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SHORT NOTE

Double broods and sibling helpers in the Australasian crested grebe (*Podiceps cristatus australis*)

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Lake Hayes, near Queenstown, now supports 1 of the largest populations of Australasian crested grebes (*Podiceps cristatus australis*) in New Zealand (Chance 2000). On 9 April 2000, while boating on the lake, I noticed a juvenile crested grebe close to the willows at the lake edge, between Bendemeer Bay and the outlet. To my surprise in the shadows behind the juvenile were 2 adult grebes with a tiny chick between them on the water. A closer look showed the chick had mounted the back of 1 of its parents and the other was carrying 2 other chicks. Later they were joined by a 2nd juvenile. I estimated the age of the juveniles to be about 11 weeks.

The group behaved as a family, with double, overlapping broods, and I assumed that the 2 sets of young were siblings. They were easily identified as they were isolated from other grebes, most of which were in the process of moving to the inflow-end of the lake. The group stayed together throughout the period of observation. I did not stay long as I judged that the adults had just left their nest site for good and the chicks might have been vulnerable to disturbance. The juveniles were almost certainly the young of the adults, since 1 feature of this bird's well-documented territoriality is that adults will not usually tolerate juveniles from other territories (Marchant & Higgins 1990). The late date at which I saw these chicks also suggests they were from a 2nd brood of the season: Chance (2000) records the last successful hatching date in 1997 on Lake Hayes as 22 March.

When I found the group the next morning, the male was under the willows catching fish and attempting to feed the chicks, but the fish were too large (Plate 9, p. 135). These prey were of appropriate size for juveniles, but not for the small chicks in his new brood. The opportunistic juveniles, which were already adept at catching their own food, were quick to take advantage and, while I was watching, they intercepted all the large fish that their siblings had refused. Plate 8 also illustrates O'Donnell's (1982) observation that "food was moistened with water before being given to a chick."

When I returned to the double brood on 13 April 2000. I found that only 1 chick remained (Plate 10, p. 135). I do not know the fate of the lost chicks, but they may have starved as a result of the adults presenting large fish that the chicks could not consume. Other frequent causes of death include competition for food (Cramp 1977), exposure to cold weather (Simmons 1989) and predation (O'Donnell & Fjeldså 1997). To my amazement, however, the sole surviving chick was being carried on the back of 1 of the juveniles (Plate 11, p. 135). This situation was not accidental, for on the following day, after a flurry of activity, I saw the chick transfer from a parental back onto the juvenile, allowing it to be fed by both adults. The parents treated the juvenile carrying the chick with a mixture of acceptance and hostility. It was frequently in attendance and would at times tent its wings to attract its young sibling, only to be chased off by a parent that was not prepared to share. The rivalry was sometimes quite intense.

This is not the 1st double brood I have seen on Lake Hayes. I photographed a family group in the same area on 25 January 1999, when the adults were accompanied by 1 large and 2 small juveniles. The 1st grebes that I observed on Lake Hayes, near the outlet on 11 February 1996, also included a probable double brood, although I did not recognize it as such at the time. Again there were 3 juveniles, 1 of which was much larger and already developing its double crest. As I watched, the older juvenile was repeatedly driven away by 1 of the adults. I

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initially assumed that this bird came from another territory, but several days later I realized that this explanation would not hold, when tension was eased as the 2 youngest birds went off with 1 parent and the older juvenile went with the other. Glen Newton (pers. comm.) and Jo Bishop have also recently observed double brooding and a sibling carrying a chick at Lake Pearson in Canterbury on 29 January 2000.

Both double broods and the carrying of chicks by older siblings have been noted in the Northern Hemisphere subspecies, the great crested grebe *(P. cristatus cristatus)* (Cramp 1977), but there are no published records about relations within family groups for the Australian and New Zealand populations (Marchant & Higgins 1990). Double-brooding has been recorded in many other grebe species: the congeneric red-necked grebe (*P. grisegena*), eared or black-necked grebe (*P. nigricollis*) and horned or Slavonian grebe (*P. auritus*), as well as the pied-billed grebe (*Podilymbus podiceps*), the New Zealand dabchick (*Poliocephalus rufopectus*), the little grebe (*Tachybaptus ruficollis*), and the least grebe (*T. dominicus*) (Cramp 1977, Ehrlich *et al.* 1988, Marchant & Higgins 1990). In addition to double broods, Marchant & Higgins (1990) recorded juvenile Australasian little grebes (*T. novaehollandiae*) feeding younger siblings. This sort of behaviour is puzzling because in most birds it requires production of sex hormones and the birds, therefore, must be adults.

When crested grebes colonize new and favourable waters as they have done on Lake Hayes (Chance 2000), double brooding may allow a population to build its numbers in the shortest possible time. In support of this argument is Schücking's (1976) report of a population of the nominate form, in which artificial nest-sites allowed 5 of 7 pairs to raise 2 broods in a season on an under-exploited lake in the Ruhr district of Germany.

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