7th Annual
West Texas Deer Study Group

This year's theme:

Managing Genetics in Deer: Questions, Quibbles, and Quandaries

ABSTRACTS

May 20-21, 2004
Y O Ranch Resort & Conference Center, Kerrville

FOREWARD

The West Texas Deer Study Group was conceived on a gray, somber day back in October, 1997. Greg Simons, Ruben Cantu, Steve Nelle, and I were returning from Donnie Harmel's funeral. Somewhere along US 83 between Junction and Menard, the idea of hosting an annual meeting on deer management was mentioned. We didn't deliberate long about whether to run with the idea, and we agreed it would be (at least to us) a dedication to Harmel's career. Harmel was a veteran of some thirty years with the Texas Parks and Wildlife Department. He is best remembered as the manager of the Kerr Wildlife Management Area.

That afternoon we laid some ground rules for all subsequent meetings of the Study Group. Those included (1) each would feature time for plant identification, which we agreed was typically the weakest link among deer aficionados; (2) to address controversial issues in a "point-counterpoint" setting; and (3) to rotate meetings annually among what we marked off as our geographic sphere of influence (West Texas), i.e., west of Interstate 35 and north of U.S. 90.

Our first meeting was in 1998 and held in San Angelo. We then moved to Albany in 1999, to Ft. Stockton in 2000, Uvalde in 2001, Clarendon in 2002, and Brownwood in 2003. This year's meeting, in Kerrville, brings us full-circle.

The issue of spike bucks and the efficacy of culling various segments of the buck herd is probably the most contentious issue in deer management (at least in Texas). As one biologist noted at a recent meeting "it's the most controversial and least important issue in deer management."

Almost 500 "cervidophiles" met in College Station in January, 1999 at a symposium featuring deer genetics. Through two days of presentations, the art and science of culling was dissected. Some left there mad; most (including me) left confused. Many of our principles of deer management were held up for close inspection (e.g., aging deer by molar wear and replacement), and the inspections revealed cracks in the mortar.

So here we are again . . . debating whether .06 deer management should be administered in the name of herd improvement, and if so, when and where. But I sense the urge for more understanding and a bit less scent-marking at this symposium than the one in 1999. I cannot claim that confusion won't be served ad libitum (I will make my contribution), but I also sense some resolve to "be kind to colleagues, ruthless to theories." As Aldo Leopold said "in such great things, the important thing is not to achieve, but to strive."

And so we do.

Dale Rollins
20 May 2004

A BRIEF HISTORY OF KERR WMA DEER PEN RESEARCH

Donnie Frels, Texas Parks and Wildlife Department, Kerr Wildlife Management Area, Hunt TX 78024

Bill Armstrong, Texas Parks and Wildlife Department, Kerr Wildlife Management Area, Hunt, TX 78024

In 1974, a high-fenced research facility was constructed on the Kerr Wildlife Management Area, Hunt, Texas, to study antler growth in white-tailed deer. This 16-acre facility consists of 6 2/3-acre breeding pens, 3 4-acre rearing pens and a series of alleys, chutes, crush and rotunda to facilitate handling of research animals. The original breeding pens consisted of 7 brood bucks (of which 6 were spikes) and 5-7 does per pen. All deer were native Texas white-tails obtained from various locations throughout the State. No additional deer were added after the fall of 1974 and the herd has been maintained as a closed, pedigreed herd. The original purpose of the pens was to address the following objectives:

1. To determine factors which contribute to antler formation in white-tailed deer.
2. To determine the effect of nutrition level on antler formation and body weight.
3. To determine if deer that were spike-antlered at 1.5 years of age have the same potential for antler development and body weight in later years as deer which were fork-antlered at 1.5 years of age.
4. To determine the influence of genetics on antler characteristics.

Since 1974, this facility has been used in a series of inter-related research programs to determine the role of nutrition and/or genetics in the antler development process. Although related, each project had its own research design and specific objectives. Due to large the sample sizes and duration of the projects, TPWD has acquired a data set unequaled throughout the world. A total of 2,681 deer have been born in the pens with 474 dams and 138 sires actually utilized in various studies resulting in 2,219 sets of antlers for analysis. As a result of these studies, several basic principles have been conclusively proven: 1) Antler development is genetically based and environmentally influenced. 2) Antler traits are heritable and passed from parents to offspring. 3) Yearling antlers are a good indicator of future antler potential.

