

*Cuon alpinus*. By James A. Cohen

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***Cuon* Hodgson, 1838**

*Cuon* Hodgson, 1838:152. Type species *Canis primaevus* Hodgson. *Chrysaeus* H. Smith, 1839:167. Type species *Canis dukhunensis* Sykes.

*Cyon* Blandford, 1888:142. Emended spelling of *Cuon*. *Anurocyon* Heude, 1888:102. Type species *Anurocyon clamitans* Heude.

**CONTEXT AND CONTENT.** Order Carnivora, Family Canidae, Subfamily Simocyoninae. The genus *Cuon* includes only one living species.

***Cuon alpinus* (Pallas, 1811)**

Dhole, Asiatic Wild Dog, Red Dog

*Canis alpinus* Pallas, 1811:34. Type locality near Udscoi Ostrog, Amurland.

*Canis javanicus* Desmarest, 1820:198. Type locality Java.

*Canis dukhunensis* Sykes, 1831:100. Type locality Deccan, peninsular India.

*Canis primaevus* Hodgson, 1833:221. Type locality Nepal.

*Cuon rutilans* Müller, 1839:51. Type locality Java.

*Cuon sumatrensis* Hardwicke, 1822:235. Type locality Sumatra.

*Cuon grayiformes* Hodgson, in Gray, 1863:5. Type locality Sikim.

*Cuon lepturus* Heude, 1892:102. Type locality Poyang Lake, south of the Yangtze, Kiangsi, China.

*Anurocyon clamitans* Heude, 1892:102. Type locality Taihu, near mouth of the Yangtze, China.

**CONTEXT AND CONTENT.** Context given above in generic account. *Cuon alpinus* has two subspecies (Afanasiev and Zolotarev, 1935) as follows:

*C. a. alpinus* (Pallas, 1811:34), see above (*javanicus* Desmarest, *dukhunensis* Sykes, *primaevus* Hodgson, *rutilans* Müller, *sumatrensis* Hardwicke, *grayiformes* Hodgson, *lepturus* Heude, *clamitans* Heude, *infuscus* Pocock, *fumosus* Pocock, *laniger* Pocock, and *adustus* Pocock are synonyms).

*C. a. hesperius* (Afanasiev and Zolotarev, 1935:427). Type locality Aksai district of Semiryechensk region, Eastern Russian Turkestan (*jason* Pocock is a synonym).

**DIAGNOSIS AND GENERAL CHARACTERS.** Length of head and body is 88 to 113 cm, length of tail, 41 to 50 cm, height, 42 to 50 cm. Adult females weigh 10 to 13 kg, adult males, 15 to 20 kg. Fur is typically rusty-red dorsally with a paler ventrum. Tail is usually tipped with black. Skull is relatively broader and has a shorter rostrum than that of most *Canis familiaris* and most other genera of canids (figures 1 and 2). Condylbasal length of skull is 174 to 188 mm, zygomatic width, 103 to 118 mm, rostrum length, 74 to 80 mm. Dentition is i 3/3, c 1/1, p 4/4, m 2/2, total 40; the third lower molar is absent. (Above information compiled from Brander, 1931; Burton, 1940; Davidar, 1975; Jerdon, 1867; Novikov, 1956; Ognev, 1931; Prater, 1965; Sosnovskii, 1967; and Stroganov, 1962.)

**DISTRIBUTION.** Formerly from the Tyan-Shan and Altai mountains, and Maritime Province of the Soviet Union southward through Mongolia, Korea, China, Tibet, Nepal, India, and South-east Asia, including the Malayan Peninsula, Sumatra, and Java (figure 3). Present range remains unstudied, but remnant populations are known to exist in India, Malaysia, Thailand, and Java.

