
CONTENTS



Acknowledgments 1

Contributors li

Foreword 1 by Malcolm A. Ferguson-Smith lviii

Foreword 2 by Denis M. Larkin lxiii

Introduction lxviii

SPECIES	COMMON NAME	2n	PAINTING PROBES	SOURCE	PAGE
MAMMALIA Time Tree					1
MONOTREMATA Time Tree					2
Order Monotremata					3
Family Tachyglossidae					
<i>Tachyglossus aculeatus</i> (F)	Short-Beaked/Short-Nosed Echidna	64	<i>Ornithorhynchus anatinus</i> (OAN)	J. A. M. Graves Rens et al. (2007)	3
<i>Tachyglossus aculeatus</i> (M)	Short-Beaked/Short-Nosed Echidna	63		J. A. M. Graves Rens et al. (2007)	3
Family Zaglossidae					
<i>Zaglossus bruijini</i> (F)	Long-Beaked/Long-Nosed Echidna	64		J. A. M. Graves Graves et al. (unpublished)	4
<i>Zaglossus bruijini</i> (M)	Long-Beaked/Long-Nosed Echidna	63		J. A. M. Graves Graves et al. (unpublished)	4
Family Ornithorhynchidae					
<i>Ornithorhynchus anatinus</i> (F)	Platypus	52	<i>Tachyglossus aculeatus</i> (TAC)	J. A. M. Graves Rens et al. (2007)	5
<i>Ornithorhynchus anatinus</i> (M)	Platypus	52			5
MARSUPIALIA Time Tree					6
Order Didelphimorphia					7
Family Didelphidae					
<i>Marmosops incanus</i>	South American Mouse Opossum	14		Svartman (1998)	7
<i>Marmosa</i> sp.	Mouse Opossum	14		Aniskin (1994a)	7
<i>Micoureus demerarae</i>	Woolly Mouse Opossum	14		Svartman (1998)	8
<i>Thylamys elegans</i>	Elegant Fat-Tailed Mouse Opossum	14		V. M. Aniskin Shchipanov et al. (1996)	8
<i>Metachirus nudicaudatus</i>	Brown Four-Eyed Opossum	14		Aniskin et al. (1991)	9

SPECIES	COMMON NAME	2n	PAINTING PROBES	SOURCE	PAGE
<i>Monodelphis domestica</i>	Short-Tailed Opossum	18	<i>Aepyprymnus rufescens</i> (ARU), <i>Notamacropus eugenii</i> (NEU), <i>Trichosurus vulpecula</i> (TVU), <i>Sminthopsis crassicaudata</i> (SCR)	P. Perelman Rens et al. (2001, 2003b)	10
<i>Monodelphis domestica</i> (Ideogram)	Short-Tailed Opossum	18	<i>Homo sapiens</i> (HSA)	Graphodatsky et al. (2011)	11
<i>Caluromys philander</i>	Bare-Tailed Woolly Opossum	14		C. Sotero-Caio Souza et al. (2013)	12
<i>Philander opossum</i>	Black Four-Eyed Opossum	22		M. Svartman (1998)	12
<i>Didelphis marsupialis</i>	Common/Large American Opossum	22		Aniskin et al. (1991)	13
<i>Didelphis virginiana</i>	Virginia Opossum	22		San Diego Institute for Conservation Research (unpublished)	13
Order Paucituberculata					14
Family Caenolestidae					
<i>Rhyncholestes raphanurus</i>	Chilean "Shrew" Opossum	14		Gallardo and Patterson (1987)	14
Order Microbiotheria					14
Family Microbiotheriidae					
<i>Dromiciops australis</i>	Monito del Monte	14F/13M		Gallardo and Patterson (1987)	14
Order Dasyuromorphia					15
Family Dasyuridae					
<i>Antechinus flavipes</i>	Yellow-Footed Marsupial "Mouse"/Antechinus	14		Rofe (1979)	15
<i>Planigale maculata</i>	Flat-Skulled Marsupial "Mouse"/Pygmy Planigale	14		Rofe (1979)	15
<i>Sminthopsis crassicaudata</i>	Fat-Tailed Marsupial "Mouse"/Dunnart/ Sminthopsis	14	<i>Aepyprymnus rufescens</i> (ARU), <i>Monodelphis domestica</i> (MDO), <i>Notamacropus eugenii</i> (NEU), <i>Trichosurus vulpecula</i> (TVU)	P. Perelman Rens et al. (1999, 2001, 2003b)	16
<i>Ningau sp.</i>	Ningauis	14		Rofe (1979)	17
<i>Antechinomys laniger</i>	Kultarr	14		Rofe (1979)	17
<i>Dasyuroides byrnei</i>	Kowari	14		Rofe (1979)	18
<i>Dasyurus maculatus</i>	Spotted-Tailed/Tiger Quoll	14		San Diego Institute for Conservation Research (unpublished)	18
<i>Dasyurus hallucatus</i>	Northern Quoll/Northern Native "Cat"/Njanmak	14		Rofe (1979)	19
<i>Dasyurus viverrinus</i>	Eastern Quoll/Native "Cat"	14		Rofe (1979)	19
<i>Sarcophilus harrisii</i>	Tasmanian Devil	14	<i>Notamacropus eugenii</i> (NEU), BAC maps	J. Deakin San Diego Institute for Conservation Research (unpublished) Deakin et al. (2012, 2013)	20
Order Peramelemorphia					21
Family Thylacomyidae					
<i>Macrotis (Thylacomyis) lagotis</i>	Greater Bilby/Bilby/ Rabbit-Eared Bandicoot	18F/19M		D. Hayman Martin and Hayman (1967)	21
Family Peramelidae					
<i>Isoodon obesulus</i>	Short-Nosed Bandicoot	14		Rofe (1979)	21
<i>Perameles nasuta</i>	Long-Nosed Bandicoot	14		Rofe (1979)	21
Order Notoryctemorphia					22
Family Notoryctidae					
<i>Notoryctes typhlops</i>	Marsupial Mole	20		P. G. Johnston Calaby et al. (1974)	22

SPECIES	COMMON NAME	2n	PAINTING PROBES	SOURCE	PAGE
Order Diprotodontia					22
Family Phascolarctidae					
<i>Phascolarctos cinereus</i>	Koala	16		San Diego Institute for Conservation Research (unpublished)	22
Family Vombatidae					
<i>Vombatus ursinus</i>	Common/Coarse-Haired Wombat	14		Rofe (1979)	23
<i>Lasiorhinus latifrons</i>	Southern Hairy-Nosed/ Soft-Furred Wombat	14	<i>Notamacropus eugenii</i> (NEU)	J. Deakin De Leo et al. (1999)	23
Family Phalangeridae					
<i>Trichosurus vulpecula</i>	Common Brush-Tailed Possum	20	<i>Aepyprymnus rufescens</i> (ARU), <i>Monodelphis domestica</i> (MDO), <i>Notamacropus eugenii</i> (NEU), <i>Sminthopsis crassicaudata</i> (SCR)	P. Perelman Rens et al. (1999, 2001, 2003b)	24
Family Potoroidae					
<i>Potorous tridactylus</i>	Long-Nosed Potoroo	12	<i>Aepyprymnus rufescens</i> (ARU), <i>Trichosurus vulpecula</i> (TVU), <i>Notamacropus eugenii</i> (NEU)	P. Perelman Rens et al. (1999, 2003a,b)	25
Family Macropodidae					
<i>Thylogale billardieri</i>	Red-Bellied Pademelon	22		R. Rofe (1979)	26
<i>Thylogale thetis</i>	Red-Necked Pademelon	22		Eldridge et al. (1992a)	26
<i>Petrogale xanthopus celeris</i>	Yellow-Footed Rock Wallaby	22		Eldridge et al. (1992a)	26
<i>Petrogale xanthopus xanthopus</i>	Yellow-Footed Rock Wallaby	22		Eldridge et al. (1992a)	27
<i>Petrogale lateralis lateralis</i>	Black-Footed Rock Wallaby	22		Eldridge et al. (1992a)	27
<i>Petrogale penicillata</i>	Brush-Tailed Rock Wallaby	22		R. Rofe (1979)	27
<i>Petrogale concinna</i>	Little Rock Wallaby	16		Eldridge et al. (1992b)	28
<i>Petrogale brachyotis</i>	Short-Eared Rock Wallaby	20		Eldridge et al. (1992b)	28
<i>Wallabia bicolor</i>	Swamp Wallaby	10F/11M	<i>Notamacropus eugenii</i> (NEU)	J. Deakin Toder et al. (1997)	29
<i>Macropus parma</i>	Parma Wallaby	16		San Diego Institute for Conservation Research (unpublished)	29
<i>Macropus rufogriseus</i>	Red-Necked Wallaby	16		Rofe (1979)	30
<i>Macropus giganteus</i>	Eastern Gray Kangaroo	16		Rofe (1979)	30
<i>Macropus parryi</i>	Whiptail Wallaby	16		Rofe (1979)	31
<i>Macropus fuliginosus</i>	Western Gray Kangaroo	16		Rofe (1979)	31
<i>Macropus robustus</i>	Common Wallaroo	16		Rofe (1979)	32
<i>Macropus rufus</i>	Red Kangaroo	20		Rofe (1979)	32
<i>Notamacropus eugenii</i>	Tammar Wallaby	16	<i>Aepyprymnus rufescens</i> (ARU), <i>Monodelphis domestica</i> (MDO), <i>Trichosurus vulpecula</i> (TVU), <i>Sminthopsis crassicaudata</i> (SCR)	P. Perelman Rens et al. (1999, 2001, 2003b)	33
Family Burramyidae					
<i>Cercartetus concinnus</i>	Western Pygmy Possum	14		Rofe (1979)	34
Family Acrobatidae					
<i>Acrobates pygmaeus</i>	Pygmy Gliding Possum/ Feather-Tailed Glider	14		Rofe (1979)	34
Family Pseudocheiridae					
<i>Pseudocheirus peregrinus</i>	Common Ring-Tailed Possum	20		Murray et al. (1980)	35
<i>Petropseudes dahli</i>	Rock Ring-Tailed Possum	16		Murray et al. (1980)	36
<i>Hemibelideus lemuroides</i>	Lemuroid/Brush-Tipped Ring-Tailed/Greater Gliding Possum	20		McQuade (1984)	36

SPECIES	COMMON NAME	2n	PAINTING PROBES	SOURCE	PAGE
Family Petauridae					
<i>Petaurus norfolcensis</i>	Lesser Gliding Possum/ Squirrel Glider	21		Rofe (1979)	37
Family Tarsipedidae					
<i>Tarsipes rostratus</i>	Honey Possum	24		Hayman (1990)	37
AFROTHERIA Time Tree					38
Order Afrosoricida					39
Family Chrysochloridae					
<i>Chrysochloris asiatica</i>	Cape Golden Mole	30	<i>Homo sapiens</i> (HSA)	Robinson et al. (2004)	39
<i>Chlorotalpa duthieae</i>	Duthie's Golden Mole	30		Bronner (1995a)	40
<i>Chlorotalpa sclateri</i>	Sclater's Golden Mole	30		Bronner (1995a)	40
<i>Cryptochloris zyli</i>	Van Zyl's Golden Mole	30		Gilbert et al. (2006)	41
<i>Amblysomus robustus</i>	Robust Golden Mole	36		Gilbert et al. (2008)	41
<i>Amblysomus hottentotus longiceps</i>	Hottentot Golden Mole	30		Gilbert et al. (2008)	42
<i>Amblysomus hottentotus meesteri</i>	Hottentot Golden Mole	30		Gilbert et al. (2008)	42
<i>Amblysomus hottentotus pondoliae</i>	Hottentot Golden Mole	30		Gilbert et al. (2008)	43
<i>Amblysomus iris</i>	Zulu Golden Mole	34		E. Nevo Capanna et al. (1989)	43
<i>Chrysofalax trevelyani</i>	Giant Golden Mole	30		Gilbert et al. (2006)	44
<i>Eremitalpa granti</i>	Grant's Golden Mole	26		Gilbert et al. (2006)	44
<i>Calcochloris obtusirostris</i>	Yellow Golden Mole	28		Gilbert et al. (2008)	45
<i>Neamblysomus julianae</i>	Juliana's Golden Mole	30		Gilbert et al. (2008)	45
Family Tenrecidae					
<i>Hemicentetes nigriceps</i>	Streaked Tenrec	38		Benirschke (1969)	46
<i>Echinops telfairi</i>	Small Madagascar "Hedgehog"	40		Benirschke (1969)	46
<i>Microgale dobsoni</i>	Dobson's Shrew Tenrec	30		Gilbert et al. (2007)	47
<i>Microgale cowani</i>	Cowan's Shrew Tenrec	38		Gilbert et al. (2007)	47
<i>Microgale fotsifotsy</i>	Pale Shrew Tenrec	32		Gilbert et al. (2007)	48
<i>Microgale soricoides</i>	Shrew-Toothed Shrew Tenrec	32		Gilbert et al. (2007)	48
<i>Microgale taiva</i>	Taiva Shrew Tenrec	32		Gilbert et al. (2007)	49
<i>Microgale thomasi</i>	Thomas's Shrew Tenrec	56		Gilbert et al. (2007)	49
<i>Microgale parvula</i>	Pygmy Shrew Tenrec	32		Gilbert et al. (2007)	50
<i>Microgale longicaudata</i>	Lesser Long-Tailed Shrew Tenrec	30		Gilbert et al. (2007)	50
<i>Microgale principula</i>	Greater Long-Tailed Shrew Tenrec	30		Gilbert et al. (2007)	51
<i>Microgale majori</i>	Major's Long-Tailed Shrew Tenrec	30		Gilbert et al. (2007)	51
<i>Oryzorictes hova</i>	Mole-Like Rice Tenrec	32		Gilbert et al. (2007)	52
Order Sirenia					53
Family Trichechidae					
<i>Trichechus manatus latirostris</i>	Florida Manatee	48	<i>Homo sapiens</i> (HSA)	R. Stanyon Kellogg et al. (2007)	53
<i>Trichechus manatus latirostris</i>	Florida Manatee	48	<i>Procapra capensis</i> (PCA), <i>Loxodonta africana</i> (LAF)	Pardini et al. (2007)	54
Order Proboscidea					55
Family Elephantidae					
<i>Elephas maximus</i>	Asian/Asiatic/Indian Elephant	56	<i>Homo sapiens</i> (HSA)	P. Perelman Yang et al. (2003a)	55
<i>Elephas maximus</i> C-bands	Asian/Asiatic/Indian Elephant	56		Perelman et al. (unpublished)	56

SPECIES	COMMON NAME	2n	PAINTING PROBES	SOURCE	PAGE
<i>Loxodonta africana</i>	African Savanna Elephant	56	<i>Procavia capensis</i> (PCA), <i>Trichechus manatus</i> (TMA), <i>Homo sapiens</i> (HSA)	P. Perelman Yang et al. (2003a), Frönicke et al. (2003), Pardini et al. (2007) Perelman et al. (unpublished)	57 58
<i>Loxodonta africana</i>	African Savanna Elephant	56			59
Order Hyracoidea					
Family Procaviidae					
<i>Procavia capensis</i>	Hyrax/Rock Dassie	54		L.Frönicke (unpublished)	59
<i>Procavia capensis</i>	Hyrax/Rock Dassie	54	<i>Trichechus manatus</i> (TMA), <i>Loxodonta africana</i> (LAF)	Pardini et al. (2007)	60
Order Tubulidentata					
Family Orycteropodidae					
<i>Orycteropus afer</i>	Aardvark	20	<i>Loxodonta africana</i> (LAF), <i>Trichechus manatus</i> (TMA), <i>Procavia capensis</i> (PCA), <i>Homo sapiens</i> (HSA), <i>Canis familiaris</i> (CFA)	P. Perelman Yang et al. (2003, unpublished), Pardini et al. (2007)	61
Order Macroscelidea					
Family Macroscelididae					
<i>Macroscelides proboscideus</i>	Short-Eared Elephant Shrew	26	<i>Homo sapiens</i> (HSA)	Svartman et al. (2004)	62
<i>Elephantulus rupestris</i>	Western Rock Elephant Shrew	26	<i>Homo sapiens</i> (HSA)	Robinson et al. (2004)	63
XENARTHRA Time Tree					
Superorder Xenarthra					
Order Pilosa					
Family Megalonychidae					
<i>Choloepus didactylus</i>	Linnaeus's Two-Toed Sloth	53		W. Nash (unpublished)	65
<i>Choloepus didactylus</i>	Linnaeus's Two-Toed Sloth	66	<i>Homo sapiens</i> (HSA)	W. Nie Yang et al. (2006)	66
<i>Choloepus hoffmanni</i>	Hoffmann's Two-Toed Sloth	50	<i>Homo sapiens</i> (HSA)	Svartman et al. (2006)	67
<i>Bradypus torquatus</i>	Maned Sloth	50	<i>Homo sapiens</i> (HSA)	M. Svartman Azevedo et al. (2012)	68
<i>Bradypus variegatus</i>	Brown-Throated Sloth	54	<i>Homo sapiens</i> (HSA)	M. Svartman Azevedo et al. (2012)	69
Family Myrmecophagidae					
<i>Myrmecophaga tridactyla</i>	Giant Anteater	60		San Diego Institute for Conservation Research (unpublished)	70
<i>Tamandua tetradactyla (longicaudata)</i>	Lesser Anteater/Tamandua	54	<i>Homo sapiens</i> (HSA)	M. Svartman Yang et al. (2006), Svartman et al. (2006)	71
Family Cyclopedidae					
<i>Cyclopes didactylus</i>	Silky Anteater	64		Jorge (2000)	72
Order Cingulata					
Family Chlamyphoridae					
<i>Chaetophractus villosus</i>	Hairy Armadillo/Peludo	60		Jorge et al. (1977)	73
<i>Euphractus sexcinctus flavimanus</i>	Six-Banded Armadillo	58	<i>Homo sapiens</i> (HSA)	W. Nie Liu et al. (2011)	74
<i>Zaedyus pichiy</i>	Pichi	62		Jorge et al. (1977)	75
<i>Cabassous centralis</i>	Northern Naked-Tailed Armadillo	62		Benirschke (1969)	76
<i>Cabassous tatouay</i>	Greater Naked-Tailed Armadillo	50		Benirschke (1969)	76
<i>Tolypeutes matacus</i>	La Plata Three-Banded Armadillo	38		San Diego Institute for Conservation Research (unpublished)	77

SPECIES	COMMON NAME	2n	PAINTING PROBES	SOURCE	PAGE
Family Dasypodidae					
<i>Dasypus septemcinctus</i>	Seven-Banded/Long-Nosed Armadillo	64		H. Seuanez Barroso and Seuanez (1991)	77
<i>Dasypus novemcinctus</i>	Nine-Banded/Long-Nosed Armadillo	64	<i>Homo sapiens</i> (HSA)	Svartman et al. (2006)	78
<i>Dasypus hybridus</i>	Southern Long-Nosed Armadillo	64		K. Benirschke Jorge et al. (1977)	78
EUARCHONTOGLIRES Time Tree					79
Order Scandentia Time Tree					80
Family Tupaiidae					
<i>Tupaia belangeri</i>	Northern Tree Shrew	62 (F)		Bigoni and Stanyon (unpublished)	81
<i>Tupaia belangeri</i>	Northern Tree Shrew	62 (M)		Nie et al. (2008)	82
<i>Tupaia minor</i>	Pygmy Tree Shrew	66	<i>Homo sapiens</i> (HSA)	R. Stanyon Dumas et al. (2012)	83
Order Dermoptera					84
Family Cynocephalidae					
<i>Cynocephalus volans</i>	Philippine Flying Lemur	38		Rickart (2003)	85
<i>Galeopterus variegatus</i>	Malayan Flying Lemur	56	<i>Homo sapiens</i> (HSA)	Nie et al. (2008)	86
Order Primates Time Tree					87
Family Lorisidae					
<i>Loris tardigradus</i>	Slender Loris	62		San Diego Institute for Conservation Research (unpublished)	88
<i>Nycticebus pygmaeus</i>	Pygmy Slow Loris	50		San Diego Institute for Conservation Research (unpublished)	89
<i>Nycticebus coucang</i>	Slow Loris	50	<i>Homo sapiens</i> (HSA), <i>Galago moholi</i> (GMO)	W. Nie Stanyon et al. (2002), Nie et al. (2006)	90
Family Galagidae					
<i>Galago moholi</i>	Mohol Bushbaby	38	<i>Homo sapiens</i> (HSA)	Stanyon et al. (2002)	91
<i>Otolemur crassicaudatus</i>	Brown Galago	62	<i>Homo sapiens</i> (HSA)	Stanyon et al. (2002)	92
Family Daubentonidae					
<i>Daubentonia madagascariensis</i>	Aye-Aye	30		San Diego Institute for Conservation Research (unpublished)	93
Family Indriidae					
<i>Propithecus verreauxi coquereli</i>	Coquerel's Sifaka	48		San Diego Institute for Conservation Research (unpublished)	94
<i>Propithecus tattersalli</i>	Golden-Crowned Sifaka	42		San Diego Institute for Conservation Research (unpublished)	94
Family Lepilemuridae					
<i>Lepilemur ruficaudatus</i>	Red-Tailed Sportive Lemur	20		Rumpler et al. (1985)	95
<i>Lepilemur leucopus</i>	White-Footed Sportive Lemur	26		Rumpler et al. (1985)	95
<i>Lepilemur septentrionalis</i>	Northern Sportive Lemur	34		Rumpler et al. (1985)	96
Family Cheirogaleidae					
<i>Microcebus murinus</i>	Gray Mouse Lemur	66		San Diego Institute for Conservation Research (unpublished)	97
Family Lemuridae					
<i>Eulemur macaco</i>	Black Lemur	44	<i>Homo sapiens</i> (HSA)	Müller et al. (1997, 2004)	98
<i>Eulemur fulvus sanfordi</i>	Sanford's Lemur	60		San Diego Institute for Conservation Research (unpublished)	99
<i>Eulemur fulvus</i>	Common Brown Lemur	60	<i>Homo sapiens</i> (HSA)	Müller et al. (1997, 2004)	100

