Introduction to the Classification, Morphology and Ecology of Asian Raptors

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2008/10/24

Subjects

PART I

- Classification: to classify many raptor species into hierarchical groups
- Morphology: the form and structure of raptors
- Ecology: the relations and interactions between raptors and their environment.

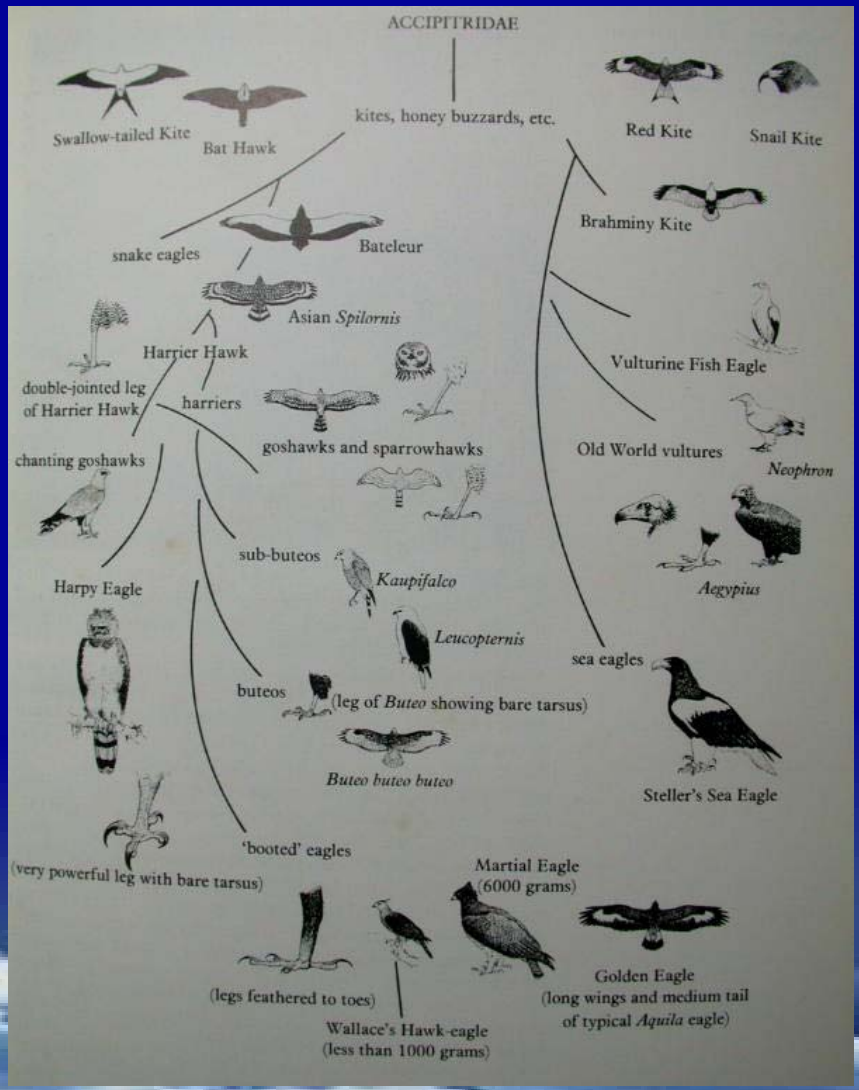
PART II

Introduction to the Asian Raptor genera

Raptor and Human Cultures

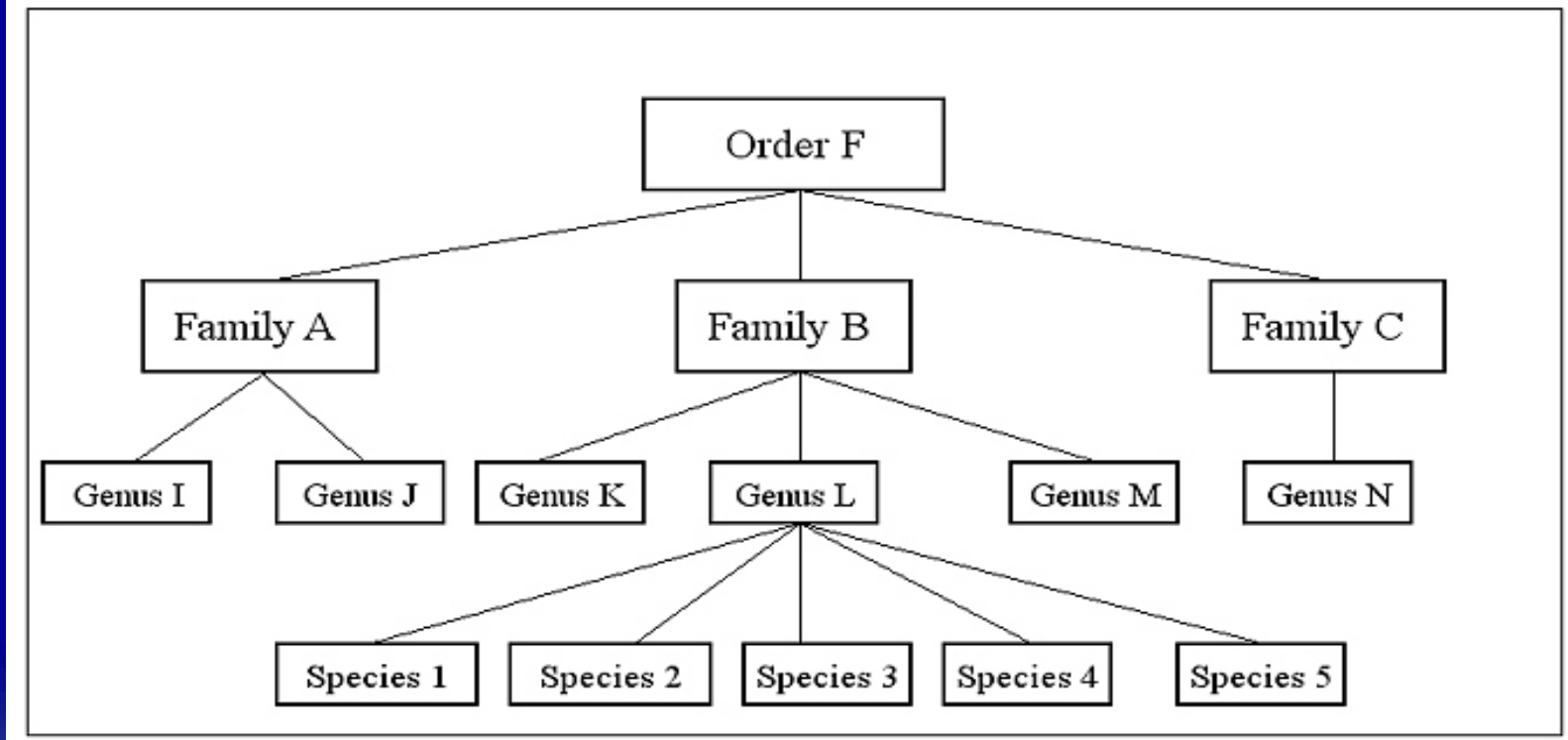
- Nomadic people in central Asia
- Many people's worship
- Logos and symbols
- Very few used in modern world

Evolution Tree of Raptors



Copy from Leslie Brown (1976)

Classification is a “tree structure”



Raptor Classification

Example 1: Sibley and Monroe 1990

belongs to Order CICONIFORMES

4 families, 81 genera, 311 species

Family	Sub-Family	Genera	Species
FAMILY ACCIPITRIDAE	PANDIONINAE ACCIPITRINAE	1 64	1 239
FAMILY SAGITTARIIDAE		1	1
FAMILY FALCONIDAE		10	63
FAMILY CICONIIDAE		5	7

