The diet of moreporks (*Ninox novaeseelandiae*) in relation to prey availability, and their roost site characteristics and breeding success on Ponui Island, Hauraki Gulf, New Zealand.

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Kirsty Marie Denny

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“A morepork at its nesthole with a weta” by Geoff Moon.

Abstract

The ecological importance of introduced mammalian predators is well acknowledged in New Zealand, however, little research has focused on the ecology of native avian predators and their role in communities. This study investigated the ecology of moreporks (*Ninox novaeseelandiae*) on Ponui Island, Hauraki Gulf, New Zealand between August 2007 and April 2008. The primary aim was to investigate the functional response of moreporks to availability of their prey. The contents of regurgitated morepork pellets were compared with relative abundance of prey taxa (invertebrates, small birds and rodents) over the study period. The diet consisted primarily of a range of invertebrate prey, particularly weta (Anostostomatidae and Raphidophoridae) and beetles (Coleoptera). Small numbers of vertebrate prey were recorded including rodents and birds. A positive relationship between the percentage contribution to pellet samples of certain taxa and their relative availability was found, and there were peaks in the occurrence of seasonally abundant taxa including cicadas (Cicadidae), and huhu beetles (*Prionoplus reticularis*). The tendency of moreporks to prey on abundant taxa indicates that they are unlikely to depress prey populations to low levels, and may have some degree of stabilising influence. A significant increase in the rodent component of the diet in April indicated that the risk to moreporks of secondary poisoning during mammalian pest control operations may vary considerably with the time of year. The secondary aims were to collect data on roost site characteristics and breeding success. Moreporks roosted at a mean height of 4m, and foliar cover at the 4-6m height tier appeared to be the most important characteristic of roost sites when compared with control sites. These findings suggested that moreporks were selecting roost sites with high overhead cover. Possible reasons for this include predator avoidance, avoidance of mobbing passerines, and the microclimate provided. None of three established pairs and two other birds were observed to establish a nest or breed successfully. Additionally, only three juvenile moreporks were sighted or heard across the 90ha study area suggesting low breeding success in 2007-08. This may have been influenced by a range of factors including 1), predation by the high densities of ship rats on Ponui, or other predators 2), a lack of suitable nest sites such as tree hollows in some areas or 3), competition for invertebrate prey with high densities of ship rats and North Island brown kiwi (*Apteryx mantelli*).

Preface

The specific focus of this thesis stemmed from the idea of my principal supervisor, Isabel Castro, for a study of predator-prey interactions on Ponui Island. Little research of this type has been carried out in New Zealand, although an understanding of the interactions between different species and their environment is essential for effective conservation and management. The importance of research on the ecology of introduced mammalian predators in New Zealand is well recognised. However, little work has focussed on the ecology of native avian predators such as the morepork, (*Ninox novaeseelandiae*) and their interactions with other species. The current study had two main aims:

- The primary aim was to investigate the diet of moreporks in relation to availability of their prey on Ponui Island.

- The secondary aims were to collect data on roost site characteristics and breeding success of moreporks on Ponui Island.

Chapter One is a general introduction that presents the importance of ecological studies, particularly those assessing the relationships between predators and their prey, and gives some background on predator-prey assemblages in New Zealand.

Chapters Two and Three present the findings from the primary aim above. Chapter Two focuses on the relative abundance of morepork prey groups (invertebrates, small birds and rodents) whilst Chapter Three describes the diet of moreporks on Ponui, and how this was related to relative abundance of prey. A separate chapter was dedicated to the relative abundance of prey in order to include more detailed results, and to discuss the findings on their own merits without detracting from the key focus of Chapter Three.

Chapter Four presents the findings from the secondary aims on roost sites and breeding success of moreporks on Ponui.

It is intended that chapters Two, Three and Four be relatively stand alone in nature. As such, there is necessarily some repetition of information in each.

Naturally, all aspects of an animal's ecology are of importance when considering its role in communities. As such, Chapter Five is a general discussion which synthesises the findings of the preceding chapters in relation to the Ponui Island ecosystem, and the broader context.

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