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Little Ringed Plover *Charadrius dubius* chicks swim to expand their foraging area with encouragement from their parents: an observation

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Many of the 214 wader species belonging to the order Charadriiformes have hindlimbs with traits adapted for swimming such as partially webbed toes (Colwell 2010). Bird watchers have observed many of these species swimming (e.g., 16 species by Wheeler 1962). However, some publications mention that only a limited number of species swim, such as phalaropes, avocets, and Ruffs (USDA 2000, O'Brien *et al*. 2006, Burger & Olla 2013, BirdLife Australia 2020).

There are even fewer records of wader chicks swimming. On Google Scholar, with search terms 'wader', 'chick', and 'swim', we found reports of chicks swimming for only four wader species: African Black Oystercatcher *Haematopus moquini* (Calf 2002), American Black Oystercatcher *H. bachmani* (Morgan 1994), Eurasian Oystercatcher *H. ostralegus* (Minton 2001), and Wattled Jacana *Jacana jacana* (Bosque & Herrera 1999). In all four accounts, authors suggested that the wader chicks swam to escape danger. More often, however, even intensive studies of wader chicks fail to mention whether the chicks could swim or not (e.g., Kim 2017: 339 Long-billed Plover *Charadrius placidus* chicks; Choi 2014: 111 Little Ringed Plover *Charadrius dubius* chicks). There is very little information in the scientific literature about the age at which wader chicks first swim and why they swim.

We report swimming by Little Ringed Plover chicks in Tong Yeong, South Korea (34°51'27"N, 128°27'00"E) in May 2021. Four chicks hatched on 4 May on a small promontory (*ca.* 0.18 ha) in a lagoon artificially formed by road construction (Fig. 1). The brood and their parents were monitored for one hour each day until the chicks were old enough to fly. In order not to disturb the birds, the observer stayed in a car parked on the road 5 m from the nest. Although none of the birds were marked, we assumed that it was the same birds throughout because the nesting site was isolated by rock banks and roads (Fig. 1). One of the four chicks disappeared shortly after hatching, but the other three were observed swimming on 7, 8, and 9 May (3–5 d old; Fig. 2). The chicks took about 15 seconds to swim across tidal creeks approximately 2 m wide and 0.4 m deep. After a second chick disappeared on 13 May, the two remaining chicks were again observed swimming on 26 May (22 d old). On 28 May (24 d old), they were observed flying several meters for the first time.

Our observation confirms that Little Ringed Plover chicks are capable of swimming across small water bodies as early as three days post-hatch. It is difficult to know with certainty what drove the brood to swim but it is unlikely that it was to escape from danger as we did not detect any potential predators or other source of danger throughout our observations. Furthermore, the observers stayed inside a car, and there was no sign that our presence was alarming the birds. The first promontory, where the adults nested, was about 5 m from a road with cars and pedestrian traffic. Therefore, it is possible that the chicks swam to the second and the third promontories to move further away from the road

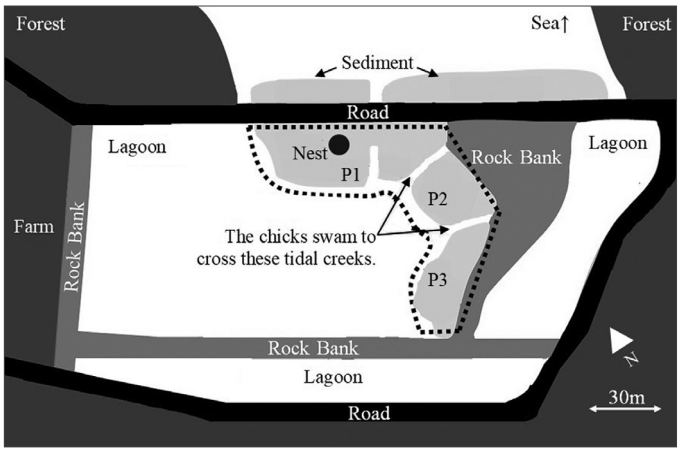

Fig. 1. Breeding area of the observed Little Ringed Plovers in Tong Yeong, South Korea (34°51'27"N, 128°27'00"E) in 2021. The breeding habitat of the plovers (area encircled with dotted line) included three promontories (P1–3).

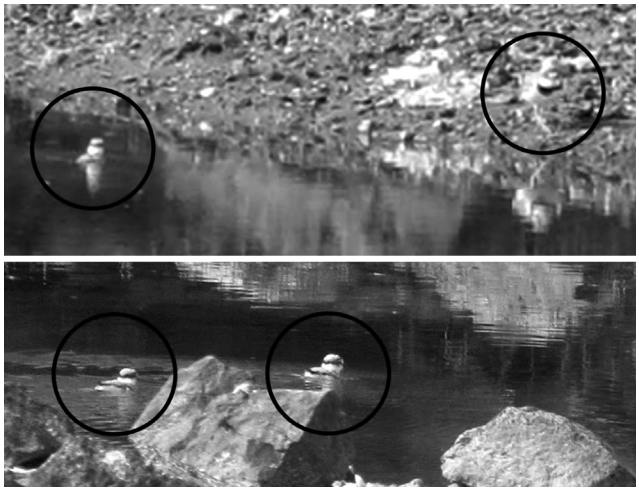

Fig. 2. Three four-day-old Little Ringed Plover chicks swimming across a tidal creek about 2 m wide on 8 May 2021 in Tong Yeong, South Korea. The female parent (top right) was waiting for the chicks to swim across, while the male parent was making 'Pi-Kuk' sounds nearby, perhaps encouraging the chicks to swim (photo: Yong-Chang Jang).

and hence from mammalian predators, which often use roads to disperse at night (Mason *et al.* 2018). Given that the first promontory, where they hatched, was only 0.18 ha with limited foraging habitat, the more likely scenario is that the brood swam to the second and third promontories (Fig. 2) in order to expand their foraging area.

We noted that the parents seemed to encourage the chicks to swim by producing a peculiar '*Pi-Kuk*' sound for about 10 seconds before the chicks began swimming. The male, identified by the darker and wider eye-ring, always accompanied the chicks whenever we observed the chicks swimming. This is noteworthy because the male was often away from the brood while the chicks were foraging or resting.

As the chicks are not fed by their parents, but feed themselves (Schekkerman 2008), securing sufficient area for foraging might be essential for their survival. Swimming may greatly expand the range of the hatched broods and can help them move to foraging habitats that are otherwise inaccessible. However, there is likely an energetic cost of swimming as well. After swimming for less than a minute, the chicks were often observed preening their feathers for about five minutes. It is known that the growth rate of precocial birds is slower than that of altricial birds because precocial young require more energy to regulate body temperature (Ricklefs 1973, Visser & Ricklefs 1993). In Semipalmated Plover *Charadrius semipalmatus*, with body size similar to Little Ringed Plover, chicks obtain homeothermy just before they achieve the peak growth rate (Visser & Ricklefs 1993). Therefore, swimming will be beneficial for precocial chicks only when the time and energy lost to preening is well compensated by the improved energy intake at a better-quality foraging site (Schekkerman & Visser 2001).

Our observation is limited to a single brood. A more systematic approach is needed to study the swimming capabilities of wader chicks and to understand its conservation implications (Davidson *et al.* 1998). Our finding that plover chicks as young as three days post-hatch can swim may bring new insights into the management of breeding habitat for waders, whose populations are declining worldwide (Hansen 2011). For example, a suggestion to build islands as nesting areas for waders (Sutherland *et al.* 2004) would be better supported by the knowledge that wader chicks swim well a few days after hatching.

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