Raptor Classification

Example 2: Clements 2000

Order FALCONIFORMES

5 families, 308 species

Family	Species
FAMILY CATHARTIDAE	7
FAMILY PANDIONIDAE	1
FAMILY ACCIPITRIDAE	236
FAMILY SAGITTARIIDAE	1
FAMILY FALCONIDAE	63

Raptor Classification

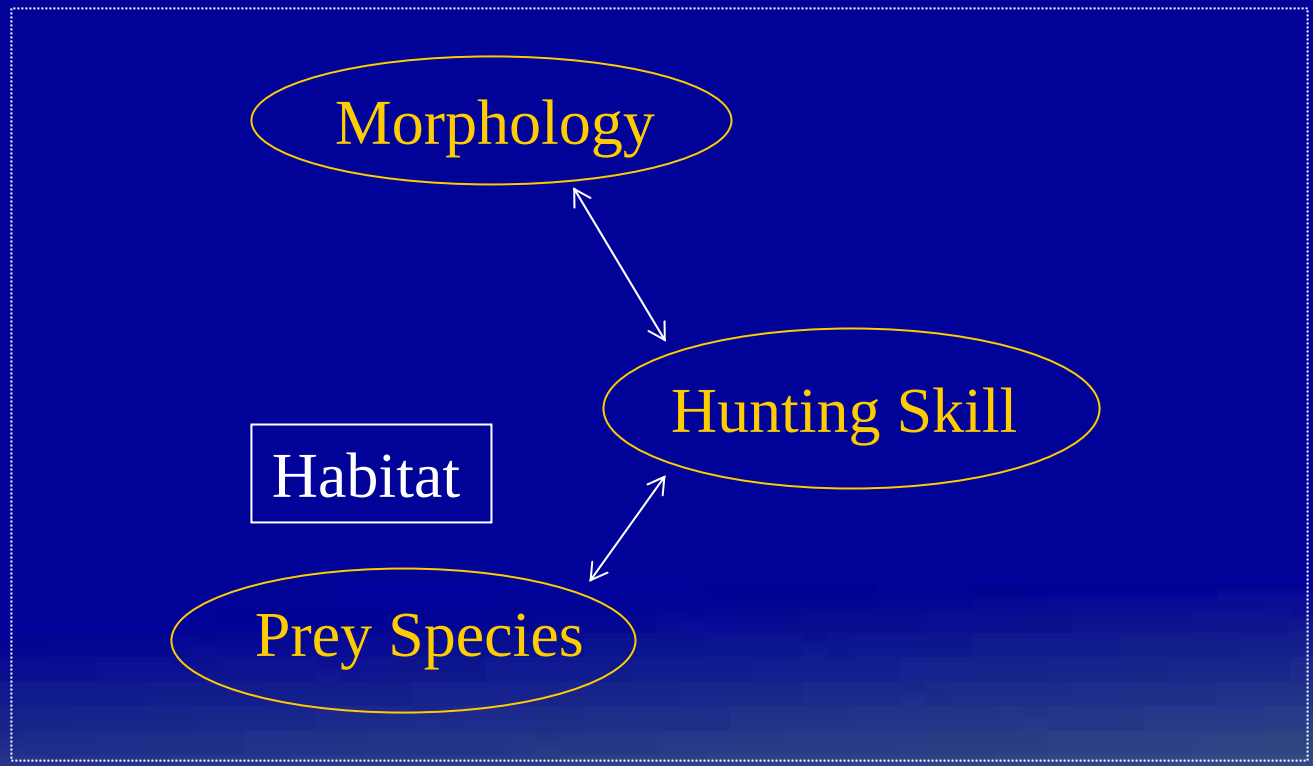
Example 3: Dickinson 2003

Order FALCONIFORMES

3 families, 83 genera, 304 species

Family	Genera	Species	World Distribution
FAMILY CATHARTIDAE	5	7	Americas
FAMILY FALCONIDAE	11	64	whole World
FAMILY ACCIPITRIDAE	67	233	whole World

