

sent to persons reporting "Wigeon" to clarify those identifications. Failure to include a female Pintail in this choice may have produced some error. No attempt was made to verify the identity of the Wood Ducks (*Aix sponsa*) or to identify any of the unknowns. Sex identification of 39 ducks gave a 1:1 sex ratio overall.

The species involved often are found together in the flooded rice and soybean fields of eastern Arkansas in winter. Dave Donaldson (pers. comm.) noted that there was much surface water in the fields at that time and suggested that the mixture of species probably reflects the composition of ducks which were feeding in the fields. Thus, the mixed flock may have been caught up in the rapidly moving storm as they tried to move ahead of it out of the fields. The other possibility is that a locally migrating flock happened to move into the storm path. There was no major migration occurring on that day (Dave Donaldson, pers. comm.).

Garner Allen of *The Daily Leader* expedited the printing of the survey form and encouraged responses through the paper's columns. I thank the 28 persons who took time to respond, including some who kindly answered requests for clarification. Dave Donaldson, Waterfowl Biologist, Arkansas Game and Fish Commission, also provided useful information. E. G. Bolen, D. F. Bray, J. R. Karr, J. K. Rosenberger, and Aileen and R. W. Rust made suggestions on the manuscript. Mr. and Mrs. Ray Roth, my parents, called my attention to the event, provided a first-hand report, and aided me in other ways. This is Miscellaneous Paper No. 709 of the Delaware Agricultural Experiment Station and Publication No. 434 of the Department of Entomology and Applied Ecology, University of Delaware.—ROLAND R. ROTH, *Dept. of Entomology and Applied Ecology, Univ. of Delaware, Newark 19711. Accepted 25 July 1975.*

Feeding rhythm in nestling White Ibis.—Daily rhythms are important homeostatic mechanisms in most animal species (Kleitman, *Physiol. Rev.* 29:1-30, 1949; Bunning, *The Physiological Clock*, Springer-Verlag, N. Y., 1973). Diel feeding rhythms exist in most species. Hunting techniques, food availability, and exposure to predation interact to produce an adaptive complex of feeding and hunting patterns. Young, cared for by adults, must have a daily feeding pattern adjusted to the adult's foraging regime. It is not so obvious whether the diurnal feeding patterns of nestlings are merely the result of the pattern of adult attentiveness or are instinctive on the part of the young and can continue without the mediating influence of parental care. Here I present the results of an experiment which shows the existence of an inherent feeding rhythm in nestling White Ibis (*Eudocimus albus*) removed from parental care at hatching.

Nestlings were removed from nests in Broward and Highland counties, Florida as pipped eggs and maintained at 30°C. Each hour they were fed as much as they would eat of a ground mixture of shrimp, sardines, water, and vitamin supplement. The feeding rhythm of 30 captive nestlings was measured over a total of 150 bird-days as the percentage of the daily ration consumed each hour. Data on wild birds were collected during 5 min periods at hourly intervals. The feeding rhythm of 50 wild nestlings was measured as the percentage of the total number of feedings observed. Nest attentiveness by male and female White Ibis was measured as the percent of the total number of adults on nests. All data were collected for chicks less than 3 weeks old. Data were combined into 3-hour blocks starting at 0300.

In the wild, adult White Ibis, the sexes of which are distinguishable in the field, differed in their patterns of nest attentiveness. Males were present most of the day and females most of the night (Fig. 1a). There were 2 exchanges of nest duties, one in the morning and one in the evening. Wild nestlings showed a bimodal pattern of feeding

