

# STATE OF THE HEARTWORM SYMPOSIUM

# 2010

## The American Heartworm Society's 13th Triennial Symposium EXECUTIVE SUMMARY

On April 15, 2010, the American Heartworm Society (AHS) welcomed 315 veterinarians, researchers and animal health industry representatives from around the world to Memphis, Tenn., for the 13th Triennial State of the Heartworm Symposium.

The event, which began in 1969, provides an opportunity for critical dialogue on new information and issues among practicing veterinarians, researchers and industry representatives. The core objective of the meeting is to further scientific progress in the study of heartworm disease and inform society members about the latest developments in the diagnosis, treatment and prevention of heartworm disease.

The Symposium was dedicated to the memory of Dr. Ronald F. Jackson, co-organizer and first president of the American Heartworm Society, who passed away in January of this year. AHS Board president Sheldon B. Rubin, DVM, said, "Dr. Jackson was a pioneer in this field and made immeasurable contributions to the health of our animals and our industry. It is fitting that we recognize his accomplishments at this event and in our professional lives."

The formal program commenced on Friday, April 16th, with welcome statements from Dr. Rubin and AHS Program Chair Carol Robertson-Plouch, DVM. Dr. Rubin recounted the history of the AHS, which since 1969

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### SYMPOSIUM HIGHLIGHTS

- Potential emergence of resistant strains in the *D. immitis* population. For the first time, a landmark initial study was presented, which evaluated microfilarial assays from heartworm positive dogs in different regions of the Mississippi Delta, revealing differences in sensitivity of the *D. immitis* microfilarial samples to macrocyclic lactones. Separate experiments demonstrated genetic variability of heartworms across geographies, creating the potential for differing responses to drugs. Taken together, these data open the door to more specific studies to help answer the reasons for unexplained cases of lack of efficacy.
- Discovery that Doxycycline treatment of heartworm-infected dogs kills all migrating larvae and half of the juvenile worms, stops production of microfilariae and blocks transmission of heartworms—dramatically reducing any potential selection of strains resistant to macrocyclic lactone preventives.
- New research again demonstrated that incidence of heartworm may be reduced by controlling mosquito exposure through limited hours spent outdoors between dusk and dawn, in combination with the use of timely preventive treatment.
- Imminent arrival to North America from Europe and Asia of *D. repens*, a major species of *Dirofilaria* causing subcutaneous nodules in dogs and people.
- Evidence of the impending arrival of *Angiostrongylus vasorum*, the French Heartworm, to the United States, a type of heartworm that is endemic in Europe and also has had well-characterized cases in northeastern Canada.
- New information about the prevalence and severity of heartworm in cats, including the reliability of diagnostic methods.

has convened leading scientists and practitioners every three years to discuss the latest research on heartworm.

The program was organized into a series of nine themed sessions spanning two days. Each session featured speakers presenting the results of their research or practice pearls, followed by a question and answer session. There also were 19 posters and two awards given to undergraduate, graduate, professional studies and residents based on the quality of the research, project study design, written abstract and poster design.

## CONCLUSIONS AND CLOSING

In response to greater evidence and increasing clarity surrounding the issue of possible selection of resistance to preventives, the AHS has assembled a commission of experts to develop clinical recommendations for the development of heartworm preventive protocols that will minimize the potential for selection and development of resistance. As soon as these recommendations are available, the AHS will publish them to their website, [www.heartwormsociety.org](http://www.heartwormsociety.org).

In closing, Wallace Graham, DVM, incoming president of the AHS, summarized the symposium, saying, "we've had a tremendous amount of information presented and raised many more questions that have yet to be answered. One thing is for certain. There are many fine people studying the challenges and the American Heartworm Society will continue to fulfill its mission and deliver the latest developments to its members and the veterinary community at large."

## KEY FINDINGS AND CONCLUSIONS FROM SYMPOSIUM SESSIONS

### Session 1: Continuing Worldwide Spread

- Temperature changes in various European regions can be linked to occurrence of heartworm parasites *D. immitis* and *D. repens* in areas of Europe formerly free of these parasites; due to travel and relocation patterns of pets and their owners, these parasites could become a significant new species of canine and feline heartworm disease in the Americas. (Claudio Genchi, DVM, PhD, DEVPC, University of Milan College of Veterinary Medicine)

