

Crested Serpent Eagle Kanmuri-Washi (Jpn) *Spilornis cheela*

Morphology and classification

Classification: Accipitriformes Accipitridae

Total length:	♂ 51.3cm (49.9-53.0cm)	♀ 52.2cm (50.5-53.7)
Wing length:	♂ 35.3cm (32.7-36.5)	♀ 35.7cm (34.1-37.5)
Tail length:	♂ 23.0cm (21.8-24.9)	♀ 23.9cm (21.1-25.3)
Culmen length:	♂ 28.9mm (27.4-30.0)	♀ 29.0mm (27.9-30.2)
Tarsus length:	♂ 79.4mm (75.0-82.5)	♀ 78.7mm (74.4-82.8)
Weight:	♂ 731g (670-780g)	♀ 756g (700-840)

Measurements of rescued adults in Ishigakijima Island by Sano (excluding individuals intensely weakened or damaged). Based on 7 males and 5 females.

Appearance:

Adult Crested Serpent Eagles are brownish black on the upperpart and brown or grayish brown with numerous white speckles on the underpart. They are black on the crown with a crest on the back of the head, which gave rise to the Japanese and English names. The crest is barely noticeable, however, except when they become tense and raise it. The iris is generally yellow, but some birds have dark brown irises regardless of sex or age. The feet and bare skin around the eye are yellow. The beak is bluish gray. They have two broad black bands on the flight and tail feathers. Juveniles are white on the upperpart with dark brown or black stripes, which makes the back look scattered with black and white specks from a distance. The underpart is conspicuously white. There are a wide range of individual variations in a black patch behind the eye. This patch is absent from some juveniles, while it has an intricate pattern in others. The iris is pale blue or yellowish green. Juveniles also have black bands on the flight and tail feathers, but they are narrower and more numerous than in adult birds.



Photo 1. Adult (above) and juvenile (below) of Crested Serpent Eagles.

Vocalization:

The resonant territorial call which sounds like "Kuk-kuk-kuk, fi-fi-fi-fee" is typical of Crested Serpent Eagle vocalization. They relatively often utter this call from late January to May. They give a single shrill cry going like "Fee" as a alarm call. They also call "Bee, bee" or "Hee, hee" in a husky voice. Females call "Kew-ooi, kew-ooi" in a wheedling voice before copulation or when receiving food from males (Sano 2003b). More than six kinds of vocalizations are confirmed including "Whoeeeyo, whoeeeyo" which males utter to call females before food transfer and nestling calls.

Distribution and Habitat

Distribution:

Crested Serpent Eagles are widely distributed in South and Southeast Asia, such as India, Sri Lanka, southern China, Taiwan, the Malay Peninsula, Sumatra, Java, Kalimantan, Sulawesi and the Philippines (Dickinson et al. 2003). A Japanese endemic subspecies *S. c. perplexus* of Crested Serpent Eagles occurs as a year-round resident and breeds in Ishigaki and Iriomote Islands, Okinawa Prefecture (the southernmost prefecture of Japan). Some authors have recently proposed a theory that this *S. c.*

Perplexus is not a subspecies but another species *S. perplexus* (Ferguson-Lee & Christie 2001).

Habitat:

Adult birds prefer a habitat composed of woodlands, rivers and mangrove swamps. They generally use woodlands as a nest site and swamps as a foraging ground. They also feed in open areas, such as rice paddies, meadows and cane fields. Young birds without established territories use small secondary forests, shrine and temple woods, cropland, rice fields and coastal forests.

Life history



Breeding system:

Crested Serpent Eagles are a monogamous breeder. They start to build a nest in late January and continue to carry the branches intermittently until early April when they begin to lay eggs. Meanwhile, they copulate many times. Females mostly incubate eggs and nestlings, while males provide food for females and nestlings. Females also leave the nest in late June to forage for food. Nestlings fledge from mid-July to August. However, it is still unknown when fledglings become independent.

Nest:

They build a nest on the slope of a moist valley covered with Luchu pines (*Pinus luchuensis*) and evergreen broad-leaved trees. They generally use as a nest tree oaks *Castanopsis sieboldii*, Luchu pines and Indian laurels (*Ficus retusa*). They build a plate-shaped nest at the fork of radial branches or on a lateral branch with a tangle of vines using Luchu pines, Indian laurels and *Fraxinus griffithii* as a nest material. The nest size is reported to be 66cm by 51cm in Luchu pine woods (Miyazaki 1981, Harato 1987, Sano 2003a).

Egg:

The clutch size is 1-2 eggs in the literature, but one newly hatched nestling was observed every year in the nest where a pair of Crested Serpent Eagles bred for three consecutive years, which suggests that the clutch size is usually one egg. The egg is about the size of a chicken egg. The egg has reddish brown speckles on an off-white ground (Miyazaki 1981, Harato 1987, Sano 2003a).



Photo 2. A nestling.

Incubation and nestling periods and fledging rate:

The incubation period is estimated to be 30-45 days. Nestlings begin to move around the branches in the vicinity of the nest 60-70 days after hatching (Yoshimi 1991, Sano 2003a).

