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Scope and Method of Study: A literature search was undertaken to determine the results of the introduction of the mongoose, Herpestes auropunctatus auropunctatus, into the island communities of the West Indies and the Hawaiian Islands. The habits of the mongoose were examined. The West Indies and the Hawaiian Islands were treated as separate communities to determine the effects of the mongoose in each. Adaptation from India to the island communities was noted. The stand against introduction to the United States was examined.

Findings and Conclusions: Herpestes auropunctatus auropunctatus is an omnivorous and prolific predator. It is widespread in the West Indies and is generally held in disfavor there. Feelings against the mongoose are not as strong in the Hawaiian Islands where it occupies four of the eight main islands. Similarities with its native habitat in India have made the island groups extremely conducive to the adaptation of the animal. It has no direct competitors on the islands and few successful predators. Interaction with man as a predator has caused the near extinction of many indigenous island species. The adaptability and food habits of the mongoose make it a formidable animal to introduce anywhere. Introduction to the United States could result in unpredictable changes in the present wildlife structure. A law exists which prohibits the introduction of the mongoose.

ADVISER'S APPROVAL

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HERPESTES AUROPUNCTATUS AUROPUNCTATUS AS AN  
INTRODUCED PREDATOR IN THE WEST INDIES  
AND THE HAWAIIAN ISLANDS

By

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## PREFACE

The mongoose has been in the Western Hemisphere for over ninety years, yet its habits in the West Indies and the Hawaiian Islands are generally not known by the average citizen of the United States. I have attempted in this report to make a literary introduction of the animal to the United States in the hope that no physical introduction will ever occur.

I would like to thank Dr. Bryan P. Glass, for his help in obtaining reference material for this report, and Dr. L. Herbert Bruneau, for his guidance and encouragement throughout my course of study.

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## CHAPTER I

### INTRODUCTION

During a recent vacation on St. Thomas in the U. S. Virgin Islands, the author noticed small brown animals which darted away from the roadsides as cars drove by. Natives said the animal was a mongoose and, usually in the same breath, called it a nuisance and a pest. Anyone whose previous experience with the mongoose has been nothing more than a reading of Rudyard Kipling's "Rikki-tikki-tavi" (5) finds it hard to believe that a mongoose could be a "pest". Kipling portrayed the animal as a defender of life who could do no wrong. However, a careful re-reading of the story does reveal a few allusions which cast some doubt on the high character of the mongoose. It is stated that the mongoose eats eggs, although in the story they are snake eggs. And a frightened muskrat is told not to fear Rikki-tikki-tavi by the unanswered question, "Do you think a snake-killer kills muskrats?" But Kipling's main purpose was to show "that all a grown mongoose's business in life was to fight and eat snakes".

The purpose of this report is to examine the results of introducing the mongoose, Herpestes auropunctatus auropunctatus, into the island communities of the West Indies and the Hawaiian Islands. It is hoped, also, that this report will reinforce the stand that the mongoose never be introduced to the continental United States or to other U. S. territories which do not at present harbor the animal.

The most complete anatomical details of the mongoose are given by Pocock (14). Pimentel (13) and Seaman (15) have written interesting accounts of the mongoose in the West Indies. Baldwin, Schwartz, and Schwartz (1) and Pearson and Baldwin (11) reported on extensive research on the mongoose in the Hawaiian Islands. And Milne and Milne (9) have detailed the circumstances of the introduction of the mongoose to Jamaica, and thus the West Indies, while Walker (20) gave an account of its arrival in the Hawaiian Islands. A selected bibliography of other reference material on the mongoose is given at the end of this report.

## CHAPTER II

### DESCRIPTION AND CLASSIFICATION

The mongoose introduced to the West Indies and the Hawaiian Islands is a long-bodied, short-legged animal with a bushy tail almost as long as its body. The head is long and pointed with short, rounded ears and yellowish eyes. The coat is a medium shade of grey-brown with yellow speckling on the guard hairs, thus the common name "gold-spotted mongoose". The long, narrow feet have five claws which are nonretractile. A pair of anal glands opening into an anal pouch are found in both sexes of the mongoose (1).

When disturbed, the mongoose erects its fur into a bristling coat. The bulk of the animal thus seems to be increased and the tail seems to double in size. It is felt that often a snake will miss harming the mongoose because its fangs will pass harmlessly through the erected hairs of the animal (14).

