

SHORT NOTE

Development of Spotless Crake chicks

The young chicks of the genus *Porzana* are usually covered with black down but often have brightly coloured bill, feet and iris. A few species also have areas without down, e.g. the crown of the head in *P. carolina* or the middle of the back in *P. flavirostra*. The chicks of many species of *Porzana* have not been described, and the functions of coloured and bare areas have been inadequately explained. Ripley (1977) described the colour of the down of 11 species of *Porzana* chicks. He did not mention those species with areas devoid of down, and described the bill colour of only three species. The change in colour and morphology with development are described for only a few species such as *P. flavirostrum* (Watson 1969, Schmitt 1975) and *P. carolina* (Kaufmann 1987).

I raised two Spotless Crake (*Porzana tabuensis*) chicks and correlated their development and age. I hope these notes will add to the descriptions of *Porzana* and enable ornithologists to tell the ages of crake chicks.

METHODS

Two Spotless Crake chicks were taken from their nest about 12 hours after they hatched on 22 and 23 October 1982 at Pukepuke Lagoon, Manawatu. I kept them in a cardboard box with a saucer of water and with an electric lamp for heat. I fed them a mixture of hard-boiled egg yolk, dog food, and small pieces of raw liver; occasionally I gave them insects. At first I offered them food from a forceps but stopped when they were able to feed themselves. I weighed them on a Pesola spring scale and measured the length of their culmen, middle toe plus claw, and tarsometatarsus every other day for 40 days, and once a week for the following month. The tame crakes were given to the Mount Bruce Reserve on 26 December 1982.

RESULTS

General body growth: The crakes grew quickly in size and weight during their first month (Fig. 1A). The crakes reached asymptote weight at one month. The loss of weight, beginning with the fifth week, was associated with the growth of the body feathers. The bill grew slowly but steadily during the first five weeks (Fig. 1B). The tarsi and toes lengthened rapidly in the first two weeks and more slowly in the next two weeks (Fig. 1C and 1D). I believe the small regressions of length of tarsi and toes are real because they occurred in both crakes. I have noticed similar regressions in measuring chicks of Soras (*Porzana carolina*) and Virginia Rails (*Rallus limicola*). However, the fluctuations in bill length in the last two weeks are probably artifacts of measuring because the base of the upper mandible was not distinct at this time. The wings, although not measured, appeared to grow very slowly in the first three weeks.

Feeding and begging behaviour: The crake chicks readily ran to the food offered in the forceps from the first day, frequently stopping to beg. Begging consisted of sitting on their tarsi and toes and waving their wings asynchronously. One chick stopped begging at 23 days but the other still

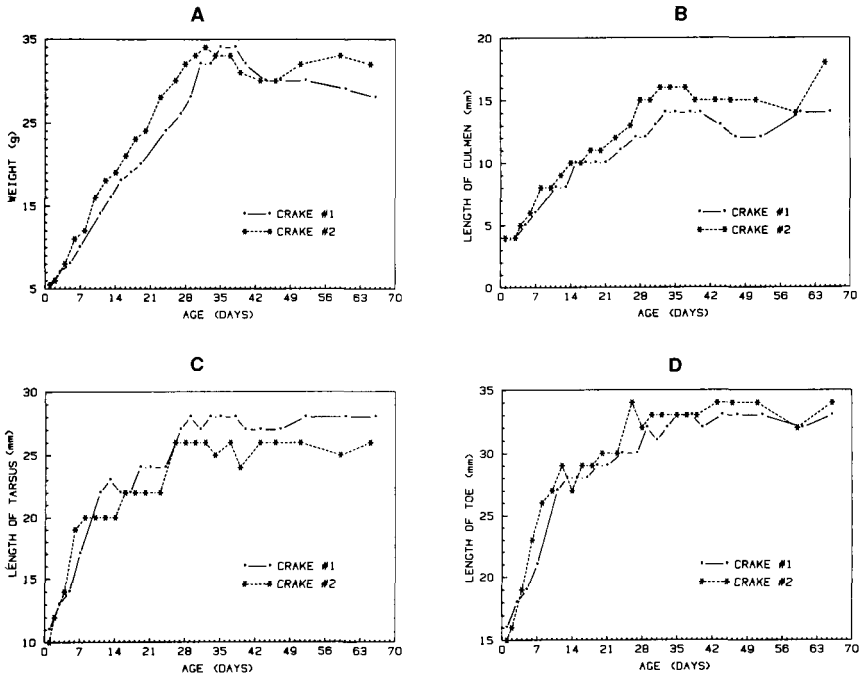


FIGURE 1 — Growth of two Spotless Crakes in weight and in length of bills, tarsi, and toes

begged at 6 weeks. They both ran toward the food-laden forceps but seemed increasingly afraid of the hand which held the food.

On the third day, chicks started to feed on moving live food by themselves, but they did not take the dog food until the seventh day. They fed on dog food without assistance by 17 days, but probably would have done earlier if they had been given live food. They began washing their food at 19 days.

Some maintenance behaviour: The chicks began to defecate in their water bowl the first day and deposited about 75% of their faeces in it by the third day. At 17 days, only about 25% of their faeces was deposited in the water. The chicks were drinking water by the third day and bathing by the fifth day. They usually bathed whenever the water bowl was cleaned, as the chicks rapidly fouled the water with faeces and washed food.

