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FOOD STORAGE BY ACORN WOODPECKERS AT THE SANTA ROSA PLATEAU PRESERVE, SANTA ANA MOUNTAINS, CALIFORNIA

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The Acorn Woodpecker (*Melanerpes formicivorus*) is well known for its habit of storing food, especially acorns, in "granaries" (e.g., Ritter 1938, Bent 1940, MacRoberts and MacRoberts 1976, Koenig and Mumme 1987). However, the food items stored and storage sites used may be expected to vary geographically, depending on the availability of food items and potential storage sites. This note reports on food items stored and storage sites used by Acorn Woodpeckers at the Santa Rosa Plateau Preserve, Riverside County, California.

The Santa Rosa Plateau Preserve was established by the Nature Conservancy in 1984 to protect vernal pools on three lava-capped mesas of the Santa Rosa Plateau, a distinct topographic unit of rolling hills covered with grassland, oak woodland, and chaparral located at the southeastern end of the Santa Ana Mountains (Lathrop and Thorne 1978, 1985). Two species of oaks, the Engelmann oak (*Quercus engelmannii*) and coast live oak (*Q. agrifolia*), dominate the preserve's oak woodland community (Lathrop and Zuill 1984, Lathrop and Wong 1986). The Acorn Woodpecker is a conspicuous resident of these woodlands, occurring in small family groups.

In November 1984, on 27 March 1985, and on 22 August 1991, we searched for acorns, presumably stored by Acorn Woodpeckers, in porphyritic basalt boulders in or near oak woodland scattered along an approximately 0.5-km ridge at the edge of Mesa de Colorado. On 23 March 1990, we inventoried food items stored by Acorn Woodpeckers in wooden fence posts, a rock wall, and granitic boulders at Rancho Santa Rosa, where the surrounding trees included introduced blue gum (*Eucalyptus globulus*), pecan (*Carya illinoensis*), olive (*Olea europaea*), and fan palm (*Washingtonia filifera*) in addition to the native oaks. On 22 August 1991, we searched for additional food items stored in granitic boulders 100 m west of the wooden fence posts. During other visits we estimated the proportion of *Q. engelmannii* and *Q. agrifolia* acorns stored in Acorn Woodpecker granaries in native oak woodland 1 km or more from the Rancho Santa Rosa site.

In November 1984, Baker found approximately 20 small acorns stored in numerous holes (0.3–1 cm wide and 5–10 cm deep) on approximately 1 m² of the surface of a boulder of porphyritic basalt (Figure 1) along a ridge of Mesa de Colorado. On 27 March 1985, only three acorns remained inside the boulder, and none was present on 22 August 1991. Several nearby boulders possessed holes suitable for the storage of acorns, but only one more acorn was found on 27 March 1985. The acorns were all from *Q. agrifolia*. They were tightly inserted with the cap end out,

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the usual method of storage by Acorn Woodpeckers (MacRoberts and MacRoberts 1976). T. Griggs (pers. comm.) photographed acorns in the same boulder in early 1984; a color slide is on file at the headquarters of the Santa Rosa Plateau Preserve (G. Bell pers. comm.).

On 23 March 1990, we found that 66.6% of the food items stored by Acorn Woodpeckers in holes drilled into wooden fence posts at Rancho Santa Ana consisted of acorns (apparently 100% from *Q. agrifolia*), while 26.1% were pecans and 7.3% were olives ($n = 2,474$ items sampled; Figure 2). Four pecans were wedged into the ends of a metal pipe on top of a gate. Along a 65-m section of a rock wall roughly 1 m tall and 0.5 m wide (beside the fence posts), we found 117 acorns of *Q. agrifolia* tightly inserted into cracks or holes between basaltic rocks or on rock surfaces; no pecans or olives were found. We also found five *Q. agrifolia* acorns wedged into cracks in three granitic boulders within 25 m of the rock wall. Most of the acorns stored in rock crevices were tightly inserted with the cap end out, indicating that they were stored by Acorn Woodpeckers. Small numbers of *Q. agrifolia* acorns were also stored in the wooden sides of a barn, in the trunks of several large fan palms at the ranch, and between the wooden window frames and plaster wall of an old building. *Eucalyptus globulus* seeds and *Q. agrifolia* acorns



Figure 1. Porphyritic basalt boulder where acorns were found in small holes during 1984 and 1985 but not when photographed in 1991.

Photo by Floyd E. Hayes

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were found loose in the larger crevices along the rock wall, but because they were not tightly wedged in, we believe they were deposited by rodents rather than woodpeckers. On 22 August 1991, we found 30 *Q. agrifolia* acorns wedged into narrow cracks on six granitic boulders 100 m west of the fence posts; one overhanging vertical crack contained 14 acorns (Figure 3).