SPECIES	COMMON NAME	2n	PAINTING PROBES	SOURCE	PAGE
Family Tarsiidae					
<i>Tarsius bancanus</i>	Western Tarsier	80		Poorman et al. (1985)	101
<i>Tarsius syrichta</i>	Philippine Tarsier	80		Rickart (2003)	102
Family Pitheciidae					
<i>Pithecia pithecia</i>	White-Faced Saki	48		San Diego Institute for Conservation Research (unpublished)	103
<i>Pithecia irrorata</i>	Rio Tapajós Saki	48	<i>Homo sapiens</i> (HSA)	J. Pieczarka Finotelo et al. (2010)	104
<i>Cacajao calvus rubicundus</i>	Red Uakari	45	<i>Homo sapiens</i> (HSA), <i>Saguinus oedipus</i> (SOE)	S. Müller Finotelo et al. (2010)	105
<i>Callicebus (Torquatus) lugens</i>	Black Titi	16	<i>Homo sapiens</i> (HSA)	R. Stanyon Bonvicino et al. (2003), Stanyon et al. (2003a)	106
<i>Callicebus pallescens</i>	White-Coated Titi	50	<i>Homo sapiens</i> (HSA)	R. Stanyon Dumas et al. (2005)	106
<i>Callicebus cupreus</i>	Coppery Titi	46	<i>Homo sapiens</i> (HSA)	R. Stanyon Dumas et al. (2005)	107
<i>Callicebus nigrifrons</i>	Black-Fronted Titi	42		Nagamachi et al. (2003)	108
<i>Callicebus personatus</i>	Atlantic Titi	44	<i>Homo sapiens</i> (HSA)	J. Pieczarka Rodrigues et al. (2011)	109
<i>Callicebus donacophilus pallescens</i>	White-Eared Titi	50	<i>Homo sapiens</i> (HSA), <i>Saguinus oedipus</i> (SOE)	S. Müller Barros et al. (2003)	110
<i>Callicebus hoffmannsi</i>	Hoffmann's Titi	50		J.C. Pieczarka (unpublished)	111
<i>Callicebus coimbrai</i>	Coimbras Titi	44		J. Pieczarka Rodrigues et al. (2006)	112
<i>Callicebus torquatus</i>	Collared Titi	22		J. Pieczarka Barros et al. (2000)	112
<i>Chirotopes utahicki</i>	Uta Hick's Bearded Saki	50	<i>Homo sapiens</i> (HSA)	S. Müller Stanyon et al. (2004b)	113
Family Cebidae					
<i>Callimico goeldii</i>	Goeldi's Marmoset	48 (F)/ 47 (M)		Dumas et al. (2007)	114
<i>Saguinus imperator</i>	Emperor Tamarin	46		San Diego Institute for Conservation Research (unpublished)	114
<i>Saguinus midas</i>	Red-Handed Tamarin	46		Bigoni et al. (unpublished)	115
<i>Callithrix jacchus</i>	Common Marmoset	46		Bigoni et al. (unpublished)	116
<i>Callithrix (Mico) argentata</i>	Silvery Marmoset	44		R. Stanyon Dumas et al. (2007)	116
<i>Callithrix emiliae</i>	Emilia's Marmoset	44		Nagamachi et al. (1996)	117
<i>Callithrix humeralifer</i>	Santarem Marmoset	44		Nagamachi et al. (1996)	117
<i>Callithrix chrysoleuca</i>	Gold And White Marmoset	44		Nagamachi et al. (1996)	118
<i>Callithrix mavesi</i>	Maves Marmoset	44		Nagamachi et al. (1996)	118
<i>Callithrix geoffroyi</i>	White-Headed Marmoset	46		Nagamachi et al. (1997b)	119
<i>Cebuella pygmaea</i>	Pygmy Marmoset	44		Dumas et al. (2007)	120
<i>Leontopithecus chrysopygus</i>	Black Lion Tamarin	46		Seuanez et al. (1988)	121
<i>Leontopithecus rosalia</i>	Golden Lion Tamarin	46		Nagamachi et al. (1997a)	121
<i>Aotus nancymae</i>	Nancy Ma's Night Monkey	54	<i>Homo sapiens</i> (HSA)	Stanyon et al. (2004b, 2005)	122
<i>Aotus lemurinus griseimembra</i>	Gray-Handed Night Monkey	54	<i>Homo sapiens</i> (HSA)	Stanyon et al. (2011)	122
<i>Aotus azarae</i>	Azara's Night Monkey	50		Garcia et al. (2002)	123
<i>Aotus vociferans</i>	Spix's Night Monkey	46		Pieczarka et al. (1992)	123

SPECIES	COMMON NAME	2n	PAINTING PROBES	SOURCE	PAGE
<i>Cebus capucinus</i>	White-Headed Capuchin	54		R. Stanyon Campa and Stanyon (1992)	124
<i>Cebus albifrons albifrons</i>	White-Fronted Capuchin	54		San Diego Institute for Conservation Research (unpublished)	125
<i>Cebus albifrons</i>	White-Fronted Capuchin	52	<i>Homo sapiens</i> (HSA), <i>Saguinus oedipus</i> (SOE)	J. Pieczarka Amaral et al. (2008)	125
<i>Cebus apella</i>	Tufted Capuchin	54		J. Pieczarka Clemente et al. (1987)	126
<i>Cebus apella paraguayanus</i>	Tufted Capuchin	54	<i>Homo sapiens</i> (HSA), <i>Saguinus oedipus</i> (SOE)	J. Pieczarka Amaral et al. (2008)	126
<i>Cebus olivaceus</i>	Weeper Capuchin	54		García et al. (2002a)	127
<i>Cebus olivaceus</i>	Weeper Capuchin	52	<i>Homo sapiens</i> (HSA)	J. Pieczarka Amaral et al. (2008)	127
<i>Saimiri sciureus</i> + Ideogram	Squirrel Monkey	44	<i>Homo sapiens</i> (HSA)	S. Müller Stanyon et al. (2000)	128
<i>Saguinus oedipus</i> <i>Cebuella pygmaea</i> <i>Callithrix argentata</i> <i>Callithrix jacchus</i> <i>Callimico goeldii</i>	(alignment of homologous chromosomes)		<i>Homo sapiens</i> (HSA)	Neusser et al. (2001)	129
Family Atelidae					
<i>Lagothrix lagotricha</i>	Woolly Monkey	62	<i>Homo sapiens</i> (HSA)	R. Stanyon Stanyon et al. (2001)	130
<i>Alouatta seniculus macconnelli</i>	Red Howler	46	<i>Homo sapiens</i> (HSA), <i>Saguinus oedipus</i> (SOE)	S. Müller de Oliveira et al. (2002)	131
<i>Alouatta sara</i>	Bolivian Red Howler	50	<i>Homo sapiens</i> (HSA)	R. Stanyon Consigliere et al. (1996)	132
<i>Alouatta belzebul</i>	Red-Handed Howler Monkey	50 (F), 49 (M)	<i>Homo sapiens</i> (HSA)	R. Stanyon Consigliere et al. (1998)	133
<i>Alouatta caraya</i>	Black Howler Monkey	54	<i>Homo sapiens</i> (HSA)	R. Stanyon de Oliveira et al. (2002)	134
<i>Alouatta fusca clamitans</i>	Brown Howler	45 (M), 46 (F)	<i>Homo sapiens</i> (HSA), <i>Saguinus oedipus</i> (SOE)	J. Pieczarka de Oliveira et al. (2002)	135
<i>Alouatta guariba</i>	Brown Howler	50	<i>Homo sapiens</i> (HSA)	R. Stanyon Stanyon et al. (2011)	136
<i>Alouatta arctoidea</i>	Ursine Howler	44	<i>Homo sapiens</i> (HSA)	R. Stanyon Consigliere et al. (1996), Stanyon et al. (2011)	137
<i>Ateles belzebuth marginatus</i>	Red-Faced Spider Monkey	34	<i>Homo sapiens</i> (HSA), <i>Saguinus oedipus</i> (SOE), <i>Lagothrix lagotricha</i> (LLA)	J. Pieczarka de Oliveira et al. (2005)	138
<i>Ateles geoffroyi</i>	Geoffroy's Spider Monkey	34	<i>Homo sapiens</i> (HSA)	R. Stanyon Morescalchi et al. (1997)	138
<i>Ateles paniscus</i>	White-Bellied Spider Monkey	34		Pieczarka et al. (1989)	139
<i>Brachyteles arachnoides</i>	Southern Muriqui	62	<i>Homo sapiens</i> (HSA), <i>Saguinus oedipus</i> (SOE), <i>Lagothrix lagotricha</i> (LLA)	S. Müller de Oliveira et al. (2005)	140
Family Cercopithecoidea					
<i>Erythrocebus patas</i>	Patas Monkey	54	<i>Homo sapiens</i> (HSA)	R. Stanyon Stanyon et al. (2005)	141
<i>Chlorocebus aethiops</i>	African Green Monkey	60	<i>Homo sapiens</i> (HSA)	R. Stanyon Finelli et al. (1999)	142

SPECIES	COMMON NAME	2n	PAINTING PROBES	SOURCE	PAGE
<i>Cercopithecus nictitans</i>	Greater Spot-Nosed Monkey	70		Ponsà and Egozcue (1981)	143
<i>Cercopithecus ascanius schmidti</i>	Schmidt's Spot-Nosed Guenon	66		San Diego Institute for Conservation Research (unpublished)	144
<i>Cercopithecus neglectus</i>	De Brazza's Monkey	62	<i>Homo sapiens</i> (HSA)	R. Stanyon Stanyon et al. (2005)	145
<i>Cercopithecus mona campbelli</i>	Campbell's Guenon/Mona Monkey	66		M. Ponsà Clemente et al. (1990)	145
<i>Cercopithecus cephus</i>	Mustached Guenon	66		M. Ponsà Clemente et al. (1990)	146
<i>Cercopithecus diana</i>	Diana Monkey	58		Ponsà (1986)	147
<i>Cercopithecus pogonias</i>	Crested Mona Monkey	72		M. Ponsà Ponsà and Egozcue (1981)	147
<i>Cercopithecus lhoesti</i>	L'Hoest's Monkey/Guenon	60		San Diego Institute for Conservation Research (unpublished)	148
<i>Cercopithecus mitis</i>	Blue Monkey	72		Bigoni and Stanyon (unpublished)	149
<i>Cercopithecus petaurista</i>	Lesser Spot-Nosed/White- Nosed Guenon/Monkey	66		M. Ponsà Clemente et al. (1990)	149
<i>Miopithecus talapoin</i>	Talapoin	54		Ponsà et al. (1980)	150
<i>Allenopithecus nigroviridis</i>	Allen's Swamp Monkey	48		San Diego Institute for Conservation Research (unpublished)	151
<i>Cercocebus galeritus</i>	Tana River Mangabey	42		Bigoni and Stanyon (unpublished)	152
<i>Cercocebus torquatus</i>	Collared/Red-Capped Mangabey	42		García et al. (2002b)	153
<i>Macaca fascicularis</i>	Crab-Eating Macaque	42		M. Ponsà Ruiz-Herrera et al. (2002)	153
<i>Macaca mulatta</i>	Rhesus Monkey	42	<i>Homo sapiens</i> (HSA)	R. Stanyon Bigoni et al. (unpublished)	154
<i>Macaca sylvanus</i>	Barbary Macaque	42		Stanyon et al. (unpublished)	155
<i>Macaca nigra</i>	Celebes Crested Macaque	42		Stanyon et al. (unpublished)	155
<i>Macaca fuscata</i>	Japanese Macaque	42	<i>Homo sapiens</i> (HSA)	Wienberg et al. (1992)	156
<i>Papio hamadryas</i>	Hamadryas Baboon	42		Bigoni and Stanyon (unpublished)	157
<i>Papio anubis</i>	Olive Baboon	42		Bigoni and Stanyon (unpublished)	157
<i>Mandrillus sphinx</i>	Mandrill	42		Ponsà et al. (unpublished)	158
<i>Trachypithecus obscurus</i>	Dusky Leaf Monkey	44		Ponsà (1983)	158
<i>Trachypithecus cristatus</i>	Silvered Leaf Monkey	44		Bigoni et al. (1997a)	159
<i>Pygathrix nemaeus</i>	Douc Langur	44	<i>Homo sapiens</i> (HSA)	Bigoni et al. (2004)	160
<i>Colobus guereza</i>	Mantled Guereza	44	<i>Homo sapiens</i> (HSA)	R. Stanyon Bigoni et al. (1997b)	161
<i>Colobus angolensis palliatus</i>	Angola Colobus	44		M. Houck (unpublished)	162
<i>Theropithecus gelada</i>	Gelada	42		M. Houck (unpublished)	163
<i>Nasalis larvatus</i>	Proboscis Monkey	48	<i>Homo sapiens</i> (HSA)	R. Stanyon Bigoni et al. (2003)	164
<i>Semnopithecus entellus</i>	Northern Plains Gray Langur	44	<i>Homo sapiens</i> (HSA)	Stanyon (unpublished)	165
Family Hylobatidae					
<i>Symphalangus syndactylus</i>	Siamang	50	<i>Homo sapiens</i> (HSA)	R. Stanyon Müller et al. (2003)	166
<i>Hylobates lar</i>	Lar Gibbon	44	<i>Homo sapiens</i> (HSA)	R. Stanyon Jauch et al. (1992), Müller et al. (2003)	167

SPECIES	COMMON NAME	2n	PAINTING PROBES	SOURCE	PAGE
<i>Hoolock hoolock</i>	Hoolock Gibbon	38	<i>Homo sapiens</i> (HSA), <i>Hylobates leucogenys</i> (HLE)	Nie et al. (2001)	168
<i>Hoolock leuconedys</i>	Eastern Hoolock Gibbon	38	<i>Homo sapiens</i> (HSA)	R. Stanyon Capozzi et al. (2012)	169
<i>Nomascus concolor</i>	Black Crested Gibbon	52	<i>Homo sapiens</i> (HSA)	R. Stanyon Müller et al. (2003)	170
<i>Nomascus leucogenys</i>	Northern White-Cheeked Gibbon	52		Nie et al. (unpublished)	171
<i>Nomascus siki</i>	Southern White-Cheeked Gibbon	52		Nie et al. (unpublished)	172
<i>Nomascus gabriellae</i>	Yellow-Cheeked Gibbon	52		Nie et al. (unpublished)	173
Family Hominidae					
<i>Pongo abelii</i>	Sumatran Orangutan	48	<i>Homo sapiens</i> (HSA)	R. Stanyon Jauch et al. (1992)	174
<i>Gorilla gorilla</i>	Lowland Gorilla	48	<i>Homo sapiens</i> (HSA)	R. Stanyon Jauch et al. (1992)	175
<i>Pan troglodytes</i>	Common Chimpanzee	48	<i>Homo sapiens</i> (HSA)	R. Stanyon Jauch et al. (1992)	176
<i>Pan paniscus</i>	Pygmy Chimpanzee/ Bonobo	48	<i>Homo sapiens</i> (HSA)	R. Stanyon Jauch et al. (1992)	177
<i>Homo sapiens</i>	Human	46		P. Nash (unpublished)	178
<i>Homo sapiens</i> Ideogram 1 Part I Chromosomal homologies between human and primate species	Human	46	<i>Nomascus concolor</i> (NCO), <i>Hylobates leucogenys</i> (HLE), <i>Symphalangus syndactylus</i> (SSY), <i>Hoolock hoolock</i> (HHO), <i>Hylobates lar</i> (HLA), <i>Colobus guereza</i> (CGU), <i>Erythrocebus patas</i> (EPA), <i>Chlorocebus aethiops</i> (CAE), <i>Cercopithecus neglectus</i> (CNE), <i>Callicebus pallescens</i> (CPA), <i>Lagothrix lagothricha</i> (LLA), <i>Saimiri sciureus</i> (SSC), <i>Aotus nancymae</i> (ANA), <i>Callimico goeldii</i> (CGO), <i>Cebuella pygmaea</i> (CPY), <i>Callithrix argentata</i> (CAR), <i>Galago moholi</i> (GMO), <i>Otolemur garnettii</i> (OGA), <i>Nycticebus coucang</i> (NCO), <i>Eulemur macaco</i> (EMA), <i>Galeopterus variegates</i> (GVA), <i>Tupaia belangeri</i> (TBE)	L. Biltueva Bigoni et al. (1997a), Müller et al. (1997, 1998, 1999), Finelli et al. (1999), Stanyon et al. (2001, 2004b, 2005, 2006), Ferguson-Smith et al. (2005), Dumas et al. (2005, 2007), Nie et al. (2001, 2008)	179
<i>Homo sapiens</i> Ideogram 1 Part II Chromosomal homologies between human and primate species	Human	46	continued	continued	180
<i>Homo sapiens</i> Ideogram 1 Part III Chromosomal homologies between human and primate species	Human	46	continued	continued	181
<i>Homo sapiens</i> Ideogram 1 Part IV Chromosomal homologies between human and primate species	Human	46	continued	continued	182
<i>Homo sapiens</i> Ideogram 2 Part I Chromosomal homologies between human and non-primate species	Human	46	<i>Loxodonta africana</i> (LAF), <i>Orycteropus afer</i> (OAF), <i>Oryctolagus cuniculus</i> (OCU), <i>Sciurus carolinensis</i> (SCA), <i>Mus musculus</i> (MMU), <i>Castor fiber</i> (CFI), <i>Tamias sibiricus</i> (TSI), <i>Cavia porcellus</i> (CPO), <i>Sus scrofa</i> (SSC), <i>Camelus dromedarius</i> (CDR), <i>Equus caballus</i> (ECA), <i>Felis catus</i> (FCA), <i>Mustela vison</i> (MVI), <i>Canis familiaris</i> (CFA)	L. Biltueva Balmus et al. (2007), Goureau et al. (1996), Graphodatsky et al. (2002), Korstanje et al. (1999), Stanyon et al. (2003b), Yang et al. (1999, 2000a, 2003a, 2004), Beklemisheva et al. (2011), Romanenko et al. (2015)	183

SPECIES	COMMON NAME	2n	PAINTING PROBES	SOURCE	PAGE
<i>Homo sapiens</i> Ideogram 2 Part II Chromosomal homologies between human and non-primate species	Human	46	continued	continued	184
<i>Homo sapiens</i> Ideogram 2 Part III Chromosomal homologies between human and non-primate species	Human	46	continued	continued	185
Order Rodentia Time Tree					186
Family Gliridae					
<i>Muscardinus avellanarius</i>	Common Dormouse/Hazel Mouse	46		A. Graphodatsky (unpublished)	187
<i>Glis glis</i>	Fat Dormouse	62		A. Graphodatsky (unpublished)	188
<i>Dryomys nitedula</i>	Forest Dormouse	48		A. Graphodatsky (unpublished)	189
<i>Eliomys quercinus</i>	Garden Dormouse	48		A. Graphodatsky (unpublished)	190
<i>Eliomys melanurus</i>	Asian Garden Dormouse	48	<i>Homo sapiens</i> (HSA)	Sannier et al. (2011)	191
<i>Myomimus personatus</i>	Masked Mouse-Tailed Dormouse	44		A. Graphodatsky (unpublished)	192
Family Sciuridae					
<i>Tamias sibiricus</i>	Chipmunk	38	<i>Homo sapiens</i> (HSA), <i>Castor fiber</i> (CFI)	Beklemisheva et al. (2011)	193
<i>Sundasciurus philippinensis</i>	Sunda Tree Squirrel	38		Rickart (2003)	194
<i>Marmota monax</i>	Groundhog	38		Beklemisheva and Perelman (unpublished)	194
<i>Marmota himalayana</i>	Himalayan Marmot	38	<i>Homo sapiens</i> (HSA), <i>Sciurus carolinensis</i> (SCA)	W. Nie Li et al. (2006a)	195
<i>Marmota baibacina</i>	Gray Marmot	38	<i>Tamias sibiricus</i> (TSI)	Beklemisheva et al. (2011)	196
<i>Marmota kastschenkoi</i>	Forest-Steppe Marmot	36	<i>Tamias sibiricus</i> (TSI)	Beklemisheva et al. (2011)	197
<i>Spermophilus erythrogegens</i>	Red-Cheeked Ground Squirrel	36	<i>Tamias sibiricus</i> (TSI)	Beklemisheva et al. (2011), Graphodatsky and Sablina (unpublished)	198
<i>Spermophilus undulatus</i>	Long-Tailed Siberian Suslik/Ground Squirrel	32	<i>Tamias sibiricus</i> (TSI)	Beklemisheva et al. (2011), Graphodatsky and Sablina (unpublished)	199
<i>Spermophilus alaschanicus</i>	Alashan Ground Squirrel/ Suslik	38		Graphodatsky and Sablina (unpublished)	200
<i>Spermophilus major</i>	Russet Ground Squirrel	36	<i>Tamias sibiricus</i> (TSI)	Beklemisheva et al. (2011)	201
<i>Spermophilus suslikus</i>	Speckled Ground Squirrel	34	<i>Tamias sibiricus</i> (TSI)	Beklemisheva et al. (2011)	202
<i>Spermophilus pygmaeus</i>	Little Ground Squirrel	36		Beklemisheva et al. (unpublished)	203
<i>Ictidomys tridecemlineatus</i>	Thirteen-Lined Ground Squirrel	34		V. Beklemisheva Beklemisheva, Perelman, Lemskaya, McMullen, Hallenbeck (unpublished), Lemskaya et al. (2018)	204
<i>Petaurista albiventer</i>	Red Giant Flying Squirrel	38	<i>Homo sapiens</i> (HSA)	W. Nie Li et al. (2006a)	205
<i>Xerus erythropus</i>	Striped Ground Squirrel	38	<i>Homo sapiens</i> (HSA), <i>Sciurus carolinensis</i> (SCA)	W. Nie Li et al. (2006a)	206
<i>Sciurus carolinensis</i>	Gray Squirrel	40	<i>Homo sapiens</i> (HSA)	W. Nie Li et al. (2006a), Stanyon et al. (2003b)	207
<i>Sciurus vulgaris</i>	Red Squirrel	40	<i>Tamias sibiricus</i> (TSI)	Beklemisheva et al. (2011)	208
Family Geomyidae					
<i>Thomomys talpoides attenuatus</i>	Northern Pocket Gopher	48		Thaeler (1968)	209
<i>Thomomys talpoides pygmaeus</i>	Northern Pocket Gopher	48		Thaeler (1968)	209

SPECIES	COMMON NAME	2n	PAINTING PROBES	SOURCE	PAGE
Family Heteromyidae					
<i>Dipodomys merriami</i>	Kangaroo Rat	52		A. D. Stock Mascarello et al. (1974)	210
Family Castoridae					
<i>Castor fiber</i>	Eurasian Beaver	48	<i>Homo sapiens</i> (HSA), <i>Tamias sibiricus</i> (TSI)	V. Beklemisheva Graphodatsky et al. (2008b), Beklemisheva et al. (2011)	211
<i>Castor canadensis</i>	North American Beaver	40		A. Graphodatsky Ward et al. (1991)	212
Family Dipodidae					
<i>Sicista napaea</i>	Altai Birch Mouse	42		A. Graphodatsky (unpublished)	213
<i>Sicista betulina</i>	Northern Birch Mouse	32		V. Aniskin and V. Volobouev Kovalskaya et al. (2011)	213
<i>Sicista betulina</i>	Northern Birch Mouse	32	<i>Homo sapiens</i> (HSA)	S. Romanenko Graphodatsky et al. (2008b)	214
<i>Sicista strandi</i>	Strand's Birch Mouse	44		V. Aniskin and V. Volobouev Kovalskaya et al. (2011)	215
<i>Sicista severtzovi</i>	Severtzov's Birch Mouse	26		V. Aniskin and V. Volobouev Kovalskaya et al. (2011)	215
<i>Sicista subtilis nordmanni</i>	Southern Birch Mouse	26		V. Aniskin and V. Volobouev Kovalskaya et al. (2011)	216
<i>Sicista subtilis subtilis</i>	Southern Birch Mouse	24		V. Aniskin and V. Volobouev Kovalskaya et al. (2011)	216
<i>Sicista</i> sp. 1	Birch Mouse	22–24		V. Aniskin and V. Volobouev Kovalskaya et al. (2011)	217
<i>Sicista</i> sp. 2	Birch Mouse	16–22		V. Aniskin and V. Volobouev Kovalskaya et al. (2011)	218
Family Pedetidae					
<i>Pedetes capensis</i>	South African Springhare/ Springhaas	38	<i>Homo sapiens</i> (HSA)	L. Biltueva Graphodatsky et al. (2008b)	219
Family Spalacidae					
<i>Spalax ehrenbergi</i>	Middle East Blind Mole-Rat	52–60		Ivanitskaya et al. (2005)	220
<i>Spalax ehrenbergi</i>	Middle East Blind Mole-Rat	52–60	<i>Homo sapiens</i> (HSA)	L. Biltueva L. Biltueva et al. (unpublished)	221
Family Nesomyidae					
<i>Dendromus lachaisei</i>	Lachaise's Climbing Mouse	30		V. Aniskin and V. Volobouev Denys and Aniskin (2012)	222
<i>Eliurus minor</i>	Lesser Tufted-Tailed Rat	76		Solano et al. (2011)	223
<i>Eliurus majori</i>	Major's Tufted-Tailed Rat	58		Solano et al. (2011)	223
<i>Nesomys rufus</i>	Island Mouse	60		Solano et al. (2011)	224
<i>Cricetomys emini</i>	Emin's Pouched Rat	80		S. Romanenko (unpublished)	225
<i>Cricetomys gambianus</i>	Gambian Pouched Rat	80		V. Aniskin and V. Volobouev (unpublished)	226