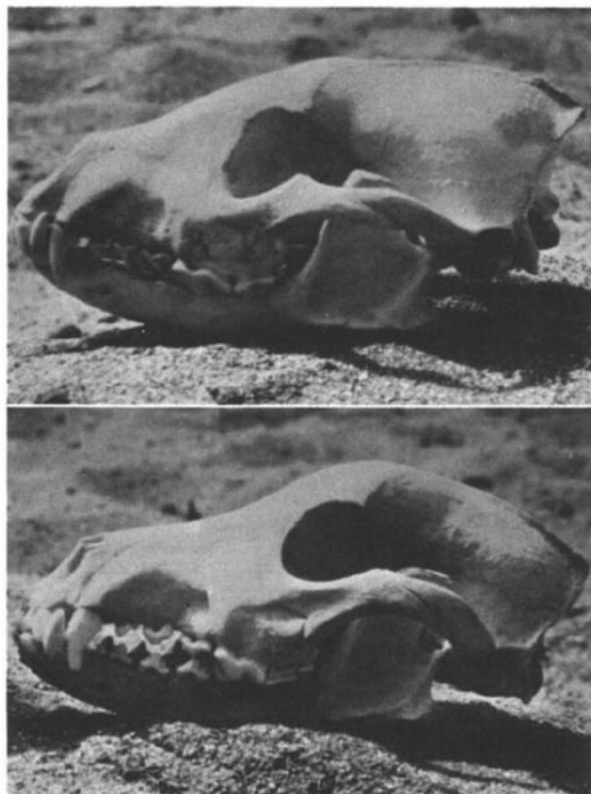


FIGURE 1. Lateral view of skulls of domestic dog (below) and dhole (above).



FIGURE 2. Ventral view of skulls of domestic dog (below) and dhole (above). Scale at lower left represents 100 mm.

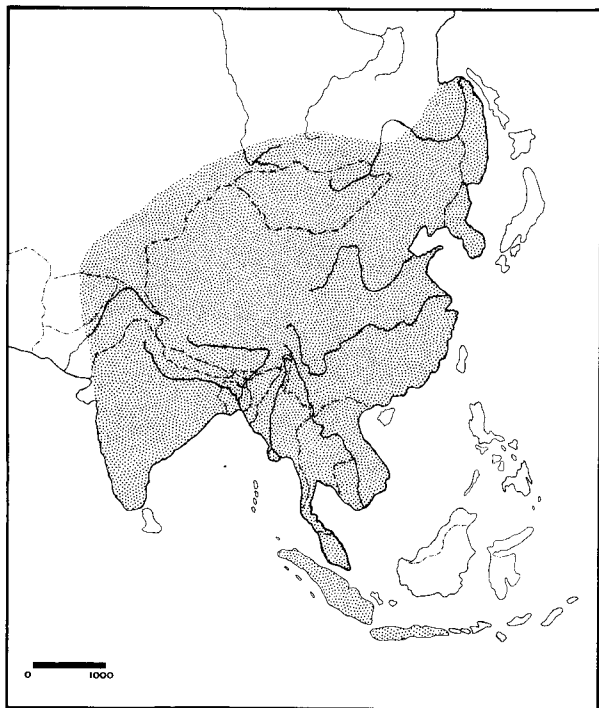


FIGURE 3. Former range of *Cuon alpinus* (after Stains, 1975) in eastern Asia. Scale at lower left represents 1000 km.

**FOSSIL RECORD.** *Cuon* bones from mid-Pleistocene cave deposits at Hundsheim in Lower Austria were described by Thienius (1954), who attempted a reconstruction of *Cuon* phylogeny.

**FORM.** No clear sexual dimorphism is apparent in this species. Dorsal and lateral adult guard hairs are 25 to 30 mm long. A fairly thick, white underfur is common. Captive specimens shed their coats once a year between March and May at the Moscow Zoo (Sosnovskii, 1967). There are normally 16 mammae (Davidar, 1975) in contrast to the usual 10 for *Canis* (Prater, 1965).

**REPRODUCTION AND ONTOGENY.** Mating occurs between September and January in India (Burton, 1940; Davidar, 1975; Prater, 1965; Pythian-Adams, 1949), but captive dholes at the Moscow Zoo typically breed in February (Sosnovskii, 1967). Gestation has been recorded as 60 to 63 days for both locations (Burton, 1940; Davidar, 1975; Sosnovskii, 1967). Average litter size is four to six pups (Prater, 1965; Sosnovskii, 1967). Maximum litter size is unknown but Pythian-Adams (1949) extracted nine embryos from the uterus of a dead female. In another female, Dr. M. W. Fox and his colleagues (including the author) counted eight fetuses (five male, three female) including one runt. Resorption rates remain unknown.

