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**Proceedings of the 10th International Ruminant Reproduction Symposium (IRRS 2018); Foz do Iguaçu, PR, Brazil, September 16th to 20th, 2018**

**Pioneer Award:** by J.E.P. Santos, Department of Animal Sciences, University of Florida, Gainesville, USA

The recipient of the 2018 International Ruminant Reproduction Symposium Pioneer Award, granted to distinguished scientists who have trained students and have made major contributions to the understanding of reproductive biology in ruminants, is Dr. William Watters Thatcher, Graduate Research Professor Emeritus in the Department of Animal Sciences at the University of Florida, Gainesville, USA.

Dr. William W. Thatcher (“Bill”) grew up in the Baltimore-Perry Hall area, Maryland, USA, where he spent time in his grandfather’s farm and developed a passion for livestock and agriculture. When it was time to go to college, he was accepted at the University of Maryland in College Park and received his Bachelor of Science degree in Agriculture and Animal Husbandry in June of 1963. He went on to do the Master of Science program at the University of Maryland and conducted his research on milk proteins and blood group polymorphisms in cattle at the Agricultural Research Service of the United States Department of Agriculture in Beltsville, Maryland under the supervision of Dr. Charles A. Kiddy. Upon completion of his MSc degree in December of 1965, Bill moved to Michigan State University where he was awarded the PhD degree in physiology of lactation and reproduction under Dr. Herbert Allen Tucker (“Tuck”) in December of 1968 with the dissertation entitled “Physiological, Biochemical and Hormonal Factors Limiting Lactation”.

In January, 1969, Bill joined the Department of Dairy Science (now Animal Sciences) at the University of Florida where he spent his entire professional career with a research focus on dairy cattle reproductive physiology. He published his first scientific abstract while in graduate school entitled “Associations Among Blood and Milk Polymorphisms in Dairy Cattle” at the Eastern Divisional Meeting of the American Dairy Science Association in College Park, Maryland in July of 1965, and his first scientific paper also was published in 1965 in the June issue of the Journal of Dairy Research, and he has not stopped since. Bill has published over 50 book chapters and reached the impressive 400-mark on scientific manuscripts published in the peer-reviewed literature, with his latest contribution appearing recently in the Journal of Dairy Science in 2018. Only a few animal scientists have had the distinction of such a prolific research career. He has over 35,000 citations with an h-index of 105 in Google Scholar. This means that not only he has been an extremely prolific publisher of scientific papers, but his peers recognize the importance of his research and they want to read and cite his papers.

Throughout his career, Bill has been the consummate professor who has always believed in interdisciplinary programs and has pushed his students to be the best scientists with a broad view of science and with tools to apply scientific methods to develop new knowledge. He believes the purpose of his program is to conduct research to create new knowledge and develop solutions to solve problems affecting animal agriculture, at the same time that he imposed an interdisciplinary approach to training graduate students. Bill has directly touched and influenced the lives of hundreds of professionals as a mentor and colleague. He has served as the advisor for 73 graduate students, postdoctoral fellows, sabbatical scientists, and visiting trainees. He has served as graduate committee member to more than 100 graduate students in Florida as well as other Universities. His graduate students originated from all corners of the world, many of which came from countries in South America, including Brazil where this symposium is being held. Graduate students and post-doctorates who worked under Bill have taken positions as faculty members, industry scientists, or industry technical service specialists in 30 countries. A great deal have become well recognized leaders in their area of work. Many of the students from South America returned to their countries and formed a legacy that has perpetuated to this day and has impacted science and teaching of cattle reproduction. As a graduate professor, he taught courses in endocrinology and reproductive physiology, and he has been an active member of the Interdisciplinary Reproductive Biology and the Animal



Molecular Cell Biology programs at the University of Florida to this day. He has served as associate editor or on the editorial boards of *Biology of Reproduction*, *Journal of Dairy Science*, *Journal of Animal Science*, *Theriogenology*, *Animal Reproduction Science*, and *Reproduction-Nutrition-Development*. He has been the president of the Society for Study of Reproduction (2005-2006) and of the International Congress on Animal Reproduction (2004-2008).

Bill arrived at the University of Florida shortly before one of his mentors, Dr. Donald Henry Barron who occupied the J. Wayne Reitz Chair in Reproductive Biology and Medicine, joined the University in 1969. Bill's efforts to foster collaborative and multidisciplinary approaches to basic and applied research, in collaboration with colleagues in Animal Sciences and the Medical College, established a joint weekly seminar in reproductive and perinatal biology in 1969 that is ongoing every Wednesday afternoon still today. Early in his career, Bill developed a strong friendship and close working relationship with Dr. Fuller Bazer in the Department of Animal Sciences at Florida. The combined inquisitive minds, with limitless imagination and complementary biological and quantitative skills resulted in a strong and very productive scientific collaboration over many years. They conducted experiments to understand the mechanisms underlying the conceptus-maternal cross-talk that lead to maintenance of the corpus luteum, critical for survival of pregnancy. Eventually, the two collaborated with Dr. Michael Roberts in the Department of Biochemistry in Florida, and their research led to the initial experiments demonstrating that protein extracts isolated from the uterine flushes from pregnant ewes or proteins purified from cultured conceptuses extended the corpus luteum lifespan for days to weeks. Those findings eventually culminated with the discovery of interferon-tau as the key molecule produced by the trophoblast of the conceptus necessary for maintenance of pregnancy in ruminants and several of the mechanisms regulating prostaglandin  $F_{2\alpha}$  secretion from the bovine endometrium.

