

Researching and Developing Novel Fecal Egg Count Methods

A new smartphone app is designed to help veterinarians obtain fecal egg count results quickly and easily in the field.

Posted by University of Kentucky College of Agriculture, Food, and Environment | Apr 21, 2015 | Article, Deworming & Internal Parasites

Paul Slusarewicz, PhD, adjunct professor at the University of Kentucky (UK) Gluck Equine Research Center and co-founder and chief scientific officer at MEP Equine Solutions LLC, is developing a method to rapidly detect and count the number of parasite eggs in feces. Slusarewicz, who began this work as a visiting scholar at UK, has been collaborating with and working in the lab of Martin Nielsen, DVM, PhD, Dipl. EVPC, ACVM, assistant professor in the Department of Veterinary Science at the Gluck Center.

Slusarewicz's previous CEO at a different company, local businessman Eric Hauck, introduced him to Nielsen, and the three co-founded MEP Equine Solutions LLC to research, develop, and commercialize the technology behind the Parasight System, which uses a smartphone to perform fecal egg diagnostics.

Jessica Scare, PhD candidate in Nielsen's lab, assisted with early validation work. Stefanie Pagano, master's student of biomedical engineering at UK, and Chris Mills, a senior in biosystems engineering at UK, also helped in the lab. As part of a UK-wide effort, the egg-binding protein that is central to the technology behind the Parasight System was produced by professors Mike Mendenhall, PhD, and David Rodgers, PhD, at Protein Core in the UK Center for Molecular Medicine.

Slusarewicz is a biochemist with experience in pharmaceuticals, biologics, and medical devices. He began his work in the equine field when he was able to transfer his work with proteins in humans to heal tendons in equines.

The idea for an easier method of fecal egg counting came in March 2014, and he began work in Nielsen's lab in June 2014, after Hauck raised research money from investors. The product takes a fecal sample, treats it with various chemicals that make the eggs glow green when illuminated with blue light, and then uses an iPhone to photograph and count the parasite eggs. The whole process takes less than five minutes. This technology can also identify parasite eggs of different parasite classes, such as ascarids and strongyles, in horses.

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The Parasight System was developed to be simple and precise and useable both on-site and in any veterinary practice. It is an alternative to the current McMaster and Stoll egg counting methods, which require a lab and lab technician to perform microscopy and manually count each individual egg with a clicker. The product prototype received an overwhelming response at the American Association of Equine Practitioners Annual Convention, held Dec. 6-10, 2014, in Salt Lake City, Utah.

"If you make the process easier, people will use it," said Slusarewicz.

Slusarewicz's work will impact the equine industry by changing how owners and veterinarians treat equines for parasites. Knowing precisely what parasites to target and even whether deworming is necessary at all will lead to more effective treatment. This means less drug resistance from parasites and fewer chemicals put into equines. He also highlighted that this technology is not limited to horses; it can be used to detect parasites in many species, including household pets, cows, sheep, and goats.

Slusarewicz said there are several directions in which he would like to continue research and development from this point. The current project focuses on creating an ambulatory product, but a sophisticated desktop system with a better camera that can discriminate a wider variety of eggs and an automated system for use by a commercial mail-in service are other ways people could use this technology.

Looking further ahead, Slusarewicz has ideas on how to develop a test using color change in a tube, so animal owners can track treatment progress themselves. Also, the identification of antigens on the eggs of particularly pathogenic parasite species, which would allow their detection in animals, is another area for development.

"I envision a more sensible and precise method for fecal egg counting that is more convenient for veterinarians and animal owners," said Slusarewicz. "With this method, a microscope will no longer be needed, and the identification of eggs will not depend on the subjectivity of the person performing the test. This will all make it easy for everyone to do the right thing, by testing instead of treating prophylactically, and so prevent the ever-growing problem of parasite drug resistance."

At this time, Slusarewicz and his team are working hard toward commercialization and expect that the product will be available to equine veterinarians in less than a year. The Parasight System was recently given an outstanding rating and awarded a \$100,000 Small Business Innovation Research (SBIR) grant by the U.S. Department of Agriculture. For more information, visit theparasightsystem.com/technology.

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