

# History of the TBA Implant Database

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## Very Brief History of Anabolic Implants in the US Cattle Industry as it Pertains to the TBA Implant Database

Implants have been approved for beef cattle production since the Food and Drug Administration (FDA) approval of Synovex-S® in 1956 (see: History of Growth Promotants in the US). They have been proven through extensive research to be extremely efficacious and safe in all phases of beef cattle production. They are one the most important aspects of technology the beef industry has for improving economic and environmental sustainability, and thus, are used extensively throughout the beef industry. Since 1956 there have been thousands of trials investigating the use of anabolic implants in various scenarios and aspects of beef production which prove their safety, efficacy, and economic and environmental sustainability.

In 1987, the first trenbolone acetate (TBA) containing implants were approved by the FDA in the form of Finaplix-S® and Finaplix-H® (see: History of Growth Promotants in the US). Finaplix-S for steers contains 120 mg of TBA, whereas Finaplix-H for heifers contains 200 mg of TBA (see: Approved Implants in the US). For these two implants to be highly efficacious, they needed to be implanted concomitantly with another implant containing an estrogen (E<sup>2</sup>) component. The TBA, or androgen component, and the E<sup>2</sup>, or estrogen component, act synergistically to improve economic growth of the animal through various endogenous pathways. Implants containing an E<sup>2</sup> component would be analogous to Synovex-S in steers or Synovex-H in heifers. The FDA allowed the practice of using these implants concomitantly to improve beef production and deemed this practice as safe for both the animals and humans alike.

In 1991, the first combination implant was approved by the FDA in the form of Revalor-S® (see: History of Growth Promotants in the US). Revalor-S was the first implant to contain both TBA and estradiol-17β in combination within the same implant. Revalor-S contains 120 mg of TBA and 24 mg of Estradiol-17β and was approved for steers in confinement for slaughter (see: Approved Implants in the US). Following 1991, an entire family of Revalor products were approved through the FDA and deemed to be efficacious and safe for both the animal, as well as human food safety. The Revalor Family of products approval years were:

- 1) Revalor-H® in 1994

- 2) Revalor-G® in 1996
- 3) Revalor-200® in 1999
- 4) Revalor-IS® in 2000
- 5) Revalor-IH® in 2000
- 6) Revalor-XS® in 2007
- 7) Revalor-XH® and Revalor-XR® in 2016.

Since 1997, other combination implants have been approved by the FDA and have been manufactured and distributed by various companies. The Synovex® brand names were first manufactured by Squibb and the combination approvals were attained by Syntex Corporation, which are now manufactured and distributed by Zoetis Animal Health. The generic implants were first manufactured by the Upjohn Company, whereas Vetlife, Inc attained the combination approvals for the generic Revalor products and are now manufactured and distributed by Elanco Animal Health under the Component® brand names (see: History of Growth Promotants in the US).

#### **History of:**

#### **Merck & Texas Tech University North American TBA Implant Database**

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With the advent of Finaplix implants in 1987 and the family of Revalor implants beginning with Revalor-S in 1991, John Paul, DVM had two individuals in his original Hoechst-Roussel Technical Service department, Jerry Rains, DVM and Wade T. Nichols, Ph.D., PAS. Through the late 80s and 90s there were a plethora of trials conducted comparing various single implant and reimplant strategies within the US beef cattle industry. These trials compared a wide variety of variables including;

- 1) various implant comparisons and strategies on live and carcass performance
- 2) various ration components
- 3) ration energy density and various protein levels
- 4) time of year variables
- 5) different age and weight variables
- 6) genetic or breed differences
- 7) comparing different days on feed
- 8) implant effects on health
- 9) implant effects on receiving cattle
- 10) conservative vs aggressive strategies within all the above, etc.

There was a great deal of information being generated and disseminated through a wide variety of research sources. During this time both Dr. Rains and Dr. Nichols were inundated with requests for data and information comparing one aspect or another within the beef industry as it pertained to growth and performance with anabolic implants. They would peruse their files

and pick a few trials matching the requests, copy them, and then mail or FAX them to the recipient. This was mostly before laptop computers, certainly before e-mail was invented, and the iPhone with texting was not yet a concept. Therefore, it could be a long and tedious process to find the correct information, summarize it, include the pertinent publication, and then mail or FAX all requested data and information.

With computers and computer technology becoming more available and the technology improving over time, Dr. Rains and Dr. Nichols knew there had to be a better way. They thought there should be a way to put all the trial data in one place and be able to query the data to help elucidate the answer a person was seeking. By 1998 the Hoechst-Roussel Technical Service department included a few more Nutritionists and Veterinarians; however, it was still an arduous task disseminating data and information for the beef industry.

In early 1998 during an internal Technical Service meeting, it was decided to develop a budget and justification for procurement of funds from Hoechst-Roussel management to try and build an implant database. The problem became identifying an entity to build this envisioned implant database. This required advanced knowledge in computer science and database management. None of the professionals within Hoechst-Roussel Technical Services were proficient enough in computer science to even begin to know where to start.