Biographical Information:
Donnie Frels is a 1985 graduate of Texas A&M University with a BS degree in Wildlife Science. From 1985-1988: Wildlife Manager for San Jose Cattle Company, Aransas County, Texas. Responsible for planning and implementing wildlife habitat operations on the 32,000 acre private ranch owned by Bass family of Fort Worth.

In 1988 he began working as a Fish and Wildlife Technician with the Texas Parks and Wildlife Department in Canyon where he conducted investigations of wildlife species and habitats within the 56 county Panhandle Regulatory District. In 1991 he began working as a Wildlife Biologist on the Gus Engeling Wildlife Management Area near Tennessee Colony.

In this role he was responsible for the management, maintenance, and development and research projects on the 11,000 acre management area in East Texas.

Since 1998 Donnie has served as Project Leader for the Edwards Plateau Ecosystems Management Project, headquartered in Hunt, Texas. As Project Leader he has supervisory responsibilities and is responsible for daily operations, maintenance, management and research on four wildlife management areas; Kerr, Mason Mountain, Walter Buck and Old Tunnel Wildlife Management Areas in Central Texas.

ANTLER DEVELOPMENT AND GENETIC RELATIONSHIP STUDIES FOR WHITE-TAILED DEER IN MISSISSIPPI

Harry A. Jacobson, Professor Emeritus, Mississippi State University

Studies on captive deer at Mississippi State University demonstrate heritability of antler traits for yearling bucks are low and that more important than heritability was the significant influence of the dam. Results of these studies argue against the practice of culling spikes for the purpose of genetically improving antler traits. Mature buck antlers do demonstrate moderate heritability for some traits such as antler points and antler mass. In a translocation study of deer from Mississippi to Michigan and vice versa, we found a genetic basis for body weights, timing of the rut, and disease resistance. Body weights of Michigan bucks averaged 23-45 lbs heavier than Mississippi bucks. Crossbred offspring were intermediate in size to their parents. Photoperiod differences between study areas resulted in a two to three week shift in timing of fawning for deer which were translocated. However, genetic differences in rut timing of five to seven weeks were seen between deer of different geographic origin. Northern deer also experienced significantly higher mortality from hemorrhagic disease than did deer of Southern origin. Offspring from mixed Southern and Northern parentage were intermediate in rut timing and disease resistance to that of their parents. In a related study, 15 fawn to yearling bucks were captured, tagged and released from September of 1997 to January of 2000, on Juniper Creek Farm, a 2,300 acre high fenced property in Pearl River County, Mississippi. Fourteen of these bucks are known to have survived to at least three years of age, with 12 surviving to four-years, or older. Photographic documentation of antler development is presented for these animals during each year of their life. Seven of the fourteen bucks were known spikes, and six were known forked antlered yearlings, with the remaining buck only photographed after he attained two years of age. Side by side comparisons of these bucks demonstrate that while some spikes had smaller antlers than forked antlered yearlings, through three years of age, by four years there are no apparent differences and the buck ending up with the most impressive antlers was a spike as a yearling. These results demonstrate the importance, yet need for caution, in making genetic management decisions and also the need for caution in genetic introduction.

Biographical Information

Dr. Harry A. Jacobson is a Professor Emeritus, Department of Wildlife and Fisheries, Mississippi State University. Since his retirement, he resides in Athens, Texas, where he now works as a private wildlife management consultant.

CRITIQUE OF EXPERIMENTS ON THE GENETICS OF ANTLER TRAITS OF WHITE-TAILED DEER

D. F. Waldron, Texas Agricultural Experiment Station, Texas A&M University System, 7887 US Hwy. 87 N., San Angelo, TX 76901-9714.

An evaluation of experimental designs, statistical analyses, results, and conclusions is presented in order to provide the audience with an impartial evaluation. Differences in conclusions are largely a result of 1) differences in herd composition, 2) differences in statistical procedures employed, and 3) differences in interpretation of results.

The data suggest that variation in antler traits is partially due to genetics and partially due to environment. Yearling antler traits are a predictor of antler traits at maturity. However, because antler traits can be affected by environmental effects, they are an imprecise predictor and examples of deer that do not follow the general trend can be found. A yearling may be a spike because of inferior genetics or because he had an inferior environment.

For selection/culling to have an effect on the next generation, the trait must be heritable. Heritability is a measure of the amount of additive genetic variation relative to the total phenotypic variation. Expected response to selection is a function of heritability. Therefore, efforts have been directed toward estimating heritability, in order to predict the response to selection.

