

Some Aspects of the Nesting Ecology of Least Terns
on the Mississippi Gulf Coast

Jerome A. Jackson
Department of Zoology
Mississippi State University
Mississippi State, Mississippi 39762

Least Terns (*Sterna albifrons*) have been known to breed on the Mississippi Gulf islands and on the mainland beaches for many years (Gandy and Turcotte 1970, Jackson 1973, Toups 1976). Only recently, however, has the species received much attention. During 1976 I had the opportunity to briefly study a Least Tern nesting area on the beach at Gulfport. In this paper I will discuss (1) nesting habitat of these birds, (2) the timing of nesting, (3) variation in the eggs and chicks, (4) chick mortality and threats to the mainland colonies, and (5) management needed to assure the future of Least Tern nesting colonies on the Mississippi coast.

Nesting Habitat

Through the efforts of Judy Toups and others, the Harrison County board of supervisors has given official protection to the Least Tern colony along the beach at Gulfport. The beach was approximately 50 yards wide at the colony I visited and was separated from the city of Gulfport by the very busy four-lane, U.S. 90 (Fig. 1). Between the highway and the beach is a low concrete wall which no doubt helps to prevent erosion of the beach

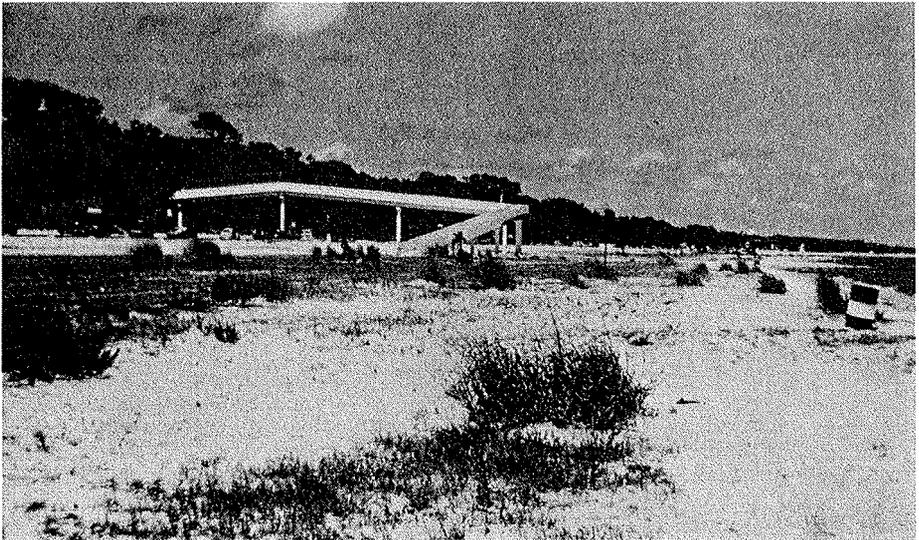


Figure 1. Most Least Tern nests on the beach at Gulfport were located in the sparse vegetation in the center and to the left of this photograph.

and drifting of sand across the highway, but which also, and very importantly, keeps Least Tern chicks away from the highway. Judy Toups and the Gulf Coast Audubon Society had carefully marked Least Tern nests in the colony earlier in the season. From their markers it was obvious that most nests were in a strand approximately 15 yards from the normal high water, 15 yards from the highway, and about 300 yards long. This area was also where vegetation was most prevalent, though at best it was sparse. The dominant vegetation was sandspur (Cenchrus sp.).

Most nests were little more than shallow depressions in the sand (Fig. 2), but a few, perhaps 10%, included obviously collected and deliberately placed bits of shell (Fig. 3).



Figure 2. A typical Least Tern nest consisting of only a shallow depression in a sparsely vegetated area. This nest was being frequently visited by adult terns as can be seen by the tracks in the sand. The sand around abandoned nests was usually smooth, having been "cleaned" of tracks by the wind.

Timing of Nesting

In 1972 I recorded the earliest Gulf coast breeding record for the Least Tern on 7 May (Jackson 1973). Other records indicate that the species commonly begins nesting here in May (Gandy and Turcotte 1970).