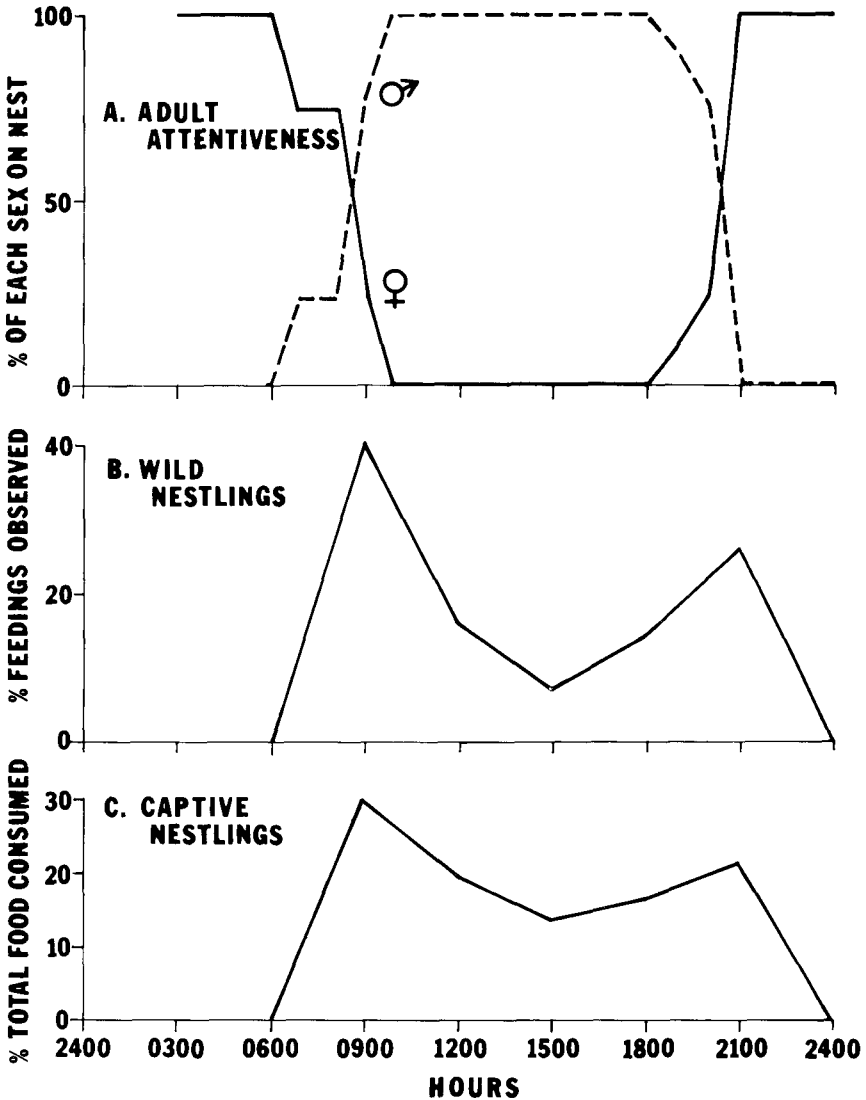


FIG. 1. Diurnal pattern of White Ibis feeding activity: (a) nest attentiveness by male and female White Ibis, (b) feeding pattern of wild nestlings, (c) feeding pattern of captive nestlings.

activity corresponding to the periods after nest exchange when one parent had just returned from the feeding ground (Fig. 1b). Little feeding of young nestlings occurred in the middle of the afternoon; no feeding occurred between 2400 and 0600. Nestlings in captivity showed a bimodal daily feeding rhythm with peaks at 0900 and 2100 hours cor-

responding to the peaks of feeding activity by wild nestlings (Fig. 1c). Thus the pattern seen in wild nestlings depends not only on adult foraging, but also on an independent nesting rhythm that persists after their removal from the proximal stimulus of adult attentiveness. The feeding pattern of nestlings is therefore governed by the coadaptation of nesting physiology and adult behavior relative to the ecological pressures that determine foraging patterns of the adult. I thank O. T. Owre for support, M. S. Kushlan for assistance, and J. L. Dusi and D. F. Werschkul for comments.—JAMES A. KUSHLAN, *Dept. of Biology, Univ. of Miami, Coral Gables, FL 33124* (Present address: *U.S. National Park Service, Everglades National Park, Homestead, FL 33030*). Accepted 24 Sept. 1975.

Observations of Swainson's Hawk nesting in northeastern Illinois.—We checked 18 large nests in northern Kane County, Illinois, for incubating raptors during early May 1973. Of the 11 active nests, 6 were of Red-tailed Hawk (*Buteo jamaicensis*), a common nester here. The other 5 were of Swainson's Hawk (*Buteo swainsoni*). These 5 nests were within 85 km of downtown Chicago between latitudes 41°58'N and 42°08'N and longitudes 88°21'E and 88°30'E. Several Swainson's Hawks had been sighted prior to these nesting discoveries, and it is our opinion that additional nests were likely present and could have been located, time permitting. The small sample size available suggests the density of nesting Swainson's approached that of the Red-tail.

Two of the 5 nests did not produce young. Desertion is known to occur frequently with the Swainson's Hawk (Bent, U.S. Natl. Mus. Bull. 167:224, 1937). One nest was deserted prior to egg laying—probably due to nearby farming operations which began after nest site selection. At the approximate time of desertion of the second nest, a dead adult female was found at the base of the nest tree. The cause of death was unknown (fluoroscopy indicated it had not been shot). The bird had a large brood patch, but the exact stage of incubation could not be determined. A deer mouse (*Peromyscus leucopus*) was in the mouth of the dead hawk.

The remaining 3 nests fledged 5 young. Two were hatched in each nest, but one nestling disappeared at approximately 2½ weeks of age. The estimated dates of hatching were from 12 June to 26 June.

Behavior of the adult pair was markedly different from that of Red-tails and made detection of the nesting pair difficult without close observation. The incubating bird remained motionless and nearly unnoticeable on the nest. Only once was a bird flushed from the incubating position—that occurred when one investigator had climbed ½ the distance up the nest tree. Incubating Red-tails, in comparison, readily left their nests when we approached. The non-incubating member of the pair was seen near the nest site only twice during incubation. On both occasions our approach resulted in the immediate departure of the bird.

After hatching occurred, the female became defensive of the nest site and would soar overhead and scream at our approach. Once, a bird folded its wings and stooped toward us at a 45° angle with legs extended downward. The bird pulled out of the dive when approximately 15 m from us. Red-tails also stooped, but never with wings folded tight to the body or legs extended.

To determine if the birds had returned the following year, we checked the 5 nest sites during the 1974 nesting season. One nest was missing, 1 contained 2 young Great-horned Owls (*Bubo virginianus*), 1 was being defended by a pair of adult Red-tails, and the remaining 2 nests were occupied by incubating Swainson's Hawks. Great-horned Owls and Red-tailed Hawks are earlier nesters than the Swainson's (Bent, U.S. Natl. Mus. Bull. 167: