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Short communication

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**Attraction of Little Terns to artificial breeding sites using decoys**

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In colonial bird species, it has been observed that young birds use social stimuli, such as existence of breeding individuals of the same species, as a key factor in their nest site selection (Lack 1966, Podolsky & Kress 1989, Podolsky 1990). Those habits were applied in technique to attract such colonial species to new breeding grounds (Kress 1983, Kotliar & Buger 1984, Kress & Nettleship 1988, Podolsky & Kress 1989, Podolsky 1990). In those experiments, decoys of target species were set and the species voice was played back at sites to attract breeding birds. Some efforts resulted in the successful establishment of breeding colonies.

The Little Tern *Sterna albifrons* is a colonial breeding species that prefers river banks or sea coasts with little vegetation (Kanai & Isobe 1990). In Japan, much of this species' habitat has been destroyed (Kanai & Isobe 1990, Kanai et al. 1991) and conservation of breeding habitat is important to avoid local extinction of the species.

Nature reserves are being established in Japan which contain breeding habitat of Little Terns. All of those habitats are constructed artificially on reclaimed land, and on some of them, vegetation management has been conducted to maintain low vegetation coverage. We have carried out experiments to attract Little Terns to those artificial habitats in a nature reserve. In this paper, we will present the results of our experiment.

**Methods and materials**

**Study sites**

We conducted our experiment at a bird sanctuary, the Tokyo Port Wild Bird Park, located on reclaimed land facing Tokyo Bay, south Tokyo metropolitan area, Japan. There were some breeding colonies near the sanctuary, and most of the colonies were

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Accepted 14 February 1995

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*Key words: artificial breeding site, attraction, decoy, Sterna albifrons*

naturally established at open area before buildings were constructed (Kanai et al. 1991).

The experiment was carried out at two sites in the sanctuary: a small island in a sea water pond (site A) and the top floor of an observatory covered with sand and stones (site B). Site B faces site A. The area of site A and B are 600 m<sup>2</sup> and 750 m<sup>2</sup> respectively. In both sites, vegetation was maintained at less than five percent coverage of the total area.

### Study period

We conducted the experiment from 1990 to 1994. The experiment was started every year in late April and finished in late June, during the breeding season of Little Terns at the study sites. We put out decoys from early to mid April and removed them in late June. We played back Little Tern voices from late April to mid May, which is the most important period in nest site selection of Little Terns.

### Decoys and voice

The size of decoys used for the experiment were life size and made of wood or Styrofoam. Their pose was designed to portray a bird sitting on the ground. To play back the voice of the species, we used 30 w speakers. In the first and second years, we set four to eight decoys and one speaker on site A, and six decoys and two speakers at site B. In 1992 and 1993, four decoys and two speakers were set at site A and B. We put four decoys and two speakers only at site A in 1994. We played the voice for 30 minutes every two hours from seven to seventeen o'clock in each year.

### Observations of behavior and number of terns

We recorded the responses with regard to breeding behavior of Little Terns to decoys and voice play back. The number of Little Terns which appeared near the experiment sites were recorded once a week in the morning from early April to late June. Because Black-tailed Gulls *Larus crassirostris* seem to affect the behavior or number of Little Terns, we also counted the number of Black-tailed Gulls.

### Results and discussion

Little Terns used areas near the experiment sites for feeding and resting. The number of terns which appeared near the sites varied according to the seasons and years. Maximum numbers of birds appearing at the study sites each year ranged from 12 in 1993 to 106 in 1990. The maximum number of terns were recorded in late April or early May each year.

In 1990, a few Little Terns stayed at site A for resting after the decoys were in place and voices were played back. We have also observed courtship behavior of Little Terns at or near site A since 1990. The terns made small holes for their resting or nests in 1992 and 1994 (Fig. 1).

In 1994, six pairs of Little Terns laid their eggs at site A in mid May (Fig. 2). Thus, it took five years to get a successful result in our experiment. However, all of the eggs were

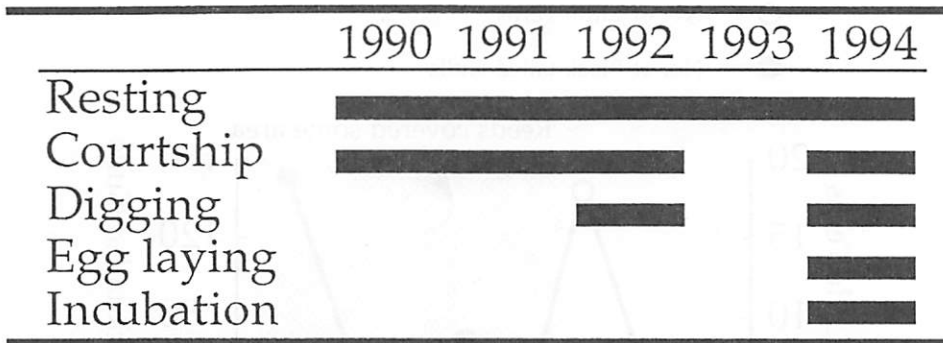


Fig. 1. Behavior observed at the experiment site in each year. Thick bar represents the duration of behavior recorded.