Den types (as classified by Fox, in manuscript) range from earthen burrows to rocky caverns. More than one female may den together and rear a litter together (Jerdon, 1867; Prater, 1965), but actual numbers of simultaneously breeding females are unknown. Using data on average litter size, I have calculated that in one instance two or three females probably bred simultaneously.

Virtually nothing is known about ontogeny.

**ECOLOGY.** Dholes have occupied nearly every habitat type from mountainous alpine regions (hence, the name *alpinus*) and dense forests of the USSR (Lekagul and McNeely, 1977; Novikov, 1956; Sosnovskii, 1967) to open country in Tibet and Ladak (Prater, 1965). In India, they live almost exclusively in dense forests and thick scrub jungles (Davidar, 1975; Krishnan, 1972), and have been sighted at altitudes up to 2,100 m (Wood, 1929). Dholes are primarily predators of large mammals. In various parts of India these include sambar (*Cervus unicolor*), chital (*Axis axis*), buffalo (*Bubalus bubalis*), swamp deer (*Cervus duvauceli*), nilgai (*Boselaphus tragocamelus*), wild pig (*Sus scrofa*), wild goat (*Capra hircus*), wild sheep (*Ovis* sp.), gaur (*Bos gaurus*), markhor (*Capra falconeri*), musk deer (*Moschus moschiferus*), tahr (*Hemitragus hylocricus*), and goral (*Nemorhaedus goral*). Smaller mammals such as hares (*Lepus* sp.) and various rodents also may be taken (Davidar, 1975). In the USSR dholes prey on reindeer (*Rangifer tarandus*), wild sheep (*Ovis* sp.), wild goats (*Capra* sp.), and badgers (*Meles meles*) (Sosnovskii, 1967). Thamin (*Cervus*

*eldi*) are taken in Burma (Ollenbach, 1930) and banteng (*Bos banteng*) in Java (Rierink, 1940).

Fox (unpublished) has visually analyzed 138 dhole scats collected in south India in 1974; 74% contained chital remains, 9% sambar, 9% unidentified small mammals, and 2% domestic cattle. The author, B. D. Barnett, A. J. T. Johnsingh, and M. W. Fox, have analyzed by microscopic cuticular-pattern analysis, 150 scats collected in the same area in 1975. Results indicate the following percentages of occurrence: 24% common hare (*Lepus nigricollis*), 19% chital, 15% sambar, 14% field rat (*Milvardia melitada*), 11% wild pig, 5% insects, and 2% domestic cattle.

Carriion may be eaten on occasion (Davidar, 1975; Lekagul and McNeely, 1977; Wood, 1929).

Dholes are active mostly in the early morning and evening (Prater, 1965) but occasionally will hunt and kill at night (Carlisle, 1932; La Personne, 1932; Prater, 1965). Captive dholes exhibit the same basic activity pattern (Sosnovskii, 1967). Fox *et al.* (unpublished) found a clear bimodal activity rhythm with peaks from 0.5 to 3.0 hrs past sunrise and from 2.5 hrs prior to sunset until sunset. Nothing is known of the home range of this species.

Dholes are susceptible to distemper and rabies (Davidar, 1975), as well as mange (Morris, 1937). Fox *et al.* (unpublished) found several tapeworms (*Taenia* sp.) in the small intestine of a female. Numerous unidentified ticks were found on the skin (see also Wood, 1929). Burton (1940) noted that ticks have been found on pups taken from dens. Fox (unpublished) discovered a recently abandoned den to be infested with fleas (*Ctenocephalides felis felis*).

In India the dhole is regarded as vermin and has been bountied since 1912 (Burton, 1940) and poisoned by villagers. This, as well as habitat loss due to agricultural expansion, has much reduced dhole populations throughout India. The dhole population has never been estimated, but seems to be declining rapidly enough to warrant inclusion of both *Cuon alpinus alpinus* and *Cuon alpinus hesperius* in the IUCN Red Data Book of endangered species.