SPECIES	COMMON NAME	2n	PAINTING PROBES	SOURCE	PAGE
Family Cricetidae					
Subfamily Arvicolinae					
<i>Myodes rufocanus</i>	Gray Red-Backed Vole	56		V. Aniskin Sokolov et al. (1990)	227
<i>Myodes sikotanensis</i>	Sikotan Vole	56		V. Aniskin Sokolov et al. (1990)	228
<i>Myodes rutilus</i>	Northern Red-Backed Vole	56	<i>Microtus agrestis</i> (MAG), <i>Dicrostonyx torquatus</i> (DTO), <i>Mesocricetus auratus</i> (MAU)	N. Lemskaya Romanenko et al. (2016)	229
<i>Myodes gapperi</i>	Southern Red-Backed Vole	56		Modi (1987)	230
<i>Myodes californicus</i>	Western Red-Backed Vole	56		Modi (1987)	230
<i>Myodes glareolus</i>	Bank Vole	56		V. Aniskin Sokolov et al. (1990)	231
<i>Myodes centralis</i>	Tien Shan Red-Backed Vole	56		V. Aniskin Sokolov et al. (1990)	232
<i>Myodes regulus</i>	Royal Vole	56		O. Sablina et al. (unpublished)	233
<i>Eothenomys miletus</i>	Large Oriental Vole	56	<i>Eothenomys proditor</i> (EPR)	W. Nie Li et al. (2006b)	234
<i>Eothenomys proditor</i>	Yulungshan Vole	32		W. Nie Li et al. (2006b)	234
<i>Alicola argentatus</i>	Silver High Mountain Vole	56		O. Sablina et al. (unpublished)	235
<i>Alicola macrotis</i>	Large-Eared Vole	56		O. Sablina et al. (unpublished)	236
<i>Alicola barakshin</i>	Gobi Altai Mountain Vole	56		N. Lemskaya and S. Romanenko (unpublished)	237
<i>Alicola strelzowi</i>	Flat-Headed Vole	56		N. Lemskaya (unpublished)	238
<i>Alicola olchonensis</i>	Olkhon Mountain Vole	56		S. Romanenko (unpublished)	238
<i>Phenacomys intermedius</i>	Heather Vole	56		W. Modi (unpublished)	239
<i>Arvicola amphibius</i>	European Water Vole	36	<i>Microtus agrestis</i> (MAG), <i>Dicrostonyx torquatus</i> (DTO), <i>Mesocricetus auratus</i> (MAU)	S. Romanenko et al. (2016), O. Sablina et al. (unpublished)	240
<i>Chionomys nivalis</i>	European Snow Vole	54		O. Sablina et al. (unpublished)	241
<i>Chionomys roberti</i>	Robert's Snow Vole	54		O. Sablina et al. (unpublished)	242
<i>Chionomys gud</i>	Caucasian Snow Vole	54		O. Sablina et al. (unpublished)	243
<i>Blanfordimys afghanus</i>	Afghan Vole	58		O. Sablina et al. (unpublished)	244
<i>Blanfordimys bucharicus</i>	Bucharian Vole	48		O. Sablina et al. (unpublished)	245
<i>Neodon juldaschi</i>	Juniper Vole	54		O. Sablina et al. (unpublished)	246
<i>Microtus (Terricola) subterraneus</i>	European Pine Vole	54		O. Sablina et al. (unpublished)	247
<i>Microtus (Terricola) subterraneus</i>	European Pine Vole	52		O. Sablina et al. (unpublished)	248
<i>Microtus (Terricola) nasarovi</i>	Nasarov's Vole	42		O. Sablina et al. (unpublished)	249
<i>Microtus (Terricola) daghestanicus</i>	Daghestan Pine Vole	54	<i>Microtus agrestis</i> (MAG)	Lemskaya et al. (2010)	250
<i>Microtus (Terricola) savii</i>	Savi's Pine Vole	54		S. Romanenko (unpublished)	250
<i>Microtus (Terricola) majori</i>	Major's Pine Vole	54		O. Sablina et al. (unpublished)	251
<i>Microtus (Terricola) schelkovnikovii</i>	Schelkovnikov's Pine Vole	54		O. Sablina et al. (unpublished)	252
<i>Microtus agrestis</i>	Field Vole	50	<i>Dicrostonyx torquatus</i> (DTO), <i>Mesocricetus auratus</i> (MAU)	Romanenko et al. (2016)	253
<i>Microtus (Microtus) kirgisorum</i>	Tien Shan Vole	54		O. Sablina et al. (unpublished)	254
<i>Microtus (Microtus) socialis</i>	Social Vole	62	<i>Microtus agrestis</i> (MAG)	Lemskaya et al. (2010), O. Sablina et al. (unpublished)	255
<i>Microtus (Microtus) schidlovskii</i>	Schidlovsky's Vole	60		O. Sablina et al. (unpublished)	256
<i>Microtus (Microtus) dogramacii</i>	Dogramaci's Vole	48	<i>Microtus agrestis</i> (MAG)	Lemskaya et al. (2010)	256
<i>Microtus (Microtus) guentheri</i>	Günther's Vole	54	<i>Microtus agrestis</i> (MAG)	Lemskaya et al. (2010), O. Sablina et al. (unpublished)	257

SPECIES	COMMON NAME	2n	PAINTING PROBES	SOURCE	PAGE
<i>Microtus (Microtus) qazvinensis</i>	Qazvin Vole	54		O. Sablina et al. (unpublished)	258
<i>Microtus (Microtus) arvalis</i>	Common Vole	46	<i>Microtus agrestis</i> (MAG)	Lemskaya et al. (2010), O. Sablina et al. (unpublished)	259
<i>Microtus (Microtus) obscurus</i>	Altai Vole	46		V. Aniskin Tougaard et al. (2013)	260
<i>Microtus (Microtus) levis</i>	East European/Sibling/ Southern Vole	54	<i>Microtus agrestis</i> (MAG)	Lemskaya et al. (2010), O. Sablina et al. (unpublished)	261
<i>Microtus (Microtus) transcaspicus</i>	Transcaspian Vole	52		O. Sablina et al. (unpublished)	262
<i>Microtus (Alexandromys) oeconomus</i>	Tundra Vole	30	<i>Microtus agrestis</i> (MAG), <i>Dicrostonyx torquatus</i> (DTO), <i>Mesocricetus auratus</i> (MAU), <i>Mus musculus</i> (MMU)	N. Lemskaya Sitnikova et al. (2007), Romanenko et al. (2016), O. Sablina (unpublished)	263
<i>Microtus (Alexandromys) montebelli</i>	Japanese Grass Vole	30		O. Sablina et al. (unpublished)	264
<i>Microtus (Alexandromys) mongolicus</i>	Mongolian Vole	50		O. Sablina et al. (unpublished)	265
<i>Microtus (Alexandromys) hyperboreus (middendorffii)</i>	North Siberian Vole	50		O. Sablina et al. (unpublished)	266
<i>Microtus (Alexandromys) sachalinensis</i>	Sakhalin Vole	50		O. Sablina et al. (unpublished)	267
<i>Microtus (Alexandromys) fortis</i>	Reed Vole	52		O. Sablina et al. (unpublished)	268
<i>Microtus (Alexandromys) evoronensis</i>	Evoronsk Vole	39–40		N. Lemskaya O. Sablina et al. (unpublished)	269
<i>Microtus (Alexandromys) maximowiczii</i>	Maximowicz's Vole	44	<i>Microtus agrestis</i> (MAG)	Lemskaya et al. (2010)	270
<i>Microtus (Alexandromys) mujanensis</i>	Musk Vole	38	<i>Microtus agrestis</i> (MAG)	Lemskaya et al. (2010, 2015)	270
<i>Microtus (Alexandromys) gromovi</i>	Gromov's Vole	44		N. Lemskaya (unpublished)	271
<i>Microtus (Alexandromys) clarkei</i>	Clarke's Vole	52	<i>Eothenomys proditor</i> (EPR)	W. Nie Li et al. (2006b)	271
<i>Microtus breweri</i>	Beach Vole	46		Modi (1986)	272
<i>Microtus townsendii</i>	Townsend's Vole	50		Modi (1987)	272
<i>Microtus oregoni</i>	Creeping Vole	17–18		Modi (1987)	273
<i>Microtus californicus</i>	California Vole	53		Modi (1987)	273
<i>Microtus pennsylvanicus</i>	Chihuahua/Meadow Vole	46		Modi (1986)	274
<i>Microtus mexicanus</i>	Mexican Vole	48		Modi (1987)	274
<i>Microtus pinetorum</i>	Woodland Vole	62		Modi (1987)	275
<i>Microtus ochrogaster</i>	Prairie Vole	54		Modi (1987)	275
<i>Microtus richardsoni</i>	North American Water Vole	56		Modi (1987)	276
<i>Microtus longicaudus</i>	Long-Tailed Vole	56		Modi (1987)	276
<i>Lasiopodomys brandtii</i>	Brandt's Vole	34		V. Aniskin and V. Volobouev (unpublished)	277
<i>Lasiopodomys brandtii</i>	Brandt's Vole	34	<i>Microtus agrestis</i> (MAG), <i>Dicrostonyx torquatus</i> (DTO)	S. Romanenko Gladkikh et al. (2016)	278
<i>Lasiopodomys (Microtus) gregalis</i>	Narrow-Headed Vole	36	<i>Microtus agrestis</i> (MAG), <i>Dicrostonyx torquatus</i> (DTO)	S. Romanenko Lemskaya et al. (2010), Gladkikh et al. (2016)	279
<i>Lasiopodomys mandarinus</i>	Mandarin Vole	48		V. Aniskin and V. Volobouev (unpublished)	280
<i>Lasiopodomys mandarinus</i>	Mandarin Vole	47		Gladkikh et al. (2016)	281
<i>Prometheomys schaposchnikowi</i>	Long-Clawed Mole Vole	56		O. Sablina et al. (unpublished)	282
<i>Dicrostonyx torquatus</i>	Palaearctic Collared Lemming	45 + B's	<i>Microtus agrestis</i> (MAG), <i>Mesocricetus auratus</i> (MAU)	Romanenko et al. (2016)	283
<i>Lagurus lagurus</i>	Steppe Lemming	56		Modi (1987)	284
<i>Neofiber alleni</i>	Round-Tailed Muskrat	52		Modi (1987)	284
<i>Ondatra zibethicus</i>	Common Muskrat	54		N. Lemskaya (unpublished)	285
<i>Lemmus sibiricus</i>	True Lemming	50		Modi (1987)	286
<i>Synaptomys cooperi</i>	Bog Lemming	50		Modi (1987)	286

SPECIES	COMMON NAME	2n	PAINTING PROBES	SOURCE	PAGE
<i>Ellobius lutescens</i>	Transcaucasian Mole Vole	17	<i>Microtus agrestis</i> (MAG), <i>Mesocricetus auratus</i> (MAU), <i>Mus musculus</i> (MMU), Ancestral <i>Ellobius</i> Karyotype (AEK)	Romanenko et al. (2007)	287
<i>Ellobius fuscocapillus</i>	Southern Mole Vole	36		P. Perelman and A. Graphodatsky (unpublished)	288
<i>Ellobius talpinus</i>	Northern Mole Vole	54	<i>Microtus agrestis</i> (MAG)	Bakloushinskaya et al. (2012)	289
<i>Ellobius tancrei</i>	Zaisan Mole Vole	54, 30	<i>Microtus agrestis</i> (MAG)	Bakloushinskaya et al. (2012, 2013)	290
Family Cricetidae					
Subfamily Cricetinae					
<i>Phodopus sungorus</i>	Dzhungarian Hamster	28	<i>Cricetulus griseus</i> (CGR), <i>Mesocricetus auratus</i> (MAU)	Romanenko et al. (2007), S. Radjabli et al. (unpublished)	291
<i>Phodopus sungorus campbelli</i>	Campbell's Hamster	28	<i>Cricetulus griseus</i> (CGR), <i>Mesocricetus auratus</i> (MAU)	Romanenko et al. (2007), S. Radjabli et al. (unpublished)	292
<i>Phodopus roborovskii</i>	Small Desert Hamster	34	<i>Cricetulus griseus</i> (CGR), <i>Mesocricetus auratus</i> (MAU)	Romanenko et al. (2007), S. Radjabli et al. (unpublished)	293
<i>Cricetus cricetus</i>	European Hamster	22	<i>Cricetulus griseus</i> (CGR), <i>Mesocricetus auratus</i> (MAU)	Romanenko et al. (2007), S. Radjabli et al. (unpublished)	294
<i>Allocricetulus eversmanni</i>	Eversmann's Hamster	26	<i>Mesocricetus auratus</i> (MAU)	Romanenko et al. (2013)	295
<i>Allocricetulus curtatus</i>	Mongolian Hamster	20	<i>Mesocricetus auratus</i> (MAU)	Romanenko et al. (2013)	296
<i>Allocricetulus pseudocurtatus</i>	Eversmann's Hamster	26	<i>Mesocricetus auratus</i> (MAU)	Romanenko et al. (2013)	297
<i>Cricetulus migratorius</i>	Gray Dwarf Hamster	22	<i>Cricetulus griseus</i> (CGR), <i>Mesocricetus auratus</i> (MAU)	Romanenko et al. (2007), S. Radjabli et al. (unpublished)	298
<i>Cricetulus barabensis</i>	Striped Dwarf Hamster	20		Radjabli et al. (unpublished)	299
<i>Cricetulus pseudogriseus</i>	Transbaikal Dwarf Hamster	24		Radjabli et al. (unpublished)	300
<i>Cricetulus griseus</i>	Chinese Hamster	22	<i>Mesocricetus auratus</i> (MAU), <i>Mus musculus</i> (MMU)	Romanenko et al. (2006) S. Radjabli et al. (unpublished)	301
<i>Cricetulus obscurus</i>	Gobi Hamster	20		Radjabli et al. (unpublished)	302
<i>Cricetulus longicaudatus</i>	Lesser Long-Tailed Hamster	24	<i>Cricetulus griseus</i> (CGR), <i>Mesocricetus auratus</i> (MAU)	Romanenko et al. (2007), S. Radjabli et al. (unpublished)	303
<i>Cricetulus sokolovi</i>	Sokolov's Dwarf Hamster	20	<i>Mesocricetus auratus</i> (MAU)	S. Romanenko Poplavskaya et al. (2017)	304
<i>Tscherskia (Cricetulus) triton</i>	Greater Long-Tailed Hamster	28	<i>Cricetulus griseus</i> (CGR), <i>Mesocricetus auratus</i> (MAU)	Romanenko et al. (2007), S. Radjabli et al. (unpublished)	305
<i>Mesocricetus brandti</i>	Brandt's Hamster	42	<i>Cricetulus griseus</i> (CGR), <i>Mesocricetus auratus</i> (MAU)	Romanenko et al. (2007), S. Radjabli et al. (unpublished)	306
<i>Mesocricetus auratus</i>	Syrian Golden Hamster	44	<i>Cricetulus griseus</i> (CGR), <i>Microtus agrestis</i> (MAG), <i>Dicrostonyx torquatus</i> (DTO), <i>Mus musculus</i> (MMU)	Romanenko et al. (2013, 2016), Radjabli et al. (unpublished)	307
<i>Mesocricetus raddei</i>	Ciscaucasian Hamster	44	<i>Cricetulus griseus</i> (CGR), <i>Mesocricetus auratus</i> (MAU)	Romanenko et al. (2007), S. Radjabli et al. (unpublished)	308
<i>Mesocricetus newtoni</i>	Romanian Hamster	38		Radjabli et al. (unpublished)	309
Family Cricetidae					
Subfamily Neotominae					
<i>Neotoma albigula/Neotoma micropus</i>	White-Throated Woodrat/ Southern Plains Woodrat	52		S. Pathak Mascarello et al. (1974)	310
<i>Peromyscus eremicus</i>	Cactus Mouse	48	<i>Cricetulus griseus</i> (CGR), <i>Mesocricetus auratus</i> (MAU), <i>Mus musculus</i> (MMU), <i>Rattus norvegicus</i> (RNO)	Da Silva et al. (2015), Romanenko et al. (2007), S. Radjabli et al. (unpublished)	311
<i>Peromyscus maniculatus</i>	North American Deer Mouse	48	<i>Mus musculus</i> (MMU)	Mlynarski et al. (2008)	312
<i>Peromyscus boylii</i>	Brush Mouse	48		Greenbaum et al. (1994)	312
<i>Peromyscus truei</i>	Piñon Mouse	48		Greenbaum et al. (1994)	312

SPECIES	COMMON NAME	2n	PAINTING PROBES	SOURCE	PAGE
Family Cricetidae					
Subfamily Sigmodontinae					
<i>Eligmodontia puerulus</i>	Andean Gerbil Mouse/ Altiplano Laucha	50		M. H. Gallardo Kelt et al. (1991)	313
<i>Eligmodontia</i> sp.	Gerbil Mouse/Laucha	32		M. H. Gallardo Kelt et al. (1991)	313
<i>Maresomys (Auliscomys) boliviensis</i>	Bolivian Big-Eared Mouse/ Pericote	22		A. E. Spotorno Walker and Spotorno (1992)	314
<i>Auliscomys sublimis</i>	Andean Big-Eared Mouse	28		A. E. Spotorno Walker and Spotorno (1992)	314
<i>Loxodontomys (Auliscomys) micropus</i>	Southern Big-Eared Mouse	34 (F), 32 (M)		A. E. Spotorno Walker and Spotorno (1992)	314
<i>Euneomys chinchilloides petersoni</i>	Patagonian Chinchilla Mouse	36		M. H. Gallardo Reise and Gallardo (1990)	315
<i>Euneomys mordax</i>	Biting Chinchilla Mouse/ Large Euneomys	42		M. H. Gallardo Reise and Gallardo (1990)	315
<i>Oryzomys yunganus</i>	Yungas Rice Rat	58		V. M. Aniskin Volobouev and Aniskin (2000a)	316
<i>Oryzomys nitidus</i>	Elegant Rice Rat	80		Volobouev and Aniskin (2000a)	316
<i>Oryzomys megacephalus</i>	Azara's Broad-Headed Rice Rat	54		Volobouev and Aniskin (2000a)	317
<i>Oligoryzomys flavescens</i>	Yellow Pygmy Rice Rat	66		Aniskin and Volobouev (1999)	318
<i>Oligoryzomys flavescens</i>	Yellow Pygmy Rice Rat	64	<i>Mus musculus</i> (MMU)	S. Müller Hass et al. (2008)	318
<i>Oligoryzomys microtis</i>	Small-Eared Pygmy Rice Rat	64		Aniskin and Volobouev (1999)	319
<i>Necomys lasiurus</i>	Hairy-Tailed Bolo Mouse	34	<i>Mus musculus</i> (MMU)	S. Müller Hass et al. (2008)	319
<i>Amphinectomys savamis</i>	Water Rat	50		V. M. Aniskin Malygin et al. (1994)	320
<i>Abrothrix (Akodon) sanborni</i>	Sanborn's Grass Mouse/ Akodont	52		Gallardo (1982)	321
<i>Abrothrix (Akodon) longipilis</i>	Long-Haired Grass Mouse/ Akodont	52		Gallardo (1982)	321
<i>Abrothrix (Akodon) olivaceus</i>	Olive Grass Mouse/ Akodont	52		Gallardo (1982)	321
<i>Akodon simulator</i>	Gray-Bellied/White-Throated Grass Mouse	36		Aniskin et al. (1996)	322
<i>Akodon toba</i>	Chako Grass Mouse	42		Aniskin et al. (1996)	322
<i>Akodon cursor</i>	Cursor Grass Mouse	15	<i>Mus musculus</i> (MMU)	S. Müller Hass et al. (2008)	323
<i>Akodon montensis</i>	Montane Grass Mouse	24	<i>Mus musculus</i> (MMU)	S. Müller Hass et al. (2008)	323
<i>Akodon montensis</i>	Montane Grass Mouse	24	<i>Hylaeamys megacephalus</i> (HME)	J. Pieczarka Suárez et al. (2015)	324
<i>Akodon</i> sp.	Grass Mouse	10	<i>Hylaeamys megacephalus</i> (HME)	J. Pieczarka Pereira et al. (2016)	324
<i>Akodon serrensis</i>	Serra do Mar Grass Mouse	46	<i>Mus musculus</i> (MMU)	S. Müller Hass et al. (2008)	325
<i>Akodon paranaensis</i>	Parana Grass Mouse	44	<i>Mus musculus</i> (MMU)	S. Müller Hass et al. (2008)	325
<i>Thaptomys nigrita</i>	Blackish Grass Mouse	52	<i>Mus musculus</i> (MMU), <i>Hylaeamys megacephalus</i> (HME)	S. Müller, J. Pieczarka Hass et al. (2008), Suárez et al. (2015)	326

