

Mountain Hawk-Eagle Kuma-Taka (Jpn) *Nisaetus nipalensis*

Morphology and classification

Classification: Accipitriformes Accipitridae

Total length:	♂ 71.4cm (69.6-72.7cm)	♀ 76.3cm (73.3-80.5)
Wing length:	♂ 48.8cm (46.0-50.5)	♀ 51.6cm (49.5-53.3)
Tail length:	♂ 34.2cm (32.0-39.5)	♀ 35.6cm (33.5-37.2)
Culmen length:	♂ 34.0mm (31.9-35.8)	♀ 37.0mm (35.6-38.1)
Tarsus length:	♂ 113.0mm (96.2-120.2)	♀ 118.2mm (105.1-128.9)
Weight:	♂ 2.2kg (2.3-2.7)	♀ 3.1kg (2.5-3.9)

Measurements in the Suzuka Mountains by the Mountain Hawk Eagle Ecology Research Group.

Appearance:

Adult Mountain Hawk-Eagles are dark brown all over and blend in with the surroundings when perched on a tree in a forest (Photo 1). The head is dark, with black and brown vertical streaks from the throat to the chest. The head plumage deepens in color with age, and the coloration from the chest to the abdomen becomes increasingly tinged with dark brown with age. There are black and white lateral stripes on the underpart of the wing. Mountain Hawk-Eagles normally have a short crest on the back of the head, which may be more elongated in some individuals in southern Kyushu (southern Japan). Juveniles are pale in plumage coloration. They are particularly white from the chest to the abdomen, which makes them conspicuous even in the distance. The iris varies greatly in color depending on the age. Their irises are ashy blue in fledglings, pale yellow at the age of 3, and almost yellow at the age of 4-5. Afterward, the yellow of the iris gradually deepens with age to become orange, changing from orange to red and finally wine red.



Photo 1. Adult (left) and juvenile (right) of Mountain Hawk Eagles [Susumu Nakano]

Vocalization:

Mountain Hawk-Eagles do not call very often in the non-breeding season, but the male and female of a pair call each other "Po-hee, po-hee" or "Pip-pee, pip-pee" in a far-reaching voice in the breeding period, especially while nest building. They also utter a low-pitched alarm call that sounds like "Gfitt, gfitt" when they sense danger near the nest in the incubation and nestling periods. Nestlings call "Pip-pip-pee, pip-pip-pee" repeatedly in a loud voice from the late nestling period at least until the early post-fledging period when they beg the parents for food.

Distribution and Habitat

Distribution:

Mountain Hawk-Eagles are distributed in southwestern India, Sri Lanka, the Indo-China Peninsula, China, the Russian Far East and Japan. In Japan a subspecies *Nisaetus nipalensis orientalis* occurs as a year-round resident in mountainous regions from Kyushu to Hokkaido across Japan. In a mountainous region covered with an extensive forest suitable for their habitat, they are continuously distributed in a density of approximately a pair per 20-40km². The distance between the nests of neighboring pairs is generally 3 or 4km. In Hokkaido (the northernmost main island), on the other hand, the breeding distribution is lower in density and more irregular than in Honshu (the largest main island). Mountain Hawk-Eagles are also irregularly distributed in the areas where Golden Eagles (*Aquila chrysaetos*) breed because they tend to avoid the breeding sites of Golden Eagles.

Habitat:

The habitat of Mountain Hawk-Eagles is a mountainous region covered with forests which abound with small and medium-sized animals. Mountain Hawk-Eagles occur in laurel forests, summer green deciduous forests and plantations. They live in a mature forest with ample space in the understory, regardless of tree species and type of forests. In addition to these habitat requirements, however, they need for breeding a large enough tree to build a nest on a mountainside.

Life history



Breeding system:

Mountain Hawk-Eagles are a monogamous breeder. Breeding pairs stay in their nest site-centered home range throughout the year, but they live separately in the non-breeding season. It is because they have high fidelity to sites, such as the hunting grounds that they usually pair with the same partner every year. In autumn, they start to perform displays, such as a boat bottom-shaped flight, undulating flight, parallel flight, approaching stoop and exhibiting perch. In January, they begin to build a nest in parallel with the displays, and call each other more frequently. They usually breed every other year because they feed fledglings until about next February.

Nest and egg:

Mountain Hawk-Eagles generally use as a nest tree the large tree which has a diameter of more than 60cm at breast height and lateral branches suitable to build a nest on. The nest tree species vary greatly between regions. For instance, they use conifers (*Pinus densiflora*, *Cryptomeria japonica*, *Abies firma*, *Tsuga sieboldii* and *Pinus parviflora*), broad-leaved deciduous trees (*Fagus crenata* and *Quercus crispula*) and evergreen broad-leaved trees (*Castanopsis* spp. and *Quercus* spp.). The nest size is 120cm by 100cm on average, and the thickness varies according to the age of use. They use thick dead branches for the frame and relatively thin branches for the upper structure. They lay twigs with green leaves in the inner cup. They usually lay eggs from February to April. The clutch size is one egg. The egg is white in color. It is about 57mm by 70mm in size and about 100-110g in weight.



Photo 2. Egg of Mountain Hawk Eagles (left) and chicken egg (right).

