Primates

An Introduction

Alfred L. Rosenberger



Contents

	List of figures	x
	List of tables	xiii
	List of boxes	xiv
	Acknowledgments	xυ
	Preface	xvi
1	What is a primate?	1
2	Arboreal frugivory: the primate adaptive zone	28
3	Madagascar: lemurs	41
4	South America: New World monkeys	69
5	Africa: lorises, galagos, Old World monkeys, and great apes	103
6	Asia: lorises, tarsiers, Old World monkeys, and apes	144
7	Primate communities compared: ecology, morphology, and behavior	167
8	The primate fossil record: highlights	199
9	Primates in crisis	221
	Glossary	224
	About the author	232
	Index	233

Figures

1.2. Divise sizes of the four main antiput and the number of minate	U
1.2 Relative sizes of the four main regions and the number of primate	o
genera per region	0 14
1.3 An indri, Madagascar's largest lemur	14
1.4 A Southeast Asian slow loris	13
1.5 A galago from mainland Africa	10
1.6 A tarsier from Southeast Asia	1/
1.7 A saki monkey from South America	18
1.8 A male gelada and his troop from mainland Africa	19
1.9 A mountain gorilla from mainland Africa	20
1.10 Cladogram of the seven major groups of living primates	22
1.11 The 25 most endangered species and subspecies of primates	25
2.1 Open-mouthed baboon showing the standard four tooth groups of the	
primate dentition	30
2.2 A young baboon riding on the back of its mother	31
2.3 A South American capuchin monkey handling a large fruit	32
2.4 An Asian langur leaping between trees and clutching her infant	33
2.5 A South American howler monkey asleep on a branch	34
2.6 The grasping feet and hands of three primates	36
3.1 Map of Madagascar highlighting the past and remaining rainforests	42
3.2 A fat-tailed, hibernating dwarf lemur	44
3.3 Cladogram and classification of the four living lemur families	45
3.4 Diagram illustrating the position and reflecting function of the tapetum	
lucidum	46
3.5 Close-up photographs of the rhinarium and toothcomb	47
3.6 Diagram illustrating how streams of dry and wet odor-carrying	
molecules enter the strepsirhine nose	48
3.7 The smallest living primate, Madame Berthe's mouse lemur	54
3.8 A bark-gouging fork-marked lemur and its specialized cranium,	
dentition, and hands and feet	57
3.9 A semi-terrestrial ring-tailed lemur	60
3,10 An ave-aye tap-scanning for grubs, its specialized cranium, and long-	
fingered hand	63
3.11 Threat levels of Endangered and Critically Endangered lemur species in	
Madagascar	67
4.1 Map of the neotropics highlighting the distribution of rainforests	70

F .		
Figures	XI	

4.2	Facial expressions of capuchin monkeys	73
4.3	The skulls and faces of a lemur and anthropoid are compared to	
	emphasize differences in the snouts, orbits, and eyes	74
4.4	The crania and faces of a platyrrhine and catarrhine are compared to	
	highlight their internal anatomical differences and external nose shapes	75
4.5	Cladogram and classification of the three living platyrrhine families and	
	the six subfamilies	77
4.6	A spider monkey exhibiting the long prehensile tail with its gripping	
	friction pad underneath	78
4.7	The sexually dimorphic fur and face of the white-faced saki monkey	80
4.8	A family group of owl monkeys twining their tails together while resting	89
4.9	The elaborate facial and fur patterns of four callitrichine species	94
4.10	Threat levels of Endangered and Critically Endangered species from	
	three of six subfamilies of New World monkeys	100
5.1	Map of mainland Africa highlighting the distribution of rainforests	105
5.2	Cladogram and classification of the families and subfamilies of galagos	
	and lorises living in Africa and Asia	107
5.3	Cladogram and classification of the families and subfamilies of Old	
	World monkeys and apes living in Africa and Asia	110
5.4	Photographs of Old World monkey molars showing the bilophodont	
	crown pattern shared by animals with different diets	113
5.5	A monkey whose cheek pouches are stuffed with fruit	114
5.6	The lip flip gesture of a female gelada	116
5.7	A comparison of skeletal structure in a terrestrial baboon, semi-	
	terrestrial chimpanzee, and arboreal gibbon	118
5.8	The massive cranium of an adult male gorilla	120
5.9	A quadrumanous potto moving through the small-branch setting in the	
	tree canopy	125
5.10	Photographic portraits of four Tai Forest monkeys	127
5.11	Chart showing how differences in body size, degree of terrestriality,	
	and diet contribute to niche differentiation among seven Tai Forest	
	monkey species	128
5.12	Terrestrial gelada monkeys living in the rugged mountainous terrain of	
	the Ethiopian highlands	131
5.13	Threat levels of Endangered and Critically Endangered species of	
	primates living in Africa and Afroasia	141
6.1	Map of South and Southeast Asia highlighting the distribution of	
	rainforests	145
6.2	Mimicry in the appearance of the Javan slow loris and the	
	spectacled cobra	149
6.3	Photographs of a tarsier in the wild and a tarsier skull	151
6.4	Chart showing how differences in body size, degree of terrestriality,	
	and diet contribute to niche differentiation among Kuala Lompat	
	monkeys, gibbons, and siamang	157
6.5	Sexual dimorphism in proboscis monkeys' nose size and shape	161
6.6	The faces of flanged and unflanged adult male orangutans	162
6.7	Threat levels of Endangered and Critically Endangered species of	
	primates living in Asia and Afroasia	164

