

Ronald L. Horst, Ph.D.

Ronald L. Horst, Ph.D., Ames, Iowa, has been named the recipient of the Award for Meritorious Service presented by the American Jersey Cattle Association (AJCA) and National All-Jersey Inc. (NAJ).

This award is given annually to a living individual(s) who, in the joint opinion of the Boards of Directors of the national Jersey organizations, *has made a notable contribution to the advancement of the Jersey breed and the livelihood of Jersey owners in the United States through research, education, development, marketing, or other significant activities of the allied dairy industry.*

Ronald Horst has improved the livelihood of Jersey farmers across the country through his discoveries on milk fever and methods for its prevention. His early research in the 1970s on mature Jersey cows yielded findings that flew in the face of traditional beliefs, pointing to a high potassium diet as the culprit of the metabolic disorder rather than high dietary calcium. This led to the development of practical measures for its prevention. Today it is common practice for dairy farmers to limit potassium in dry-cow rations, monitoring dietary cation-anion difference (DCAD) of the ration and feeding anionic salts when necessary to modify blood pH.

"These management concepts were put forward largely as a result of research in Dr. Horst's laboratory," wrote Dr. Marcus E. Kehrl Jr., who worked alongside Horst at the National Animal Disease Center (NADC) and now leads the center's Virus and Prion Diseases Research Unit.

It was the loss of his favorite cow to milk fever as a young boy that ultimately shaped "Doctor Ron's" future as a scientist. He earned an animal science degree from West Virginia University in 1971 and a doctorate in nutrition and biochemistry from the University of Wisconsin in 1976. He joined the physiopathology research unit team at the NADC in Ames, Iowa, the following year and got busy pursuing his goal a cure for hypocalcemia in dairy cattle.

The first order of business was discovery of what causes milk fever. Because of their predisposition to the disorder, Jerseys were an obvious place to start. Horst and his colleagues developed a model (funded in



part by a grant from the AJCC Research Foundation) that induced milk fever in mature cows fed an alfalfa-based diet, then compared blood and mineral hormonal changes between cows that developed the disorder with those that did not. They discovered that high dietary potassium causes metabolic alkalosis. This impairs function of the parathyroid hormone (the major calcium regulating hormone) and leads to the life-threatening drop of blood calcium expressed as milk fever in early postpartum dairy cows.

Development of a measure that could be used to prevent this the addition of hydrochloric acid to feed additives to acidify the diet was born in Horst's laboratory as well.

"I distinctly remember the day I walked into Dr. Jesse Goff's office, where he and Dr. Horst were developing a concoction to feed cows, when they asked me how I thought it tasted," continued Dr. Kehrl. "They were of course mixing hydrochloric acid with molasses and would never ask a cow to eat something they didn't find palatable themselves."

This research rapidly changed the way dry cows were fed. Feed supplements containing hydrochloric acid were developed and fertilization strategies modified to reduce potassium content of forages while

also increasing chloride content.

"Think about what this has meant to the Jersey cow," remarked G. Joe Lyon and his son, Eric, and nephew, Stuart, who have been breeding Registered Jerseys in Toledo, Iowa, for decades. "The only block to her commercial, large herd acceptability had been susceptibility to milk fever. With the advent of anionic/cationic balanced diets for warm-up cows, this hurdle was effectively eliminated. Now our Jersey cow has unlimited potential and competes in large commercial settings."

In the course of his studies on milk fever, Dr. Horst became an expert on the metabolism of calcium and vitamin D as well. In addition to anionic salts, his team has done the bulk of the scientific work on oral calcium supplements, to enhance intestinal absorption and bone resorption of calcium for the prevention of hypocalcemia.

Horst's work has crossed into the field of human medicine as well. One of his two patents for vitamin D analogues is being investigated for the treatment of psoriasis and osteoporosis in humans. His laurels in human medicine research include the Brown University Award for Research Excellence in Vitamin D in 2005 and a career research excellence award from the International Workshop on Vitamin D the following year.

Dr. Horst is among the top 2% of animal scientists in terms of number of publications and their impact. He has authored or co-authored 366 refereed journal articles, five books and seven patents. He has given 100-plus lectures in this country and 18 abroad and advised 36 graduate students earning advanced degrees.