The weight of the mongoose varies from 1.0 to 2.8 pounds for males and from 0.7 to 1.35 pounds for females (1). Pocock (14) cited a body and head length of 13.2 inches for the largest male caught and 10.2 inches for the largest female. In the same individuals, the tail measured 10.2 inches and the hind foot 2.4 inches for the male while in the female the tail was 9.6 inches and the hind foot 2.2 inches. Both Pimentel (13) in Puerto Rico and the Hawaiian researchers (1) found the introduced species to be somewhat larger than those described by Pocock.



Perhaps this discrepancy can be explained by the introduced individuals' coming from more than one population in India.

#### Classification

Since the classification of the many species of mongoose was not complete in India when the animal was first introduced to the West Indies, there was much controversy as to the identification of this particular species. In identifying the carcass of a mongoose that was mysteriously found in Kentucky in 1920, Jackson (3) called the species Herpestes griseus, but later (4) he corrected this to be H. birmanicus after correspondence from Dr. Glover M. Allen. Pocock (14) called the species H. javanicus auropunctatus and stated that it was the one shipped to the West Indies, with the British Museum as his authority. Today it is generally accepted that the animal is of the species Herpestes auropunctatus auropunctatus. The common name is the gold-spotted mongoose, but in both the West Indies and the Hawaiian Islands the animal is known simply as "the" mongoose.

Appendix A shows the classification of this mongoose in relation to others in its family and tribe.

## CHAPTER III

### HABITS OF THE MONGOOSE

Although the habits of Herpestes auropunctatus auropunctatus are generally the same as those exhibited in its native India, observations of this introduced animal in the West Indies and the Hawaiian Islands have been more complete. This report will deal with the particular habits of habitat, food, social habits, and reproduction. While specific examples have been limited here, the reader is referred to the works cited in the bibliography for numerous further examples.

#### Habitat

The mongoose is adaptable to a wide variety of ranges. In Hawaii the animal has been found in forest, grassland, desert scrub, seacoast, fields of sugar cane and pineapple, coffee plantations, and even in settled suburban areas (1). On the islands of Maui and Hawaii, it has been found at altitudes as high as 10,000 feet; but it seems to prefer the 2000-foot elevation. Collections at 7000 feet in Nepal and 6300 feet in Kashmir have been recorded in the native region (14). Pimentel (13) listed the mongoose as having many habitats on the island of Puerto Rico and said that only the forested and urban areas are avoided. However, the largest populations were found in the dense grass bordering lowland streams.

Forests are generally avoided since the mongoose is not a tree

climber. Baldwin and associates (1) stated that one essential feature of good mongoose habitat is the availability of ready-made retreats for shelter. Thus rock crevices, chinks in stone walls, heavy grass, dense underbrush, litter, logs, and other animal burrows may provide retreats. The mongoose will make a burrow for himself if no other shelter is available (14).

As we shall examine further in Chapter VI, the habitats in both the West Indies and the Hawaiian Islands are very similar to those occupied in India. It has been found that the suitability of a particular habitat depends more on the availability of shelter and food than on the amount and type of vegetation (1).

#### Food

The mongoose is omnivorous. The lists of stomach contents are almost an inventory of the fauna and flora indigenous to a region.

In its native India, the animal is reported to prey upon any mammals, birds, or reptiles it is capable of killing and to eat the eggs of birds and reptiles. It also eats scorpions, centipedes, beetles, hornets, termites, and all kinds of insects except the true ants. In addition, it feeds on fruits and other vegetable substances (14). One wonders at the naivete of the Jamaican planter who thought that the imported mongooses would feed only on rats.

In Puerto Rico in 1955, only 2.5 percent of stomach contents of mongooses were found to be rat remains. Reptiles, insects, arachnids, and myriapods occurred in larger percentages than mammals, but Pimentel (13) pointed out that only a small number of mammals were available on the island. Also, the few birds on Puerto Rico, most of which nest in

high places, accounted in part for the lack of bird remains in the stomach contents.

Studies in Hawaii showed that bird remains made up 4.1 percent of scats which the researchers examined (1). Mammals here accounted for 39.6 percent with the remains of Mus musculus being by far the most abundant. Insects occurred as 27.0 percent of the remains. The large amount of plant remains, 29.3 percent, no doubt was due to the fact that the specimens were collected from open grass pastures.