In order to obtain a reliable heritability estimate, measurements on a large number of animals, from a large number of families, are required. The ideal is to have measurements on a representative sample of non-inbred, unselected animals from the population of interest. The data sets that have been collected and analyzed are not large enough and/or the ideal conditions have not been met to provide precise heritability estimates. The reported estimates suggest that antler traits are heritable, but it is unclear if the heritability is high or low.

In addition to a heritable trait, an effective selection program must have adequate variation within the population of breeding animals, and an effective way to ensure which animals are allowed to produce offspring in the next generation. Expected response to selection depends on the heritability, available variation, and selection intensity. Because there are environmental factors that affect antler traits, these factors must be accounted for when making selection decisions if maximum progress is to be made.

The research that has been conducted has not given us a precise definitive answer on the heritability of antler traits. Therefore, expected responses to selection practices are also imprecise. If estimating heritability is the objective of a future research project, it should start with a large representative sample of animals, a well planned mating scheme, and a comprehensive data collection procedure. In addition, the most powerful statistical tools available should be used in order to obtain the most useful information possible.

Biographical Information

Dan Waldron has been with Texas A&M University since1993. He is an Associate Professor in the Department of Animal Science with a research appointment in the Texas Agric. Experiment Station. He received his Ph.D. from the University of Illinois in 1990. He has served as a reviewer for several scientific journals. (Journal of Animal Science, Small Ruminant Research, Sheep and Goat Research, Animal Production)

His research program in animal breeding and genetics is about determining better ways to select the parents of the next generation so that ranchers can produce better sheep and goats. He works with a wide variety of traits in his sheep and goat research. As a result of the theme of this meeting we have asked him to broaden his interest even further and consider antler traits in white-tail deer. Dan was invited to use his knowledge of quantitative genetics and statistical analysis to evaluate the research that has been conducted and the conclusions that have been drawn.

CAN A SELECTIVE BUCK HARVEST AFFECT FREE-RANGING WHITE-TAILED DEER ANTLER CHARACTERISTICS?

Mickey W. Hellickson, Ph.D., King Ranch Chief Wildlife Biologist, King Ranch Production Office, P.O. Box 1090, Kingsville, TX 78364-1090

Selective breeding experiments with penned deer have documented rapid improvement in antler quality. This experiment was designed to determine if rapid improvement was possible in a free-ranging population subjected to selective harvest. The study, conducted on King Ranch in south Texas, included 9,500-acre treatment and control areas. Both received similar, conservative, sport harvest. The treatment area also received intensive culling of 1.5-year-old bucks with <6 antler points and bucks $\geq$2.5 years old with <9 points. Results were monitored by annual helicopter and spotlight surveys and live capture on both areas. We report five years of results through the fall 2003 capture. Culling on the treatment area resulted in 34, 66, 13, and 7 bucks removed during the 1999-2002 hunting seasons. Census data for the treatment area indicated 22.8 deer per 1,000 acres prior to the study versus 17.8 deer per 1,000 acres after study initiation. Census data for the control area indicated 32.8 deer per 1,000 acres prior to the study versus 20.1 deer per 1,000 acres after study initiation. Five years of capture resulted in 165 bucks on the treatment area and 106 on the control area. Percentage of captured 1.5- to 2.5-year-old bucks qualifying as culls has not differed during any year between treatment and control areas ($P \geq 0.18$). Small sample sizes require study continuation to discern any effects of the culling treatment. Companion studies on buck dispersal and reproductive success also provided insight.

Biographical information

Mickey is originally from Iowa, where he earned a Bachelor of Science degree in Fisheries and Wildlife Biology from Iowa State University in 1988. Later that fall, he moved to south Texas to pursue a Masters Degree from Texas A&I University in Range and Wildlife Management which he completed in 1991. Mick then began work toward a Ph.D. Degree in Wildlife Management from The University of Georgia, which he completed during summer 2002. Mick worked as a Wildlife Research Scientist at the Caesar Kleberg Wildlife Research Institute for one year prior to becoming the Chief Wildlife Biologist for King Ranch in 1999. He also continues to serve as an adjunct professor at CKWRI. His research background and management interests have focused on white-tailed deer.

