 30 minutes drive from Kuching city. UNIMAS campus is mainly surrounded by peat swamp forests and secondary forests (Voon *et al.*, 2014) which have provided diverse vegetation types for various species of birds. The campus is further divided into two study sites, namely the new (West) and old (East) campus as depicted in Figure 3 and 4 respectively.

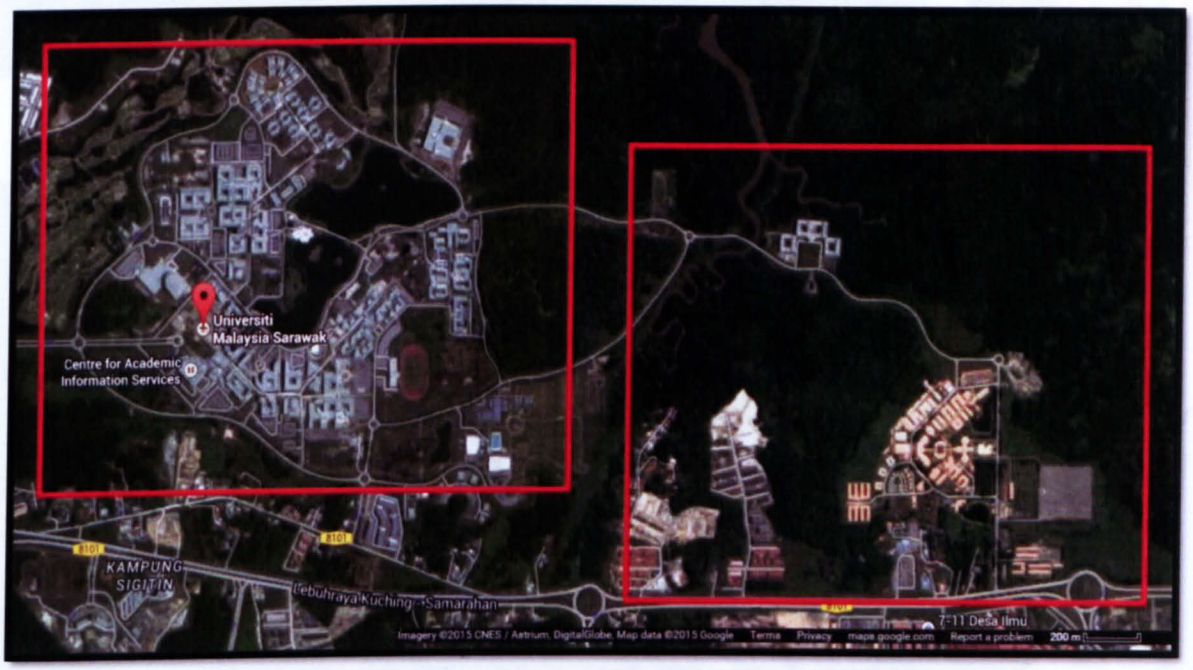

Figure 2 Map of UNIMAS campus in Kota Samarahan, Malaysia
Source: Google Map (2015)

3.2 Study Sites

Figure 3 Map of UNIMAS West campus
Source: Google Map (2015)

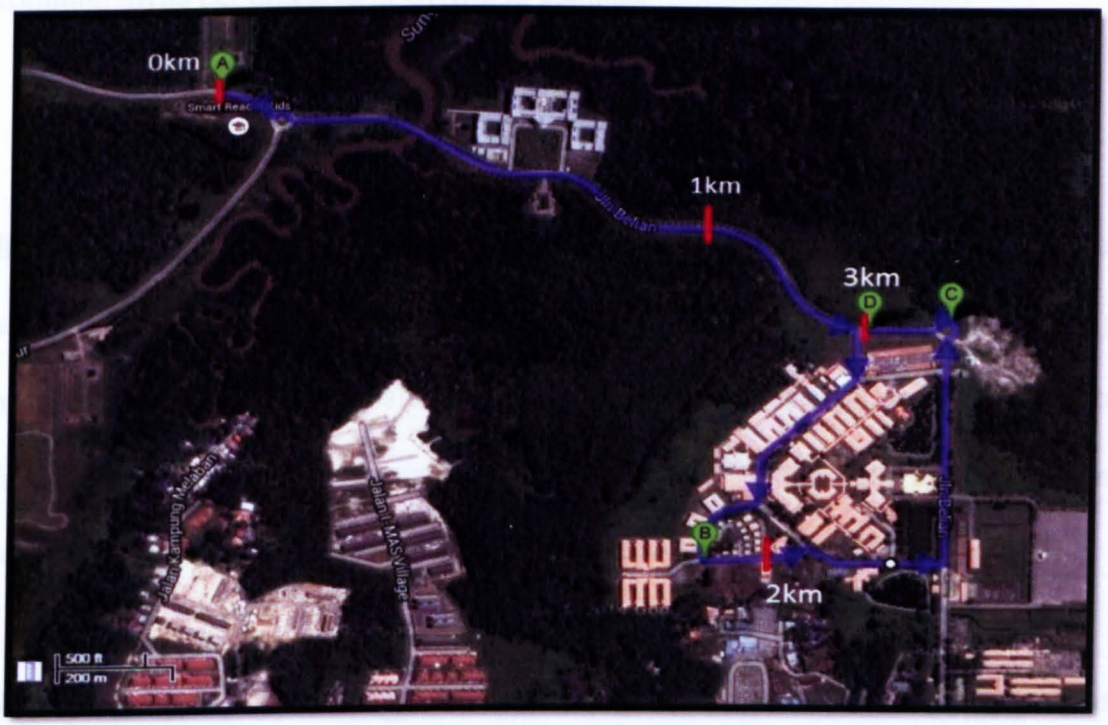

Figure 4 Map of UNIMAS East campus
Source: Google Map (2015)

3.3 Field Methods

(i) Distribution and Population Density

Bird detection. – GPS (GPSMAP 76CSx) and map of UNIMAS were utilised while doing line transect in both West and East campus (for six months) which covered 5 km and 3 km respectively. Common myna spotted through naked eyes or binocular (Nikon Monarch) was noted down for its location, position (marked on map), time and activities. The study was conducted in the morning between 0700-1000 hours or in the late evening between 1600-1900 hours. At the same time, number of individuals spotted along the transect line was recorded, along with distance and angle readings using TruPulse 360 Rangefinder for population density study.

Statistical analysis. – Population density was analysed using DISTANCE 7.0 software, where a mathematical model was fitted onto observation data to get an estimation of common myna per unit area in UNIMAS campus.

(ii) Home range study

Bird capture. – Common mynas were captured for the home range study. Mist-nets were set up at four different locations around UNIMAS campus, with one of the mist-nets placed near one of its' roosting sites at Cempaka college. Birds caught were checked for age, feather conditions and measurements such as weight, total length and wing-span were recorded. They were then ringed with metal ring and colour banded on the tarsus.

Radio-tagging. – A4540 transmitter tuned to a frequency of 216-220 MHz, weighing 2.8 gm with battery lifespan of 127 days was attached to the tail feathers and fastened via sewing as indicated in Figure 5. The method of attachment was based on the work of Lim