The hot and humid subtropical climate in the state of Florida urged scientists to focus efforts on understanding the impacts of heat stress and find solutions to mitigate the losses caused by hyperthermia in livestock. That was one of Bill Thatcher's initial tasks when he arrived at the University of Florida because of the need to understand the impacts of heat stress on cattle and improve reproduction under such conditions. He and colleagues (Dr. Peter J. Hansen) characterized many of the early aspects of how heat stress and consequent hyperthermia affects the reproductive physiology and the reproductive performance of dairy cows. They showed that heat stress affects ovarian follicular development, follicle steroidogenesis, and endometrial synthesis of prostaglandins. His work showed that cows under heat stress have reduced expression of estrus, which deters the efficient use of artificial insemination (AI). Bill studied and developed methods that facilitate the implementation of AI in herds, which has been a hallmark of his scientific contributions. He was a member of a team of scientists and allied industry professionals who developed prostaglandin  $F_{2\alpha}$  as a reproductive hormone to be used in estrous synchronization protocols to control luteal lifespan. His initial work with colleagues (Dr. Jim W. Lauderdale) on the use of prostaglandin  $F_{2\alpha}$  led to the development of commercial products marketed to induce estrus in cattle. Work from his group as well as others characterized the early findings of follicular dominance in the bovine that eventually led to a better understanding of the control of the estrous cycle in cattle. His laboratory in collaboration with Dr. Keith L. MacMillan ("Jock MacMillan") conducted the initial experiments on manipulation of ovarian follicle development with the use of GnRH and then incorporated prostaglandin  $F_{2\alpha}$  to control luteal lifespan to better synchronize estrus in dairy cattle. This early groundbreaking work eventually led to development of timed AI protocols that are currently used for reproductive management of lactating dairy cows and dairy heifers all over the world. Their findings on the use of GnRH and prostaglandin  $F_{2\alpha}$  became the foundation for therapy of cows with ovarian cystic disease and other types of anovulatory conditions in dairy cows. This same work on control of follicle development and luteal lifespan was eventually applied to embryo transfer programs to allow for fixed timed embryo transfer in cattle. Bill always had strong quantitative skills and he collaborated with Dr. Charlie J. Wilcox, a statistician at Florida to make sure his research was sound and that his students understood the importance of proper design of experiments and data analyses.



Bill not only fostered interdisciplinary training for his students, but he also applied the same concepts to his research program. The progression of his career eventually led to integration of concepts on reproductive management, nutrition, and health to improve reproduction of lactating dairy cows. The collaborations with Dr. Charles R. Staples and Dr. José E. Santos in the area of nutrition and reproduction improved our understanding of the roles of animal health and fatty acids on reproduction in dairy cattle. Polyunsaturated fatty acids are potent regulators of cellular function in mammals and work conducted by Thatcher and colleagues at the University of Florida have characterized some of the cellular and reproductive effects of omega-3 and omega-6 fatty acids on regulating prostaglandin  $F_{2\alpha}$  synthesis, embryo development, and maintenance of pregnancy in cattle. Bill has been a pioneer on the understanding of how growth hormone and insulin-like growth factor 1 affect ovarian follicle development and pregnancy in cattle. His work, integrating use of recombinant bovine growth hormone with estrous synchronization protocols for timed AI demonstrated the benefits of bovine somatotropin to improving embryo development and pregnancy in lactating dairy cattle.

It is safe to say that the work developed by Bill Thatcher over many years has greatly impacted animal production and has changed how dairy producers manage reproduction today. His influence on how we think about dairy cattle reproduction is present every day in the scientific setting or on the farm. It is very likely that many of the concepts discussed in this Symposium has, one way or another, something related to Bill's scientific contributions. His impact has extended to all corners of the world in which dairy cattle are raised to produce food for humans. He has been invited to 50 countries to give lectures and seminars to extend knowledge in dairy cattle reproduction and management.

Bill has been officially retired and became Emeritus Professor at the University of Florida since 2004. Nevertheless, he still comes to work and contributes with the mission of the Department and the University by advising faculty and graduate students. He continues to contribute to scientific societies by editing books, writing and reviewing manuscripts. He is an exceptional example of how, through collaboration, scientists can educate one another and create an environment of rich scientific stimulation. It is important to mention that Bill's success in the scientific arena did not preclude him from enjoying his time and creating strong friendships with colleagues. Everyone who knows him is aware of his intensity as a scientist, but also recognize his collegiality and friendship. At home, he has always had a strong pillar and a safe harbor in his wife, Marie-Joelle Thatcher. She has supported him throughout his career and has made sure his health stays strong.

Bill has received more than 20 awards recognizing his scientific contributions and graduate student mentoring ability, among them the Journal Dairy Science 100 Club Award from the American Dairy Science Association (2017), the Carl G. Hartman Award from the Society for Study of Reproduction (2014), the Pioneer Award from the International Embryo Transfer Society (2014), the Hetzel Award for lifetime achievement from Hungarian Society for Animal Production (2008), the Morrison Award from the American Society of Animal Science (2006), honorary member of the American College of Theriogenologists (2003), the Merial Dairy Management Research Award from the American Dairy Science Association (2002), the Research Award from the National Association of Animal Breeders (2000), the Doctoral Dissertation Mentoring Award from the University of Florida (2002), the Graduate Teaching Award from the College of Agriculture and Life Sciences at the University of Florida (2001), and the Lester E. Casida Award for Excellence in Graduate Training from the American Society of Animal Science (1997), among others. He is a fellow of the American Dairy Science Association (2007) and the American Society of Animal Science (2011).

The 2018 Pioneer Award from the International Ruminant Reproduction Symposium is the latest of many international accolades recognizing the distinguished scientific career in reproductive biology of Dr. William W. Thatcher and his contributions to our understanding of reproduction in ruminants.