Impact Of Human Infrastructure And Human Disturbances On Mammalian Predator Communities: Mongoose

Introduction

Human infrastructure and disturbances can negatively affect the behaviour and activities of terrestrial mammals such as the invasive small Indian mongoose (Herpestes auropunctatus). commonly known as mongoose. One aspect of human infrastructure is physical infrastructure, which refers to the standard physical structures needed for an economy to function and survive (e.g., transportation networks, power grids, and waste disposal systems; (IGI Global, 2019). According to Grenada Cultural Foundation (2019), a mongoose is a mammalian predator of rats and snakes that were previously introduced to Grenada in the 1880s as a biological control on sugarcane agricultural fields. However, due to insufficient prior knowledge on the ecology of mongoose, the predicted solution became an even bigger problem as mongoose are diurnal organisms and rats are nocturnal. Unfortunately, the mongoose population have grown significantly over the years and therefore it can have severe health effects on humans particularly at the Maurice Bishop International Airport (MBIA) where the study will be conducted . .

Mongoose are vectors of diseases such as rabies, tuberculosis, and streptococcal which can cause death to humans and other mammals within days Tumram, Bardale, Dixit, and Deshmukh, (2012) thus, the MBIA is concerned with whether or not there is a prevalence of mongoose within the airport's vicinity. Rabies and tuberculosis are caused by bacteria contained in the mongoose saliva and is transmitted when an individual is bitten by one of these potentially deadly creatures. According to Tumram et. al (2012), persons who are diabetic and have already been diagnosed with illness such as HIV are very susceptible to mongoose bites and may most

likely die. A study conducted by a team of scientists reveals that mongoose can become disoriented in the presence of noise disturbances which causes irrational behaviour which may cause them to attack an individual (Drake, Bracken, Kern and Radford, 2017). Therefore, the MBIA must find ways to reduce the abundance or completely remove the mongoose population around the vicinity of the airport to reduce risk to the health of employees and visitors.

Recently, animal behaviour in general has been a rapidly developing area of research for many wildlife ecologist and health specialist. The focus of many researchers is allocated to the relationship between anthropogenic noise and mongoose behaviour (Drake et.al., 2017), the diet of the mongoose population (Flint, 2016) and the various infections that are transmitted by mongoose (Tumram, 2012). However, none of the previous studies were conducted at the MBIA thus, the data collected from this research will provide baseline information on the mongoose population at the airport. The results from this study can also be used to infer management decisions to find a solution to the high mongoose abundance in Grenada and other Caribbean countries. A previous study done by Flint et. al (2016) found that mongoose display high levels of aggression when foraging in garbage cans thus, this aspect of human infrastructure can greatly affect the behaviour of mongoose. This study will assess the behaviour of mongoose at the MBIA in response to the infrastructure present at the airport and the level of disturbances

exhibited by persons at the study site.

There has not been any study conducted in Grenada on the physical and mental behaviour or the possible health effects of the invasive species on the Grenadian population. Therefore, we are unaware of key information such as the number of individual mongooses in the country,

whether they have reduced the population of other species like snakes, how they respond to various stimuli e.g. noise and food source or how many persons have been injured or died from an infection given by mongoose. However, according to a test conducted by Zieger et. al. (2014), the rabies virus is present in Grenadian mongoose but how prevalent is not known. Everard, Baer, and James (1974), confirms that there is a greater risk of humans contracting rabies from other mammalian animals such as cattle and goats as they are tied to restrict movement making it easier for them to be attacked by the mongoose and humans allow these animals to live in close proximity to them. Nevertheless, assessing the behaviours of these infectious species can bring the airport officials one step closer to finding possible solutions to the problem.

This study is aimed at observing the behaviours of mongoose in response to human infrastructure and disturbances. The main methodology that will be applied in this research is observation-where the researchers will record any behaviour exhibited by the mongoose. The results from this assessment will be used as baseline data to formulate management strategies that will be presented to the airport officials. The study will conclude by making recommendations to eradicate or reduce the activities of the invaders.

Methods

This research, guided by the topic ‘Impact of human infrastructure and human disturbances on mammalian predator community’ will be conducted at the Maurice Bishop International Airport (MBIA) in Point Saline’s, St. George, Grenada. Therefore, the study site is located at the most southern part of the island. See Fig.1 below for a satellite representation of the study site and a key showing where mongoose have been observed on the airport.

Fig.1 Satellite image of sites at Maurice Bishop International Airport (MBIA).

The focal species to be monitored is the mongoose which is found in many Caribbean countries. This species of mongoose is within the same family as the Meerkat and has a slight resemblance to it (Satore, 2018). It has an extended face, elongated bodies, small, rounded ears,

short legs, and long, narrow tails. They also have non-retractile claws that are used for digging (Satore, 2018). Moreover, the majority are brindled or grizzly while a subset has intensely marked coats which closely resembles mustelids (Satore, 2018).

The main research technique that will be employed in this study is observation. Nevertheless, there are several materials required to conduct this study. These include a datasheet, binoculars, compass, rangefinder and a G.P.S. On the datasheet the observer will record the following information: the number of mongooses observed (count), a description of their behaviour or any outstanding activity seen, their distance from U.T.M and the environment in

which they were seen.

The binoculars are an equipment used to enhance the sight of the observer to locate and properly observe the behaviour of mongoose. The compass is used for showing direction in relation to the geographical cardinal directions, and in this study is responsible for giving the bearing from the nearest station. The rangefinder is a piece of equipment that gives precise measurements of distance as opposed to visual estimates by the observer. Finally, the G.P.S is a device that determines geographical coordinates in real time, so that the position of an individual can be determined and replicated on a map.

This study will be conducted throughout five visits to the MBIA, within the period of September 2019-November 2019. Primarily data will be collected utilizing the equipment provided to help fill out the necessary data slots. Data will be collected at both air and landside sites on the airport during the early afternoon period.

The aim of this study is to assess the frequency and primary location of mongoose and determine whether human infrastructure and disturbances are key factors in their distribution and abundance. This study will also assess the behaviour and activities of the focal species to their surrounding infrastructure and environment; which may help determine whether there is a risk to human health.

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