The peak of the nesting season seems to have been in June in 1976. When I visited the Gulfport colony on 26-27 June there were several hundred recently fledged Least Terns present on the beaches, a few incubating adults, and hundreds of chicks. Judy Toups, Richard Rummel, Wayne Weber, and I examined nests and banded chicks for 5 hours along the Gulfport Beach. Of 190 nests found with eggs, 101 had only a single egg, 87 contained 2 eggs, and 2 contained 3 eggs. It was evident that egg-laying was still in progress, though many of the nests with one egg had been abandoned.

I arbitrarily placed each chick into one of five size classes (see Figs 3-7). Chicks in size class 0 were newly hatched and still in the nest. Chicks in class 1 were downy, showed no signs of developing primaries, and had left the nest. On the basis of Hardy's (1957) descriptions, I estimate



Figure 3. Newly hatched Least Tern chicks (my size class 0). The parents of these chicks lined their nest with bits of shell. These chicks illustrate the two color phases I observed in downy young.

that chicks in my size class 1 ranged in age from 2 to 5 days. Chicks in size class 2 had primary quills emerging and were well into their post-natal molt. I estimate their ages to have ranged from about 6 to 9 days. Class 3 included chicks whose wing feathers were approximately 1/3 to 1/2 grown and whose age probably ranged from about 10 to 13 days. Chicks in size class 4 were near adult size and difficult to catch, but were incapable of flight. These chicks still showed some down and probably ranged from about 14 to 17 days old. Chicks in class 5 were nearly fully feathered and were capable of short but not sustained flight. These probably ranged from 18-21 days old. Assignment of chicks to these size classes was solely by their appearance. Except for newly hatched chicks, none were of known age.

Of 273 chicks found, 72 were in size class 0, 65 in class 1, 38 in class 2, 39 in class 3, 52 in class 4, and 7 in class 5. Although we found nests and young representing most stages of the breeding cycle on 26 June, there did appear to be some degree of nesting synchrony within subsections of the colony. More eggs and newly hatched young were present on a portion of the beach where the vegetation was barely emergent, whereas older young were more frequently found where the vegetation was more developed. There did not appear to be any differences in the spacing or relative numbers of nests in the two areas.



Figure 4. Two chicks found together that characterize those I placed in size class 2. These I estimate were about 8 days old. Note the plumage variation.

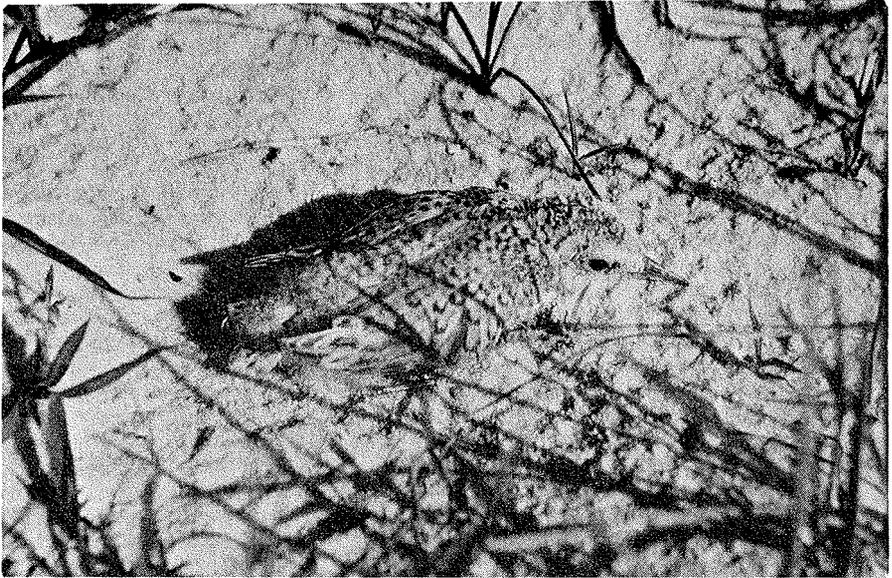


Figure 5. A chick well into its post-natal molt (size class 3).



Figure 6. A well-feathered chick, still showing some down and incapable of flight (size class 4).

On 7 August I again visited the Gulfport colony, this time with my wife Nancy, and Bob and Kathy Esher. We found and banded 6 Least Tern chicks, all in an area with only scattered emergent vegetation. This area was at the west end of the colony and had been primarily bare sand on 26 June. The areas of our previous work were now ragged with weeds, though by no means overgrown. Of the chicks captured, one was in size class 1, two in class 2, one in class 3, and two in class 4. While there were still a few eggs in nest scrapes on the beach, I could find no nests that looked active. The remaining eggs were likely infertile or otherwise abandoned. Scores of recently fledged young were present in groups near the water edge.