xii	Figures
лп	rigures

7.1	Profiles of tropical rainforest structure dominated by African	
	angiosperms and Asian dipterocarps	171
7.2	A young bamboo lemur eating a bamboo stalk	173
7.3	A seed-eating uakari holding a fruit	174
7.4	A male silverback gorilla in knuckle-walking stance	175
7.5	A leaf-eating silvered leaf monkey	177
7.6	A long-legged, vertical-clinging-and-leaping sifaka and a long-armed,	
	brachiating gibbon	185
7.7	Sexual dimorphism of skulls and canine size and shape in hamadryas	
	baboons	190
7.8	Skulls and vocalization mechanisms of a male howler monkey and male	
	spider monkey	192
7.9	Twins being carried by an adult common marmoset	193
7.10	Primates belonging to different regions and taxonomic groups that have	
	similar social organizations	195
8.1	Molar teeth of four fossil primates from a single Eocene site in Libya	201
8.2	The fossil cranium of Rooneyia, a proto-anthropoid from the Late	
	Eocene found in Texas, U.S.A.	209
8.3	The cranium of a female fossil <i>Propliopithecus</i> (also called	
	Aegyptopithecus), the oldest stem catarrhine, from the Oligocene of Egypt	211
8.4	An owl monkey skull compared with the fossil Tremacebus from the	
	Miocene of Argentina	212
8.5	Three crania of the subfossil lemur Archaeolemur from Madagascar	218
8.6	A subfossil cranium of Antillothrix found in a submerged cave in the	
	Dominican Republic	218
9.1	Orphaned juvenile orangutans that live in a reintroduction shelter	223

Tables

1.1	Geographical distribution of the seven major groups of living primates	4
3.1	Ecological profiles of lemur genera in Madagascar	52
4.1	Ecological profiles of platyrrhines at Manu National Park in Peru	83
4.2	Comparison of the body sizes of platyrrhine genera from the Amazon	
	basin and the Atlantic Forest in Brazil	98
5.1	Distinguishing features of living catarrhines and platyrrhines	111
5.2	The main ecological features of Tai Forest primates in Côte d'Ivoire	123
5.3	Traits that distinguish bonobos and common chimpanzees	134
6.1	General features describing the lorises, Old World monkeys, and apes	
	that occur in both Asia and Africa	147
6.2	The main ecological characteristics of Kuala Lompat primates in Malaysia	156
7.1	Examples of convergent evolution in adaptations of primates living in	
	the four geographical regions	179
7.2	Weights of the smallest and largest primate species in five major	
	taxonomic groups	181
7.3	Examples of convergent evolution associated with sociality and mating	
	among species with similar, independently evolved social organizations	196
8.1	Major events of primate history recorded in the fossil record	200
9.1	Factors driving wild primate populations toward extinction and the	
	mitigating strategies	222

Boxes

1.1	Evolutionary principles: natural selection and selective pressure	5
3.1	Locomotion and the intermembral index	49
3.2	Sexual monomorphism and dimorphism	50
3.3	The dental formula	62
4.1	Vocal communication	79
5.1	Bonobos	134
5.2	Jane Goodall	136
5.3	Dian Fossey	139
7.1	Evolutionary principle: coevolution	169
7.2	Primates benefit from being social	188