Mechanism of Raptor Evolution



Morphology

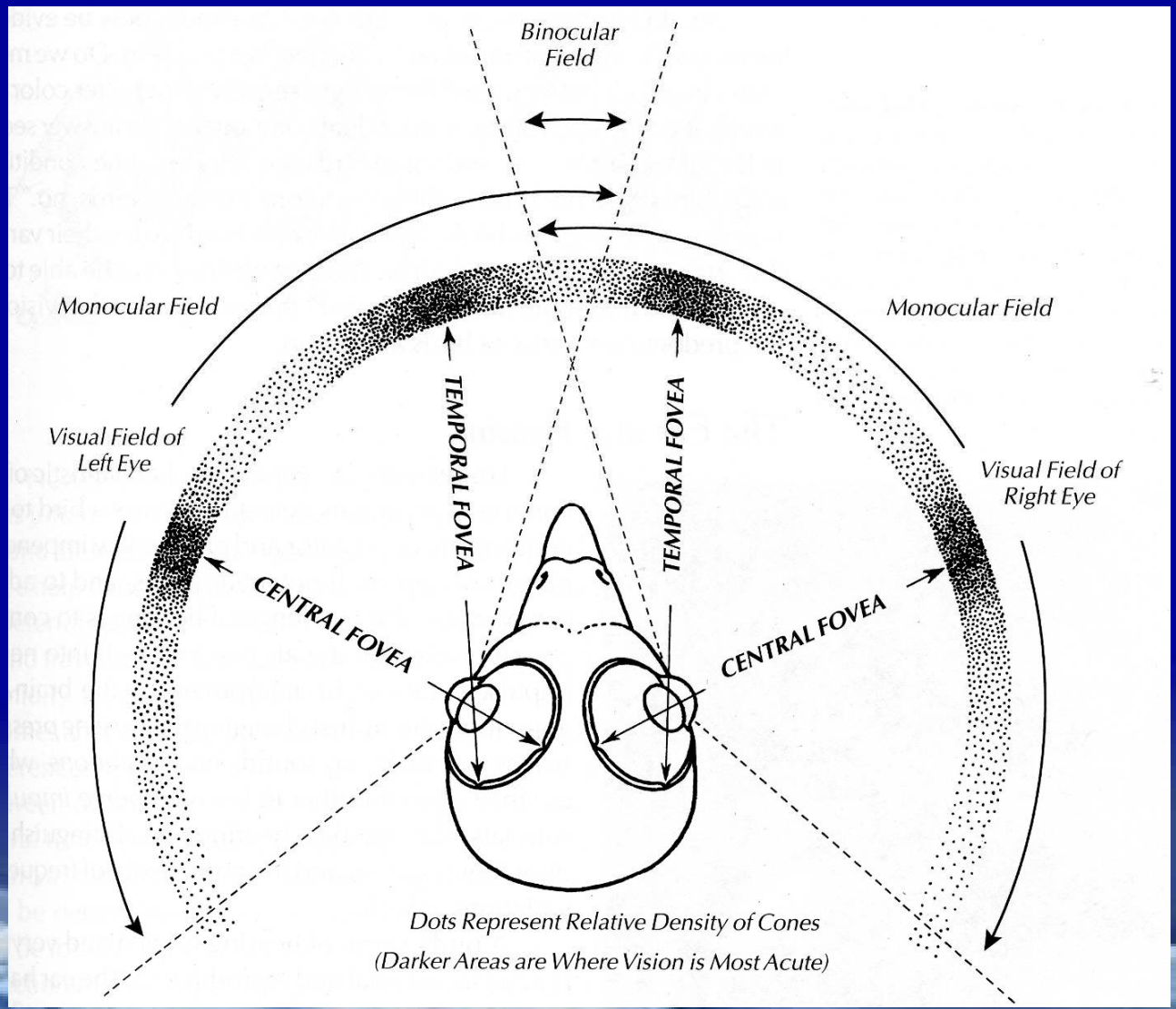
The biology to study
the form and structure of organisms.