Fig. 2. A Little Tern that laid and incubated eggs at experiment site A in 1994.

lost probably to crows from the site by the end of May.

Although Little Terns stayed at the several different sites before we set decoys and initiated voice play back, Little Terns changed their resting area to site A after we began the experiment in 1994. From 1990 to 1992, response to decoys by Little Terns was observed during the first two weeks after we started the experiment.

In the middle of May of 1990 and 1991, reeds grew up and covered bare parts of the site A, and the terns disappeared from the site (Fig. 3). In 1991, the number of Black-tailed Gulls near the study sites increased just before the number of terns decreased (Fig. 3). We also observed Jungle Crows *Corvus macrorhynchos* attacking decoys we put at site A.

According to these results, it seems that decoys and voice play back had an important role for attraction of Little Terns in our experiment. In addition, controlling the vegetation structure and the number of gulls and crows are important for attraction of Little Terns.

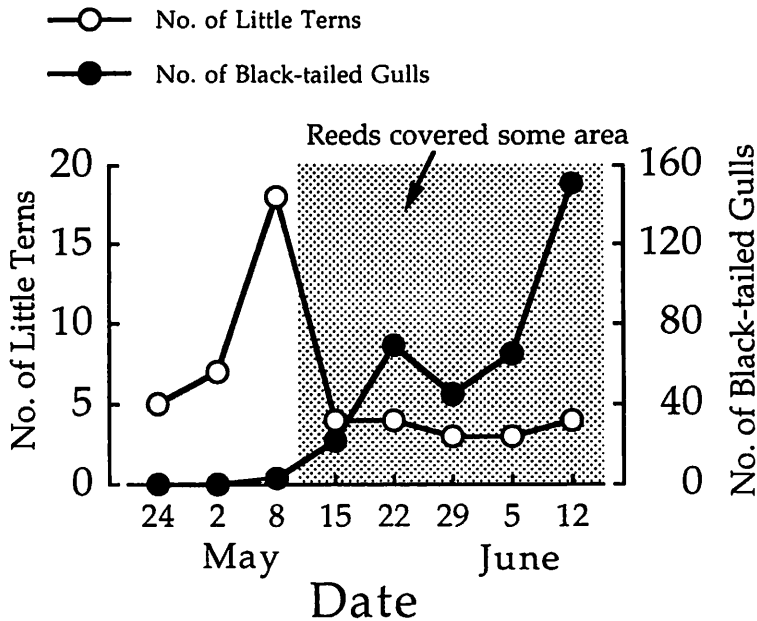


Fig. 3. Number of Little Terns and Black-tailed Gulls observed near the experiment site in 1992. Shaded area shows duration reeds covered some portion of the experiment site.

#### Acknowledgments

Decoys used in our experiments were made and donated by volunteers of the Tokyo Port Wild Bird Park and the Wild Bird Society of Japan, and designed by Takashi Akiyama. Tsuruhiko Kabaya donated the play back tape of Little Terns for our experiment. We are pleased to acknowledge the considerable assistance of Shinichi Hanawa of WWF Japan, Yutaka Kanai, Kazuji Fukui, Reiko Kurosawa and Takashi Uehara of the Wild Bird Society of Japan in our field study and Masaaki Asagi of Mokucho-kai for making decoys. We also thank for cooperation of the Tokyo Port Terminal Public Corporation and the Marine Parks Section of Bureau of Port and Harbor, Tokyo Metropolitan Government for the experiment. Part of this research was supported by the Wild Bird Research Fund of the Wild Bird Society of Japan.

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#### 人工的につくられた営巣場所へのコアシサシの誘致実験

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筆者らは、東京港野鳥公園に造成された裸地2か所に、コアシサシの模型と音声を使って同種の集団繁殖地を誘致する実験を、1990年から5年間にわたって実施した。その結果、1990年から、実験地とその周辺で求愛給餌などの繁殖行動が確認され、1992年には巣穴をほる行動が認められた。そして、1994年には、6つがいを実験地の1か所に産卵し、抱卵を行なった。その後、おそらくカラス類によってすべての卵が捕食されたが、今回の結果から、コアシサシの集団繁殖地を誘致する手段として、模型と音声を利用することの有効性が予想された。

キーワード: コアシサシ, 人工営巣場所, 模型, 誘致実験