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SHELTERS DECREASE GULL PREDATION ON CHICKS AT A COMMON TERN COLONY

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Abstract.—Predation by gulls on Common Tern (*Sterna hirundo*) chicks at a colony near Port Colborne, Ontario has annually resulted in reduced breeding success among late nesting terns. Small chick shelters were designed and their effectiveness at reducing larid predation rates was tested. Observations of predation on chicks were performed before and after shelters were placed next to each of 30 nests. Predation on chicks was commonly observed prior to shelter placement and declined to zero thereafter. The number of chicks that disappeared was significantly reduced after shelter placement. In view of the declining Common Tern population on the Great Lakes, efforts to minimize predation are imperative.

REFUGIOS REDUCEN LA DEPREDACIÓN DE POLLUELOS DE *STERNA HIRUNDO* POR PARTE DE GAVIOTAS (*LARUS* SPP.)

Sinopsis.—La depredación de pichones de *Sterna hirundo* por parte de gaviotas (*Larus* spp.) en una colonia cerca de Port Colborne, Ontario, ha traído como resultado un reducción en el éxito de anidamiento de individuos de *S. hirundo* que anidan tarde. Se diseñaron unos refugios para pichones para probar su efectividad en la reducción de la tasa de depredación por parte de gaviotas. Se hicieron observaciones sobre depredación antes y después de colocar refugios cercanos a 30 nidos. Previo a la introducción de los refugios, la depredación fue un fenómeno común el cual se redujo a cero con la colocación de los refugios. En vista de la reducción en números de la población de individuos de *S. hirundo* en los Grandes Lagos, los esfuerzos para minimizar la depredación de estas aves es inminente.

Numerous studies have reported avian predation at Common Tern (*Sterna hirundo*) colonies. For example, nocturnal predation of chicks by Great Horned Owls (*Bubo virginianus*; Morris and Wiggins 1984, Nisbet 1975) and Black-crowned Night-Herons (*Nycticorax nycticorax*; Collins 1970, Hunter and Morris 1976) and diurnal predation by Herring Gulls (*Larus argentatus*; Becker 1984, Hatch 1970, pers. obs.) and Ring-billed Gulls (*L. delawarensis*; Morris et al. 1991b, pers. obs.) contribute to decreased breeding success. While chick shelters are assumed to protect chicks from avian predation and heat stress (e.g., Jenks-Jay 1982), we are unaware of any experimental data on shelter success at reducing or preventing avian predation. The purpose of this study was to design a simple shelter and to test its effectiveness at reducing predation of Common Tern chicks by gulls.

METHODS

The Common Tern colony was on a concrete breakwall 1 km off the north shore of Lake Erie, near Port Colborne, Ontario (42°53′N, 79°16′W). No mammalian predators live on the breakwall and the major cause of chick mortality among late nesting terns is predation by Ring-billed and Herring Gulls (Morris et al. 1991b). We established a 4 × 16-m study

site at a location on the wall used by late nesting Common Terns. Our daily nest checks of the study site began on 17 Jun. 1990 when the first clutch was initiated in this area, and continued until early July when they were discontinued to reduce disturbance to mobile chicks. Chicken wire fencing (0.65-cm diameter mesh) was constructed around the study site on 30 Jun. 1990. Chicks were observed from a blind erected immediately in front of the site.

In an attempt to limit predation by gulls on Common Tern chicks that began shortly after chicks started hatching, we placed chick shelters immediately adjacent to each of 30 nests within the fenced area on 19 Jul. 1990, 8 d after the first chicks hatched. Shelters were constructed of rectangular pieces of plywood (approx. 12.5 × 25.0 cm) nailed together to form an "open-ended tent" with a peak about 10 cm from the ground (Fig. 1).

RESULTS AND DISCUSSION

The first clutch was initiated within the fenced area on 17 Jun. 1990. The first egg hatched on 11 July and predation on chicks was heavy during the next 8 d when most eggs had hatched. The average age of chicks still alive within the fenced area when the shelters were placed on 19 July was 3.83 ± 2.21 (SD) d (n = 13 chicks).

The timing of shelter placement (19 July) permitted calculation of pre-

FIGURE 1. A chick shelter adjacent to a Common Tern nest site. A single chick is visible beneath the shelter.

TABLE 1. Numbers of chicks seen being taken by Herring and Ring-billed Gulls during 122 h of observation.

	Present	Observed depredated	Disappeared[1]
Pre-shelter	29	10	6
Post-shelter	13	0	5

[1] Cause unknown.

and post-shelter survival rates. We accumulated 48 h of observation from the blind (over 8 d) prior to placement of the shelters, and 74 h of observation (over 12 d) thereafter. Our times of observation (0600–0900; 1700–2100 hours) coincided with periods of known maximum foraging activity by Herring Gulls at this location (Morris 1987). The distribution of chicks present within the fenced area, and the number that we observed depredated, differed before and after the placement of shelters (Table 1). Shelters significantly decreased the number of chicks seen taken by gulls ($\chi^2 = 4.72$, df = 1, $P < 0.05$); no chicks were observed predated after the shelters were in place. The number of chicks that survived from hatching to the date of shelter placement (19 July) was compared to chicks that survived to 20 d of age after placement of the shelter (Table 2). Significantly more chicks survived after placement of the shelters ($\chi^2 = 4.34$, df = 1, $P < 0.05$).

Chicks did not use the shelters immediately but most were regularly occupied within 24–48 h after placement by the nest site. Some chicks rarely left their shelter thereafter, even when their parents delivered food. Chicks were occasionally seen to run beneath the shelters when a Ring-billed or Herring Gull flew low over the colony. They also used the shelters for shade on sunny days.

On 5 Aug. 1990, we surveyed broods within the fenced area (4 × 16 m) where shelters were placed, and the much larger area (approx. 4 × 270 m) on the breakwall that comprised the remainder of the Common Tern colony at Port Colborne. Thirty chicks were counted within the fenced area (0.47 chicks per m^2), while only eight were counted elsewhere in the colony (0.007 chicks per m^2) despite the presence during the previous week of several hundred pairs attending eggs and chicks.

In view of the declining Common Tern population throughout the Great Lakes and the requirement for intensive conservation measures to

TABLE 2. Survival of late nesting Common Tern chicks before and after placement of the shelters.

	At-risk	Survived
Pre-shelter	29	13
Post-shelter	13	8

preserve the larger colonies (Morris et al. 1991a), methods to reduce predation are imperative. These shelters were simple to construct with minimal cost, can readily be stacked on top of one another for transport and storage, and will be used in future years at Port Colborne to increase fledging success of late nesting Common Terns.

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