Assuming that the youngest chick banded on 7 August was 2 days old (which was my estimate at the time I found it), and that if successful it would fledge at the age of 20 days, the nesting season at the Gulfport colony would have lasted until about 25 August. Thus, breeding activities at the Mississippi coastal Least Tern colonies may span nearly four months from the laying of the first eggs to fledging of the last young. Within this time period it might be possible for some birds to raise two broods, but no data are available to evaluate this possibility. It seems more likely that the late nesters were birds that renested after having lost their first eggs or young.

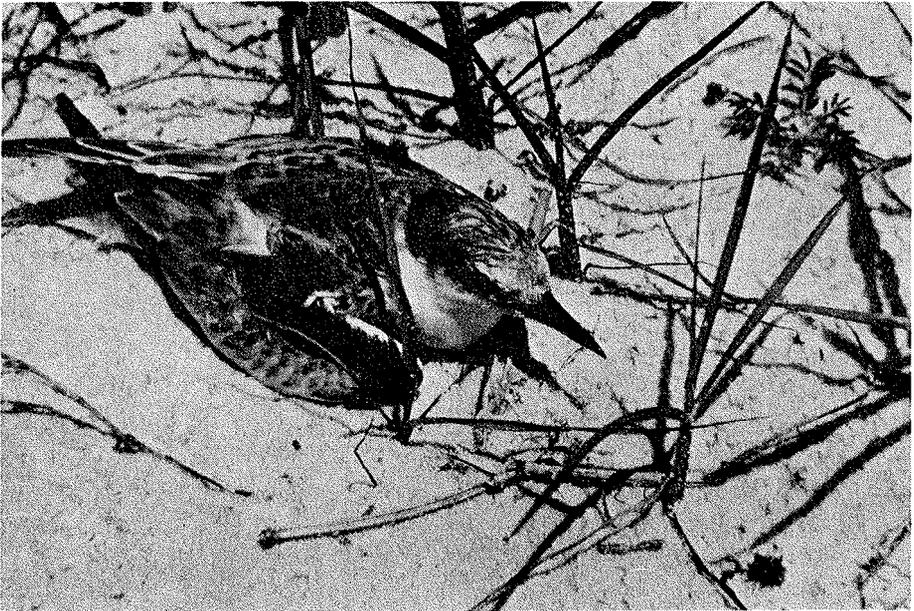


Figure 7. A Least Tern chick that was capable of short, but not sustained flight (size class 5).

Variation in the Eggs and Chicks of Mississippi Least Terns

In the course of studying the Least Tern colony at Gulfport, I noticed that the color and markings on eggs varied among and within clutches. I did not quantify this variation, but eggs varied from a plain pale tan to slightly darker with light to dark brown spots scattered over the surface.

Chicks also varied in color. I was not aware of the variation when we began our banding efforts, but as I became aware of the variation I began recording the frequency of occurrence of each variant type. In the end I recorded three basic leg colors: flesh, yellow, and orange; three patterns of marking on the top of the head: plain, spotted, and streaked; and two basic colors of down covering the upper surface of young chicks: tan and white (see Fig. 3). As noted for Royal Terns (*Thalasseus maximus*) by Buckley and Buckley (1970), Least Tern chicks in juvenal plumage were also quite variable. The frequency of occurrence of color variation in Least Tern chicks at Gulfport is summarized in Table 1. Sample sizes for body color variation are small because I did not begin recording this characteristic until very late. Nevertheless, both white and tan birds were common among downy chicks and the difference between the two down colors was quite distinct (Fig. 3). Whatever their down color, most downy chicks had flesh-colored legs and spotted heads. Yellow and orange legs were more prevalent among older chicks than they were among downy chicks.

Table 1. Frequency of leg, head, and down color variation in Least Tern chicks at Gulfport, Mississippi, 26 June 1976.

	Age class	Number of chicks per age class					
		0	1	2	3	4	5
Leg color:							
Flesh		55	54	18	11	23	2
Yellow		3	9	12	14	17	3
Orange		0	0	4	4	3	0
Head markings:							
Plain		14	15	7	10*	37**	4
Spotted		43	46	27	21	7	1
Streaked		1	6	1	1	0	0
Down color:							
Tan		15	5	3	-	-	-
White		5	8	0	-	-	-

* Transitional between natal and juvenal plumage. ** Juvenal plumage.

