Interactions of Aoudad & Bighorn Sheep

Trans-Pecos Region of Texas

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Aoudad, or barbary sheep, were first released into the wild in California in 1924. Since then, the species has shown remarkable ability to adapt to local habitat conditions with populations now existing in California, New Mexico and Texas. Due to their apparent ease of adaptability there is considerable concern for serious ecological competition with endemic fauna and modification of local flora.

Anecdotal evidence suggests that abundant resources, low competition and low predation have resulted in high fecundity, reproductive rate, recruitment and survival of aoudad. In portions of the Chihuahuan Desert, aoudad populations have grown quickly and spread into new environs. The effect of aoudad on native Chihuahuan Desert flora is yet unknown, and its influence as a competitor with native ungulates such as desert bighorn sheep and mule deer has only been scientifically documented in limited situations.

Historically, desert bighorn sheep (DBS) occupied 15-16 mountain ranges in the Trans-Pecos region of Texas, but by the mid 1960s they had been extirpated from their native range. Due to decades of work by Texas Parks and Wildlife Department and various other state agencies, bighorn sheep are slowly re-inhabiting their historic mountain ranges.

Reports from agency staff, biologists, hunters and landowners suggest that the reestablishment of desert bighorn is potentially most threatened by the distribution and population increase of aoudad. Few studies have been conducted to assess the interactions of bighorn and aoudad, and thus great need exists to provide quantitative evidence documenting the interactions between these species.

Over the years, much speculation has been directed at the interactions of aoudad and desert bighorn sheep. Advocates

Aoudad & Bighorn Activity
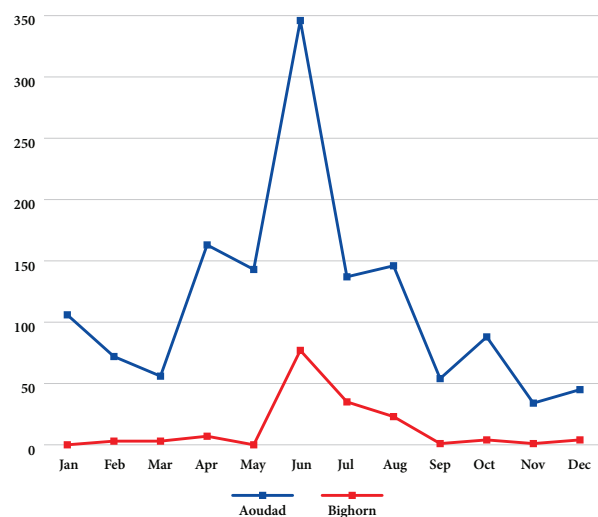
Monthly camera trap recordings of aoudad and desert bighorn sheep recorded from March 2014 to December 2015.

of desert bighorn sheep claim the sheep outcompete aoudad in native ranges thereby causing a decline in populations. Conversely, proponents of aoudad support the notion that these species utilize clearly defined niches, and that no competition exists between the animals.
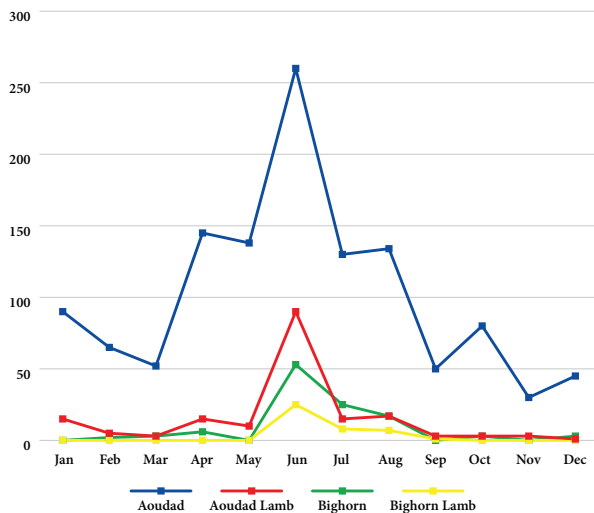
Most of the current information regarding interactions between these species is speculative. Concerns were highlighted at the recent Desert Bighorn Council Meeting held in April 2015 at Borrego Springs Resort, Ca. Various state wildlife agencies,

Bighorn & Aoudad Activity (Lambs apart)

Estimated lambing seasons of aoudad and desert bighorn sheep from March 2014 to December 2015.

biologists and managers looked to Texas to provide answers regarding aoudad/bighorn interactions. Unfortunately very little, if any, scientific evidence exists examining direct competitive interactions between aoudad and DBS. As a result, the Borderlands Research Institute (BRI) at Sul Ross State University in partnership with TPWD initiated a research project aimed at determining the level of interaction between these two species.