In 1998, Dr. Michael Galyean accepted the "Thornton Distinguished Chair" at Texas Tech University (TTU) in the Animal and Food Science Department. Dr. Galyean had already developed an outstanding reputation within the beef industry due to his research and work ethic at New Mexico State University and the Clayton Research Center. Before accepting the Distinguished Thornton Chair position at Texas Tech University, he was conducting further important and pertinent research, as well as teaching at West Texas A&M as a professor in the Animal Science Department. During a meeting in 1998 with Dr. Galyean, Dr. Nichols asked about the feasibility of developing a searchable implant database. Dr. Galyean is a very positive person, with an inquisitive mind and great work ethic, and very rarely has he declined any interesting and challenging project with an outright no as his first response. Mostly his standard answer is "I don't know but let me take a look at it and see what I can do". This meeting was the very early beginning of the TTU and Merck TBA implant database. Dr. Galyean and Dr. Nichols met several times over the course of the next couple of months. In addition, Dr. Galyean's eldest son, Joe Dan, was a student at TTU and majoring in Computer Science. Dr. Galyean visited with Joe Dan about the project to get his thoughts and expertise on the subject. Joe Dan is a lot like his father with a high degree of intelligence and a great work ethic and he went to work on the project. During that time, it was decided that only trials containing TBA would be included in the database. By this time, the beef industry was utilizing combination implants in all facets and phases of production within the industry. In addition, it would be almost impossible to find all the trials conducted since 1956 dealing with anabolic implant technology. However, between Dr. Galyean's files and Dr. Nichols's files, they felt confident that they would have virtually all the trials that had been conducted with TBA-containing

implants. It was also decided which variables would be most useful to compare when searching the database. The variables decided upon were:

- 1) Number of head/treatment
- 2) Days on Feed (DOF)
- 3) Initial weight (InWt)
- 4) Average Daily Gain (ADG)
- 5) Feed to Gain (F/G)
- 6) DMI (Dry Matter Intake)
- 7) Hot Carcass Weight (HCW)
- 8) Dressing Percent (DP)
- 9) Percent Choice (%CH)
- 10) Yield Grade (YG)

When perusing the data, it was readily apparent that the database would need to be divided into “Single Implant Strategies” and “Reimplant Strategies”. There would also be the need to divide those by “Heifer” and “Steer” implant data. Over the course of the next several months, Joe Dan wrote the algorithms for the searchable database and both he and Dr. Galyean entered the data and tested the beta version of the product. Joe Dan also added another aspect to the database, where you can download the pdf file of the manuscript if it was available. The beta version was a success and the final aspects to the database were instituted. Joe Dan went on to graduate from TTU in Computer Science in 2001 and, as expected, he has been very successful in his life and family endeavors.

By mid-1999, the searchable database was ready to be rolled out to the public. A contract was negotiated with Dr. Galyean to be the “monitor and caretaker” of the implant database at TTU. The name “*Hoechst-Roussel and Texas Tech University North American TBA Implant Database*” was chosen for this unique searchable database. A public notice was distributed through various organizations which asked anybody with published TBA implant data to please send that publication to Dr. Galyean for inclusion into the TBA implant database. Dr. Galyean was very conscientious about keeping the database up to date with recent trial data and answering any concerns an individual may have concerning the database. There is an aspect to the database itself that can determine how many queries are requested from the database and where those queries originate. The data from this program indicates thousands of queries from all over the world. This unique searchable database has proven to be very beneficial in assisting the beef industry in making beneficial decisions concerning implant programs across a wide range of variables and comparisons.

Dr. Galyean continued to be the manager for the TBA implant database, even as he stepped up to be the Dean of the College of Agricultural Sciences and Natural Resources at Texas Tech University. When he took the next step up to become the Provost of Texas Tech University, however, he was too busy to manage the TBA implant database. About that same time the world was hit with the Covid-19 pandemic and for a short time the TBA implant database was

left unattended. It was no one's fault, just a matter of time and circumstances. Texas Tech University filled the Distinguished Thornton Chair position with Dr. Kristin Hales and she has agreed to be the new monitor and caretaker of the now "*Merck and Texas Tech University North American TBA Implant Database*". The TBA database is now up and running and up to date with the most recent trials being added and searchable.

From a wild idea and an ignoble beginning emanated a prodigious and very useful tool for the entire world beef industry. Thank you to Hoechst-Roussel for the original funds to allow this database to be built. An extended thank you to Intervet and Merck for continuing to fund the database every year. A grateful acknowledgement to both Dr. Galyean and Joe Dan Galyean for their efforts and expertise in making this searchable database a reality. Thank you to Dr. Galyean for his very long-standing term as manager of the database. Another thank you to Dr. Kristin Hales for agreeing to be the manager going forward and keeping the implant database up to date and functioning. Thank you to all the individuals who have sent or are sending TBA implant trials for inclusion into the TBA implant database. Without any of the above individuals and corporations, this valuable tool would still only be an idea or long defunct. Thank you so very much one and all.

**Merck and Texas Tech University North American TBA Implant Database Website:**

<http://idb.asft.ttu.edu/dbhome/default.htm>

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