- A 15-year epidemiological survey of *D. immitis* in dogs, cats and humans on the island of Gran Canaria showed that infection rates have moderated slightly with the emergence of preventives and public education; there remains a similarity in infection rates in each of the four different isoclimate zones found on the island. (Elena Carreton, DVM, Las Palmas de Gran Canaria at the University of Spain)
- A four-year study comparing infection rates of coyotes in urban versus rural settings showed that with the particular geography studied, urban infection rates (41%) outpaced rural infection rates (5%) by a significant margin. The concept of urban heat islands (concrete and buildings holding heat) and how this increases the effective transmission period of heartworms were also discussed. (Allison Willingham, MS, Urban Wildlife Research Coordinator, Urban Wildlife Institute, Lincoln Park Zoo, Chicago, IL)

#### Additional Speakers

Dwight D. Bowman, DVM, Cornell University College of Veterinary Medicine

Albert Marinculin, DVM, Croatia

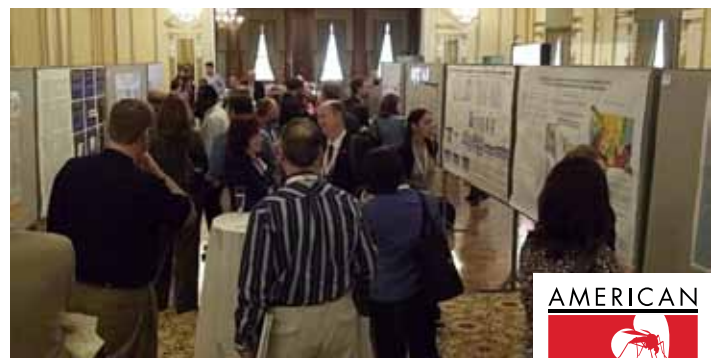
### Session 2: Emerging Issues in Heartworm and Associated Diseases, Part I

- Computer modeling suggests that the lungworm, *Angiostrongylus vasorum*—also known as French Heartworm—will spread from Eastern Canada to other parts of North America in areas where the intermediate hosts (snails and slugs) are found. Currently, this parasite only is endemic in the Newfoundland-Labrador province of Canada. (Dr. Gary A. Conboy, DVM, Atlantic Veterinary College at University of Prince Edward Island in Newfoundland)

#### Additional Speakers

Clotilde Carlow, Parasitologist, New England Biolabs

Tara E. Paterson, DVM, St. George's University, Grenada, West Indies



### Session 3: Emerging Issues in Heartworm and Associated Diseases, Part II

- It is only a matter of time before *D. repens*—one of the two most significant species of genus *Dirofilaria*, including *D. immitis*, which poses a more significant risk to humans—becomes established on the continent of North America. (Roland Schaper, DVM, Bayer Animal Health GmbH)
- A case study described the use of ultrasound and cytological diagnoses to reveal *D. repens* infection in the subject dog. In this case, *D. repens* presented as a subcutaneous cyst that was treated with a minimally invasive removal procedure. (Valentia Valenti, DVM, practitioner, Pavia, Italy)

### Session 4: New Strategies for Prevention and Compliance

- Geographical Information Systems can aid scientists in predicting the occurrence and seasonality of *D. immitis* infections. (Laura Rinaldi, DBSc, Università degli Studi di Napoli Federico II)

#### Additional Speakers

Julie K. Levy, DVM, University of Florida

Tatty Hodge, DVM, MS, MPH, DACVPM, Pfizer Animal Health

“The first paper on an emerging parasite, French Heartworm, that at this time in eastern maritimes (Newfoundland) but clearly there’s the potential for that parasite to move...all we need is sufficient number of infected dogs, sufficient number of gastropods (snails and slugs) to support it, and a potential interaction between the two. The principle point is that we will see it. It’s just a matter of when.” - Dr. Byron Blagburn

### Session 5: Feline Heartworm Infection: Rates, Diagnoses, Effects and Practical Protocols

- Research shows significant structural and ultrastructural changes in the lungs of cats experimentally infected with *D. immitis*. (Valdemiro Amaro da Silve, Jr., PhD, Brazil)
- Based on research into the tools used to diagnose heartworm in cats, interstitial radiographic lesions may be a better indicator of heartworm disease than histopathology or serology. (Ray Dillon, DVM, Auburn University)

- Urine tests in cats revealing microalbuminuria tend to indicate the presence of heartworms only at a very late stage of infection. (Clarke Atkins, DVM, College of Veterinary Medicine at North Carolina State University)

#### Additional Speakers

Luigi Venco, DVM, DEVPC, Veterinary Hospital Citta di Pavia, Italy

David Michael Tillson, DVM, Auburn University

Lynn Buzhardt, Private Practitioner, DVM, Louisiana

Robert Stannard, Private Practitioner, California

“I think the day’s points surround the fact there are emerging issues that may not affect the US yet, but have the potential to do so.” - Dr. Stephen Jones