Several reports are available of the eating of carrion by the mongoose, but perhaps the most interesting is that of La Rivers (6). As an entomologist, he was engaged in trapping insects in the Hawaiian Islands. He used baits of putrid meat which were so consistently taken by the mongoose that this method was abandoned. Excreta was found to be the only material of animal origin which could be used as bait in mongoose territory. And the mongoose was a further nuisance since it was also a competitor for the insects.

#### Social Habits

The mongoose is not a gregarious animal but is usually found singly or occasionally in small groups of two or three. La Rivers (6) described two mongooses which cooperated in fishing for crabs in shallow water along a shore. Very young mongooses were observed to steal food from adults of the species (20), but this is no doubt an indulgence on the part of the adults. Pimentel (13) observed caged mongooses fight until one of a pair was killed by the other, and he cited some evidence of cannibalism here since one of the mongooses ate a hind leg of its victim. Baldwin and associates (1) found traces of mongoose hair in

two out of 86 scats examined. They also tell of a female, caught in a steel trap, that was killed and partly eaten by a male and of captive mongooses avidly eating skinned mongoose carcasses.

Pimentel (13) stated that only newly-grown young animals will hunt together or, of course, a mother with her young. The Hawaiian researchers (1) felt that mongooses will hunt in pairs in order to overcome adversaries which one animal could not fight alone.

### Reproduction

Because the reproductive cycle of the mongoose lacks various specializations, it is considered to be primitive (11). Of common mammals, the cycle most closely resembles that of the ferret.

However, the male mongoose differs from the male ferret in spermatogenesis. It has been found that once a male matures, sometimes as early as four months of age, he will begin to produce sperm. Thereafter, he will continue to produce sperm throughout the year although there will be a slight enlargement of the testes in the spring. In adults the testes cannot be retracted.

The female mongoose also is similar to the ferret in her reproductive organs. The extreme length of the oviducts and ovarian ligaments shows a marked difference from the female ferret, however (11). The ovaries are relatively small. Laboratory observations suggest that ovulation does not occur in the absence of the male.

Because the males are continually fertile, the breeding season depends on the female. Generally a female mongoose will produce two litters a year, one in April and the other in July (11). Pocock (14) reported three litters in one year and Walker (20) said that in Hawaii he

had observed young entirely absent only in the months of October, November, and December. Pimentel (13) reported this also for Puerto Rico.

The gestation period is about seven weeks. The number of young per litter ranges from two to four, but two pups is by far the most usual number. The young are born blind and are kept in the burrow until about one month of age (20). Thereafter they forage with the mother until they are full grown.

## CHAPTER IV

### RESULTS OF INTRODUCTION TO THE WEST INDIES

The mongoose was introduced to Jamaica in 1872 by a planter, W. Bancroft Espeut. It was actually his wife's idea since she had lived in India as a child, had had a pet mongoose, and remembered that it killed rats around the house (9). Since rats at that time were the scourge of the sugar plantations because of damage to cane, almost any remedy was worth trying. In about 10 years after the introduction, it was estimated that the mongoose had prevented rat damage to the extent of one-half million dollars; but in about 20 years the island began to realize that the mongoose was preying on much more than the rats.

Besides Jamaica, the mongoose now exists on the following islands in the West Indies: Puerto Rico, Cuba, St. Thomas, St. Croix, St. John, Vieques, Tortola, Antigua, St. Kitts, Guadeloupe, Martinique, St. Lucia, St. Vincent, Grenada, Barbados, Hispaniola, and Trinidad. The animal is not found on Montserrat, Anegada, Virgin Gorda, St. Eustatius, Saba, Water Island, Jost Van Dyke, Culebra, Dominica, and some smaller islands. There is some uncertainty of occurrence on Desirade, St. Bartholomew, St. Martin, Barbuda, Sombrero, and Redonda. (2), (10), and (13).

There were attempts to introduce the mongoose to the island of Dominica in the 1880's, but on this particular island the introduction was unsuccessful. One explanation given is the excessively moist climate of Dominica, the wettest island in the West Indies (2). Another factor

cited is the existence of a boa constrictor on the island, and it has been observed in Trinidad that this snake will eat mongooses (19).