Morphology vs Function

Structure	Function
Eyes	To see,to seek prey
Ears	To hear, to seek prey
Nose	To smell
Bill	To tear the prey apart
Wings	To fly, to chase the prey
Tail	To turn, to keep balance
Claws	To kill
Plumage	To hide

Eyes & Sight

Eyes & Sight



(Podulka et al. eds 2004. Handbook of Bird Biology. Cornell Lab of Ornithology, Princeton University Press)

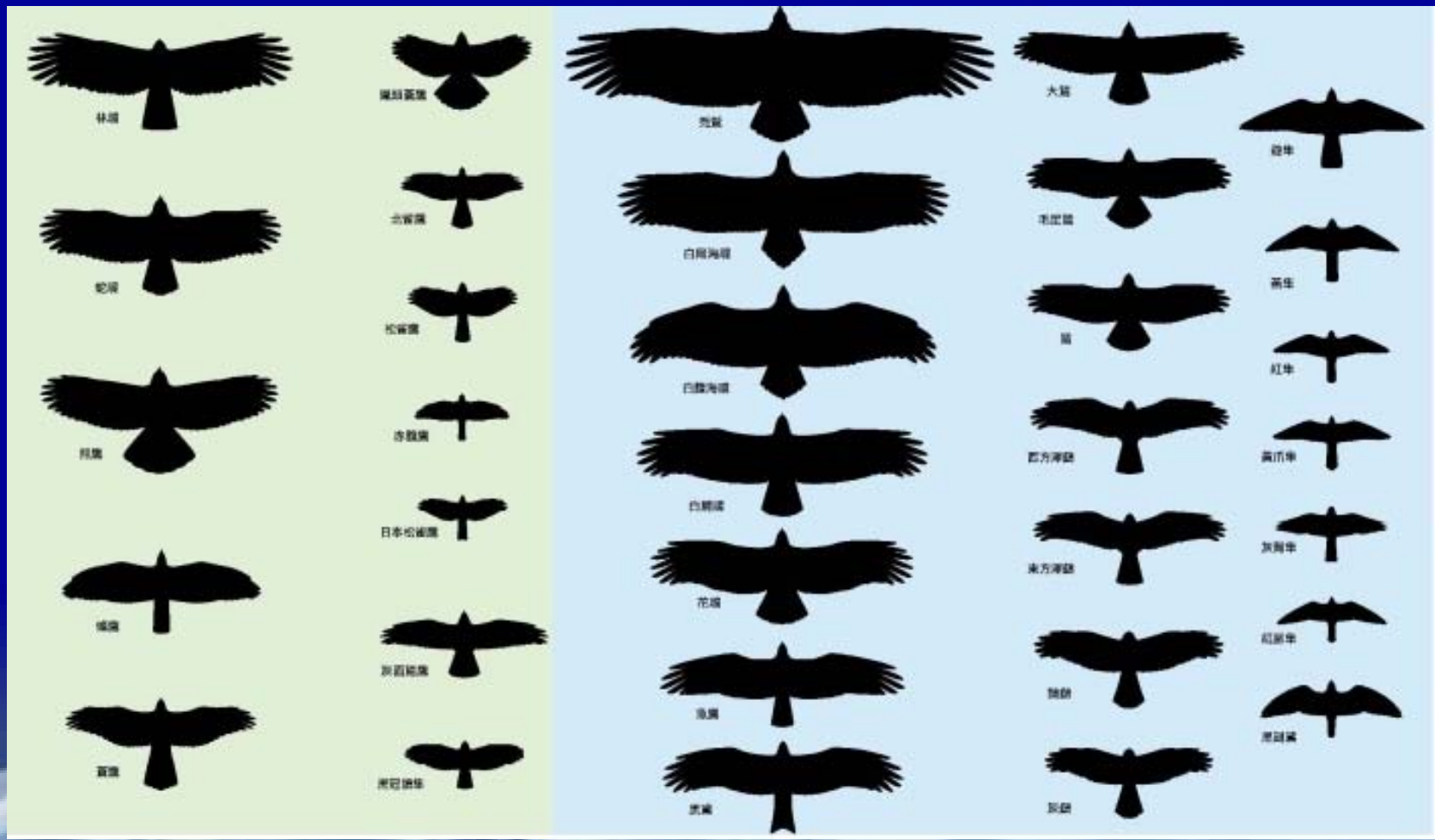
Ears & Hearing

Nose & Smell

Wings & Flight

Advantage for	Wing Feature	disadvantage for
Soaring	Big Area	High wind resistance
Gliding, Long distance travel	Long & Narrow	Action in small space
Agility in Small space	Short & Broad	Long distance travel
Stable slow flight	Deep “Fingers”	Fast flight
Fast flight	Pointed Wing	Slow flight
Frequent flapping	Angled	
Long time Floating	Light weighted	Stooping Strength

Wing & Tail shape diversity



Tail

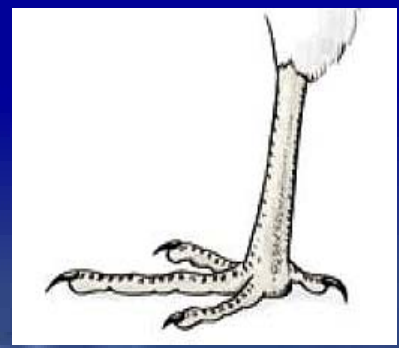
- Long tail benefits swift turning
- Raptor's tail length relates to its turning agility, also relates to its prey's agility
- "Third wing" of small raptors
- Special balance function

Feet & Claws

Eagle, Hawk-eagle

Sparrowhawk

Osprey



Vulture

Ecology

- from Greek “oikos”, it means “home”
- Ernest Haekel (1869) is the first one to use the word
- Krebs(1972): “the scientific study of the interations that determine the distribution & abundance of organisms”
- the science to understand the relations and interactions between organisms and their environment.

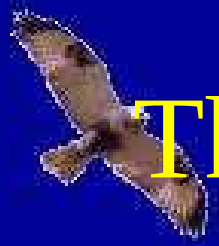
Ecology

Organism of different species

Organism of the same species

Organism

Environment



The role of raptor in an ecosystem

Predator

- Higher consumers, feeds on various animals
- Distributes all terrestrial ecosystems worldwide
- Small population, but controls huge small animal's population.
- Enhance evolution and biodiversity
- Very diverse in size, in shape, etc.
- Perfect killers, with extremely good flight skills
- A good indicator of the ecosystem's health

How to Study Raptor Ecology in your hometown? -some suggestions

- First of all, go out to find raptors, and record it.
- Accumulate records, then you have begun the distribution study.
- Think about why these raptors distribute like this, then you have begun the habitat study.
- To observe what does the raptor feed on, then you have begun the food habit study.
- If you can find a raptor nest, observe the whole breeding period carefully, then you have begun the best part of life history study.