CONFOUND IT! A PRIMER ON THE USE AND MISUSE OF STATISTICS WHEN EVALUATING DEER MANAGEMENT SCENARIOS

Dale Rollins, Professor and Extension Wildlife Specialist, Texas Cooperative Extension, 7887 US Hwy 87N, San Angelo, TX 76901-9714,d-rollins@tamu.edu

Researchers use various statistics (e.g., means, standard deviation, correlation coefficients) to evaluate the response of some variable (e.g., quail nest success in quail) to some imposed treatment (e.g., predator control). The goal is to look objectively at two treatments and discern reliably (e.g., 95% of the time) whether any observed treatment response was attributable to the treatment or merely a result of chance. By the careful application of an appropriate study design, methods, and analyses, we strive for objectivity. These decisions are guided by appropriate experimental designs, statistical tests, and the ability not to be drawn into some common pitfalls. Evaluating various impacts on deer management is a ripe target for some of these pitfall traps.

Wildlife scientists are just as likely to disagree as any other group of professionals, hence the point-counterpoint discussions we have at this conference. But it's important that we "be kind to colleagues, but ruthless with theories". As scientists, we adhere to a philosophy that uses observation and experimentation to seek the truth. But then the situation often deteriorates as findings are taken out of context, embellished, or otherwise manipulated to support one's arguments. We measure the worth of our wares by publishing in "refereed" journals (e.g., Journal of Wildlife Management). A manuscript is subjected to anonymous reviews by (usually) three peers who challenge your methods, analyses, and interpretations. If it fails substantially any of these measures, it is unacceptable for publication in the professional journal.

Some common problems associated with field experiments, including deer genetics studies, include (a) confounding, (b) spurious correlations, and (c) extrapolating beyond the context of one's study. Other experimental concerns like lack of randomization, replication, low sample size, observer error, and other basic statistical prerequisites often shroud our ability to be definitive about the impacts of Treatment A. So, when we say "it depends" we are correct in being cautious about broad-brush statements.

Confounding. When several variables are intertwined to such a degree that the scientist cannot separate the effects of Variable A from Variable Z, the results are "confounded." Many (most) evaluations of various deer management practices are "hopelessly confounded", as simultaneously imposed treatments may include livestock reduction, supplemental feeding, brush management, prescribed burning, and selective harvest. Thus, how does one discern the population effects caused by a treatment of interest (e.g., culling) from the entire complement of treatments? You cannot.

Spurious correlations. One of the most common pitfalls we step into is the inability to separate relationships that are "causal" (i.e., a "cause and effect" relationship exists) from those that are "spurious", i.e., simply "correlated" (i.e., they vary together). In the latter situation, two variables may be highly correlated (either positively or negatively) and yet have little biological significance.

Extrapolation. One of the standard caveats learned by any student of statistics (especially correlation analyses) is to never "extrapolate beyond the range of your data." Extrapolation means stretching whatever inferences may be gained from your analysis to points (or contexts) beyond which your respective data set applied.

Biographical Information

Dale Rollins received his BS degree in Biology and MS degree Wildlife Ecology from Oklahoma State University in 1977 and 1980 respectively. In 1983 he received his PhD in Range Management from Texas Tech University. Dale is recipient of numerous professional honors and awards including Outstanding Young Range Professional from the Society of Range Management, Conservation Educator of the Year from SCOT, Outstanding Achievement Award from the SE section of The Wildlife Society, Excellence in Leadership Award, and Meritorious Service Award from the 4-H Volunteer Leader Association of Texas. He is an active writer and has over a dozen publications to his credit as well as numerous popular articles and columns in magazines. Dale is best known for his leadership role in initiating the Bobwhite Brigade program and its spin-off program Buckskin Brigade. Dale's research emphasis is in quail, brush sculpting and sustainable wildlife production in semiarid landscapes. He is currently Professor and Extension Wildlife Specialist with the Texas Cooperative Extension Service in San Angelo.

COMPARATIVE MATING SUCCESS OF MALE WHITE-TAILED DEER IN RELATION TO AGE AND PERCIEVED QUALITY

Donnie Frels, Texas Parks and Wildlife Department, Kerr Wildlife Management Area, Hunt TX 78024

Dr. James Ott, Southwest Texas State University, Department of Biology, San Marcos, TX 78666