Diet and foraging behavior

The diet of Crested Serpent Eagles consists of various animals, such as amphibians, reptiles, small mammals, birds, fish, crustaceans, insects, chilopods, thelyphonida and earthworms. They often prey on vipers *Trimeresurus elegans* and introduced marine toads (*Bufo marinus*) that secrete venom from parotoid glands. They also capture Asian house shrews (*Suncus murinus*) with a strong smell and *Typopeltis crucifer*. Sano (2003a) reported that the diet of nestlings included frogs (27%), crabs (13%), skinks (11%) and snakes (6%). They primarily still-hunt, namely they perch on a tree and an utility pole to wait for the prey and swoop down on it when they detect it beneath. Experienced birds also use humans to

secure food. For instance they capture small animals driven out of cover by grass harvesting and levee burning or trapped in a ditch at the side of a road. They may also scavenge road kills.

Topics of ecology, behavior and conservation

● Easy to observe due to a relatively high tolerance for humans

Since Crested Serpent Eagles nest in a dense forest with low visibility, it is difficult to observe them in the nest site, which is responsible for the lack of nesting records and observations. When they are perched on a utility pole and a tree at the edge of a forest, on the other hand, it is easier to observe them than other birds of prey because they are more tolerant of humans. It is possible, therefore, to confirm detailed plumage coloration, sexes, ages and leg bands. Even unbanded birds may be identified based on facial features in particular, which can help determine the home range of established adult birds. There have recently increased the tourists who take photographs of Crested Serpent Eagles perched on a utility pole by the roadside in Ishigaki and Iriomote Islands and upload them in their blogs. Some of these images include valuable information on leg bands or facial features. The Crested Serpent Eagle Research (<http://kanmuriwasi.web.fc2.com/>) collects information on banded birds and juvenile facial photographs every year to attempt to determine the population of Crested Serpent Eagles.

● Sighting records of Crested Serpent Eagles outside Ishigaki and Iriomote Islands

Crested Serpent Eagles occur as a year-round resident and breed in Ishigaki and Iriomote Islands, but they have been sighted in the neighboring islands as well. There were two sighting records off Tarama Island in the 1980s (Hisagai & Yamamoto 1981, Hisagai 1998) and three in Yonaguni Island in the late 1970s to the early 1980s (Koyama et al. 1980, the Agency of the Environment 1982). Since Yonaguni Island is close to Taiwan (ca. 110km), however, the observed birds may have belonged to the subspecies of Taiwan. In addition to these older records, one juvenile was observed in the coastal forest of Taketomi Island in the winter of 2004-2005 (Kikuchi & Sano 2007) and seven birds were sighted in the vicinity of the coastal forest of Obama Island between 1995 and 2007 (Takahara 2004, the Ministry of the Environment 2008). A subadult bird with some juvenile plumage was rescued in Obama Island in 2010. The bird was banded and released later to be found in Iriomote Island in 2011 (the Iriomote Wildlife Conservation Center of the Ministry of the Environment per. comm.). Since no ages were described in the sighting records before 2000, it is unknown whether the sighted birds were adults or juveniles, but young birds have been recorded in recent years, which suggests that they temporarily use islands around Ishigaki and Iriomote Islands, which are not available to them due to severe territorial rivalry with adult birds. It is important to accumulate these records to understand the movement and dispersal of Japanese Crested Serpent Eagle population and conserve the habitats.

● Increasing traffic accidents of Crested Serpent Eagles

In Ishigaki and Iriomote Islands, 9.5 and 5.3 moribund or dead Crested Serpent Eagles on average are rescued or collected every year, respectively. Traffic accidents represent 54% of the contributory factors (based on the 2000-2001 study of the Crested Serpent Eagle Research). Along with the construction



Photo 3. A Crested Serpent Eagle feeding on a road. Since the eagles tend to take flight at the last moment when a car approaches, it is at risk from a road accident.

of roads and traffic increase, recent years have found more small animals that are killed in a traffic accident or fall into a ditch at the side of a road. Crested Serpent Eagles that scavenge for these road-kills have been involved in a traffic accident as well (Photo. 3; Fig. 1). The Crested Serpent Eagle Research has called for drivers to be cautious of Crested Serpent Eagles by distributing handouts, while we are engaged in the rehabilitation and release of Crested Serpent Eagles injured in a traffic accident with the cooperation of the local administration and veterinary hospitals as well as collecting information on birds released back into the wild.

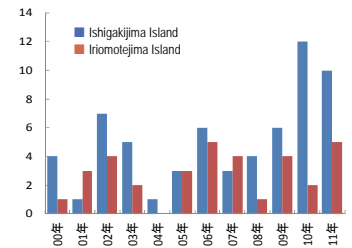


Fig. 1. Number of traffic accidents involving Crested Serpent Eagles since 2000 (By the Crested Serpent Eagle Research).

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Author

Kiyotaka SANO Crested Serpent Eagle Research

Crested Serpent Eagles are a well-known bird in name only partly because they are designated as a special natural monument. In Ishigakijima Island they are used for the names of a Coast Guard helicopter and a project for improving scholastic ability as well as the mascot of New Ishigaki Airport which will be opened soon. However, these eagles have created images divorced from the actual ecology and the current critical state of the species. It is 15 years since I started to study Crested Serpent Eagles and six years since this working group was established. I intend to supply more information on Crested Serpent Eagles as they really are in the future.