The omnivorous habits of the mongoose are one of the main reasons it soon lost favor after importation to the West Indies. Its predation of domestic fowl makes it particularly unpopular, but in the Dominican Republic the natives have made use of the animal's aversion to forests by keeping their hens and young chicks in the cocoa groves (15). Predation on such creatures as fawns and attempted predation on the eggs of sea turtles and also those of pelicans have been recorded by Seaman and Randall (16). These writers gave the mongoose much blame for the reduction of Iguana iguana, the virtual elimination of the ground lizard (Am-eiva polops), the rarity of the blind snake (Typhlops richardi), and the extinction of the one native snake (Alsophis sanctae-cruis) from the Virgin Islands. From the agricultural viewpoint, the mongoose is detrimental since it destroys ground-nesting birds and insectivorous reptiles and amphibians. The portion of insects in its diet does not make up for the loss of these normal enemies of insects (10).

The arboreal habit of the black rat, Rattus rattus, is another reason for the continuing unpopularity of the mongoose. These rats still abound in the West Indies, and they most probably had displaced the ground-dwelling species, the Norway rat (Rattus norvegicus), before the arrival of the mongoose. Seaman (15) cited that in 1951 cane damage by rats in the Virgin Islands was estimated at 15 to 25 percent while at the same time as many as 10 mongooses per acre could be trapped in suitable habitat.

The mongoose has been found to be a vector of rabies in Puerto Rico (13). However, the animal is so resistant that so far no internal para-



site or bacterium has been found which could be used for mongoose control (15). The spirochete of lepto-spirosis has also been found in mongooses in Puerto Rico.

Trinidad used the bounty system as a mongoose control. Payments were still going on in 1931 (19). The increasing number of bounty payments showed little evidence of control but rather that the mongoose was increasing in number and range. In fact, now Trinidad has an ordinance which prohibits the keeping of the mongoose in captivity since it was feared that the animals were being raised for bounty (10). St. Kitts, Antigua, Barbados, and St. Vincent have also employed the bounty system.

In spite of an early about-face in satisfaction with the mongoose, Jamaica seems to be the lone island in the West Indies that feels the animal does more good than harm at present. This may be the result of that island's still incurring a loss of as high as one-third of its extensive cane fields because of rat destruction (10).

## CHAPTER V

### RESULTS OF INTRODUCTION TO THE HAWAIIAN ISLANDS

At the time when the mongoose was held in most favor in Jamaica, the animal was introduced to the Hawaiian Islands. Seventy-two mongooses were brought to the islands from Jamaica in 1883. Had the Hawaiian planters waited ten more years to find out the results in the West Indies, the chances are great that the introduction of the mongoose would never have been made (20).

Discrete populations of the mongoose are now found on the following Hawaiian Islands: Molokai, Oahu, Maui, and Hawaii. The animal is not found on Kauai, Lanai, Niihau, and Kahoolawe; and no evidence is available of attempted introductions to these islands (1). However, Perkins (12) stated that plantations on Kauai suffered from rat damage as much as those on other islands, yet by 1903 Kauai seemed to be in no more danger from rats than the islands which had the mongoose. Therefore, he felt that a decrease in the number of rats occurred in the Hawaiian Islands which had nothing to do with the arrival of the mongoose.

Again, as in the West Indies, the present rat population in the Hawaiian Islands is made up largely of the arboreal Rattus rattus. On islands which do not have the mongoose there is a greater number of Rattus norvegicus. Walker (20) said that on the latter islands poison must be used to keep the rats in check.

Perhaps it is because the rats continue to do much damage to sugar

cane in the Hawaiian Islands that the feelings against the mongoose are not as strong as in the West Indies. However, introduction of the animal does not seem to be desired by plantation owners on the islands which do not have the mongoose (1).

Walker (20) felt that many of the highly specialized endemic wildlife of the Hawaiian Islands were near extinction before the introduction of the mongoose. He attributed this largely to the clearing of the land for agricultural use. Short-eared owls and buteo hawks were the only native predators before rats, feral cats and dogs, and finally the mongoose were brought inadvertently or purposely to the islands. Yet none of these other predators seems to be a direct competitor of the mongoose although there is some overlapping of food habits (1).

One area of predation in which the mongoose seems to be the chief factor is the decrease in numbers of small sea birds. Kauai has several colonies of shearwaters which are not found on islands with the mongoose (1). La Rivers (6) reported on some resident birds at Pearl Harbor on Oahu. Of the mynah, house sparrow, peaceful dove, Chinese turtledove, linnet, wandering tattler, cardinal, Knudsen stilt, and black-crowned night heron, only the adult herons were not caught by the mongoose.

