

Coues' Deer: Research

Development of Genetic Markers to Identify Coues', Carmen Mountain, and Other Whitetails

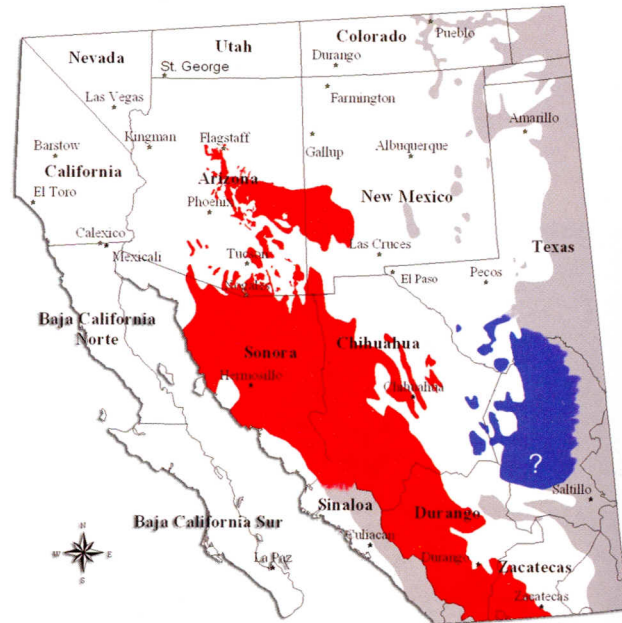
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The Coues' Collaboration

As part of a larger, multi-faceted deer genetic project, Dr. David Paetkau and Renee Prive of Wildlife Genetics International (WGI) were funded, in part by the Pope & Young Club, to develop a genetic test that would allow us to determine if a deer was a Coues' whitetail (red on map) or not ("other" whitetail in gray on map). During the research we realized that this was an excellent opportunity to add some Carmen Mountains whitetail (blue on map) samples and take a look at that enigmatic deer as well.

No one really thought this could be done because subspecies are poorly delineated and closely related. However, when we distributed the call for proposals, WGI sent a proposal containing a preliminary analysis of Coues' and non-Coues' whitetail they had in their freezer and it looked like they had a high potential to be successful.

With Coues' samples collected by Roy Lopez for his graduate research, some from Jim Heffelfinger, and a lot more from Mexico collected by Dr. Carlos Alcalá-Galvan, and also some Carmen Mountain whitetail samples from collaborators in Texas, we were able to apply the latest genetic analysis techniques to this topic.



Plan of Attack

The project was a four-phase process:

- 1) In addition to the initial group of genetic markers, analyze 9 additional microsatellite markers on deer DNA already in the freezer, that have existing data from 12 genetic markers, which will give a group of samples run with 21 genetic markers;
- 2) Analyze the 21 markers and select 8–10 markers that did the best job of differentiating Coues' from other types of white-tailed deer;
- 3) Use the 8–10 selected markers to analyze all additional samples from geographic areas that were not covered by archived samples;
- 4) repeat the computer analysis and summarize the results in a final report.

Not only were we able to add Carmen Mountain whitetail samples, but we also obtained samples from many different Mexican whitetail subspecies from Dr. Randy DeYoung at Texas A&M University – Kingsville. These additional samples were thought to be from these species and subspecies: *Odocoileus virginianus miquihuanensis*, *O. v. mexicanus*, *O. v. sinaloae*, *O. v. veraecrucis*, *O. v. carminis*, *O. v. texanus*, *O. v. couesi*, and *O. hemionus* (mule deer). Using the new 8-marker data, we repeated the computer analysis and found that the separation of Carmen from Coues' was not perfect – there was some overlap. This was not the primary purpose of the study, but we were so close, we decided to see if we could find a way to separate these 2 types of Southwestern whitetails.

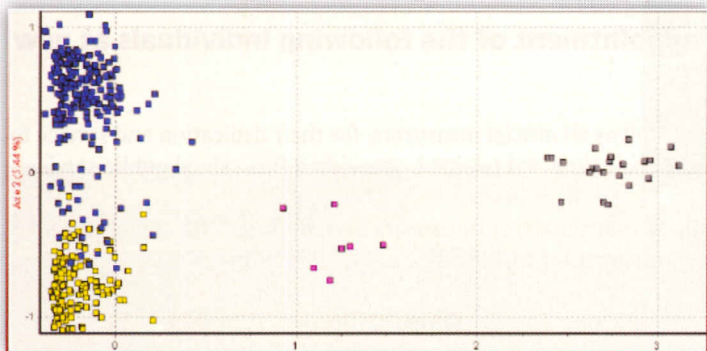
Separating Species and Subspecies

To refine the Coues'-Carmen separation, WGI returned to phase 2 (marker selection) and added markers to a total of 16. By working with all 16 markers and more sophisticated analytical techniques, we achieved acceptable separation of Carmen and Coues' whitetails, satisfying our objective of developing a test to separate Coues' deer from other types of deer north of the Tropic of Cancer (as you go deeper into Mexico all these subspecies combine and blend together and are called different subspecies).

