

# Letters

Dear Editor:

The recent articles on oak regeneration in *California Agriculture* (49[5]:5-21) do not make me optimistic about the long-term health of the oak woodland ecosystem, especially for blue (*Quercus douglasii*) and valley (*Quercus lobata*) oaks.

There is a general consensus among scientists, resource managers, and conservation groups that California's blue and valley oaks are regenerating poorly throughout large parts of the state. Research demonstrates that acorns are being produced, but seedlings suffer high mortality rates for a variety of abiotic and biotic reasons. These articles indicate that oak seedlings can survive with the assistance of deer and rabbit-proof exclosures, chemical weed control, drip irrigation, and above and below ground screens to exclude pocket gophers, ground squirrels, and grasshoppers. Although these technologies might be economical and practical along road right-of-ways, in parks and home-steads, and at environmental mitigation sites, it is difficult to imagine that California's 7.6 mil-

lion acres of oak woodlands, mostly on private lands, can ever be hand-planted, screened, watered, and weeded!

This does not discount the usefulness of research using these techniques, but it does indicate that additional research is necessary to develop cost-effective and low-input technologies for reestablishing oaks on lands where natural regeneration is not occurring. My suspicion is that more research needs to be conducted on the enhanced survival of naturally planted acorns, whether these are planted by gravity or scrub jays. Otherwise, as California's blue and valley oaks age and die, this important habitat type will continue to dwindle and become fragmented. If this happens, the hundreds of terrestrial vertebrate species in California that use these oak woodlands will be impacted to an unknown, but negative, degree.

Robert H. Schmidt  
Utah State University

*Author's response:*

Dr. Schmidt makes some very important comments about the need to demonstrate cost-effective oak restoration techniques. It is important, however, to clarify a few points made about the status of regeneration on hardwood rangelands. The Integrated Hardwood Range Management Program (IHRMP) has funded 20 studies on various aspects of oak regeneration, early on perceived to be the gravest threat to sustainability of oak woodlands. This research has resulted in a better understanding of the ecological processes of natural regeneration.

It has also demonstrated that there is a high probability of achieving stump sprouting in most hardwood rangeland oak species, which reduces concerns arising from the lack of sapling trees. Practical techniques for artificial regeneration have been developed and oak seedlings are now widely available commercially. These techniques are being applied mostly as mitigation efforts where the high costs can be justified financially. IHRMP research has shown that blue oak stands managed extensively for

livestock production in wide areas of the state have been quite stable over the last 40 to 60 years in the absence of land use changes. Pollen analysis of cores taken on hardwood rangelands suggests that current oak density on hardwood rangelands may be higher than at any time over the last several thousand years, possibly due to fire exclusion.

These results have reduced the initial concerns over perceived poor regeneration. It is now recognized, however, that fairly stable oak woodlands at the stand level do not ensure sustainable ecosystem processes. Fragmentation of habitats due to land use change, mainly to urban and suburban uses, is the major impact on woodlands, and is receiving major emphasis in research, education, and policy studies of the IHRMP. Hopefully this clarifies the status of oak regeneration in the state, and provides context for the status of hardwood rangelands in California.

Richard B. Standiford  
Program Manager, IHRMP



Blue oak meadow near Glennville in Kern County.

James Bartolome