The Hawaiian researchers (1) felt that the mongoose as an exotic preys on many creatures in Hawaii which are likewise exotics. Thus, as far as wildlife is concerned, a balance has not been established between predator and prey; and therefore, in the Hawaiian Islands, no definite judgment can be made about the role of the mongoose.

## CHAPTER VI

### ADAPTATION FROM INDIA TO ISLAND COMMUNITIES

If one examines any atlas, the similarities between the native India of the mongoose and the islands of the West Indies and the Hawaiian group will be noted. All three areas are grouped around the latitude of 20° north, and the climates are generally that of the moist subtropics or the savanna. The seasonal temperature ranges are about fifteen degrees Fahrenheit with the coldest months being December or January and the warmest months May or June. The maximum rainfall generally occurs in the summer months. The vegetation is largely that of grass to mixed forest. Thus it can be seen that the mongoose did not have to make any great adaptations to its new territories. Indeed, the island climates are probably milder than that of continental India.

The mongoose had a distinct advantage over the island fauna in that its family appeared in the Tertiary period and it evolved in the large Afroasian area of the world. Matthew (7) felt that during a period of continental emergence such as the Tertiary the earth was arid with markedly zonal climates. Animals existing then had to adapt themselves to the inclemency of nature, scarcity of food, variation of climate, competition of rivals, and attacks of enemies. Thus the mongoose evolved with the ability to exist in many habitats and to withstand many adversities. Except for the rats, few island fauna can be considered as adaptable as the mongoose.

In addition, the mongoose had little or no competition with which to contend on the islands. Herpestes auropunctatus auropunctatus was the only species of mongoose in the new areas while in India there were many species, some so specialized that they ate only a particular type of food, such as crabs (14). In spite of the reputation for killing snakes, it is logical to assume that many young and inexperienced mongooses were killed by snakes since the animal is not immune to snake venom.

The predators of the mongoose in the West Indies are listed as man, dogs, cats, some snakes, and possible ants (13). Dogs and cats do not have much effect. There is no direct evidence that ants are predators, but the fire ant (Solenopsis geminata) has been observed killing young rats and the analogy can be made to young mongooses in their burrows. Boa constrictor, of all snakes in the West Indies, seems to be on the increase (19). This may be largely due to the fact that stomachs of full-grown specimens of this snake in Trinidad have been found to contain mongooses. Thus the evidence suggests that this snake should be protected as a control on the mongoose.

In the Hawaiian Islands, the predators are again man, dogs, and cats. La Rivers (6) reported that a large tom cat killed a mongoose at Pearl Harbor, but the cat refused to eat the kill. It is unusual that the Hawaiian Islands, with less natural enemies of the mongoose than the West Indies, should feel more favorable toward the animal.

All researchers noted that the mongoose is easily trapped and may even be retrapped without much difficulty. Thus trapping is one means of control. Seaman (15) has suggested that trapping and poisoning are the only effective means of control at present. The mongoose is suscep-

tible to such rodent poisons as strychnine alkaloid, arsenic trioxide, warfarin, and 1080 (sodium fluoroacetate). Reinfestation of an area will require continuous control efforts, however.

Although man is an enemy of the mongoose, in most of the island communities he is also an ally of the animal in the predation of native species. It is this man-mongoose interaction which perhaps makes the mongoose such a dangerous creature. Matthiessen (8) cited the black-capped petrel as an example. This bird nests in West Indian mountain burrows. It has been extensively hunted by man even though there was difficulty in the hunt. But the nests were inaccessible to man. Not so for the mongoose, and now the present nesting sites are unknown and only random individuals have been seen in recent years. In the Hawaiian Islands, man's land use practices as well as his direct predation have had a definite role in the decrease of native species (1), and the additional presence of the mongoose has hastened the demise of many creatures.

## CHAPTER VII

### STAND AGAINST INTRODUCTION TO THE UNITED STATES

The United States has been fortunate in that it was able to examine the results of introducing the mongoose to the West Indies and the Hawaiian Islands. Yet in 1892 it was only the vigorous protests of persons familiar with the mongoose that kept the animal from being introduced to the United States to help in the extermination of gophers (15). And the one reported by Jackson (3) found in Kentucky showed that some individuals were being brought to this country as late as 1920.

