

## CHROMOSOMAL DIVERSITY OF INDIAN MAMMALS, AMPHIBIANS AND REPTILES

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### INTRODUCTION

Number and morphology of chromosomes are species specific. Information on chromosomes have been frequently found immensely useful and occasionally even conclusive in distinguishing between closely related taxa. Comparative chromosomal analyses have quite often proved helpful in tracing phylogenetic relationships. Harvey (1916, 1920) was the first to review chromosome numbers in the Metazoa. Makino (1956) reviewed the chromosome numbers in animals. Matthey (1973) published chromosome formulae of Eutherian mammals. Morescalchi (1973), Singh (1972) and Gorman (1973) also provided information on Amphibian and Reptilian chromosomes for the purpose. Manna (1983) and Rao & Ghosh (1983) updated the information on Indian Amphibian and Reptilian chromosomes. In this brief account we have presented only the diploid chromosome numbers (2n) of Indian Ungulates, Rodents, Amphibians and Reptiles. The chromosomal features of these species are being worked out to be published in the form of a catalogue, what have been published on 129 Mammalian species belonging to 9 orders (refer Singh *et. al.* 1999).

### MAMMALIA

Order ARTIODACTYLA

Family BOVIDAE

	2n (Diploid number)
1. <i>Antilope cervicapra</i> (Linnaeus)	31-33 ♂; 30-32 ♀
2. <i>Bos frontalis</i> Lambert	58
3. <i>Bos grunniens</i> Linnaeus	60
4. <i>Bos taurus</i> Linnaeus	60
5. <i>Boselaphus tragocamelus</i> (Pallas)	46
6. <i>Bubalus bubalis</i> (Linnaeus)	50
7. <i>Budorcas taxicolor</i> Hodgson	52
8. <i>Capra falconeri</i> (Wagner)	60
9. <i>Capra hircus</i> Linnaeus	60

10. <i>Capra ibex</i> Linnaeus	60
11. <i>Gazella dorcas</i> (Linnaeus)	31 ♂; 30 ♀
12. <i>Hemitragus jemlahicus</i> (H. Smith)	48
13. <i>Nemorhaedus goral</i> (Hardwicke)	55
14. <i>Oryx gazella</i> (Linnaeus)	56
15. <i>Ovis ammon</i> (Linnaeus)	58
16. <i>Ovis aries</i> Linnaeus	54
17. <i>Pseudois nayaur</i> (Hodgson)	54
18. <i>Tetracerus quadricornis</i> (Blainville)	38

## Family CAMELIDAE

19. <i>Camelus bactrianus</i> Linnaeus	74
20. <i>Camelus dromedarius</i> Linnaeus	74

## Family CERVIDAE

21. <i>Cervus axis</i> Erxleben	66
22. <i>Cervus duvauceli</i> G. Cuvier	56
23. <i>Cervus elaphus</i> Linnaeus	68
24. <i>Cervus eldi</i> M'Clelland	58
25. <i>Cervus porcinus</i> (Zimmermann)	68
26. <i>Cervus unicolor</i> (Kerr)	64-65
27. <i>Muntiacus muntjak</i> (Zimmermann)	6 ♀; 7 ♂

## Family SUIDAE

28. <i>Sus salvanius</i> (Hodgson)	38
29. <i>Sus scrofa</i> Linnaeus	38

## Order PERISSODACTYLA

## Family EQUIDAE

1. <i>Equus asinus</i> Linnaeus	62
2. <i>Equus caballus</i> Linnaeus	64
3. <i>Equus onager</i> Boddaert	56

## Family RHINOCEROTIDAE

4. <i>Rhinoceros unicornis</i> Linnaeus	82
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## Order RODENTIA

