

# EDITOR'S CHOICE

*Rangeland Ecology and Management, Volume 71, Issue 3*

## **Relationships Between Cattle and Biodiversity in a Multi-use Landscape Revealed by the Kenya Long-Term Exclosure Experiment (KLEE)**

Truman P. Young, Lauren M. Porensky, Corinna Riginos, Kari E. Veblen, Wilfred O. Odadi, Duncan M. Kimuyu, Grace K. Charles, and Hillary S. Young

The recipients of the Editor's Choice award from issue 72, volume 3 of *Rangeland Ecology and Management* features a spectacular group of world-renowned scientists working at a Long-term Exclosure Experiment in Kenya (KLEE). Since 1995, these researchers have been manipulating the combinations of cattle and wild ungulates, such as elephants and giraffes, with various other management techniques, including controlled burns, in a series of replicated 10-acre plots. In this exceptional paper, the authors summarize 22 years of experimental conclusions within a synthesis of current literature to provide insights into the fragile relationship between cattle, wild ungulates, and biodiversity in savanna-dominated ecosystems in Africa. Because of rapid loss of wildlife habitat combined with high demand for livestock production, the need for strategies that conserve ecosystem function, maintain biodiversity, and support large mammal coexistence is substantial. It is clear that livestock-wildlife coexistence is problematic when cattle are improperly managed. The influence of cattle and wildlife on one another and on critical ecosystem properties and processes when cattle are moderately stocked and well-managed is unclear. This information is essential to developing range management strategies that can achieve multiple habitat use objectives, while fostering sustainable ecosystems.

In summary, the authors' experiments confirm that cattle usually compete with wild ungulates and wild ungulates usually compete with cattle, and cattle initiate a series of changes throughout the food chain in this savanna community. However, at moderate cattle densities, livestock production and wildlife conservation are not incompatible. The researchers have identified multiple mitigating factors between cattle and other large herbivores that increase the windows of opportunity for coexistence. They state that even mutual profitability can occur where grazing management minimizes competitive effects among mammals. One example is providing protein supplementation during dry periods when nutritious forbs are scarce.

Although cattle are not the exact ecological equivalent of wild herbivores, it appears that cattle may essentially be surrogates for the diverse mixture of wildlife species they suppress, a result consistent with the surprising finding that cattle suppress habitat use of browsers at least as much as grazers, with caveats of course. They state that their findings raise the prospect that wildlife conservation and economic development through livestock production at moderate densities both can be achievable in these savanna rangelands. Based on a review and analysis of global datasets, the researchers indicate this may also be the case in many other ecosystems around the world. One of the most fundamental conclusions of their research is that at moderate densities, cattle production in Africa is compatible with the conservation of (and even sustainable use of) considerable biodiversity.

Lastly, the authors know a few ecosystems in east Africa exist where this difficult and tenuous balance between livestock and wildlife is still being maintained, like Ngorongoro in Tanzania and Laikipia in Kenya, although the future of these is by no means secure. To the extent that they survive, the authors believe those areas have the potential to become the touchstone "reference communities" for potential refaunation (rewilding) efforts of future generations, which both history and their research show could include both livestock and the spectacular wildlife diversity that awed the outside world over a century ago.

Much of this text is taken directly from the article appearing in *Rangeland Ecology & Management* 71(3):281–291 (May 2018), and the authors are credited with the entire contribution. Please consider reading the entire paper; it is well worth the time.



Figure. Elephants and cattle sharing a watering point in Laikipia, Kenya. The relationships between livestock and wildlife are complex, and not universally negative.

Roger Sheley  
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