Eastern Spot-billed Duck Karugamo (Jpn) *Anas zonorhyncha*

Morphology and classification

Classification: Anseriformes Anatidae

Total length:	515-645mm	Wing length:	245-292mm
Tail length:	79-102mm	Culmen length:	45-49mm
Tarsus length:	41-51mm	Weight:	750-1156g

Total length and weight after Kear (2005), and the others after Kobayashi (1985).

Appearance:

Eastern Spot-billed Ducks are dark brown on the upperpart from the head to tail. They are tan on the chest and dark brown on the abdomen with dark brown flecks densely scattered. The superciliary is cream yellow and the eye stripe is dark brown. The speculum is metallic dark blue. The outer edge of the tertiary flight feathers is white. The tip of a bill and the legs are orange yellow, which are conspicuous in the field.

Males and females are roughly similar in plumage coloration, but different in the color of the the upper and lower tail coverts between the sexes. Males look black, while females look brownish in the upper and lower tail coverts from a distance because the individual feather of both tail coverts is black in males but rimmed with brown in females. When you look closely at two Eastern Spot-billed Ducks staying together in the breeding season and notice the difference in color between their upper and lower tail coverts, they may be a pair.

Photo 1. Female of Eastern Spot-billed Ducks.

Vocalization:

Eastern Spot-billed Ducks quack "Gwet, gwet", which is similar to the call of Mallards (*Anas platyrhynchos*), but carries a greater distance.

Distribution and Habitat

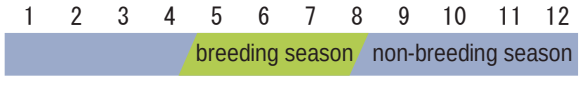
Distribution:

Eastern Spot-billed Ducks are species breeds almost throughout Japan and is generally a year-round resident south of Honshu (the largest main island). Banding studies have shown that some birds migrate to Sakhalin and the Chinese Continent.

Habitat:

Eastern Spot-billed Ducks prefer lowlands and usually occur in lakes, marshes, wetlands, rice fields, tidal flats and rivers. They nest separately from late April to July in meadows and reed beds on lakes, ponds and rivers, but they may also breed in a colony in island-like places such as sandbars in a river. In the wintering period, they are found in most bodies of water, such as lakes, marshes, ponds and rivers. They also form a flock with Mallards in littoral regions.

Life history



Nest:

They build a plate-shaped nest using herbs, bamboos, reeds and dead grass. The nest has a diameter of 22-30cm on top and 15-20cm at the base and is 8-12cm in depth (Photo. 2).

Egg:

The egg is creamy white with no flecks. The size is 55.5mm by 41.6mm and the weight is 44.3-57.4g (Photo. 3). The clutch size is 10-14 eggs.

Photo 2. Nest of Eastern Spot-billed Ducks

Incubation and nestling periods:

Females alone build a nest and incubate eggs. The incubation period is 26-28 days. Hatchlings leave the nest immediately after the feathers dry and follow their female parent. Juveniles become almost the size of their parents and start to fly in August, when they form flocks of several dozen birds

Photo 3. Eggs of Eastern Spot-billed Ducks

Diet and foraging behavior

The diet of Eastern Spot-billed Ducks consists primarily of the seeds and leaves of various plants including rice. They glean, filter food out of the water and feed upside down in the water depending on the feeding habitat.

Photo 4. Eastern Spot-billed Duck feeding in a rice field.

We counted the number of Eastern Spot-billed Ducks and studied their behavior in rice fields during the day and night in the breeding season. The density of the ducks using rice fields was significantly higher at night than in the daytime (Fig. 1). Of the behavior, on the other hand, feeding and resting accounted for 67% and 22%, respectively in the daytime, whereas feeding was 94% and resting 3% at night (Fig. 2). This study suggests that Eastern Spot-billed Ducks use rice fields as a feeding site during the night with high frequency. In addition, a proportion of two-bird (pair) flocks was higher at night (63%) than in the daytime (41%).

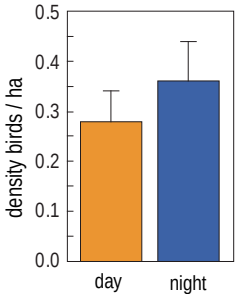


Fig. 1. Densities of ducks using rice fields by day and night.

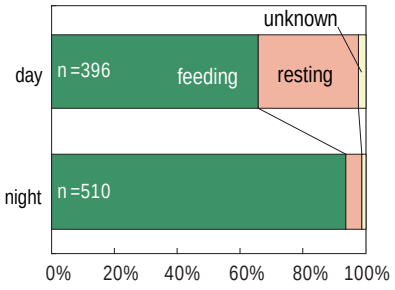


Fig. 2. Proportion of behaviors by day and night.