## Family ARVICOLIDAE

1. *Alticola roylei* Gray 56

## Family CAVIIDAE

2. *Cavia porcellus* (Linnaeus) 64

## Family CRICETIDAE

3. *Meriones hurrianae* Jerdon 40  
4. *Tatera indica* (Hardwicke) 66, 68

## Family HYSTRICIDAE

5. *Hystrix indica* Kerr 66

## Family MURIDAE

6. *Apodemus sylvaticus* (Linnaeus) 48  
7. *Bandicota bengalensis* (Gray & Hardwicke) 42, 44  
8. *Bandicota indica* (Bechstein) 42, 44-47  
9. *Berylmus bowersi* (Anderson) 40  
10. *Berylmus mackenziei* (Thomas) 40  
11. *Chiropodomys gliroides* (Blyth) 28  
12. *Cremnomys blanfordi* (Thomas) 36  
13. *Cremnomys cutchicus* Wroughton 36  
14. *Golunda ellioti* Gray 50, 52, 54  
15. *Leopoldamys edwardsi* (Thomas) 42  
16. *Leopoldamys sabanus* (Thomas) 42  
17. *Micromys mimutus* (Pallas) 68  
18. *Millardia gleadowi* (Murray) 40  
19. *Millardia meltada* (Gray) 50, 52  
20. *Mus booduga* (Gray) 40  
21. *Mus castaneus* Waterhouse 40  
22. *Mus cervicolor* Hodgson 40  
23. *Mus cookii* Ryley 40  
24. *Mus domesticus* Ruddy 24, 26, 28, 29, 30, 40  
25. *Mus dunni* Wroughton (= *Mus terricolor* Blyth) 40

26. <i>Mus musculus</i> Linnaeus	40
27. <i>Mus pahari</i> Thomas	40, 48
28. <i>Mus platythrix</i> Bennett	22, 24, 26, 30
29. <i>Mus saxicola</i> Elliot	22, 24-26
30. <i>Nesokia indica</i> (Gray & Hardwicke)	42
31. <i>Niviventer fulvescens</i> (Gray)	42, 46
32. <i>Niviventer niviventer</i> (Hodgson)	46
33. <i>Rattus exulans</i> (Peale)	42
34. <i>Rattus muelleri</i> (Jentink)	42
35. <i>Rattus nitidus</i> (Hodgson)	42
36. <i>Rattus norvegicus</i> (Berkenhout)	42
37. <i>Rattus rattus</i> (Linnaeus)	38, 42
38. <i>Rattus turkestanicus</i> (Satunin)	42
39. <i>Vandeleuria oleracea</i> (Bennett)	29 ♂, X <sub>1</sub> X <sub>2</sub> Y; 29 ♀ X <sub>1</sub> X <sub>1</sub> X <sub>2</sub>

#### Family SCIURIDAE

40. <i>Funambulus palmarum</i> (Linnaeus)	46, 54
41. <i>Funambulus pennanti</i> wroughton	54
42. <i>Funambulus tristriatus</i> (Waterhouse)	46
43. <i>Hylopetes alboniger</i> (Hodgson)	38
44. <i>Hylopetes fimbriatus</i> (Gray)	46
45. <i>Marmota caudata</i> (Geoffroy)	38
46. <i>Petaurista magnificus</i> (Hodgson)	38
47. <i>Petaurista petaurista</i> (Pallas)	38

### AMPHIBIA

#### Order ANURA

#### Family BUFONIDAE

1. <i>Bufo andersonii</i> (Boulenger)	22
2. <i>Bufo himalayanus</i> Günther	22
3. <i>Bufo melanostictus</i> Schneider	22
4. <i>Bufo stomaticus</i> Lütken	22

## Family MICROHYLIDAE

- |   |        |
|---|--------|
| 5. <i>Kaloula pulchra</i> Gray                | 28     |
| 6. <i>Microhyla heymonsi</i> Vogt             | 24     |
| 7. <i>Microhyla ornata</i> (Duméril & Bibron) | 24, 26 |
| 8. <i>Ramanella variegata</i> (Stoliczka)     | 26     |
| 9. <i>Uperodon globulosus</i> (Günther)       | 26     |
| 10. <i>Uperodon systoma</i> (Schneider)       | 26     |