**BEHAVIOR.** The dhole is a social canid. Packs usually number five to 12 individuals in India, but groups of up to 40 dholes have been reported (Davidar, 1975; Hoogerwerf, 1970). Packs may divide and later re-group (Prater, 1965). McNeely (personal communication) states that in Thailand social groups of more than three dholes are rarely seen.

Social organization within packs remains largely unexplored, but Sosnovskii, (1967) indicated that "hierarchical disputes" occur in captive dhole groups between animals of the same sex, but no details were given. Fox *et al.* (unpublished) have witnessed vertical tail threats and aggressive growling. Submissive animals responded with passive submission involving lateral recumbence (see Fox, 1971). Burton (1940) reported dholes paying "marked deference," presumably by active submission (see Fox, 1971), to the largest pack member.

Mating has been described by Davidar (1973). The male sniffed the genital region of an estrus female and attempted to mount twice. Copulation occurred on the third attempt in a crouched position and was accompanied by whimpering on the part of the female. These sounds elicited the submissive approach of several other pack members, whimpering, crawling, and tail-wagging toward the mated pair. A seven-minute copulatory tie ensued; the pair lay on their sides facing each other.

In captivity, the female remains in the den with her pups until the second day post-partum (Sosnovskii, 1967). In the wild, other pack members return to the den from a kill and will regurgitate food for both the female and her pups (Davidar, 1975; Pythian-Adams, 1949).

Dholes have been heard to produce nearly every vocalization typical of domestic dogs except loud or repeated barks (Burton, 1940). Short, rudimentary barks or "yaps" may be heard (Khajuria, 1963; Krishnan, 1972), as well as growls, whines, whimpers, and howls (Davidar, 1975). Short, repeated "whistling" may also be given (Fox and Cohen, 1977), especially when hunting (Burton, 1940; Krishnan, 1972).

Little is known of olfactory communication in this species. Ognev (1931) stated that domestic dogs exhibit extreme piloerection when sniffing dhole tracks, thus suggesting the possibility of interdigital glands. Hildebrand (1952) implied the presence of a supracaudal gland. Scats are frequently encountered at trailcrossings in the field (Davidar, 1975; personal observations), but no regular patterns of fecal deposition have been distinguished to indicate a territorial function. Several animals in a pack may defecate simultaneously (Fox *et al.*, unpublished).

Dholes apparently track their prey by scent and then pursue them by sight (Jerdon, 1867; Prater, 1965). Krishnan (1972) and Waller (1972) reported incidences of packs apparently separating prey individuals from a herd before closing in to attack. Prater (1965), in contrast to Wood (1929), stated that gaur and buffalo

herds may be "stampeded" by the pack, which then attacks the calves.

Seizure of prey appears to occur in a random manner, dholes grasping and holding on wherever possible. Killing is usually accomplished by eventual disembowelment (Davidar, 1975). Patterns of hunting and killing small prey have not been described.

Interspecific encounters between dholes and the following nonprey species have been recorded: tiger (*Panthera tigris*—Brander, 1931; Burton, 1940; Connell, 1944), leopard (*Panthera pardus*—Brander, 1931; Burton, 1940; Morris, 1933); domestic dog (*Canis familiaris*—Davidar, 1965; Williams, 1935).

**REMARKS.** The taxonomic association of *Cuon*, *Lycaon*, and *Speothos* into a single subfamily, Simocyoninae, has been questioned by Kleiman (1967), who suggested that these monotypic genera appear more closely related to other canid genera than to each other. Clutton-Brock *et al.* (1976) provided further support for this view. These authors analyzed 37 canid species using a total of 90 morphological, ecological, and behavioral traits. When all traits were considered, *Cuon* more closely resembled *Canis*, *Dusicyon*, and *Alopex* than either *Speothos* or *Lycaon*. When only cranial and dental characters were considered, however, *Cuon* most resembled *Speothos* and *Lycaon*.

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