Also, as a bonus, some mule deer samples were included in this group of genetic markers and they separate out from whitetail very well. A few known hybrids plot directly between clusters of mule deer and whitetail. This was not the purpose of this re-

search, but it is clear that this is a very easy way to also diagnose F1 hybrids.

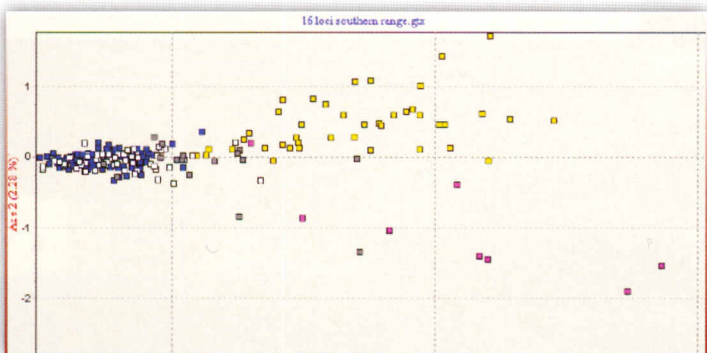
Clustering of 8-locus genotypes from Coues' deer (yellow), other WTD (blue), mule deer (grey) and mule deer x WTD hybrids (pink).



Coues' vs. Carmens

Excluding mule deer and other U.S. whitetails allows us to look more closely at the differences between Carmen Mountain and Coues' whitetails.

Using all 16 markers shows the difference in: US Coues' whitetails (blue), Mexican Coues' (white), Carmen (yellow), other Mexico whitetails that live farther to the south (pink and grey). When using all 16 markers, WGI is able to fully separate Coues' (blue and white above) from Carmen (yellow) whitetails. The lack of a big gap between the two reflects the similarity of these groups, and thus the difficulty of this task.



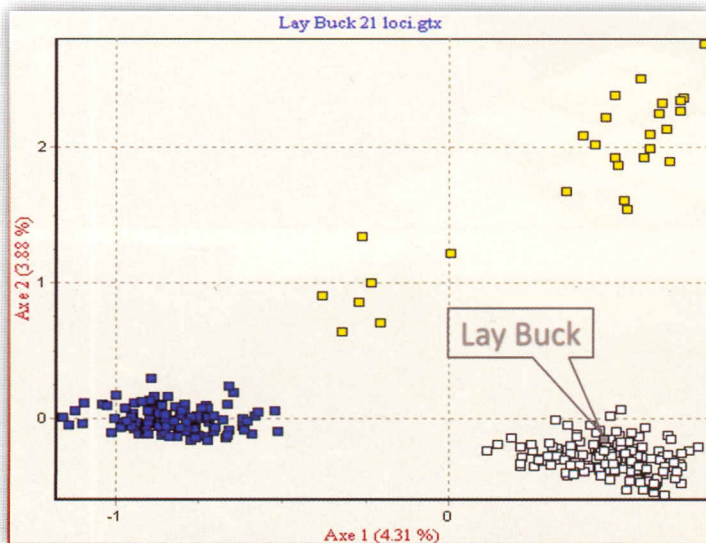
Putting it to use

An example of the usefulness of this analysis came when we tested the "Lay Buck". Buck Buckner (Boone & Crockett Club VP of Records) became aware of a white-tailed deer skull plate and antlers that was reported to be a Coues' whitetail. The shape of the antlers



showed many similarities to characteristics typically seen in Coues. This buck, however, scored 145-5/8 Boone and Crockett points, which would make him the new world record, surpassing the current 144-1/8" buck. Two samples of bone material were carefully removed with a slow-turning drill bit and placed in a sterile container. These samples were sent to WGI and included in the analysis. This test showed clearly this buck is not a Coues' whitetail.

Clustering of Coues' whitetails (blue) and non-Coues' whitetails (white) and the results of the analysis placing the Lay Buck (gray) near the middle of the white squares. The yellow squares are mule deer with the 7 yellow squares in the center being hybrids. It is obvious that the Lay buck is not a Coues' whitetail.



Researching 'til the Coues' Come Home

The various parts of this overall research project have taken a long time to develop and come to fruition for a variety of reasons, but our efforts are now yielding results and we are putting them into practice to help keep trophy records programs accurate. Scientific papers don't help records committees very much, so we are starting to distill the most important results into practical guidelines and directives that will apply what we learned to real-world rules and protocols. This will include who will do testing of questionable deer and how much that will cost. We already have a sampling protocol developed and in use. All these materials will be published, discussed, and disseminated to organizations and wildlife enthusiasts as we close the book on this exciting research effort. None of this would be possible without the support of organizations like the Pope & Young Club and its members. Thank you for your support of wildlife conservation and our hunting heritage!!!