Incubation and nestling periods and fledging rate:

The incubation period is about 43-50 days. Females mostly incubate eggs and nestlings, while males provide food. The nestling period is about 70-80 days and the young fledge from June to August. The fledging day is difficult to determine because the fledglings frequently return to the nest even after they left the nest and receive the food that the parent birds bring back. The few long-term monitorings of breeding Mountain Hawk-Eagles showed that the mean fledging rate of three years was 21.4% in Yamagata, Shiga and Miyazaki Prefectures (the Study of the Rare Birds of Prey, Japanese Society for Preservation of Birds 2004). However, the pairs with good reproductive performance bred almost every other year, and the fledging rate varied greatly between the pairs.

Diet and foraging behavior

Mountain Hawk-Eagles prey on small to medium-sized animals, such as mammals (hare, racoon dog, marten, flying squirrel, squirrel and shrew mole), birds (Copper Pheasant, Eurasian Jay and others) and reptiles (snake and skink). However, the prey items increase as more studies are conducted and the diet varies greatly depending on regions because Mountain Hawk-Eagles capture a wide variety of small to medium-sized animals which are abundant and readily

available in their habitat. They hunt primarily in forests and at their edge. They usually perch on a tree and wait for their prey to come along or move from one spot to another in its search, but occasionally fly around right above the tree canopy, looking for their prey animals.

Topics of ecology, behavior and conservation

● Internal structure of the home range

A breeding pair of Mountain Hawk-Eagles has a home range with a definite internal structure. There is a nesting tree (site) in the center of a home range. A nest site is surrounded by the area the juvenile mostly use after fledging until next February. This area is usually within a radius of less than 500m (or 1,000m depending on geographical features) from a nest tree. Breeding behaviors, such as nest material transportation, call exchange and copulation are carried out in a breeding territory including a juvenile area. A breeding territory is an exclusive zone set up in the breeding period, which is defended by behaviors, such as exhibiting-perch (perching on a conspicuous tree for self-display with chest feathers fluffed out) and the chasing-out of intruders. A breeding territory covers about 3km², which contains suitable trees for nesting other than a nest tree. A radius of roughly 1.5km from a nest tree is the core area of a home range (ca. 7-8km²). A core area includes the most part of the main hunting ground and major roosting sites as well as a breeding territory. The core area generally does not overlap with that of a neighboring pair. Since a pair has other hunting sites outside its core area, the outer boundary of the home range of a pair overlaps with that of its neighboring pair. Each breeding pair of Mountain Hawk-Eagles possess a home range of similar size with an internal structure, and the distance between the nests of neighboring pairs is usually about 3km which is double the radius (1.5km) of a core area.

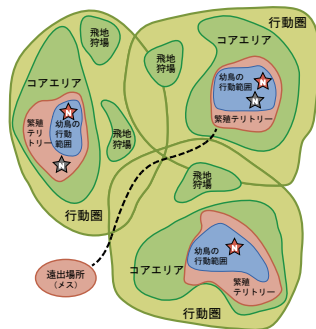


Fig. 1. The internal structure of a Mountain Hawk Eagle home range. Red (N): Nest tree, gray: the other large trees suitable for nesting. Red polygon: breeding territory, Blue polygon: home range of a juvenile, Green polygon: core/hunting area of a breeding pair, Olive polygon: home range of a breeding pair.

● Extremely limited range of daily movements

Mountain Hawk-Eagles generally spend the whole day in a core area without widely moving around. Except when they cover a large area by display flights or chasing out intruders, they stay in an extremely restricted area during the day because they usually perch on trees and wait for their prey to come along in a familiar hunting ground. In addition, after they have captured their prey, they often spend the rest of the day sitting still at one spot.

● Delayed independence of juveniles

The fledglings of Mountain Hawk-Eagles gradually extend their flying range from the nest as they develop their flight ability, but they usually stay within a radius of 1km (mostly less than 500m) from the nest tree at least until next

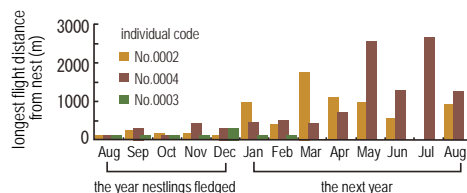


Fig. 2. Longest flight distances of three fledglings from their nests.

February. During this period, they improve their hunting skills, while food is provided for them by their parent birds, especially the male parent. Mountain Hawk-Eagles have adopted a breeding strategy to take care of their juveniles until they can acquire their hunting skills and disperse.

● A real threat is the rapid change of forests

Mountain Hawk-Eagles are widely distributed in the forests of mountains from Kyushu to Hokkaido in Japan, but the reduced reproductivity has a profound effect on the survival of the population. Although construction related to development may disturb their breeding, the decline of their reproductive rate is primarily attributed to the large-scale deforestation and the replacement of many broad-leaved forests by the monocultural plantations of conifers, such as Japanese cedars and Japanese cypresses (*Chamaecyparis obtusa*) after World War II. It is assumed that many pairs of Mountain Hawk-Eagles have lost suitable nesting sites due to the logging of trees large enough to build a nest. Coniferous plantations without proper maintenance not only provide them with a limited number of small to medium-sized animals suitable for their prey but also hinder them from hunting in the interior. As a result, an increased number of breeding pairs cannot secure enough food to fledge their nestlings successfully. To conserve Mountain Hawk-Eagles closely related to the mountain forest ecosystem of Japan, it is of vital importance to construct the mechanism to preserve large trees in their favorable nesting grounds as well as to make environmentally sustainable use of timber resources.

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