SPECIES	COMMON NAME	2n	PAINTING PROBES	SOURCE	PAGE
<i>Cerradomys langguthi</i>	Terraced Rice Rat	46	<i>Hylaeamys megalcephalus</i> (HME)	J. Pieczarka Nagamachi et al. (2013)	327
<i>Hylaeamys (Oryzomys) megalcephalus</i>	Large-Headed Rice Rat	54		J. Pieczarka Nagamachi et al. (2013)	328
<i>Oecomys paricola</i>	Brazilian Oecomys	68–70		J. Pieczarka Rosa et al. (2012)	329
<i>Neacomys dubosti</i>	Dubost's Neacomys	64		J. Pieczarka Da Silva et al. (2015)	330
<i>Neacomys paracou</i>	Paracou Neacomys	56		J. Pieczarka Da Silva et al. (2015)	330
<i>Neacomys</i> sp. 1	Neacomys	58		J. Pieczarka Da Silva et al. (2015)	330
<i>Sigmodon arizonae</i>	Arizona Cotton Rat	22	<i>Sigmodon hispidus</i> (SHI)	C. Sotero-Caio Swier et al. (2009)	331
<i>Sigmodon mascotensis</i>	Mexican Cotton Rat	28	<i>Sigmodon hispidus</i> (SHI)	C. Sotero-Caio Swier et al. (2009)	331
<i>Sigmodon fulviventer</i>	Tawny-Bellied Cotton Rat	30	<i>Sigmodon hispidus</i> (SHI)	C. Sotero-Caio Swier et al. (2009)	331
Family Muridae					
Subfamily Deomyinae					
<i>Lophuromys melanonyx</i>	Black-Clawed Brush-Furred Rat	60		Aniskin et al. (1997a)	332
<i>Lophuromys brevicaudus</i>	Short-Tailed Brush-Furred Rat	68		Aniskin et al. (1997a)	333
<i>Lophuromys chrysopus</i>	Ethiopian Forest Brush-Furred Rat	54		Aniskin et al. (1997a)	334
<i>Acomys dimidiatus</i>	Eastern Spiny Mouse	38		S. Romanenko (unpublished)	335
Family Muridae					
Subfamily Gerbillinae					
<i>Tatera nigricauda</i>	Large Naked-Soled Gerbil	40		Qumsiyeh (1986)	336
<i>Tachyoryctes macrocephalus</i>	Big-Headed/African Mole-Rat	50		Aniskin et al. (1997b)	337
<i>Tachyoryctes splendens</i>	East African Mole-Rat	48		Aniskin et al. (1997b)	338
<i>Gerbillus rupicola</i>	Rocky/Northern Pygmy Gerbil	52		V. Volobouev Granjon et al. (2002)	339
<i>Gerbillus occiduus</i>	Occidental Gerbil	40		Aniskin et al. (2006)	340
<i>Gerbillus perpallidus</i>	Pale Gerbil	40		Aniskin et al. (2006)	341
<i>Gerbillus pyramidum</i>	Greater Egyptian Gerbil	38		Aniskin et al. (2006)	342
<i>Gerbillus tarabuli</i>	Tarabul's Gerbil	40		Aniskin et al. (2006)	343
<i>Gerbillurus tytonis</i>	Dune Hairy-Footed Gerbil	36		V. Aniskin Volobouev et al. (2007)	344
<i>Gerbilliscus gambianus</i>	Gambian Gerbil	52		V. Aniskin Volobouev et al. (2007)	345
<i>Gerbilliscus guineae</i>	Guinean Gerbil	50		V. Aniskin Volobouev et al. (2007)	346
<i>Gerbilliscus kempfi</i>	Northern Savanna Gerbil	48		V. Aniskin Volobouev et al. (2007)	347
<i>Gerbilliscus leucogaster</i>	Bushveld Gerbil	40		V. Aniskin Volobouev et al. (2007)	348
<i>Gerbilliscus robustus</i>	Fringe-Tailed Gerbil	36		V. Aniskin Volobouev et al. (2007)	349
<i>Gerbilliscus</i> sp.	Gerbil	46		V. Aniskin Volobouev et al. (2007)	350
<i>Meriones crassus</i>	Sundevall's Jird	58		V. Aniskin J. Darvish and V. Volobouev (unpublished)	351

SPECIES	COMMON NAME	2n	PAINTING PROBES	SOURCE	PAGE
<i>Meriones libycus</i>	Libyan Jird	44		V. Aniskin J. Darvish and V. Volobouev (unpublished)	352
<i>Meriones persicus</i>	Persian Jird	42		V. Aniskin J. Darvish and V. Volobouev (unpublished)	353
<i>Meriones rex</i>	King Jird	38		V. Aniskin J. Darvish and V. Volobouev (unpublished)	354
<i>Meriones unguiculatus</i>	Mongolian Jird	44		V. Aniskin J. Darvish and V. Volobouev (unpublished)	355
<i>Meriones meridianus</i>	Midday Jird	50		S. Romanenko (unpublished)	356
<i>Rhombomys opimus</i>	Great Gerbil	40		S. Romanenko (unpublished)	356
<i>Taterillus petteri</i>	Petter's Gerbil	19		Dobigny (2002a)	357
<i>Taterillus pygargus</i>	Senegal Gerbil	22		Dobigny (2002a)	357
<i>Taterillus arenarius</i>	Robbins's Gerbil	31 (M)		Volobouev et al. (1996)	358
<i>Taterillus tranieri</i>	Tranier's Gerbil	15		Dobigny et al. (2003)	358
<i>Taterillus congicus</i>	Congo Gerbil	54		Dobigny (2002a)	359
<i>Taterillus</i> sp. 1	Small Naked-Soled Gerbil	23		Dobigny (2002a), Dobigny et al. (2002b)	360
<i>Taterillus</i> sp. 2	Small Naked-Soled Gerbil	37		Dobigny (2002a), Dobigny et al. (2002b)	361
<i>Taterillus</i> sp. 3	Small Naked-Soled Gerbil	20		V. Volobouev and V. Aniskin (unpublished)	362
<i>Taterillus</i> sp. 4	Small Naked-Soled Gerbil	19		V. Volobouev and V. Aniskin (unpublished)	363
Family Muridae					
Subfamily Murinae					
<i>Apodemus peninsulae</i>	Korean Field Mouse	48 (+Bs)		O. Sablina et al. (unpublished)	364
<i>Apodemus sylvaticus</i>	Long-Tailed Field Mouse	48	<i>Mus musculus</i> (MMU)	Stanyon et al. (2004a), O. Sablina et al. (unpublished)	365
<i>Apodemus uralensis</i>	Ural Field Mouse	48		Volobouev and Aniskin (unpublished)	366
<i>Apodemus agrarius</i>	Striped Field Mouse	48		Sablina et al. (unpublished)	367
<i>Apodemus flavicollis</i>	Yellow-Necked Mouse	48+B's		Sablina et al. (unpublished)	368
<i>Apodemus mystacinus</i>	Broad-Toothed Field Mouse	48		Sablina et al. (unpublished)	369
<i>Mus musculus</i>	House Mouse	40	<i>Homo sapiens</i> (HSA), <i>Cricetulus griseus</i> (CGR), <i>Mesocricetus auratus</i> (MAU), <i>Peromyscus maniculatus</i> (PMA), <i>Rattus norvegicus</i> (RNO)	S. Romanenko Romanenko et al. (2006), Mlynarski et al. (2008), Graphodatsky et al. (2011)	370
<i>Mus macedonicus</i>	Macedonian Mouse	40		E. Nevo Ivanitskaya et al. (1996)	371
<i>Mus mahomet</i>	Mahomet Mouse	36		Aniskin et al. (1998)	371
<i>Mus mattheyi</i>	Matthey's Mouse	36	<i>Mus musculus</i> (MMU)	Volobouev and Aniskin (unpublished), Veyrunes et al. (2006)	372
<i>Mus minutooides</i>	Southern African Pygmy Mouse	33		Volobouev and Aniskin (unpublished)	373
<i>Mus minutooides</i>	Southern African Pygmy Mouse	18–34		Veyrunes et al. (2004)	374
<i>Mus pahari</i>	Gairdner's Shrewmouse/ Indochinese Shrewlike Mouse	48	<i>Mus musculus</i> (MMU)	Veyrunes et al. (2006)	375
<i>Mastomys natalensis</i>	Natal Mastomys/ Multimammate Mouse/ African Soft-Furred Rat	32		Volobouev et al. (2002a)	376

SPECIES	COMMON NAME	2n	PAINTING PROBES	SOURCE	PAGE
<i>Mastomys erythroleucus</i> (Cytotype 3)	Guinea Multimammate Mouse/Reddish-White Mastomys	38		Volobouev et al. (2002a)	377
<i>Mastomys awashensis</i>	Awash Mastomys/ Multimammate Mouse	32		Volobouev et al. (2002a)	378
<i>Mastomys huberti</i>	Hubert's Mastomys	32		Volobouev et al. (2002a)	379
<i>Mastomys kollmannspergeri</i>	Kollmannsperger's Mastomys/Verheyen's Multimammate Mouse	38		Volobouev et al. (2002a)	380
<i>Mastomys coucha</i>	Southern Multimammate Mouse/Southern African Mastomys	36		S. Romanenko (unpublished)	381
<i>Praomys daltoni</i>	Dalton's Mouse/Dalton's Praomys	36		Volobouev et al. (2002a)	382
<i>Arvicanthis niloticus</i> (Cytotype 1a)	African Arvicanthis/African Grass Rat	62		Volobouev et al. (2002b)	383
<i>Arvicanthis niloticus</i> (Cytotype 1b)	African Arvicanthis/African Grass Rat	62		Volobouev et al. (2002b)	384
<i>Arvicanthis ansorgei</i>	Sudanian Arvicanthis/ Sudanian Grass Rat	62		Volobouev et al. (2002b)	385
<i>Arvicanthis rufinus</i>	Guinean Arvicanthis/ Guinean Grass Rat	62		Volobouev et al. (2002b)	386
<i>Lemniscomys barbarus</i>	Barbary Striped Grass Mouse	54		S. Romanenko (unpublished)	387
<i>Otomys irroratus</i>	Southern African Vlei Rat	28 + Bs	<i>Mus musculus</i> (MMU)	R. Stanyon Engelbrecht et al. (2006)	388
<i>Rhabdomys pumilio</i>	Four-Striped Grass Mouse	46	<i>Mus musculus</i> (MMU)	Rambau and Robinson (2003)	389
<i>Dasymys incomtus</i>	African Marsh Rat	36		Volobouev et al. (2000)	390
<i>Dasymys rufulus</i>	West African Shaggy Rat	36 + Bs		Volobouev et al. (2000)	391
<i>Stenocephalemys albicaudata</i>	Ethiopian Narrow-Headed Rat/White-Tailed Stenocephalemys	54		V. Aniskin Lavrenchenko et al. (2001)	392
<i>Stenocephalemys griseicauda</i>	Gray-Tailed Narrow- Headed Rat/Gray-Tailed Stenocephalemys	54		V. Aniskin Lavrenchenko et al. (2001)	393
<i>Stenocephalemys albipes</i>	Ethiopian White-Footed Rat/White-Footed Stenocephalemys	46		V. Aniskin Lavrenchenko et al. (2001)	394
<i>Hapalomys delacouri</i>	Delacour's Marmoset Rat	48 + Bs	<i>Rattus norvegicus</i> (RNO)	Badenhorst et al. (2012)	395
<i>Leopoldamys edwardsi</i>	Long-Tailed Giant Rat	44		O. Sablina et al. (unpublished)	396
<i>Rattus norvegicus</i>	Norway Rat	42	<i>Maxomys surifer</i> (MSU), <i>Mus musculus</i> (MMU)	O. Sablina et al. (unpublished), Badenhorst et al. (2011), Helou et al. (2001), Nilsson et al. (2001)	397
<i>Rattus rattus</i>	Black Rat	38		O. Sablina et al. (unpublished)	398
<i>Rattus rattus ideogram</i>	Black Rat	38	<i>Mus musculus</i> (MMU), <i>Rattus norvegicus</i> (RNO)	Cavagna et al. (2002)	399
<i>Rattus tanezumi</i>	Tanezumi Rat	42		V. Aniskin and V. Volobouev (unpublished)	400
<i>Rattus flavipectus</i>	Buff-Bellied Rat	46		O. Sablina et al. (unpublished)	401
<i>Nesokia indica</i>	Short-Tailed Bandicoot Rat	42		O. Sablina et al. (unpublished)	402
<i>Niviventer confucianus</i>	Confucian Niviventer	46		V. Aniskin and V. Volobouev (unpublished)	403
<i>Maxomys surifer</i>	Red Spiny Rat	52	<i>Rattus norvegicus</i> (RNO)	Badenhorst et al. (2011)	404

SPECIES	COMMON NAME	2n	PAINTING PROBES	SOURCE	PAGE
<i>Phloeomys cumingi</i>	Slender-Tailed Cloud Rat	44		E. Rickart Rickart and Heany (2002)	405
<i>Crunomys suncoides</i>	Sulawesian Shrew Rat	36		E. Rickart Rickart and Heany (2002)	405
<i>Archboldomys luzonensis</i>	Isarog Shrew Mouse	26		E. Rickart Rickart and Heany (2002)	406
<i>Celaenomys silaceus</i>	Luzon Striped Rat	44		E. Rickart Rickart and Heany (2002)	406
Family Calomyscidae					
<i>Calomyscus urartensis</i>	Urar Mouse-Like Hamster	32		S. Romanenko Graphodatsky et al. (2000a)	407
<i>Calomyscus</i> sp. 1	Mouse-Like Hamster	52	<i>Cricetulus griseus</i> (CGR), <i>Mesocricetus auratus</i> (MAU)	S. Romanenko Romanenko et al. (2007)	408
<i>Calomyscus mystax</i>	Great Balkhan Mouse-Like Hamster	44		S. Romanenko S. Romanenko (unpublished)	409
<i>Calomyscus bailwardi</i>	Zagros Mountains Mouse-Like Hamster	46		S. Romanenko S. Romanenko (unpublished)	410
<i>Calomyscus elburzensis</i>	Goodwin's Brush-Tailed Mouse	44		S. Romanenko S. Romanenko (unpublished)	411
<i>Calomyscus</i> sp. 2	Mouse-Like Hamster	30		Graphodatsky et al. (2000a)	412
<i>Calomyscus</i> sp. 3	Mouse-Like Hamster	37		Graphodatsky et al. (2000a)	413
<i>Calomyscus firiusaensis</i>	Firiuza Mouse-Like Hamster	44		Graphodatsky et al. (2000a)	414
Family Hystricidae					
<i>Hystrix indica</i>	Indian Crested Porcupine	66		S. Romanenko (unpublished)	415
Family Dinomyidae					
<i>Dinomys branickii</i>	Pacarana	58		San Diego Institute for Conservation Research (unpublished)	416
Family Chinchillidae					
<i>Lagostomus maximus</i>	Argentine Plains Viscacha	56		A. Graphodatsky D. Graphodatskaya and A. Graphodatsky (unpublished)	417
Family Capromyidae					
<i>Capromys pilorides</i>	Cuban Hutia	40		P. Perelman et al. (unpublished)	418
<i>Mysateles prehensilis</i>	Prehensile-Tailed Hutia	34		N. Bulatova Milishnikov et al. (1990)	418
Family Echimyidae					
<i>Myocastor coypus</i>	Nutria/Coypu	42	<i>Homo sapiens</i> (HSA)	L. Biltueva L. Biltueva and A. Graphodatsky (unpublished)	419
<i>Proechimys brevicauda</i> (Cytotype 1)	Huallaga/Short-Tailed Spiny Rat	28		Aniskin (1994b)	420
<i>Proechimys steerei</i>	Steere's Spiny Rat	24		Aniskin (1994b)	421
<i>Proechimys simonsi</i>	Simon's Spiny Rat	32		Aniskin (1994b)	422
<i>Proechimys</i> sp. 1	Terrestrial Spiny Rat	30		Aniskin (1994b)	423
<i>Proechimys</i> sp. 2	Terrestrial Spiny Rat	34		Aniskin (1994b)	423
<i>Proechimys goeldii</i>	Goeldi's Spiny Rat	26F/27M, 24F/25M		Rodrigues Da Costa et al. (2016)	424
<i>Proechimys longicaudatus</i>	Long-Tailed Spiny Rat	16F/17M		Amaral et al. (2013)	425
<i>Proechimys roberti</i>	Roberto's Spiny Rat	30		Ribeiro et al. (2011)	425
<i>Lonchotrix emiliae</i>	Tuft-Tailed Spiny Tree Rat	60		Aniskin (1994b)	426
<i>Isotrix sinnamariensis</i>	French Guiana Brush-Tailed Rat/Toros	28		Vié et al. (1996)	426
<i>Dactylomys dactylinus</i>	Amazon Bamboo Rat/Coro-Coro	94		Aniskin (1993)	427

SPECIES	COMMON NAME	2n	PAINTING PROBES	SOURCE	PAGE
Family Abrocomidae					
<i>Abrocoma bennetti</i>	Chinchilla Rat/Chinchillone	64		Spotorno et al. (1995)	428
Family Ctenomyidae					
<i>Ctenomys rionegrensis</i>	Rio Negro Tuco-Tuco	50		Garcia et al. (2002b)	429
<i>Ctenomys talarum</i>	Los Talas Tuco-Tuco	48		Garcia et al. (2002b)	429
<i>Ctenomys maulinus brunneus</i>	Maule Tuco-Tuco	26		Gallardo (1979)	430
<i>Ctenomys maulinus maulinus</i>	Maule Tuco-Tuco	26		Gallardo (1979)	430
<i>Ctenomys magellanicus magellanicus</i>	Magellanic Tuco-Tuco	34		Gallardo (1979)	430
<i>Ctenomys opimus</i>	Highland Tuco-Tuco	26		Gallardo (1979)	431
<i>Ctenomys fulvus</i>	Tawny Tuco-Tuco	26		Gallardo (1979)	431
<i>Ctenomys (fulvus) robustus</i>	Tawny Tuco-Tuco	26		Gallardo (1979)	431
<i>Octodon degus</i>	Degu	58		S. Romanenko (unpublished)	432
<i>Octodon lunatus</i>	Moon-Toothed Degu	78		Spotorno et al. (1995)	433
<i>Spalacopus cyanus</i>	Coruro	58		Spotorno et al. (1995)	433
<i>Aconaemys fuscus</i>	Chilean Rock Rat	56		M. H. Gallardo Gallardo and Mondaca (2002)	434
<i>Aconaemys sagei</i>	Sage's Rock Rat	54		Gallardo and Mondaca (2002)	434
<i>Aconaemys porteri</i>	Porter's Rock Rat	58		Gallardo and Mondaca (2002)	434
<i>Tympanoctomys barrerae</i>	Plain's Red Viscacha Rat	102		R. Stanyon Gallardo et al. (2004)	435
Family Erethizontidae					
<i>Chaetomys subspinosus</i>	Bristle-Spined Rat	52		Vilela et al. (2009)	436
<i>Sphiggurus villosus</i>	Orange-Spined Hairy Dwarf Porcupine	42		Bonvicino et al. (2000)	436
Family Dasyproctidae					
<i>Dasyprocta fuliginosa</i>	Black Agouti	64–65		Ramos et al. (2003)	437
Family Caviidae					
<i>Hydrochaeris hydrochaeris</i>	Capybara	66		San Diego Institute for Conservation Research (unpublished)	438
<i>Dolichotis patagonum</i>	Patagonian Mara	64		S. Romanenko S. Romanenko (unpublished)	438
<i>Cavia porcellus</i>	Guinea Pig	64	<i>Homo sapiens</i> (HSA)	S. Romanenko S. Romanenko et al. (2015)	439
<i>Cavia tschudii</i>	Montane Guinea Pig	64		S. Romanenko S. Romanenko (unpublished)	440
Family Bathyergidae					
<i>Heterocephalus glaber</i>	Naked Mole-Rat	60		S. Romanenko (unpublished)	441
<i>Bathyergus janetta</i>	Namaqua Dune Mole-Rat	54	<i>Heterocephalus glaber</i> (HGL)	Deuve et al. (2008)	442
<i>Fukomys hottentotus damarensis</i>	Southern African Mole-Rat	80	<i>Heterocephalus glaber</i> (HGL)	Deuve et al. (2008)	443
<i>Fukomys darlingi</i>	Darling's Mole-Rat	54	<i>Heterocephalus glaber</i> (HGL)	Deuve et al. (2008)	444
<i>Fukomys mechowi</i>	Giant Mole-Rat	40	<i>Heterocephalus glaber</i> (HGL)	Deuve et al. (2008)	445
<i>Heliophobius argenteocinereus</i>	Silvery Mole-Rat	62	<i>Heterocephalus glaber</i> (HGL)	Deuve et al. (2008)	446
Family Thryonomyidae					
<i>Thryonomys swinderianus</i>	Greater Cane Rat	44	<i>Heterocephalus glaber</i> (HGL)	Deuve et al. (2008)	447
Family Laonastidae					
<i>Laonastes aenigmamus</i>	Laotian Rock Rat	38–42	<i>Homo sapiens</i> (HSA)	F. Richard Richard et al. (2016)	448
Family Ctenodactylidae					
<i>Ctenodactylus gundi</i>	North African Gundi	40		George (1979)	449
<i>Ctenodactylus vali</i>	Val's/Sahara Gundi	40		George (1979)	449
<i>Felovia vae</i>	Felou Gundi	36		George (1979)	450
<i>Massoutiera mzabi</i>	Mzab Gundi	36		George (1979)	450
<i>Pectinator spekei</i>	Speke's Pectinator/Gundi	40		George (1979)	450

SPECIES	COMMON NAME	2n	PAINTING PROBES	SOURCE	PAGE
Order Lagomorpha Time Tree					451
Family Ochotonidae					
<i>Ochotona princeps</i>	American Pika	68		Stock (1976)	452
<i>Ochotona forresti</i>	Forrest's Pika	54	<i>Homo sapiens</i> (HSA), <i>Oryctolagus cuniculus</i> (OCU)	W. Nie Ye et al. (2011)	453
<i>Ochotona hyperborea</i>	Northern Pika	40		P. Perelman and A. Graphodatsky (unpublished)	453
Family Leporidae					
<i>Oryctolagus cuniculus</i>	European/Domestic Rabbit/Coney	44	<i>Homo sapiens</i> (HSA), <i>Tamias sibiricus</i> (TSI)	V. Beklemisheva Korstanje et al. (1999), Robinson et al. (2002), Beklemisheva et al. (2011)	454
<i>Pronolagus rupestris</i>	Red Rabbit	42	<i>Oryctolagus cuniculus</i> (OCU)	V. Beklemisheva Robinson et al. (2002)	455
<i>Bunolagus monticularis</i>	Bushman Rabbit	44	<i>Oryctolagus cuniculus</i> (OCU)	V. Beklemisheva Robinson et al. (2002)	456
<i>Romerolagus diazi</i>	Volcano Rabbit	48	<i>Oryctolagus cuniculus</i> (OCU)	V. Beklemisheva Robinson et al. (2002)	457
<i>Brachylagus idahoensis</i>	Pygmy Rabbit	44	<i>Oryctolagus cuniculus</i> (OCU)	V. Beklemisheva Robinson et al. (2002)	458
<i>Sylvilagus aquaticus</i>	Swamp Rabbit	38		Robinson et al. (1983)	459
<i>Sylvilagus palustris</i>	Marsh Rabbit	38		Robinson et al. (1983)	459
<i>Sylvilagus transitionalis</i>	New England Cottontail	46		Robinson et al. (1983)	460
<i>Sylvilagus floridanus</i>	Eastern Cottontail	42	<i>Oryctolagus cuniculus</i> (OCU)	V. Beklemisheva Robinson et al. (1983, 2002)	460
<i>Sylvilagus nuttallii</i>	Mountain Cottontail	42		Robinson et al. (1984)	461
<i>Sylvilagus audubonii</i>	Desert Cottontail	42		Robinson et al. (1984)	461
<i>Lepus californicus</i>	Black-Tailed Jackrabbit/ Hare	48		Robinson et al. (2002)	462
<i>Lepus saxatilis</i>	Cape Scrub Hare	48	<i>Oryctolagus cuniculus</i> (OCU)	V. Beklemisheva Robinson et al. (2002)	462
<i>Lepus timidus</i>	Mountain Hare	48	<i>Tamias sibiricus</i> (TSI)	Beklemisheva et al. (2011)	463
<i>Lepus mandshuricus</i>	Manchurian Hare	48		V. Beklemisheva and I. Kartavtseva (unpublished)	464
<i>Lepus tolai</i>	Tolai Hare	48		V. Beklemisheva and S. Romanenko (unpublished)	464
LAURASIATHERIA Time Tree					465
Order Eulipotyphla (Insectivora) Time Tree					466
Family Solenodontidae					
<i>Solenodon paradoxus</i>	Hispaniolan Solenodon	34		Benirschke (1969)	467
Family Erinaceidae					
<i>Neohylomys hainanensis</i>	Hainan Gymnure	32		Li et al. (2008)	467
<i>Neotetracus sinensis</i>	Shrew Gymnure/ Hedgehog	32	<i>Homo sapiens</i> (HSA)	W. Nie Ye et al. (2006)	468
<i>Hylomys suillus</i>	Short-Tailed Gymnure	48		L. Biltueva S. Pavlova (unpublished)	468
<i>Podogymnura truei</i>	Mindanao Gymnure/ Philippine Wood Shrew	40		Rickart (2003)	469
<i>Erinaceus europaeus</i>	Eurasian/West European Hedgehog	48		A. Graphodatsky S. Radjabli and A. Graphodatsky (unpublished)	469

