

PINE CONES AS GRANARIES FOR ACORN WOODPECKERS

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Acorn Woodpeckers (*Melanerpes formicivorus*) are well known for storing acorns in communal storehouses or "granaries," which are usually in the trunk and main branches of a large tree. Other locations are sometimes used (e.g., fence posts, eaves of buildings), including sites from which the eventual retrieval of acorns is impossible (hollow trees, through open windows of cabins; Ritter, Condor 23:1-14, 1921; Henshaw, Condor 23:109-118, 1921; MacRoberts and MacRoberts, Ornithol. Monogr. 21, 1976). Under certain conditions holes or crevices of almost any size or shape may be sufficient to "release" storage behavior (Ritter, Scientific Monthly 31:253-257, 1930; Gignoux, Condor 23:118-121, 1972). This note reports acorn storage in pine cones. The location is particularly inappropriate because 1) the acorns are not retrievable, and 2) the storage site itself is of an impermanent and transitory nature.

In early January 1976 Jack Reveal informed me that several Coulter Pine (*Pinus coulteri*) cones found on the ground near a campground at Warner Hot Springs (elev. 1460 m), San Diego County, California, contained acorns. Because that area receives much human use, it seemed possible that this might have resulted from play of children. On 28 January we visited the area and inspected approximately 400 fallen cones in the area where the cones had been obtained. Only one contained acorns (7). It was found under a large isolated pine that stood near the middle of a meadow. The adjacent hillsides were composed of a mixed pine-oak assemblage, which included oaks of several species. Binocular inspection of attached cones—all well beyond the reach of humans—revealed no acorns, but this was not surprising given the fact that only upward-facing (and therefore unviewable) interstices might contain nuts.

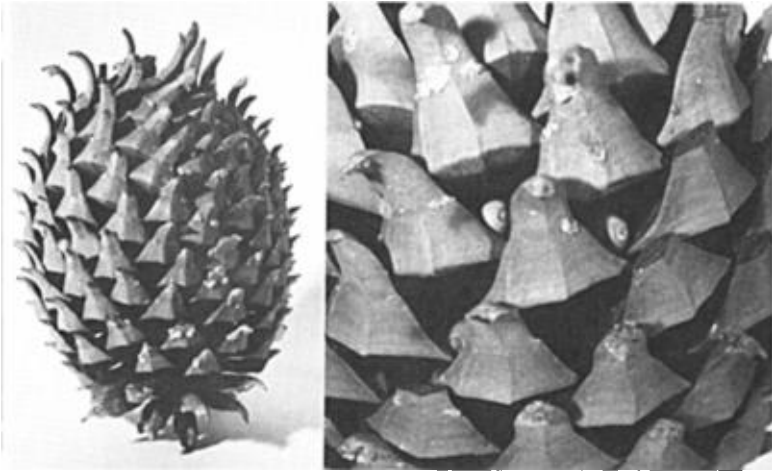


Figure 1. Cone of Coulter Pine (*Pinus coulteri*) used for acorn storage. On the right, two acorns (positioned for this photograph) can be seen between the scales.

NOTES

With great inefficiency, revelry and diligence, we were eventually able to lasso four cones by standing on the roof of a truck. Three of these contained approximately 50, 60 and 100 acorns (Figure 1); the exact number could not be determined because some were lost as the cones crashed to the ground. All were of Coast Live Oaks (*Quercus agrifolia*). The caps had been removed; some had slight scratches or pitting on one end, presumably made by a woodpecker's bill. None showed evidence of having been pounded into place. The triangular openings between the scales were large (base, 10-25 mm; height, 10-15 mm; depth, ca. 40 mm), of more than sufficient size to accept an acorn with no additional work. Indeed, several large holes contained as many as four acorns.

The depth of the openings, which was effectively increased by the recurved spines on each scale, was such that most of the acorns were beyond the depth at which a woodpecker could probe. By using forceps of several sizes, I tried to extract the acorns. Failing completely, I obtained a pair of heavy scissors (15 cm blades), opened the tips slightly, and pounded repeatedly on the cone. I succeeded in making a few small dents but did not dislodge or loosen a scale. These experiments convinced me that most of the acorns could have been retrieved by a bird or mammal only after the cone had fallen or been destroyed.

On a subsequent trip in mid-March, S.I. Bond and I established that the area was inhabited by a single group of 5-6 woodpeckers. They concentrated their activities near an apparent nest cavity in a snag atop a large Coast Live Oak near the edge of the meadow. They were not particularly active, occasionally flycatching and sometimes flying to the adjacent hillsides and returning with acorns. The granary was in a snag atop a similar oak approximately 100 m from the "nest" tree. The Coulter Pine was approximately 60 m from each of these trees and formed the apex of a roughly equilateral triangle. In several hours, we never saw woodpeckers approach or land in the pine or show any interest in fallen cones, although Bond saw one bird extract an acorn from the granary and carry it to a nearby oak, where it was apparently stored. Observations under the granary revealed that several slabs of bark and large branches that had been used for storage had recently rotted and fallen to earth. W. Koenig (Ph.D. thesis, Univ. Calif., Berkeley, 1978) reported that granaries are used traditionally and are not easily replaced, thus forming a limited resource for the woodpecker. I suspect that the sudden shortage of suitable storage areas may have caused the birds to seek elsewhere in the immediate vicinity and to use the preformed holes in the cones. In years when acorn crops are large, the woodpeckers use sub-optimal sites when the main storage areas are replete (W. Koenig pers. comm.).

It should be noted that the cones of Coulter Pines are exceptionally large, often exceeding 30 cm in length, and are the only ones that could accommodate acorns. W. Koenig has pointed out that the ranges of the pine and woodpecker overlap broadly. And since the cones may remain on the tree for a year or so after the scales open widely, it is conceivable that some acorns could be recovered. Thus, what seems to represent an interesting but biologically unimportant event may have broader significance than we can presently imagine. Perhaps it will be worthwhile to examine the interior of pine cones more closely. But, in my experience, it has been a little difficult to explain that you are "just looking for acorns."

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