There is a specific law, the so-called Lacey Act, which was enacted in 1900, which prohibits the introduction of the mongoose to the United States. The law was primarily designed to stop the traffic in birds for millinery purposes; but the importation of such creatures as the mongoose, fruit bat, and starling is also prohibited by it. However, the fines set are low in terms of today's inflated dollar. Therefore, efforts must be continued to prevent the introduction of the mongoose.

(Appendix B contains pertinent excerpts from the Lacey Act.)

Walker (20), who felt the mongoose fitted into a proper niche in the Hawaiian Islands, commented on the need for rodent control in the western United States. However, he said "a carnivore that was evolved to cover the needs of Java" is not the answer to the problem. The protection of our native predators would seem a more logical solution of the problem. The introduction of the omnivorous mongoose would only add more problems.

## CHAPTER VIII

### SUMMARY AND CONCLUSIONS

Herpestes auropunctatus auropunctatus was introduced to the West Indies in 1872 and to the Hawaiian Islands in 1883. It is a small, ground-dwelling predator with omnivorous habits. Females produce litters of two to four young twice a year although males are fertile throughout the year.

The mongoose is now widespread in the West Indies. It is held in disfavor on most of the islands, and methods are still being examined for its control. Feelings against the mongoose are not as strong in the Hawaiian Islands where it exists on four of the eight main islands. The animal has proved extremely adaptable to both island groups with one reason for its adaptability being the similarity of island climates with its native India. It has no direct competitors on the islands and few successful predators.

The adaptability and food habits of the mongoose make it a formidable animal to introduce anywhere. Introduction to the United States could result in unpredictable changes in the present wildlife structure. A law exists which prohibits the introduction of the mongoose to this country.

As Matthiessen (8) has said, "... there is always the risk that some deranged admirer of this savage little beast will loose a pair upon the country". Therefore, the United States should make continued efforts through control and education to prevent the introduction of the mongoose to its continental states or to its territories.



#### SELECTED BIBLIOGRAPHY

1. Baldwin, Paul H., Charles W. Schwartz, and Elizabeth Reeder Schwartz. "Life History and Economic Status of the Mongoose in Hawaii." Journal of Mammalogy, XXXIII (August, 1952), 335-56.
2. Barbour, Thomas. "Some Faunistic Changes in the Lesser Antilles." Proceedings of the New England Zoological Club, XI (January 10, 1930), 73-85.
3. Jackson, Hartley H. T. "A Mongoose in Kentucky." Journal of Mammalogy, II (November, 1921), 234-35.
4. \_\_\_\_\_. "Correction." Journal of Mammalogy, III (May, 1922), 116.
5. Kipling, Rudyard. "Rikki-tikki-tavi." The Jungle Book. Garden City, New York: Doubleday, Doran and Company, Inc., 1929. (First copyrighted by Kipling in 1893.)
6. La Rivers, Ira. "Some Hawaiian Ecological Notes." The Wasmann Collector, VII (August, 1948), 85-110.
7. Matthew, William Diller. "Climate and Evolution." Special Publications of the New York Academy of Sciences, I (June 15, 1939), 1-223.
8. Matthiessen, Peter. Wildlife in America. New York: The Viking Press, 1959.
9. Milne, Lorus J., and Margery Milne. The Balance of Nature. New York: Alfred A. Knopf, 1961.
10. Myers, J. G. "The Mongoose. The Present Position of the Mongoose in the West Indies." Tropical Agriculture, VIII (April, 1931), 94-95.
11. Pearson, Oliver P., and Paul H. Baldwin. "Reproduction and Age Structure of A Mongoose Population in Hawaii." Journal of Mammalogy, XXXIV (November, 1953), 436-47.
12. Perkins, R. C. L. "Vertebrata." Fauna Hawaiiensis, I (Part IV). Cambridge: The Cambridge University Press, 1903.
13. Pimentel, David. "Biology of the Indian Mongoose in Puerto Rico." Journal of Mammalogy, XXXVI (February, 1955), 62-68.

14. Pocock, R. I. "Mammalia - Vol. II." The Fauna of British India including Ceylon and Burma. London: Taylor and Francis, Ltd., 1941.
15. Seaman, George A. "The Mongoose and Caribbean Wildlife." Transactions of the Seventeenth North American Wildlife Conference. Washington, D. C.: Wildlife Management Institute, 1952, pp. 188-97.
16. \_\_\_\_\_, and John E. Randall. "The Mongoose as a Predator in the Virgin Islands." Journal of Mammalogy, XLIII (November, 1962), 544-46.
17. Simpson, George Gaylord. "The Principles of Classification and a Classification of Mammals." Bulletin of the American Museum of Natural History, LXXXV (1945), 1-350.
18. United States Congress. The Statutes at Large of the United States of America, 56th Congress (December, 1899 - March, 1901). Washington, D. C.: Government Printing Office, 1901.
19. Urich, F. W. "The Mongoose in Trinidad." Tropical Agriculture, VII (April, 1931), 95-97.
20. Walker, Lewis W. "Citizen Mongoose." Audubon Magazine, L (March-April, 1948), 80-85.