SPECIES	COMMON NAME	2n	PAINTING PROBES	SOURCE	PAGE
<i>Erinaceus concolor</i>	Eastern Eurasian/Southern White-Breasted Hedgehog	48		V. M. Aniskin Sokolov et al. (1991)	470
<i>Erinaceus amurensis</i>	Amur/Manchurian Hedgehog	48		A. Graphodatsky S. Radjabli and A. Graphodatsky (unpublished)	471
<i>Hemiechinus auritus</i>	Long-Eared Desert Hedgehog	48	<i>Homo sapiens</i> (HSA)	W. Nie Yang et al. (2006)	472
<i>Mesechinus (Hemiechinus) dauuricus</i>	Daurian Hedgehog	48		A. Graphodatsky S. Radjabli and A. Graphodatsky (unpublished)	473
<i>Paraechinus hypomelas</i>	Brandt's/Desert Hedgehog	48		A. Graphodatsky S. Radjabli and A. Graphodatsky (unpublished)	474
Family Soricidae					
<i>Sorex araneus</i>	Eurasian/Common Shrew	20–33	<i>Homo sapiens</i> (HSA), <i>Sorex granarius</i> (SGR)	L. Biltueva Dixkens et al. (1998), Ye et al. (2006), Biltueva et al. (2011)	475
<i>Sorex minutus</i>	Eurasian Pygmy Shrew	42	<i>Sorex granarius</i> (SGR)	L. Biltueva Biltueva et al. (2011)	476
<i>Sorex caecutiens</i>	Laxmann's Shrew	42	<i>Sorex granarius</i> (SGR)	L. Biltueva Biltueva et al. (2011)	477
<i>Sorex raddei</i>	Radde's Shrew	36	<i>Sorex granarius</i> (SGR)	L. Biltueva Biltueva et al. (2011)	478
<i>Sorex granarius</i>	Lagranja/Iberian Shrew	36–37	<i>Sorex araneus</i> (SAR), <i>Talpa altaica</i> (TAL), <i>Homo sapiens</i> (HSA)	L. Biltueva Biltueva et al. (2011), Biltueva and Vorobieva (2012)	479
<i>Sorex tundrensis</i>	Tundra Shrew	30–35	<i>Sorex granarius</i> (SGR)	L. Biltueva Biltueva et al. (2011)	480
<i>Sorex coronatus</i>	Crowned/Millet's Shrew	22–23	<i>Sorex granarius</i> (SGR)	L. Biltueva Biltueva et al. (2011)	480
<i>Neomys fodiens</i>	Old World/Eurasian Water Shrew	52		A. Graphodatsky P. Perelman and A. Graphodatsky (unpublished)	481
<i>Blarina carolinensis</i>	Southern Short-Tailed Shrew	46		R. J. Baker George et al. (1982)	482
<i>Blarina carolinensis</i>	Southern Short-Tailed Shrew	37		R. J. Baker George et al. (1982)	482
<i>Blarina carolinensis peninsulae</i>	Southern Short-Tailed Shrew	50		R. J. Baker George et al. (1982)	483
<i>Blarina hylophaga</i>	Elliot's Short-Tailed Shrew	19		R. J. Baker George et al. (1982)	483
<i>Blarinella griselda</i>	Asiatic/Indochinese Short-Tailed Shrew	44	<i>Homo sapiens</i> (HSA)	W. Nie Ye et al. (2006)	484
<i>Crocidura dsinezumi</i>	Dsinezumi/Japanese White-Toothed Shrew	40		A. Graphodatsky Biltueva et al. (1999)	484
<i>Crocidura suaveolens</i>	Lesser White-Toothed Shrew	40		A. Graphodatsky Graphodatsky et al. (1987)	485
<i>Crocidura watasei</i>	Lesser Ryukyu Shrew	26		A. Graphodatsky Harada et al. (1985)	485
<i>Crocidura leucodon</i>	Bicolored Shrew, Georgia	28		Graphodatsky et al. (1987)	486
<i>Crocidura leucodon</i>	Bicolored Shrew, Lesbos	28		Vogel and Sofianidou (1996)	486
<i>Crocidura tarfayensis</i>	Saharan/Tarfaya Shrew	36		L. Biltueva Vogel et al. (2006)	487

SPECIES	COMMON NAME	2n	PAINTING PROBES	SOURCE	PAGE
<i>Crocidura sicula</i>	Sicilian Shrew	36		L. Biltueva Vogel et al. (2006)	487
<i>Crocidura canariensis</i>	Canarian Shrew	36		L. Biltueva Vogel et al. (2006)	487
<i>Crocidura pergrisea</i>	Pale Gray Shrew	22		A. Graphodatsky Graphodatsky et al. (1987)	488
<i>Crocidura sibirica</i>	Siberian Shrew	40		A. Graphodatsky Graphodatsky et al. (1987)	488
<i>Crocidura crossei</i>	Crosse's Shrew	44		V. Aniskin (unpublished)	489
<i>Crocidura glassi</i>	Glass's Shrew	36		V. Aniskin (unpublished)	490
<i>Crocidura muricauda</i>	West African Long-Tailed Shrew	36		V. Aniskin (unpublished)	490
<i>Crocidura obscurior</i>	West African Pygmy/ Obscure White-Toothed Shrew	38		V. Aniskin (unpublished)	491
<i>Crocidura olivieri</i>	African Giant/Olivier's Shrew	50		V. Aniskin (unpublished)	491
<i>Suncus murinus</i>	Gray Musk/Asian House Shrew	40		A. Graphodatsky Perelman et al. (unpublished)	492
Family Talpidae					
<i>Talpa europaea</i>	European Mole	34	<i>Homo sapiens</i> (HSA)	M. Volleth Volleth and Müller (2006)	493
<i>Talpa altaica</i>	Siberian/Altai Mole	34	<i>Homo sapiens</i> (HSA), <i>Sorex granarius</i> (SGR)	L. Biltueva Biltueva and Vorobieva (2012), A. Graphodatsky (unpublished)	494
<i>Parascalops breweri</i>	Hairy-Tailed Mole	34		Benirschke (1969)	495
<i>Mogera insularis</i>	Insular Mole	32		Kawada et al. (2007)	496
<i>Mogera kanoana</i>	Kano Mole	32		Kawada et al. (2007)	496
<i>Dymecodon pilirostris</i>	True's Shrew Mole	34		Kawada and Obara (1999)	497
<i>Urotrichus talpoides</i>	Japanese Shrew Mole/ Himizu	34		Kawada and Obara (1999)	497
<i>Euroscaptor klossi</i>	Kloss's Mole	36		Kawada et al. (2006)	498
<i>Parascaptor leucura</i>	White-Tailed Mole	34		Kawada et al. (2016)	498
<i>Scaptonyx fuscicaudus</i>	Long-Tailed Mole	34		Kawada et al. (2008)	499
<i>Neurotrichus gibbsii</i>	American Shrew Mole	34		Kawada et al. (2008)	500
<i>Scapanulus oweni</i>	Gansu Mole	34		W. Nie He et al. (2012)	501
Order Chiroptera Time Tree					502
Family Rhinopomatidae					
<i>Rhinopoma microphyllum</i>	Greater Mouse-Tailed Bat	42		Qumsiyeh (1988)	503
<i>Rhinopoma hardwickii</i>	Lesser Mouse-Tailed/Long Tailed Bat	36		Qumsiyeh (1988)	503
Family Megadermatidae					
<i>Megaderma spasma</i>	Lesser Asian False Vampire Bat	38	<i>Homo sapiens</i> (HSA)	W. Nie Mao et al. (2007b, 2008)	504
<i>Megaderma lyra</i>	Greater Asian False Vampire Bat	54		Choudhury and Mohanty (1993)	505
Family Rhinolophidae					
<i>Rhinolophus rouxii</i>	Rufous Horseshoe Bat	56		M. Volleth Zima et al. (1992)	505
<i>Rhinolophus ferrumequinum tragatus</i>	Greater Horseshoe Bat	56	<i>Aselliscus stoliczkanus</i> (AST)	W. Nie Mao et al. (2007a)	506

SPECIES	COMMON NAME	2n	PAINTING PROBES	SOURCE	PAGE
<i>Rhinolophus pusillus</i>	Least Horseshoe Bat	62	<i>Aselliscus stoliczkanus</i> (AST)	W. Nie Mao et al. (2007a)	507
<i>Rhinolophus pearsonii</i>	Pearson's Horseshoe Bat	44	<i>Aselliscus stoliczkanus</i> (AST)	W. Nie Mao et al. (2007a)	508
<i>Rhinolophus sinicus</i>	Chinese Rufous Horseshoe Bat	36	<i>Aselliscus stoliczkanus</i> (AST), <i>Myotis myotis</i> (MMY)	W. Nie Mao et al. (2007a)	509
<i>Rhinolophus formosae</i>	Formosan Woolly Horseshoe Bat	52	<i>Aselliscus stoliczkanus</i> (AST), <i>Myotis myotis</i> (MMY)	M. Volleth Volleth et al. (2017)	510
<i>Rhinolophus hipposideros</i>	Lesser Horseshoe Bat	56	<i>Myotis myotis</i> (MMY)	M. Volleth Volleth et al. (2013)	511
<i>Rhinolophus luctoides</i>	Woolly-Like Horseshoe Bat	32	<i>Myotis myotis</i> (MMY)	M. Volleth Volleth et al. (2015)	512
<i>Rhinolophus (luctus) morio</i>	Woolly Horseshoe Bat	32	<i>Myotis myotis</i> (MMY)	M. Volleth Volleth et al. (2015)	513
<i>Rhinolophus sedulus</i>	Lesser Woolly Horseshoe Bat	28	<i>Myotis myotis</i> (MMY)	M. Volleth Volleth et al. (2014)	514
Family Hipposideridae					
<i>Aselliscus stoliczkanus</i>	Stoliczka's Asian Trident Bat	30	<i>Homo sapiens</i> (HSA), <i>Myotis myotis</i> (MMY)	W. Nie Ao et al. (2007), Mao et al. (2007a, 2010)	515
<i>Hipposideros speoris</i>	Schneider's Leaf-Nosed Bat	32		Sreepada et al. (1993)	516
<i>Hipposideros ater</i>	Dusky Leaf-Nosed Bat	32		Sreepada et al. (1993)	516
<i>Hipposideros fulvus</i>	Fulvus Leaf-Nosed Bat	32		Sreepada et al. (1993)	516
<i>Hipposideros fulvus pallidus</i>	Pale Fulvus Leaf-Nosed Bat	32		Choudhury and Patro (1993)	517
<i>Hipposideros cineraceus</i>	Ashy Leaf-Nosed Bat	32		Sreepada et al. (1993)	517
<i>Hipposideros lankadiva</i>	Indian Leaf-Nosed Bat	32		Sreepada et al. (1993)	517
<i>Hipposideros larvatus</i>	Intermediate Roundleaf Bat	32	<i>Aselliscus stoliczkanus</i> (AST), <i>Homo sapiens</i> (HSA)	W. Nie, L. Biltueva Mao et al. (2007a, 2010), Volleth et al. (2002)	518
<i>Hipposideros pratti</i>	Pratt's Roundleaf Bat	32	<i>Aselliscus stoliczkanus</i> (AST)	W. Nie Mao et al. (2010)	519
<i>Hipposideros pomona</i>	Pomona Roundleaf Bat	32	<i>Aselliscus stoliczkanus</i> (AST)	W. Nie Mao et al. (2010)	520
<i>Hipposideros armiger</i>	Great Roundleaf Bat	32	<i>Aselliscus stoliczkanus</i> (AST)	W. Nie Mao et al. (2010)	521
Family Pteropodidae					
<i>Rousettus aegyptiacus</i>	Rousette Fruit Bat	36		R. J. Baker Haiduk et al. (1981)	522
<i>Rousettus lanosus</i>	Long-Haired Rousette	36		E. Teeling and R. Stanyon (unpublished)	523
<i>Rousettus (Lissonycteris) angolensis</i>	Angolan Soft-Furred Fruit Bat	36		R. J. Baker Haiduk et al. (1981)	523
<i>Rousettus leschenaulti</i>	Leschenault's Rousette	36	<i>Aselliscus stoliczkanus</i> (AST)	W. Nie Mao et al. (2007a)	524
<i>Eonycteris spelaea</i>	Cave Nectar/Lesser Dawn Bat	36	<i>Homo sapiens</i> (HSA), <i>Myotis myotis</i> (MMY)	W. Nie, M. Volleth Volleth et al. (2013), Mao et al. (2007b)	525
<i>Eonycteris robusta</i>	Philippine Dawn Bat	36		Rickart et al. (1999)	526
<i>Megalaglossus woermanni</i>	Woermann's/African Long-Tongued Fruit Bat	34		R. J. Baker Haiduk et al. (1981)	526
<i>Myonycteris torquata</i>	Little Collared Fruit Bat	36		R. J. Baker Haiduk et al. (1981)	527

SPECIES	COMMON NAME	2n	PAINTING PROBES	SOURCE	PAGE
<i>Pteropus rodricensis</i>	Rodriguez Flying Fox	38		San Diego Institute for Conservation Research (unpublished)	527
<i>Pteropus giganteus</i>	Indian Flying Fox	38		Choudhury and Jena (1995)	528
<i>Pteropus lylei</i>	Lile's Flying Fox	40		R. J. Baker Hood et al. (1988)	528
<i>Hypsignathus monstrosus</i>	Hammer-Headed Fruit Bat	36		R. J. Baker Haiduk et al. (1981)	529
<i>Epomops franqueti</i>	Franquet's Epauletted Fruit Bat	36		Haiduk et al. (1981)	529
<i>Micropteropus pusillus</i>	Peter's Lesser/Dwarf Epauletted Fruit Bat	35		R. J. Baker Haiduk et al. (1981)	530
<i>Scotonycteris ophiodon</i>	Pohle's Fruit Bat	34		R. J. Baker Haiduk et al. (1981)	530
<i>Otopteropus cartilagonodus</i>	Luzon Pygmy Fruit Bat	48		Rickart et al. (1999)	531
<i>Alionycteris paucidentata</i>	Mindanao Pygmy Fruit Bat	36		Rickart et al. (1999)	531
<i>Cynopterus sphinx</i>	Greater Short-Nosed Fruit Bat	34	<i>Myotis myotis</i> (MMY)	W. Nie Ao et al. (2007)	532
<i>Eidolon helvum</i>	African Straw-Colored Fruit Bat	34		M. Houck (unpublished)	532
Family Noctilionidae					
<i>Noctilio albiventris</i>	Lesser Bulldog/Fisherman's Bat	34		E. Morielle-Versute Varella-Garcia et al. (1989)	533
Family Mormoopidae					
<i>Mormoops blainvillei</i>	Antillean Ghost-Faced/Blainville's Leaf-Chinned Bat	38		J. W. Bickham Sites et al. (1981)	534
<i>Pteronotus personatus</i>	Wagner's Mustached Bat	38		J. W. Bickham Sites et al. (1981)	534
<i>Pteronotus macleayi</i>	MacLeay's Mustached/Naked-Backed/Leaf-Lipped Bat	38		J. W. Bickham Sites et al. (1981)	535
<i>Pteronotus gymnotus</i>	Mustached/Big Naked-Backed/Leaf-Lipped Bat	38		J. W. Bickham Sites et al. (1981)	535
Family Phyllostomidae					
<i>Desmodus rotundus</i>	Common Vampire Bat	28	<i>Phyllostomus hastatus</i> (PHA), <i>Carollia brevicauda</i> (CBR)	E. Morielle-Versute, C. Sotero-Caio Varella-Garcia et al. (1989), Sotero-Caio et al. (2011)	536
<i>Glossophaga soricina</i>	Pallas's Long-Tongued Bat	32	<i>Homo sapiens</i> (HSA), <i>Macrotus californicus</i> (MCA)	C. Sotero-Caio Volleth et al. (1999), Sotero-Caio et al. (2013)	537
<i>Monophyllus redmani</i>	Leach's Single Leaf Bat	32		Baker et al. (1979)	537
<i>Diaemus youngi</i>	White-Winged Vampire Bat	32	<i>Phyllostomus hastatus</i> (PHA), <i>Carollia brevicauda</i> (CBR)	Sotero-Caio et al. (2013)	538
<i>Diphylla ecaudata</i>	Hairy-Legged Vampire Bat	32	<i>Phyllostomus hastatus</i> (PHA), <i>Carollia brevicauda</i> (CBR)	Sotero-Caio et al. (2013)	538
<i>Macrotus waterhousii</i>	Waterhouse's Leaf-Nosed/Big-Eared Bat	46		Baker et al. (1979)	539
<i>Macrotus californicus</i>	Californian Leaf-Nosed/Big-Eared Bat	40		Sotero-Caio et al. (2013)	539
<i>Miconycteris hirsuta</i>	Hairy Big-Eared Bat	30		Baker et al. (1979)	540
<i>Miconycteris hirsuta</i>	Hairy Big-Eared Bat	26	<i>Phyllostomus hastatus</i> (PHA), <i>Carollia brevicauda</i> (CBR)	J. Pieczarka Ribas et al. (2013)	540

SPECIES	COMMON NAME	2n	PAINTING PROBES	SOURCE	PAGE
<i>Micronycteris schmidtorum</i>	Schmidt's Big-Eared Bat	38		Baker et al. (1979)	541
<i>Micronycteris minuta</i>	Tiny Big-Eared Bat	28		Baker et al. (1979)	541
<i>Micronycteris megalotis</i>	Little Big-Eared Bat	40		Baker et al. (1979)	542
<i>Micronycteris brachyotis</i>	Yellow-Throated Big-Eared Bat	32		Baker et al. (1979)	542
<i>Micronycteris nicefori</i>	Niceforo's Big-Eared Bat	28		Baker et al. (1979)	542
<i>Vampyrum spectrum</i>	Linnaeus's False Vampire/ Spectral Bat	30		Baker et al. (1979)	543
<i>Trachops cirrhosus</i>	Fringe-Lipped/Frog-Eating Bat	30		Baker et al. (1979)	543
<i>Trachops cirrhosus</i>	Fringe-Lipped/Frog-Eating Bat	30		C. Sotero-Caio Barros et al. (2009)	543
<i>Chropterus auritus</i>	Woolly False Vampire Bat	28		Morielle-Versute et al. (1992)	544
<i>Phylloderma stenops</i>	Pale-Faced/Peter's Spear-Nosed Bat	32		Baker et al. (1979)	544
<i>Phyllostomus discolor</i>	Pale Spear-Nosed Bat	32		Baker et al. (1979)	545
<i>Phyllostomus hastatus</i>	Greater Spear-Nosed Bat	32	<i>Carollia brevicauda</i> (CBR)	Pieczarka et al. (2005)	545
<i>Lophostoma silvicolum</i>	White-Throated Round-Eared Bat	34	<i>Phyllostomus hastatus</i> (PHA), <i>Carollia brevicauda</i> (CBR)	J. Pieczarka Ribas et al. (2015)	546
<i>Lophostoma occidentale</i>	Western Round-Eared Bat	34	<i>Macrotus californicus</i> (MCA)	Sotero-Caio et al. (2015)	546
<i>Lonchorhina aurita</i>	Common/Tomes's Sword-Nosed Bat	32		C. Sotero-Caio Barros et al. (2009)	547
<i>Gardnerycteris (Mimon) crenulatum</i>	Striped Hairy-Nosed/ Gray's Spear-Nosed Bat	32		Baker et al. (1979)	547
<i>Tonatia bidens</i>	Greater Round-Eared Bat	16		Baker et al. (1979)	547
<i>Tonatia saurophila</i>	Stripe-Headed Round-Eared Bat	16	<i>Phyllostomus hastatus</i> (PHA), <i>Carollia brevicauda</i> (CBR), <i>Macrotus californicus</i> (MCA)	Sotero-Caio et al. (2017)	548
<i>Lonchophylla concava (mordax)</i>	Goldman's Nectar Bat	28	<i>Macrotus californicus</i> (MCA)	Sotero-Caio et al. (2013)	548
<i>Lonchophylla robusta</i>	Orange Nectar Bat	28		Baker et al. (1979)	549
<i>Hsunnycteris (Lonchophylla) thomasi</i>	Thomas's Nectar Bat	30		Baker et al. (1979)	549
<i>Lionycteris spurrelli</i>	Chestnut Long-Tongued Bat	28		Baker et al. (1979)	549
<i>Anoura caudifera</i>	Tailed Tailless Bat	30		E. Morielle-Versute Varella-Garcia et al. (1989)	550
<i>Anoura cultrata</i>	Handley's Tailless Bat	30	<i>Macrotus californicus</i> (MCA)	Sotero-Caio et al. (2013)	550
<i>Lichonycteris obscura</i>	Dark Long-Tongued Bat	24		Baker et al. (1979)	551
<i>Hylonycteris underwoodi</i>	Underwood's Long-Tongued Bat	16		Baker et al. (1979)	551
<i>Choeronycteris mexicana</i>	Mexican Long-Tongued/ Hog-Nosed Bat	16		Baker et al. (1979)	551
<i>Choeroniciscus minor</i>	Lesser Long-Tongued Bat	20		J. Pieczarka Ribeiro et al. (2003); Das Neves et al. (2001)	552
<i>Choeroniciscus intermedius</i>	Intermediate Long-Tongued Bat	20		Stock (1975)	552
<i>Choeroniciscus godmani</i>	Godman's Long-Tongued Bat	19		R. J. Baker Hsu et al. (1968)	553
<i>Erophylla sezekorni</i>	Brown Flower Bat	32		Baker et al. (1979)	553
<i>Phyllonycteris poeyi</i>	Cuban Flower Bat	32		Baker et al. (1979)	554
<i>Carollia brevicauda</i>	Silky/Short-Tailed Bat	20F/21M	<i>Phyllostomus hastatus</i> (PHA)	J. Pieczarka Pieczarka et al. (2005)	554

