CURRENT RAPTOR STUDIES IN MÉXICO

Edited by

Ricardo Rodríguez-Estrella

Centro de Investigaciones Biológicas del Noroeste, S.C.
Comisión Nacional para el Conocimiento y Uso de la Biodiversidad
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PREFACE

Biological diversity of México, raptors and scientific research

México is one of the most biologically diverse countries on the planet, as a result of its very complex geological history, geographic position, and environmental heterogeneity, among other factors. Its biological diversity is such, that together with 17 other countries such as India, China and Brazil, it is referred to as Megadiverse. Together, these countries sustain more than 70% of all living organisms, including plants, animals and microorganisms, México ranking first for its diversity of reptiles and amphibians, third for its mammalian diversity, fourth for its diversity of vascular plants, and eleventh for its diversity of birds. Moreover, a high percentage of the species, up to 65% in amphibians, are endemic to México; i.e. with geographic ranges restricted to the country.

The biological diversity of México has been part of the geographic and natural settings that have accompanied its inhabitants since they first settled in the country more than 12,000 years ago. The legendary diversity of the country has astonished scientists such as Baron Alexander Von Humbolt, who described México as a biological paradise. Unfortunately, this impressive natural diversity of the country is practically unknown by most Mexicans, who instead should be proud of their biological inheritance.

Nowadays, the biological diversity of México is seriously threatened. Hundreds of species and thousands of populations are endangered, mainly because of human population size and social inequity. México's population size is expected to become stable around 145 millions, but only in three decades. The loss of biological diversity has severe consequences at a biological and social level, because populations and species are the basis for the structure and functioning of biological systems, which provide us for free with environmental goods and services. These goods and services, which include the maintenance of a proper atmospheric gas composition, the ozone layer, soil fertility and quality and quantity of water, among others, generate the environmental conditions that allow life on Earth. They are the basis of our existence. Paradoxically, their continuance depends on our activities.

The only way to understand the complex relationships of living organisms with their environment, their role in providing environmental services, and better management of these living organisms to reconcile their use with their conservation, is through a solid investment in scientific research. However, many governments, including the Mexican government, surrender to the temptation of investing little in scientific and technological research, focusing on other approaches to fight social and economic problems. Those governments ignore that one of the few ways out of poverty is through the generation of scientific and technological knowledge, which is fundamental to the development of any country.

That is why I have received with great satisfaction this volume addressing the ecology and conservation of raptors – one group of species very sensitive to anthropogenic disturbances. As top predators, with low population sizes, raptors are susceptible to environmental changes that can affect them negatively, and thus increase the risk of their extinction. That is precisely why their status is an indication of environmental conditions, much like canary birds long ago used to indicate the presence of toxic gases to miners. The results presented by researchers working with raptors in México can have an immediate application in conservation.

The careful editing of the editor has produced an interesting book of high scientific quality. I am sure that time will be the best test of the benefits of this type of publications, which are essential to maintain the welfare of our society.

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Food habits of breeding peregrine falcons (*Falco peregrinus*) in the Ojo de Liebre Lagoon, Baja California Sur, México

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ABSTRACT

Feeding habits of the peregrine falcon (*Falco peregrinus anatum*) were studied by analyzing prey remains at 3 eyries in the Laguna Ojo de Liebre, Baja California Sur, México, during the 1993 and 1994 breeding seasons. The falcons consumed water and terrestrial birds and one species of mammal, the pygmy pocket gopher (*Thomomys umbrinus*). We collected 86 feeding items. The diet included 17 species of waterbirds, of which 6 comprised 69% of the diet. Marbled godwit (*Limosa fedoa*) was the most common. The variety of prey items found in the study area was greater than that reported for peregrine falcons on Gulf of California islands. This may be attributable to greater diversity and availability of prey in the lagoon.

Key words: peregrine falcon, diet, Ojo de Liebre Lagoon, B.C.S., México.

RESUMEN

Estudiamos los hábitos alimenticios del halcón peregrino (*Falco peregrinus anatum*) mediante el análisis de restos de presas en 3 nidos, en la Laguna Ojo de Liebre, Baja California Sur, México, durante el período reproductor de 1993 y 1994. Los halcones consumieron aves acuáticas y terrestres y tuzas (*Thomomys umbrinus*). Colectamos un total de 86 restos de especímenes. La dieta incluyó 17 especies de aves acuáticas, sin embargo, 6 especies comprendieron el 69% de las presas. Una de las especies, *Limosa fedoa*, constituyó el grueso de la dieta. La variedad de la dieta encontrada en el área de estudio fue más amplia que la reportada para halcones peregrinos residentes en islas del Golfo de California. Esto puede deberse a la mayor diversidad y disponibilidad de presas en los humedales de la Laguna Ojo de Liebre.

