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Media contact:

Brittany Morstatter

+1-217-356-3182 ext. 143

ARPAS@assochq.org

“Stacked stressors” and digestive disorders in cows

Combination of factors likely leads to clinical disease, according to a recent case study in Applied Animal Science

Champaign, IL, October 3, 2022—The unpredictability of digestive disorders among lactating cows presents a challenge to dairy farmers, in part because there rarely is an obvious cause. A team of scientists from Kansas State University (Manhattan, KS, USA), Micronutrients (Indianapolis, IN, USA), and Michigan State University (East Lansing, MI, USA) documented the outbreak and resolution of digestive disorders to study the factors that likely resulted in clinical disease ranging from mild diarrhea to hemorrhagic bowel syndrome. Their findings are presented in a new [case study](#) report in [Applied Animal Science](#).

For 14 weeks, researchers observed a subset of 15 affected Holstein dairy cows from the control group of a larger production study conducted between April 30 and August 5, 2019. The diet included drought-stressed corn silage, which introduced difficulties such as low energy density, high dry matter content, and mycotoxin contamination. That combination of factors likely led to microbial and gastrointestinal disruptions, which resulted in digestive disorders in a subset of cows.

Previous research has been limited to assessments of individual risk factors, which have been inadequate to replicate the digestive disorders on their own. In addition, commercial farms rarely obtain individual cow data that would allow for analysis of contributing factors before disease onset. “The research suggests multiple factors that likely lead to microbial and gastrointestinal disruptions resulting in clinical disease in affected cows,” said David K. Beede, PhD, editor in chief of *Applied Animal Science*. This study focused on those contributing factors.

“Gastrointestinal disease on commercial dairy operations may typically result from multiple risk factors occurring simultaneously,” said Barry Bradford (PhD, Kansas State University, Michigan State University), lead investigator of the case study. “Documentation of these factors, throughout the course of an outbreak, would help to improve our understanding of the disease process.”



Caption: Maintaining digestive health is critical to dairy cattle well-being. Pictured: lead author Steven Quanz with Number 7 (Credit: Taylor Duff).

Bradford and the other researchers speculate that compounds such as mycotoxins act as stressors, and although they may not directly cause intestinal disease, they may lead to greater inflammatory biomarker concentrations and disease.

“We propose that the gastrointestinal health challenges observed during this study emerged as a result of ‘stacked stressors,’” Bradford said. Diet quality compounded with seasonal heat stress likely encouraged growth of opportunistic pathogens and altered gastrointestinal function.

Bradford stated that the researchers hope these observations in this case study can inform the development of testable hypotheses that may lead to a more robust understanding of how stacked stressors promote gastrointestinal disease.

The article appears in the October issue of *Applied Animal Science*.

Notes for editors

“Case Study: Combined risk factors and digestive disorders in mid-lactation Holstein cows,” by S. T. Quanz, K. E. Griswold, L. K. Mamedova, S. K. Kvidera, M. J. Brouk, R. S. Fry, and B. J. Bradford (<https://doi.org/10.15232/aas.2022-02313>), *Applied Animal Science*, volume 38, issue 5 (October 2022), published by Fass Inc. and Elsevier.

Full text of the article is also available to credentialed journalists upon request; contact Brittany Morstatter at +1-217-356-3182 ext. 143 or ARPAS@assochoq.org to obtain copies. To schedule an interview with the author(s), please contact Barry Bradford at bjbrad@msu.edu.

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