SPECIES	COMMON NAME	2n	PAINTING PROBES	SOURCE	PAGE
<i>Carollia perspicillata</i>	Seba's Short-Tailed Bat	20F/21M		E. Teeling and R. Stanyon (unpublished)	555
<i>Carollia castanea</i>	Chestnut Short-Tailed Bat	22		Stock (1975)	555
<i>Rhinophylla pumilio</i>	Dwarf Little Fruit Bat	36		Baker et al. (1979)	555
<i>Rhinophylla pumilio</i>	Dwarf Little Fruit Bat	34		J. Pieczarka Gomes et al. (2012)	556
<i>Rhinophylla fischeriae</i>	Fischer's Little Fruit Bat	38		J. Pieczarka Gomes et al. (2010)	556
<i>Sturnira lilium</i>	Little Yellow Shouldered/ American Epauleted Bat	30		Varella-Garcia et al. (1989)	557
<i>Sturnira mordax</i>	Talamancan Yellow Shouldered/American Epauleted Bat	30		Baker et al. (1979)	557
<i>Sturnira erythromos</i>	Hairy Yellow Shouldered/ American Epauleted Bat	30		Baker et al. (1979)	557
<i>Uroderma magnirostrum</i>	Brown Tent-Making/ Tent-Building Bat	36	<i>Phyllostomus hastatus</i> (PHA), <i>Carollia brevicauda</i> (CBR)	J. Pieczarka Pieczarka et al. (2013)	558
<i>Uroderma bilobatum</i>	Common Tent-Making Bat	42	<i>Phyllostomus hastatus</i> (PHA), <i>Carollia brevicauda</i> (CBR)	J. Pieczarka Pieczarka et al. (2013)	558
<i>Platyrrhinus vittatus</i>	Greater Broad-Nosed Bat	30		Baker et al. (1979)	559
<i>Platyrrhinus lineatus</i>	White-Lined Broad-Nosed Bat	30		E. Morielle-Versute Varella-Garcia et al. (1989)	559
<i>Platyrrhinus incarum (helleri)</i>	Heller's/Incan Broad- Nosed Bat	30		J. Pieczarka Gomes et al. (2016)	559
<i>Vampyressa brocki</i>	Brock's Yellow-Eared Bat	24		Baker et al. (1979)	560
<i>Vampyressa brocki</i>	Brock's Yellow-Eared Bat	24	<i>Phyllostomus hastatus</i> (PHA), <i>Carollia brevicauda</i> (CBR)	J. Pieczarka Gomes et al. (2016)	560
<i>Vampyressa nymphaea</i>	Striped Yellow-Eared Bat	26		Baker et al. (1979)	560
<i>Vampyressa thylene</i>	Northern Little Yellow- Eared Bat	24	<i>Phyllostomus hastatus</i> (PHA), <i>Carollia brevicauda</i> (CBR)	J. Pieczarka Gomes et al. (2016)	561
<i>Vampyressa pusilla</i>	Southern Little Yellow- Eared Bat	18		Baker et al. (1979)	561
<i>Vampyressa (Vampyriscus) bidens</i>	Bidentate Yellow-Eared Bat	26	<i>Phyllostomus hastatus</i> (PHA), <i>Carollia brevicauda</i> (CBR)	J. Pieczarka Gomes et al. (2016)	562
<i>Chiroderma improvisum</i>	Guadeloupean Big-Eyed/ White-Lined Bat	26		Baker et al. (1979)	562
<i>Chiroderma villosum</i>	Hairy Big-Eyed/White- Lined Bat	26	<i>Phyllostomus hastatus</i> (PHA), <i>Carollia brevicauda</i> (CBR)	J. Pieczarka Gomes et al. (2016)	563
<i>Chiroderma doriae</i>	Brazilian Big-Eyed/White- Lined Bat	26		E. Morielle-Versute Varella-Garcia et al. (1989)	563
<i>Mesophylla macconnelli</i>	MacConnell's/Little Yellow-Faced Bat	21M/22F	<i>Phyllostomus hastatus</i> (PHA), <i>Carollia brevicauda</i> (CBR)	J. Pieczarka Gomes et al. (2016)	564
<i>Ectophylla alba</i>	Honduran White Bat	30		Baker et al. (1979)	564
<i>Artibeus lituratus</i>	Great Fruit-Eating/ Neotropical Fruit Bat	31		Varella-Garcia et al. (1989)	565
<i>Artibeus jamaicensis</i>	Jamaican Fruit-Eating/ Neotropical Fruit Bat	28		Baker et al. (1979)	565
<i>Artibeus obscurus</i>	Dark Fruit-Eating/ Neotropical Fruit Bat	30/31	<i>Phyllostomus hastatus</i> (PHA), <i>Carollia brevicauda</i> (CBR)	Pieczarka et al. (2013)	566
<i>Vampyrodes caraccioli</i>	Great Stripe-Faced Bat	30		J. Pieczarka Pieczarka et al. (2013)	566

SPECIES	COMMON NAME	2n	PAINTING PROBES	SOURCE	PAGE
<i>Enchisthenes hartii</i>	Velvety Fruit-Eating/Hart's Little Fruit Bat	31		Baker et al. (1979)	567
<i>Ardops nichollsi</i>	Tree Bat	31		Baker et al. (1979)	567
<i>Phyllops haitiensis (falcatus)</i>	Cuban Fig-Eating/ Falcate-Winged Bat	31		Baker et al. (1979)	568
<i>Ariteus flavescens</i>	Jamaican Fig-Eating Bat	31		Baker et al. (1979)	568
<i>Ametrida centurio</i>	Little White-Shouldered Bat	31		Baker et al. (1979)	568
<i>Sphaeronycteris toxophyllum</i>	Red Fruit/Visored Bat	28		Baker et al. (1979)	569
Family Mystacinidae					
<i>Mystacina tuberculata</i>	New Zealand Lesser Short-Tailed Bat	36		Bickham et al. (1980)	569
Family Vespertilionidae					
<i>Myotis keenii</i>	Keen's Myotis/Little Brown Bat	44		Bickham (1979)	570
<i>Myotis thysanodes</i>	Fringed Myotis/Little Brown Bat	44		Bickham (1979)	570
<i>Myotis mystacinus</i>	Whiskered Myotis/Little Brown Bat	44		Volleth (1987)	571
<i>Myotis sodalis</i>	Indiana Myotis/Little Brown Bat	44		Bickham (1979)	571
<i>Myotis nigricans</i>	Black Myotis/Little Brown Bat	44		Bickham (1979)	571
<i>Myotis altarium</i>	Szechwan Myotis	44	<i>Myotis myotis</i> (MMY), <i>Aselliscus stoliczkanus</i> (AST)	W. Nie Ao et al. (2006), Mao et al. (2007a)	572
<i>Myotis dasycneme</i>	Pond Myotis	44	<i>Aselliscus stoliczkanus</i> (AST)	Kulemzina et al. (2011b)	572
<i>Scotozous dormeri</i>	Dormer's Bat/Dormer's Pipistrelle	30		Volleth et al. (2001)	573
<i>Hypsugo eisentrauti</i>	Eisentraut's Pipistrelle	42		Volleth et al. (2001)	573
<i>Hypsugo crassulus</i>	Broad-Headed Pipistrelle	30		Volleth et al. (2001)	574
<i>Hypsugo pulveratus</i>	Chinese Pipistrelle	44	<i>Myotis myotis</i> (MMY)	W. Nie Ao et al. (2006)	574
<i>Pipistrellus kuhlii</i>	Kuhl's Pipistrelle	42		Volleth et al. (2001)	575
<i>Pipistrellus pipistrellus</i>	Common Pipistrelle	44		Volleth (1987)	575
<i>Pipistrellus ceylonicus</i>	Kelaart's Pipistrelle	36		Sreepada et al. (1996)	576
<i>Pipistrellus javanicus</i>	Javan Pipistrelle	34		Volleth et al. (2001)	576
<i>Pipistrellus coromandra</i>	Indian Pipistrelle	30		Sreepada et al. (1996)	576
<i>Pipistrellus (Vespadelus) vulturinus</i>	Little Forest Bat/Pipistrelle	44		Volleth et al. (1989)	577
<i>Pipistrellus (Vespadelus) sagittula (darlingtoni)</i>	Large Forest Bat/ Pipistrelle	44		Volleth et al. (1989)	577
<i>Pipistrellus stenopterus</i>	Narrow-Winged Pipistrelle	32		Volleth et al. (2001)	577
<i>Pipistrellus (Falsistrellus) tasmaniensis</i>	Eastern False Pipistrelle	44		Volleth and Tidemann (1991)	578
<i>Pipistrellus mimus (tenuis)</i>	Least Pipistrelle	38		Volleth et al. (2001)	578
<i>Hesperoptenus blanfordi</i>	Blanford's Bat	32		Volleth et al. (2001)	579
<i>Chalinolobus morio</i>	Chocolate Wattled/Lobe-Lipped/Groove-Lipped/ Wattled Bat	44		Volleth and Tidemann (1989)	579
<i>Tylonycteris pachypus</i>	Club-Footed/Lesser Bamboo Bat	32		Volleth et al. (2001)	579
<i>Tylonycteris robustula</i>	Greater Bamboo Bat	32	<i>Myotis myotis</i> (MMY)	W. Nie Ao et al. (2006)	580
<i>Tylonycteris</i> sp.	Pygmy Bamboo Bat	30		W. Nie Ao et al. (2006)	580

SPECIES	COMMON NAME	2n	PAINTING PROBES	SOURCE	PAGE
<i>Scotorepens balstoni</i>	Western/Lesser Broad-Nosed Bat	30		Volleth and Tidemann (1991)	581
<i>Eptesicus bottae</i>	Botta's Serotine/House Bat	50		Volleth et al. (2001)	581
<i>Eptesicus fuscus</i>	Big Brown/House Bat	50		E. Teeling and R. Stanyon (unpublished)	582
<i>Euderma maculatum</i>	Spotted/Pinto Bat	30		Stock (1983)	582
<i>Scotophilus kuhlii</i>	Lesser Asiatic House/Yellow Bat	36		Stock (1975)	583
<i>Scotophilus heathii</i>	Greater Asiatic Yellow House Bat	36		Stock (1975)	583
<i>Scotophilus dinganii</i>	Yellow-Bellied House/Yellow Bat	36		M. Volleth Eick et al. (2007)	583
<i>Nyctophilus gouldi</i>	Gould's Long-Eared/Australian Big-Eared Bat	44		Volleth et al. (1989)	584
<i>Corynorhinus townsendii</i>	Lump-Nosed/Townsend's Big-Eared/American Long-Eared Bat	32		Stock (1983)	584
<i>Lasiurus borealis</i>	Hairy-Tailed/Eastern Red Bat	28		E. Morielle-Versute Varella-Garcia et al. (1989)	585
<i>Idionycteris phyllotis</i>	Allen's Big-Eared/Lappet-Eared Bat	30		Stock (1983)	585
<i>Nyctalus velutinus (plancyi)</i>	Chinese/Villus Noctule	36	<i>Myotis myotis</i> (MMY)	W. Nie Ao et al. (2006)	586
<i>Miniopterus fuliginosus (schreibersii)</i>	Eastern Bent-Wing/Schreiber's Long-Fingered Bat	46	<i>Myotis myotis</i> (MMY)	W. Nie Ao et al. (2006)	586
<i>Glauconycteris beatrix</i>	Beatrix Butterfly Bat	22	<i>Myotis myotis</i> (MMY)	Volleth and Heller (2007)	587
<i>Vespertilio murinus</i>	Particolored Bat	38	<i>Aselliscus stoliczkanus</i> (AST)	A. Kulemzina Kulemzina et al. (2011b)	587
<i>Plecotus auritus</i>	Brown Long-Eared Bat	32	<i>Homo sapiens</i> (HSA), <i>Aselliscus stoliczkanus</i> (AST)	A. Kulemzina Kulemzina et al. (2011b)	588
<i>Murina hilgendorfi</i>	Hilgendorf's Tube-Nosed Bat	44	<i>Aselliscus stoliczkanus</i> (AST)	A. Kulemzina Kulemzina et al. (2011b)	588
<i>Murina cyclotis</i>	Round-Eared Tube-Nosed Bat	44		Rickart et al. (1999)	588
<i>Phoniscus atrox</i>	Groove-Toothed Trumpet-Eared Bat	40		M. Volleth Volleth (2006)	589
Family Molossidae					
<i>Molossops temminckii</i>	Dwarf Dog-Faced/Broad-Faced Bat	48		Morielle-Versute et al. (1996)	590
<i>Molossops (Cynomops) abrasus</i>	Cinnamon Dog-Faced/Broad-Faced Bat	34		Morielle-Versute et al. (1996)	590
<i>Nyctinomops laticaudatus</i>	Broad-Eared/New World Free-Tailed Bat	48		Morielle-Versute et al. (1996)	591
<i>Eumops perotis</i>	Greater Bonneted/Mastiff Bat	48		Morielle-Versute et al. (1996)	591
<i>Eumops glaucinus</i>	Wagner's Bonneted/Mastiff Bat	40		Morielle-Versute et al. (1996)	592
<i>Tadarida teniotis</i>	European Free-Tailed Bat	48	<i>Myotis myotis</i> (MMY)	W. Nie Mao et al. (2008)	592
<i>Molossus molossus</i>	Pallas's Mastiff/Velvet Free-Tailed Bat	48		Morielle-Versute et al. (1996)	593

SPECIES	COMMON NAME	2n	PAINTING PROBES	SOURCE	PAGE
<i>Molossus rufus (ater)</i>	Black Mastiff/Velvet Free-Tailed Bat	48		Morielle-Versute et al. (1996)	593
<i>Chaerephon plicatus</i>	Wrinkle-Lipped Free-Tailed Bat	48		W. Nie Mao et al. (2007b)	594
Family Natalidae					
<i>Natalus major</i>	Hispaniolan Greater Funnel-Eared Bat	36		R. J. Baker Hoyt et al. (1980)	595
Family Emballonuridae					
<i>Cormura brevirostris</i>	Chestnut Sac-Winged Bat	22		J. Pieczarka Araujo et al. (2016)	595
<i>Saccolaimus (Taphozous) longimanus</i>	Long-Winged Tomb Bat	42		Sreepada et al. (1995)	596
<i>Taphozous nudiventris</i>	Naked-Rumped Tomb Bat	42		Sreepada et al. (1995)	596
<i>Taphozous melanopogon</i>	Black-Bearded Tomb Bat	42	<i>Homo sapiens</i> (HSA)	W. Nie Mao et al. (2007b, 2008)	597
<i>Saccolaimus (Taphozous) saccolaimus</i>	Naked-Rumped Pouched Tomb Bat	44		Sreepada et al. (1995)	597
Order Carnivora Time tree					598
Family Nandiniidae					
<i>Nandinia binotata</i>	African Palm Civet	38		Wurster-Hill and Gray (1975)	599
Family Eupleridae					
<i>Cryptoprocta ferox</i>	Fossa	42		San Diego Institute for Conservation Research (unpublished)	600
<i>Galidia elegans</i>	Malagasy Ring-Tailed Mongoose	44		Wurster-Hill and Gray (1975)	600
<i>Fossa fossa</i>	Malagasy Civet	42	<i>Nyctereutes procyonoides viverrinus</i> (NPR), <i>Felis catus</i> (FCA)	Nash et al. (2008)	601
Family Herpestidae					
<i>Herpestes javanicus</i>	Javan/Small Asian Mongoose	36	<i>Canis familiaris</i> (CFA), <i>Felis catus</i> (FCA)	W. Nie Nie et al. (2012)	602
<i>Helogale parvula</i>	Dwarf Mongoose	36	<i>Nyctereutes procyonoides viverrinus</i> (NPR), <i>Felis catus</i> (FCA)	Nash et al. (2008)	603
<i>Atilax paludinosus</i>	African Marsh/Water Mongoose	35		Wurster-Hill and Gray (1975)	604
<i>Bdeogale</i> sp.	Black-Legged Mongoose	36		Wurster-Hill and Gray (1975)	604
Family Hyaenidae					
<i>Crocuta crocuta</i>	Spotted Hyena	40	<i>Canis familiaris</i> (CFA), <i>Mustela vison</i> (MVI), <i>Homo sapiens</i> (HSA)	P. Perelman Perelman et al. (2005)	605
Family Viverridae					
<i>Genetta genetta</i>	Small Spotted/Common Genet	54		San Diego Institute for Conservation Research (unpublished)	606
<i>Genetta tigrina</i>	Large Spotted/Cape Genet	54		San Diego Institute for Conservation Research (unpublished)	606
<i>Genetta johnstoni</i>	Johnston's Genet	50		P. Gaubert Gaubert et al. (2004)	607
<i>Genetta maculata</i>	Rusty-Spotted/Panther Genet	52		M. do Mar Oom Matoso Silva et al. (2016)	607
<i>Genetta pardina</i>	Pardine/West African Genet	52		V. Beklemisheva (unpublished)	608

SPECIES	COMMON NAME	2n	PAINTING PROBES	SOURCE	PAGE
<i>Viverricula indica</i>	Small Indian Civet	36	<i>Canis familiaris</i> (CFA), <i>Felis catus</i> (FCA)	W. Nie Nie et al. (2012)	608
<i>Paradoxurus hermaphroditus</i>	Palm Civet	42	<i>Canis familiaris</i> (CFA), <i>Felis catus</i> (FCA)	W. Nie Nie et al. (2012)	609
<i>Paguma larvata</i>	Masked Palm Civet	44	<i>Canis familiaris</i> (CFA), <i>Mustela vison</i> (MVI), <i>Homo sapiens</i> (HSA)	P. Perelman Perelman et al. (2005)	609
<i>Arctictis binturong</i>	Binturong	42		Wurster-Hill and Gray (1975)	610
<i>Hemigalus derbyanus</i>	Banded Palm Civet	42		Wurster-Hill and Gray (1975)	610
Family Prionodontidae					
<i>Prionodon linsang</i>	Banded/Oriental Linsang	34		Wurster-Hill and Gray (1975)	611
Family Felidae					
<i>Leopardus pardalis</i>	Ocelot	36		Wurster-Hill and Gray (1975)	612
<i>Leopardus tigrinus</i>	Oncilla/Northern Tiger/ Little Spotted Cat	36		Wurster-Hill and Centerwall (1982)	612
<i>Leopardus (Lynchailurus) colocolo</i>	Pampas Cat	36		Wurster-Hill and Gray (1973)	613
<i>Leopardus (Oncifelis) geoffroyi</i>	Geoffroy's Cat	36		W. Nash (unpublished)	614
<i>Felis catus</i>	Domestic Cat	38	<i>Homo sapiens</i> (HSA), <i>Canis familiaris</i> (CFA), <i>Nyctereutes procyonoides viverrinus</i> (NPR), <i>Mephitis mephitis</i> (MME), <i>Mustela vison</i> (MVI), <i>Ailuropoda melanoleuca</i> (AME)	W. Nash and V. Beklemisheva Yang et al. (2000a), Nash et al. (1998, 2001, 2008), Graphodatsky et al. (2002), Nie et al. (2002), Tian et al. (2002), Yang & Graphodatsky (2004), Perelman et al. (2008), Ensembl genome browser	615
<i>Felis chaus</i>	Jungle Cat	38		Wurster-Hill and Gray (1973)	616
<i>Felis margarita</i>	Sand Cat	38		Wurster-Hill and Gray (1973)	616
<i>Felis nigripes</i>	Black-Footed Cat	38		W. Nash (unpublished)	617
<i>Panthera leo</i>	Lion	38	<i>Canis familiaris</i> (CFA)	W. Nash (unpublished), Tian et al. (2004)	618
<i>Panthera tigris altaica</i>	Siberian Tiger	38		San Diego Institute for Conservation Research (unpublished)	619
<i>Neofelis nebulosa diardi</i>	Bornean Clouded Leopard	38		W. Nash (unpublished)	620
<i>Neofelis nebulosa</i>	Clouded Leopard	38	<i>Canis familiaris</i> (CFA)	W. Nie Tian et al. (2004)	621
<i>Neofelis nebulosa</i>	Mainland Clouded Leopard	38		W. Nash (unpublished)	622
<i>Puma concolor</i>	Puma/Cougar/Mountain Lion	38		Wurster-Hill and Gray (1973)	623
<i>Acinonyx jubatus</i>	Cheetah	38		W. Nash (unpublished)	624
<i>Herpailurus yagouaroundi</i>	Jaguarundi	38		Wurster-Hill and Gray (1973)	625
<i>Lynx lynx</i>	Eurasian Lynx	38	<i>Canis familiaris</i> (CFA), <i>Felis catus</i> (FCA)	Nie et al. (2012)	626
<i>Prionailurus bengalensis</i>	Asian Leopard Cat	38		Wurster-Hill and Gray (1973)	627
<i>Prionailurus bengalensis euptilurus</i>	Amur Leopard Cat	38		Proskuryakova et al. (unpublished)	628
<i>Prionailurus viverrinus</i>	Fishing Cat	38		Wurster-Hill and Gray (1973)	629
<i>Otocolobus manul</i>	Pallas's Cat	38		Wurster-Hill and Gray (1975)	630
<i>Catopuma (Profelis) temminckii</i>	Asian Golden Cat	38		Wurster-Hill and Gray (1973)	631
<i>Caracal caracal</i>	Caracal	38		Wurster-Hill and Gray (1973)	631
<i>Leptailurus serval</i>	Serval	38		Wurster-Hill and Centerwall (1982)	632
Family Canidae					
<i>Vulpes vulpes</i>	Red Fox	34 + Bs	<i>Canis familiaris</i> (CFA), <i>Felis catus</i> (FCA), <i>Mustela vison</i> (MVI), <i>Homo sapiens</i> (HSA)	V. Beklemisheva Yang et al. (1999, 2000a), Graphodatsky et al. (2000b, 2008a)	633