We conducted a replicated manipulative field experiment to determine single-season reproductive success of male white-tailed deer. The experiment tested the null hypothesis of equal mating success between mature (≥ 4.5 age classes) and yearling males and between mature males of high and low antler quality. The experiment was conducted within two ≈500 acre enclosures at Mason Mountain Wildlife Management Area, Mason, Texas at a sex ratio of ≈2.5 females/male and a density of ≈1 deer/7 acres. To establish the experimental populations, resident deer were removed (fall 1999) and enclosures stocked with selected WTD culled from 320 native deer trapped in central Texas during winter 1999. The following classes of WTD were introduced into the enclosures and allowed to acclimate until the 2001 breeding season: does ≥1.5 years old, bucks ≥ 3.5 years old of high and low antler quality, and 0.5 year old buck fawns. DNA samples were collected prior to release of all deer. Following the 2001 breeding season, deer were collected and adults and fetuses were typed at ≤13 microsatellite loci. The computer program "Cervus" followed by hand-matching was used to assign paternity. Reproductive success differed significantly between mature and yearling males and between antler quality classes of mature bucks. However, both yearling and low antler quality bucks sired offspring in each population. Additionally, multiple paternity of 16% to 28% was observed. Our results provide the first estimates of single-season male reproductive success and multiple paternity in field populations of WTD and raise questions regarding both the breeding ecology and management of WTD.

CONSIDERING GENETICS AND BREEDING SUCCESS IN THE MANAGEMENT OF WHITE-TAILED DEER

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The distribution of breeding success has important ramifications for management and will determine the potential for negative effects from overharvest (e.g., inbreeding, "high-grading") as well as the effectiveness of selective harvest to affect the genetic characters for antler development. It has long been assumed that most breeding in white-tailed deer is done by a small number of dominant, large-antlered bucks. However, there is relatively little information to support this assumption. We determined buck breeding success using genetic paternity assignment in 3 populations of deer with long-term differences in harvest management. These included a public area with heavy male-biased harvest (sex ratio >1:7 bucks:doe; 20% of bucks >2.5 years old), an area managed under the "quality" (QDM) management strategy (sex ratio <1:3 bucks:doe; 30% of bucks >2.5 years old), and an area managed for trophy bucks (sex ratio <1:3 bucks:doe; 58% of bucks >2.5 years old). In the QDM and trophy-managed areas, where sex ratios were relatively balanced, mature bucks (>2.5 years old) sired ~70% of offspring. The skewed sex ratio and compressed buck age structure on the public area resulted in equal breeding among age classes. Unexpectedly, breeding was distributed among a large number of bucks in all 3 populations, including young (1.5 and 2.5 years) bucks. Successful bucks sired few offspring within years (maximum = 6) or over their lifetimes (maximum = 14; average: <2.5 fawns/buck). Further, there was no clear association between antler characters and buck breeding success. Despite differences in buck harvest intensity among areas, there were no differences in the amount of inbreeding or genetic diversity. Selective harvest plans that seek to produce genetic changes in population antler characters will be highly inefficient because the breeding success of individual bucks is low and cannot be predicted on the basis of antler traits. On the other hand, these same factors are likely to make free-ranging white-tailed deer resistant to negative effects from harvest, such as inbreeding and high-grading, over a wide range of harvest intensities.

Biographical Information

Randy grew up in south Texas, where he developed a strong passion for wildlife in both recreational and professional contexts- in other words, he likes to hunt and fish as well as do research. He recently returned to Texas as a research scientist with the Caesar Kleberg Wildlife Research Institute after spending six years in Mississippi, where he earned a Ph.D. in wildlife ecology. His interests involve using molecular techniques in wildlife research and management.

LANDOWNER PANEL, MASSER RANCH, HARPER

Ted Masser.

The Masser Ranch is located in the western portion of Gillespie County. This is an area of shallow, rocky soils, low annual rainfall and hot summers that rapidly reduce the protein content of our plant species that are needed for quality animal condition. This is an area that has long been known as a producer of small "Texas Hill Country Whitetail".

We, at Masser Ranch, believe that genetics and their manipulation have a tremendous role in the improvement of our whitetail herd. Our ranch, which has been under game fence since the fall of 1991, has shown tremendous growth in those things usually thought of as desirable; antlers with wider spreads, more mass, more points, and heavier body weights in both our bucks and does. The deer herd on the ranch is a direct result of the native animals enclosed when the fence was erected. There has never been any "outside blood" introduced on the ranch. Since 1994 approximately 95% of the trophy bucks harvested will qualify for the SCI Record Book of Trophy Animals and The Texas Big Game Awards. We have harvested bucks that have grossed in excess of 167 B& C. Remember, these are native Hill Country whitetails.