INTRODUCTION

The peregrine falcon (*Falco peregrinus*) is widely distributed in the world (Ratcliffe 1993). In México, it is a resident of the northern and central part of the country. A major concentration of this bird is known from the Baja California Peninsula and the Gulf of California islands (Hunt *et al.* 1988, Porte *et al.* 1988). Though a well-studied bird in most parts of its range, very little is known about its biology, ecology, and conservation status on the west coast of the Baja California Peninsula, where they were historically abundant until the early 1970s (Banks 1969, Porter *et al.* 1988).

Recent reports suggest that the peregrine falcon is now recovering in the

region (Castellanos *et al.* 1994, 1997). The species was recently removed from the status of endangered birds in México (NOM-059-ECOL-2001). Research on its feeding ecology may provide basic information for managers to develop appropriate management strategies in México. In this paper, we document food habits of the peregrine falcon in the large Pacific coastal lagoon called Laguna Ojo de Liebre of the Baja California Peninsula, México. This lagoon, part of El Vizcaino Biosphere Reserve and listed as a natural site in the World Heritage List (UNESCO 1994), is a recently documented nesting area of the peregrine falcon (Castellanos *et al.* 1994).

STUDY AREA AND METHODS

Laguna Ojo de Liebre (~27.8°N,114°W), on the west coast of the state of Baja California Sur, (Fig. 1), is about 48 km long and 22 km wide, with shallow waters, deep channels, and strong tidal currents. The lagoon is a large complex of wetlands supporting more than 94 species of birds (Massey and Palacios 1994), of which 16 breed on small islands in the lagoon complex (Castellanos *et al.* 2001). The climate is arid and semi-arid. The mean annual precipitation is less than 36 mm, most of which occurs in winter (Salinas *et al.* 1991). *Ruppia maritima, Zostera marina*, and *Phyllospadix scouleri* cover portions of the lagoon's bottom and shoreline (Lot *et al.* 1986). Five small relatively flat islands and several light towers along a navigation channel are within the lagoon. Surrounding the lagoon are coastal dune scrub (*Ambrosia, Dalea,* and *Plantago* spp.), the Vizcaino desert flat, which is covered with 30 to 60 cm high

halophyte scrubs (*Ambrosia, Bursera, Frankenia, Bouteloa,* and *Muhlenbergia* spp.) (León de la Luz *et al.* 1991), salt production ponds, and a few coastal outposts and the nearby town of Guerrero Negro.

Figure 1. Map of the vegetation zones and location of the study site.

Prey remains were collected during the breeding season from three peregrine falcon nests, one on the ground on Piedras Island and the other two on channel towers near the sand dune coast. The bulk of the prey remnants were collected from the nest on Piedras Island. The first collection, in May 1993, involved all recognizable material accumulated for an unknown period of time. The nest site area was cleaned and a second collection was made in June 1993. Regular collections (25 to 30 days apart) were made from March to June 1994. To determine diet, remains collected in both years were combined and identified by comparison with reference collection specimens at the Museo de Historia Natural of the Universidad Autónoma de Baja California Sur (UABCS). Frequency of prey in the diet is expressed in percent.

RESULTS AND DISCUSSION

During the sampling, 86 individual prey items were identified, including 18 species of birds and one mammal, the pygmy pocket gopher (*Thomomys umbrinus*). Six species of birds constituted 68.6% of the prey items found in the peregrine falcon nests. The marbled godwit was the most frequent bird in our sample, representing 38% of the items, followed by the black-crowned night heron, long-billed curlew, short-billed dowitcher, royal tern, and willet (Table 1). Three of the bird species (black-crowned night heron, royal tern, and snowy egret) breed in colonies on two small islands in the lagoon.