SPECIES	COMMON NAME	2n	PAINTING PROBES	SOURCE	PAGE
<i>Vulpes corsac</i>	Corsac Fox	36	<i>Canis familiaris</i> (CFA), <i>Vulpes vulpes</i> (VVU)	V. Beklemisheva San Diego Institute for Conservation Research (unpublished), Graphodatsky et al. (2008)	634
<i>Vulpes macrotis</i>	Kit Fox	50		Wayne et al. (1987b)	635
<i>Vulpes (Alopex) lagopus</i>	Arctic Fox	48–50	<i>Canis familiaris</i> (CFA), <i>Nyctereutes procyonoides viverrinus</i> (NPR)	V. Beklemisheva Graphodatsky et al. (2000b, 2008a), Nash et al. (2001)	636
<i>Vulpes (Fennecus) zerda</i>	Fennec Fox	64	<i>Canis familiaris</i> (CFA)	V. Beklemisheva Graphodatsky et al. (2008)	637
<i>Urocyon cinereoargenteus</i>	Gray Fox	66	<i>Canis familiaris</i> (CFA)	Graphodatsky et al. (2008)	638
<i>Cerdocyon thous</i>	Crab-Eating Fox	74		Nash et al. (2001)	639
<i>Cerdocyon thous</i> (ideogram)	Crab-Eating Fox	74	<i>Felis catus</i> (FCA), <i>Nyctereutes procyonoides viverrinus</i> (NPR)	Nash et al. (2001)	640
<i>Nyctereutes procyonoides viverrinus</i>	Japanese Raccoon Dog	38–42 + Bs	<i>Canis familiaris</i> (CFA), <i>Felis catus</i> (FCA), <i>Ailuropoda melanoleuca</i> (AME)	W. Nash and P. Perelman Graphodatsky et al. (2001)	641
<i>Nyctereutes procyonoides procyonoides</i>	Chinese Raccoon Dog	54 + B's	<i>Canis familiaris</i> (CFA)	Nie et al. (2003)	642
<i>Atelocynus microtis</i>	Small-Eared/Round-Eared Dog	74		Wurster-Hill and Centerwall (1982)	643
<i>Speothos venaticus</i>	Bush Dog	74		Wayne et al. (1987a)	644
<i>Canis latrans</i>	Coyote	78		Wurster-Hill and Centerwall (1982)	645
<i>Canis lupus</i>	Gray Wolf	78		Wurster-Hill and Centerwall (1982)	646
<i>Canis familiaris</i>	Domestic Dog	78	<i>Homo sapiens</i> (HSA)	V. Beklemisheva Yang et al. (1999), Graphodatsky et al. (2000)	647
<i>Cuon alpinus</i>	Dhole/Red Wolf	78	<i>Canis familiaris</i> (CFA)	A. Graphodatsky Graphodatsky et al. (2008)	648
<i>Chrysocyon brachyurus</i>	Maned Wolf	76		Wayne et al. (1987a)	649
<i>Otocyon megalotis</i>	Bat-Eared Fox	72		Wayne et al. (1987a)	650
Family Procyonidae					
<i>Bassariscus astutus</i>	Ringtail/Cacomistle	38	<i>Nyctereutes procyonoides viverrinus</i> (NPR), <i>Felis catus</i> (FCA)	Nash et al. (2008)	651
<i>Procyon lotor</i>	Raccoon	38	<i>Canis familiaris</i> (CFA), <i>Felis catus</i> (FCA), <i>Martes foina</i> (MFO), <i>Homo sapiens</i> (HSA)	P. Perelman and W. Nie Perelman et al. (2008), Nie et al. (2012)	652
<i>Potos flavus</i>	Kinkajou	38		San Diego Institute for Conservation Research (unpublished)	653
<i>Bassaricyon</i> sp.	Olingo	38		Wurster-Hill and Gray (1975)	653
Family Mustelidae					
<i>Mustela erminea</i>	Ermine/Stoat	44		A. Graphodatsky (unpublished)	654
<i>Mustela nivalis</i>	Least Weasel	42		P. Perelman and A. Graphodatsky (unpublished)	655
<i>Mustela altaica</i>	Mountain Weasel	44	<i>Mustela vison</i> (MVI)	P. Perelman Graphodatsky et al. (2002)	656
<i>Mustela lutreola</i>	European Mink	38	<i>Mustela vison</i> (MVI)	P. Perelman Graphodatsky et al. (2002)	657
<i>Mustela sibirica</i>	Siberian Weasel	38		A. Graphodatsky (unpublished)	657
<i>Mustela itatsi</i>	Japanese Weasel	38		A. Graphodatsky (unpublished)	658

SPECIES	COMMON NAME	2n	PAINTING PROBES	SOURCE	PAGE
<i>Mustela (Neovison) vison</i>	American Mink	30	<i>Canis familiaris</i> (CFA), <i>Martes foina</i> (MFO), <i>Homo sapiens</i> (HSA), <i>Felis catus</i> (FCA)	P. Perelman, W. Nie Graphodatsky et al. (2000c, 2002), Nie et al. (2002)	659
<i>Mustela putorius putorius</i>	European Polecat/Black Polecat/Forest Polecat/Common Ferret	40	<i>Mustela vison</i> (MVI)	P. Perelman, A. Graphodatsky Graphodatsky et al. (2002)	660
<i>Mustela putorius furo</i>	Domesticated Ferret	40	<i>Homo sapiens</i> (HSA), <i>Felis catus</i> (FCA)	P. Perelman Cavagna et al. (2000)	661
<i>Mustela eversmanni</i>	Steppe Polecat	38	<i>Mustela vison</i> (MVI)	P. Perelman Graphodatsky et al. (2002)	662
<i>Mustela nigripes</i>	Black-Footed Ferret/ American Polecat	38		M. Houck (unpublished)	663
<i>Martes foina</i>	Beech/Stone Marten	38	<i>Canis familiaris</i> (CFA), <i>Felis catus</i> (FCA), <i>Homo sapiens</i> (HSA)	W. Nie Nie et al. (2002, 2012)	664
<i>Martes martes</i>	European Pine Marten	38		A. Graphodatsky (unpublished)	665
<i>Martes zibellina</i>	Sable	38		A. Graphodatsky (unpublished)	665
<i>Martes melampus</i>	Japanese Marten	38	<i>Mustela vison</i> (MVI)	P. Perelman Graphodatsky et al. (2002)	666
<i>Martes flavigula</i>	Yellow-Throated Marten	40	<i>Martes foina</i> (MFO), <i>Felis catus</i> (FCA)	Nie et al. (2002)	667
<i>Eira barbara</i>	Tayra	38		Wurster-Hill and Centerwall (1982)	668
<i>Galictis vittata</i>	Allamand's/Greater Grison	38		Wurster-Hill and Centerwall (1982)	668
<i>Vormela peregusna</i>	Marbled Polecat	38		A. Graphodatsky (unpublished)	669
<i>Ictonyx striatus</i>	Striped Polecat/Zorilla	38	<i>Mustela vison</i> (MVI)	P. Perelman Graphodatsky et al. (2002)	670
<i>Gulo gulo</i>	Wolverine	42		A. Graphodatsky (unpublished)	671
<i>Mellivora capensis</i>	Ratel/Honey Badger	40		Wurster-Hill and Centerwall (1982)	671
<i>Meles meles</i>	European/Eurasian Badger	44	<i>Martes foina</i> (MFO), <i>Felis catus</i> (FCA)	W. Nie Nie et al. (2002)	672
<i>Melogale moschata</i>	Ferret Badger	38	<i>Martes foina</i> (MFO), <i>Felis catus</i> (FCA)	W. Nie Nie et al. (2002)	673
<i>Lutra lutra</i>	European River Otter	38		A. Graphodatsky (unpublished)	674
Family Ailuridae					
<i>Ailurus fulgens</i>	Lesser/Red Panda	36	<i>Martes foina</i> (MFO), <i>Felis catus</i> (FCA), <i>Canis familiaris</i> (CFA)	W. Nie Nie et al. (2002), Tian et al. (2002)	675
Family Mephitidae					
<i>Mephitis mephitis</i>	Striped Skunk	50	<i>Martes foina</i> (MFO), <i>Homo sapiens</i> (HSA)	Perelman et al. (2008)	676
<i>Mephitis macroura</i>	Hooded Skunk	50	<i>Martes foina</i> (MFO)	Perelman et al. (2008)	677
<i>Conepatus leuconotus</i>	American Hog-Nosed Skunk	46	<i>Martes foina</i> (MFO)	Perelman et al. (2008)	678
<i>Spilogale gracilis</i>	Eastern Spotted Skunk	60	<i>Martes foina</i> (MFO)	Perelman et al. (2008)	679
Family Ursidae					
<i>Tremarctos ornatus</i>	Spectacled Bear	52		W. Nash (unpublished)	680
<i>Tremarctos ornatus</i> (Ideogram)	Spectacled Bear	52	<i>Felis catus</i> (FCA), <i>Canis familiaris</i> (CFA)	Nash et al. (1998), Tian et al. (2004), Yang and Graphodatsky (2004)	681
<i>Ursus thibetanus</i>	Asiatic Black Bear	74		Nash and O'Brien (1987)	682
<i>Ursus americanus</i>	American Black Bear	74		Nash and O'Brien (1987)	683
<i>Ursus arctos</i>	Brown Bear	74		Nash and O'Brien (1987)	684

SPECIES	COMMON NAME	2n	PAINTING PROBES	SOURCE	PAGE
<i>Ursus maritimus</i>	Polar Bear	74		Nash and O'Brien (1987)	685
<i>Ursus malayanus</i>	Sun Bear	74		Nash and O'Brien (1987)	686
<i>Ursus ursinus</i>	Sloth Bear	74		Nash and O'Brien (1987)	687
<i>Ailuropoda melanoleuca</i>	Giant Panda	42	<i>Nyctereutes procyonoides viverrinus</i> (NPR)	P. Perelman W. Nash (unpublished), Nash et al. (2001)	688
<i>Ailuropoda melanoleuca</i>	Giant Panda	42	<i>Canis familiaris</i> (CFA), <i>Felis catus</i> (FCA), <i>Homo sapiens</i> (HSA)	W. Nie Nash et al. (1998), Nie et al. (2012)	689
Family Otariidae					
<i>Callorhinus ursinus</i>	Northern Fur Seal	36		Arnason (1977)	690
<i>Arctocephalus pusillus</i>	South African/Southern Fur Seal	36		Arnason (1977)	690
<i>Zalophus californianus</i>	California Sea Lion	36		Arnason (1974b)	691
<i>Eumetopias jubatus</i>	Steller Sea Lion	36	<i>Canis familiaris</i> (CFA), <i>Martes foina</i> (MFO), <i>Homo sapiens</i> (HSA)	Beklemisheva et al. (2016)	692
<i>Phocarcos hookeri</i>	New Zealand Sea Lion	36		Beklemisheva et al. (unpublished)	693
<i>Arctocephalus forsteri</i>	Australasian Fur Seal	36		Beklemisheva et al. (unpublished)	693
Family Odobenidae					
<i>Odobenus rosmarus</i>	Walrus	32	<i>Canis familiaris</i> (CFA), <i>Martes foina</i> (MFO), <i>Homo sapiens</i> (HSA)	Beklemisheva et al. (2016)	694
Family Phocidae					
<i>Monachus schauinslandi</i>	Hawaiian Monk Seal	34		Arnason (1997)	695
<i>Leptonychotes weddellii</i>	Weddell Seal	34		Arnason (1974b)	696
<i>Mirounga angustirostris</i>	Northern Elephant Seal	34		Arnason (1974b)	696
<i>Erignathus barbatus</i>	Bearded Seal	34		V. Beklemisheva et al. (unpublished)	697
<i>Cystophora cristata</i>	Hooded Seal	34		Arnason (1974b)	697
<i>Halichoerus grypus</i>	Gray Seal	32		Arnason (1970)	698
<i>Phoca groenlandica</i>	Harp Seal	32		Arnason (1974c)	698
<i>Phoca hispida</i>	Ringed Seal	32		V. Beklemisheva et al. (unpublished)	699
<i>Phoca fasciata</i>	Ribbon Seal	32		Arnason et al. (1997)	699
<i>Phoca vitulina</i>	Harbor/Common Seal	32	<i>Homo sapiens</i> (HSA)	W. Nash and V. Beklemisheva Fröncke et al. (1997)	700
<i>Phoca largha</i>	Spotted Seal	32		V. Beklemisheva (unpublished)	701
<i>Pusa sibirica</i>	Baikal Seal	32	<i>Canis familiaris</i> (CFA), <i>Martes foina</i> (MFO), <i>Homo sapiens</i> (HSA), <i>Felis catus</i> (FCA)	Beklemisheva et al. (2016)	702
Order Pholidota Time Tree					703
Family Manidae					
<i>Manis javanica</i>	Javan Pangolin	38	<i>Homo sapiens</i> (HSA), <i>Martes foina</i> (MFO)	W. Nie Yang et al. (2006)	704
<i>Manis pentadactyla</i>	Chinese Pangolin	40	<i>Homo sapiens</i> (HSA), <i>Manis javanica</i> (MJA)	Nie et al. (2009)	705
Order Cetartiodactyla Time Tree					706
Family Camelidae					
<i>Camelus bactrianus</i>	Bactrian/Two-Humped Camel	74	<i>Homo sapiens</i> (HSA)	T. Raudsepp Balmus et al. (2007), Avila et al. (2014, 2015)	707
<i>Camelus bactrianus</i>	Bactrian/Two-Humped Camel	74		A. Graphodatsky (unpublished)	708

SPECIES	COMMON NAME	2n	PAINTING PROBES	SOURCE	PAGE
<i>Camelus ferus</i>	Wild Bactrian Camel	74		A. Proskuryakova A. Proskuryakova et al. (unpublished)	709
<i>Camelus dromedarius</i>	Dromedary/One-Humped Camel	74	<i>Homo sapiens</i> (HSA)	T. Raudsepp Balmus et al. (2007), Avila et al. (2014, 2015)	710
<i>Lama pacos</i>	Alpaca	74	<i>Homo sapiens</i> (HSA)	T. Raudsepp Balmus et al. (2007), Avila et al. (2014, 2015)	711
<i>Lama guanicoe</i>	Guanaco	74	<i>Homo sapiens</i> (HSA)	T. Raudsepp Balmus et al. (2007), Avila et al. (2014, 2015)	712
<i>Lama glama</i>	Llama	74	<i>Homo sapiens</i> (HSA)	T. Raudsepp Balmus et al. (2007), Avila et al. (2014, 2015)	713
Family Suidae					
<i>Sus scrofa domestica</i>	Domestic Pig	38	<i>Bos taurus</i> (BTA), <i>Camelus dromedarius</i> (CDR), <i>Homo sapiens</i> (HSA), <i>Canis familiaris</i> (CFA)	L. Biltueva Frönicke et al. (1996), Frönicke and Wienberg (2001), Biltueva et al. (2004), Balmus et al. (2007)	714
<i>Sus scrofa scrofa</i>	European Wild Boar	36		San Diego Institute for Conservation Research (unpublished)	715
<i>Sus scrofa scrofa</i> X <i>Sus scrofa domestica</i> hybrid	European Wild Boar X Domestic Pig Hybrid	37		A. Graphodatsky (unpublished)	716
<i>Sus scrofa nigripes</i> X <i>Sus scrofa domestica</i> hybrid	Asian Wild Boar X Domestic Pig Hybrid	37		A. Graphodatsky (unpublished)	716
<i>Sus barbatus</i>	Bearded Pig	38		San Diego Institute for Conservation Research (unpublished)	717
<i>Sus cebifrons</i>	Visayan Warty Pig	34		San Diego Institute for Conservation Research (unpublished)	717
<i>Potamochoerus porcus</i>	Red River Hog	34		San Diego Institute for Conservation Research (unpublished)	718
<i>Potamochoerus porcus</i>	Red River Hog	34	<i>Sus scrofa</i> (SSC)	Musilova et al. (2010)	718
<i>Potamochoerus larvatus</i>	Southern/African Bush Pig	34		San Diego Institute for Conservation Research (unpublished)	719
<i>Phacochoerus africanus</i>	Southern Warthog	34	<i>Sus scrofa</i> (SSC)	Musilova et al. (2010)	720
<i>Babyrousa babyrussa</i>	Buru Babirusa	38	<i>Sus scrofa</i> (SSC)	A. Proskuryakova Bosma et al. (1996)	721
Family Tayassuidae					
<i>Catagonus wagneri</i>	Chacoan Peccary	20		Benirschke and Kumamoto (1989)	722
<i>Tayassu pecari</i>	White-Lipped Peccary	26	<i>Sus scrofa</i> (SSC)	A. Proskuryakova Bosma et al. (2004)	723
<i>Pecari tajacu</i>	Collared Peccary	30	<i>Ovis aries</i> (OAR), <i>Sus scrofa</i> (SSC)	A. Proskuryakova Adega et al. (2006)	724
Family Hippopotamidae					
<i>Hippopotamus amphibius</i>	Common Hippopotamus	36	<i>Homo sapiens</i> (HSA), <i>Camelus dromedarius</i> (CDR)	A. Proskuryakova Kulemzina et al. (2009)	725
<i>Choeropsis liberiensis</i>	Pygmy Hippopotamus	36	<i>Bos taurus</i> (BTA), <i>Sus scrofa</i> (SSC)	H. Cernohorska Fröhlich et al. (2016)	726
Family Balaenidae					
<i>Balaena mysticetus</i>	Bowhead/Greenland Right Whale	42		U. Arnason Jarelle (1979)	727

SPECIES	COMMON NAME	2n	PAINTING PROBES	SOURCE	PAGE
Family Balaenopteridae					
<i>Balaenoptera acutorostrata</i>	Minke Whale	44		Arnason (1981)	728
<i>Balaenoptera physalus</i>	Fin Whale	44		Arnason (1974a)	728
<i>Balaenoptera borealis</i>	Sei Whale	44		W.G. Nash (unpublished)	729
<i>Balaenoptera musculus</i>	Blue Whale	44		Arnason and Widegren (1989)	730
<i>Megaptera novaeangliae</i>	Humpback Whale	44		Arnason (1974c)	731
Family Eschrichtiidae					
<i>Eschrichtius robustus</i>	Gray Whale	44	<i>Homo sapiens</i> (HSA), <i>Camelus dromedarius</i> (CDR)	A. Proskuryakova Kulemzina et al. (2016)	732
Family Physteridae					
<i>Kogia breviceps</i>	Pygmy Sperm Whale	42		Arnason and Benirschke (1973)	733
<i>Physeter macrocephalus</i>	Sperm Whale	42		Arnason and Benirschke (1973)	734
Family Ziphiidae					
<i>Mesoplodon europaeus</i>	Gervais' Beaked Whale	42		Arnason et al. (1977)	735
<i>Mesoplodon carlhubbsi</i>	Hubbs' Beaked Whale	42		Arnason et al. (1977)	736
Family Lipotidae					
<i>Lipotes vexillifer</i>	Baiji/Chinese River Dolphin	44		Minrong et al. (1986)	737
Family Phocoenidae					
<i>Phocoena phocoena</i>	Harbor/Common Porpoise	44		Arnason (1980)	738
<i>Neophocaena phocaenoides asiaeorientalis</i>	Yangtze Finless Porpoise	44	<i>Homo sapiens</i> (HSA), <i>Martes foina</i> (MFO)	W. Nie Nie et al. (2012)	739
Family Monodontidae					
<i>Delphinapterus leucas</i>	Beluga/White Whale	44		U. Arnason Jarrell and Arnason (1981)	740
Family Delphinidae					
<i>Stenella clymene</i>	Atlantic Spinner Dolphin	44		Arnason (1980)	741
<i>Lagenorhynchus albirostris</i>	White-Beaked Dolphin	44		Arnason (1980)	741
<i>Stenella attenuata</i>	Pantropical Spotted Dolphin	44		Stock (1981)	742
<i>Stenella dubia</i>	Spotted Dolphin	44		Arnason (1974c)	743
<i>Delphinus delphis</i>	Common/Saddleback Dolphin	44		Arnason (1974a)	743
<i>Tursiops truncatus</i>	Bottle-Nosed Dolphin	44		San Diego Institute for Conservation Research (unpublished)	744
<i>Tursiops truncatus</i> (Ideogram)	Bottle-Nosed Dolphin	44	<i>Homo sapiens</i> (HSA)	Bielec et al. (1998)	744
<i>Orcinus orca</i>	Orca/Killer Whale	44		Arnason et al. (1980)	745
<i>Globicephala macrorhynchus</i>	Short-Finned Pilot Whale/Blackfish Whale	44	<i>Homo sapiens</i> (HSA), <i>Camelus dromedarius</i> (CDR)	A. Proskuryakova Kulemzina et al. (2009)	746
Family Tragulidae					
<i>Tragulus javanicus</i>	Java/Lesser Malay Chevrotain/Asiatic Mouse Deer	32	<i>Homo sapiens</i> (HSA), <i>Camelus dromedarius</i> (CDR)	A. Proskuryakova Kulemzina et al. (2011a)	747
Family Moschidae					
<i>Moschus moschiferus</i>	Siberian Musk Deer	58	<i>Homo sapiens</i> (HSA), <i>Camelus dromedarius</i> (CDR)	A. Proskuryakova San Diego Institute for Conservation Research (unpublished), Kulemzina et al. (2009)	748
<i>Moschus berezovskii</i>	Forest Musk Deer	58	<i>Muntiacus reevesi</i> (MRE)	W. Nie Chi et al. (2005a)	749
Family Bovidae					
<i>Tragelaphus angasii</i>	Lowland Nyala	55	<i>Bos taurus</i> (BTA)	H. Cernohorska San Diego Institute for Conservation Research (unpublished), Rubes et al. (2008)	750

SPECIES	COMMON NAME	2n	PAINTING PROBES	SOURCE	PAGE
<i>Tragelaphus strepsiceros</i>	Greater Kudu	32	<i>Bos taurus</i> (BTA)	H. Cernohorska San Diego Institute for Conservation Research (unpublished), Rubes et al. (2008)	751
<i>Tragelaphus imberbis</i>	Lesser Kudu	38	<i>Bos taurus</i> (BTA)	H. Cernohorska San Diego Institute for Conservation Research (unpublished), Rubes et al. (2008)	752
<i>Tragelaphus eurycerus</i>	Bongo	34 (F), 33 (M)	<i>Bos taurus</i> (BTA)	H. Cernohorska Rubes et al. (2008)	753
<i>Tragelaphus scriptus</i>	Harnessed Bushbuck	34	<i>Bos taurus</i> (BTA)	H. Cernohorska Rubes et al. (2008)	754
<i>Tragelaphus spekii</i>	Sitatunga	30	<i>Bos taurus</i> (BTA)	H. Cernohorska Rubes et al. (2008)	755
<i>Taurotragus oryx pattersonianus</i>	Patterson's Eland	31 (M), 32 (F)	<i>Bos taurus</i> (BTA)	H. Cernohorska San Diego Institute for Conservation Research (unpublished), Rubes et al. (2008)	756
<i>Taurotragus derbianus</i>	Giant Eland	32 (F), (31) M	<i>Bos taurus</i> (BTA)	M. Houck and H. Cernohorska San Diego Institute for Conservation Research (unpublished), Rubes et al. (2008)	757
<i>Boselaphus tragocamelus</i>	Nilgai	46		Gallagher et al. (1998)	758
<i>Tetracerus quadricornis</i>	Four-Horned Antelope	38		H. Cernohorska Popiquet et al. (2010)	759
<i>Bubalus bubalis</i>	Asian Water Buffalo	50	<i>Homo sapiens</i> (HSA)	Iannuzzi et al. (1998)	760
<i>Bubalus depressicornis</i>	Lowland Anoa	48		San Diego Institute for Conservation Research (unpublished)	761
<i>Syncerus caffer</i>	Forest/African Buffalo	54–56		H. Cernohorska Ropiquet et al. (2010)	762
<i>Bos taurus</i>	Domestic Cattle	60	<i>Sus scrofa</i> (SSC), <i>Camelus dromedarius</i> (CDR), <i>Homo sapiens</i> (HSA)	L. Biltueva Hayes et al. (1995), Chowdhary et al. (1996), Schmitz et al. (1998), Balmus et al. (2007)	763
<i>Bos javanicus</i>	Javan Banteng/Bali Cattle	60		San Diego Institute for Conservation Research (unpublished)	764
<i>Bos frontalis (gaurus)</i>	Gaur/Seladang	58		San Diego Institute for Conservation Research (unpublished)	765
<i>Bos frontalis (gayal)</i>	Gayal	58	<i>Muntiacus reevesi</i> (MRE)	W. Nie Chi et al. (2005a)	766
<i>Bos grunniens</i>	Yak	60		A. Graphodatsky and L. Biltueva (unpublished)	767
<i>Bison bonasus</i>	European Bison/Wisent	60		A. Graphodatsky (unpublished)	768
<i>Pseudoryx nghetinhensis</i>	Saola	50	<i>Homo sapiens</i> (HSA), <i>Camelus dromedarius</i> (CDR)	A. Proskuryakova Kulemzina et al. (2014)	769
<i>Cephalophus rufilatus</i>	Red-Flanked Duiker	60		San Diego Institute for Conservation Research (unpublished)	770