## Family PELOBATIDAE

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| 11. <i>Megophrys lateralis</i> (Anderson) | 26 |
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## Family RANIDAE

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| 12. <i>Euphlyctis cyanophlyctis</i> (Schneider)    | 26 |
| 13. <i>Euphlyctis hexadactylus</i> (Lesson)        | 26 |
| 14. <i>Hoplobatrachus crassus</i> (Jerdon)         | 26 |
| 15. <i>Hoplobatrachus tigerinus</i> (Daudin)       | 26 |
| 16. <i>Limnonectes limnocharis</i> (Gravenhorst)   | 26 |
| 17. <i>Limnonectes macrodon</i> (Duméril & Bibron) | 24 |
| 18. <i>Occidozyga lima</i> (Gravenhorst)           | 26 |
| 19. <i>Rana chalconota</i> (Schlegel)              | 26 |
| 20. <i>Rana livida</i> (Blyth)                     | 26 |

## Family RHACOPHORIDAE

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| 21. <i>Polypedates leucomystax</i> (Gravenhorst) | 26 |
| 22. <i>Polypedates maculatus</i> (Gray)          | 26 |
| 23. <i>Rhacophorus reinwardtii</i> (Schlegel)    | 26 |

## Order CAUDATA

## Family SALAMANDRIDAE

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| 24. <i>Pleurodeles verrucosus</i> (Anderson) | 24 |
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## Order GYMNOPTIONA

## Family CAECILIDAE

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| 25. <i>Gegenophis carnosus</i> (Beddome) | 30 |
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## Family ICHTHYOPHIIDAE

26. *Ichthyophis beddomei* Peters 42

## Family URAEOTYPHLIDAE

27. *Uraeotyphlus menoni* Annandale 36  
28. *Uraeotyphlus narayani* Seshachar 36

**REPTILIA**

## Order CROCODYLIA

## Family CROCODYLIDAE

1. *Crocodylus palustris* Lesson 30  
2. *Crocodylus porosus* Schneider 34

## Family GAVIALIIDAE

3. *Gavialis gangeticus* (Gmelin) 32

## Order SAURIA

## Family AGAMIDAE

4. *Bronchocela cristatella* (Kuhl) 34  
5. *Calotes emma* Gray 34  
6. *Calotes jerdoni* Günther 34  
7. *Calotes mystaceus* Duméril & Bibron 34  
8. *Calotes versicolor* (Daudin) 32, 34  
9. *Ceratophora stoddartii* Gray 34  
10. *Cophotis ceylanica* Peters 28  
11. *Japalura variegata* Gray 34  
12. *Laudakia caucasica* (Eichwald) 34, 36  
13. *Laudakia himalayana* (Steindachner) 36  
14. *Laudakia nupta* (De Filippi) 36  
15. *Laudakia tuberculata* (Hardwicke & Gray) 34  
16. *Lyriocephalus scutatus* (Linnaeus) 30  
17. *Psammophilus dorsalis* (Gray in : Griffith & Pidgeon) 32  
18. *Ptyctolaemus gularis* (Peters) 34  
19. *Sitana ponticeriana* Cuvier 36, 44, 46

20. *Trapelus ruderatus* (Olivier) 46  
 21. *Uromastyx hardwickii* Hardwicke & Gray 34, 36