The color patterns that Buckley and Buckley (1970) found in Royal Terns were more variable than those I observed in Least Terns. They felt that the major adaptive value of the variation had to do with thermoregulation and with recognition of chicks by their parents. Tomkins (1959) noted variation in the eggs and chicks of Least Terns in Georgia, but he made only brief

mention of it and did not comment on the possible adaptive value of the variation. I feel that, in addition to helping with thermoregulation and possibly with recognition of chicks by their parents, that this variability provides the species with protective coloration in the open and changing environment in which it nests. For example, the chicks with darker down were precisely the color of wet sand at Gulfport, whereas the lighter chicks were the color of dry sand. Further, some parts of the nesting area had more shells and plant debris mixed with the sand and the spotted chicks blended into this background better than they did against uniformly colored sand. Conversely, the uniformly colored chicks were more obvious against the varied background. It would be interesting to compare down color of chicks with nesting substrate color over a large portion of the species geographic range.

Chick Mortality and Threats to the Colonies

On 26 June we found only 18 dead Least Tern chicks in the Gulfport colony. Of these, one newly hatched chick had been crushed by a human intruder, two older chicks had been eaten by what was probably a mammalian predator (feathers and pieces of wing with feathers attached were the only remains), and the other 15 chicks had died of unknown causes. Domestic cats and dogs are common in Gulfport, but their threat to the tern colonies is probably minimized by the highway which conveniently separates the city from the beach and probably selects very strongly against those which dare to cross to the beach. An elevated walkway (Fig. 1) which was just constructed across the highway to the middle of the tern colony may increase the threat from cats and dogs as well as increasing human disturbance to the colony. I must note with admiration that the citizens of Gulfport seem to have a strong protective attitude toward their Least Tern colonies. Every 15 to 20 minutes of the five hours we worked in the colony someone would shout from one of the speeding cars on the highway for us to "Get the hell away from the birds!"

Soon after we began working with the terns we became aware of a problem which may prove to be serious. Twenty-one of the chicks we handled had been injured by sandspurs. These spine-covered seeds punctured the webbing between toes, injured wings, and were found at various other places on chicks (Fig. 8). In every case the chick was bleeding, hampered in its movements, and apparently unable to remove the sandspur. Some chicks had more than one sandspur and most had several puncture wounds from the seeds. In managing the beaches, the county board of supervisors frequently rakes the sand with heavy equipment to remove (and bury?) debris and to prevent growth of unwanted vegetation. The areas set aside for the terns are treated in this way outside of the nesting season, but during the nesting season the vegetation is allowed to grow. As a result, at the end of each season the sandspurs are mechanically "planted" only to come back in profusion during the next breeding season.

Management for the Least Tern on the Mississippi Coast

The Least Tern is characteristically a species which nests in very open areas. Soots and Parnell (1975) found that Least Tern colonies in North Carolina averaged only 2.5% vegetation cover - less than any of nine other



Figure 8. A Least Tern chick with sandspurs imbedded in its right wing and left leg.

colonial nesting seabirds. They also found that Least Terns preferred nesting sites with large amounts of shell mixed with the sand. Maintenance of the beach in an early successional stage (little vegetation) is very important to the continued existence of the Gulfport Least Tern colonies. At the same time, some vegetation seems to be important. Older chicks always tried to find shade from vegetation or debris in which to escape the heat of the sun. I feel that use of areas with emergent vegetation for nest sites is an important behavioral adaptation of the species. Such areas generally guarantee some cover for the chicks shortly after hatching. It might be a good turn if the sandspurs could be controlled and some species of similar growth form cultivated in its place. However, the situation may not be so simple. The loss of a small percentage of tern chicks to sandspur injuries may be worthwhile if the sandspurs also deter predators (and bare-footed humans) from entering the area. The problem with sandspurs needs close attention before action is taken. If action is taken, the effects of the action on the birds should be closely monitored.