SPECIES	COMMON NAME	2n	PAINTING PROBES	SOURCE	PAGE
<i>Cephalophus niger</i>	Black Duiker	60		San Diego Institute for Conservation Research (unpublished)	771
<i>Cephalophus sylvicultor</i>	Yellow-Backed Duiker	60		San Diego Institute for Conservation Research (unpublished)	772
<i>Cephalophus dorsalis</i>	Bay Duiker	60		San Diego Institute for Conservation Research (unpublished)	773
<i>Cephalophus monticola</i>	Blue Duiker	60		San Diego Institute for Conservation Research (unpublished)	774
<i>Redunca fulvorufula</i>	Mountain Reedbuck	56–57	<i>Bos taurus</i> (BTA)	H. Cernohorska Rubes et al. (2007)	775
<i>Kobus ellipsiprymnus defassa</i>	Defassa Waterbuck	53–54	<i>Bos taurus</i> (BTA)	O. Ryder, H. Cernohorska Kingswood et al. (1998b), Rubes et al. (2012)	776
<i>Kobus ellipsiprymnus ellipsiprymnus</i>	Ellipsen Waterbuck	50–52	<i>Bos taurus</i> (BTA)	O. A. Ryder, H. Cernohorska Kingswood et al. (1998b), Rubes et al. (2012)	777
<i>Kobus megaceros</i>	Nile Lechwe	52	<i>Bos taurus</i> (BTA)	M. L. Houck, H. Cernohorska Kingswood et al. (2000), Rubes et al. (2012)	778
<i>Kobus leche</i>	Red Lechwe	48	<i>Bos taurus</i> (BTA)	M. L. Houck, H. Cernohorska Kingswood et al. (2000), Rubes et al. (2012)	779
<i>Kobus kob thomasi</i>	Uganda Kob	50	<i>Bos taurus</i> (BTA)	M. L. Houck Kingswood et al. (2000)	780
<i>Pelea capreolus</i>	Rhebok	56		H. Cernohorska Robinson et al. (2014)	781
<i>Hippotragus equinus</i>	Roan Antelope	60		San Diego Institute for Conservation Research (unpublished)	782
<i>Hippotragus niger</i>	Sable Antelope	60		San Diego Institute for Conservation Research (unpublished)	783
<i>Oryx dammah</i>	Scimitar-Horned Oryx	56–58	<i>Bos taurus</i> (BTA)	O. A. Ryder, H. Cernohorska Kumamoto et al. (1999), Rubes et al. (2012)	784
<i>Oryx leucoryx</i>	Arabian Oryx	57–58	<i>Bos taurus</i> (BTA)	M. Houck, H. Cernohorska San Diego Institute for Conservation Research (unpublished), Rubes et al. (2012)	785
<i>Oryx beisa beisa</i>	Beisa Oryx	58		O. A. Ryder Kumamoto et al. (1999)	786

SPECIES	COMMON NAME	2n	PAINTING PROBES	SOURCE	PAGE
<i>Oryx beisa callotis</i>	Fringe-Eared Oryx	58		O. A. Ryder Kumamoto et al. (1999)	787
<i>Oryx gazella</i>	Gemsbok	56		San Diego Institute for Conservation Research (unpublished)	788
<i>Addax nasomaculatus</i>	Addax	60	<i>Bos taurus</i> (BTA)	M. Houck, H. Cernohorska San Diego Institute for Conservation Research (unpublished), Rubes et al. (2012)	789
<i>Beatragus (Damaliscus) hunteri</i>	Hunter's Hartebeest/ Antelope/Hirola	44		M. L. Houck Kumamoto et al. (1996)	790
<i>Damaliscus lunatus topi</i>	Topi/Sassaby	36	<i>Bos taurus</i> (BTA)	M. L. Houck, H. Cernohorska Kumamoto et al. (1996), Rubes et al. (unpublished)	791
<i>Damaliscus pygargus phillipsi</i>	Blesbok/Sassaby	38	<i>Bos taurus</i> (BTA)	M. L. Houck, H. Cernohorska Kumamoto et al. (1996), Rubes et al. (2012)	792
<i>Alcelaphus buselaphus jacksoni</i>	Jackson's Hartebeest	40		San Diego Institute for Conservation Research (unpublished)	793
<i>Connochaetes gnou</i>	White-Tailed Gnu/Black Wilbebeest	58	<i>Bos taurus</i> (BTA)	M. Houck, H. Cernohorska San Diego Institute for Conservation Research (unpublished), Rubes et al. (2012)	794
<i>Connochaetes taurinus albojubatus</i>	White-Bearded Gnu	58	<i>Bos taurus</i> (BTA)	M. Houck, H. Cernohorska San Diego Institute for Conservation Research (unpublished), Rubes et al. (2012)	795
<i>Oreotagus oreotragus stvensoni</i>	Stevenson's Klipspringer	60		M. L. Houck San Diego Institute for Conservation Research (unpublished)	796
<i>Raphicerus campestris</i>	Steenbok	30		San Diego Institute for Conservation Research (unpublished)	797
<i>Neotragus moschatus</i>	Suni/Dwarf Antelope	52–56		Kingswood et al. (1998a)	797
<i>Madoqua guentheri</i>	Guenther's Dik-Dik	48–50		Kingswood and Kumamoto (1996)	798
<i>Madoqua kirkii</i>	Kirk's Dik-Dik	46–48	<i>Bos taurus</i> (BTA)	Cernohorska et al. (2011)	799
<i>Antilope cervicapra</i>	Blackbuck	30–33	<i>Bos taurus</i> (BTA)	H. Cernohorska Cernohorska et al. (2012)	800
<i>Aepyceros melampus petersi</i>	Black-Faced Impala	58–60	<i>Bos taurus</i> (BTA)	M. Houck, H. Cernohorska San Diego Institute for Conservation Research (unpublished), Rubes et al. (2012)	801
<i>Gazella saudiya</i>	Saudi Gazelle	46–53		M. L. Houck Kumamoto et al. (1995)	802
<i>Gazella bennettii</i>	Chinkara/Indian Gazelle	49–52		M. L. Houck Kumamoto et al. (1995)	802

SPECIES	COMMON NAME	2n	PAINTING PROBES	SOURCE	PAGE
<i>Gazella gazella</i>	Mountain Gazelle	34 (F), 35 (M)		San Diego Institute for Conservation Research (unpublished)	803
<i>Gazella spekei</i>	Speke's Gazelle	32 (F), 33 (M)		San Diego Institute for Conservation Research (unpublished)	803
<i>Gazella leptoceros</i>	Rhim Gazelle	33 (M), 32 (F)	<i>Bos taurus</i> (BTA)	Cernohorska et al. (2012)	804
<i>Gazella subgutturosa subgutturosa</i>	Persian Goitered Gazelle	32 (F), 31 (M)		San Diego Institute for Conservation Research (unpublished)	805
<i>Gazella subgutturosa marica</i>	Sand Gazelle	30–32 (F), 31–33 (M)		Kingswood and Blank (1996), karyotype by Arlene Kumamoto	805
<i>Gazella cuvieri</i>	Cuvier's Gazelle	32 (F), 33 (M)		San Diego Institute for Conservation Research (unpublished)	806
<i>Eudorcas (Gazella) rufifrons laevipes</i>	Red-Fronted Gazelle	58		San Diego Institute for Conservation Research (unpublished)	806
<i>Eudorcas (Gazella) thomsonii</i>	Thomson's Gazelle	58		San Diego Institute for Conservation Research (unpublished)	807
<i>Nanger (Gazella) granti roosevelti</i>	Roosevelt's Gazelle	30 (F), 31 (M)		San Diego Institute for Conservation Research (unpublished)	807
<i>Nanger (Gazella) dama ruficollis</i>	Addra Gazelle	38–40	<i>Bos taurus</i> (BTA)	H. Cernohorska San Diego Institute for Conservation Research (unpublished), Cernohorska et al. (2012)	808
<i>Nanger (Gazella) dama mhorr</i>	Mhorr Gazelle	38–40	<i>Bos taurus</i> (BTA)	M. Houck, H. Cernohorska San Diego Institute for Conservation Research (unpublished), Cernohorska et al. (2012)	809
<i>Nanger (Gazella) soemmerringii</i>	Soemmerring's Gazelle	34–39		San Diego Institute for Conservation Research (unpublished)	810
<i>Antidorcas marsupialis</i>	Springbok/Springbuck	56		San Diego Institute for Conservation Research (unpublished)	811
<i>Oreamnos americanus</i>	Rocky Mountain Goat	42		San Diego Institute for Conservation Research (unpublished)	811
<i>Capricornis crispus</i>	Japanese Serow	50		Biltueva et al. (unpublished)	812
<i>Capricornis sumatraensis</i>	Sumatra Serow	48	<i>Muntiacus reevesi</i> (MRE)	W. Nie Huang et al. (2005)	813
<i>Naemorhedus goral</i>	Goral	56		Biltueva et al. (unpublished)	814
<i>Naemorhedus baileyi cranbrookii</i>	Red Goral	56	<i>Capra aegagrus</i> (CAE), <i>Muntiacus reevesi</i> (MRE)	W. Nie Huang et al. (2005)	815
<i>Budorcas taxicolor</i>	Takin	52	<i>Bos taurus</i> (BTA)	M. Houck, H. Cernohorska San Diego Institute for Conservation Research (unpublished), Rubes et al. (2012)	816

SPECIES	COMMON NAME	2n	PAINTING PROBES	SOURCE	PAGE
<i>Ovibos moschatus</i>	Musk Ox	48	<i>Homo sapiens</i> (HSA), <i>Camelus dromedarius</i> (CDR)	A. Proskuryakova et al. (unpublished)	817
<i>Capra hircus hircus</i>	Domestic Goat	60		L. Biltueva and A. Graphodatsky (unpublished)	818
<i>Capra hircus aegagrus</i>	Wild Goat	60	<i>Muntiacus reevesi</i> (MRE)	W. Nie Huang et al. (2005)	819
<i>Capra cylindricornis</i>	East Caucasian Tur/Goat	60		San Diego Institute for Conservation Research (unpublished)	820
<i>Capra pyrenaica hispanica</i>	Spanish Ibex/Goat	60		San Diego Institute for Conservation Research (unpublished)	821
<i>Pseudois nayaur szechuanensis</i>	Chinese Bharal/Blue Sheep	56		San Diego Institute for Conservation Research (unpublished)	822
<i>Pseudois schaeferi</i>	Dwarf Blue Sheep	54	<i>Bos taurus</i> (BTA)	H. Cernohorska Veterinary Research Institute Brno (unpublished)	822
<i>Ovis aries musimon</i>	European Mouflon/Sheep	54		San Diego Institute for Conservation Research (unpublished)	823
<i>Ovis aries orientalis</i>	Asiatic Mouflon/Sheep	54		A. Proskuryakova, V. Beklemisheva (unpublished)	824
<i>Ovis aries aries</i>	Domestic Sheep	54	<i>Homo sapiens</i> (HSA)	D. S. Gallagher, A. Proskuryakova Cribiu et al. (2001), Iannuzzi et al. (1999)	825
<i>Ovis canadensis</i>	Rocky Mountain Bighorn Sheep	54		San Diego Institute for Conservation Research (unpublished)	826
<i>Ovis ammon</i>	Argali	56	<i>Muntiacus reevesi</i> (MRE)	W. Nie Huang et al. (2005)	827
<i>Ovis nivicola</i>	Snow Sheep	52	<i>Capra aegagrus</i> (CAE), <i>Muntiacus reevesi</i> (MRE)	W. Nie Huang et al. (2005)	828
<i>Hemitragus jemlahicus</i>	Himalayan Tahr	48	<i>Bos taurus</i> (BTA)	H. Cernohorska Rubes et al. (2012)	829
Family Giraffidae					
<i>Okapia johnstoni</i>	Okapi	45	<i>Homo sapiens</i> (HSA), <i>Camelus dromedarius</i> (CDR)	A. Proskuryakova Kulemzina et al. (2009)	830
<i>Giraffa camelopardalis</i>	Giraffe	30	<i>Homo sapiens</i> (HSA), <i>Camelus dromedarius</i> (CDR), <i>Bos taurus</i> (BTA), <i>Muntiacus reevesi</i> (MRE)	A. Proskuryakova, W. Nie Huang et al. (2008), Kulemzina et al. (2009), Cernohorska et al. (2013)	831
Family Antilocapridae					
<i>Antilocapra americana</i>	Pronghorn	58	<i>Homo sapiens</i> (HSA), <i>Camelus dromedarius</i> (CDR), <i>Bos taurus</i> (BTA), <i>Sus scrofa</i> (SSC)	A. Proskuryakova, H. Cernohorska Cernohorska et al. (2013), Kulemzina et al. (2014)	832
<i>Antilocapra americana</i>	Pronghorn	58		A. Proskuryakova Kulemzina et al. (2009)	833
Family Cervidae					
<i>Elaphodus cephalophus</i>	Tufted Deer	47	<i>Muntiacus reevesi</i> (MRE)	W. Nie Huang et al. (2006a)	834

SPECIES	COMMON NAME	2n	PAINTING PROBES	SOURCE	PAGE
<i>Muntiacus muntjak vaginalis</i>	North Indian Muntjac/ Barking Deer	6 (F), 7 (M)	<i>Homo sapiens</i> (HSA), <i>Ovis aries</i> (OAR), <i>Muntiacus reevesi</i> (MRE), <i>Mazama gouazoubira</i> (MGO)	L. Biltueva, W. Nie, A. Proskuryakova Biltueva et al. (unpublished), Burkin et al. (1997), Chi et al. (2005b), Fröncke et al. (1997), Murmman et al. (2008), Yang et al. (1997a,b)	835
<i>Muntiacus feae</i>	Fea's Muntjac/Barking Deer	14M		F. Yang B. Fu and F. Yang (unpublished)	836
<i>Muntiacus feae</i> (Ideogram)	Fea's Muntjac/Barking Deer	14M	<i>Muntiacus reevesi</i> (MRE)	W. Nie Huang et al. (2006b)	836
<i>Muntiacus reevesi</i>	Chinese Muntjac/Barking Deer	46		F. Yang (unpublished)	837
<i>Muntiacus gongshanensis</i>	Gongshan Muntjac/ Barking Deer	8F		F. Yang B. Fu and F. Yang (unpublished)	838
<i>Muntiacus gongshanensis</i> Ideogram	Gongshan Muntjac/ Barking Deer	8F	<i>Muntiacus reevesi</i> (MRE)	W. Nie B. Fu and F. Yang (unpublished)	838
<i>Muntiacus crinifrons</i>	Black Muntjac/Barking Deer	8 (F), 9 (M)		B. Fu and F. Yang (unpublished)	839
<i>Dama mesopotamica (dama)</i>	Persian Fallow Deer	68		San Diego Institute for Conservation Research (unpublished)	840
<i>Axis kuhlii</i>	Bawean/Kuhl's Deer	68		San Diego Institute for Conservation Research (unpublished)	841
<i>Axis calamianensis</i>	Calamian/Axis Deer	68		San Diego Institute for Conservation Research (unpublished)	842
<i>Rusa (Cervus) unicolor malaccensis</i>	Malayan Sambar Deer/ Wapiti	56		San Diego Institute for Conservation Research (unpublished)	843
<i>Rusa (Cervus) timorensis russa</i>	Javan Rusa	60	<i>Bos taurus</i> (BTA)	H. Cernohorska Fröhlich et al. (2017)	844
<i>Przewalskium (Cervus) albirostris</i>	White-Lipped/Thorold's Deer	66	<i>Bos taurus</i> (BTA)	Veterinary Research Institute Brno (unpublished)	845
<i>Cervus elaphus bactrianus</i>	Bactrian Wapiti/Red Deer	68		San Diego Institute for Conservation Research (unpublished)	846
<i>Cervus elaphus sibiricus</i>	Altai Red Deer/Wapiti	68		A. Graphodatsky (unpublished)	847
<i>Cervus nippon</i>	Sika Deer	66	<i>Muntiacus reevesi</i> (MRE)	W. Nie Huang et al. (2006a)	848
<i>Cervus elaphus</i>	Red Deer	62	<i>Muntiacus reevesi</i> (MRE)	W. Nie Huang et al. (2006a)	848
<i>Rucervus eldii</i>	Eld's Deer		<i>Bos taurus</i> (BTA)	H. Cernohorska Fröhlich et al. (2017)	849
<i>Alces alces</i>	Moose/Elk	68		A. Graphodatsky (unpublished)	850
<i>Rangifer tarandus</i>	Siberian Reindeer/Caribou	70		A. Graphodatsky (unpublished)	851
<i>Odocoileus virginianus</i>	White-Tailed Deer	70		J. M. B. Duarte J. M. B. Duarte (unpublished)	851
<i>Capreolus pygargus</i>	Roe Deer	70 + Bs	<i>Bos taurus</i> (BTA), <i>Camelus dromedarius</i> (CDR)	A. Proskuryakova Demetyeva et al. (2010)	852
<i>Mazama americana</i>	South American Red Brocket	43 + Bs (male)		J. M. B. Duarte Aquino et al. (2013)	853

SPECIES	COMMON NAME	2n	PAINTING PROBES	SOURCE	PAGE
<i>Mazama nana</i>	Southern Bororó/Brazilian Dwarf/Pygmy Brocket	36 + Bs		J. M. B. Duarte Abril and Duarte (2008)	853
<i>Mazama bororo</i>	São Paulo Bororó/Small Red Brocket	34 + Bs		J. M. B. Duarte J. M. B. Duarte (unpublished)	853
<i>Mazama gouazoubira</i>	South American Brown Brocket	70 + Bs		A. Proskuryakova A. Proskuryakova, F. Yang (unpublished)	854
<i>Mazama nemorivaga</i>	Amazonian Brown Brocket	68/69 + Bs		J. M. B. Duarte Fiorillo et al. (2013)	855
<i>Pudu puda</i>	Southern Pudu	70		A. Spotorno Spotorno and Fernández-Donoso (1975)	855
<i>Blastocerus dichotomus</i>	Marsh Deer	66		J. M. B. Duarte Duarte and Giannoni (1995a)	856
<i>Ozotoceros bezoarticus</i>	Pampas Deer	68		J. M. B. Duarte Duarte and Giannoni (1995b)	857
<i>Hippocamelus bisulcus</i>	Guemal	70		A. Spotorno Spotorno et al. (1987)	857
Order Perissodactyla Time Tree					858
Family Equidae					
<i>Equus caballus</i>	Domestic Horse	64	<i>Homo sapiens</i> (HSA)	T. Raudsepp, T. Lear Houck et al. 2017, Raudsepp et al. (1996), Yang et al. (2004)	859
<i>Equus caballus</i>	Domestic Horse	64		Graphodatsky (unpublished)	860
<i>Equus przewalskii</i>	Przewalski's Horse	66	<i>Equus caballus</i> (ECA)	W. Nie Yang et al. (2003b)	861
<i>Equus asinus</i>	Donkey	62	<i>Homo sapiens</i> (HSA), <i>Equus caballus</i> (ECA)	T. Raudsepp Raudsepp and Chowdhary (1999, 2001), Yang et al. (2004)	862
<i>Equus asinus</i> C-bands	Donkey	62		Graphodatsky (unpublished)	863
<i>Equus asinus (africanus) somaliensis</i>	Somali Wild Ass	62–64		Houck et al. (1998)	864
<i>Equus hemionus onager</i>	Onager	55–56	<i>Equus caballus</i> (ECA), <i>Equus grevyi</i> (EGR), <i>Tapirus indicus</i> (TIN)	A. Proskuryakova San Diego Institute for Conservation Research (unpublished), Trifonov et al. (2008)	865
<i>Equus hemionus kulan</i>	Kulan	54–55	<i>Equus caballus</i> (ECA)	H. Cernohorska, J. Rubes Musilova et al. (2009, 2013)	866
<i>Equus kiang</i>	Kiang	52	<i>Equus caballus</i> (ECA)	H. Cernohorska, J. Rubes Musilova et al. (2009, 2013)	867
<i>Equus burchellii</i>	Burchell's Zebra	44	<i>Equus caballus</i> (ECA), <i>Tapirus indicus</i> (TIN), <i>Ceratotherium simum</i> (CSI)	A. Proskuryakova Musilova et al. (2009, 2013), Trifonov et al. (2008)	868
<i>Equus burchellii boehmi</i>	Grant's/Boehm's Zebra	44–45		San Diego Institute for Conservation Research (unpublished)	869
<i>Equus grevyi</i>	Grévy's Zebra	46	<i>Homo sapiens</i> (HSA), <i>Tapirus indicus</i> (TIN), <i>Equus caballus</i> (ECA), <i>Equus burchellii</i> (EBU)	A. Proskuryakova, H. Cernohorska Musilova et al. (2007), Trifonov et al. (2008)	870
<i>Equus zebra hartmannae</i>	Hartmann's Mountain Zebra	32	<i>Equus caballus</i> (ECA), <i>Equus burchellii</i> (EBU)	W. Nie Yang et al. (2003b)	871

SPECIES	COMMON NAME	2n	PAINTING PROBES	SOURCE	PAGE
Family Tapiridae					
<i>Tapirus terrestris</i>	Lowland Tapir	80	<i>Equus caballus</i> (ECA)	A. Proskuryakova Houck et al. (2000), Trifonov et al. (2008)	872
<i>Tapirus pinchaque</i>	Mountain Tapir	76	<i>Equus caballus</i> (ECA)	A. Proskuryakova Houck et al. (2000), Trifonov et al. (2008)	873
<i>Tapirus bairdii</i>	Baird's Tapir	80	<i>Equus caballus</i> (ECA)	A. Proskuryakova Houck et al. (2000), Trifonov et al. (2008)	874
<i>Tapirus indicus</i>	Malayan Tapir	52	<i>Homo sapiens</i> (HSA), <i>Equus caballus</i> (ECA)	A. Proskuryakova Trifonov et al. (2008)	875
Family Rhinocerotidae					
<i>Rhinoceros unicornis</i>	Indian Rhinoceros	82		Houck et al. (1995)	876
<i>Ceratotherium simum simum</i>	Southern White Rhinoceros/Square-Lipped Rhinoceros	82	<i>Equus burchellii</i> (EBU)	A. Proskuryakova Houck et al. (1994), Trifonov et al. (2003)	877
<i>Diceros bicornis</i>	Black Rhinoceros	84	<i>Homo sapiens</i> (HSA), <i>Equus burchellii</i> (EBU), <i>Tapirus indicus</i> (TIN)	A. Proskuryakova Houck et al. (1995), Trifonov et al. (2003, 2008)	878
<i>Diceros bicornis</i> C-bands	Black Rhinoceros	84		A. Proskuryakova Trifonov et al. (unpublished)	879
<i>Dicerorhinus sumatrensis</i>	Sumatran Rhinoceros	82		M. Houck (unpublished)	880

References 881**Afterword Chromosomes: Much More Than DNA by Jennifer A. Marshall Graves 902****Index 904****Index of Painting Probes 930**