MOVEMENTS AND SURVIVAL

In September 2015, BRI captured and collared 12 aoudads (10 female, 2 male) via a net-gun fired from a helicopter. Aoudads were captured from the Sierra Vieja Mountain Range in far West Texas and fitted with very high frequency global positioning system (VHF/GPS) collars.

These collars were to remain on the aoudad for two years and then automatically released from the sheep. The collars will record the location of the individual every four hours. This location data is only available once the collars have been retrieved, therefore the aoudad are located weekly using the VHF signals emitted from the collars. Additionally, any mortalities can be detected via the collars "mortality mode" (80 beeps/minute [bpm] instead of 40 bpm) which is activated when the collar is stationary for eight or more hours.

Currently, aoudads appear to be incredibly hardy creatures, and we have not recorded a single mortality in the collared individuals. At the time of collaring aoudad, 24 desert bighorn sheep retained VHF/GPS collars deployed as part of a companion study. Survival rates of the sheep averaged approximately 73 percent on the study site. The information gleaned from both the aoudad and bighorn sheep should allow us to compare movements, home range use, survival and the level of competition (if any) experienced between the two species.

DIET COMPETITION

To determine if bighorn sheep and aoudads are competing for dietary resources, we have collected fecal pellets from both species. Fecal pellets will be analyzed using a technique known as micro histological fecal analyses. This method is preferred over other methods since the animal does not have to be harvested to determine the diet.

Once we have all of this data, we will then use a niche overlap index. This index quantifies the forage in the diets of both aoudad and bighorn and gives a metric of the level of dietary overlap between these species. For example, we may find the level of overlap may be as high as 100 percent or as little as 0 percent.

Since we suspect these species use different habitats at certain times of the year, fecal material will be collected and analyzed in each of the seasons: spring (March-May), summer (June-August), fall (September-November) and winter (December- February). Thus far, we have collected a total of 34 samples—19 from aoudad and 15 from desert bighorn sheep.

ARTIFICIAL WATER UTILIZATION

The final component to this study was the use of water by these species. Water is particularly important to large mammals in arid landscapes, and a great deal of effort has been spent in providing artificial water sources to bighorn sheep in the mountains of West Texas. We hope to address if competition exists at these watering points between aoudad and bighorn sheep. Trail cameras were placed at nine artificial water sources found on Capote and Escondido Mountains within the Sierra Vieja Range. Cameras were mounted on camera stands or T-posts and attached 60 centimeters above the ground and set to be active 24 hr/day. Cameras are set to a two-picture burst to increase probability of identifying an animal and have a five-minute delay after each burst.

Each camera records the date and time of all photos taken. Cameras are being checked every two weeks and photographs analyzed for each monitored water site. Camera trapping was initiated in March 2014 with the initial intention of monitoring bighorn sheep. It soon became evident that aoudad were utilizing artificial watering sources with great frequency, particularly during the warm months. Aoudad sightings have occurred with greater frequency than bighorn sheep with up to 10 times the number of camera pictures recording aoudad use.

Interesting findings from the camera traps were the timings of lamb sightings. Although the peak in lambing period seem to be correlated between aoudads and bighorn sheep, aoudads appear to have a much longer, protracted lambing season compared to desert bighorn sheep. Aoudads appear to begin lambing in April, with the season lasting through August. Bighorn sheep appear to have a shorter lambing season with the first lambs being recorded on camera traps in June, and the last lambs being recorded in August. Aoudads may be lambing for five months of the year, while bighorn sheep are lambing for three months.