In other Acorn Woodpecker granaries in oak woodland away from Rancho Santa Rosa (> 1 km), we found that 90–95% of the acorns were from *Q. agrifolia* and only 5–10% were from *Q. engelmannii*. Obtaining exact percentages was difficult because the acorns were present in large quantities and usually had to be pulled out to be identified. The acorns were stored in the trunks and lower limbs of dead or live oaks of both species. No pecans or olives were found.

Acorn Woodpeckers usually store acorns in trunks and large branches of trees, but other locations such as telephone poles, fence posts, eaves of buildings, pine cones, and clay roof tiles also suffice (MacRoberts and MacRoberts 1976, Jehl 1979). This appears to be the first report of Acorn Woodpeckers storing acorns in rocks and metal objects. Crevices of almost any size or shape may be sufficient to release storage behavior in Acorn Woodpeckers, especially if storage space is limited (Jehl 1979, Koenig and Mumme 1987). Our finding acorns in the basaltic boulder irregularly suggests that acorns are more likely to be stored in rocks during years with surplus acorn crops.

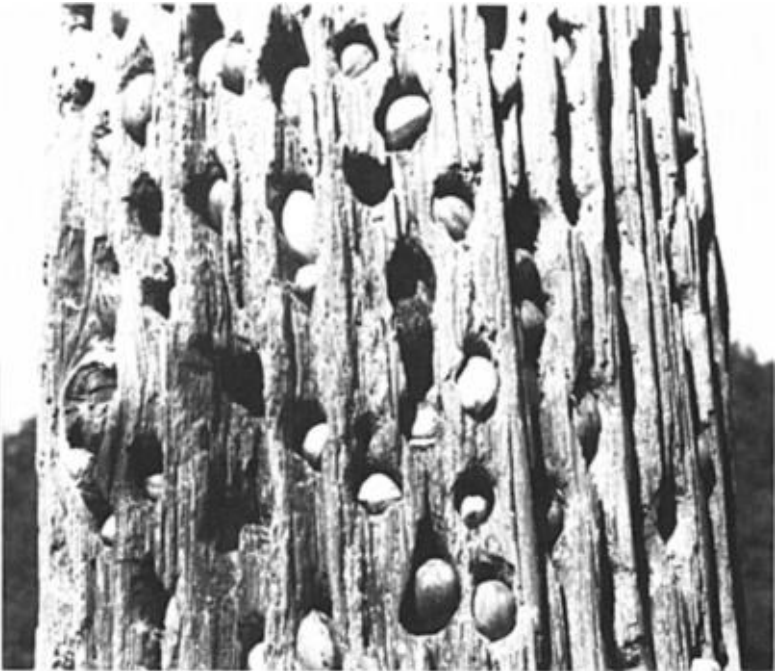


Figure 2. Pecans and a single olive (center) stored in holes drilled into a fence post.

Photo by Earl W. Lathrop

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Bent (1940:216) reported the storage of pecans by Acorn Woodpeckers. However, there appear to be no previous reports of olives in the diet of Acorn Woodpeckers. The olive trees at Rancho Santa Rosa have since been cut down. Acorn Woodpeckers feed on a variety of plant and animal food items in addition to acorns (Ritter 1938, Bent 1940, MacRoberts and MacRoberts 1976, Koenig and Mumme 1987). Our observations suggest that they readily exploit novel items of food, such as pecans and olives, when available.

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Figure 3. Overhanging vertical crack in a granitic boulder (left) and closeup (right) showing acorns.

Photo by Floyd E. Hayes

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LITERATURE CITED

- Bent, A. C. 1940. Life histories of North American woodpeckers. U. S. Natl. Mus. Bull. 174:1-334.
- Jehl, J. R., Jr. 1979. Pine cones as granaries for Acorn Woodpeckers. W. Birds 10:219-220.
- Koenig, W. D., and R. L. Mumme. 1987. Population ecology of the cooperatively breeding Acorn Woodpecker. Princeton Univ. Press, Princeton, N. J.
- Lathrop, E. W., and Thorne, R. F. 1978. A flora of the Santa Ana Mountains, California. Aliso 9:197-278.
- Lathrop, E. W., and Thorne, R. F. 1985. A new preserve on the Santa Rosa Plateau. Fremontia 13(1):15-19.
- Lathrop, E. W., and Wong, B. 1986. Stand characteristics of southern oak woodland on the Santa Rosa Plateau, southern California. Crossosoma 12(4):1-7.
- Lathrop, E. W., and Zuill, H. A. 1984. Southern oak woodlands of the Santa Rosa Plateau, Riverside County, California. Aliso 10:603-611.
- MacRoberts, M. H., and MacRoberts, B. R. 1976. Social organization and behavior of the Acorn Woodpecker in central coastal California. Ornithol. Monogr. 21:1-115.
- Ritter, W. E. 1938. The California Woodpecker and I. Univ. of Calif. Press, Berkeley.

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Acorn Woodpecker

Photo by Peter La Tourrette