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THE ROLE OF INSECTICIDES AND OTHER  
PREDATORS IN THE ESTABLISHMENT OF A PIARY  
IN A FOREST ENVIRONMENT. SARLAYA,  
GUZON, PHILIPPINES

THE <sup>c/</sup>ROLE OF INSECTIVOROUS VERTEBRATES AND OTHER PREDATORS  
IN THE ESTABLISHMENT OF AN APIARY IN AN AGROFOREST  
ENVIRONMENT: SARIAYA, QUEZON, PHILIPPINES

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## ABSTRACT

MAFFATOEBA SILA, University of the Philippines at Los Banos, May 1989. The Role of Insectivorous Vertebrates and Other Predators in the Establishment of an Apiary in an Agroforest Environment: Sariaya, Quezon, Philippines.

Major Professor: Dr. Roberto P. Rubio

The role of some insectivorous vertebrates in apiculture in agro-forestry was studied by observing their feeding habits. Non-vertebrate bee enemies have been observed while some bee plants were identified thru pollen analysis.

Crop and stomach content analyses revealed that four of the 16 dissected vertebrates were bee predators. These were *Bufo marinus* L., *Chaetura gigantea gigantea* (Temminck), *Monticola solitarius philippensis* (P.L.S. Muller), and *Artamus leucorhynchus leucorhynchus* Linnaeus, having the following percentages of bee fragments examined in their crops and stomach: 0.26%, 66.46%, 5.56%, and 10.71%, respectively. In the later part of the study, *Merops philippinus philippinus* L. was seen feeding on bees during the study.

Among eight bird populations studied, only *Lanius cristatus lucionensis* Linnaeus was significantly correlated with population density of foraging honey bees. Population fluctuations between *C. g. gigantea* and foraging honey bees demonstrated the "predator-prey" interaction that was described by the Lotka-Volterra models.

*Chaetura gigantea gigantea* (Temminck) was observed in the study area from October 1988 to January 1989. They visited the apiary in groups of 3-39 individuals, usually early in the morning until late in the afternoon. Consumption of bees by *C.g. gigantea* ranged from 299 to 449 bees per day. *A.l. leucorhynchus* was seen preying on queen bees and drones that are mating in the air.

*Merops philippinus philippinus* L. was considered dangerous to the bees only when present in big groups. Foulbrood diseases, *Varroa jacobsoni* Oudemans and *Galleria mellonella* (L.) were found the most important enemy of the bees in the area.

Eleven species of pollen were determined as food sources of the honey bees. *Cocos nucifera* L. was the dominant source in six consecutive months, accounting for 91.59% of the pollen sample in August 1988, 97.12% in September 1988, 86.72% in October 1988, 63.45% in November 1988, 71.68% in December 1988, and 94.25% in January 1989.

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## INTRODUCTION

Apiculture can be considered as vital component of agroforestry. Honey bees, both wild and cultured like any other beneficial insects contribute to the maintenance of environmental quality, aside from the economic benefits derived from them. It is one good source of livelihood in rural areas, particularly in developing countries.

Human population keeps on increasing, while the land areas remain constant. In such situation where land is becoming scarce, all remaining and available hectarage must be efficiently utilized in a multipurpose land-use concept for optimal and sustained productivity. A promising approach to this conceptual goal is agroforestry, by which apiculture could be an additional component.

Agroforestry provides a favorable condition not only for honey bees but to insectivorous vertebrates, which can become a limiting factor to beekeeping establishment. Toads, frogs, lizards, bats, skunks, moles, shrews, and birds as among the higher vertebrates that feed largely or entirely on insects (Morse, 1978). Some other species of amphibians, birds, and mammals in many parts of the world, particularly in Africa and Asia, cause serious problems in apiculture. In America and Europe, birds are threats in queen honey bee rearing operations.

In a developing country, wildlife management is usually incorporated in the multiple-use concept of forest land utilization. It thus becomes most interesting to investigate the role of insectivorous in an agroforest eco-system, particularly in apiculture. The study may result into the formulation of a support system that can