Following are a few of the things we do to genetically improve the whitetail herd on the Masser Ranch:

Harvest Excess Does. We believe the harvest of does and particularly of older does will aid in the genetic improvements we strive to obtain in our deer herd. The overall herd health of our deer herd requires us to play a numbers game with our herd, i.e. a high birth rate and survival rate in our fawn crop each year requires the harvest of a significant number of deer each year. We have no problem in marketing doe hunting.

Harvest Spike Bucks. Studies indicate that spike bucks carry and pass their genetic traits to future generations.Market value of spike bucks is not conducive to keep them in the herd past the age of 1 ½. We again have to play a numbers game each year because of the potential deer population on the ranch.

Biographical Information

Ted is a former educator and coach. In 1980 he left teaching and entered into ranching and the professional hunting and outfitting profession full-time. He was one of the first people to outfit Mexico for big whitetail deer starting in 1979. He has outfitted in several western states and has contacts throughout the hunting world. He is or has been a member of Safari Club International, The International Professional Hunters Association, Texas Trophy Hunters, Quail Unlimited, The Foundation of North American Wild Sheep, Game Conservation International, Texas Wildlife Association, Exotic Wildlife Association, and The National Rifle Association.

He works with The Texas Parks and Wildlife Department and the Texas Agricultural Extension Service in formulating the Masser Ranches' ongoing wildlife management plans. Ted and his wife, Katherine, and have two grown children, Tara and Tres.

LANDOWNER PANEL, HARRISON RANCHES,UVALDE

Bob Zaiglin, Manager

Culling can be defined as the attempt to augment desirable antler qualities by removing males exuding undesirable antler characteristics. Attention is focused on the removal of yearling spike-antlered males and mature (greater than or equal to four years old) males displaying antlers composed of eight or fewer points. Prior to initiating a culling program, several prerequisites must be met: 1. The deer population should exist at or below the natural carrying capacity of the land; 2. Sex ratios balanced; and 3. Forty-plus percent of the buck segment of the deer herd should be greater than or equal to four years old. The paramount ingredient to realizing genetic antler potential is age and nutrition, both of which are impacted by climatic conditions. Optimal antler size is realized under ideal range conditions as a result of rainfall, particularly in the spring and early summer. Fawn survival also increases because of the abundance of escape cover. Fawns born earlier in the spring subsist on a higher nutritional plane augmenting body development in turn antler size at maturity. It is also important to note that the females' genetic contribution is equivalent to the male. Size of management area must also be considered. On open range landholdings in excess of 5,000 acres in South Texas, culling is an extremely questionable method of improving antler quality. As a result of yearling buck dispersal, culling on smaller open range tracts, less than 5,000 acres, is questionable. However, culling undesirable antler traits on confined herds can be effective. Habitat is the key component to the production of quality-racked bucks, thus more emphasis should be placed on sustaining and improving habitat than on genetic manipulation, particularly on free-ranging herds. The potential enhancement of highly desirable antler traits by restricting doe harvest on isolated areas will be discussed.

Biographical Information
Bob Zaiglin came to Texas via West Virginia. He has a B.S. degree in Wildlife Science from West Virginia University. He received his M.S. degree in Range & Wildlife Management from Texas A&I University. He is an official scorer for the Boone & Crockett Club, Wildlife Consultant, and member of the Buckmasters American Deer Foundation, Wildlife Biologist for the Harrison Ranches and author or numerous popular magazine articles on hunting and managing white - tailed deer.

LANDOWNER PANEL, TREADWELL RANCHES, FT.MCKAVETT

Brian Treadwell

My family runs two Edward's Plateau ranches, one which had a very high deer density and one with a very low density. We have worked with TP&W for 10 years now, and we shoot spikes as cull bucks. The decision to harvest a spike compared to the process of judging a mature buck for inferior qualities makes our culling operation simple. However, we see the culling of deer as just one step towards better habitat management. All management decisions are easier if your big picture is habitat management.

Biographical Information:

Brian Treadwell co-manages his family's 8000 acre Menard & McCulloch CO ranch. He is founder and operator of Rocket T Outfitters, which was started 10 years ago at his family's 117 year old Ft. McKavett Ranch. Brian has received technical guidance and harvest recommendations from TP&W field biologists since the family decided to go commercial. Rocket T Outfitters has earned many honors, including the first Edward's Plateau ranch to be featured in the Realtree Monsterbucks Series, and as a result, was one of the first hunting services to bring hunting the Edward's Plateau onto primetime TV with their sponsorship of numerous TV shows. He lives at the ranch with his wife Ginger and their two children who are both under the age of 3.