## APPENDIX A

### CLASSIFICATION

The mongoose is classified in the family Viverridae which also includes the genets and civets. Simpson (17) stated that the viverrids are an old group of carnivores that include many different lines of specialization. He listed the following as the subfamilies of Viverridae: Viverrinae, Paradoxurinae, Hemigalinae, Herpestinae, and Cryptoproctinae. The subfamily Herpestinae is further classified as follows:

Tribe Suricatini:

Suricata -- mierkats

Tribe Herpestini:

Herpestes -- common mongooses and ichneumons

Helogale -- dwarf mongooses

Atilax -- marsh mongooses

Mungos -- striped mongooses

Crossarchus -- cusimanses

Ichneumia -- white-tailed mongooses

Bdeogale -- African mongooses

Rhynchogale -- African mongooses

Cynictis -- mierkats

Xenogale -- African mongooses

The genus Herpestes has by far the widest present distribution as a native genus in Africa, Asia, and Spain and as an introduced genus in the West Indies and the Hawaiian Islands.

## APPENDIX B

### EXCERPTS FROM THE LACEY ACT (18)

"Approved May 25, 1900.

"Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the duties and powers of the Department of Agriculture are hereby enlarged so as to include the preservation, distribution, introduction, and restoration of game birds and other wild birds.

"The object and purpose of this Act is to aid in the restoration of such birds in those parts of the United States adapted thereto where the same have become scarce or extinct, and also to regulate the introduction of American or foreign birds or animals in localities where they have not heretofore existed ....

"Sec. 2. That it shall be unlawful for any person or persons to import into the United States any foreign wild animal or bird except under special permit from the U. S. Department of Agriculture: Provided that nothing in this section shall restrict the importation of natural history specimens for museums or scientific collections, or the importation of certain cage birds, such as domesticated canaries, parrots, or such species as the Secretary of Agriculture may designate.

"The importation of the mongoose, the so-called "flying foxes" or fruit bats, the English sparrow, the starling, or such other birds or animals as the Secretary of Agriculture from time to time declare injurious to the interest of agriculture or horticulture is hereby prohibited, and any such species upon the arrival at any ports of the United States shall be destroyed or returned at the expense of the owner.

"For each evasion or violation of this Act the shipper shall, upon conviction, pay a fine of not exceeding two hundred dollars; and the consignee knowingly receiving such articles so shipped and transported in violation of this Act shall, upon conviction, pay a fine of not exceeding two hundred dollars; and the carrier knowingly carrying or transporting the same shall, upon conviction, pay a fine of not exceeding two hundred dollars."

VITA

Ardyce Jane Asire

Candidate for the Degree of

Master of Science

Report: HERPESTES AUROPUNCTATUS AUROPUNCTATUS AS AN INTRODUCED PREDATOR  
IN THE WEST INDIES AND THE HAWAIIAN ISLANDS

Major Field: Natural Science

Biographical:

Personal Data: Born in Cincinnati, Ohio, May 10, 1931, the daughter of Arthur G. and Claire D. Reisner. Married to Donald H. Asire.

Education: Graduated from Walnut Hills High School, Cincinnati, Ohio, in 1949; received the Bachelor of Arts degree from Ohio Wesleyan University, with majors in mathematics and physics, in June, 1953; completed requirements for the Master of Science degree in May, 1965.

Professional Experience: Entered the United States Air Force in 1953 and served until 1957 as a weather officer; during this period attended the Basic Meteorology course at the University of Chicago; served as a reserve officer until 1962 and is now a Captain in the Air Force Reserve. Taught mathematics at the Morgan School, Clinton, Connecticut, from 1958 until 1960; attended the University of Connecticut to obtain teacher certification and holds a temporary teaching certificate from the state of Connecticut.

Organizations: Initiated into Phi Beta Kappa fraternity in 1953; initiated into Phi Sigma society in 1964.