### Session 6: Is it Resistance? An Evidence-Based Inquiry

- A survey of dog owners and trainers south of the 37<sup>th</sup> parallel suggests that a substantial number do not give heartworm preventive year round and do not test annually for heartworm infection. (Sharon Patton, MS, PhD, University of Tennessee)
- An analysis of Dr. Sharon Patton’s survey of dog owners and trainers reveals that a reduction in the number of hours spent outdoors during the period between dusk and dawn, as well as proper timing of heartworm tests, may help prevent infection rates. (Barton W. Rohrbach, VMD, MPH, DACVPM, University of Tennessee)
- Significant decreases in L3 motility observed during an in vitro model-design study will allow a more accurate and definitive in vitro method of screening for susceptibility of *D. immitis* to macrocyclic lactones. This model utilizes one of the same life stages of heartworms (L3) as is targeted by the macrocyclic lactones. (Andy Moorhead, DVM, MS, PhD, College of Veterinary Medicine at the University of Georgia)
- A study of different treatment histories for different parasite samples of *D. immitis* indicates evidence of significant differences in genetic makeup, a first attempt to determine whether genetic selection to current heartworm preventives has already occurred. (Bourguinat, PhD, Institute of Parasitology, McGill University)
- A study targeting perceived ‘resistant’ heartworm cases across the south central portion of the United

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States was described. This study performed susceptibility screening, utilizing in vitro testing on the microfilarial life stage of heartworms. This research demonstrated cases of variability of this life stage to macrocyclic lactones in samples collected from three dogs. Further studies will be necessary to determine if the microfilarial variability seen will actually translate to reduced susceptibility of the targeted life stages of these heartworms. (Byron Blagburn, MS, PhD Auburn University)

#### Additional Speakers

Grayson Brown, Epidemiologist, University of Kentucky  
Tanja McKay, DVM, Arkansas State University  
Michael J. Murray, DVM, MS, DACVIM, Merial Limited  
Catherine Bourginat, PhD, Institute of Parasitology, McGill University

### Session 7: Diagnosis and Treatment Strategies: Impacting Prognosis, Efficacy and Safety, Part I

- Results of an experiment dissecting the ovaries of female *D. immitis* and analyzing the presence of *Wolbachia* throughout the reproductive system of female heartworms indicates that *Wolbachia* are present throughout the microfilaria and that removing them is detrimental to the worm. (Weislaw J. Kozek, PhD, University of Puerto Rico)
- Research on the use of doxycycline alone and in combination with ivermectin adds support to current research that shows this protocol's effectiveness in heartworm adulticidal therapy. (Laura Kramer, DVM, PhD, DEVPC, Universtia di Parma, Italy)
- Results of research into the effectiveness of using doxycycline on various phases of heartworm maturity in dogs infected with both *Brugia malayi* and *Dirofilaria immitis* demonstrated a profound effect on microfilarial production and development of infections. (John McCall, MS, PhD, University of Georgia)

### Session 8: Diagnosis and Treatment Strategies: Impacting Prognosis, Efficacy and Safety, Part II

- Results from an exploration of the use of cardiopulmonary biomarkers as an indicator of heartworm infection seem to indicate that dogs infected with *D. immitis* demonstrate high levels of biomarkers of pulmonary thromboembolism, which may provide another tool to help practitioners diagnose the disease. (Elena Carreton, DVM,



University of Las Palmas de Gran Canaria)

- Research into the effect of administering prednisone on the efficacy of adulticide treatment in infected dogs found that the use of prednisone concurrently with Immiticide has no negative impact on efficacy. (Michael Dzimianski, MS, DVM, University of Georgia)

#### Additional Speakers

Giulio Grandi, DVM, PhD, DEVPC, University of Parma Veterinary School

### Session 9: Diagnosis and Treatment Strategies: Impacting Prognosis, Efficacy and Safety, Part III

- Private practitioners presented an assessment and virtual demonstration of treatments and anesthetic protocols for severe heartworm infection.

#### Additional Speakers

Brandon Pogue, DVM, University of Florida  
Stephen Jones, DVM, Lakeside Animal Hospital, Moncks Corner, South Carolina  
Tom Nelson, DVM, Animal Medical Centers of NE Alabama

## ABOUT AMERICAN HEARTWORM SOCIETY

The American Heartworm Society, headquartered in Wilmington, DE, is the global resource for the prevention, diagnosis and treatment of heartworm disease and was formed during the Heartworm Symposium of 1974. The American Heartworm Society stimulates and financially supports research, which furthers knowledge and

"Everyone wants to know about resistance... whether it exists...I think we have, perhaps, as Dr. Blagburn quoted 'the harbinger of resistance is coming into view', but there are no conclusions about resistance at this point." - Wallace Graham