THE BUCK CHRONICLES

Mike Biggs, P.O. Box 330787, Ft. Worth, TX 76163

This is a dual-projector program, narrated live by Mike, in which we will take some dramatic looks into some of the most intriguing aspects of the white-tailed deer, including the whitetail mystique, the judging and aging of live deer on the hoof, year-to-year relationships between aging and antller development, aggression and other behaviors, and numerous extreme, unique and anomalous examples of great whitetail moments captured on film. It includes several examples of same-buck, year-to-year photographs, graphically illustrating body and antler development of wild deer as they age. The program presents 160 dramatic and beautiful whitetail images and usually lasts about an hour. It contains some remarkable and unexpected images. Even the most jaded, experienced whitetail chasers are likely to see some things here that they have not seen before.

Biographical Information:

Mike Biggs is a Freelance Outdoor Writer, Photographer, Videographer and Publisher. For the past 20 years, his photos have been regularly published in such publications as: Field & Stream, Outdoor Life, Sports Afield, North American Whitetail, Deer & Deer Hunting, American Hunter, Petersen's Hunting, Texas Sportsman, Texas Trophy Hunters, North American Hunter, Buckmasters, Petersen's Bowhunting, Georgia Sportsman, Florida Game and Fish, The Complete Sportsman, Bowhunter, Texas Fish and Game, Texas Parks and Wildlife, and many others.

Biggs has also had numerous photos published in books, calendars, sales brochures, product packaging, posters, credit cards, extensively in advertising, on clothing and in other miscellaneous formats. His works have been printed in newspapers through out the country and in European publications. Biggs is also well-known for his unique fine-art photographic prints. He has written, photographed, designed and produced three landmark books on white-tailed deer, *"Amazing Whitetails,"* *"Whitetails in Action,"* and *"The Whitetail Chronicles."* These books have received high praise from reviewers all over the country, including some of the most respected people in the outdoors world. Biggs' latest project is *"Mike Biggs' Amazing Whitetails VIDEO-2."*. It is a follow up to his recently published video, the original *"Amazing Whitetails VIDEO."* His products are regularly shipped into all fifty states and many foreign countries.

Biggs has had over 15,000 photos published, including approximately 1,000 covers. He is an active member of the Outdoor Writer's Association of America, as well as the Texas Outdoor Writer's Association. His photographic style is highly recognized by both laymen and other professionals. Biggs specializes in whitetails and whitetail photography and has photographed over 3,500 different whitetail bucks in the wild, in over 150 locations in six states and Mexico.

Biggs graduated from Tarleton State University with a degree in business and resides in Ft. Worth.

ECONOMIC BENEFITS OF SELECTIVE HARVEST

Mitch Lockwood, Texas Parks and Wildlife Department, Ingram, TX 78025

Often times a landowner's primary goal is economically driven, and the landowner's consultant may recommend that all yearling bucks be protected to ensure more mature bucks in future harvests. While such consultants assume a conflict between economics and herd quality, I suggest a strong correlation between the two; as the quality of a herd improves, the value of the hunting experience on that ranch increases. Thirty years of white-tailed deer research has produced profound results regarding negative implications of spike-antlered bucks on a whitetail herd. However, with no regard to genetic or economic implications, I do see a situation in which protection of spike-antlered yearlings would be in the best interest of a landowner. That situation exists for the landowner who plans to sell the ranch within 5½ years of making his deer-management decisions, which is the time from conception to maturity.

We occasionally hear individuals in the deer-management circle suggest that spikes will mature into 'management bucks' worth as much as $2,500. While the frequency of this occurrence is questionable, there is no doubt that a mediocre (i.e., <120 GBC) 120-pound 8-point buck will appeal to more hunters than a 60-pound spike-antlered buck. These individuals also imply that these so-called 'management bucks' provide the majority of income for some ranches. This very well may be true, for managers who care only about revenue produced from a single year's cohort. As is the case with livestock production, retaining a single buck in the herd can have long-term ramifications. One must consider if the goal is the continued production of mature bucks that *may* return $2,500, or if the goal is to improve the quality of the herd so that it produces a class of bucks that return $5,000. *Actually, to be consistent with the assumption that a mature management buck returns $2,500, a mature trophy buck would return more than $10,000.* From the moment you decide to let a spike walk, you have invested in that deer. While considering your potential return on that investment, be mindful of the effects that one buck will have on the population for years to come.