## Family EUBLEPHARIDAE

22. *Eublepharis macularius* (Blyth) 38

## Family GEKKONIDAE

23. *Bunopus tuberculatus* Blanford 42  
 24. *Cosymbotus platyurus* (Schneider) 46  
 25. *Crossobamon eversmanni* (Wiegmann) 42  
 26. *Gekko gekko* (Linnaeus) 38  
 27. *Gekko smithii* (Gray) 38  
 28. *Hemidactylus brookii* Gray 40  
 29. *Hemidactylus bowringii* (Gray) 46  
 30. *Hemidactylus flaviviridis* Rüppell 40, 46  
 31. *Hemidactylus frenatus* Duméril & Bibron 40  
 32. *Hemidactylus garnotii* Duméril & Bibron  
 $2n = 3x = 63$ ;  $2n = 3x = 42$ ;  $2n = 3x = 70$   
 33. *Hemidactylus turcicus* (Linnaeus) 44  
 34. *Lepidodactylus lugubris* (Duméril & Bibron)  
 $2n = 3x = 63$ ;  $2n = 3x = 66$ ;  $2n = 44$   
 35. *Ptychozoon kuhli* Stejneger 42  
 36. *Teratoscincus scincus* (Schlegel) 34, 36

## Family LACERTIDAE

37. *Eremias guttulata* (Lichtenstein) 38  
 38. *Eremias persica* Blanford 38  
 39. *Eremias velox* (Pallas) 38  
 40. *Ophisops elegans* Ménétriés 38  
 41. *Takydromus sexlineatus* Daudin 38, 40, 42

## Family SCINCIDAE

42. *Asymblepharus himalayanus* (Günther) 30  
 43. *Chalcides ocellatus* (Forsskál) 26, 28  
 44. *Dasia olivacea* Gray 32

45. <i>Eumeces schneideri schneideri</i> (Daudin)	32
46. <i>Lygosoma punctata</i> (Gmelin)	24
47. <i>Mabuya aurata</i> (Linnaeus)	32
48. <i>Mabuya carinata</i> (Schneider)	30, 32
49. <i>Mabuya macularia</i> (Blyth)	26, 32, 38
50. <i>Mabuya multifasciata</i> (Kuhl)	32
51. <i>Mabuya rudis</i> Boulenger	32
52. <i>Mabuya rugifera</i> (Stoliczka)	32
53. <i>Sphenomorphus indicus</i> (Gray)	28, 30

Family VARANIDAE

54. <i>Varanus bengalensis</i> (Daudin)	40
55. <i>Varanus flavescens</i> (Hardwicke & Gray)	40
56. <i>Varanus griseus</i> (Daudin)	40
57. <i>Varanus salvator</i> (Laurenti)	40

Order SERPENTES

Family ACROCHORDIDAE

58. <i>Acrochordus granulatus</i> (Schneider)	36
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Family BOIDAE

59. <i>Eryx conicus</i> (Schneider)	34
60. <i>Eryx johnii</i> (Russell)	34
61. <i>Python molurus</i> (Linnaeus)	36

Family COLUBRIDAE

62. <i>Ahaetulla nasuta</i> (Lacepède)	36
63. <i>Amphiesma stolatum</i> (Linnaeus)	36
64. <i>Argyrogena fasciolata</i> (Shaw)	36
65. <i>Boiga forsteni</i> (Duméril, Bibron & Duméril)	36
66. <i>Boiga trigonata</i> (Schneider in : Bechstein)	36
67. <i>Cerberus rynchops</i> (Schneider)	36, 38
68. <i>Chrysopelea ornata</i> (Shaw)	36, 40
69. <i>Dendrelaphis pictus</i> (Gmelin)	36
70. <i>Elaphe mandarina</i> (Cantor)	38



71. <i>Elaphe radiata</i> (Schlegel)	30
72. <i>Elaphe taeniura</i> (Cope)	36
73. <i>Enhydris enhydris</i> (Schneider)	36
74. <i>Gerarda prevostiana</i> (Eydoux & Gervais)	36
75. <i>Lycodon aulicus</i> (Linnaeus)	36
76. <i>Natrix tessellata</i> (Laurenti)	34
77. <i>Oligodon arnensis</i> (Shaw)	46
78. <i>Pseudoxenodon macrops</i> (Blyth)	38
79. <i>Ptyas korros</i> (Schlegel)	36
80. <i>Ptyas mucosus</i> (Linnaeus)	34, 36
81. <i>Xenochrophis piscator</i> (Schneider)	40, 42
82. <i>Zaocys nigromarginatus</i> (Blyth)	34, 36

