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Evolutionary history and dispersal route of catarrhine primates in the late Neogene of Eastern Asia

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Extanct Asian non-human primates are now widely distriuted in the temperate to tropical/subtropical forest and open lands in South to Southeast/East Asia. In this study I discuss the evolutionary history nad the dispersal route of the Asian catarrhine primates, including Hominoidea (apes including gibbons and orangutan) and Cercopithecoidea (Old World monkeys including Colobinae and Cercopithecinae), based on the fossil records in Eastern Asia.

It is generally recognized that the the Asian hominoids and Old World monkeys have origined in Africa in the Early/Middle Miocene, and then invaded into Eurasia in the Middle Miocene or later. They have finally dispersed to Far East Asia, such as Japan and islands of Southeast Asian by the Early Pleistocene.

Among the two groups, hominoids have diversified first, invading into Eurasia as early as the early Middle Miocene, and then dispersed eastward until Southeast Asia via Southern Asia. The oldest fossil record of the Asian large hominoids is Sivapithecus from the Lower Siwaliks of India/Pakistan, which probably produced Gigantopithecus, Pongo (orangutan) and other relatives. Although the fossil specimens of these large hominoids have been discovered from the Middle Miocene through the Middle Pleistocene sediments of the wide area in southern Asian through southern China, all taxa except orangutans of Southeast Asian islands have disappeared by the late Pleistocene. The fact that no homoinoid fossils have been discovered from the northern China indicates they have dispersed to East Asia through southern Asia. The evolutionary history of small apes, gibbos, is not well known because of the scanty fossil records of this group.

On the other hand, Old World monkeys have invaded into Eurasia from Africa as early as the Late Miocene, which is much later than did hominoids. Although both groups (colobines and cercopithecines) have finally arrived at the Far East Asia, the fossil records indicate that evolutionary history of the two groups is not simultaneous: the present fossil records suggest that colobine monkeys have invaded into Eurasia first during the late Miocene, and then cercopithecines followed them around the latest Miocene, and that the eastward despersal of colobines in the Eurasian continent was much earlier than that of cercepithecines. The oldest fossil records of colobines is from the late Miocene of Upper Siwaliks in Southern Asia, and recently, colobine fossils was discovered from the latest Miocene/early Pliocene of Myanmar, Southeast Asia. In addition, the colobine fossils have been reported from the middle Pliocene of Transbaikalia, southern Sibelia, suggesting the possibility of the northern dispersal route. The preliminary analysis of the relatively complete colobine skull discovered from the Upper Pliocene of Kanagawa Prefecture indicates that it is not similar to Asian but to African forms, suggesting the complicated evolutionary history of the group.

Meanwhile, cercopithecine monkeys invaded into Eurasia as early as the latest Miocene: the oldest fossil record is the isolated macaque(?) teeth from the early Pliocene of Yushe, Shanxi Province, northern China, suggesting the distribution of macaque monkeys in the relatively high latitude ares at this time. On the other hand, many fossils remains of macaques as well as colobines have been discovered from the Lower Pleistocene cave deposits of southern China, suggesting that the Southeast Asia was the center of the diversification of Old World monkeys. Moreover, many fossil specimens of large non-macaque cercopihtecine monkeys have been reported from the Pliocene sediments of Europe and Asia. Although the phyletic positions of these large cercopithecines are still in debates, their geographic distribution is obviously viased in the high-latitude area, suggesting the northern dispersal route rather than the southern one.

Keywords: primates, East Asia, hominoids, Old World monkeys, dispersal route