

- LOMHOLT, J. P. 1976. The development of the oxygen permeability of the avian egg shell and its membranes during incubation. *J. Exp. Zool.* 198: 177-184.
- LYNN, W. G., & T. VON BRAND. 1945. Studies on the oxygen consumption and water metabolism of turtle embryos. *Biol. Bull.* 88: 112-125.
- RAHN, H., C. V. PAGANELLI, I. C. T. NISBET, & G. C. WHITTOW. 1976. Regulation of incubation water loss in eggs of seven species of terns. *Physiol. Zool.* 49: 245-259.
- SIMKISS, K. 1967. Calcium in reproductive physiology. New York, Reinhold Publishing.
- SMITH, A. H. 1973. Avian physiology. Pp. 19-22 in 25 years of high-altitude research White Mountain Research Station (R. H. Kellogg, A. H. Smith, & P. S. Timiras, Eds.). Berkeley, Univ. California.
- SOKAL, R. R., & F. J. ROHLF. 1969. Biometry. San Francisco, W. H. Freeman & Co.
- TAIGEN, T. L., G. C. PACKARD, P. R. SOTHERLAND, & L. R. HANKA. 1978. Influence of solute concentration in albumen on water loss from avian eggs. *Auk* 95: 422-424.
- WANGENSTEEN, O. D., H. RAHN, R. R. BURTON, & A. H. SMITH. 1974. Respiratory gas exchange of high altitude adapted chick embryos. *Respir. Physiol.* 21: 61-70.
- WHITE, F. N., & J. L. KINNEY. 1974. Avian incubation. *Science* 186: 107-115.

Received 14 February 1978, accepted 19 May 1978.

Food-storing by Yellow-bellied Sapsuckers

RICHARD N. CONNER

Wildlife Habitat and Silviculture Lab., Southern Forest Experiment Station, Box 7600 SFA Station,
Nacogdoches, Texas 75962 USA

AND

JAMES C. KROLL

School of Forestry, Stephen F. Austin State University,
Nacogdoches, Texas 75962 USA

On four occasions during November and December in Nacogdoches, Texas we observed eastern Yellow-bellied Sapsuckers (*Sphyrapicus varius*) storing food. On 24 November 1977, an immature bird stored a whole pecan (*Carya illinoensis*) nut in a crevice of a dead pecan branch stub about 10 m above the ground. The sapsucker placed the nut in the crevice and pecked on it to wedge it into place. The bird had previously examined three other dead branch stubs and apparently found them unsuitable. While searching for a storage site with the pecan in its bill, the sapsucker repeatedly uttered its meow-like call.

On 8 December 1976, an adult male sapsucker removed a pecan from its covering, flew 15 m to a utility pole and wedged the pecan in a crevice 10 m above the ground near the top. He repeated the process three times.

On 13 December 1976, a juvenile male sapsucker fed on a southern magnolia (*Magnolia grandiflora*) fruit and then stored several 14 m above the ground in a crevice of an American elm (*Ulmus americana*). The next day the same bird stored red oak (*Quercus falcata*) acorns in the same elm tree. We did not observe sapsuckers preparing sites for food storage nor returning to feed on any of the stores.

Food storing has been reported in only six other North American picids, five of which are melanerpine (*Melanerpes erythrocephalus*: Kilham 1958, *Wilson Bull.* 70: 107-113; *Melanerpes carolinus*: Kilham 1963, *Wilson Bull.* 75: 227-234; *Melanerpes lewis*: Bock 1970, *Univ. Calif. Publ. Zool.* Vol. 92; *Melanerpes formicivorus*: MacRoberts 1970, *Condor* 72: 196-204; *Melanerpes aurifrons*: Martin and Kroll 1975, *Wilson Bull.* 87: 553). Alderson (1890, *Oologist* 7: 147) reported a Hairy Woodpecker (*Picoides villosus*) storing insects in an unused nest cavity. We believe this to be the first report of food storing by Yellow-bellied Sapsuckers, and it is of special interest because the genus *Sphyrapicus* belongs to the melanerpine assemblage of woodpeckers (Short and Morony 1970, *Condor* 72: 310-315).

We thank C. Bock and L. Kilham for excellent comments on the manuscript.

Received 3 March 1978, accepted 23 May 1978.