His studies on milk fever were cited as one of the top research findings supported by the National Research Initiative competitive grants program in 2000 and by the U.S. Animal Health Association in 2011 as one of the top 10 cattle health achievements of the previous two decades. A paper he co-authored with Dr. Goff in 1997 describing physiological changes at parturition and their relationship to metabolic disorders (*Journal of Dairy Science*, vol. 80, issue 7) has been referenced 1,144 times according to Google Scholar.

Horst received the Presidential Rank

Meritorious Service Award

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Award for Meritorious Senior Professionals in 2006 and was inducted into the ARS Hall of Fame in 2010. Dean Food recognized his dairy industry research in 2000. The American Dairy Science Association elected him as an ADSA Fellow in 2006. Most recently he received the 2014 Kenneth R. Spencer Award for Outstanding Achievement in Food and Agricultural Chemistry.

Widely respected among his peers, he was the first non-veterinarian to lead a research group at the NADC and the only non-veterinarian to direct the center, a post he held before retiring in 2006 to found Heartland Assays LLC and then GlycoMyr Inc. with Dr. Goff. Since 1988, Horst has been an adjunct professor with Iowa State University.

Returning to his roots, Doctor Ron and his wife, Marina, established Grand Central Jerseys LLC with his brother and sister-in-law, Robert and Patricia Horst, in 2008. The Horsts milk 200 cows on the farm in Bristow, Iowa, with a focus on herd health and milk quality. Ron especially enjoys showing cattle, a love born from dairy judging days in FFA and college. A highlight was watching GCJ Jade Varsity earn laurels as two-time Intermediate Champion of the All American Jersey Show in the mid-2000s.

“You may not be familiar with his professional resume, but this former Division I football player turned researcher came from a small dairy farm in West Virginia and solved the last remaining hurdle to the advancement of the Jersey cow in large dairy settings,” summed the Lyons family.

For this alone, it is fitting to recognize Dr. Ronald Horst for his lifelong contributions to the welfare of the Jersey cattle industry with the AJCA-NAJ Award for Meritorious Service.

Editor's Note: In a sad note of news, Dr. Horst passed away on May 23, 2019. He will be recognized posthumously at the AJCA Jersey Breeders' Banquet in Saratoga Springs, N.Y., on June 29.

AJCA-NAJ Award for Meritorious Service

- 1999 Morris B. Ewing, Tucson, Ariz.*
- 2000 Allen D. Meyer, West Fargo, N.D.*
- 2001 Calvin Covington, Ocala, Fla.
- 2002 John Jeter, Hilmar, Calif.
- 2003 Charlene Nardone, Orient, Ohio*
- 2003 Merlin D. Woodruff, Urbana, Ohio*
- 2004 Michael L. Brown, Seattle, Wash.
- 2005 Rodger S. Hoyt, Delaware, Ohio*
- 2006 Dr. Clarence S. Olson, Madison, Wis.
- 2007 Dr. John C. Wilk, Raleigh, N.C.
- 2008 Henry H. Dowlen, Lewisburg, Tenn.
- 2009 Dr. Ronald E. Pearson, Blacksburg, Va.
- 2010 Dr. Joseph A. Lineweaver, Radford, Va.
- 2011 David Brandau, Wilton, Wis.
- 2011 David Parkinson, Sahuarita, Ariz.
- 2012 Dr. H. Duane Norman, Fulton, Md.
- 2012 Dr. Curtis P. Van Tassell, Beltsville, Md.
- 2013 Dr. Robert Cropp and Dr. Edward Jesse, Madison, Wis.
- 2014 Richard "Dick" Smith, Waunakee, Wis.

- 2015 Paula M. England, Columbus, Ohio
- 2016 Richard "Dick" Clauss, Hilmar, Calif.
- 2017 Dr. Kent A. Weigel, Madison, Wis.
- 2018 Dr. Ole M. Meland, Ocala, Fla.
- 2019 Ronald L. Horst, Ph.D., Ames, Iowa*

* deceased