Bill colour: The bright white eggtooth on the tip of the upper mandible is the most conspicuous part of the bill of the newly hatched chicks. The lower mandible is black, as is most of the upper mandible. The nares are pink, and a narrow band of pink across the top of the upper mandible connects the two. The eggtooth is creamy white by the fifth day. The tooth dropped off one chick at 13 days and the other at 15 days. The bill remained black except for the pink nares and band of pink across the top for 3 weeks. Then the pink area expanded from the nares and also on the lower mandible

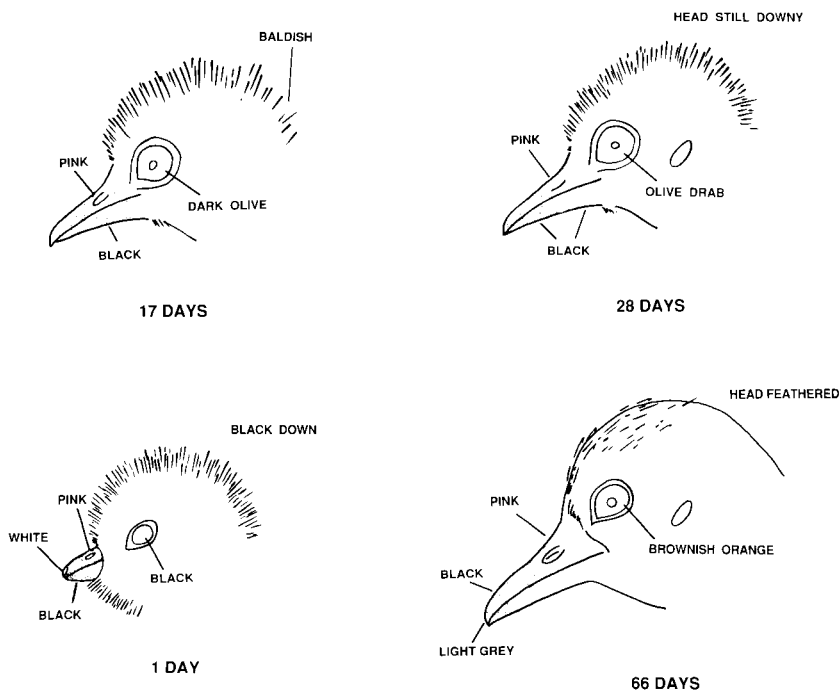


FIGURE 2 — Head coloration of Spotless Crake chicks of 1 day, 17 days, 28 days, and 66 days of age

below the nares. At 4 weeks the band of pink was 1.5 mm wide across the the upper mandible and 4.7 mm across the lower mandible. The pink area expanded to include the lower third at the base of both mandibles at 66 days. In addition, the tips of both mandibles were light grey (Figure 2).

Iris pigmentation: The eyes of the chicks were black at hatching and were surrounded by black skin, covering most of the sides of their heads. The iris became increasingly olive, changing from dark olive to olive drab by the end of 1 month. The iris then increased in orange pigmentation, to brownish orange at 40-66 days. The iris of breeding adults is bright red.

Tarsus and toe colours: The tarsi and toes of the newly hatched chicks were dark brownish grey, grading to pink behind the tarsi and under the toes. At 1 month, they were dark brown with pink on the joints and between the scales. At 7 weeks, the tarsi were grey-brown with salmon in between the scales, and the toes were light grey-brown above, grading to light salmon below. The tarsi and toes of breeding adults are bright red.

Plumage: The newly hatched chicks were evenly covered with black down, which had a greenish sheen in the sunlight. However, the back of the head appeared to be going bald at 18 days as the down became thinner there. Emergence of juvenile feathers began at 15 days, when shed black down was in their water after bathing, and the feathers of the ventral and crural

tracts appeared on the breast and legs. The feathers of the ventral tract continued to emerge toward the neck and abdomen, and at 21 days all the feathers had begun emergence from the neck to the posterior abdomen. At 29 days, the ventral feathers had completely emerged, being white in the cervical area, whitish grey on the breast, and brownish grey on the abdomen. The feathers of the crural tract were continuous with those of the ventral tract at 21 days, and covered the upper half of the leg. The spinal tract began emerging between the base of the neck to between the wings at 21 days; by 29 days these feathers were well opened and dark brown, but the posterior spinal tract still had down with a few brown feathers. The femoral tract began emerging at 19 days; the feathers were brownish grey at 29 days. The undertail coverts began emerging at 19 days. The head was still down covered at 29 days. At 40 days all feathers had at least partly emerged, including those on the head and wing.

The first evidence of the growth of primaries and secondaries was the elongation of the shaft of the down feathers at 21 days. The sheath of the primaries and secondaries appeared a few days later. The sheaths measured 3.3-7.4 mm at 24 days. At 40 days the sheaths were 15-18 mm and the feathers 18-26 mm, and at 52 days, the sheaths were 7-17 mm and the feathers 39-49 mm, and the crakes could fly. At 66 days, the feathers had still not completely emerged.

DISCUSSION

Boyd & Alley (1948) noted that bright head coloration in rail chicks was rare in more primitive genera such as *Rallus* and *Porzana* and more frequent and elaborate in more recently specialised genera such as *Fulica*. They speculated that bright coloration functions to stimulate the adults to feed the young, and is more prevalent in bolder, aquatic species. As most rail species feed their chicks, I believe the function is more complex than this. The brightest coloration of *Porzana* chicks occurs in *P. carolina*, a migratory species which breeds in ephemeral habitats and has the largest clutch size (maximum of 18 eggs) and span of hatching of the clutch of all *Porzana*. The bill of *P. tabuensis* is undoubtedly conspicuous enough to help the adults direct the food to the chick's bill. Perhaps that is all that is necessary in more sedentary species with lower clutch size and little asynchrony of hatching. More work must be done on the breeding biology of *Porzana* species before further comparisons can be made.

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