Topics of ecology, behavior and conservation

Infanticide of females

As a peculiar behavior, there is a record of infanticide committed by a Eastern Sopt-billed Duck female in the breeding season (Shimada et al. 2002). In Yatsu tidal flat, Chiba Prefecture, central Japan a female with one young attacked and killed eight ducklings of another Eastern Spot-billed Duck and three ducklings of a Gadwall (*Anas strepera*). It is assumed that the parent birds of Eastern

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Spot-billed ducks more frequently show aggression toward other ducks and therefore commit infanticide in urban areas where they are forced to breed close together due to a short supply of nesting sites.

Relationship between Eastern Spot-billed Ducks and Mallards

It is said that Mallards and Eastern Spot-billed ducks are ecologically equivalent species because they are similar in morphology and behavior. Observations showed that one of these species was sometimes taken into a larger flock of the other species when there was a marked difference in flock size between the two duck species. When more than several dozen birds congregate, on the other hand, the two species did not form a mixed flock, but maintained single-species flocks. In Lake Izunuma (2.89km^2), Mallards and Eastern Spot-billed Ducks were separately distributed in the western and eastern part of the marsh, respectively. In ponds of small urban parks, dominant duck species vary from one pond to another. For instance, the density of Mallards was low in a pond with the high density of Eastern Spot-billed Ducks and vice versa, which shows that there is an inverse proportion in density between the two species.

Conservation issues

Eastern Spot-billed Ducks cause damage to the farming in the breeding season in the Tohoku region, northern Japan. They eat paddies sown in flooded rice fields or reduce rice germination rate by treading on the surface of rice fields. Research showed that the density of Eastern Spot-billed Ducks was high in the vicinity of human settlements, where hunting pressure was low, and the rate of agricultural damage became higher in proportion to their density (Fig. 3). The hazard map of the agricultural damage inflicted by Eastern Spot-billed Ducks has been made based on this result (Fig. 4).

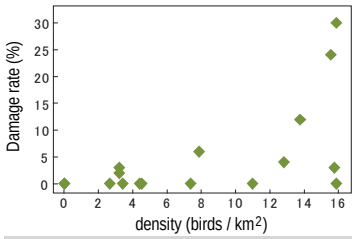

Fig. 3. Relationship between the density of Eastern Spot-billed Ducks and their damage rate. The damage rate and density were based on a questionnaire survey and a field study, respectively. The damage was surveyed in the rice fields where no preventive measures were taken against Eastern Spot-billed Ducks.

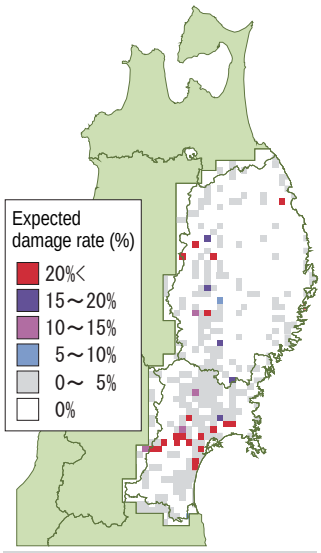

Fig. 4. Hazard map of agricultural damage by Eastern Spot-billed Ducks A square is 5 by 5 km.

It is predicted that human activities have a great effect on the number of surface feeding ducks taking a rest in the daytime, such as Eastern Spot-billed Ducks, Mallards and Teals (*A. crecca*) in the small ponds of urban parks in the wintering season. Since surface feeding ducks are assumed to need the core area of a pond for safety from terrestrial predators, we used Eastern Spot-billed Ducks as a representative species and calculated the safe area of ponds (Shimada 2001). The safe area was 'total pond area' minus 'escape distance multiplied by the shoreline length that humans have easy approach', where escape distance is the distance that ducks flee from humans. We calculated two levels of the distance from the shore as ca. 10m in a pond with artificial feeding and ca. 30m in a pond without feeding. The number of ducks was significantly correlated with the safety area, though no significant correlation was detected between the number of ducks and the whole area of a pond. This analysis suggests that the safety of a pond (distance from humans) plays a major role in the habitat selection of surface feeding ducks.

Eastern Spot-billed Ducks are one of the most familiar ducks to Japanese people, but their ecology has only partially been known. Although they are commonly found in Japan, it is necessary to study them more earnestly considering they are distributed in the Far East alone.

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I studied ducks including Eastern Spot-billed Ducks in the Tokyo Bay area of Chiba Prefecture. I met Azuma, one of the coauthors through the study of Eastern Spot-billed Ducks. They are one of the ducks in which I have been interested since I moved to Lake Izunuma. I always look at them, searching for some interesting study topics on them. (Tetsuo Shimada) tshimada0423@gmail.com

Since 2001 we have worked on making the "hazard map of Eastern Spot-billed Duck damage to paddy fields based on their population study" as a part of the research commissioned by the Ministry of Agriculture and Forestry. Last year we made the hazard map of Eastern Spot-billed Duck damage to rice farming in the Tohoku region based on the study of their density and behavior. We would like to carry out a more detailed study on the life of this species through the year, if given a chance. (Atsuki Azuma & Toru Kumagai)

From left, Kumagai, Shimada and Azuma.