## Family ELAPIDAE

83. <i>Bungarus caeruleus</i> (Schneider)	44 ♂, 43 ♀
84. <i>Bungarus fasciatus</i> (Schneider)	38
85. <i>Naja kaouthia</i> Lesson	38
86. <i>Naja naja</i> (Linnaeus)	38

## Family HYDROPHIIDAE

87. <i>Enhydrina schistosa</i> (Daudin)	32 ♂, 33 ♀
88. <i>Hydrophis cantoris</i> Günther	35 ♀
89. <i>Hydrophis cyanocinctus</i> Daudin	32 ♂, 33 ♀, 36 (♂ ♀)
90. <i>Hydrophis fasciatus</i> (Schneider)	35 ♀
91. <i>Hydrophis gracilis</i> (Shaw)	35 ♀
92. <i>Hydrophis ornatus</i> (Gray)	32
93. <i>Hydrophis spiralis</i> (Shaw)	32 ♀
94. <i>Kerilia jerdonii</i> Gray	32
95. <i>Laticauda colubrina</i> (Schneider)	34
96. <i>Laticauda laticaudata</i> (Linnaeus)	40
97. <i>Pelamis platurus</i> (Linnaeus)	38
98. <i>Praescutata viperina</i> Schmidt	32

## Family TYPHLOPIDAE

99. <i>Ramphotyphlops braminus</i> (Daudin)	
2n = 3x = 42	

## Family VIPERIDAE

100.	<i>Daboia russelii</i> (Shaw & Nodder)	36
101.	<i>Echis carinatus</i> (Schneider)	36
102.	<i>Macrovipera lebetina</i> (Linnaeus)	36
103.	<i>Trimeresurus erythrurus</i> (Cantor)	36
104.	<i>Trimeresurus mucrosquamatus</i> (Cantor)	36
105.	<i>Trimeresurus stejnegeri</i> Schmidt	36
106.	<i>Trimeresurus gramineus</i> (Shaw)	36

## Family XENOPELTIDAE

107.	<i>Xenopeltis unicolor</i> Boie	36
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## Order TESTUDINES

## Family BATAGURIDAE

108.	<i>Cuora amboinensis</i> (Daudin)	50, 52
109.	<i>Cyclemys oldhamii</i> (Gray)	50-52
110.	<i>Kachuga smithii</i> (Gray)	48-52
111.	<i>Kachuga tecta</i> (Bell in : Gray)	52
112.	<i>Melanochelys trijuga</i> (Schweigger)	50, 52
113.	<i>Pyxidea mouhotii</i> (Gray)	52

## Family CHELONIIDAE

114.	<i>Caretta caretta</i> (Linnaeus)	52 ♂, 51 ♀ 58 ♂, 57 ♀
115.	<i>Chelonia mydas</i> (Linnaeus)	56 ♂, 55 ♀ ;
116.	<i>Eretmochelys imbricata</i> (Linnaeus)	56
117.	<i>Lepidochelys olivacea</i> (Eschscholtz)	52 ♂, 51 ♀ 58 ♂, 57 ♀ 56

## Family DERMOCHELYIDAE

118.	<i>Dermochelys coriacea</i> (Vandelli)	56
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## Family TESTUDINIDAE

119.	<i>Indotestudo elongata</i> (Blyth)	52
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## Family TRIONYCHIDAE

120.	<i>Lissemys punctata</i> (Bonnaterre)	66
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## SUMMARY

Chromosome numbers of 228 species reported from the Indian subcontinent have been presented. Mammalia consist of Artiodactyla 29, Perissodactyla 4 and Rodentia 47 species. Amphibia include Anura 24, Caudata 1, and Gymnophiona 4 species. Reptilia the largest group with 119 species are represented by 4 orders *viz.*, Crocodylia 3, Sauria 54, Serpentes 49 and Testudines 13. All these species with diploid numbers have been placed under their different families alphabetically.

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