Biographical Information

Mitch has BS and MS degrees in Wildlife Science from Texas A&M University. He has worked for the Florida Game and Fish Commission as lead Area Biologist of the Blackwater Wildlife Management Area in Northwest Florida. After a short time there he moved to Texas as Private Lands Biologist with the Texas Parks and Wildlife Department in the central and western Edwards Plateau where he has developed 119 active Wildlife Management Plans covering almost ½ million acres in 16 counties. He is now the White-tailed Deer Program Leader with statewide responsibilities.

CULLING OF SPIKES: ECONOMIC CONSIDERATIONS

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Deer Managers have long agreed that the three cornerstones of quality deer management are adequate age structure within the buck segment of the herd, sound nutrition for the entire deer herd on a sustaining basis, and genetic potential. What deer managers do not all agree on, however, is the "manageability" of genetics within the deer herd, which often results in much debate regarding strategies for manipulating genetics or strengthening the genetic potential of the deer herd. Culling of 1.5 year old bucks remains a confusing and controversial issue within the deer management arena and will likely remain the most contentious point in deer management for an indefinite period of time.

I am generally not an advocate of shooting 1.5 year old spikes, especially if this is an attempt to manipulate the genetic profile of a deer herd. The only time I am favorable to the idea of shooting 1.5 year old spikes is when the following three requisites have been satisfied.

1. Nutritional status of the deer herd is such that nutritional requirements of the entire deer herd are being satisfied on a sustained annual basis.
2. Total buck numbers are at or above your targeted goal.
3. Fawn production from the previous year (not the same year) was at least 35% or higher.

The economic consequence of culling "undesirable" bucks is often overlooked, and is without question, not well understood. I would go on to say that if a deer program is either profit oriented or cost conscious that it could be a "costly" mistake to shoot 1.5 year old spikes. A bottom line oriented program which meets the three criteria I previously mentioned, and who chooses to exercise a culling program on bucks, would perhaps be better off culling bucks at an older age, preferably 3.5 years, as opposed to shooting them at 1.5 years of age. A three-year old is beginning to express his antler traits and capabilities, more so than a 1.5 year old, which allows you to minimize "mistakes" and a three-year old management buck can generate a much higher price from a paying hunter than a one-year old buck. Another "cost" associated with shooting 1.5 year old spikes is that we know that some spikes do indeed grow into " trophy" size bucks, thus shooting these bucks at 1.5 years of age would deny the operation of being able to cash in on these deer at a later age.

Furthermore, though some studies may suggest that 1.5 year old spikes do not perform as favorably as other cohort members, these studies have in no way concluded that the culling of these 1.5 year old spikes yields any measurable results in terms of being able to manipulate the genetic profile of that deer herd in an upgraded fashion. Even if spikes carried a "spike gene," there may also be 1.5 year old multi-pointed bucks carrying that gene as well, as geneticists do agree that genetic characteristics (genotype) of an

individual are not always expressed through its physical appearance (phenotype). Additionally, we also know that there is a sex linkage in antler traits back to the dam, which complicates the idea of culling even more, as there is no practical ways of culling does to select for certain antler traits.

So, it is my sentiment that culling 1.5 year old spikes is typically a costly mistake relative to the financial consequences associated therewith. It is also my assessment that culling of these bucks will likely yield little or no results in terms of being able to upgrade the genetic profile of a deer herd.

Biographical information:
Greg Simons graduated from Texas A&M University in 1987 with a wildlife degree and immediately formed Wildlife Systems, Inc., which is a business enterprise he concepted in college. WSI provides a blend of outfitting and wildlife management services to private landowners and hunters and has grown into an organization that has been actively involved in New Mexico, Colorado, Oklahoma, and various regions of Texas. This company currently conducts hunting trips on many different properties comprising approximately 400,000 acres and provides wildlife management consulting on various other properties. WSI was chosen 2002 Dodge Outfitter of the Year from a cast of over 450 operations in the U. S., Mexico, and Canada. Simons is also a partner in Wildlife Safaris, Inc., which serves as a booking agent for hunting operations in New Zealand, Canada, South Africa, Zimbabwe, and Zambia. He has served as an officer in Texas Chapter of The Wildlife Society, is a board member of Texas Wildlife Association, and is also on the steering committee of North Texas Buckskin Brigade and West Texas Wildlife Advisory Committee, not to mention being one of the founders of the annual West Texas Deer Study Group Meeting. He, his wife Deborah, and their two children reside in San Angelo.