Table 1. Prey remains identified in peregrine falcon eyries during the breeding season of 1993-1994.

scientific name	common name	items	frequency (%)
Limosa fedoa	marbled godwit	33	38.37
Nycticorax nycticorax	black-crowned night heron	6	6.98
Numenius americanus	willet	5	5.81
Catoptrophorus semipalmatus	long-billed curlew	5	5.81
Limnodromus griseus	short-billed dowitcher	5	5.81
Sterna maxima	royal tern	5	5.81
Calidris alpine	dunlin	2	2.33
Larus spp.	gulls	2	2.33
Calidris alba	sanderling	1	1.16
Actitis macularia	spotted sandpiper	1	1.16
Arenaria interpres	ruddy turnstone	1	1.16
Heteroscelus incanus	wandering tattler	1	1.16
Phalaropus fulicaria	red phalarope	1	1.16
Egretta thula	snowy egret	1	1.16
Larus philadelphia	Bonaparte gull	1	1.16
Sterna hirundo	common tern	1	1.16
Pluvialis squatorola	black-bellied plover	1	1.16
Mimus sp.	mockingbird	1	1.16
	unidentified birds	11	12.79
Thomomys umbrinus	pocket gopher	2	2.33

Peregrine falcons capture a wide variety of prey including birds (Ratclife 1993), small mammals (Porter and White 1973, Bradley and Oliphant 1990), and bats (Stager 1941, Porter and Jenkins 1988). However, this species is considered a bird predator specialist (Ratcliffe 1993). Studies throughout the world (Cade 1960, White and Cade 1971, Porter and White 1973, Czechura 1984, Vasina and Straneck 1984, ●ro and Tella 1995) documented a diet based on a wide variety of bird species. In some places, peregrine falcons prey on fewer species of birds (Beebe 1960, Ratcliffe

1993, Velarde 1993).

Our findings indicate that the peregrine falcon diet includes many bird species. This dietary breadth is greater than that documented for peregrine falcons on the Gulf of California islands. Velarde (1993) found that peregrine falcons on Isla Rasa rely on three species of marine birds (Larids). She mentioned the finding of Anderson that peregrine falcons on Isla Partida preyed heavily on two resident marine bird species (Alcids) (*Oceanodroma microsoma* and *O. melania*). We have no systematic data on abundance and availability of peregrine falcon prey in the Laguna Ojo de Liebre. However, our data suggest that peregrine falcons rely mainly on waterbirds there, as do their counterparts in the Gulf of California islands (Porter and Jenkins 1988, Velarde 1993). This can be explained because they regularly inhabit small islands and coastal locations (Ratcliffe 1993), and by the particular environmental conditions of the lagoon.

Peregrine falcons take birds in proportion to their abundance, but they also may exhibit preferences for some species because of factors such as size, behavior, availability, and hunting ability (Hunter *et al.* 1988, Porter and White 1973, Ratcliffe 1993). Surveys of wintering shorebirds made by Morrison *et al.* (1992), and Page *et al.* (1997) in the Laguna Ojo de Liebre indicate that the marbled godwit is the most abundant large-size shorebird there, followed by willets and dowitchers. The predominance of marbled godwit in the peregrine falcon diet reflects their relative abundance in the area.

Of the waterbirds breeding in the area, only three were taken by peregrine falcons: royal tern, snowy egret, and black-crowned night heron. The last two breed on Piedras Island. The falcon nest is located a few meters from them. The royal terns nest in a dense colony of about 2,800 pairs (Castellanos *et al.* 2001) in an open area on Conchas Island. Remains of this prey were found in the falcon nests on the channel towers, about 22 km from Conchas Island. These three species of resident birds are less abundant than the marbled godwit, willet, and dowitcher, but we suspect that their colonial nesting near peregrine eyries make them more accessible to peregrine falcons.

Very few land birds were found amongst the prey remains we collected. The limited occurrence of terrestrial birds can be explained in part by the halophyte scrub of the Vizcaino Flats, which support a few small passerines, such as sparrows (Emberizidae), which typically are not important prey species of the peregrine falcon (Ratcliffe 1993). However, the low frequency of small terrestrial birds may be a limitation of the sampling method (Marti 1978). For example, we observed peregrine falcons consuming American pipits (*Anthus rufescens*) on several occasions and found no remains of this species. Peregrine falcons resist capturing ground prey, such as rodents (Porter and White 1973). However, the open landscape surrounding the lagoon may leave the pygmy pocket gopher, a small rodent, common in some parts of El Vizcaino Desert, exposed when it emerges from its burrows, and vulnerable to predation by the falcons.

Given the variety, abundance, and availability of prey, we believe that additional pairs of peregrine falcons could be sustained in the Laguna Ojo de Liebre. The development of a conservation program offering artificial nesting sites could be an appropriate strategy to increase their numbers in the lagoon, an area where cliffs and other elevated suitable nesting sites are scarce.

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