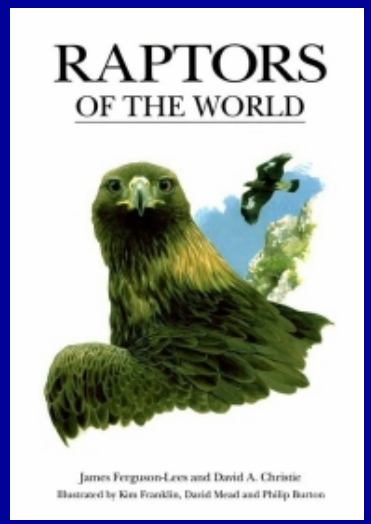
Ecological Isolation of the Raptor in Taiwan
The food

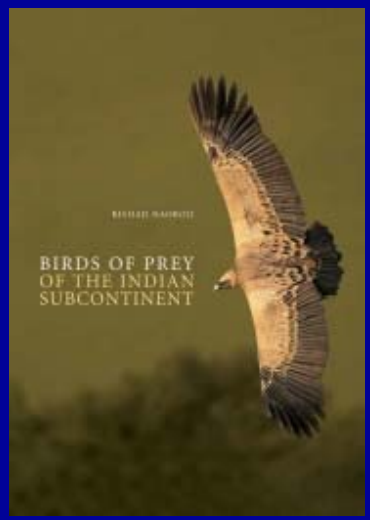
	P. ha	C. ae	F. ti	F. pe	S. ch	A. tr	A. vi	M. mi	I. ma	S. ni
Larger mammals										●
Rata		●	●			●	○		●	
Squirrels						●			○	●
Larger Birds				●		○				●
Medium Birds		○		●		●	○	○		
Small Birds			●	○		○	●			
Chick, Eggs									●	
Snakes, Lizards					●	○	○		○	○
Frogs		○			○					
Insects			●			○	●			
Fishes	●									
Dead Fish, Garbage								●		

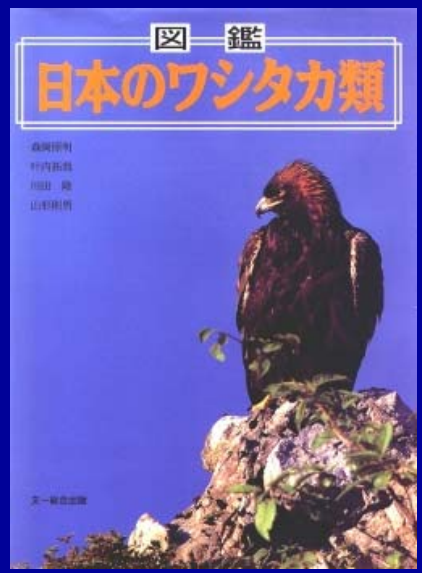
Ecological Isolation of the Raptor in Taiwan
The Habitat

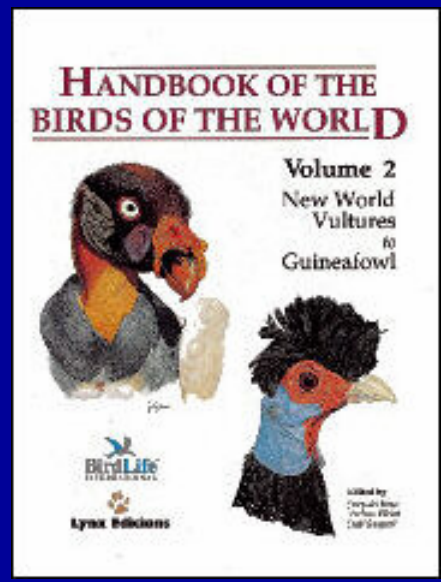
		P. ha	C. ae	F. ti	F. pe	S. ch	A. tr	A. vi	M. mi	I. ma	S. ni
High alt.	Grassland			○							
	Coniferous Fr.							○			○
Mid alt.	Hybrid Fr.					○	●	●		○	●
	Broadleaved Fr					○	●	●		●	●
Low alt.	Secondary Fr.					●	●	●	●	●	
	Plantation					●	●	●	○		
Plain	Village			○	○		○		●		
	Meadows		○	●	○						
	Wetlands		●		○				○		
	Rivers, Lakes	●							●		
Sea shore	Seashore	●		●	●				●		
	Isles	●		●	●						

Some suggested further readings









Let the sky owns the raptors,
Let the raptors own the sky.