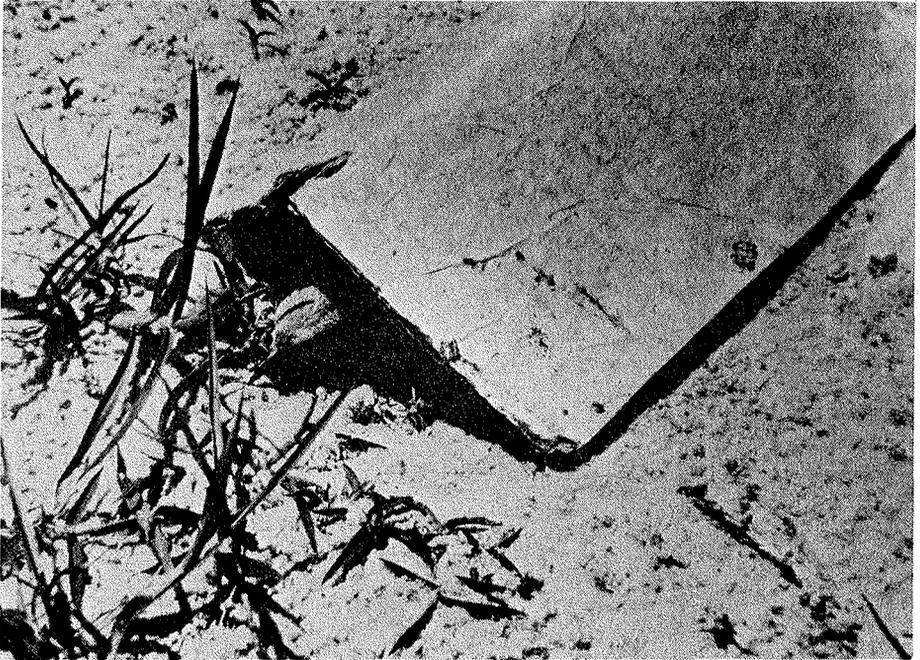


Figure 9. An older Least Tern chick took advantage of the "tent" formed by this piece of cardboard. Any shade provided by plants, driftwood, trash, or trash barrels was used by the birds.

The colony sites might be improved if bits of shell are mixed with the sand in the area and if small boards or something similar (drain tiles?) are placed in the area to provide shelter for chicks (Fig. 9). Neither of these suggestions seems really necessary to the species continued use of the area. Continued management of the vegetation, however, is probably very important.

Finally, it must be remembered that a place to nest is only one of the requirements of a species. An adequate food supply and a healthy environment in many other respects are also needed. The fact that Least Terns are nesting on our beaches is a good sign. Let's keep our Gulf clean and healthy so that they and we can thrive.

Acknowledgments

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and Kathy Esher for helping to collect the data presented here. We all owe a special thanks to the Gulf Coast Audubon Society and the Harrison County Board of Supervisors for the foresight in setting aside the nesting areas for the Least Terns.

Literature Cited

- Buckley, P. A. and F. G. Buckley. 1970. Color variation in the soft parts and down of Royal Tern chicks. *Auk* 87:1-13.
- Gandy, B. E. and W. H. Turcotte. 1970. Catalog of Mississippi bird records. State Wildlife Museum, Jackson, Ms.
- Hardy, J. W. 1957. The Least Tern in the Mississippi valley. *Publ. Mus. Mich. State Univ. Biol. Ser.* 1(1):1-60.
- Jackson, J. A. 1973. An observation of a Least Tern laying an egg. *Mississippi Kite* 3:4-5.
- Soots, R. F., Jr. and J. F. Parnell. 1975. Ecological succession of breeding birds in relation to plant succession on dredge islands in North Carolina estuaries. *Univ. North Carolina Sea Grant Publ.*, UNC-SG-75-27.
- Tomkins, I. R. 1959. Life history notes on the Least Tern. *Wilson Bull.* 71:313-322.
- Toups, J. 1976. A brief history of efforts to protect the Least Tern on the Mississippi coast. *Mississippi Kite* 6:22-24.

Avocets in Sharkey County

William H. Turcotte
Route 7, Box 257
Jackson, Mississippi 39209

A flock of 19 American Avocets (*Recurvirostra americana*) was observed October 20, 1976 on a catfish pond near Blanton, Mississippi, Sharkey County, by Robert G. Lilly, John T. Kerr and Henry Bobbs, Jr. This sighting was described by John T. Kerr after the party observing them confirmed identification by the contrasting black and white on the wings and back and the upturned bill. The birds were observed carefully at fairly close range while on the ground and in flight. They returned to the pond after being flushed and making short flights. On the following day the birds had left the area.